



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

**LMJ Enterprises, LLC
Penobscot County
Lincoln, Maine
A-1023-71-C-A (SM)**

**Departmental
Findings of Fact and Order
Air Emission License
Amendment #2**

FINDINGS OF FACT

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

I. REGISTRATION

A. Introduction

LMJ Enterprises LLC (LMJ) was issued Air Emission License A-1023-71-A-N on October 27, 2009, permitting the operation of emission sources associated with their animal bedding manufacturing facility. The license was subsequently amended on June 8, 2011 (A-1023-71-B-M), to extend the stack testing date time frame.

LMJ has requested an amendment to their air emissions license in order to include a High Efficiency Air Filtration (HEAF) unit as a particulate matter control device and adjust the current PM and VOC emission limits. The equipment addressed in this license is located at 431 Main Street Lincoln, Maine.

B. Emission Equipment

The following equipment is licensed at LMJ's facility:

Fuel Burning Equipment

Equipment	Max. Capacity (MMBtu/hr)	Max. Firing Rate	Fuel Type, % sulfur	Post Comb. Controls	Stack #
Wood-fired Burner	12	1900 lbs/hr *	Bark & wood waste, %S negligible	multiple cyclone, HEAF unit	1

* Assumes average moisture content of 25% (6375 Btu/lb)

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

Process Equipment

Equipment	Max. Process Feed Rate	Pollution Control Equipment	Stack #
Rotary Dryer	18,500 lbs/hr	multi-cyclones and HEAF unit	1
Screening Operations	N/A	none	Fugitive
Fuel/Feed Stock Conveying Systems	N/A	none	Fugitive

C. Application Classification

The modification of a minor source is considered a major or minor modification based on whether or not expected emission increases exceed the “Significant Emission Levels” as defined in the Department’s regulations. The emission increases are determined by subtracting the current licensed emissions preceding the modification from the maximum future licensed allowed emissions, as follows:

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Sig. Level
PM	24.9	24.9	0	100
PM ₁₀	24.9	24.9	0	100
SO ₂	1.3	1.3	0	100
NO _x	15.0	15.0	0	100
CO	25.2	25.2	0	100
VOC	45.9	49.0	3.1	50
CO ₂ e	<100,000	<100,000	0	100,000

This modification is determined to be a minor modification and has been processed as such.

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 as well as for those sources located in designated non-attainment areas.

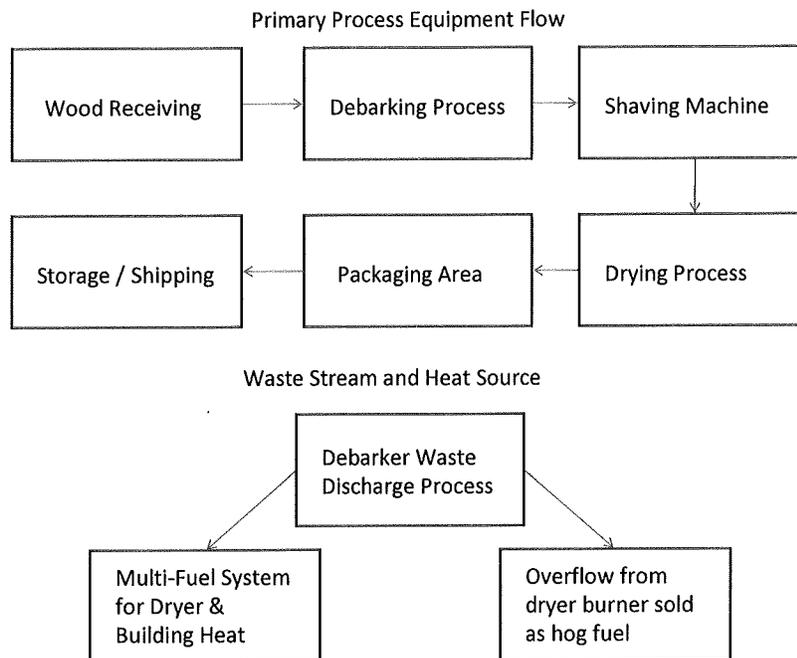
BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental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

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

- the existing state of technology;
- the effectiveness of available alternatives for reducing emissions from the source being considered; and
- the economic feasibility for the type of establishment involved.

Process Description

The facility processes wood into manufactured animal bedding for various markets. The plant receives whole pine logs in multiple lengths, but predominately in tree length from regional suppliers. The first step in the process is receiving and slashing of the wood to length. Once the wood has been passed through the slasher it is debarked & then fed into the shaver. The shavings are then discharged in to the drying system through a belt conveyor. The dryer then removes excess moisture from the wood, and discharges the dried shavings into a storage silo prior to bagging operations. Once bagged, the materials are then either palletized or fed directly on to "bulk" trailer trucks. The following flow diagram describes this process:

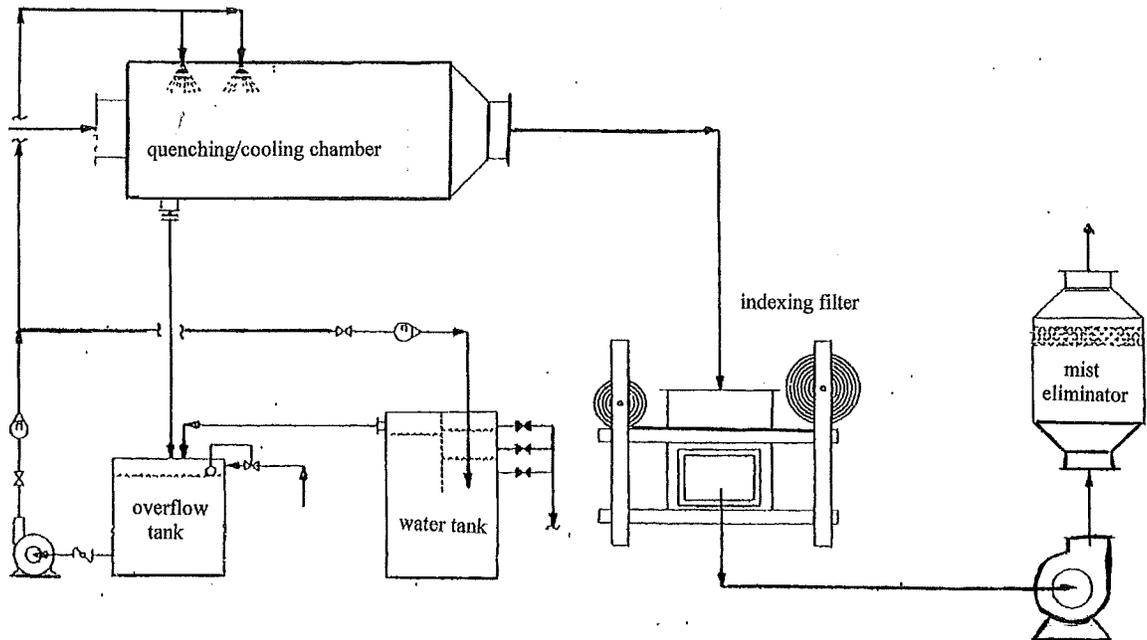


LMJ is proposing to modify the existing wood shaving manufacturing equipment to achieve the original design production rate of ~18,500 lbs/hr as established in LMJ's current air license. The modification will take place in possibly two phases; the first is the installation and operation of the HEAF control system in order to control particulate and VOC emissions. LMJ may also, depending on the ability to meet production and regulatory needs, replace the existing 6 foot rotary dryer. Upon analysis of performance and efficiency of the phase one installation, LMJ will determine if the installation of the new dryer drum is necessary. Because it has struggled with achieving the original design rates of its existing dryer it may replace its dryer with a larger unit, capable of its original design. For license flexibility if this change occurs, the Department will require a production limit of 8400 lb/hr of product based on 0% moisture. Should LMJ decide to modify or replace its dryer and supporting equipment it will need to limit its production to 8400 lb/hr and maintain daily average production records, documenting compliance with this limit.

B. HEAF Control System

To reduce particulate emissions and opacity from the facility's process, LMJ has purchased and installed a HEAF Air Pollution Control system designed by Anderson 2000, Inc. This unit was purchased from the former Blue Ridge facility of Lisbon, Maine in 2012. It consists of a quenching/cooling chamber assembly,

an indexing filter, and a mist eliminator. The following process flow diagram shows the primary components for this system:



LMJ has been operating parts of this system since early May 2013. The system is used to control air emissions from the dryer chamber and is designed to remove filterable and condensable particulate matter and reduce visible emissions. As shown in the design of the system, a quenching unit is used prior to the indexing filter pad. The quenching chamber was originally designed to use water to reduce the exhaust temperature; however, LMJ has requested to use ambient air as the cooling media to determine if this operating mode will be sufficient to demonstrate compliance with emission limits. LMJ conducted diagnostic visible emissions testing on October 31, 2013 using EPA visible emissions observation Method 9. The trial results show that operating the HEAF utilizing ambient air in the quenching/cooling chamber to maintain an exhaust stream temperature at no greater than 176 °F will allow LMJ to achieve the 30% visible emission opacity limit as specified in Condition (16) F of Air Emissions License, A-1023-71-A-N. Operation without cooling the stack gas prior to the HEAF filtering index yielded noticeably higher visible emissions. LMJ has requested to use air to quench and cool the exhaust rather than water as a better choice for their facility. The facility believes this is a better choice because it can achieve the 176°F average temperature design basis with cooling air given the excess capacity in the system. Also, cooling with water will require significant operational and environmental challenges. LMJ anticipates that a significant quantity of make-up water would be required to maintain cool enough cooling chamber injection water temperatures to meet LMJ's target of 176°F. This would require collection and

treatment of a new liquid stream and possible connection to the municipal system or separate transportation and disposal.

Furthermore, the HEAF stack height is taller than the existing stack. The HEAF stack is 39 feet above ground level (AGL) and the prior exhaust stack was 26 feet AGL. The former dryer exhaust stack will be closed during normal operating conditions, except it may be used during start-up/shutdown/malfunction (SSM) periods according to requirements outlined in Condition (16) G of this air emissions license amendment.

A stack test for particulate and VOC emissions will be required within 60 days of issuance of this air emission license amendment to verify compliance with LMJ's VOC and PM limits. The stack test will be done under normal operation of both the process and HEAF unit. The stack test shall determine the HEAF unit operation process parameters (pressure drop, temperature, bypass, etc.) to verify ongoing compliance.

C. PM Emission Limit

LMJ's current PM emission limit is 5.7 lb/hr for filterable emissions; this license amendment will not change this PM limit. However, the Air Emission License program and definitions in Department Regulations Chapters 100 and 115 have changed since LMJ was originally permitted. PM₁₀ now includes both filterable and condensable emissions. AP-42 estimates that condensable emissions from drying pine in a rotary dryer is 1.5 lb/ODT, which correlates to 6.15 lb/hr for LMJ at a 4.2 tons per hour production rate.

In order to account for condensable emissions, LMJ will have the following emission limits: 5.7 lb PM/hr and 11.9 lb PM₁₀/hr. LMJ will further maintain emissions below the 25 ton per year modeling threshold by limiting annual emissions as follows:

The facility's PM/PM₁₀ emissions will be ≤ 25 TPY based on a 12-month rolling total. This limit will be calculated using an emission rate of 2.83 lb/ODT (11.9 lb/hr / 4.2 tons/hr) processed or the most recent stack test results (whichever is lower).

A detailed BACT analysis is described in the July 2012 application. LMJ researched several control technologies, including: Baghouse, ESP, and wet scrubbers but all were found to be either technically or economically infeasible. The installation of the HEAF unit is expected to maintain compliance with the PM emission limits and is selected as BACT for this facility along with the above particulate matter emission limits.

D. VOC Emission Limit Change

LMJ has requested a change in the short term (lb/hr) and long term (ton/year) licensed allowed VOC emissions. Currently the license limits the facility to 10.5 lb/hr and an annual cap of 45.9 tons per year. LMJ submitted a recent BACT analysis and determined that the original air license used an unreasonable VOC emission factors based on the type of wood (pine) used at LMJ and the moisture content of the wood delivered, which was significantly higher than what the original license accounted for. As detailed in the July 2012 application, no specific VOC reduction add-on pollution control devices (including thermal oxidizers) were economically feasible. Due to this information, the VOC limit will need to be adjusted. LMJ has requested a short-term VOC limit of 34.1 lb/hr based on emission factors established by the NCASI and the University of Maine. The data gathered after the required VOC stack test per this amendment will be used to establish a more appropriate VOC limit.

E. Dryer size

LMJ currently operates a six foot diameter rotary dryer with a maximum processing feed rate of 18,500 lb/hr. The current air license and its conditions do not require LMJ to limit the physical size of the rotary dryer; it only limits the maximum processing rate as stated in Condition (16) of Air Emission License, A-1023-71-A-N, "The Rotary Dryer shall have a maximum material processing rate of 18,500 lbs/hr".

Because it has struggled with achieving the original design rates of its existing dryer, the facility is looking to possibly replace its dryer with a larger unit, capable of its original design. The dryer's production rate is more accurately measured and will be limited going forward by this amendment. To this end and to allow for license flexibility, LMJ will meet the following new condition:

"LMJ shall limit production to less than 8400 lb/hr of product based on 0% moisture. LMJ may modify or replace its dryer and supporting equipment but shall limit its production to the production rate that demonstrates compliance during the initial performance test and maintain daily average production records, documenting compliance with this limit."

It is anticipated that a larger dryer may reduce dryer operating temperatures, which will result in lower particulate and VOC emissions.

F. 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.

G. General Process Emissions

Visible emissions from any general process source 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.

H. Annual Emissions

1. LMJ shall be restricted to the following annual emissions, based on a 12 month rolling total:

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

	PM	PM ₁₀	SO ₂	NO _x	CO*	VOC*	HAPS (Individual/ Total)
Total TPY	24.9	24.9	1.3	15.0	25.2	49.0	9.9/24.9

* Note: CO emissions are not included in determining the annual license fee.
Only the VOC emissions (increase from 45.9 tpy to 49 tpy) is being changed from the original air emissions license.

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 (CO₂e).

Based on the facility's fuel use limit(s), the worst case emission factors from AP-42, IPCC (Intergovernmental Panel on Climate Change), and *Mandatory Greenhouse Gas Reporting*, 40 CFR Part 98, and the global warming potentials contained in 40 CFR Part 98, LMJ is below the major source threshold of 100,000 tons of CO₂e per year. Therefore, no additional licensing requirements are needed to address GHG emissions 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 emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

Pollutant	Tons/Year
PM ₁₀	25
SO ₂	50
NO _x	50
CO	250

The total facility licensed emissions 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 amendment.

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-1023-71-C-A subject to the conditions found in Air Emission License A-1023-71-A-N, in amendment A-1023-71-B-M, and in 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.

SPECIFIC CONDITIONS

The following conditions are new to Air Emissions License, A-1023-71-A-N:

- (26) LMJ shall install, operate, and maintain the HEAF unit in accordance with on-site specifications established after the required stack test to control particulate emissions and visible emissions from the rotary drying process. The temperature of the exhaust gas after the quench chamber and prior to the indexing filter media shall be determined after the upcoming compliance. LMJ shall maintain a temperature probe to monitor this temperature and record on an hourly basis, whenever the rotary dryer is in operation.
- (27) LMJ shall stack test for both particulate matter (PM/PM₁₀) and VOC within 60 days after issuance of this air emissions license amendment. Within 60 days of completing the compliance testing, LMJ shall submit a monitoring plan to the Department indicating the process operating parameters including associated ranges, averaging times, and recording frequencies determined appropriate based on the compliance testing, to demonstrate ongoing compliance with the particulate matter and VOC emission limits. [06-096 CMR 115, BACT]
- (28) LMJ shall seal the by-pass vent (original dryer exhaust stack) in order to avoid emissions from that stack within 60 days of issuance of this license amendment, except during periods of start-up/shutdown/malfunction (SSM) as outlined in Condition (16) G of this amendment.

The following condition shall replace Condition (16) (A), (B), (C), (F), and (G) of Air Emission License Amendment, A-1023-71-A-N: [06-096 CMR 115, BACT]

(16) Direct Fired Biomass Burner and Rotary Dryer

- A. LMJ shall limit production to less than 8400 lb/hr of product based on 0% moisture. LMJ may modify or replace its dryer and supporting equipment but shall limit its production to the production rate that demonstrates compliance during the initial performance test and maintain daily average production records, documenting compliance with this limit.

B. Emissions from the Burner and Rotary Dryer combined shall not exceed the following:

Emission Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Burner & Rotary Dryer	5.7	11.9	0.4	3.4	5.8	34.1*

* This VOC lb/hr emission limit shall apply until a more appropriate limit can be established based on stack testing.

C. LMJ shall meet the following particulate matter (PM/PM₁₀) and VOC emission equations, determined monthly and based on a 12-month rolling total:

[Oven Dry Tons (ODT) of Wood Processed] * 2.83 lbs of PM/ODT /2000 lbs/ton must be \leq 25 TPY (tons per year) of PM/PM₁₀

[Oven Dry Tons (ODT) of Wood Processed] * 8.1 lbs of VOC/ODT /2000 lbs/ton must be \leq 49.0 TPY (tons per year) of VOC

Lower lb/ODT limits may be utilized in the PM/PM₁₀ and VOC equations above upon written request from LMJ and confirmation by stack test results. Such use of lower PM/PM₁₀ and VOC emission factors are subject to approval by the Department.

Note: Oven-dried tons (ODT) refers to a moisture content of 0% by weight.

[06-096 CMR 115, BACT]

F. Visible emissions from the Rotary Dryer after passing through HEAF unit stack (Stack #1) shall not exceed 30% opacity on a 6-minute block average basis, except for no more than two 6-minute block averages in a 3-hour period. [06-096 CMR 101]

LMJ Enterprises, LLC
Penobscot County
Lincoln, Maine
A-1023-71-C-A (SM)

Departmental
Findings of Fact and Order
Air Emission License
Amendment #2

12

- G. Exhaust gases from the wood-fired burner shall be directed through the rotary dryer, multiple cyclones, and HEAF unit, except during periods of startup, shutdown, or malfunction. These periods shall be limited to no more than two (2) hours per event, with an upper opacity limit of 50% on a six-minute block average. If the startup, shutdown, or malfunction event lasts longer than 2 hours, LMJ shall shut the unit down for at least a one hour period. [06-096 CMR 115, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS 10 DAY OF September, 2014.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Corne for
PATRICIA W. AHO, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-1023-71-A-N.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: July 17, 2012

Date of application acceptance: August 1, 2012

Date filed with the Board of Environmental Protection:

This Order prepared by Edwin Cousins, Bureau of Air Quality

