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

DEPARTMENT ORDER

GL Real Estate Holdings, LLC **Somerset County** **Madison, Maine** **A-1151-71-A-N**	**Departmental** **Findings of Fact and Order** **Air Emission License**

FINDINGS OF FACT

After review of the air emission 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 (M.R.S.) § 344 and § 590, the Maine Department of Environmental Protection (Department) finds the following facts:

I. REGISTRATION

A. Introduction

GL Real Estate Holdings, LLC (GLREH) has applied for an Air Emission License for the operation of emission sources associated with their wood fiber insulation manufacturing facility.

GLREH is proposing to manufacture wood fiber insulation at the former Madison Paper Mill facility. GLREH plans to manufacture residential and commercial, environmentally sustainable building insulation, including interior batts, exterior boards, and blown-in insulation all made from wood fiber. GLREH's boards, batts, and blown-in products will be produced from a combination of sawmill residuals and softwood chips.

The equipment addressed in this license is located at 1 Main Street, Madison, Maine.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Max. Capacity (MMBtu/hr)	Maximum Firing Rate	Fuel Type	Date of Manuf.	Date of Install.	Stack #
Boiler #1	48.9	47,941 scfh	Natural Gas	1995	2020	Boiler #1 Stack
Flash Tube Dryer Heater #1	20.4	20,000 scfh	Natural Gas	2020	2020	Flash Tube Dryer #1 Stack
Flash Tube Dryer Heater #2	20.4	20,000 scfh	Natural Gas	2020	2020	Flash Tube Dryer #2 Stack
Batt Line Heater	*5	4,902 scfh	Natural Gas	2020	2020	Batt Line Heater Stack

*estimate – final purchase of unit has not yet been made

GLREH may operate small stationary engines smaller than 0.5 MMBtu/hr. These engines are considered insignificant activities and are not required to be included in this license. However, they are still subject to applicable State and Federal regulations. More information regarding requirements for small stationary engines is available on the Department's website at the link below.
http://www.maine.gov/dep/air/publications/docs/SmallRICEGuidance.pdf

Additionally, GLREH may operate portable engines used for maintenance or emergency-only purposes. These engines are considered insignificant activities and are not required to be included in this license. However, they may still be subject to applicable State and Federal regulations.

Process Equipment

Equipment	Production Rate	Pollution Control Equipment	Stack #
Flash Tube Dryer #1	7.8 tons/hr (oven dry)	High Efficiency Cyclone	Flash Tube Dryer #1 Stack
Flash Tube Dryer #2	7.8 tons/hr (oven dry)	High Efficiency Cyclone	Flash Tube Dryer #2 Stack
Loose Fill Line	4.4 tons/hr (oven dry)	Baghouse	Loose Fill Line Baghouse Stack
Batt Line	7.8 tons/hr (oven dry)	Baghouse	Batt Line Baghouse Stack
Board Line	7.8 tons/hr (oven dry)	Baghouse	Board Line Baghouse Stack

GLREH proposes to operate an aqueous-based parts washer. The cleaning solution contains less than 5% VOC, it does not meet the definition of solvent cleaning machine, and there are no applicable requirements in *Solvent Cleaners*, 06-096 C.M.R. ch. 130. Therefore, it is considered an insignificant activity and mentioned for completeness purposes only.

C. Application Classification

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

A new source is considered a major source based on whether or not total licensed annual emissions exceed the "Significant Emissions" levels as defined in the Department's *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100.

Pollutant	Total Licensed Annual Emissions (TPY)	Significant Emissions Levels
PM	19.1	100
$PM_{10}/PM_{2.5}$	14.4	100
SO_2	0.3	100
NO_x	34.7	100
CO	48.6	100
VOC	49.4	50

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 C.M.R. ch. 115.

D. Facility Classification

With GLREH's VOC emissions limited to 49.4 tons per year, the facility is licensed as follows:

- As a synthetic minor source of air emissions, because GLREH is subject to license restrictions that keep facility emissions below major source thresholds for criteria pollutants; and
- As an area source of hazardous air pollutants (HAP), because the licensed emissions are below the major source thresholds for HAP.

Emissions of VOC are licensed above 80% of the major source threshold. Therefore, this facility is classified as an "80% Synthetic Minor" for the purpose of determining the minimum required compliance inspection frequency in accordance with Maine's Compliance Monitoring Strategy. Please note, this designation may change upon start up and VOC emissions testing of the facility.

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.

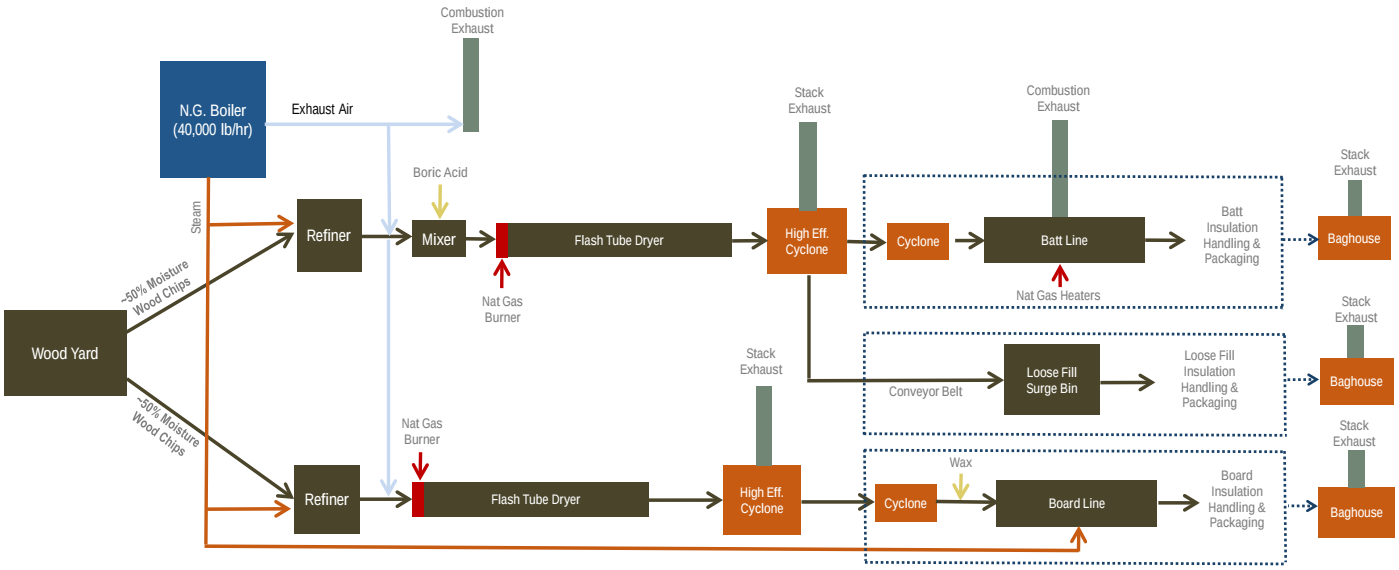
BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental, and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

B. Process Description

GLREH is planning to construct a wood fiber insulation manufacturing plant at the former Madison Paper Mill site. The equipment will produce three products, which include loose-fill, batt, and board insulation. The manufacturing process will consist of a wood receiving and handling area, where trucks deliver green sawmill residuals and softwood chips into large bins. From the bins, the wood materials will be metered in and conveyed to either of two wood fiber refiners. The two refiners are operated with high temperature and pressure steam and grinding plates to break down the wood materials into wood fibers. These fibers are mixed with boric acid to provide final product fire retardancy and mold protection. The addition of boric acid to the wood materials being processed will not contribute to emissions of VOC or any regulated HAP. These refiners are located inside buildings and are not directly vented outside. The refined wood is sent to either of two flash tube drying lines where the wood fiber is dried using a combination of the exhaust from Boiler # 1 and heat from natural gas-fired supplemental heaters before being separated from the air stream using high efficiency cyclones. The exhaust from each high efficiency cyclone is vented to the atmosphere and the materials collected in the high efficiency cyclones are sent to one of the following process lines: a loose fill insulation product handling and packaging line, a batt insulation manufacturing and packaging line, or a board insulation manufacturing and packaging line. Wax is sometimes added to the board process line, and similar to the use of boric acid, there are no VOC or regulated HAP emissions expected from the addition of the wax. Particulate emissions from these lines are captured and vented to baghouses associated with each line.

A natural gas-fired boiler will provide steam (40,000 lb/hr, 260 psi) and heat to the process equipment in addition to supplemental heat burners at the inlet of the dryers and on the batt production line. In the process flow diagram below is a visual depiction of the proposed process components and air emission points.

GL Real Estate Holdings, LLC
Wood Fiber Insulation Manufacturing Process Flow Diagram



NOTES: The two flash tube dryer lines are each designed to process approximately 7.8 ODT/hr. The Batt and Board Lines are each estimated at 7.8 ODT/hr Max Production. Loose Fill is estimated at 4.4 ODT/hr.

C. Boiler # 1

GLREH operates Boiler #1 for process steam and heat. The boiler was manufactured by Cleaver Brooks (Model DL-52-E) and is rated at 48.9 MMBtu/hr firing natural gas. The boiler is to be installed in 2020 and is to exhaust through its own 80-foot stack which is greater than 60% of the stack height required by good engineering practices. Up to 100% of Boiler #1's exhaust may be routed to either of the two flash tube dryers for use as direct contact process heat to dry the wood materials.

1. BACT Findings

GLREH submitted a BACT analysis for control of emissions from Boiler #1, summarized below.

a. Particulate Matter (PM, PM_{10})

PM and PM_{10} from fuel combustion are formed from non-combustible material (ash) in the fuel and from incomplete combustion. Add-on pollution control equipment for the control of PM/PM_{10} includes baghouses, scrubbers, electrostatic precipitators, and other filtration technologies. Due to the size of the boiler and proposed use of clean burning natural gas with minimal impurities, the installation of add-on pollution control equipment is not economically feasible. Good combustion practices, including operating the boiler according to manufacturer's recommendations, will minimize the products of incomplete combustion, including

PM/PM_{10}, during operation. Employing good combustion practices is a technically feasible way to control PM/PM_{10} emissions from the boiler and is therefore proposed as BACT for Boiler #1. Proposed limits are 0.01 lb/MMBtu for PM and 0.36 lb/hr for PM_{10}.

The Department finds that BACT for PM/PM_{10} is the use of natural gas using good combustion practices and emission limits of 0.49 lb/hr for PM (based on 0.01 lb/MMBtu) and 0.36 lb/hr for PM_{10}.

b. Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is formed during combustion from sulfur in the fuel. Boiler #1 will utilize natural gas, an inherently low sulfur fuel. GLREH is proposing the use of natural gas as BACT for limiting SO_2 emissions from the Boiler. The use of natural gas results in minimal emissions of SO_2. Therefore, additional add-on pollution controls are not economically feasible.

The Department finds that BACT for SO_2 emissions from Boiler #1 is the use of natural gas and an emission limit of 0.03 lb/hr.

c. Nitrogen Oxides (NO_x)

NO_x emission may be created through the conversion and release of nitrogen bound in the fuel (i.e., fuel NO_x) and/or by the thermal combustion process (i.e., thermal NO_x).

Fuel NO_x is produced from the reaction of fuel-bound nitrogen compounds with oxygen and is typically found in very small quantities in natural gas fuel. Low nitrogen content natural gas releases minimal fuel NO_x and is not a focus of controls as compared to thermal NO_x.

Thermal NO_x is the primary mechanism of NO_x formation from natural gas fuel combustion. Thermal NO_x arises from the reaction of nitrogen (N_2) and oxygen (O_2) in the combustion air. It is formed at elevated temperatures (>2900°F) and pressures and increases exponentially with combustion temperature.

Potential control technologies for NO_x emissions from fuel combustion sources include: add-on controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR), combustion of clean fuels, and combustion control technologies and good practices.

(1) Add-on Controls – Add-on pollution control technology for the reduction of NO_x includes selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR), which are primarily used on large industrial and utility boilers. However, they have a negative environmental impact resulting in the emission

of unreacted ammonia. In addition, due to the initial capital cost and the annual operating costs, these systems are typically only considered cost effective for units larger than Boiler #1.

(2) Combustion Controls/Good Combustion Practices – The use of combustion controls such a Flue Gas Recirculation (FGR), low emitting burners, optimized fuel-to-air ratios, and using clean fuels to minimize NO_x emissions are feasible for the proposed boiler. GLREH has selected a natural gas-fired boiler with a Todd (low NO_x) burner system and FGR that can achieve emissions of 60 ppm NO_x and 200 ppm CO. The use of fuel-to-air ratios optimization technology such as FGR and low emitting burners limit thermal NO_x formation. For a mid-sized gas-fired boiler, this combination of fuel and technology greatly minimizes the formation of NO_x. It makes the application of add-on controls unjustifiable and economically infeasible.

The Department finds that BACT for NO_x emissions from Boiler #1 is the use of FGR, the Todd burner system, and a NO_x emission limit of 3.42 lb/hr.

d. Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

CO and VOC emissions result from incomplete combustion of fuels when there is insufficient residence time or oxygen available to complete the final step in oxidation.

To control CO and VOC emissions from mid-sized combustion units firing natural gas, no add-on control equipment is warranted. Properly maintaining the boiler, the Todd burner, and FGR system will keep CO and VOC emissions at a minimum. Proper maintenance includes keeping the air/fuel ratio at the manufacturer's specified setting and having the proper air and fuel pressures at the burners. GLREH proposes good combustion practices and limits of 7.34 lb/hr for CO and 0.53 lb/hr for VOC as BACT.

The Department finds that BACT for CO and VOC emissions from Boiler #1 is the use of good combustion practices and emission limits of 7.34 lb/hr for CO and 0.53 lb/hr for VOC.

e. Emission Limits

The BACT emission limits for Boiler #1 were based on the following:

Natural Gas
(a heating value of 1020 Btu/scf was used in calculations)

PM	–	0.01 lb/MMBtu based on 06-096 C.M.R. ch. 115, BACT
PM_{10}	–	7.6 lb/MMscf for PM_{10} based on AP-42 Table 1.4-2, dated 7/98
SO_2	–	0.6 lb/MMscf based on AP-42 Table 1.4-2, dated 7/98
NO_x	–	3.42 lb/hour based on vendor data (60 ppm)
CO	–	7.34 lb/hr based on vendor data (200 ppm)
VOC	–	11 lb/MMscf based on TOC emission factor in AP-42 Table 1.4-2, dated 7/98
Visible Emissions	–	06-096 C.M.R. ch. 115, BACT

The BACT emission limits for Boiler #1 firing natural gas are the following:

Unit	PM (lb/MMBtu)	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #1	0.01	0.49	0.36	0.03	3.42	7.34	0.53

2. Visible Emissions

Visible emissions from Boiler #1 shall not exceed 10% opacity on a six-minute block average basis.

3. Periodic Monitoring

Periodic monitoring for Boiler #1 shall include recordkeeping to document the quantity of natural gas used on both a monthly and 12-month rolling total basis.

4. New Source Performance Standards (NSPS): 40 C.F.R. Part 60, Subpart Dc

Boiler #1 is subject to Federal Regulation 40 C.F.R. Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* 40 C.F.R. Part 60, Subpart Dc which applies to steam generating units that commence construction, modification, or reconstruction after June 9, 1989, and have a heat input capacity from fuels combusted in the steam generating unit between 10 MMBtu/hour and 100 MM Btu/hour. Due to Boiler #1 firing natural gas, there are no applicable emission standards or monitoring and testing requirements, however, GLREH does have recordkeeping and reporting requirements listed below. [40 C.F.R. § 60.40c]

GLREH shall comply with all requirements of 40 C.F.R. Part 60, Subpart Dc applicable to Boiler #1 including, but not limited to, the following:

a. Notifications
GLREH shall submit notification to EPA and the Department of the date of construction, anticipated start-up, and actual start-up. This notification shall include the design heat input capacity of the boiler and the type of fuel to be combusted. [40 C.F.R. § 60.48c(a)]

b. Reporting and Recordkeeping

(1) GLREH shall maintain records of the amounts of each fuel combusted during each calendar month. [40 C.F.R. § 60.48c(g)]

(2) GLREH shall submit semi-annual reports to EPA and to the Department. [40 C.F.R. § 60.48c(d)] These reports shall include the following:

(i) Calendar dates covered in the reporting period; [40 C.F.R. § 60.48c(e)(1)]
(ii) Records of fuel supplier certifications; [40 C.F.R. § 60.48c(e)(11)] and
(iii)Any instances of excess emissions (including opacity) from ***Boiler #.***
[40 C.F.R. § 60.48c(c)]

(3) The semi-annual reports are due within 30 days of the end of each six-month period. [40 C.F.R. § 60.48c(j)]

(4) The following address for EPA shall be used for any reports or notifications required to be copied to them:

U.S. Environmental Protection Agency, Region I
5 Post Office Square, Suite 100 (OES04-2)
Boston, MA 02109-3912
Attn: Air Compliance Clerk

5. National Emission Standards for Hazardous Air Pollutants (NESHAP): 40 C.F.R. Part 63, Subpart JJJJJJ

Boiler #1 is not subject to the *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources*, 40 C.F.R. Part 63, Subpart JJJJJJ. The unit is considered a new boiler rated more than 10 MMBtu/hr meeting the definition of a gas-fired boiler which is exempt from 40 C.F.R. Part 63, Subpart JJJJJJ.
[40 C.F.R. §§ 63.11193 and 63.11195]

D. Flash Tube Dryers and Supplemental Heaters

GLREH is proposing to construct two Büttner industrial flash tube dryers, designed to dry wood with a high moisture content. Wet wood is pneumatically brought, using a forced draft fan system, into the dryers where water is evaporated from the wood in a matter of seconds from direct contact with up to 100% of the exhaust from Boiler #1 and/or the supplemental heaters associated with each flash tube dryer. At the end of each flash tube dryer, the material is separated from the air stream using high-efficiency cyclones. Each dryer will be approximately 354' in length with a 4' diameter. The required 336 °F heat will be provided primarily by Boiler #1, but each dryer will also be equipped with a 20.4 MMBtu/hr natural gas-fired burner to provide supplemental heat to the dryers. The residence time for the wood dried in the flash tube dryers is estimated at 4 seconds.

1. BACT Findings

Following is a BACT analysis for control of emissions from the Flash Tube Dryers and the Supplemental Heaters.

a. Particulate Matter (PM, PM_{10})

The principal components of particulate matter emissions from the proposed wood dryer lines include filterable and condensable organic PM from the wood drying process. Additionally, minimal particulate is carried through from the flue gas from Boiler #1 and the gas-fired supplemental burners located at the beginning of each of the dryer lines. The organic PM portion of the PM emissions leave the stack as vapor but condense at normal atmospheric temperatures to form liquid particles or mist that can create a visible blue haze. Quantities emitted are dependent on wood species, dryer temperature, and other factors, including season of the year, the time between logging and processing, and wood storage time.

GLREH has selected clean-burning natural gas combustion sources to provide the heat within the dryers. It has also elected to use a flash tube drying system, which requires very low drying temperatures (inlet temperature estimated at 336 °F) and a 4 second residence time. Because of the low drying temperature and the clean heat sources, the dryers will be inherently lower emitters of PM as compared to drum dryers operating at higher temperatures (typically 600 to 1000 °F) and longer residence times. Additionally, GLREH will be processing spruce and fir softwoods and avoiding pine to minimize the condensable particulate emissions and blue haze. The combination of a natural gas heat source, low temperature drying, and lower resin content softwoods will help to limit the quantity of particulate matter generated.

Potential controls of PM emissions from the natural gas combustion sources and flash tube dryer systems are summarized and ranked in the following table:

Ranking of Control Technologies for PM

Control Technology	% Control	Feasibility
Baghouse	98+	Technically infeasible
Thermal Oxidation	98+	Technically feasible, but cost prohibitive
Wet ESP	99	Technically feasible, but environmentally and economically prohibitive
Dry ESP	95-98	Technically infeasible
High Efficiency Cyclone System	70	SELECTED
EGR	40-60	Technically feasible, but energy and environmentally prohibitive

Baghouse

Baghouses (i.e., fabric filters) consist of a number of fabric bags placed in parallel that collect particulate matter on the surface of the bag as the exhaust stream passes through the fabric membrane. The collected particulate matter is periodically dislodged from the bags' surface to collection hoppers via short blasts of high-pressure air (pulsejet), physical agitation of the bags, or by reversing gas flow. Baghouse systems are capable of PM collection efficiencies greater than 98%.

Baghouses are theoretically possible to control PM emissions from wood dryers; however, the moisture content of the exhaust gas in conjunction with the high organic content is expected to routinely plug or "blind" the fabric filter resulting in lower gas flow, greater pressure drop, and subsequent reduction in PM control efficiency. In addition, the bags would require significant maintenance and replacement resulting in high operational costs and system downtime. Thus, the use of baghouses to control PM emissions from the wood dryer system is technically infeasible.

Thermal Oxidation

Thermal oxidizers (TO) destroy condensable PM by burning particles at high temperatures. Regenerative thermal oxidizers (RTOs) are designed to preheat the inlet emission stream with heat recovered from the incineration exhaust gases. Gases entering the RTO are heated by passing through preheated beds packed with a ceramic media. A gas burner brings the preheated emissions up to an incineration temperature between 788° and 871°C (1450° and 1600°F) in a combustion chamber with sufficient gas residence time to complete the combustion process. Combustion gases then pass through a cooled ceramic bed where heat is extracted. By reversing the flow through the beds, the heat transferred from the combustion exhaust air preheats the gases to be treated, thereby reducing auxiliary fuel requirements. TOs and RTOs are both technically feasible control technologies.

According to the US-EPA Air Pollution Control Technology Fact Sheet (EPA-452/F-03-021) for RTOs, posted 7/15/03, the average annualized cost for an RTO to control roughly 58,000 SCFM of exhaust will be about $1,100,000. This would conservatively result in a cost of $73,300 per ton of PM controlled (based on a PM annual limit of 15 TPY); therefore, the installation of a thermal oxidizer is cost prohibitive.

Wet Electrostatic Precipitator (Wet ESP)

The principal component of a wet ESP is an array of vertical collection tube bundles. Above the collection tubes are spray headers that continuously wet the collection tube bundles. Exhaust gas enters a pre-quench to cool and saturate the gases before they enter the ESP. The pre-quench is essentially a low-energy scrubber that sprays water into the incoming gas stream. Some fraction of the highly water-soluble compounds may be scrubbed by the pre-quench and collected. However, the wet ESP collects only particles and droplets that can be electrostatically charged; vaporous components of the gas stream that do not condense are not collected by the device. Wet ESPs have PM control efficiencies of at least 80%. Wet ESPs are a technical feasible control technology for control of PM emissions from the wood dryer systems.

According to the US-EPA Air Pollution Control Technology Fact Sheet (EPA-452/F-03-029) for Wet ESPs, posted 7/15/03, the average annualized cost for a Wet ESP to control roughly 58,000 SCFM of exhaust will be about $1,680,000. This would conservatively result in a cost of $112,000 per ton of PM controlled (based on a PM annual limit of 15 TPY); therefore, the installation of a Wet ESP is cost prohibitive.

Dry Electrostatic Precipitators

Dry electrostatic precipitators (dry ESP) control PM emissions using the force of an induced electrostatic charge. The particles in the exhaust stream are negatively charged using high voltage electrodes and then drawn onto a positively charged collection surface. At periodic intervals, the collection surfaces (plates) are cleaned by electromagnetic “rappers” that deliver a blow to the surface header creating a vertical shock wave that causes the collected particulate to dislodge and fall into the hopper below.

Dry ESPs are ideal for exhaust streams with minimal organic particulate. Organic particulate tends to adhere to the positively charged collection surface, subsequently requiring additional “rapping” to dislodge the particulate and reducing control efficiency. Dry ESPs are not recommended for removing moist particles or those likely to adhere to the collection surface. Therefore, the use of a dry ESP on the proposed wood dryer system is technically infeasible.Cyclones

Cyclones typically are an integral part of the post wood dryer separation process and are also a very common particulate control device used in many applications, especially those where relatively large particles need to be collected. Cyclones are very simple devices that utilize centripetal force to separate particles from gas streams. The incoming exhaust gas enters the cyclone at a high velocity along the inner wall at the top of the cyclone. Gravity pulls the spinning gas down and the taper of the cyclone body helps keep the cyclonic effect in motion until the particle drops out the bottom of the cyclone into a hopper. They are commonly constructed of sheet metal and have a relatively low capital cost, very low operating costs, and no moving parts. Well-engineered, high efficiency cyclones can achieve significant levels of control. Cyclones are a technically feasible control technology for control of PM emissions from the wood dryer system and will be further evaluated.

Exhaust Gas Recycle

Condensable PM emissions can be controlled using a heat/energy system that accommodates exhaust gas recycle (EGR). EGR uses an oversized combustion unit that can accommodate 100 percent recirculation of dryer exhaust gases. The recirculated dryer exhaust is mixed with combustion air and exposed directly to the burner flame. Condensable PM emissions are incinerated in the second stage of the unit. High temperature exhaust from the combustion unit may either pass through a heat exchanger, which provides heat for dryer inlet air, and then through an add-on device for additional PM emission control or be directed directly back through the dryer.

EGR controls a portion of the particulate matter generated by the wood dryer system and requires additional energy input to overcome the added static pressure in the system. Further, the moisture laden return gas stream will result in increased operational complexity and variability in other emissions including CO, VOC, and opacity and was not advised by the design engineer for these small-scale dryer systems. The energy and environmental impacts associated with controlling a portion of the 15.8 TPY potential PM emissions make an EGR system infeasible.

The combination of a natural gas heat source, low temperature drying, and lower resin content softwoods will help to significantly limit the quantity of particulate matter generated. Thus, significant capital and operating investment controls such as thermal oxidizers, wet ESPs, and EGR are not warranted for GLREH's inherently low emitting design. GLREH is proposing the installation of high efficiency cyclones as BACT for each of its flash tube drying lines and will meet PM and PM_{10} emission rates of 3.9 lb/hr and 3.0 lb/hr, respectively.

b. Sulfur Dioxide (SO_2)

No sulfur dioxide is formed in the drying of wood in the flash tube dryers. However, Sulfur dioxide (SO_2) is formed from sulfur contained in the fuel used in the supplement heaters during combustion. The quantity of SO_2 released is entirely

dependent upon the sulfur content of the fuel and is independent of the burner design. The SO_2 emissions associated with GLREH's proposed dryer systems are incidental as there are only trace amounts of sulfur contained in the natural gas burned. The sulfur combines with oxygen in the combustion process and exhausts through the dryer stacks. The SO_2 emissions are minor in quantity and do not justify controls. GLREH is proposing to comply with an SO_2 emissions limit of 0.01 lb/hr as BACT.

c. Nitrogen Oxides (NO_x)

Nitrogen oxides (NO_x) are not formed during the drying of wood in the flash tube dryers. However, NO_x is a product of combustion in the supplemental heaters. NO_x is generated in one of three mechanisms: fuel NO_x, thermal NO_x, and prompt NO_x. Fuel NO_x is produced by oxidation of nitrogen in the fuel source. Combustion of fuels with high nitrogen content produces greater amounts of NO_x than those with low nitrogen content. Thermal NO_x is formed by the fixation of nitrogen (N_2) and oxygen (O_2) at temperatures greater than 3600°F. Prompt NO_x forms from the oxidation of hydrocarbon radicals near the combustion flame and produce an insignificant amount of NO_x.

GLREH has elected to use inherently clean burning natural gas which emits low levels of NO_x. Cost-intensive add on controls are not practical for small natural gas combustion sources such as the 20.4 MMBtu/hr natural gas-fired burners proposed.

Proper combustion techniques control NO_x emissions by maintaining optimum combustion conditions within the system via optimization of residence time, temperature, and mixing. GLREH is proposing as BACT a combination of using clean burning natural gas and employing good combustion practices for controlling NO_x emissions from the dryer combustion systems to achieve an overall NO_x emission rate of 2.0 lb/hr from each line.

d. Carbon Monoxide (CO)

Carbon Monoxide is not formed during the drying of wood in the flash tube dryers. CO emissions result when there is insufficient residence time or if there is insufficient oxygen available near the hydrocarbon molecule during combustion to complete the final step in hydrocarbon oxidation. GLREH has elected to use inherently clean burning natural gas. Add on controls such as thermal oxidation and oxidation catalysts are not economically feasible for small natural gas combustion sources.

Proper combustion techniques control CO emissions by maintaining optimum combustion conditions within the system via optimization of residence time, temperature, and mixing. GLREH is proposing as BACT a combination of using

clean burning natural gas and employing good combustion practices to control CO emissions from the wood dryer combustion systems.

e. Volatile Organic Compounds

Volatile organic compounds (VOC) are generated in the wood dryer system as a result of incomplete combustion and from the evaporation of the naturally occurring VOC in the wood. Quantities of VOC emitted are dependent on wood species and operating parameters such as temperature, residence time, and oxygen content.

During the drying process, water in the wood chip material is driven off first. If additional heat is applied after the water is removed, the temperature of the wood subsequently increases and the VOC in the wood begin to evaporate.

GLREH has selected a low VOC emitting drying technology comprised of flash tube dryers which operate at low temperatures (inlet estimated at about 336 °F) with a 4-second residence time in 354-foot length, 4-foot diameter, high velocity chambers. Because of the low drying temperature and the clean heat (natural gas) sources, the dryers will inherently generate less VOC than high temperature (typically 600 to 1000 F), high residence time inherent in drum dryers. Additionally, GLREH will be processing spruce and fir softwoods and avoiding higher resin pine to further minimize VOC emissions.

Methods of controlling high concentration VOC exhaust gas streams may include thermal destruction, electrostatic precipitators, and exhaust gas recycle. Provided in the table below is a ranking of the technically feasible control technologies for VOC control and an estimation of the expected level of control for application at GLREH.

Ranking of Control Technologies for VOC

Control Technology	% Control VOC	Feasibility
Thermal Oxidation	98+	Technically feasible, but cost prohibitive
Wet ESP	98+	Technically feasible, but environmentally prohibitive
Exhaust Gas Recycle	40-60	Technically feasible, but energy and environmentally prohibitive

Thermal Oxidation

Thermal oxidizers destroy condensable VOC by burning them at high temperatures. Thermal oxidizers also reduce VOC and CO emissions in direct-fired dryer exhausts by oxidizing the exhaust to H_2O and CO_2 (products of complete combustion). Regenerative thermal oxidizers (RTOs) are designed to preheat the

inlet emission stream with heat recovered from the incineration exhaust gases. Gases entering an RTO are heated by passing through preheated beds packed with ceramic media. A gas burner brings the preheated emissions up to an incineration temperature between 788° and 871°C (1450° and 1600°F) in a combustion chamber with sufficient gas residence time to complete the combustion process. Combustion gases then pass through a cooled ceramic bed where heat is extracted. By reversing the flow through the beds, the heat transferred from the combustion exhaust air preheats the gases to be treated, thereby reducing auxiliary fuel requirements. Thermal oxidation is a technically feasible VOC emission control technology for the wood dryer system.

The average annualized cost for an RTO to control roughly 58,000 SCFM of exhaust will be about $1,100,000. Thus, the cost per ton of controlled VOCs would be $24,000 based on an annual VOC process emissions of 45 TPY; therefore, the installation of a thermal oxidizer is cost prohibitive.

Wet Electrostatic Precipitators

Wet electrostatic precipitators (wet ESPs) use high-voltage fields to apply electrical charge to particles. The charged particles then move toward an oppositely charged collection surface where they accumulate. The accumulated dust can then be dislodged from the collectors and collected in hoppers below. The collected material is then removed for disposal or recycling. In a wet ESP, gases exiting the dryer enter a pre-quench to cool and saturate the gases before they enter the ESP. The pre-quench is essentially a low-energy scrubber that sprays water into the incoming gas stream. Some fraction of the highly water-soluble compounds, such as formaldehyde and methanol, may be scrubbed by the pre-quench and collected. However, the wet ESP collects only particles and droplets that can be electrostatically charged; vaporous components of the gas stream that do not condense are not collected by the device. In addition, the ability of the wet ESP to absorb water-soluble compounds diminishes as the recirculating liquid becomes saturated with these compounds; therefore, the disadvantage of the wet ESP is that it generates significant wastewater effluent.

As mentioned above, the average annualized cost to install and operate a wet ESP on each of the proposed wood dryers would be roughly $1,680,000. This would conservatively result in a cost of $37,000 per ton of VOC controlled (based on a VOC annual emissions of 45 TPY). For a wood dryer system of this size, the cost to install a wet ESP would be economically infeasible.

Exhaust Gas Recycle

Another technology for control of wood dryer VOC emissions is the use of a heat/energy system that accommodates exhaust gas recycle. Typically, this technology uses an oversized combustion unit that can accommodate 100 percent recirculation of dryer exhaust gases. The recirculated dryer exhaust is mixed with

combustion air and exposed directly to the burner flame. VOC and organic PM emissions from burner combustion are incinerated in the second stage of the unit. High temperature exhaust from the combustion unit may either pass through a heat exchanger, which provides heat for dryer inlet air, and then through an add-on device for PM emission control or be routed directly back through the dryer.

Exhaust gas recycle only controls a portion of the VOC generated by the wood dryer system and requires additional energy input to overcome the added static pressure in the system. Further, the moisture-laden return gas stream will result in increased operational complexity and variability in other emissions, including CO, PM, and opacity, and was not advised by the design engineer for these small-scale systems. The energy and environmental impacts associated with controlling a portion of the 45 TPY potential VOC process emissions from just the flash tube dryers make an EGR system infeasible.

GLREH is proposing to employ good combustion practices and its inherently low VOC emitting flash tube dryer technology and an emission limit of 11.92 lb VOC/hr as BACT.

In addition, GLREH shall have a facility-wide VOC limit of 49.4 tons to stay below the major source license threshold for VOC. This is calculated using the following formula:

(ODT of spruce/fir)*(1.5 lb VOC/ODT)) / 2000 + natural gas fired (MMscf) x 11 lb VOC/MMscf $\leq$ 49.4 tpy

The natural gas fired is the total amount fired by the license fuel burning equipment at the facility consisting of Boiler #1, the Flash Tube Dryers #1 and #2 and the Batt Line heater.

Stack testing shall be used to demonstrate compliance with the lb/hr emission limits and to verify the production-based lb VOC/ODT emission factor.

GLREH's air emission license application contains a summary of several wood drying operations permitted in the States of Maine and New Hampshire, their processing rates, and pollution controls. Aside from one operation listed, all plants are licensed to control emissions using cyclones similar to that proposed by GLREH. In addition, GLREH's operation will run at a much lower temperature, will utilize natural gas as a heating source rather than wood, and will not process high-resin pine; therefore, GLREH's emissions are expected to be lower than other comparably sized plants.

f. BACT Emission Limits

The portion of the BACT determined emission limits associated with the process related emissions from Flash Tube Dryers #1 and #2 are based on the following emission factors:

Pollutant	Spruce/Fir (lb/ODT)	Comments
PM	0.5	based on high efficiency cyclone vendor data
PM_{10}	0.38	PM_{10} is at least 25% less than Total PM based on AP-42 Sec. 10.6.1-1 for softwood.
VOC	1.5	Based on NCASI testing

The portion of emissions for Flash Tube Dryers #1 and #2 are as follows:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
*Flash Tube Dryers #1	3.9	3.0	-	-	-	11.7
*Flash Tube Dryers #2	3.9	3.0	-	-	-	11.7

* process related emissions only; does not include combustion related emissions

2. Emissions associated with Flash Tube Dryer Supplemental Heaters #1 and #2

The portion of the BACT determined emission limits for each Flash Tube Dryer Supplemental Heater #1 and Heater #2 are based on the following:

Natural Gas

PM	–	0.01 lb/MMBtu based on 06-096 C.M.R. ch. 115, BACT
PM_{10}	–	7.6 lb/MMscf for PM_{10} based on AP-42 Table 1.4-2, dated 7/98
SO_2	–	0.6 lb/MMscf based on AP-42 Table 1.4-2, dated 7/98
NO_x	–	100 lb/MMscf based on AP-42 Table 1.4-1, dated 7/98
CO	–	84 lb/MMscf based on AP-42 Table 1.4-1, dated 7/98
VOC	–	11 lb/MMscf based on TOC emission factor in AP-42 Table 1.4-2, dated 7/98
Visible Emissions	–	N/A (See Visible Emission requirements for the high efficiency cyclones)

This portion of emissions for Flash Tube Dryers Supplemental Heaters are as follows:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
*Heater #1	0.20	0.15	0.01	2.00	1.68	0.22
*Heater #2	0.20	0.15	0.01	2.00	1.68	0.22

* combustion related emissions only; does not include process related emissions

The combined (process and combustion) BACT emission limits for the Flash Tube Dryers #1 and #2 are as follows:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Flash Tube Dryer #1 + Heater #1	4.1	3.15	0.01	2.00	1.68	11.92
Flash Tube Dryer #2 + Heater #2	4.1	3.15	0.01	2.00	1.68	11.92

GLREH shall have a facility-wide VOC limit of 49.4 tons calculated using the following formula:

(ODT of spruce/fir)*(1.5 lb VOC/ODT)) / 2000 + *natural gas fired (MMscf) x 11 lb VOC/MMscf

* The natural gas fired is the total amount fired in Boiler #1, the Flash Tube Dryer Heaters #1 and #2, and the Batt Line heater.

To ensure GLREH stays below major source thresholds, the facility shall be limited to 120,000 tons of wood chips (at ~50% moisture) processed per year. This amount shall be calculated both on a monthly and 12-month rolling total basis.

3. Stack Testing

GLREH shall submit a test protocol, submit test results, and use test methods approved by the Department as outlined in the Standard Conditions of this license. Testing on each Flash Dryer stack shall be performed in accordance with the compliance methods listed below:

Pollutant	lb/hr	Compliance Method
PM	4.1	EPA Method 5 (Performance Test)
PM_{10}	3.15 (filterable + Condensable)	EPA Method 5 and 202
VOC	11.92	EPA Method 25 or 25A

Because the actual VOC process emissions are expected to be lower than the licensed emission rate, GLREH may choose to amend their licensed emission rates, VOC facility-wide limit and/or their total production rate based on the stack testing results.

4. Visible Emissions

The Flash Tube Dryers and Flash Tube Supplemental Heaters exhaust through high efficiency cyclones. Visible emission from each Flash Tube Dryer stack shall not exceed 20% opacity on a six-minute block average basis.

Control Equipment Operation, Periodic Monitoring, and Recordkeeping

a. GLREH shall operate the high efficiency cyclone anytime its associated Flash Tube Dryer is in operation.

b. The high efficiency cyclones shall be inspected at least monthly.

c. GLREH shall maintain records documenting all routine and non-routine maintenance for the high efficiency cyclones.

E. Loose Fill Packaging and Handling

GLREH plans to construct three product manufacturing lines to make residential and commercial, environmentally-sustainable building insulation, including interior batt, exterior boards, and blown-in insulation, all made from wood fiber.

The blown-in insulation line shall be referred to in this license as the Loose Fill Line which will consist of a surge-bin which receives dried wood fiber from Flash Dryer #1 by conveyor. The Loose Fill Line also consists of handling and packaging to prepare it for shipping. Dust collection systems collect and control dust from this line and direct it to a baghouse with an external vent stack.

The Department has determined that BACT for control of PM emissions from the Loose Fill Line will be the installation, operation, and maintenance of a baghouse.

Visible emissions from the Loose Fill Line baghouse shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

F. Batt Insulation Manufacturing, Handling & Packaging

The Batt insulation line (Batt Line) will consist of a receiving bin which pneumatically receives dried wood fiber from Flash Dryer #1, a Batt manufacturing line, and handing and packaging equipment. Particulate matter emissions will be generated in this area. The pneumatic conveyer, manufacturing equipment, and handling and packaging equipment will be controlled by a baghouse. A dust collection system will collect and control dust and direct it to a baghouse with an external vent stack.

The Department has determined that BACT for control of PM emissions from the Batt Line will be the installation, operation, and maintenance of a baghouse.

Batt Line Heater

Additionally, a 5 MMBtu/hr natural gas heater, the Batt Line Heater, will be utilized in the process. This heater will burn natural gas and have its own exhaust stack. The Department has determined that BACT for the Batt Line Heater will be the use of natural gas and good combustion practices.

Emission Limits

The BACT emission limits for the Batt Line Heater are based on the following:

Natural Gas

PM	–	0.01 lb/MMBtu based on 06-096 C.M.R. ch. 115, BACT
PM_{10}	–	7.6 lb/MMscf based on AP-42 Table 1.4-2, dated 7/98
SO_2	–	0.6 lb/MMscf based on AP-42 Table 1.4-2, dated 7/98
NO_x	–	100 lb/MMscf based on AP-42 Table 1.4-1, dated 7/98
CO	–	84 lb/MMscf based on AP-42 Table 1.4-1, dated 7/98
VOC	–	11 lb/MMscf based on TOC emission factor in AP-42 Table 1.4-2, dated 7/98
Visible Emissions	–	06-96 M.R. ch. 115, BACT

1. The BACT emission limits for the Batt Line Heater firing natural gas are the following:

Unit	Pollutant	lb/MMBtu
Batt Line Heater	PM	0.01

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Batt Line Heater	0.05	0.04	0.01	0.49	0.41	0.05

2. Visible emissions from the Batt Line Heater shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

G. Board Insulation Manufacturing, Handling & Packaging

The Board insulation line (Board Line) will consist of a receiving bin, which receives dried wood fiber from Flash Dryer #2 pneumatically, a Board manufacturing line, and handling and packaging equipment. Particulate matter emissions will be generated in this area. A baghouse will control emissions from the pneumatic conveyor, manufacturing equipment, and handling and packaging equipment. A dust collection system will collect and control dust and direct it to a baghouse with an external vent stack.

The Department has determined that BACT for control of PM emissions from the Board Line will be the installation, operation, and maintenance of a baghouse.

Visible emissions from the Board Line baghouse shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

H. Batt Line, Loose Fill Line, and Board Line PM Control

The Batt Line, Loose Fill Line, and the Board Line are each equipped with a baghouse system for PM control.

1. GLREH shall operate the baghouse anytime its associated line is in operation.

2. Visible emissions from each baghouse shall not exceed 10% opacity on a six-minute block average basis. The facility shall take corrective action if visible emissions from any of these baghouses exceed five percent opacity on a six-minute block average basis.

3. GLREH shall inspect each baghouse at least monthly for leaks and shall keep records of these inspections as well as of any maintenance (routine or non-routine) performed on each baghouse.

I. Fugitive Emissions

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed 20% opacity on a five-minute block average basis.

J. General Process Emissions

Visible emissions from any general process source shall not exceed 20% opacity on a six-minute block average basis.

K. VOC RACT

Reasonably Available Control Technology for Facilities that Emit Volatile Organic Compounds, 06-096 C.M.R. ch. 134 (VOC RACT) is applicable to sources that have the potential to emit quantities of VOC equal to or greater than 40 tons/year from non-exempt equipment. The units addressed in this license are exempt from VOC RACT because they are subject to a BACT analysis in this Air Emission License.

L. Emission Statements

GLREH is subject to emissions inventory requirements contained in *Emission Statements*, 06-096 C.M.R. ch. 137. GLREH shall maintain the following records in order to comply with this rule:

1. The amount of natural gas fired in Boiler #1, Flash Tube Heaters #1 and #2, and the Batt Line Heater, on a monthly basis;
2. Flash Tube Dryer #1 and #2 throughput on a monthly basis;
3. Calculations of the VOC emissions from the facility on a calendar year total basis; and
4. Hours each licensed emission unit was active or operating on a monthly basis.

Beginning with reporting year 2020 and every third year thereafter, GLREH shall report to the Department emissions of hazardous air pollutants as required by 06-096 C.M.R. ch. 137, § (3)(C). The Department will use these reports to calculate and invoice for the applicable annual air quality surcharge for the subsequent three billing periods. GLREH shall pay the annual air quality surcharge, calculated by the Department based on these reported emissions of hazardous air pollutants, by the date required in Title 38 M.R.S. § 353-A(3). [38 M.R.S. § 353-A(1-A)]

M. 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.

Maximum potential emissions were calculated based on the following assumptions:

- A Facility-wide VOC emission limit of 49.4 tpy;
- A process rate not to exceed 120,000 wet tons/year (at 50% moisture);
- Boiler #1, Flash Tube Dryer Supplement Heaters #1 & #2, and Batt Line Heater are in operation for 8,760 hr/yr.

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}	SO_2	NO_x	CO	VOC
Boiler#1	2.1	1.6	0.1	15.0	32.1	2.3
Flash Tube Dryers and Heaters #1 and #2	16.8	12.6	0.1	17.5	14.7	46.9
Batt Line Heater	0.2	0.2	0.1	2.2	1.8	0.2
Total TPY	**19.1**	**14.4**	**0.3**	**34.7**	**48.6**	**49.4**

Pollutant	Tons/year
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source is determined by the Department on a case-by case basis. In accordance with 06-096 C.M.R. ch. 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-1151-71-A-N subject the following conditions.

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.

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. § 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 C.M.R. ch. 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 C.M.R. ch. 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 C.M.R. ch. 115]

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

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

(11) In accordance with the Department's air emission compliance test protocol and 40 C.F.R. 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 C.F.R. 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 C.M.R. ch. 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 the written test report by the Department, or another alternative timeframe approved by the Department, 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 C.F.R. 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 C.M.R. ch. 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 license requirement. [06-096 C.M.R. ch. 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 C.M.R. ch. 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 C.M.R. ch. 115]

(16) The licensee 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. § 605). [06-096 C.M.R. ch. 115]

SPECIFIC CONDITIONS

(17) **Boiler #1**

A. Boiler #1 is licensed to fire natural gas. GLREH shall record the amount of fuel fired in Boiler #1 both on a monthly and 12-month rolling total basis.
[06-096 C.M.R. ch. 115, BACT]

B. Emissions shall not exceed the following:

Emission Unit	Pollutant	lb/MMBtu	Origin and Authority
Boiler #1	PM	0.01	06-096 C.M.R. ch. 115, BACT

C. Emissions shall not exceed the following [06-096 C.M.R. ch. 115, BACT]:

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler #1	0.49	0.36	0.6	3.43	7.34	0.53

D. Visible emissions from Boiler #1 shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

E. Emissions of NO_x and CO from Boiler #1 shall be controlled by the operation and maintenance of the Todd Burner and FGR system during all times Boiler #1 is in operation. [06-096 C.M.R. ch. 115, BACT]

F. Requirements for NSPS Subpart Dc.
GLREH shall comply with all requirements of 40 C.F.R. Part 60, Subpart Dc applicable to Boiler #1 including, but not limited to, the following:

1. Notifications

GLREH shall submit notification to EPA and the Department of the date of construction, anticipated start-up, and actual start-up. This notification shall include the design heat input capacity of the boiler and the type of fuel to be combusted. [40 C.F.R. § 60.48c(a)]

2. Reporting and Recordkeeping

a. GLREH shall maintain records of the amounts of natural gas combusted during each month [40 C.F.R. § 60.48c(g)(2)]

b. GLREH shall submit semi-annual reports to EPA and to the Department. [40 C.F.R. § 60.48c(d)] These reports shall include the following:

(1) Calendar dates covered in the reporting period; [40 C.F.R. § 60.48c(e)(1)]
(2) Records of fuel supplier certifications; [40 C.F.R. § 60.48c(e)(11)] and
(3) Any instances of excess emissions (including opacity) from Boiler #1**.** [40 C.F.R. § 60.48c(c)]

c. The semi-annual reports are due within 30 days of the end of each six-month period. [40 C.F.R. § 60.48c(j)]

(18) **Flash Tube Dryers and Supplemental Heaters #1 and #2**

A. Annual Limits

1. GLREH shall be limited to 120,000 tons of wood chips (at ~50% moisture) processed per year. This amount shall be calculated on a monthly and 12-month rolling total basis.

2. GLREH shall have a facility-wide VOC limit of 49.4 tons calculated using the following formula:

(ODT of spruce/fir)*(1.5 lb VOC/ODT)/ 2000 + *natural gas fired(MMscf) x 11 lb VOC/MMscf

* The natural gas fired is the total amount of natural gas fired by Boiler #1, the Flash Tube Dryer Heaters #1 and #2, and the Batt Line Heater.

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

1. GLREH shall weigh, measure, and calculate the tons of spruce/fir processed on a monthly basis. The moisture content of the wood shall be determined on a monthly basis.

2. Within 270 days of each flash tube dryer process starting up, GLREH shall conduct stack testing to demonstrate compliance with the lb/hr emission limits for PM, PM_{10}, and VOC listed below, as well as to demonstrate that the lb/ODT emission factors used to develop the lb/hr emission limits and listed in the table below are appropriate.

3. GLREH shall submit a stack test protocol, submit stack test results, and use methods approved by the Department as outlined in the Standard Conditions of this license. Each Flash Dryer Tube stack shall be tested to the limits listed below. Testing shall be performed in accordance with the compliance methods listed below:

Pollutant	lb/hr	Compliance Method
PM	4.1	EPA Method 5 (Performance Test)
PM_{10}	3.15 (filterable + Condensable)	EPA Method 5 and 202
VOC	11.92	EPA Method 25 and 25A

C. The emission limits for Flash Tube Dryers #1 and #2 and heaters are as follows:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Flash Tube Dryer #1 + Heater #1	4.1	3.15	0.01	2.00	1.68	11.92
Flash Tube Dryer #2 + Heater #2	4.1	3.15	0.01	2.00	1.68	11.92

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

D. Flash Tube Dryers Supplemental Heaters #1 and #2

1. The Flash Tube Dryer Supplemental Heaters #1 and #2 are licensed to fire natural gas.

2. GLREH shall maintain records showing the quantity of natural gas used by these heaters both on a monthly and 12-month rolling total basis.
[06-096 C.M.R. ch. 115, BACT]

3. Visible Emissions

Visible emission from each Flash Tube Dryer stack shall not exceed 20% opacity on a six-minute block average basis.
[06-096 C.M.R. ch. 115, BACT]:

4. Periodic Monitoring and Recordkeeping

   a. GLREH shall operate the high efficiency cyclone anytime its associated flash tube dryer is in operation.

   b. The high efficiency cyclones shall be inspected at least monthly. GLREH shall maintain records documenting all routine and non-routine maintenance for the high efficiency cyclones.

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

(19) **Batt Line Heater**

A. The Batt Line Heater is licensed to fire natural gas.

B. GLREH shall maintain records showing the quantity of natural gas used by the heater both on a monthly and a 12-month rolling total basis. [06-096 C.M.R. ch. 115, BACT]

C. The BACT emission limits for the Batt Line Heater firing natural gas are the following: [06-096 C.M.R. ch. 115, BACT]

Unit	Pollutant	lb/MMBtu
Batt Line Heater	PM	0.01

D. Emissions shall not exceed the following: [06-096 C.M.R. ch. 115, BACT]

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Batt Line Heater	0.05	0.04	0.01	0.49	0.41	0.05

E. Visible emissions from the Batt Line Heater shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

(20) **Loose Fill Line, Batt Line, and Board Line Baghouses**

A. GLREH shall operate each baghouse anytime its associated line is in operation. [06-096 C.M.R. ch. 115, BACT]

B. Visible emissions from each of the Batt Line, the Loose Fill Line, and the Board Line baghouses shall not exceed 10% opacity on a six-minute block average basis. The facility shall take corrective action if visible emissions from any of the baghouses exceed five percent opacity. [06-096 C.M.R. ch. 115, BACT]

C. GLREH shall inspect each baghouse at least monthly for leaks and shall keep records of these inspections as well as of any routine or non-routine maintenance performed on each baghouse. [06-096 C.M.R. ch. 115, BACT]

(21) **Fugitive Emissions**

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed 20% opacity on a five-minute block average basis.
[06-096 C.M.R. ch. 115, BACT]

(22) **General Process Sources**

Visible emissions from any general process source shall not exceed 20% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

(23) **Annual Emission Statements**

A. In accordance with *Emission Statements*, 06-096 C.M.R. ch. 137, GLREH shall annually report to the Department, in a format prescribed by the Department, the information necessary to accurately update the State's emission inventory. The emission statement shall be submitted as specified by the date in 06-096 C.M.R. ch. 137.

B. GLREH shall keep the following records in order to comply with 06-096 C.M.R. ch. 137:

1. The amount of natural gas fired in Boiler #1, Flash Tube Heaters #1 and #2, and the Batt line Heater (each) on a monthly basis;
2. Flash Tube Dryer #1 and #2 throughput on a monthly basis;
3. Calculations of the VOC emissions from the facility on a calendar year total basis; and
4. Hours each emission unit was active or operating on a monthly basis.

C. Beginning in reporting year 2020 and every third year thereafter, GLREH shall report to the Department emissions of hazardous air pollutants as required by 06-096 C.M.R. ch. 137, § (3)(C). GLREH shall pay the annual air quality surcharge, calculated by the Department based on these reported emissions of hazardous air pollutants, by the date required in Title 38 M.R.S. § 353-A(3). [38 M.R.S. § 353-A(1-A)]

DONE AND DATED IN AUGUSTA, MAINE THIS 7th DAY OF MAY, 2020.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____ for ____
GERALD D. REID, COMMISSIONER

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

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

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: March 24, 2020
Date of application acceptance: March 25, 2020

Date filed with the Board of Environmental Protection:

This Order prepared by Lisa P. Higgins, Bureau of Air Quality.

FILED

MAY 7, 2020

State of Maine
Board of Environmental Protection