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

DEPARTMENT ORDER

Irving Forest Products, Inc. **Aroostook County** **Nashville Plantation, Maine** **A-314-77-8-A**	**Departmental** **Findings of Fact and Order** **New Source Review** **NSR #8**

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 (the Department) finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Irving Forest Products, Inc.
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	321912 (Cut Stock, Resawing Lumber, and Planing) 321113 (Sawmills) 321999 (All Other Misc. Wood Product Manufacturing)
NATURE OF BUSINESS	Wood Products
FACILITY LOCATION	1218 Portage Road, Nashville Plantation, Maine

B. NSR License Description

Irving Forest Products, Inc. (Irving) has requested a New Source Review (NSR) license to address a mill efficiency project that includes the addition of a new drying kiln (Kiln #4) and discontinuance of a volatile organic compounds (VOC)-containing product (SAPTEK).

C. Emission Equipment

The following new equipment is addressed in this NSR license:

Equipment	Production Rate
Kiln #4	65 MMBF/year

The following existing process is removed by this project:

Equipment	Production Rate
SAPTEK	65 MMBF/year

There are no other existing processes or equipment which are affected or modified by this project.

D. Project Description

Irving has proposed installation of a new kiln (Kiln #4). Kiln #4 is a Valutec TC kiln which operates continuously with cross circulation and multiple drying zones. It has an estimated maximum capacity of 65 million board feet per year (MMBF/year). The continuous drying design will increase overall energy efficiency and decrease drying time.

Irving currently dries between 90 and 100 MMBF/year. Kiln #4 will become the primary kiln and operated near capacity. However, future facility throughput is only expected to increase to approximately 130 MMBF/year, because Irving plans to shift production away from the existing, less efficient kilns. Since the existing kilns are not physically modified by this project and they are not expected to see an increase in utilization, they are not considered project affected units.

Kiln #4 is expected to be substantially more efficient than the existing kilns using less steam to dry equivalent board feet. Use of the more efficient kiln and reduction in throughput for Kilns #1 - #3 is expected to result in no increase in steam demand or fuel consumption in the facility's existing boilers. Since the boilers are not physically modified by this project and they are not expected to see an increase in utilization, they are not considered project affected units.

This project also includes the discontinuance of a product known as SAPTEK. SAPTEK is an alcohol-based liquid which was sprayed onto the lumber. It changes color based on the species of the tree, allowing Irving to differentiate between spruce and fir lumber. This process is no longer necessary because the facility's moisture detection system is capable of determining a log's moisture content and density allowing it to be classified without the need to use SAPTEK.

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 Irving does not violate any applicable federal or state requirements. The modification of a major source is considered a major or minor modification based on

whether or not expected emissions increases exceed the "Significant Emission Increase" levels as given in *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100. For a major stationary source, the expected emissions increase from each new, modified, or affected unit may be calculated as equal to the difference between the post-modification emissions and the baseline actual emissions for each NSR regulated pollutant.

1. Baseline Actual Emissions

   Baseline actual emissions (BAE) are equal to the average annual emissions from any consecutive 24-month period within the ten years prior to submittal of a complete license application.

   BAE for new equipment, such as Kiln #4, are considered to be zero for all pollutants. BAE for existing modified equipment, such as the SAPTEK process, are based on actual annual emissions reported to the Department through *Emissions Statements*, 06-096 C.M.R. ch. 137. Irving has proposed using 1/2017 – 12/2018 as the 24-month baseline period from which to determine baseline actual emissions for the SAPTEK process.

   As described earlier in this license, the existing kilns and boilers are not considered affected equipment since this equipment will not be physically modified, and there is no expected increase in utilization.

   The only criteria pollutant emitted from either Kiln #4 or the SAPTEK process is VOC.

   The results of this baseline analysis are presented in the table below.

Baseline Actual Emissions (1/2017 – 12/2018 Average)

Equipment	VOC (tpy)
Kiln #4	0.00
SAPTEK	8.61
Total	**8.61**

2. Post-Project Emissions

   In calculating emissions increases, new emission units (Kiln #4) must use potential to emit (PTE) emissions for post-project emissions. PTE for Kiln #4 is based on a throughput of 65 MMBF/year and an emission factor of 1.283 pounds per thousand board feet (lb/MBF) based on data from testing done at the University of Maine as recorded in *Estimated VOC Losses During the Drying of Five Northeastern Species* (R.W. Rice and L. Zibilske, 1999).

Since the SAPTEK process has been discontinued, post-project emissions are zero.

Post-project emissions from the new and affected equipment are shown below.

Post-Project Emissions

Equipment	VOC (tpy)
Kiln #4	41.70
SAPTEK	0.00
Total	**41.70**

3. Emissions Increases

Emissions increases are calculated by subtracting BAE from the post-project emissions. The emission increase is then compared to the significant emissions increase levels.

Pollutant	Baseline Actual Emissions 1/2017 – 12/2018 (ton/year)	Post-Project Emissions (ton/year)	Emissions Increase (ton/year)	Significant Emissions Increase Level (ton/year)
VOC	8.61	41.70	33.09	40

4. Classification

Since emissions increases do not exceed significant emissions increase levels, this NSR license is determined to be 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 operation of Kiln #4.

This project is not subject to future project emissions reporting pursuant to 40 C.F.R. § 52.21(r)(6), because PTE was used in determining post-project emissions and not projected actual emissions as determined by 40 C.F.R. §§ 52.21(b)(41)(2)(a) thru (c).

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. Kiln #4

Irving proposes the installation of Kiln #4, a 65 MMBF/year continuous kiln used to dry spruce and fir lumber. Kiln #4 will have five charging zones and multiple exhaust vents. The exhaust from these vents has a high moisture content and low concentrations of various organic compounds released from the wood as it dries.

Best Available Control Technology (BACT)

The only criteria pollutant expected to be emitted from Kiln #4 is VOC. Potential control technologies for VOC emissions from lumber kilns include thermal and catalytic oxidation, adsorption, absorption/scrubbing systems, and condensation.

1. Thermal Oxidation

A thermal oxidizer raises the temperature of the exhaust stream to oxidize (burn) or pyrolyze (thermally break down) the constituents. In the case of hydrocarbons (including VOC), complete combustion produces carbon dioxide and water. Regenerative thermal oxidizers (RTOs) use heat exchangers to preheat the exhaust and/or recover waste heat from the treated air stream. Both RTOs and non-regenerative thermal oxidizers operate in a range of 1,500 – 1,800 °F. A regenerative catalytic oxidizer (RCO) operates similarly to an RTO with the addition of a catalyst which allows the unit to operate at a lower temperature (500 – 1,000 °F).

RCOs typically require a clean gas stream to operate efficiently. The catalyst is prone to being blinded or masked by moisture and condensates found in the kiln exhaust. Additionally, thermal oxidizers would require the burning of significant amounts of fuel to destroy the VOC, leading to emissions of other pollutants such as NO_x and CO.

Therefore, thermal oxidation, including the use of an RTO or RCO, is not considered environmentally feasible for control of VOC from Kiln #4.

2. Adsorption

Adsorption is the process by which molecules collect on and adhere to the surface of an adsorbent solid due to physical and/or chemical forces. Activated carbon is typically used as an adsorbent because of its large surface area which is a critical factor in the adsorption process although other materials, such as zeolite and polymers, may also be used.

Adsorption media, such as activated carbon or zeolite, are hydrophobic which is problematic for controlling VOC from wood products applications. The moisture in the exhaust competes for active adsorptive sites in the media and decreases the VOC control efficiency. Dehumidification can help this problem but is impractical at high flow rates. Additionally, the terpenes from wood present in the exhaust will tend to condense and foul the media, reducing efficiency and increasing needed maintenance. Therefore, an adsorption system is determined to not be technically feasible for control of VOC from Kiln #4.

3. Absorption/Wet Scrubbers

In absorption systems, constituents of a gas stream are selectively removed by a liquid solvent. The control of gas-phase VOC using an absorption scrubber system relies on contact between the gas stream and a liquid in which the contaminants are soluble or with which it will chemically react. The degree of control depends upon the solubility of the gas, gas/liquid throughput rates, contact time, and the mechanism of the scrubber. Gas absorption is commonly used to recover product or to purify gas streams with high concentrations of water-soluble compounds. They are most effective for gas streams with pollutant concentrations between 250 and 10,000 ppmv. Low concentrations of organics in an exhaust stream require long contact times and large quantities of absorbent for effective removal.

VOC emissions from Kiln #4 include compounds which are water soluble. However, the kiln exhaust has expected low VOC concentrations. In addition, use of an absorption system would result in large volumes of wastewater that would need to be stored, treated, and discharged. Therefore, the use of an absorption system is determined to not be technically or environmentally feasible for control of VOC from Kiln #4.

4. Condensation

   A condenser cools the exhaust stream, changing the organic compounds from a vapor to a liquid phase using a heat exchange surface maintained at a temperature low enough to cause the VOC to condense on its surface.

   The nature of the condensable portion of the organic compounds in the kiln exhaust will result in fouling of a heat exchanger system which will prevent efficient and effective operation. Also, the high moisture content of the kiln exhaust would result in large volumes of wastewater to be stored, treated, and discharged. For these reasons, condensation is determined to not be technically feasible for control of VOC from Kiln #4.

5. Determination

   Given the number and nature of the kiln exhaust points, high moisture content of the exhaust stream, and the variety and low concentration of VOC expected in the exhaust stream, all of the control technologies considered are technically infeasible and/or have significant environmental trade-offs.

   Therefore, the Department finds that BACT for Kiln #4 shall consist of compliance with the existing emission limit of 93.0 tpy of VOC (12-month rolling total basis) from the facility's kilns (A-314-77-3-A, 11/6/2016). This limit will now include emissions from Kiln #4 and is equivalent to a facility-wide throughput of 145 MMBF/year. Compliance shall be demonstrated through records of kiln throughput kept on a monthly and 12-month rolling total basis.

C. SAPTEK Process

With the issuance of this license, Irving shall discontinue use of SAPTEK as previously described in the facility's air emission licenses.

D. Incorporation into the Part 70 Air Emission License

Pursuant to *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 (i.e., startup of Kiln #4), as provided in 40 C.F.R. Part 70.5.

E. 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 biomass fuel limit of 37,450 tons/year (including sawdust, wood chips, and/or absorbent pads with up to 5,000 gal/year of absorbed distillate fuel) for Boilers #4 and #5 combined;
- A distillate fuel limit of 250,000 gal/year for Boiler #7;
- 100 hours/year of operation for Fire Pump #1;
- A throughput limit of 145 MMBF/year for the four Lumber Drying Kilns combined; and
- 8,760 hours/year of operation for the CEC Screen Engine.

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**
Boilers #4 and #5 (combined)	50.6	53.4	35.4	4.2	37.1	101.1	2.9
Boiler #7	1.4	1.4	0.2	0.1	1.9	0.5	0.1
Fire Pump #1	0.1	0.1	---	0.1	0.4	0.1	0.1
Lumber Drying Kilns	---	---	---	---	---	---	93.0
CEC Screen Engine	0.3	0.3	---	0.1	12.2	2.6	1.0
Total TPY	**52.4**	**55.2**	**35.6**	**4.5**	**51.6**	**104.3**	**97.1**

Pollutant	**Tons/year**
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

Irving previously submitted an ambient air quality impact analysis outlined in air emission license A-314-77-1-A (dated 10/25/2013) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards (AAQS). An additional ambient air quality impact 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-314-77-8-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

(1) **SAPTEK**

With the issuance of this license, Irving shall discontinue use of SAPTEK.
[06-096 C.M.R. ch. 115]

(2) **Kiln #4**

Irving is licensed to install and begin operation of Kiln #4. Irving shall submit notification to the Department of the date of startup of Kiln #4 within 30 days of its occurrence.
[06-096 C.M.R. ch. 115, BACT]

The following shall replace Specific Condition (3) of air emission license A-314-77-3-A:

(3) **Lumber Drying Kilns**

Irving shall be limited to 93.0 tpy of VOC on a 12-month rolling total basis from all facility lumber drying kilns combined. This limit is equivalent to a total combined kiln throughput of 145 MMBF/year. Compliance with the annual VOC limit shall be demonstrated by recordkeeping of kiln throughput on a monthly and 12-month rolling total basis.
[06-096 C.M.R. ch. 115, BACT]

(4) Irving shall submit an application to incorporate this NSR license into the facility's Part 70 air emission license no later than 12 months from commencement of operation of Kiln #4. [06-096 C.M.R. ch. 140 § 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS 16th DAY OF SEPTEMBER, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____ for _____
MELANIE LOYZIM, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 8/20/2021
Date of application acceptance: 8/25/2021

Date filed with the Board of Environmental Protection:

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

FILED

SEPT 16, 2021

State of Maine
Board of Environmental Protection