NORTH CAROLINA
DIVISION OF AIR QUALITY
Application Review and Preliminary Determination

Issue Date: xx

Region: Raleigh Regional Office
County: Halifax
NC Facility ID: 4200207
Inspector's Name: N/A
Date of Last Inspection: N/A
Compliance Code: N/A

Facility Data

Applicant (Facility's Name): Roanoke Valley Lumber

Facility Address:
Roanoke Valley Lumber
290 Power Place Drive
Weldon, NC 27890

SIC: 2421 / Sawmills & Planing Mills General
NAICS: 321113 / Sawmills

Facility Classification: Before: Permit/Registration Pending **After:** Title V
Fee Classification: Before: N/A **After:** Title V

Permit Applicability (this application only)

SIP: 02D .0512, .0515, .0516, .0521, .0530, .0544, .1111 and .1806, and 02Q .0317 and .0504
NSPS: No
NESHAP: Part 63 Subparts DDDD and ZZZZ
PSD: Major Source Review for VOC and GHGs
PSD Avoidance: NOx
NC Toxics: No
112(r): No
Other: None

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Kevin Jobe Regional Environmental Manager (318) 548-6608 290 Power Place Drive Weldon, NC 27890	Jake Elston Senior Vice President - Operations (541) 679-3311 290 Power Place Drive Weldon, NC 27890	Kevin Jobe Regional Environmental Manager (318) 548-6608 290 Power Place Drive Weldon, NC 27890

Application Data

Application Number: 4200207.21A
Date Received: 08/05/2021
Application Type: Greenfield Facility
Application Schedule: PSD

Existing Permit Data
Existing Permit Number: N/A
Existing Permit Issue Date: N/A
Existing Permit Expiration Date: N/A

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP

<No Inventory>

Review Engineer: Rahul Thaker

Review Engineer's Signature: **Date:** January 10, 2022

Comments / Recommendations:
Issue 10708/R00
Permit Issue Date: xx
Permit Expiration Date: xx

1. Purpose of Application

Roseburg Forest Products ("owner") submitted a PSD (Prevention of Significant Deterioration) application to construct and operate a new lumber sawmill, named Roanoke Valley Lumber ("RVL"), located at 290 Power Place Drive, Weldon, Halifax County, NC. The mill will be located on the site of the former Roanoke Valley Energy (cogeneration facility).

The stationary source is a new sawmill, which is yet to be constructed. It will be constructed in two phases: the first phase will support up to 300 million bd-ft per year of lumber drying capacity. The second phase will support additional 200 million bd-ft per year lumber drying capacity bringing the total capacity to 500 million bd-ft/yr. Even though the facility will be constructed in two phases, this PSD permit application is for the entire project (five kilns and ancillary equipment).

As requested, the DAQ will process this application in accordance with the "two-step" procedure in 15A NCAC 02Q .0504. That is, the agency will process the submitted application pursuant to the requirements in 02Q .0300 and 02D .0530. Then, the facility will be required to submit a second application meeting the Title V procedures in 02Q .0500, within 12-months of commencement of the facility, presuming a PSD permit is granted to the facility.

The owner of the facility is registered as a limited liability company with NC Secretary of State office as "Roseburg Forest Products Co."[1] The application includes the legal entity/owner as "Roseburg Forest Products" and site name as "Roanoke Valley Lumber". Thus, the air quality permit will be issued to Roanoke Valley Lumber, if the PSD permit is approved.

2. Application Chronology

April 13, 2021	Pre-application discussions held with the applicant.
July 6, 2021	Additional discussions held with the applicant before application submittal.
August 5, 2021	Application received.
August 12, 2021	Application fees were received.
August 12, 2021	Application determined to be complete for PSD processing effective this date and the statutory 1-year processing clock for PSD began.
September 2, 2021	Discussed the application with the applicant and representatives.
September 3-24, 2021	Provided comments via email to the applicant on several issues: facility wide NOx emissions, potential to emit (PTE) for fire pump, VOC BACT for similar kilns, derivation of VOC emission factor for kilns, benzene emission factor for natural gas fired units, emission factors for particulates for various units, state regulated air toxics, stack parameters, among other issues.
September 24, 2021	DAQ received response to most of questions raised on September 3rd and 14th.
October 5, 2021	Requested BACT analysis for the fire pump, and update to the submitted modeling for fire pump engine emissions or in the alternate, stack parameters for this engine.
October 8, 2021	Requested additional information on manufacturing process.
October 25, 2021	Requested supporting basis on applicant's characterization on planer mill control equipment "inherent".
October 27, 2021	DAQ received the response to many different questions.
November 5, 2021	Requested information on the monitoring approach for the proposed VOC BACT.
November 16, 2021	Received the response to the question on "inherent".
November 22, 2021	Received the response to the question on monitoring for VOC BACT.
December 6, 2021	Received the response on design capacity of lumber drying kilns.
December 9, 2021	Submitted draft permit and application review to Supervisor.

3. Statement of Compliance

The facility has not yet been constructed. Compliance will be determined after the facility is constructed or when it commences operation, as applicable. Some permitting requirements will apply to the construction of the facility while others will apply to its operation.

4. Facility Operations

4.1 Site Description

The facility is located at 290 Power Place Drive, Weldon, Halifax County, NC, at latitude N 36° 26' 16.8216" and longitude W 77° 37' 2.7336". The facility is located a few miles northwest of downtown Weldon. The topography of the site near the facility is described as generally flat terrain. The site location and aerial view of the facility are exhibited below in Figures 4-1 and 4-2, respectively.

[1] North Carolina Secretary of State Business Registration Search (sosnc.gov)

Figure 4-1: Site Location Map

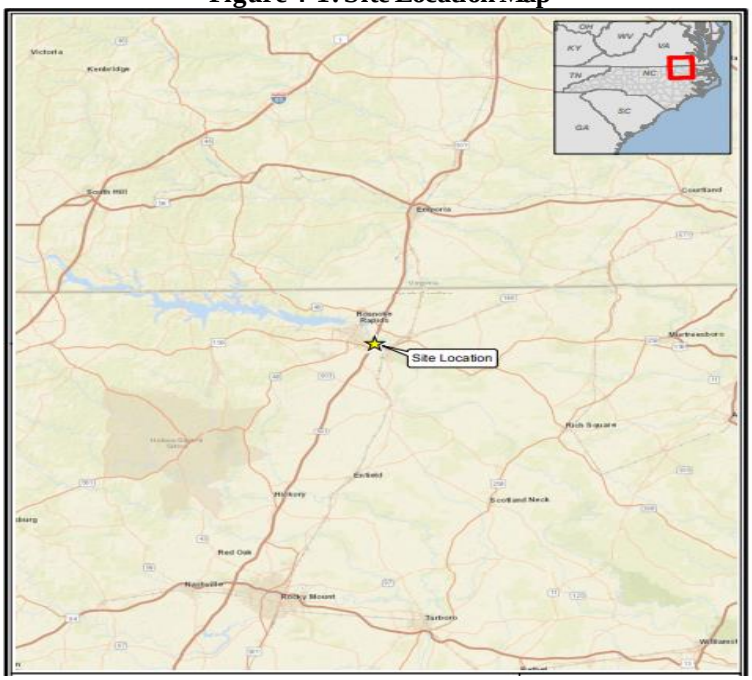
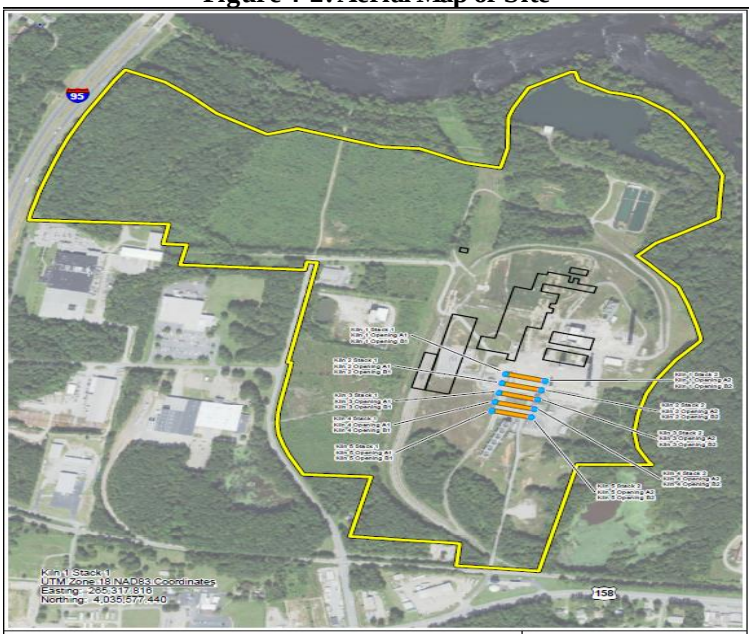


Figure 4-2: Aerial Map of Site



Current air quality designations for Halifax County with respect to the promulgated National Ambient Air Quality Standards (NAAQSs) are described in Table 4-1 below, in accordance with 40 CFR 81.334 "North Carolina":

Table 4-1: Air Quality Designations for Halifax County

Pollutant	NAAQS	Designation
PM_{10}	150 ug/m^3 (24-hour) (1987)[2]	Attainment[3]
$PM_{2.5}$	35 ug/m^3 (24-hour) (2006)[4] 12 ug/m^3 (annual) (2012)	Unclassifiable/Attainment
Sulfur Dioxide	0.03 ppm (annual) (1971)[5] 75 ppb (1-hour) (2010)	Attainment Attainment/Unclassifiable
Nitrogen Dioxide	53 ppb (annual) (1971)[6] 100 ppb (1-hour) (2010)	Attainment Unclassifiable/Attainment
Carbon Monoxide	35 ppm (1-hour) 9 ppm (8-hour) (1971)[7]	Unclassifiable/Attainment
Ozone	75 ppb (8-hour) (2008) 70 ppb (8-hour) (2015)	Unclassifiable/Attainment Attainment/Unclassifiable
Lead	0.15 ug/m^3 (3-months) (2008)	Unclassifiable/Attainment

In summary, Halifax County is in attainment or attainment/unclassifiable or unclassifiable/attainment of all promulgated NAAQSs. Further, this County is considered a Class II area with ambient air increments for PM_{10}, PM_{25}, SO_2, and NO_2. Halifax County is triggered for increment tracking under PSD for PM_{10}, SO_2 and NOx. The proposed stationary source will result in an emission increase in 1.49 pounds per hour of PM_{10}, 0.12 pounds per hour of SO_2, and 9.12 pounds per hour of NOx. Finally, the closest Class I area from this facility is Swanquarter National Wilderness Area, which is located approximately 99 miles (159 kilometers) southeast of the facility.

5. Proposed New Source

5.1 Stationary Source

[2] The same PM_{10} NAAQSs (primary and secondary) retained in 1997, 2006, and 2012.
[3] Assumed. Halifax County has been designated unclassifiable / attainment for more stringent $PM_{2.5}$ NAAQSs for both 24-hr and annual averaging periods.
[4] The same $PM_{2.5}$ NAAQSs (primary and secondary) retained in 2012.
[5] The annual SO_2 NAAQS is effective in only certain areas of the country as per https://www.epa.gov/criteria-air-pollutants/naaqs-table.
[6] The same 1971 NO_2 NAAQSs (primary and secondary) retained in 1985, 1996, 2010 and 2012.
[7] The same 1971 CO NAAQSs (primary) for both 1-hr and 8-hr averaging periods retained in 1985, 1994 and 2011.

The mill will process raw southern pine logs into planed pine lumber and wood chips/pine shavings. Pine logs will be delivered to the plant and stored outside. The sawmill will transform the pine logs into green rough-cut lumber through debarking, bucking and rough sawing. Rough-cut lumber will then enter a system of stackers where it will be prepared for the drying kilns. The kilns will dry the lumber to customer- and industry-specified criteria for minimum drying temperature and maximum moisture content. Dried rough-cut lumber from the drying kilns is sent to the planer mill for final processing. The following sections describe in detail each of these manufacturing steps:

Green Lumber Operations

Green lumber operations at Roanoke Valley Lumber involve processing whole logs into rough-sawn lumber of various dimensions. Processes included in this mill area are log debarking, log bucking, lumber sawing, and byproduct material collection, conveyance, and storage.

The debarker, bucking line and sawmill are enclosed operations, either using enclosed equipment or equipment located inside a building. In addition, the materials handled in the green lumber operation have high natural moisture content (approximately 50%), and primary lumber saws incorporate water sprays to control temperature. Based on these factors and published guidance from EPA [8], emissions from the debarker, bucking line and sawmill are expected to be negligible or non-existent.

Scraps from the process, which include bark, sawdust, and partial lumber pieces, will be sent to a bark hog, block/trim chipper, and/or byproduct storage bins. The bark hog and block/trim chipper will resize larger scraps to meet customer specifications prior to transferring those materials to the byproduct storage bins. The green wood byproducts (bark, sawdust, and hogged wood) are transferred via mechanical conveyors to enclosed truck bins. The bark hog and chipper are enclosed, and the sawdust and hogged wood conveyors are covered to minimize emissions. Phase 1 construction will include a single bark hog and single block/trim chipper. Additional hog and chipper capacity will likely be added during Phase 2.

All green lumber operations (i.e., debarker including log bucking and debarking, sawmill, bark hogs, and block/trim chippers) are insignificant emissions activities, as the expected emissions are either zero or negligible, well below the regulatory cut-offs in NC's Title V procedures in 02Q .0503(8).

Lumber Drying

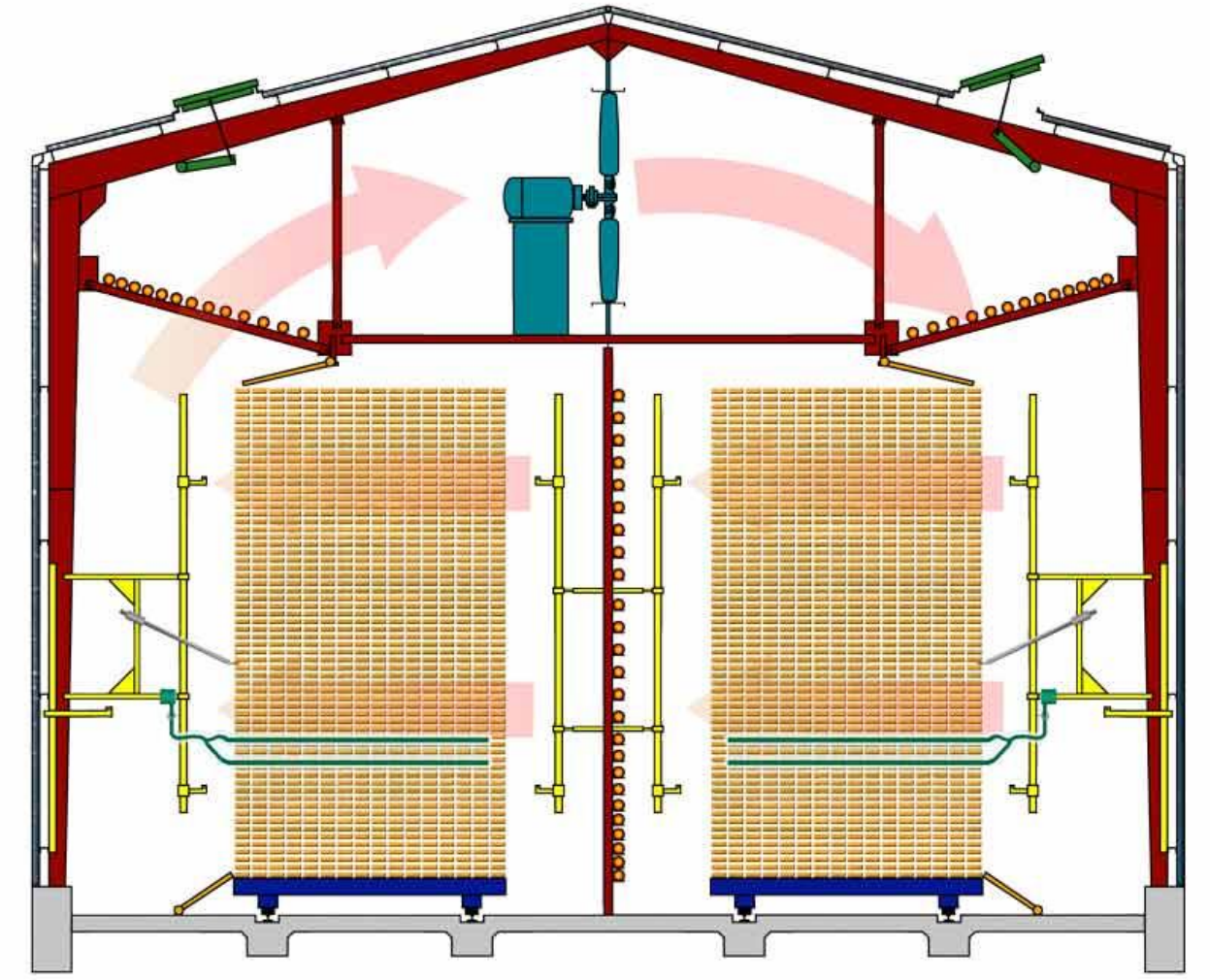
Roanoke Valley Lumber proposes to dry the lumber with direct-fired, continuous, dual track kilns. Each kiln will be equipped with a 45 million Btu/hr natural gas-fired, low NOx burner (LNB) and will have an annual lumber design capacity of 100 million bd-ft/yr. As stated earlier, the facility plans to install three (3) kilns in Phase 1. Up to two (2) additional kilns will be installed in Phase 2.

Continuous lumber drying kilns offer high production while reducing energy consumption and improving grade recovery. The design features two tracks running parallel with each other. The lumber travels in opposite directions on each of the two tracks in a "counterflow" arrangement. Lumber entering the kiln is preheated by heat from the exiting lumber until it gets to the center section where the actual high temperature drying takes place (operating temperatures between 180°F and 250°F). As the lumber passes through the outgoing extension, moisture from the incoming wet lumber transfers to the exiting dry lumber in a similar manner to the way steam spray is used in batch kilns to equalize the moisture content and relieve the drying stresses in the dry lumber. A unique pusher system design precisely controls the movement of the wood through the drying process. A typical continuous lumber drying kiln with a double track arrangement is shown in Figures 5-1 and 5-2 below:

[8] *"Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country"*, Dan Meyer, Environmental Engineer, Air Permits & Diesel Unit, May 8, 2014, EPA Region 10, Seattle, WA.

Figure 5-1: Continuous Lumber Drying Kiln
(Double Track Arrangement - Perspective View)

Figure 5-2: Continuous Lumber Drying Kiln
(Double Track Arrangement - Cross-sectional View)



Planer Mill

Planer mill operations involve processing rough, kiln dried dimensional lumber into finished lumber. Processes in this mill area include planing and trimming the dried, rough lumber and byproduct material collection, conveyance, and storage. Trim pieces are processed in an enclosed dry wood hog. All planer mill operations are conducted within the planer mill building, limiting the emissions of fugitive PM. Wood byproducts consisting of dry shavings, dust and hogged wood chips are transferred to truck bins by the Planer Mill pneumatic dust collection system. Materials are separated from the pneumatic transfer air using a cyclone and product capture baghouse. Both the cyclone and baghouse are considered "inherent" to the process. Material captured is collected in enclosed truck bins and sold.

Additional Mill Operations

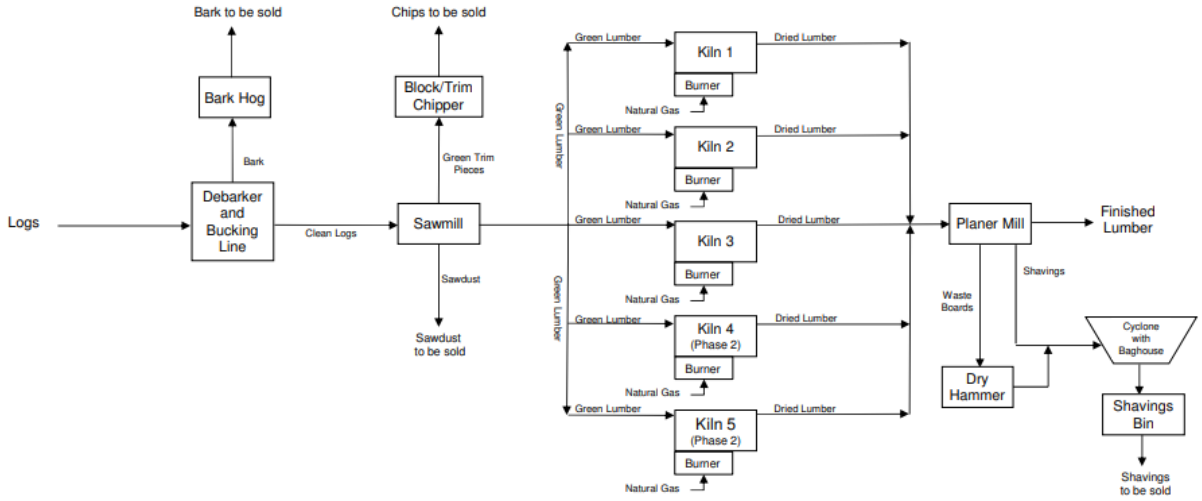
Maintenance and fuel storage activities consist of procedures such as parts degreasing, welding stations, metal fabrication/grinding stations, compressed air system maintenance, and small storage tanks or totes containing diesel oil, hydraulic fluids or lubricants. Maintenance and fuel storage operations are sources of regulated air pollutants; however, the activities are either categorically exempt or insignificant based on size/emission levels under the Title V program as implemented in 15A NCAC 02Q .0500.

Fugitive VOC emissions from the wood byproduct storage and log piles are not considered quantifiable and are not included in this application. Logs, lumber, chips, sawdust, bark, and shavings are all shipped into or out of the mill by truck. The facility roads will be paved to minimize emissions associated with truck traffic.

Fire protection systems will utilize electric pumps as the primary source of water pressure. A diesel-fired emergency fire water pump will be on site as a backup to these electric systems. This fire water pump is an insignificant source of emissions.

Finally, the Figure 5-3 below includes a process flow diagram for the entire manufacturing operation described above.

Figure 5-3: Process Flow Diagram



5.2 Construction Schedule

The expected construction schedule is described below per the application:

- Phase 1 site preparation to start February 2022.
- Phase 1 construction to start May 2022.
- Phase 1 construction complete and begin commercial production March 2023.

- Phase 2 construction to begin no later than September 2024.

5.3 Stationary Source Emissions

Emissions of PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, VOC, lead, greenhouse gases (GHGs), hazardous air pollutants (HAPs), and NC-regulated air toxics, are expected due to the proposed stationary source. The potential emissions for this new construction including insignificant sources, covering both phases (1 and 2), are listed below. They are discussed in detail and reviewed for regulatory applicability in Section 6 below.

- Particulate Matter: 11.62 tons/year (TPY or tpy)
- PM_{10}: 6.52 TPY
- $PM_{2.5}$: 3.43 TPY
- SO_2: 0.54 TPY
- NOx: 39.94 TPY
- CO: 63.63 TPY
- VOC: 1054.3 TPY
- Lead: 0.0004 TPY
- GHGs (as CO_2e): 89,843.0 TPY
- Methanol (single largest HAP): 49.8 TPY
- Total HAPs: 73.1 TPY

The stack parameters for the main stacks are included in Table 5-1 below:

Table 5-1: Stack Parameters

Stack with ID No.	Stack Height ft	Stack Diameter ft	Temperature ^{O}F	Exit Velocity ft/sec
Kiln 1 Stack 1 KLN1_S1	36	2.6875	120	58.76
Kiln 1 Stack 2 KLN1_S2	36	2.6875	120	58.76
Kiln 2 Stack 1 KLN2_S1	36	2.6875	120	58.76
Kiln 2 Stack 2 KLN2_S2	36	2.6875	120	58.76
Kiln 3 Stack 1 KLN3_S1	36	2.6875	120	58.76
Kiln 3 Stack 2 KLN3_S2	36	2.6875	120	58.76
Kiln 4 Stack 1 KLN4_S1	36	2.6875	120	58.76
Kiln 4 Stack 2 KLN4_S2	36	2.6875	120	58.76
Kiln 5 Stack 1 KLN5_S1	36	2.6875	120	58.76
Kiln 5 Stack 2 KLN5_S2	36	2.6875	120	58.76

6. Regulatory Applicability

The proposed sources are subject to the following air quality requirements:

<u>15A NCAC 02D .0512 Particulates from Miscellaneous Wood Products Finishing Plants</u>

A person shall not cause, allow, or permit particulate matter caused by the working, sanding, or finishing of wood to be discharged from any stack, vent, or building into the atmosphere without providing, as a minimum for its collection,

duct work and collectors that are properly designed and adequate to collect particulate to the maximum extent practicable, or such other devices as approved by the Commission. In no case shall the ambient air quality standards be exceeded beyond the property line.

The planer mill (including dry hog) is subject to this requirement and it will comply by providing and maintaining adequate duck-work and both cyclone and baghouse (collectors) for reducing particulate emissions. It needs to be clarified that both cyclone and bagfilter on the planer mill are deemed "inherent" to the process and not air pollution control devices. Complete details on this conclusion is included in Section 15 below of this application review.

Particulates (PM_{100}) loading at the outlet of the planer mill baghouse is expected to be 0.0017 grain/ft^3 which equates to 1.17 lb/hr emission rate based on an air flow rate of 79,500 ft^3/min. Compliance is expected for the planer mill.

In addition, the insignificant activities, especially the green wood block/trim chippers and bark hogs, and byproducts handling sources (storage bins) are subject to this regulation. Due to negligible emissions, compliance is expected.

15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes"

This rule sets emissions limit for PM resulting from any industrial process for which no other emission control standards are applicable according to the following formula. For sources with production rates less than or equal to 30 tons per hour (tph):

$$E = 4.1 \times (P^{0.67})$$

Where:
E = the allowable emission rate in lb/hr
P = process weight rate in tph

The rule also sets emission limit for particulate matter (PM) for process weight rates greater than 30 tph as following:

$$E = 55.0 \times (P)^{0.11} - 40$$

Where:
E = allowable emission rate in lbs/hr
P = process weight rate in tph

The regulation specifies that solid fuels charged are considered as part of the process weight, but liquid and gaseous fuels and combustion air are not.

This requirement in 02D .0515 applies to lumber drying kilns. Table 6-1 below presents the process weight rates and associated allowable emissions for the kilns. The process weight for the kilns are based on the worst-case drying capacity of 15,100 bd-ft/hr and a conservative conversion factor of 2.5 lb/bd-ft on a dry basis, which is based upon the density of dry wood (pine).

Table 6-1: Allowable v. Potential PM Emissions

Emission Source	Process Weight Rate ton/hr	Allowable Emission Rate lb/hr	Uncontrolled or Controlled Potential Emission Rate lb/hr
ES-DKN1	18.88	29.36	0.36
ES-DKN2	18.88	29.36	0.36
ES-DKN3	18.88	29.36	0.36
ES-DKN4	18.88	29.36	0.36
ES-DKN5	18.88	29.36	0.36

As specified in the Table above, the expected maximum emission rate for each kiln is 0.36 lb/hr, as compared to the allowable emission rate of 29.36 lbs/hr. Compliance with this requirement is expected for each kiln.

15A NCAC 02D .0516 "Sulfur Dioxide Emissions from Combustion Sources"

Emission of sulfur dioxide (SO_2) from any source of combustion discharged from any vent, stack, or chimney shall not exceed 2.3 pounds of sulfur dioxide per million BTU input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. Sulfur dioxide formed or reduced as a result of treating flue gases with sulfur trioxide or other materials shall also be accounted for when determining compliance with this standard. This standard does not apply to any source if it is subject to an emission standard for sulfur dioxide in 02D .0524, .0527, .1110, .1111, .1206, or .1210.

Sulfur dioxide emissions from the lumber drying kilns are subject to 2.3 pounds of sulfur dioxide per million BTU input emission standard as they are not subject to the SO_2 standard in any of the above exclusionary rules. The estimated emissions from these sources are negligible as compared to this limit, as shown below in Table 6-2.

For the kilns, the SO_2 emission rate is based upon the emission factor of 0.6 lb/million sft[39] and natural gas heating value of 1,020 Btu/sft[3].

Table 6-2: Allowable v. Potential SO_2 Emissions

Emission Source	Emission Standard lb/million Btu	Potential Emission Rate lb/million Btu
ES-DKN1	2.3	0.00059
ES-DKN2	2.3	0.00059
ES-DKN3	2.3	0.00059
ES-DKN4	2.3	0.00059
ES-DKN5	2.3	0.00059

Compliance with the above standard is expected for each of these sources.

In addition, SO_2 emissions from the emergency engine (insignificant activity) are subject to 02D .0516 standard. Due to negligible emissions, compliance is expected.

15A NCAC 02D .0521 "Control of Visible Emissions"

The intent of this Rule is to prevent, abate and control emissions generated from fuel burning operations and industrial processes where visible emissions can be reasonably expected to occur, except during startup, shutdowns, and malfunctions, approved as such, according to the procedures approved under 15A NCAC 02D .0535.

For sources manufactured after July 1, 1971, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period. However, except for sources required to install, operate, and maintain continuous opacity monitoring systems (COMS), compliance with the 20 percent opacity limit shall be determined as follows:

i. No six-minute period exceeds 87 percent opacity;
ii. No more than one six-minute period exceeds 20 percent opacity in any hour; and
iii. No more than four six-minute periods exceed 20 percent opacity in any 24-hour period.

Excess emissions during startup and shutdown shall be excluded from the determinations in paragraphs i. and ii. above, if the excess emissions are exempted according to the procedures set out in 02D .0535(g). Excess emissions during malfunctions shall be excluded from the determinations in paragraphs i. and ii. above, if the excess emissions are exempted according to the procedures set out in 02D .0535(c).

[9] *"[Section] 1.4 Natural Gas Combustion"*, 7/98, AP-42, EPA.

All periods of excess emissions shall be included in the determinations in paragraphs i. and ii. above, until such time that the excess emissions are exempted according to the procedures in 02D .0535.

The lumber drying kilns and the planer mill (including dry hog) are subject to the opacity limit of 20%. Due to natural gas burning and wood drying in the kilns, and the operation of the "inherent" dust control system (cyclone and baghouse) on the planer mill, visible emissions from these sources are expected to be negligible and compliance is expected.

In addition the insignificant activities, especially the green wood block/trim chippers and bark hogs, and by products handling sources (storage bins), and the emergency fire pump engine, are subject to this regulation. Due to negligible emissions, compliance is expected.

15A NCAC 02D .0530 "Prevention of Significant Deterioration"
15A NCAC 02D .0544 "Prevention of Significant Deterioration for Greenhouse Gases"

United States (US) Congress first established the New Source Review (NSR) program as a part of the 1977 Clean Air Act Amendments and modified the program in the 1990 amendments. The NSR program includes requirements for obtaining a pre-construction permit and satisfying all preconstruction review requirements for major stationary sources and major modifications, before beginning actual construction for both attainment areas and non-attainment areas. The NSR program for attainment and non-attainment areas are called "Prevention of Significant Deterioration" (PSD) and "Non-attainment New Source Review" (NAA NSR), respectively. The NSR focuses on industrial facilities, both new and modified, that create large increases in the emissions of specific pollutants.

The basic goal for PSD is to ensure that the air quality in attainment areas (e.g., Halifax County NC for PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, lead, and ozone) does not significantly deteriorate while maintaining a margin for future industrial growth.

Under PSD, all major new or modified stationary sources of air pollutants as defined in §169 of the CAA must be reviewed and permitted, prior to construction, by EPA and/or the appropriate permitting authority, as applicable, in accordance with §165 of CAA. A "major stationary source" is defined as any one of 28 named source categories (e.g., "fossil fuel-fired steam electric plants of more than 250 million Btu per hour heat input"), which emits or has a potential to emit (PTE) of 100 tons per year of any "regulated NSR pollutant", or any other stationary source (i.e., other than 28 named source categories), which emits or has the potential to emit 250 tons per year of any "regulated NSR pollutant".

Pursuant to the Federal Register (FR) notice on February 23, 1982 (47 FR 7836), North Carolina (NC) has a full authority from the US Environmental Protection Agency (EPA) to implement the PSD regulations in the State effective May 25, 1982. NC's State Implementation Plan (SIP) - approved PSD regulations have been codified in 15A NCAC 02D .0530 (for all regulated NSR pollutants except GHGs) and 02D .0544 (for GHGs), which implement the requirements of 40 CFR 51.166 "Prevention of Significant Deterioration of Air Quality" with a few exceptions as included in these approved regulations. The version of the CFR incorporated in the NC's SIP regulation, with respect to §51.166, is that of July 1, 2019, and it does not include any subsequent amendments or editions.[10]

The RVL is not one of the listed 28 source category sources. Therefore, it is to be classified according to major source threshold of 250 tons.

The Permittee has performed an applicability analysis for PSD as follows for the source for determination of whether it results in an emission increase of any regulated NSR pollutant above the major source threshold. Using the "Actual-to-potential test for projects that only involve construction of a new emissions unit(s)" in §51.166(a)(7)(iv)(d) (as implemented through 02D .0530), the Permittee has performed calculations for PTE (post-change) for each regulated NSR pollutant expected to be emitted from each new unit. Consistent with §51.166(b)(4), the "potential to emit" estimates for all emissions units have been based upon the maximum process rate (throughput or heat input, as applicable) or design capacity, as applicable, control device efficiency (if applicable), and 8760 hours of operation

[10] 85 FR 57707 (9/16/2020) and 40 CFR §52.1770(c).

(except emergency fire pump engine). The baseline emissions (pre-change) for all new units resulting from the initial construction will be zero as per the §51.166(b)(47)(iii).

Lumber drying kilns' PM emissions estimate is based upon 500 million bd-ft per year maximum lumber drying throughput (aggregate) and DAQ emission estimation spreadsheet[11]. The PM_{10} emissions estimate for the lumber drying kilns is based upon the size distribution data for a variety of wood dryers in the EPA SPECIATE emission estimation tool and the above lumber drying throughput. The $PM_{2.5}$ emissions estimate for kiln lumber drying is based upon the "Weyerhaeuser's Particulate Matter Estimating Guide, 2003"[12] and the lumber drying throughput as above. VOC emissions for kiln lumber drying are based upon the proposed BACT basis of 4.2 lb/1000 bd-ft and the above lumber drying throughput.

Fuel combustion emissions have been estimated using a maximum heat input rate of 306,600 million Btu per year with the natural gas firing for each kiln and the DAQ spreadsheet[13]. The applicant has clarified that although the low-NOx burners for each kiln will have a nameplate rating of 45 million Btu per hour, this high rate of heat input will not normally occur and cannot take place on a long-term basis. Drying lumber is a closely controlled process, requiring varying heat input throughput the drying cycle. The applicant has argued that the lumber product would be destroyed if the kilns were operated at 45 million Btu per hour on a continuous basis. The required annual heat input will reflect the conditions necessary to dry a maximum of 100 million board-foot of lumber per year (per kiln). At this drying capacity, each kiln will combust a maximum of 306,600 million Btu per year of natural gas, which is equivalent to 35 million Btu per hour at 8,760 hours per year.

Total particulate emissions from the bark hogs and block/trim Chippers are estimated using the maximum process rates of 262,800 tons/yr (bark hog) and 219,000 tons/hr (block/trim chipper), moisture content, and the National Council for Air and Stream Improvement (NCASI) emissions factors[14].

As stated previously, planer mill (including dry hammer hog) emissions are estimated based upon particulates (PM_{100}) loading at the outlet of the baghouse of 0.0017 grain/ft^3 and an air flow rate of 79,500 ft^3/min.

Byproducts handling sources (i.e., chip storage bin, bark storage bin, sawdust storage bin, and shavings storage bin)' emissions are estimated based on percent moisture, numbers of transfers, maximum amount of annual transfer rates, and emissions factors[15].

Emergency engine emissions are based upon the engine output capacity of 305 HP, DAQ emission estimation spreadsheet[16], and 500 hours of operation[17].

The Table 6-3 below provides emissions estimate for the new major stationary source:

Table 6-3: Emissions Estimate for Proposed Major Stationary Source

[11] *"Wood Kiln Emissions Calculator Revision C July 2007"*, Available at Emission Estimation Spreadsheets | NC DEQ.
[12] Referenced in the May 2010 Weyerhaeuser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.
[13] *"Natural Gas Combustion Emissions Calculator Revision N 01/05/2017"*, Available at Emission Estimation Spreadsheets | NC DEQ.
[14] *"Table 9.1 TPM1 (Filterable) Emissions from Wood Preparation Activities"*, Compilation of Criteria Air Pollutant Emissions Data for Sources at Pulp and Paper Mills including Boilers – An Update to Technical Bulletin No. 884. Technical Bulletin No. 1020, National Council for Air and Stream Improvement, Inc., December 2013.
[15] *"[Section] 13.2.4 Aggregate Handling And Storage Piles"*, 11/06, AP-42, EPA.
[16] *"Gas and Diesel Combustion Engines Emissions Calculator Revision S 6/22/2015"*, Available at Emission Estimation Spreadsheets | NC DEQ.
[17] *"Calculating Potential to Emit (PTE) for Emergency Generators"*, John Seitz, Director, OAQPS, EPA, September 6, 1995.

Regulated NSR Pollutant	Baseline Actual Emissions Tons Per Year	Potential to Emit Emissions Tons Per Year	Emissions Change Tons Per Year	Major Stationary Source Threshold Tons Per Year	Significant Emission Rate Tons Per Year	Major Source Review Required?
PM	0	11.62	11.62	250	25	No
PM_{10}	0	6.52	6.52	250	15	No
$PM_{2.5}$	0	3.43	3.43	250	10	No
SO_2	0	0.54	0.54	250	40	No
NOx (as NO_2)	0	39.94	39.94	250	40	No
CO	0	63.63	63.63	250	100	No
VOC	0	1054.3	1054.3	250	40	Yes
Lead	0	0.0004	0.0004	250	0.6	No
GHG as CO_{2e}	0	89,843.0	89,843.0	-	75,000	Yes

In Table 6-3 above, it should be noted that the combustion and process emissions are mostly stack emissions. However, some kiln emissions can escape as fugitive emissions especially from the open ends of continuous kilns where the lumber enters and exits. Additionally, the PTE for all indicators of particulates, PM, PM_{10} and $PM_{2.5}$, include both filterable and condensable portions, pursuant to NC's SIP-approved regulations in 02D .0530 and .2609. The following can be deduced:

- The facility is a new major stationary source; because, it emits or has a potential to emit 250 tons per year or more of at least one regulated NSR pollutant (VOC). Thus, a PSD permit for the major stationary source must be obtained for this pollutant, meeting the requirements therein, before construction can begin.

- Since the facility is a "major" source for at least one regulated NSR pollutant (VOC), the remaining pollutants' emissions are subject to their respective significance levels in accordance with §51.166(b)(23). If the emissions of the other pollutants are greater than these thresholds, they too would be subject to major stationary source review under PSD. There is not any other pollutant (other than VOC, non-GHGs) for the proposed source, whose emissions exceed the significant levels.

- Regarding the GHGs, the PTE is more than its significance threshold of 75,000 tons/yr CO_2e. Thus, major source review is required for GHGs as well (in addition to VOC), consistent with the requirements in 02D .0544(a) and UARG v. EPA[18]. Briefly, the new greenfield facility is a major stationary source for least one "anyway" pollutant (i.e., non-GHG pollutants), such as VOC, and it will have a PTE for GHGs more than 75,000 TPY CO_2e; thus, this pollutant (GHGs) becomes "subject to regulation [PSD]" in accordance with §51.166(b)(48)(iv)(a).

Thus, RVL is required to perform the following reviews and analyses, as applicable, for emissions of VOC and GHGs, consistent with 15A NCAC 02D .0530 and .0544.

- BACT analysis
- Air quality analysis
- Source impact analysis
- Additional impact analysis
- Class I analysis (if applicable)

It needs to be emphasized that "there are currently no NAAQS or PSD increments established for GHGs, and therefore these PSD requirements [i.e., NAAQS and PSD increment compliance (source impact analysis), air quality analysis, additional impact analysis, and Class I analysis) do not apply for pollutant GHGs, even when PSD is triggered for GHGs."[19] Further the federal agency (EPA) has opined that "compliance with the BACT analysis is the best technique that can be employed at present to satisfy the additional impacts analysis and Class I area requirements of the rules

[18] *Utility Air Regulatory Group (UARG) v. Environmental Protection Agency*, Supreme Court of the United States, June 23, 2014.
[19] Page 31520 at 75 FR 31514, June 3, 2010.

related to GHG".[20] In summary, only the BACT analysis portion of the PSD requirement applies for GHGs for major stationary source or a major modification to an existing major stationary source.

Refer to Sections 7 through 10 below for discussions on these requirements.

15A NCAC 02D .1111 "Maximum Achievable Control Technology"

Part 63 Subpart DDDD

Pursuant to §112(d), EPA has promulgated a Maximum Achievable Control Technology (MACT) standard in 40 CFR 63 Subpart DDDD as "National Emissions Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products (PCWP)" manufacturing facilities at 69 FR 46011, July 30, 2004. This MACT was lastly revised at 85 FR 49434, August 13, 2020.

If the PCWP manufacturing facility is located at a major source of HAP emissions, the MACT does apply.

A PCWP manufacturing facility is defined as a facility that manufactures plywood and/or composite wood products by bonding wood material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product. **Plywood and composite wood products manufacturing facilities also include facilities that manufacture dry veneer and lumber kilns located at any facility.** Plywood and composite wood products include, but are not limited to, plywood, veneer, particleboard, oriented strandboard, hardboard, fiberboard, medium density fiberboard, laminated strand lumber, laminated veneer lumber, wood I-joists, kiln-dried lumber, and glue-laminated beams.

As stated previously, the RVL facility has a potential to emit methanol (single largest HAP) at a rate of 49.8 TPY and total HAPs at a rate of 73.1 TPY. Thus, the facility is a major source for HAPs (both for single and aggregate HAPs) and it is a PCWP manufacturing facility due to five lumber drying kilns.

However, pursuant to §63.2252, the lumber kilns at the RVL are not required to comply with the compliance options, work practice requirements, performance testing, monitoring, and recordkeeping or reporting requirements of this Subpart, or any other requirements in Subpart A of this Part, except for the initial notification requirements in § 63.9(b).

This application serves as the initial notification for the construction of the initial three lumber drying kilns under Phase 1. An updated notification will be submitted when Phase 2 construction is underway. No other requirements apply to the facility as stated above under Part 63 for the proposed lumber kilns.

Part 63 Subpart ZZZZ

EPA has promulgated "National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines" in 40 CFR 63 Subpart ZZZZ. These standards were lastly revised at 85 FR 78463, December 4, 2020.

The insignificant activity (fire pump engine) has been "constructed" at the RVL site in 1993; thus, it is an existing emergency engine. The size of the engine is 305 HP with 7 liters cylinder displacement.

The engine is required to meet the requirements regarding changing oil and filter, and inspection of air cleaner and hoses and belts, pursuant to §63.6602 and Table 2c to the Subpart.

There are no operating restrictions.

If the fire pump engine operates or contractually obligated to function under the "demand response" situation, then it must meet the fuel requirements per §63.6604(b).

[20] Page 48, *"PSD and Title V Permitting Guidance for Greenhouse Gases"*, Prepared by the OAQPS, US EPA, RTP, NC 27711, March 2011.

There are no performance tests required to be conducted under this NESHAP.

The Permittee is required to comply with the monitoring, installation, collection, and operation and maintenance requirements, pursuant to §63.6625(e), (f), (h), and (i).

There are no initial compliance requirements. Though the Permittee is required to demonstrate continuous compliance per §§663.6605 and 63.6640.

There are no notifications required for emergency engines.

The Permittee shall comply with all applicable reporting requirements in §63.6650 and record keeping requirements in §63.6655.

15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions"

The owner or operator of a facility subject to this Rule shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary. The RVL facility is expected to comply with this requirement.

15A NCAC 02Q .0317 "Avoidance Conditions for Prevention of Significant Deterioration"

As specified above, the potential to emit for NOx for the facility is 39.94 tons/yr, just shy of its significance threshold of 40 tons/yr for NOx; which otherwise would require a PSD permit for this pollutant as well, since the new stationary source is "major" for at least one pollutant (VOC). The DAQ believes that a non-applicability limit is required to be established for PSD so that both the actual and potential emissions remain less than the above significant amount. It needs to be noted that the NOx PTE estimate is based on EPA emissions factors (AP-42), which are average emissions factors for the nationwide units (natural gas combustors, diesel-fired emergency engines). Since the applicant did not provide more accurate emissions estimates for the facility sources (lumber drying kilns, emergency engine) based upon equipment vendor data or guaranteed emissions, and uncertainty involved in the PTE estimate, it would be appropriate for the agency to establish an avoidance limitation for PSD for this pollutant for facility emissions.

The DAQ proposes to require monitoring and record keeping of NOx emissions on a monthly basis for each month of operation, and reporting of emissions on a semi-annual basis, as below. The owner will also be required to monitor and keep records monthly of usage of both natural gas and diesel fuel, and operating hours of emergency engine, and report them on a semi-annual basis. However, the monitoring, recordkeeping, and reporting requirements for the same parameters for PSD will be sufficient for this PSD avoidance requirement.

NOx emissions will be calculated as per the formula below:

NOx Emissions Per Month

$= [\Sigma\{50 \text{ lb}/10^6 \text{ scf} \times \text{A scf/month}\}] + [0.031 \text{ lb/hp-hr} \times 305 \text{ hp} \times \text{B hr/month}] / [2000 \text{ lbs/ton}]$

Where,

A = natural gas usage in standard cubic feet per month for each lumber drying kiln.

B = hours of operation per month for diesel-fired emergency fire water pump.

50 $\text{lb}/10^6$ scf = emission factor for small natural gas fired combustors with low-NOx burners (Table 1.4-1 "Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion", AP-42).

0.031 lb/hp-hr = emission factor for small diesel-fired stationary engines (Table 3.3-1 "Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines", AP-42).

15A NCAC 02Q .0700 "Toxic Air Pollutant Procedures"
15A NCAC 02D .1100 "Control of Toxic Air Pollutants"

Per 15A NCAC 02Q .0704(a) and (c), the owner or operator of a new facility shall submit a permit application to comply with 15A NCAC 02D .1100 if emissions of any toxic air pollutant, excluding sources exempt from evaluation pursuant to 02Q .0702, exceed the levels set forth in 02Q .0711. In addition, the state agency shall review the sources specifically meeting the exemption set forth in 02Q .0702(a)(27), pursuant to NCGS 143-215.107(a)(5)b.

With this new facility construction, there are increases in emissions of certain toxics air pollutants, causing exceedance of toxic air pollutant emission rates (TPERs) in 02Q .0711. Thus, per 02Q .0704, toxic air pollutant (TAP) compliance demonstration is required for this new facility to ensure that the emissions of TAPs will not cause the exceedance of the applicable acceptable ambient level (AAL) listed in 15A NCAC 02D .1104 beyond the property line. It needs to be noted that although the air emissions sources, subject to Part 63 standards (five lumber drying kilns subject to Subpart DDDD and fire pump engine subject to Subpart ZZZZ) are exempt from air toxics permitting pursuant to 02Q .0702(a)(27)(B), the Permittee has volunteered to include emissions of all such exempt sources for compliance purposes.

It needs to be clarified that the stacks installed on the kiln exhaust hoods will be vertical and unobstructed. However, the hoods will only capture a portion of the kiln emissions (design capture of 80%), which are modeled as point sources (total 10). The remaining kiln emissions will be exhausted through the doors, which are modeled as volume sources (total 20). The applicant assumed that there is a horizontal component to the volume source exhaust; therefore, the TPER values associated with non-vertical exhaust were used in the applicability analysis. A point source of fire pump engine was also included. The following Table 6-4 provides the facility-wide air toxics evaluation to determine the pollutant(s) exceeding the TPERs:

Table 6-4: Air Toxics Evaluation

	Per Kiln				5 Kiln Total			Fire Pump			Site Total			TPER*			Modeling Required?		
HAPs/TAPs	**lb/hr**	**lb/day**	**ton/yr**	**lb/yr**	**lb/hr**	**lb/day**	**lb/yr**	**lb/hr**	**lb/day**	**lb/yr**	**lb/hr**	**lb/day**	**lb/yr**	**lb/hr**	**lb/day**	**lb/yr**	**lb/hr**	**lb/day**	**lb/yr**
Acetaldehyde (kiln)	7.85E-01	1.88E+01	2.60E+00	5.20E+03	3.93E+00	9.42E+01	2.60E+04												
Acetaldehyde (fuel)	6.71E-07	1.61E-05	2.28E-06	4.57E-03	3.35E-06	8.05E-05	2.28E-02												
Acetaldehyde (Total)	7.85E-01	1.88E+01	2.60E+00	5.20E+03	3.93E+00	9.42E+01	2.60E+04	1.64E-03	3.93E-02	8.19E-01	3.93E+00	9.43E+01	2.60E+04	6.80			NO		
Acrolein (kiln)	1.13E-01	2.72E+00	3.75E-01	7.50E+02	5.66E-01	1.36E+01	3.75E+03				5.66E-01	1.36E+01	3.75E+03						
Acrolein (fuel)	7.94E-07	1.91E-05	2.71E-06	5.41E-03	3.97E-06	9.53E-05	2.71E-02				3.97E-06	9.53E-05	2.71E-02						
Acrolein (Total)	1.13E-01	2.72E+00	3.75E-01	7.50E+02	5.66E-01	1.36E+01	3.75E+03	1.97E-04	4.74E-03	9.87E-02	5.66E-01	1.36E+01	3.75E+03	0.02			**YES**		
Ammonia (fuel)	1.41E-01	3.39E+00	4.81E-01	9.62E+02	7.06E-01	1.69E+01	4.81E+03				7.06E-01	1.69E+01	4.81E+03	0.68			**YES**		
Arsenic (fuel)	8.82E-06	2.12E-04	3.01E-05	6.01E-02	4.41E-05	1.06E-03	3.01E-01	8.54E-06	2.05E-04	4.27E-03	5.27E-05	1.26E-03	3.05E-01			0.05			**YES**
Benzene (fuel)	9.26E-05	2.22E-03	3.16E-04	6.31E-01	4.63E-04	1.11E-02	3.16E+00	1.99E-03	4.78E-02	9.96E-01	2.46E-03	5.89E-02	4.15E+00			8.10			NO
Benzo(a)pyrene (fuel)	5.29E-08	1.27E-06	1.80E-07	3.61E-04	2.65E-07	6.35E-06	1.80E-03	4.01E-07	9.63E-06	2.01E-04	6.66E-07	1.60E-05	2.00E-03			2.20			NO
Beryllium (fuel)	5.29E-07	1.27E-05	1.80E-06	3.61E-03	2.65E-06	6.35E-05	1.80E-02	6.41E-06	1.54E-04	3.20E-03	9.05E-06	2.17E-04	2.12E-02			0.28			NO
1,3-Butadiene				0.00E+00			0.00E+00	8.35E-05	2.00E-03	4.17E-02	8.35E-05	2.00E-03	4.17E-02			11.00			NO
Cadmium (fuel)	4.85E-05	1.16E-03	1.65E-04	3.31E-01	2.43E-04	5.82E-03	1.65E+00	6.41E-06	1.54E-04	3.20E-03	2.49E-04	5.98E-03	1.66E+00			0.370			**YES**
Chromium VI (Fuel) soluble chromate compounds as Chromium VI equivalent	6.18E-05	1.48E-03	2.10E-04	4.21E-01	3.09E-04	7.41E-03	2.10E+00	6.41E-06	1.54E-04	3.20E-03	3.15E-04	7.57E-03	2.11E+00		0.013			NO	
Formaldehyde (kiln)	7.35E-05	1.76E-03	1.13E-02	2.25E+01	3.68E-04	8.82E-03	1.13E+02				3.68E-04	8.82E-03	1.13E+02						
Formaldehyde (fuel)	1.83E-02	4.39E-01	9.15E-01	1.83E+03	9.15E-02	2.20E+00	9.15E+03				9.15E-02	2.20E+00	9.15E+03						
Formaldehyde (Total)	1.84E-02	4.41E-01	9.26E-01	1.85E+03	9.19E-02	2.20E+00	9.26E+03	2.52E-03	6.05E-02	1.26E+00	9.44E-02	2.27E+00	9.26E+03	0.04			**YES**		
Hexane (fuel)	7.94E-02	1.91E+00	2.71E-01	5.41E+02	3.97E-01	9.53E+00	2.71E+03				3.97E-01	9.53E+00	2.71E+03		23.00			NO	
Manganese (fuel)	1.68E-05	4.02E-04	5.71E-05	1.14E-01	8.38E-05	2.01E-03	5.71E-01	1.28E-05	3.07E-04	6.41E-03	9.66E-05	2.32E-03	5.78E-01		0.63			NO	
Mercury (fuel)	1.15E-05	2.75E-04	3.91E-05	7.82E-02	5.74E-05	1.38E-03	3.91E-01	6.41E-06	1.54E-04	3.20E-03	6.38E-05	1.53E-03	3.94E-01		0.013			NO	
Nickel (fuel)	9.26E-05	2.22E-03	3.16E-04	6.31E-01	4.63E-04	1.11E-02	3.16E+00	6.41E-06	1.54E-04	3.20E-03	4.70E-04	1.13E-02	3.16E+00		0.13			NO	
Phenol (kiln)	1.51E-01	3.62E+00	5.00E-01	1.00E+03	7.55E-01	1.81E+01	5.00E+03				7.55E-01	1.81E+01	5.00E+03	0.24			**YES**		
Toluene (fuel)	1.50E-04	3.60E-03	5.11E-04	1.02E+00	7.50E-04	1.80E-02	5.11E+00	8.73E-04	2.10E-02	4.37E-01	1.62E-03	3.90E-02	5.55E+00	14.40	98.00		NO	NO	
Xylene								0.000608	1.46E-02	3.04E-01	6.08E-04	1.46E-02	3.04E-01	16.4	57		NO	NO	

*TPER rate conservatively based on TPER for emission release points for obstructed or non vertical oriented (02Q .0711 (a)). Assumed volume source would have some non vertical release.

Based on the above, the Permittee is required to demonstrate compliance with the AALs for acrolein, ammonia, arsenic, cadmium, chromium (VI), formaldehyde, and phenol. The Permittee has performed the modeling analysis for these pollutants on a source-by-source basis and the resulting modeled concentrations are compared to the applicable AALs. The potential to emit emission rates for the emissions sources emitting these pollutants are utilized in the modeling. All TAPs emissions impacts for annual regulatory thresholds (AALs) were based upon 8,760 hours per year facility operations, except for the fire pump engine operation at 500 annual hours. The following Tables 6-5 and 6-6 includes the modeled air toxics rates and the predicted maximum impacts:

Table 6-5: Air Toxics Limits

Model ID	Description	Type	Acrolein	Ammonia	Arsenic	Cadmium	Formaldehyde	Phenol
KLN1_S1	Kiln 1 West Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN1_S2	Kiln 1 East Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN2_S1	Kiln 2 West Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02

Model ID	Description	Type	Acrolein	Ammonia	Arsenic	Cadmium	Formaldehyde	Phenol
KLN2_S2	Kiln 2 East Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN3_S1	Kiln 3 West Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN3_S2	Kiln 3 East Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN4_S1	Kiln 4 West Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN4_S2	Kiln 4 East Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN5_S1	Kiln 5 West Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
KLN5_S2	Kiln 5 East Stack	Point	4.530E-02	5.650E-02	3.539E-06	1.941E-05	1.120E-01	6.040E-02
FWP	Fire pump Engine	Point	1.970E-04	--	8.540E-06	6.410E-06	2.520E-03	--
KLN1_A1	Kiln 1 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN1_A2	Kiln 1 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN1_B1	Kiln 1 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN1_B2	Kiln 1 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN2_A1	Kiln 2 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN2_A2	Kiln 2 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN2_B1	Kiln 2 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN2_B2	Kiln 2 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN3_A1	Kiln 3 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN3_A2	Kiln 3 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN3_B1	Kiln 3 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN3_B2	Kiln 3 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN4_A1	Kiln 4 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN4_A2	Kiln 4 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN4_B1	Kiln 4 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN4_B2	Kiln 4 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN5_A1	Kiln 5 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN5_A2	Kiln 5 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN5_B1	Kiln 5 West Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03
KLN5_B2	Kiln 5 East Door	Volume	5.660E-03	7.060E-03	4.406E-07	2.420E-06	1.400E-02	7.550E-03

"--" means source was not modeled for that particular air toxics analysis.

Table 6-6: Maximum Predicted Impacts

Pollutant	Averaging Period	AAL ($\mu g/m^3$)	Maximum Predicted Impacts As Percent of AAL
Acrolein	1-hour	80	47.6 %
Ammonia	1-hour	2700	1.75 %
Arsenic	Annual	2.10E-03	3.33 %
Cadmium	Annual	5.50E-03	6.54 %
Formaldehyde	1-hour	150	62.8 %
Phenol	Annual	950	5.35 %

The DAQ has verified the emissions factors and the methodology used to estimate emissions rates and found them to be satisfactory. The Air Quality Analysis Branch (AQAB) has reviewed the dispersion modeling analysis for the facility and concluded that the submitted modeling analysis adequately demonstrates compliance on a source-by-source basis.

Finally, North Carolina Division of Air Quality's air toxics program is a "risk-based" regulatory program designed to protect the public health by limiting the emissions of toxic air pollutants from man-made sources. Because the analysis demonstrated compliance on a source-by-source basis including emissions of exempt sources with the applicable AALs, the DAQ has concluded that the emissions from the exempt Part 63 affected sources, such as five lumber drying kilns and fire pump engine, will not present an unacceptable risk to human health based on dispersion modeling analysis. Thus, consistent with 02Q .0702(a)(27)(B), the DAQ will not include the approved air toxics emissions rates, as above, because all emissions for each of these pollutants are from the exempt sources. Again, consistent with the above exemption, the DAQ will not include the requirement for those pollutants whose facility-wide emissions did not exceed the applicable TPER. In summary, the facility, as proposed, will remain an exempt facility from the air toxics requirements in 02Q .0700 and 02D .1100.

7. BACT Analysis

Background

The CAA §169(3) defines:

> "The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emissions of any pollutant which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act. Emissions from any source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under this paragraph as it existed prior to enactment of the federal Clean Air Act Amendments of 1990."

Given the variation between emission sources, facility configuration, local air-sheds, and other case-by-case considerations, Congress determined that it was impossible to establish a single BACT determination for a particular pollutant or source. Economic, energy, and environmental impacts are mandated in the CAA to be considered in the determination of case-by-case BACT for specific emission sources. As defined, BACT is an emission limitation and in most instances, BACT may be defined through a numerical emission limit. In cases where this is impracticable (such as economical or technical infeasibility for a specific emissions unit to measure the amount of pollution), BACT can be defined using a particular type of control device, work practice, or fuel type. In no event, can a technology be recommended which would not comply with any applicable standard under CAA §111 (Part 60, 40 CFR) or §112 (Parts 61 and 63, 40 CFR).

The EPA developed guidance, commonly referred to as "Top-Down" BACT[21], for PSD applicants for determining BACT. This guidance is a non-binding reference material for permitting agencies, which process PSD applications pursuant to their SIP-approved regulations. As stated in Section 6 above, NCDAQ issues PSD permits in accordance with its SIP-approved regulations in 15A NCAC .02D .0530 and .0544. Therefore, the DAQ does not strictly adhere to EPA's "top-down" guidance. Rather, it implements BACT in accordance with the statutory and regulatory language. As such, NCDAQ's BACT conclusions may differ from those of the EPA.

[21] *"Improving New Source Review (NSR) Implementation"*, J. Craig Potter, Assistant Administrator for Air and Radiation US EPA, Washington D.C., December 1, 1987, and *"Transmittal of Background Statement on "Top-Down" Best Available Control Technology"*, John Calcagni, Director, Air Quality Management Division, US EPA, OAQPS, RTP, NC, June 13, 1989.

As stated previously, a major source review is triggered for this new facility due to increases in emissions of VOC and GHGs. Thus, the new stationary source is required to apply BACT for these pollutants, consistent with §51.166(j)(2).

The emissions unit must be defined so that the BACT analysis can be performed. The fundamental purpose or the basic design of the proposed facility is to construct a lumber mill for processing southern yellow pines and manufacturing structural (dimensional) lumber, using direct, natural gas-fired continuous kilns. Thus, it is clear that the BACT analysis for the facility needs to be performed for the direct, natural gas-fired continuous kilns for VOC and GHGs, while processing southern yellow pines. In addition, emergency fire water pump also needs to apply BACT for these pollutants as it contributes to the project PTE.

BACT Analysis for VOC

Lumber Drying Kilns

Organic compounds present in wood are released during the lumber drying process. These compounds are in gaseous form at the elevated temperatures experienced in the kiln. The species and quantity of compounds released depend on several factors related to the drying process, including the kiln temperature profile, the surface area of the wood material relative to its mass, initial moisture content, and the amount of moisture removed from the wood. Emissions also vary depending on the species of wood.

Emissions from lumber kilns are difficult to capture. Efforts by the wood products industry to accurately test and quantify potential VOC emissions from lumber drying kilns have met with limited success. The kiln exhaust exits from multiple vents and openings in the roof of a batch kiln, as well as from the open ends of a continuous kiln, where the lumber enters and exists. Directing the kiln exhaust flow to a control device would disrupt the necessary ventilation and circulation patterns required to maintain the proper moisture content and temperature during the various drying cycles. In addition, potential back pressure from a control device or a vacuum generated by a blower would disrupt the controlled drying environment and adversely affect the lumber product quality

Control Alternatives & Technical Feasibility

Proper Maintenance and Operation

Proper maintenance and operation of lumber drying kilns can effectively reduce VOC emissions. Proper drying schedules and temperatures should be selected based on moisture content and manufacturer's specifications. Routine maintenance should also be completed on all kilns based on manufacturer's recommendations. This technique is considered to be a technically feasible option for the proposed kilns.

Condensation

VOC emissions are condensed and removed from the exhaust by chilling the exhaust gases. VOCs condense when the concentration of organics in the gas exceed their vapor pressure at the condenser temperature. The condensed VOCs are then destroyed in a separate combustion device, or the materials are recovered for sale.

Condensation is only effective to the extent that the temperature of the emissions can be cooled to a temperature necessary to cause condensation to occur. The primary constituents of lumber kiln emissions are terpenes. In order to reduce the concentration of terpenes to a reference level of 100 ppm, the temperature would need to be reduced below 32 °F. However, kiln exhaust is saturated with moisture. At temperatures below the freezing point of water, the unit would plug up with ice from the water vapor. The emission stream of the proposed lumber drying kilns contain significant quantities of water vapor. Thus, condensation is concluded to be technically infeasible technique for this project VOC emissions removal.

Thermal or Catalytic Oxidation

VOCs are oxidized to carbon dioxide and water vapor at a high temperature with a residence time between one-half and one second. Thermal oxidizers can be designed as conventional thermal units, recuperative units, or regenerative

thermal oxidizers. A conventional thermal oxidizer does not have heat recovery capability. Therefore, the fuel cost is extremely high, and it is not suitable for high volume flow applications. In a recuperative unit, the contaminated inlet air is preheated by the combustion exhaust gas stream through a heat exchanger.

A regenerative thermal oxidizer generally consists of two or more chambers packed with ceramic media. The VOC-laden gas enters one hot ceramic bed, where the gas is heated to the desired combustion temperature. Auxiliary fuel may be required in this stage, depending on the heating value of the inlet gas. After reacting in the combustion zone, the gas then passes through another ceramic bed, where the heat released from combustion is recovered and stored in the bed. The process flow is then switched so that the polluted gas is preheated by the ceramic bed. The system is operated in an alternating cycle, recovering up to ninety-five percent of the thermal energy during normal operation. Similar to a regenerative thermal oxidizer, a regenerative catalytic oxidizer oxidizes VOC to carbon dioxide and water. However, a regenerative catalytic oxidizer uses catalysts to lower the activation energy required for oxidation so that the oxidation can be accomplished at a lower temperature than in a regenerative thermal oxidizer. Thus, the necessity for auxiliary fuel is lower for a regenerative catalytic oxidizer than for a regenerative thermal oxidizer.

Several factors make the use of thermal or catalytic oxidation technically infeasible for controlling VOC emissions from lumber drying kilns. The most important factor is the difficulty of capturing emissions from a kiln without adversely impacting product quality. As discussed previously, directing the kiln exhaust flow to a control device would disrupt the necessary ventilation and circulation patterns required to maintain the proper moisture content and temperature during the various drying cycles. In addition, potential back pressure from a control device or a vacuum generated by a blower would disrupt the controlled drying environment.

Another important factor concerning potential application of oxidation technologies to a lumber drying kiln is the ability to control the oxidation process temperature. Oxidation unit burners are sized to bring the oxidation chamber to the desired operating temperature in a reasonable amount of time when the unit is drawing ambient air with no VOC. They are turned down during normal operation to supply just enough heat to keep the process at the desired temperature. The burners have a limited turndown ratio, so they cannot be operated below a certain heat (Btu) output. The VOCs being burned also supply heat to keep the temperature high. When the combined heat input from the VOCs and the burner raise the combustion temperature above the safe operating range of the unit, it will shut down.

The potential to thermally overload an oxidizer is severe for lumber kilns because of the highly variable emission flow rate and VOC concentrations. The oxidation unit must be designed to accommodate the highest kiln exhaust rate at the lowest VOC concentration. The oxidizer must also handle the lowest expected flow rate at the highest VOC concentration. However, the range of flows and concentrations is so large that at the low exhaust rate and high VOC concentration conditions, the oxidation unit will be thermally overloaded and shut down. The challenge of variable flow and concentration is somewhat reduced in a continuous kiln, as compared to a batch kiln; however, the challenge still exists. In addition, capturing the exhaust from a continuous kiln is complicated by the fact that a large fraction of the exhaust escapes through the open ends (where lumber enters and exits the unit). However, these ends must remain open to support the continuous nature of the process. Adding forced exhaust inside the kiln will disrupt the humidity and temperature gradients required for heat transfer and lumber conditioning. As such, proper operation of the kiln does not allow for forced exhaust of the air flow. Since the airflow cannot be captured, no add-on control device is feasible.

Moreover, maintaining a minimum flow through the oxidation unit is not an option. The exhaust rate from the kiln is set by the necessary ventilation and circulation patterns required to maintain the proper moisture content and temperature during the various drying cycle stages. Potential pressure changes from a blower-generated vacuum would disrupt the controlled drying environment and adversely affect the lumber product quality. Finally, the combustion of an auxiliary fuel would increase NOx emissions. Generating NOx emissions in an effort to reduce VOC emissions is unlikely to yield an environmental benefit, as both pollutants contribute to ambient ozone formation. Additional NOx emissions are of particular concern to NC, where ozone formation is NOx-limited.

For the reasons discussed above, DAQ concludes oxidation technology (both thermal oxidation and catalytic) technically infeasible for reducing VOC emissions from the proposed lumber drying kilns.

Carbon Adsorption

Carbon adsorption systems can potentially be used to remove VOC from exhaust gas streams. The core component of a carbon adsorption system is an activated carbon bed contained in a steel vessel. The VOC-laden gas passes through the carbon bed where the VOC is adsorbed on the activated carbon. The cleaned gas is discharged to the atmosphere. The spent carbon is regenerated either at an on-site regeneration facility or by an off-site activated carbon supplier. Spent carbon is regenerated by using steam to displace adsorbed organic compounds at high temperatures.

Carbon adsorption is not recommended for exhaust streams with greater than 50 percent relative humidity and temperatures greater than 150 °F. At high moisture content, water molecules begin to compete with the hydrocarbon molecules for active adsorption sites. This reduces the capacity and the efficiency of the adsorption system. In addition, high exhaust temperatures reduce the efficiency of the activated carbon in capturing hydrocarbons. The exhaust from a lumber drying kiln is saturated with moisture for extended periods of the drying cycle. Exhaust temperatures vary according to the drying cycle but can exceed 200 °F.

Moreover, although heavier compounds tend to be more easily adsorbed than lighter compounds for a given adsorption system, their desorption is very difficult. Thus, carbon adsorption technology is not recommended for compounds with molecular weights above 130 lb/lb-mole[22] such as pinenes (main constituent in southern yellow pines with a molecular weight of 136.24 lb/lb-m).

Due to the reasons discussed above, carbon adsorption is considered to be a technically infeasible technique for reducing VOC emissions from the proposed lumber drying kilns.

Biofiltration

Biofiltration is the process by which off-gases containing biodegradable organic compounds are vented through a biologically active material under controlled temperature and humidity conditions. The process typically uses a biofilm immobilized on a porous substrate as the biofilter. Contaminants in the exhaust gas partition into the liquid phase of the biofilm as the gas passes through the biofilter. The contaminants transferred to the biofilm are then available for oxidation through biodegradation by the microorganisms inhabiting the biofilm.

In general, the microorganisms used in biofiltration cannot survive at temperatures exceeding 105 °F; however, the temperature of the exhaust stream leaving a kiln is typically 120 °F or higher. In addition, the primary VOC constituent of the kiln exhaust is terpenes, which are highly viscous and would lead to fouling of the biofilter. Thus, biofiltration is concluded to be a technically infeasible technology for controlling VOC emissions for the proposed kilns at RVL.

Energy, Environmental, and Economic Impacts

The only remaining feasible technique for controlling VOC emissions from lumber drying kilns is proper operation and maintenance. There is no adverse energy, environmental or economic impact associated with proper operation and maintenance technique.

BACT Determination

Applicant Proposed BACT

The applicant proposed the VOC BACT of 1,054.1 tons/yr (based upon the emission limit of 4.2 lb/1000 bf as WWP1 (i.e., as terpene + formaldehyde + methanol) for lumber drying and 5.5 lb/million sft^3 for fuel combustion), using the control methods of proper maintenance and operation of kilns, for five, direct, natural gas-fired, continuous kilns. The applicant also proposed the following work practice standards in the form of proper maintenance and operation as VOC BACT:

[22] *"Section 4.6 Carbon Adsorption"*, Handbook - Control Technologies for Hazardous Air Pollutants, US EPA, Washington, DC, EPA/625/6-91/014, June 1991.

1. The lumber kiln drying operation target final moisture content will be 12% or greater for boards, 15% for all other lumber.

2. The lumber kiln will be operated following a dry-bulb temperature set-point of 250°F or less.

3. Routines for preventative maintenance will be as detailed in a monitoring plan based on manufacturer's recommendations or at least the minimum:

   Daily Routine

   - Ensure all Resistance Temperature Detectors (RTDs) are working and placed in right place.
   - Check all lumber entrance/exit baffles for placement and damage and report problems in writing to the maintenance department.
   - Ensure kiln controls including all alarms are functioning properly.
   - Check all motors and couplings on the system.
   - Check all amp meters and indicator lights on pre-wired fan system.
   - Check air compressor for proper operation and pressure and leaks.

   Weekly Routine

   - Drain water from transducers and air supplies.

   Monthly Routine

   - Check bearing and bolts external to kiln.
   - Grease fan bearing inside kiln (via external lubrication points).
   - Grease kiln car wheels if bearings, inspect plastic if UHMW bushings.
   - Ensure control room's air conditional/heater is working properly for maintaining correct temperature for electrical components.

   Quarterly Routine

   - Clean tracks through kilns.
   - Inspect fans, bearings, and shafts.
   - Check internal baffles for damage and report problems in writing to the Maintenance Department.
   - Inspect kiln walls and structure for deterioration.
   - Check for leaks at fittings, coil units, hand valves, control valves, traps, check valves, and strainers.
   - Check pusher system for proper operation, hydraulic leaks, and electrical connections.

   Semiannually

   - Check for loose connections on electrical wires and RTDs.
   - Inspect kiln building and foundation for damage and repair.
   - Check air compressor and all air operated parts.

   Annually

   - Check calibration of all transducers, valves, and vent controls.
   - Check fan bearing taper lock for looseness or excessive wear.

4. Kiln operation control equipment will be calibrated as per manufacturer's specifications.

The applicant based its proposed BACT on the following rationale and justifications:

BACT determinations for lumber drying kilns, made by other permitting authorities around the country over the past 10 years, range from 2.49 to 6.8 lb/1000 bd-ft. No add-on controls are applied in any of the determinations, and

emissions from the lumber drying kilns are emitted directly to the atmosphere from the kiln vents. Some of the permits specify an annual VOC emission rate, with compliance based on a maximum annual kiln throughput. Other permits only specify compliance with the work practice standards, with no specific tracking of emissions and no emission limit specified in the determination. Furthermore, none of the determinations in the RBLC Clearinghouse indicate that compliance with the BACT has been verified through stack testing. Many of the limits in the RBLC Clearinghouse specify they are on a VOC as Carbon basis – in particular, many of the determinations that fall at or below 3.5 lb/10^3 bd-ft. Others use the same numeric limit but do not specify if the value is on a carbon basis or total mass basis. The few determinations that clearly specify they were made on a VOC as terpene basis are consistently on the higher end of the range and generally fall at or above 4 lb/10^3 bd-ft.

The lowest limit identified was 2.49 lb/1000 bd-ft for a Temple Inland facility in Texas. This determination was made in 2011. Based on the information provided by the permit engineer, the limit is based on testing conducted on similar units at other Temple Inland facilities. However, no other data is available to explain conditions during testing, test methods used, variability in test data or why the emissions from these tests are so much lower than industry data available from NCASI and other sources. As such, no other companies have used this site-specific factor in the intervening 10 years.

Source testing has been conducted for two direct-fired continuous kilns in South Carolina – Georgia Pacific McCormick and West Frasier Newberry. The kilns operated by these facilities fire dry shavings, whereas the continuous kilns proposed by Roanoke Valley Lumber fire natural gas. However, the wood dried in the kilns is the same species (Southern yellow pine), and kiln VOC emissions are believed to be primarily a function of the lumber dried. The Georgia Pacific kiln was tested twice, once in February 2012 and again in July 2013. The results were remarkably close, with VOC at 5.82 lb/1000 bd-ft in 2012 and 5.71 lb/1000 bd-ft in 2013. The West Frasier kiln was tested in March 2015, with measured VOC at 4.55 lb/1000 bd-ft. There is no discernable difference in operating practices at these kilns; therefore, the range of VOC emissions is likely a reflection of general process variability and the complicated process of measuring emissions from lumber drying kilns. NCASI and other agencies have tested a number of kilns, representing a range of companies and equipment design and operating conditions. The range of results collected by NCASI varies greatly. NCASI reports a median emission rate of 3.4 lb/1000 bd-ft VOC as Carbon for steam-heated batch kilns drying southern yellow pine. Converting this to a total VOC basis yields a result of 3.94 lb/10^3 bd-ft VOC (as terpene + formaldehyde + methanol), based on EPA protocol for measurement of VOC emissions from Wood Products Industry (WPP1)[23].

BACT emission limits are intended to represent the rate at which a source (such as lumber drying kiln) will consistently emit over its life with proper design and operation. Thus, the applicant proposed the VOC BACT of 1,054.1 tons/yr, using the emission limit of 4.2 lb/10^3 bd-ft VOC (as WPP1), after considering the limited test data available for similar sources, while also allowing for expected variability in emissions performance over the life of the equipment.

[23] "*Interim VOC Measurement Protocol for the Wood Products Industry*", July 2007.

For NSR and Title V purposes, EPA requires the total mass of VOC to be relied upon for permitting analyses.

Based on WPP1, wood products industry VOC emissions are to be adjusted from traditional VOC as carbon to a total mass VOC basis. This protocol is intended to address the limitations and challenges in VOC testing methods, as they apply to the organic constituents typically present in the exhaust of common wood products industry sources. Per the protocol, total VOC is expressed as propane plus methanol and formaldehyde, expressed as compound minus adjustment, as below:

Total VOC = (VOC as C) *1.133 + (1-0.65) *Methanol + Formaldehyde

The VOC as carbon emission factor (VOC as C, generally from a Method 25/25A test method) is multiplied by 1.133, the ratio of the molecular weight of pinene ($C_{10}H_{16}$, 136) to the molecular weight of the carbon in pinene (120). As the Method 25/25A test method does not register oxygenated compounds well, emissions of formaldehyde and methanol are added to account for their presence in the exhaust stream. EPA has established response factors for these chemicals. Formaldehyde is not typically picked up by the VOC test method; therefore, it has a 0% response factor. Conversely, 65% of methanol present in an exhaust stream is typically captured within the VOC as C emission factor. Therefore, to avoid double-counting of emissions, the speciated methanol emission factor is reduced by 65%.

DAQ Proposed BACT

For determining the appropriate BACT for the proposed kilns at RVL, the DAQ first reviewed the RBLC data for the period January 2011 through August 30, 2021, which indicates that that there are numerous BACT determinations for the lumber drying kilns. These determinations are for a wide variety of kiln drying process types (batch v. continuous process, direct v. indirect fired, natural gas v. wood fired v. steam-heated, softwood v. hardwood drying). It appears that there are eight determinations for direct, natural gas-fired, continuous lumber drying kilns, processing southern yellow pines, and are applicable to the proposed kilns at RVL. They are summarized below in Table 7-1. The entire RBLC search is also included in Appendix A below.

Table 7-1 Recent VOC BACT Determinations for Direct, Natural Gas-fired Continuous Lumber Kilns

RBLC ID	Facility Name	Permit Issuance Date	Process Name	Primary Fuel	Throughput	Throughput Unit	Control Method	Emission Limit	Emission Limit Unit	Case-by-Case	Compliance Verified
AL-0308	Two Rivers Lumber Co., LLC	1/3/2017	15.4 MBF/Hr Continuous Direct-fired (DPK-1) Lumber Drying (Southern Yellow Pine Softwood) Kiln with 38.8 Million Btu/hr Natural Gas Burner	Natural Gas	15.4	MBF/Hr	-	3.8 as C (equivalent to 4.74 as WPP1)	Lb/MBF	PSD BACT	-
AL-0308	Two Rivers Lumber Co., LLC	1/3/2017	15.4 MBF/Hr Continuous Direct-fired (DPK-2) Lumber Drying (Southern Yellow Pine Softwood) Kiln with 38.8 Million Btu/hr Natural Gas Burner	Natural Gas	15.4	MBF/Hr	-	3.8 as C (equivalent to 4.74 as WPP1)	Lb/MBF	PSD BACT	-
AR-0124	El Dorado Sawmill	8/3/2015	Lumber Drying (Southern Yellow Pine Softwood) Kiln SN-01, Direct-fired with LNB	Natural Gas	45	Million Btu/Hr	Proper Maintenance and Operation	3.8	Lb/MBF	PSD BACT	N
AR-0124	El Dorado Sawmill	8/3/2015	Lumber Drying (Southern Yellow Pine Softwood) Kiln SN-02, Direct-fired with LNB	Natural Gas	45	Million Btu/Hr	-	3.8	Lb/MBF	PSD BACT	N
AR-0124	EL Dorado Sawmill	8/3/2015	Lumber Drying (Southern Yellow Pine Softwood) Kiln SN-03, Direct-fired with LNB	Natural Gas	45	Million Btu/Hr	-	3.8	Lb/MBF	PSD BACT	N
AR-0122	Georgia – Pacific Wood Products South LLC	2/6/2015	SN-09 #4 Lumber Drying (Southern Yellow Pine Softwood) Kiln, Direct-fired	Natural Gas	130	MBF/Yr	-	3.8	Lb/MBF	PSD BACT	N

RBLC ID	Facility Name	Permit Issuance Date	Process Name	Primary Fuel	Throughput	Throughput Unit	Control Method	Emission Limit	Emission Limit Unit	Case-by-Case	Compliance Verified
AL-0310	Fulton Sawmill	6/8/2017	11.4 MBF/Hr Continuous Direct-fired Lumber Drying (Southern Yellow Pine Softwood) Kiln, 40 million Btu/Hr Natural Gas Burner, 4 Million Btu/Hr Natural Gas Condensate Evaporator	Natural Gas	11.4	MBF/Hr	Proper Kiln Operation and Maintenance Practices	4.0 as WPP1	LB/MBF	PSD BACT	-
SC-0184	NSLC - Darlington	2/6/2018	Lumber Drying (Southern Yellow Pine Softwood) Kiln 7, Continuous Direct-fired	Natural Gas	80	MBF/Yr	Work Practice Standards. VOC Emissions Based on an Emissions Factor of 4.2 lb VOC/MBF (as terpene +methanol + formaldehyde).	4.2 as WPP1	LB/MBF	PSD BACT	U

As can be seen in Table 7-1 above, the VOC BACT, determined by various permitting agencies for direct natural gas-fired continuous kilns, processing southern yellow pines, is in the range of 3.8 lb/MBF to 4.2 lb/MBF, using proper kiln operation and maintenance practices. None of them have been verified for compliance or it is unknown whether they have been achieved in practice. None of the determinations include any add-on controls. Finally, not all these determinations are reported in the same unit of measurement for VOC: Two determinations specify VOC as C, two determinations with VOC as WPP1)[24], and the remaining contain no information on the basis for VOC BACT.

Second, the DAQ reviewed one recent PSD permit[25], which is not available in the RBLC database. This permit included the VOC BACT of 4 lb/MBF as WWP1, using proper maintenance and operating practices, for continuous, direct, natural gas-fired lumber drying kilns, processing southern yellow pines.

Finally, the DAQ reviewed three recent BACT determinations that it had issued for continuous, natural gas-fired lumber drying kilns, processing southern yellow pines. They are summarized in Table 7-2 below:

Table 7-2 DAQ-Issued Recent BACT Determinations for Natural Gas-fired Continuous Lumber Kilns

Facility Name	Permit No. / Issuance Date	Process Name	Primary Fuel	Throughput	Throughput Unit	Control Method	Emission Limit	Emission Limit Unit	Case-by-Case	Compliance Verified
Weyerhaeuser NR Company – Grifton, NC	06270T25, 5/12/20	Three Direct Wood/Natural Gas-fired Continuous Dry kilns	Wood	340	Million BF/Yr (aggregate)	Good Design and Operating Practices	4.34 as pinene 737.8 as pinene	Lb/MBF Tons/yr	PSD BACT	N

[24] It "establishes calculation procedures and emission measurement methods [for wood products industry] to approximate VOC emissions for determining applicability with federal programs (particularly for NSR and Title V)." Further, per the protocol, total VOC is expressed "as propane plus methanol and formaldehyde expressed as compound minus adjustment.", *"Interim VOC Measurement Protocol for the Wood Products Industry – July 2007"*, US EPA.

[25] *"The Westervelt Company – Thomasville Mill"*, Thomasville, AL, Permit No. 102-S014-X002, November 22, 2019, Alabama Department of Environmental Management.

Troy Lumber Company Inc., Troy, NC	02330T25, 12/22/20	Three Steam-Heated Indirect-fired Continuous Lumber Drying Kilns	Steam	13	MBF/Hr	Good Design and Operating Practices	4.78 as WPP1 634.33 as pinene	Lb/MBF Tons/Yr	PSD BACT	N
Jordan Lumber & Supply, Co., Mt. Gilead, NC	03469T29, 2/9/21	One Direct Gasified Wood/Natural gas-fired Continuous Lumber Kiln	Wood	67.34	Million BF/Yr	Good Design and Operating Practices	4.34 as pinene	Lb/MBF	PSD BACT	N

As stated previously, there are no §§111 or 112 standards applicable to lumber drying kilns[26]. After evaluating the information presented above in Tables 7-1 and 7-2 and one recent PSD permit from AL agency (also discussed above), and the applicant justifications on its proposed BACT, and the RBLC summary included in Appendix A below, it is clear that there are no add-on control methods required by the agencies to reduce VOC emissions from the direct continuous lumber drying kilns and proper maintenance and operation practices is the only viable and available technique to control VOC emissions from such sources. The DAQ also believes that the basis (emission rate) for the applicant-proposed BACT of 4.2 lb/MBF as WPP1 is similar to the BACT determinations discussed above for the direct, natural gas-fired, continuous during kilns, processing southern yellow pines. It should be noted that this basis of 4.2 lb/MBF VOC as WPP1 is equivalent to 3.63 lb/MBF as C, after considering the DAQ-suggested emissions factors of 0.199 lb/MBF for methanol and 0.0183 lb/MBF for formaldehyde, for steam-heated lumber drying kilns, processing southern yellow pines[27]. This converted (equivalent) BACT basis of 3.63 lb/MBF as C also falls in line with the above determinations with 3.8 lb/MBF as C, for natural gas-fired, direct, continuous drying lumber kilns, processing southern yellow pines (type of softwood).

Thus, after careful consideration, the DAQ proposes to approve the VOC BACT of 4.2 lb/MBF (as WPP1) as a 3-hour average and 1,054.1 tons per rolling 12-months using good design and operating practices. The BACT applies during all periods of operations (normal, start-ups, shutdowns, and malfunctions). Due to technical infeasibility of measuring the kilns emissions, verification of BACT through source (stack) sampling will not be required. Instead, the DAQ proposes to require monitoring of lumber drying kilns' throughputs and VOC emissions on a monthly basis for determining that the 12-months rolling VOC emissions do not exceed the BACT (1,054.1 tons/yr). VOC emissions shall be calculated as below:

$$\text{VOC tons/month} = [\sum\{4.2\ \text{lb}/1000\ \text{bd-ft} \times A\ \text{bd-ft/month}\} + \sum\{5.5\ \text{lbs}/10^6\ \text{scf} \times B\ \text{scf/month}\}] / 2000\ \text{lbs/ton}$$

Where:
A = Production rate in bd-ft per month for each lumber drying kiln.
B = Natural gas usage in standard cubic feet per month for each lumber drying kiln's low NOx burner.
4.2 lb/1000 bd-ft is an emission factor, based on the proposed VOC BACT for lumber drying kilns.
5.5 lbs/10^6 scf is an emission factor for natural gas-fired combustors (Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion", AP-42).

Consistent with the recently issued DAQ permits, for direct-fired continuous lumber kilns, referenced above, the Permittee will be required to operate and maintain the proposed lumber drying kilns as per manufacturer's specifications. In addition, within 180 days of commencement of operation of first kiln, the Permittee will be required to develop and submit for approval to DAQ a site-specific operation and maintenance practices plan for these kilns. This plan will identify key parameters to monitor that will allow continued compliance with the BACT. The site-specific plan will replace the requirement to operate and maintain the kilns as per the manufacturer's specifications, when approved. The Permittee will also be required to keep records on a monthly basis of kilns production rates, natural gas firing rates, and emissions. Finally, for each month of the semi-annual reporting period, the Permittee will be required to report the kiln production rates, natural gas firing rates, and emissions.

[26] The lumber drying kilns are subject to Part 63 Subpart DDDD standards but there are no requirements or emissions standards for such sources except the initial notification requirement.
[27] *"Wood Kiln Emissions Calculator Revision C July 2007"*, NC Division of Air Quality, Raleigh, NC, Available at NC DEQ: Emission Estimation Spreadsheets.

In summary, this proposed VOC BACT is both practically and legally enforceable; thus, it meets the requirements of both the statutory (§169(3)) and regulatory provisions (§51.166(b)(12)).

Emergency Fire Pump Engine

The diesel-fired emergency fire pump engine's PTE is defined by assuming 500 hours per year operation[28]. The PTE for VOC is only 0.192 ton/yr. Add-on controls are impractical given the intermittent operation of this source considering that it is a back-up system for the primary electric fire pump units and the back-up fire pump engine is to operate only during the events when there is a simultaneous power outage and fire. Other than maintenance and readiness testing, the diesel-fired fire pump is to operate for emergency purposes only.

The above diesel-fired fire pump engine is not subject to any §111 standard such as Part 60 Subpart IIII due to the construction date. However, it is subject to §112 standard, such as Part 63 Subpart ZZZZ. But, as stated previously, this NESHAP does not contain any emission standard for HAPs emissions for such sources. However, the NESHAP requires work practice standards as below for complying with §112: (i) Operate and maintain the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions or (ii) develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

The DAQ review of EPA's RBLC database for emergency engines indicate that typically no add-on technology was identified for reduction of emissions of VOC. The determinations indicate that the BACT were based upon the applicable NSPS, other federal standards, use of certified engines, clean fuels (such as 15 ppm sulfur diesel), good combustion control practices, or limited operation (500 hours).

The DAQ agrees with the applicant that any consideration of add-on controls for the triggered pollutants will be impractical and infeasible, due to intermittent operation of the diesel-fired fire water pump. The DAQ also believes that even if a particular technology may be found to be technically feasible, the technology's economic impact is likely to be unreasonable due to intermittent operations. Thus, the DAQ proposes to approve the work practice standards in the form of good combustion control (good operation and maintenance practices), use of low sulfur diesel (15 ppm sulfur), and limited operations (500 annual hours) as the BACT for the diesel-fired emergency fire water pump.

BACT Analysis for GHGs

Lumber Drying Kilns

GHGs are defined in 40 CFR 51.166(b)(48) as a single air pollutant, comprising of an aggregate group of six greenhouse gases: CO_2, N_2O, CH_4, HFCs, PFCs, and SF_6.

CO_2, N_2O, and CH_4 are the principal GHGs that will be emitted from direct, natural gas-fired continuous lumber drying kilns. Emissions of GHGs from combustion sources are typically 99% or more CO_2, which result from oxidation of carbon in the fuel. CH_4 emissions result from incomplete combustion, and N_2O emissions result primarily from low temperature combustion. Emissions of CH_4 and N_2O from the lumber drying kilns are low and as a result, control options for these pollutants are not discussed.

EPA recommends that permit applicants and permitting authorities identify all "available" GHG control options that have the potential for practical application to the source under consideration. In the *PSD and Title V Permitting Guidance for GHGs* (EPA, March 2011), EPA emphasizes two mitigation approaches for CO_2: energy efficiency and carbon capture and storage (CCS). This guidance also states that clean fuels, which would reduce GHG emissions be considered, while not fundamentally redefining the source.

Control Alternatives & Technical Feasibility

Carbon Capture and Sequestration (CCS)

[28] Id. at 17.

The contribution of CO_2 emissions from the kiln burners at the proposed facility is a fraction of the scale for sources where CCS might ultimately be feasible. USEPA's GHG BACT Guidance document as referred above, supports this conclusion.

CCS involves post-combustion capture of CO_2 from combustion sources, and sequestration of the CO_2 in some fashion. In general, carbon capture could be accomplished with low pressure scrubbing of CO_2 from the exhaust stream with solvents (e.g., amines and ammonia), solid sorbents, or membranes. However, commercial scale operation of these processes has only been demonstrated on high CO_2 concentration streams and not from natural gas combustion exhaust. A number of post combustion capture projects have taken place on slip streams at coal-fired power plants. These projects have demonstrated the technical feasibility of small-scale CO_2 capture on a slipstream of a power plant's emissions using various solvent-based scrubbing processes. However, these post combustion technologies have not been installed on a lumber kiln burner or on the full exhaust stream of any similar combustion source. The CO_2 concentration and exhaust conditions are very different on a lumber kiln compared to a slipstream off a coal-fired power plant. Therefore, the technology is not considered "available" in terms of BACT. In addition, any CCS technology would first require capturing the exhaust stream. As discussed above, emissions from lumber kilns are difficult to capture. The kiln is a direct fired, with the fuel combustion exhaust comingling with the lumber drying emissions. The exhaust leaves the kiln through multiple vents and openings in the roof of a batch kiln, as well as from the open ends of a continuous kiln, where the lumber enters and exists. Directing the kiln exhaust to a control or capture device would disrupt the necessary ventilation and circulation patterns required to maintain the proper moisture content and temperature during the various drying cycles. In addition, potential back pressure from the capture system or a vacuum generated by a blower would disrupt the controlled drying environment and adversely affect the lumber product quality.

The DAQ concludes the CCS to be technically infeasible for the proposed direct, natural gas-fired, continuous lumber drying kilns.

Low Carbon Fuels

CO_2 emissions from fuel combustion depend on the carbon content of the fuel. CO_2 emissions from firing natural gas are the lowest on a heat input basis among any available fuel. The proposed kilns will be fired with natural gas only. The DAQ concludes use of low carbon fuels such as natural gas a technically feasible option.

Good Combustion, Operating and Maintenance Practices

Good combustion and operating practices with routine burner tune-ups are a potential control option by improving the fuel efficiency of the source. Fuel efficiency has a direct correlation with reducing CO_2 emissions. Good combustion practices include burner tune-ups at least once per year following manufacturer's specifications. Regular tune-ups enhance fuel efficiency and also result in reduced methane and N_2O emissions. Minimizing emissions of methane and N_2O is also important (even if their emissions are insignificant as compared to CO_2) as these pollutants have much higher global warming potential than that of CO_2.

Proper maintenance includes regular inspections of the air and fuel delivery systems and mixing valves to maintain the proper air-to-fuel ratio throughout the combustion zone. These inspections should follow the frequency and procedures specified by the burner manufacturer.

The DAQ concludes this option comprising of good combustion, operating and maintenance practices a technically feasible option.

<u>Energy, Environmental, and Economic Impacts</u>

There are no adverse energy, economic, and environmental impacts, with respect to the use of good combustion, operating and maintenance practices (leading to improvement of energy efficiency) or low carbon fuels (such as natural gas) on the proposed lumber drying kilns.

<u>BACT Determination</u>

DAQ Proposed BACT

First, there are no §§111 or 112 standards for GHGs emissions applicable to lumber drying source category.

For determining the appropriate BACT for the proposed kilns at RVL, the DEQ reviewed the RBLC data for the period January 2011 through August 30, 2021, which indicates that that there are only two BACT determinations for lumber drying kilns for controlling GHGs emissions. They are summarized below in Table 7-3 below.

Table 7-3 Recent GHGs BACT Determinations for Lumber Drying Kilns

RBLC ID	Facility Name	Permit Issuance Date	Process Name	Primary Fuel	Throughput	Throughput Unit	Control Method	Emission Limit	Emission Limit Unit	Case-by-Case	Compliance Verified
SC-0181	Resolute FP US Inc. - Catawba Lumber Mill	11/3/17	3 Continuous Direct-Fired Lumber Kilns	Green Sawdust	104.17	Million BF/Yr	Energy Efficiency	206.79 (CO_2 only)	Lb/Million Btu	PSD BACT	U
TX-0842	Lumber Mill	6/15/18	Thermal Oil Heating System	Biomass	149.25	Million Btu/Hr	Fuel Cell or Hybrid Suspension Grate Unit Design, Firing Biomass as the Only Fuel Source, and the Operation of Several Energy Efficiency Options	206.8 (CO_2e)	Lb/Million Btu	PSD BACT	U

The above determinations indicate that the control method for GHGs emissions is generally energy efficiency in the form of good combustion control practices. Moreover, the applicant-search of the RBLC data on natural gas-fired combustors (size less than 100 million Btu/hr) indicates good combustion control and clean fuels as BACT.

Roanoke Valley Lumber proposed a BACT of 89,756 tons/yr CO_2e for the five lumber drying kilns, based upon the 12-month rolling sum of natural gas fuel combustion in the kilns totaling 1.533×10^6 million Btu/yr. The applicant proposed to achieve this BACT by combusting natural gas in the lumber drying kilns. The proposed kiln burners are a fuel efficient, low NO_X design. The burners will undergo annual tune-ups and follow the manufacturer's specifications for operation and maintenance to achieve long term efficient performance.

After careful consideration, the DAQ proposes to approve the GHGs BACT of 89,756 tons/yr as CO_2e based on 12-month rolling average, using good combustion, operating and maintenance practices, as an aggregate emission limitation for five, direct, natural gas-fired continuous drying lumber kilns. The BACT applies during all periods of operations (normal, start-ups, shutdowns, and malfunctions). Due to technical infeasibility of measuring and verifying this BACT through source sampling, the DAQ proposes to require monitoring of drying kilns' fuel consumption and GHGs emissions on a monthly basis for determining that the 12-months rolling GHGs emissions do not exceed the BACT (89,756 tons/yr as CO_2e).

The GHGs emissions shall be calculated as below, using the applicable emissions factors for CO_2, CH_4, and N_2O, in accordance with Tables C-1 and C-2 of Part 98 of 40 CFR, and the global warming potentials (GWP) for CH_4, and N_2O, as per Table A-1 of 40 CFR 98:

GHGs as CO_2e, tons/month =

$(\Sigma$ [{53.06 kg/10^6 Btu x A scf/month x 1,026 Btu/scf} +
{0.001 kg/10^6 Btu x A scf/month x 1,026 Btu/scf x 25} +
{0.0001 kg/10^6 Btu x A scf/month x 1,026 Btu/scf x 298}] +

[{73.96 kg/10^6 Btu x 16.4 gallon/hour x B hour/month x138,000 Btu/gallon} +
{0.003 kg/10^6 Btu x 16.4 gallon/hour x B hour/month x 138,000 Btu/gallon x 25} +
{0.0006 kg/10^6 Btu x 16.4 gallon/hour x B hour/month x138,000 Btu/gallon x298}])
x (2.205) / 2000

Where,

A = Natural gas usage in standard cubic feet per month for each lumber drying kiln's low NOx burner

B = Operating hours per month for emergency fire water pump

The applicant will also be required to perform annual tune-ups, and operate and maintain each kiln according to the manufacturer's specifications or DAQ-approved site-specific operation and maintenance plan, as applicable. The DAQ acknowledges that the same site-specific plan for operation and maintenance for complying with the VOC BACT will reduce the GHGs emissions as well and thus, help comply with the proposed GHGs BACT. In summary, this proposed GHGs BACT is both practically and legally enforceable; thus, it meets the requirements of both the statutory (§169(3)) and regulatory provisions (§51.166(b)(12)).

Emergency Fire Pump Engine

As said earlier, the diesel-fired emergency fire pump engine's PTE is defined by assuming 500 hours per year operation. The PTE for GHGs is only 87 tons/yr as CO_2e. Add-on controls are impractical given the intermittent operation of this source considering that it is a back-up system for the primary electric fire pump units and the back-up fire pump engine is to operate only during the events when there is a simultaneous power outage and fire. Other than maintenance and readiness testing, the diesel-fired fire pump is to operate for emergency purposes only.

The above diesel-fired fire pump engine is not subject to any §111 standard such as Part 60 Subpart IIII. However, it is subject to §112 standard, such as Part 63 Subpart ZZZZ. But, as stated previously, this NESHAP does not contain any emission standard for HAPs emissions for such sources. However, the NESHAP requires work practice standards as below for complying with §112: (i) Operate and maintain the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions or (ii) develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.

The DAQ review of EPA's RBLC database for emergency engines (generators) indicate that typically no add-on technology was identified for reduction of emissions of GHGs. The determinations also indicate the BACT were based upon the applicable NSPS, other federal standards, use of certified engines, clean fuels (such as 15 ppm sulfur diesel), good combustion control practices, and limited operation (500 hours).

The DAQ agrees that any consideration of add-on controls for the triggered pollutants will be impractical and infeasible, due to intermittent operation of the diesel-fired fire water pump. The DAQ also believes that even if a particular technology may be found to be technically feasible, the technology's economic impact is likely to be unreasonable due to intermittent operations. Thus, the DAQ proposes to approve the work practice standards in the form of good combustion control (good operation and maintenance practices), use of low sulfur diesel (15 ppm sulfur), and limited operations (500 annual hours), as the BACT for the diesel-fired emergency fire water pump.

BACT Summary

The following Table 7-4 summarizes the DAQ proposed BACT for five lumber drying kilns and one emergency diesel-fired fire water pump:

Table 7-4: BACT Summary

EMISSION SOURCE	REGULATED NSR POLLUTANT	BACT	CONTROL DESCRIPTION
Lumber Drying Kilns (ID Nos. DKN1 through DKN5)	VOC	4.2 lb/1000 bd-ft as WPP1 (i.e., as terpene + methanol + formaldehyde), 3-hour average 1,054.1 tons per consecutive 12-months	Good design and operating practices
Lumber Drying Kilns (ID Nos. DKN1 through DKN5)	GHGs	89,756 tons per consecutive 12-months	Good combustion, operating and maintenance practices
Emergency Fire Water Pump (ID No. I-FP1)	VOC	good combustion control (good operation and maintenance practices), use of low sulfur diesel (15 ppm sulfur), and limited operations (500 annual hours)	-
Emergency Fire Water Pump (ID No. I-FP1)	GHGs	good combustion control (good operation and maintenance practices), use of low sulfur diesel (15 ppm sulfur), and limited operations (500 annual hours)	-

8. Air Quality Analysis

§51.166(m)(1) requires that the major source or major modification application for a PSD permit include an analysis of the existing ambient air quality of the area where the source is located for any regulated NSR pollutant exceeding the major source threshold or significant net emissions increase, respectively. This analysis is called "pre-application analysis" (generally called the "pre-construction monitoring" requirement). For pollutants with associated NAAQSs, the application must include 1 year of continuous monitoring data from the date of the receipt of the complete application. The permitting agency may accept ambient monitoring data for a shorter duration, but data cannot be for less than 4 months. For pollutants for which no NAAQS(s) exist, the permitting authority can require an analysis containing such data as it determines appropriate for assessing the ambient air quality in the area in which the source is located.

§51.166(m)(2) includes that the owner or operator of a major source or major modification, shall, after construction of such modification, conduct such ambient monitoring as the permitting authority determines to be necessary for determining the effect of emissions from the stationary source or modification may have, or are having, on air quality in any area. This monitoring is called "post-construction monitoring".

However, §51.166(i)(5) includes that permitting authority may exempt a proposed major stationary source or major modification from the requirements of §51.166(m), with regard to both "preconstruction monitoring" and "post-construction monitoring" for a specific pollutant, if the emissions increase of the pollutant from a new stationary source or the net emissions increase of the pollutant from a modification would cause, in any area, air quality impacts less than the following amounts:

Carbon monoxide - 575 ug/m^3, 8-hour average;
Nitrogen dioxide - 14 ug/m^3, annual average;
$PM_{2.5}$ - 0 µg/m^3, 24-hour average;
PM_{10} -10 µg/m^3, 24-hour average;
Sulfur dioxide - 13 ug/m^3, 24-hour average;
Lead - 0.1 µg/m^3, 3-month average.
Fluorides - 0.25 µg/m^3, 24-hour average;
Total reduced sulfur - 10 µg/m^3, 1-hour average
Hydrogen sulfide - 0.2 µg/m^3, 1-hour average; and
Reduced sulfur compounds - 10 µg/m^3, 1-hour average

The above concentration values are called "significant monitoring concentrations (SMC)".

In addition, for ozone, no *de minimis* air quality level (i.e., SMC) has been provided. As per EPA, any net emissions increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data.

The same provision includes some more exemptions from this air quality analysis requirement (both "preconstruction monitoring" and "post-construction monitoring") for the source (i.e., applicant) as follows: (i) If any regulated NSR pollutant is not listed with the associated impact level (i.e., SMC), or (ii) the concentrations of the pollutant in the area that the major modification would affect is less than the associated SMC.

As stated above, this major stationary source review is conducted for both VOC and GHGs. For ozone NAAQS, the potential to emit for VOCs is greater than 100 tons per year. Refer to Section 9 below for further details on VOC emissions impacting this NAAQS. In addition, there are no SMC established for GHGs; so, no ambient monitoring (both pre- and post-construction) for GHGs can be required.

9. Source Impact Analysis

Introduction

DAQ's PSD modeling analysis, in general, followed all applicable federal and state rules, and applicable federal and state modeling guidance. A detailed description of the modeling analysis methodologies and results is provided in the following sections for each relevant component of the PSD single source impact analysis.

Major Stationary Source Analysis

The initial modeling analysis was received on August 20, 2021 with the subsequent revisions received October 28, 2021. The analysis was revised to include the fire pump engine in the air toxics modeling demonstration, and to provide design specifications on the fumigation hoods and stacks affixed to the continuous kiln openings. As shown in Table 6-3 and the ensued conclusions above in Section 6, the construction of this new lumber facility would result in the PTE above the applicable "major stationary source" threshold of 250 tons per year in §51.166(b)(1)(i)(b) for at least one "regulated NSR pollutant" (such as VOCs), as defined in §51.166(b)(49), and VOCs being a precursor for ozone under the above definition, pursuant to §51.166(k), a single source impact analysis of project emissions was performed for VOCs (ozone).

Cumulative Modeling Analysis Using Class II Area Tier 1 Screening Analysis for Ozone Precursors

In accordance with state and federal ozone modeling guidance, NO_X and VOCs emissions were evaluated in terms of precursor impacts on secondary ozone formation. A Tier 1 screening analysis was conducted to evaluate project NO_X and VOC emissions impacts on secondary formation of ozone in Class II areas designated as attainment for the 8-hour Ozone NAAQS. The screening analysis was based on EPA's draft *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program* (April 30, 2019, 454-R-19-003). This Tier I screening approach is consistent with Section 5.3.2(b) of Appendix W. Ozone monitoring data collected at the NC DAQ Edgecombe County monitoring station covering the 2018-2020 period shows an 8-hour ozone design value of 58 ppb. NO_X and VOC project emissions' impacts on ozone formation were scaled according to the conservatively representative MERPs hypothetical source located in Nash County (as shown in MERPs Appendix Table A-1). MERPs secondary ozone impact values for NO_X and VOC emissions were based on the 500-tpy and 1000-tpy, respectively, short stack release configuration. As such, the NO_X and VOC secondary ozone impacts derived from the MERPs hypothetical source were 1.98 ppb and 0.085 ppb, respectively. These ozone impacts from the MERPs modeling were scaled to project emissions as follows:

Ozone from major stationary source NO_X Emissions = (1.98 ppb) x (39.94 tpy NO_X) / (500 tpy) = 0.158 ppb

Ozone from major stationary source VOC Emissions = (0.085 ppb) x (1054.3 tpy VOC) / (1000 tpy) = 0.0896 ppb

Adding the scaled MERPs ozone concentrations with the interpolated ozone design concentration results in a total 8-hour ozone concentration of 58.25 ppb, which is below the 8-hour ozone NAAQS of 70 ppb. Therefore, impacts from major stationary source NO_X and VOC emissions are not expected to cause or contribute to a violation of the 8-hour ozone NAAQS.

10. Additional Impact Analysis

In accordance with the requirements under §51.166(o), additional impact analyses were conducted to assess commercial, residential, industrial, and other growth impacts on air quality, and to assess any significant impairment to soils, vegetation, and visibility that would result from the project.

Growth Impact

According to Section 7.2 of the PSD permit application, significant growth impacts were not expected based on the following statements: "The proposed project is expected to result 137 new full-time positions at the mill. Most of these positions are expected to be filled from the local employment pool. In addition, commercial/industrial growth associated with the project will be negligible, as the existing infrastructure is already in place."

Soils and Vegetation

No significant project impacts were anticipated to soils and/or vegetation given that VOCs do not include secondary NAAQS provisions.

Class II Visibility Impairment Analysis

No visibility assessment was conducted given that VOCs do not typically hinder visibility.

11. Facility Wide Air Toxics

Refer to Section 6 above.

12. Facility Emissions Review

Refer to Section 6 above.

13. Public Notice/EPA and Affected State(s) Review

This permit application processing is conforming to the public participation requirements, pursuant to both 15A NCAC 0530 "Prevention of Significant Deterioration" and 15A NCAC 02Q .0300 "construction and operation permits".

A public notice (See Appendix B) for the issuance of both the preliminary determination and the draft air quality permit will be published in a local newspaper of general circulation for 30 days for review and comments. Moreover, the DEQ's draft Environmental Justice (EJ) Analysis will also be noticed for public comments for 30 days. A copy of the public notice will be provided to the EPA, and all local and state authorities having authority over the location at which the proposed modification is to be constructed. Draft permit documents will also be provided to EPA, affected states, and all interested persons in mailing list, maintained by the DAQ. All documents will be placed on the DEQ's website and a complete administrative record for the draft permit documents will be kept for public review at the DEQ's Raleigh Regional Office for the entire public notice period.

As this application is not processed pursuant to 15A NCAC 02Q .0500 "Title V procedures", none of the public participation requirements contained therein apply to the application.

Appendix C includes listing of both the entities and the documents to be sent to each listed entity for the proposed PSD major stationary source, satisfying the requirements in §51.166(q) "public participation".

14. Stipulation Review

Not applicable. This is an unpermitted ("greenfield") facility. All stipulations included in the air permit are new.

15. Conclusions, Comments, and Recommendations

- Professional Engineer (PE) Seal Requirement

The regulation in 02Q .0112 "Applications Requiring Professional Engineer Seal" specifies that a professional engineer registered in North Carolina shall be required to seal the technical portions of air permit applications for new sources and modifications of existing sources that involve design, determination of applicability and appropriateness, or determination and interpretation of performance; of air pollution capture and control system.

For the planer mill baghouse, Mr. Thomas O. Pritcher (applicant consultant) has provided a professional engineer (PE) seal for its design, performance, and adequacy to comply with the applicable regulatory requirements. Based on North Carolina Board of Engineers Land Surveyors (NCBELS), Mr. Pritcher's PE license is "active". The baghouse design features are as below:

Type of dust: sawdust
Nos. of bags: 626
Length of bag: 3700 millimeter
Diameter of bag: 160 millimeter
Air flow rate: 79,500 acfm (nominal), 84,500 acfm (maximum)
Type of filter material: felted (non-woven)
Total filter surface area: 12,280 ft^2
Air-to-cloth ratio: 6.88:1
Type of baghouse: air pulse
Control Efficiencies: > 99.9% (PM/PM10), > 99% (PM2.5)

Typical air-to-cloth ratio for air pulse baghouse, controlling sawdust emissions, is 12[29]. Thus, the design of the proposed bagfilter is considered to be safe. It is this engineer's judgement that the proposed baghouse should be able to achieve the above control efficiencies if it operated and maintained as per the equipment manufacturer.

However, it needs to be emphasized that the planer mill cyclone and bagfilter are "inherent" process equipment and not air pollution control equipment. The applicant has provided justifications based on the approach laid out in the EPA applicability determination[30] concluding that the above equipment are "inherent" to the planer mill and not pollution control devices. The analysis on the following three questions were provided, as required, when determining the nature of these devices. The three questions are:

- Is the primary purpose of the equipment to control air pollution?
- Where the equipment is recovering product, how do the cost savings from the product recovery compare to the cost of equipment?
- Would the equipment be installed if no air quality regulations are in place?

The lumber finishing process in the planer mill generates **wood byproducts** in the form of shavings, chips and sawdust. At the proposed capacity, these byproducts will be generated at a rate of approximately 15.84 tons/hour. **These byproducts must be removed from the wood working equipment continuously and efficiently in order for the equipment to function. Failure to remove the byproducts will slow production rates, cause**

[29] Table 5 "*Gas-to-Cloth Ratios for Various Industries*", Air Pollution Engineering Manual, Air & Waste Management Association (Anthony J. Buonicore and Wayne T. Davis (editors)), 1992, Van Nostrand Reinhold.
[30] Letter from David Solomon, Acting Group Leader, Integrated Implementation Group, EPA, RTP, NC, to Timothy J. Mohin, Government Affairs Manager, Environment, Health and Safety, Intel Government Affairs, Washington, DC, November 27, 1995.

increased downtime, and increase equipment maintenance needs. As such, an efficient dust collection system (consisting of piping, a blower, a cyclone, and a baghouse) is an integral part of the planer mill design. The primary purpose of the dust collection system is to remove the wood byproducts created from the operation of the planer mill.

Pneumatic dust collection systems use air flow and pressure differential to move material through a pipe. Pneumatic systems used to transport wood byproducts operate under a slight vacuum to draw wood fines into the dust collection ductwork from the point of generation in the planer mill. The vacuum is created by placing the blower at the end of the dust collection system. A negative pressure system enhances dust capture and limits the potential for blockages in the transfer lines. However, in a negative pressure system, it is essential to remove the transported material (wood byproducts) before the transfer air reaches the blower. The blower would quickly become blocked and shutdown without efficient removal of particulates from the air stream. This is the function of the cyclone on a dust collection system. Depending upon system demands, a cyclone can operate independently or in conjunction with filtration equipment to remove suspended material from the transfer air in a pneumatic conveyance system.

Cyclones are very efficient at separating large particles from a gas stream. According to EPA [31], a conventional cyclone can achieve 70 to 90 percent control efficiency of PM. However, the efficiency drops quickly for smaller particle sizes, with EPA estimating an efficiency of 0 to 40 percent for PM2.5.

EPA's data specifies conventional cyclones are not used for flow rates above 25,400 cfm. High throughput cyclones are available but are typically not guaranteed to remove particles below 20 microns in diameter. The flow rate required for the Roanoke Valley Lumber dust collection system is approximately 80,000 cfm; therefore, a high throughput cyclone is appropriate. A baghouse is placed downstream of the cyclone to capture the fine wood particles that will not be captured by the cyclone. Dry wood dust is highly combustible, and it is important to remove these fines from the air stream to minimize the risk of explosive combustion. **The cyclone and baghouse work together to remove suspended wood dust before the pneumatic transfer air reaches the blower. Efficient removal of the wood dust extends the useful life of the blower, reduces maintenance, and reduces the explosion risk. Each of these functions is critical and completely unrelated to air quality regulations.** Product is recovered by the dust collection system. In keeping with the EPA guidance, the following cost benefit analysis is provided.

The wood byproducts captured by the dust collection system represent a significant revenue stream for the facility. As stated earlier, the planer mill will generate approximately 15.84 tons/hour (138,758 tons/year) of byproducts when operating at full capacity. The market value of these byproducts varies with market conditions, but dry planer mill byproducts typically sell at $50 to $60 per ton from the facility to wholesalers. Wholesale companies sell this material to consumers in bulk for $80 to $100 per ton. Even using the lowest expected value of $50/ton, the planer mill wood byproducts will generate a revenue stream of $6.938 million annually when the facility reaches full capacity.

The dust collection system quoted to the facility will cost $1.28 million including the ductwork, fan, cyclone, baghouse, spark detection and explosion safety devices, foundations and structural support, and exhaust stack. The components are all designed to work with each other, and costs are not provided for individual components. Each component is designed and selected to work with other parts of the system. Changing the design of the fan would necessitate a different design and cost for the cyclone. Similarly, any change in the design of the cyclone would change the design and cost of the baghouse. Therefore, the cost benefit of the system can only be considered looking at the whole and not for any individual component.

Cost of Dust Collection System	$1,282,000
Captured Wood Residuals	138,758 tons/yr
Value of Wood Residuals	$50/ton

[31] Air Pollution Control Technology Fact Sheet: Cyclones, EPA-452/F-03-005, U.S. Environmental Protection Agency.

Total Annual Value of Captured Wood Residuals	$6,938,000[32]
Return on Investment (ROI) for Dust Collection System	0.18 Years[33]
Shortest Depreciation Schedule for Dust Collection System	10 Years
Useful Life of Baghouses	15 Years +

The ROI of less than one year is significantly less than the useful life of the baghouse or the most aggressive depreciation schedule for the dust collection system. This demonstrates that the wood residuals have a significant value compared to the cost of the dust collection system. The planer mill dust collection system would be installed if no air quality regulation were in place for the reasons presented above. **The planer mill cannot operate if the wood residuals are not removed continuously and the only practical way to remove the wood residuals is with a pneumatic system.**

Conveying wood residuals pneumatically requires a means of separating the material from the airstream, and the combination of a high throughput cyclone with a baghouse provides the most efficient method of collection for subsequent material recovery. **As demonstrated using a simple payback analysis, the residuals collected from the planer mill system hold significant value, and the facility would install this equipment even in the absence of air quality regulations.**

In summary, the DAQ agrees with the applicant and approves the assessment discussed herein that the planer mill dust collection system equipment (both cyclone and baghouse) is "inherent" process equipment, and these devices (cyclone and baghouse) are not air pollution controls.

- Zoning Requirement

  The town of Weldon has provided a zoning consistency determination on August 11, 2021, stating that the Town has received a copy of the air permit application and the proposed facility is consistent with applicable zoning ordinances of Town of Weldon. In addition, Halifax County Planning and Development Services has provided a zoning consistency determination on August 16, 2021, stating that the County has received a copy of the air permit application and the proposed facility is consistent with their ordinance as a permitted use in the HI (Heavy Industrial Zoning District).

- The draft permit (pre-public notice version) was emailed to the Raleigh Regional Office (RRO) for review on December 15, 2021. No comments were submitted by the RRO.

- The draft permit (pre-public notice version) was sent to the Permittee for review on December 15, 2021. Roanoke Valley Lumber ("RVL" or applicant) provided comments on the pre-public notice version of the draft permit documents. They were received by DAQ on December 23, 2021. The applicant later amended the initial comments and sent additional comments, which were received on December 29, 2021. Each of the comments has been described below in verbatim (in double quotes) along with the DAQ response.

  Pre-Public Notice Draft Permit

  Comment 1:

  "Condition 2.2.A"

  "In the table listing the Application regulations, for Nitrogen Oxides (as NO2), the applicable regulation listed is 15A NCAC 02Q .0317 (avoidance of PSD); however, a PSD avoidance was not requested in the application.

[32] 138,758 tons/year * $50 per ton
[33] $1,282,000 / $6,938,000 per year

Additionally, uncontrolled emissions of NOx were calculated to be 39.95 tpy which is well below the PSD avoidance threshold of 250 tons per consecutive 12-month period (as listed in condition 2.2.A.3.a.)."

"Roseburg is requesting additional clarification as to why the PSD avoidance is referenced in the permit."

"In addition to the previous comment addressing the 250-ton NOx limit in condition 2.2.A.3.a., Roseburg would also like to clarify that potential emissions of NOx from the site are 39.94 tons per year which is below the PSD SER of 40 tons per year. While the potential emissions are close to the 40 tons per year, because they were calculated with potential emissions and no limits were taken, Roseburg feels like any reference to a PSD avoidance for NOx should be removed."

"Additionally, as stated in 2.2.A.3.c., the recordkeeping conditions in 2.2.A.1.m., o., r., and s. "shall be sufficient to ensure compliance with 15A NCAC 02Q .0317." Also, condition 2.2.A.3.f. states that the reporting conditions in 2.2.A.1.u. "shall be sufficient to ensure compliance with 15A NCAC 02Q .0317."

"As such, Roseburg is requesting that section 2.2.A.3. be removed since NOx emissions do not exceed the 40 ton per year SER when calculated as potential emissions and potential monitoring and recordkeeping requirements will already be met in other conditions."

DAQ Response:

As described on page 13 of the preliminary determination, the Roanoke Valley Lumber facility is a new major stationary source; because, it emits or has a potential to emit 250 tons per year or more of at least one regulated NSR pollutant (VOC). Since the facility is a "major" source for at least one regulated NSR pollutant (VOC), the remaining pollutants' emissions are subject to their respective significance levels in accordance with §51.166(b)(23). If the emissions of the other pollutants are greater than these thresholds, they too would be subject to major stationary source review under PSD.

As discussed on page 15 of this determination, the potential to emit for NOx for the facility is 39.94 tons/year, just shy of its significance threshold of 40 tons/year for NOx, which otherwise would require a PSD permit for this pollutant as well, since the new stationary source is "major" for at least one pollutant (VOC).

The DAQ believes that a non-applicability limit should be established for PSD for pollutant NOx so that both its actual and potential emissions remain less than the above significant amount. It needs to be emphasized that the NOx PTE estimate is based on EPA emissions factors (AP-42), which are average emissions factors for the nationwide combustion units (natural gas combustors, diesel-fired emergency engines). Since the applicant did not provide more accurate emissions estimates for the facility sources (lumber drying kilns, emergency engine) based upon equipment vendor data or guaranteed emissions, and uncertainty involved in the PTE estimate, it would be appropriate for the agency to establish an avoidance limitation for PSD for this pollutant for facility emissions. This approach for inclusion of non-applicability limit for PSD would protect both the applicant as well as the agency regarding complying with the CAA permitting requirements and avoiding any facility non-compliance in future if the actual emissions on a facility-wide basis exceeds the significance level for NOx. The above approach and DAQ viewpoint on this matter were earlier communicated to the applicant via email on September 3, 2021.

In general, it needs be emphasized that it is the applicant's responsibility to provide the information the permitting agency needs to determine compliance with various permitting and CAA requirements. But it is the agency's responsibility to determine which requirements under CAA and its implementing regulations apply and need to be included in the permit.

Thus, the DAQ believes that it is justified to include a PSD Avoidance Condition for NOx for this new facility.

However, it needs to be stated that there is a typographical error in Section 2.2.A.3.a. regarding the avoidance limit, which will be corrected to "less than 40 tons per consecutive 12-months period" from "less than 250 tons per consecutive 12-months period." The preliminary determination clearly states that the non-applicability limit for NOx for the facility is less than 40 tons/year emissions.

Regarding the monitoring for the NOx avoidance limit, the permit includes monthly emissions calculations, determination of rolling 12 months total for each 12-month period, and record keeping of emissions calculations, and reporting of emissions for each semi-annual period. In addition, the DAQ has determined that the monitoring/recordkeeping/reporting for fuel usage for lumber kilns and emergency fire pump, and operating hours for emergency fire pump under the PSD stipulation are adequate to meet the PSD avoidance requirement for NOx.

In sum, the DAQ finds its draft permit stipulation for the NOx PSD Avoidance requirement to be reasonable.

Comment 2:

"Condition 2.2.A.1.e"

"In the table listing the BACT limits, for VOC from the lumber kilns, the BACT limit of 4.2 lb/1000 bf-ft as WPP1 is to be based on 3 run stack test average. However, Roseburg did not propose to perform stack test on the kilns."

"Additionally, for the VOC from the Emergency Fire Water Pump, please remove the use of low sulfur diesel (15 ppm) as BACT."

"As previously stated in the December 23, 2021 response, Roseburg did not propose to perform stack tests on the kilns, and the DAQ has agreed stack testing is not appropriate for the kilns. Therefore, Roseburg requests to change "3 run stack test average" to "3-hour average"."

DAQ Response:

The DAQ agrees with the applicant, and it will revise the averaging period for the VOC BACT of 4.2 lb/1000 bf-ft as WPP1 in Table to Section 2.2.A.1.e. for lumber kilns from "3 run stack test average" to "3-hour average" to avoid any confusion. This clarification will make the proposed VOC BACT for the lumber kilns more accurate and remove any indication that the compliance for this BACT is based on a source test.

Regarding the VOC BACT for fire pump engine of 15 ppm sulfur (among other work practice standard), the DAQ points to page 27 of the preliminary determination where it indicated that the state agency (DAQ)'s review of EPA's RBLC database for emergency engines indicated that typically no add-on technology was identified for reduction of emissions of VOC. Further the RBLC determinations indicated that the BACT determinations were based upon the applicable NSPS, other federal standards, use of certified engines, clean fuels (such as 15 ppm sulfur diesel), good combustion control practices, or limited operation (500 hours). In addition, the applicant submittal dated October 27, 2021 confirms that other permitting agencies have previously concluded that the use of 15 ppm diesel as VOC BACT for similar emergency engines.

In general, clean fuel such as 15 ppm sulfur diesel, is expected to have less impurities in the form of chars (particulates, organics); thus, use of clean diesel can aid in reducing VOC emissions from the RVL's emergency fire pump.

In summary, the DAQ believes that the proposed VOC BACT of 15 ppm sulfur diesel (among other work practice standards) for the emergency fire pump engine is reasonable and based on similar engines with similar functionality permitted nationwide. No change will be made to this proposed BACT.

Comment 3:

"Condition 2.2.A.1.s"

"Roseburg would like the condition revised to read as follows:"

"The Permittee shall perform tune-ups on low-NOx burners of each lumber drying kiln (ID Nos. DKN1 through DKN5) annually (no more than 13 months after the previous tune-up) ~~as per~~ and follow the manufacturer's

specifications for all other operation and maintenance. The Permittee shall keep records of tune-ups performed on each low-NOx burner including a description of any corrective actions taken as a part of the tune-up."

DAQ Response:

Agreed.

This stipulation will be clarified to make it clear and state that all other operation and maintenance (other than periodic tune-ups) on lumber kilns shall be performed according to manufacturer's specifications in Section 2.2.A.1.j. or an approved site-specific plan in Section 2.2.A.1.k., as applicable.

Comment 4:

"Condition 2.2.A.1.u.i and 2.2.A.1.u.ii"

"What is the significance of the 17-month period referred to in the conditions?"

"After further review, the 17-month timeframe is understood."

DAQ Response:

No response is needed.

Comment 5:

"Condition 2.2.A.1.b.i."

"This condition states, "Phase 1 construction to begin no later than May 2022…", which places a time constraint on the initiation of construction of the facility beyond what is listed in Condition 2.2.A.1.d. (allows for 18 months to commence construction). While Roseburg intends to begin construction in May 2022, there is concern that the comment period for the permit could yield comments that would delay the issuance of the permit, weather conditions could cause delays, or any number of other issues resulting in delays may prevent Roseburg from commencing construction in May 2022. Therefore, Roseburg is requesting that Condition 2.2.A.1.b.i. be rewritten to state, "Phase 1 construction intended to begin in no later than May 2022…"."

DAQ Response:

Implementing regulation for PSD in §51.166 (as incorporated in NC's SIP-approved regulation in 02D .0530) includes the provisions for both projected and approved construction dates, and validity of PSD permits. They become important especially for the phased construction projects to determine whether the construction has commenced for each independent phase and whether any demonstration on appropriateness of the previously approved BACT is needed from the permittee for each independent phase. In general, construction dates, regardless of phased construction, provide the information on time remaining for validity of a PSD permit.

DAQ understands and shares applicant's concerns on inclusion of fixed deadlines for the start of construction for each phase of the RVL facility. Thus, the DAQ proposes to revise Section 2.2.A.1.b.i. and ii. of the permit as below:

i. Phase 1 construction is projected to begin in May 2022…
ii. Phase 2 construction is projected to begin by September 2024…

Finally, if the PSD permit is delayed due to adverse or numerous public comments during the public participation process, the above dates can be changed before the final PSD permit is issued.

Comment 6:

"Conditions 2.2.A.1.l. through q., 2.2.A.1.u.i., and ii., and 2.2.A.3.c."

"BACT limits for the kilns are based on total kiln throughput from all five kilns as indicated in the BACT table in Condition 2.2.A.1.e. (BACT limits of 1,054.1 tons VOC per year for all five kilns, and 89,756 tons GHG per year from all five kilns). As such, Roseburg is requesting to monitor the total lumber throughput and total natural gas usage in all five kilns instead of monitoring each individual kiln."

DAQ Response:

It is appropriate and logical to monitor emissions (both VOC and GHGs), lumber throughput, and fuel usage on a kiln specific basis and then total for each of the consecutive 12-months period on a facility wide basis (total of all operating kilns) to evaluate compliance with the associated BACT. This approach is reasonable and provides accurate information. The DAQ routinely employs the above approach on a wide spectrum of industrial category sources including lumber industry. The same approach was included in DAQ-issued permits for similar lumber drying kilns[34]. In summary, the DAQ believes that the specified monitoring approach is reasonable; thus, it does not believe that the change is warranted.

Comment 7:

"Conditions 2.2.A.1.p., r., u.ii., and 2.2.A.3.c."

"Roseburg recognizes the DAQ's attempt to allow a more accurate reporting of emissions by calculating emissions based on actual diesel usage in the emergency fire water pump. However, most fire water pumps do not come equipped with a fuel meter, and it would be cumbersome to the facility to monitor the fuel usage for the fire water pump. Roseburg is requesting the more conservative route of monitoring the monthly hours of operation for the emergency fire water pump by using the manufacturer's specification of 16.4 gallons per hour at maximum load for monitoring, recordkeeping, and reporting purposes."

DAQ Response:

Agreed.

The DAQ will revise the formula for GHGs emissions calculations in Section 2.2.A.1.p as below to allow the permittee to track only the hours of operation for the fire pump engine by inserting the maximum manufacturer-specified diesel fuel usage of 16.4 gallons per hour and making the changes accordingly:

GHGs as CO_2e, tons/month =

$$
\begin{aligned}
&(\Sigma\ [\{53.06\ kg/10^6\ Btu \times A\ scf/month \times 1{,}026\ Btu/scf\} + \\
&\{0.001\ kg/10^6\ Btu \times A\ scf/month \times 1{,}026\ Btu/scf \times 25\} + \\
&\{0.0001\ kg/10^6\ Btu \times A\ scf/month \times 1{,}026\ Btu/scf \times 298\}] + \\
&[\{73.96\ kg/10^6\ Btu \times 16.4\ gallon/hour \times B\ hour/month \times 138{,}000\ Btu/gallon\} + \\
&\{0.003\ kg/10^6\ Btu \times 16.4\ gallon/hour \times B\ hour/month \times 138{,}000\ Btu/gallon \times 25\} + \\
&\{0.0006\ kg/10^6\ Btu \times 16.4\ gallon/hour \times B\ hour/month \times 138{,}000\ Btu/gallon \times 298\}]) \\
&\times (2.205)\ /\ 2000
\end{aligned}
$$

Where,

A = Natural gas usage in standard cubic feet per month for each lumber drying kiln's low NOx burner

B = operating hours per month for emergency fire water pump

[34] Air Quality Permit 03469T29T29 (February 9, 2021) Issued to Jordan Lumber & Supply Co., Mt. Gilead, NC, Air Quality Permit 02330T25 (December 22, 2020) Issued to Troy Lumber Company Inc., Troy, NC, and Air Quality Permit 06270T25 (May 12, 2020) Issued to Weyerhaeuser NR Company, Grifton, NC,

In addition, the DAQ will remove the references for diesel usage in Sections 2.2.A.1.r., u.ii., and Sections 2.2.A.3.c., f.

Application Review

Comment 8:

"Kiln Burners' Heat Input Rate"

"On page 12 of the Application Review, the DAQ indicates that that "fuel combustion emissions have been estimated using 45 million Btu per hour heat input rate…" Roseburg would like to clarify that the burners will have a nameplate rating of 45 million Btu per hour. However, that high rate of heat input will not normally occur and cannot take place on a long-term basis. Drying lumber is a closely controlled process, requiring varying heat input throughput the drying cycle. The lumber product would be destroyed if the kilns were operated at 45 MMBtu/hr on a continuous basis. The annual heat input reflects the conditions necessary to dry 100 million board-foot of lumber per year (per kiln). At the capacity of these kilns, each kiln will combust a maximum of 306,600 million Btu per year of natural gas, which is equivalent to 35 million Btu per hour at 8,760 hours per year."

DAQ Response:

Agreed. The applicant's clarifications on annual heat inputs to each kiln will be made in the preliminary determination.

The fuel combustion emissions for each kiln have been estimated using a maximum heat input rate of 306,600 million Btu per year with natural gas firing and the DAQ spreadsheet on natural gas combustion, and not using burners' nameplate rating of 45 million Btu per hour on an annual 8760 hours. The DAQ agrees that that this high rate of heat input (45 million Btu/hr) will not normally occur and may not take place on a long-term basis. Thus, the required annual heat input reflects the conditions necessary to dry a maximum of 100 million board-foot of lumber per year (per kiln). At this drying capacity, each kiln will combust a maximum of 306,600 million Btu per year of natural gas, which is equivalent to 35 million Btu per hour at 8,760 hours per year.

Comment 9:

"Emission Stream Moisture Content"

"On page 19, the Application Review states, "The emission stream of the proposed lumber drying kilns contain significant quantities of water vapor (approximately 12% moisture content at the outlet of the kiln)." Roseburg would like to clarify that, as stated in the October 27, 2021 Additional Information Request, the moisture content of the dried lumber exiting the kiln will be 12%. A previous statement in the same paragraph of the Application Review states, "…kiln exhaust is saturated with moisture." This statement is accurate and, as such, Roseburg would like to remove the reference to 12% moisture content at the outlet of the kiln in reference to the exhaust."

DAQ Response:

Agreed. The DAQ will make the requested change to the reference for moisture content in the kiln exhaust.

- This engineer recommends issuing the permit after the completion of public comment period.

Appendix A
RBLC Data

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
ID-0022	ST. MARIES COMPLEX	6/21/2019	Dual track steam-heated batch-type lumber dry kiln	N/A	68133	mbf/yr	PSD BACT work practice requirements: 1. The 60-minute block average dry bulb temperature of air exiting the lumber shall not exceed 245F. Compliance is determined separately at 20 locations (two loads, ten monitoring locations each) at any one time. After each periodic fan reversal, compliance is similarly determined at 20 new locations on the opposite side of each load (two loads, ten monitoring locations each). 2. The moisture content of the lumber shall not be less than 13%, dry basis. Compliance is determined at the end of the drying cycle, and prior to equalizing and conditioning (if any) by averaging the instantaneous moisture content measured at eight separate locations (four per load). For partial loads, the number of monitoring locations shall be proportional to the loads length (e.g. two monitoring locations for a load spanning half the length of the kiln). Emission limit informing the BACT analysis: The permittee requested, and EPA	0		BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
							Region 10 established, a 50 tpy VOC limit applicable to the kiln. The threshold value roughly reflects the kiln's maximum annual emissions considering the three species of wood the permittee is authorized to dry in the kiln. A batch's emissions are determined by multiplying the temperature-dependent emission factor (lb/mbf) by the volume of lumber in the batch (mbf).				

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
LA-0347	BOGALUSA SAWMILL	4/25/2019	lumber kilns (2)		52.03	mm BF/yr (each)	Proper operation and maintenance (operate as manufacturer's recommendations, inspect weekly, repair timely, place kiln sticker uniformly, minimize short circuiting, set target moisture content as high as possible, minimize redrying)	0		BACT-PSD	U
LA-0338	URANIA SAWMILL	5/8/2018	Lumber Drying Kilns (K-1, K-2, K3)	Steam	45	MMBTU/hr	proper maintenance and operation	0		BACT-PSD	U
SC-0176	GEORGIA PACIFIC - MCCORMICK SAWMILL	10/27/2016	Direct fired continuous lumber kiln	Wood Fired	26	MMBTU/HR		0		BACT-PSD	N
SC-0166	NEW SOUTH LUMBER COMPANY - DARLINGTON INC.	1/26/2016	TWO KILNS - KLN5 AND KLN6	GREEN SAWDUST	85	MILLION BD-FT/YR	PROPER OPERATION AND MAINTENANCE	0		BACT-PSD	U
LA-0363	HOLDEN WOOD PRODUCTS MILL	10/2/2019	Electric QA Kiln (15-19)		0.04	M board ft/hr	Proper Kiln Design and Good Operating Practices	0.04	M BF/H	BACT-PSD	U
TX-0584	TEMPLE INLAND PINELAND MANUFACTURING COMPLEX	8/12/2011	Dry stud mill kilns 1 and 2	Wood	156000	board feet per charge	good operating practice and maintenance	2.49	LB VOC/1000 BOARDFEE	BACT-PSD	U
TX-0842	LUMBER MILL	6/15/2018	Kilns (EPNs CK01 and CK02)	Wood (thermal oil heating)	25	MBF/KILN	Proper design and operation	3.38	LB / DBF	BACT-PSD	U
AR-0158	POTLATCHDELTIC LAND AND LUMBER, LLC - WARREN LUMBER MILL	1/3/2019	Continuous Drying Kilns		360	MMBF		3.5	LB/MBF	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AR-0157	POTLATCHDELTIC MANUFACTURING L.L.C. - WALDO MILL	11/29/2018	Continuous Drying Kilns	Steam	300	MMBF		3.5	LB/MBF	BACT-PSD	U
FL-0365	PERRY MILL	4/11/2017	Direct-Fired Batch Lumber Drying Kiln No. 5	Waste wood	50000	MMBF per year	Minimization of over-drying	3.5	LB/MBF	BACT-PSD	U
FL-0358	GRACEVILLE LUMBER MILL	7/14/2016	Direct-fired continuous lumber drying Kiln No. 5	Sawdust	110000	Thousand bf/yr	Lumber moisture used as proxy for VOC emissions -- product that is over dried likely means more VOC driven off and emitted	3.5	LB/THOUSAND BF	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
FL-0340	PERRY MILL	4/1/2014	Direct-fired lumber drying kiln	Waste wood	90	million board ft/yr	At a minimum, the permittee shall operate the kiln in accordance with the following best operating practices (BMP). a. Minimize over-drying the lumber; b. Maintain consistent moisture content for the processing lumber charge; and c. Dry at the minimum temperature. The permittee shall develop and operate in accordance with a written plan to implement the above BMP and any others required by the kiln manufacturer. Ninety days before the initial startup of the kiln, the permitted shall submit to the Compliance Authority the BMP plan. The Title V air operation permit shall include the submitted BMP plan.	3.5	LB/THOUSAND BOARD FT	BACT-PSD	U
AR-0135	WEST FRASER, INC. (LEOLA LUMBER MILL)	8/5/2013	LUMBER KILN, CONTINUOUS, INDIRECT	Steam (wood)	275	MMBF/YR		3.5	LB/MBF	BACT-PSD	
SC-0149	KLAUSNER HOLDING USA, INC	1/3/2013	LUMBER DRYING KILNS EU007	Steam (wood)	700	MILLION BOARD FOOT PER YEAR		3.5	LB/MBF	OTHER CASE-BY-CASE	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
TX-0607	LUMBER MILL	12/15/2011	Continuous lumber kilns (2)	Wood	275	MMBF/YR	proper temperature and process management; drying to appropriate moisture content	3.5	LB/MBF	BACT-PSD	U
AL-0305	RESOLUTE FOREST PRODUCTS - ALABAMA SAWMILL	6/24/2015	Continuous Direct-Fired Lumber Dry Kilns with 35 mmbtu/hr Wood Fired Burner	Wood	108.33	mmbf/yr - each		3.76	LB/MBF	BACT-PSD	N
FL-0343	WHITEHOUSE LUMBER MILL	9/9/2014	Direct-Fired Continuous Kilns	Wood waste	40	MMBTU/H	Proper Maintenance and Operating Procedures: Minimize over-drying the lumber. Maintain consistent moisture content for the processing lumber charge. Dry the lumber at the minimum temperature. Develop a written Operation and Maintenance (O&M) plan identifying the above practices and the operation and maintenance requirements from the kiln manufacturer. Record and monitor the total monthly amount and 12-month annual total of wood dried in each kiln (board-feet). Record the calculated monthly and 12-month annual total emissions of VOC to demonstrate compliance with the	3.76	LB/THOUSAND BOARD FT	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
							process and emissions limits.				
SC-0180	ELLIOTT SAWMILLING COMPANY, INC.	6/10/2014	Batch Drying Lumber Kiln No. 5	Wood	53	MM BF/YR		3.76	LB/M BF	BACT-PSD	U
AL-0257	WEST FRASER-OPELIKA LUMBER MILL	11/1/2013	Two(2) 87.5 MMBF/YR Continuous kilns with a 35 MMBtu/hr direct-fired wood burner	Wood Shavings	175	MMBF/YR		3.76	LB/MBF	BACT-PSD	N
SC-0151	WEST FRASER - NEWBERRY LUMBER MILL	4/30/2013	TWO - 35 MMBTU/H DUAL PATH, DIRECT FIRED, CONTINUOUS LUMBER KILNS, 15 THOUSAND BF/H, EACH	SAWDUST	0		PROPER OPERATION AND GOOD OPERATING PRACTICES	3.76	LB/MBF	BACT-PSD	N
AL-0258	WEST FRASER, INC. - MAPLESVILE MILL	4/15/2013	Two(2) 100 MMBF/Y Continuous direct fired kiln	Wood Residuals	200	MMBF/YR		3.76	LB/MBF	BACT-PSD	U
AR-0152	INTERFOR U.S. INC	6/29/2018	Convert Kiln #2 to continuous operation	Sawdust	209014	MBF/yr		3.8	LB/MBF	BACT-PSD	U
AR-0148	CADDO RIVER LLC	1/29/2018	Dual Path Kiln # 3	Wood	185000	MBF		3.8	LB/MBF	BACT-PSD	U
AR-0147	ANTHONY FOREST PRODUCTS COMPANY, LLC	10/2/2017	Dual Path Kiln #3	Sawdust	31.5	MMBtu/hr		3.8	LB/MBF	BACT-PSD	U
AR-0146	WEST FRASER, INC.	9/14/2017		Wood	0			3.8	LB/MMBOARD FEET	BACT-PSD	N

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AL-0308	TWO RIVERS LUMBER CO., LLC	1/3/2017	15.4 MBF/HR CDK (DPK-1) W/ 38.8 MMBTU/HR NATURAL GAS BURNER (Continuous Direct-fired)	NATURAL GAS	15.4	MBF/H		3.8 as C	LB/MBF	BACT-PSD	
AL-0308	TWO RIVERS LUMBER CO., LLC	1/3/2017	15.4 MBF/HR CDK (DPK-2) W/ 38.8 MMBTU/HR NATURAL GAS BURNER (Continuous Direct-fired)	NATURAL GAS	15.4	MBF/H		3.8 as C	LB/MBF	BACT-PSD	U
AR-0124	EL DORADO SAWMILL	8/3/2015	LUMBER DRYING KILN SN-01, Direct-fired w/LNB	NATURAL GAS	45	MMBTU/H	PROPER MAINTENANCE AND OPERATION	3.8	LB/MBF	BACT-PSD	N
AR-0124	EL DORADO SAWMILL	8/3/2015	LUMBER DRYING KILN SN-02, Direct-fired w/LNB	NATURAL GAS	45	MMBTU/H		3.8	LB/MBF	BACT-PSD	N
AR-0124	EL DORADO SAWMILL	8/3/2015	LUMBER DRYING KILN SN-03, Direct-fired w/LNB	NATURAL GAS	45	MMBTU/H		3.8	LB/MBF	BACT-PSD	N
AR-0122	GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PLYWOOD AND	2/6/2015	SN-09 #4 LUMBER KILN, Direct-fired	NATURAL GAS	130	MILLION BOARD FEET		3.8	LB/ 1000 BOARD FEET	BACT-PSD	N
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	4/25/2012	KILN 3	WASTE WOOD	65000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.83	LB/MBF	BACT-PSD	N

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	4/25/2012	KILN 4	WASTE WOOD	73000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.93	LB/MBF	BACT-PSD	N
AL-0310	FULTON SAWMILL	6/8/2017	11.4 MBF/HR CONTINUOUS DIRECT-FIRED LUMBER DRY KILN, 40 MMBTU/HR NATURAL GAS BURNER, 4 MMBTU/HR NATURAL GAS CONDENSATE EVAPORATOR	NATURAL GAS	11.4	MBF/H	BACT DETERMINED AS PROPER KILN OPERATION AND MAINTENANCE PRACTICES	4 as WPP1	LB/MBF	BACT-PSD	
SC-0192	CANFOR SOUTHERN PINE - CONWAY MILL	5/21/2019	Batch Lumber Kilns	Steam (natural gas)	0		Work practice standards	4.2	MBD-FT	BACT-PSD	U
LA-0335	JOYCE MILL	10/4/2018	GRP0003 Lumber kilns (AK1)	Steam (wood)	300	million board feet/yr	properly design and operation	4.2	LB/MBF	BACT-PSD	U
SC-0184	NSLC - DARLINGTON	2/6/2018	Lumber Drying Kiln 7, Continuous Direct-fired	Natural Gas	80	MMbd-ft/yr	Volatile Organic Compounds (VOC) best available control technology for the continuous lumber drying kiln, KLN7, is work practice standards. VOC emissions are based on an emissions factor of 4.2 lb VOC/1000 bd-ft (as terpene +methanol + formaldehyde).	4.2 as WPP1	LB VOC/1000 BD-FT	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AL-0322	COTTONTON SAWMILL	8/5/2015	Continuous Direct-fired Lumber Dry Kiln with 34 MMBtu/hr Wood-fired burner	Biomass	16.4	MBF/hr	Good combustion practices and proper maintenance	4.21	LB/MBF	BACT-PSD	U
TX-0856	LUMBER MILL	3/20/2019	Direct-Fired Wood Drying Kiln No. 3	wood	14.88	MBF	proper operation and maintenance of the kiln	4.24	LB/MBF	BACT-PSD	U
LA-0363	HOLDEN WOOD PRODUCTS MILL	10/2/2019	Continuous Lumber Drying Kilns A and B (01-19 and 02-19)	Wood residuals	15.97	M board ft/hr	Proper Kiln Design and Good Operating Practices	4.33	LB/M BF	BACT-PSD	U
MS-0093	VICKSBURG FOREST PRODUCTS, LLC WALTERSVILLE LUMBER MILL	10/14/2020	Lumber Drying	Steam	164114	thousand board-feet per year		4.43	LB/1000 BOARD-FEET	BACT-PSD	U
AL-0259	THE WESTERVELT COMPANY	8/21/2013	Three (3) 93 MMBF/Y Continuous, Dual path, indirect fired kilns	Steam (Indirect heat)	0			4.57	LB/MMBF	BACT-PSD	U
AL-0311	MILLPORT WOOD PRODUCTS FACILITY	8/30/2016	THREE CONTINUOUS DIRECT-FIRED LUMBER DRY KILNS, CDK-4/X023A, CDK-5/X023B, CDK-6/X023C	WOOD-SAWDUST	385	MMBF/YR	OPERATING AND MAINTENANCE PRACTICES	4.7	LB/MBF AS WPP1	BACT-PSD	

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AL-0273	MILLPORT WOOD PRODUCTS FACILITY	12/30/2014	Continuous direct-lumber dry kiln	Green sawdust	140000	mbf/yr	Proper maintenance & operating practice requirements. Test method information: Method 18/25.	4.7	LB	BACT-PSD	U
TX-0870	LUMBER MANUFACTURING PLANT	11/26/2019	Lumber Kilns		188000	NBF/Kiln	Proper design and operating practices	5.49	LB/MBF	BACT-PSD	U
AL-0312	BELK CHIP-N-SAW FACILITY	5/26/2016	115,000 MBF/YR CDK D (ES-006) WITH 35 MMBTU/HR WOOD-FIRED AND 7 MMBTU/HR NG-FIRED BURNERS	WOOD-SAWDUST	115	MMBF/YR	OPERATING AND MAINTANCE PRACTICES MEASURE LUMBER MOISTURE CONTENT	5.49	LB/MBF AS WPPI VOC	BACT-PSD	N
AL-0312	BELK CHIP-N-SAW FACILITY	5/26/2016	115,000 MBF/YR CDK E (ES-009) WITH 35 MMBTU/HR WOOD-FIRED AND 7 MMBTU/HR NG-FIRED BURNERS	WOOD-SAWDUST	115	MMBF/YR	OPERATING AND MAINTENANCE PRACTICES LUMBER MOISTURE CONTENT MEASUREMENT	5.49	LB/MBF AS WPP1 VOC	BACT-PSD	N

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
SC-0186	GEORGIA-PACIFIC WOOD PRODUCTS, LLC - PROSPERITY CHIP-N-SAW	2/21/2019	Lumber Drying Kiln 4	Steam	88000	1000 bf/yr	S.C. Regulation 61-62.5, Standard No. 7) Volatile Organic Compounds (VOC) Best Available Control Technology (BACT) for the continuous lumber drying kiln, KLN7, is work practice standards. VOC emissions are based on an emission factor of 5.72 lb VOC/103 bd-ft (as WPP1 VOC).	5.72	LB VOC/1000 BD-FT	BACT-PSD	U
SC-0185	CANFOR SOUTHERN PINE - CAMDEN PLANT	9/6/2018	Lumber Drying Kiln 7	Sawdust	110	MMbd-ft/yr	Volatile Organic Compounds (VOC) Best Available Control Technology (BACT) for the continuous lumber drying kiln, KLN7, is work practice standards. VOC emissions are based on an emission factor of 5.82 lb VOC/1000 bd-ft (as terpene + methanol + formaldehyde)	5.82	LB/1000 BD-FT	BACT-PSD	U
SC-0181	RESOLUTE FP US INC. - CATAWBA LUMBER MILL	11/3/2017	3 Continuous Direct-Fired Lumber Kilns, CDK1, CDK2, CDK3	green sawdust	104.17	MM BF/YR		5.82	LB/M BF	BACT-PSD	U
AR-0120	OLA	2/11/2015	Drying Kiln No. 5 (SN-21)	wood residue	60	MMBF/yr		23.5	LB/H	BACT-PSD	N
LA-0293	CHOPIN MILL	3/18/2014	Lumber Dry Kilns Nos. 1 & 2 (EQT 37 & 38)		25000	M BD-FT/YR	Good operating practices to limit VOC emissions to 4.29 lb/M bd-ft (12-month rolling average).	24.51	LB/H	BACT-PSD	U
AR-0123	DELTIC TIMBER CORPORATION WALDO	10/18/2013	KILN NO. 3	Steam (wood)	0		PROPER KILN OPERATION	27	LB/H	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AR-0123	DELTIC TIMBER CORPORATION WALDO	10/18/2013	KILN NO. 5	Steam (wood)	0			27	LB/H	BACT-PSD	
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	1/31/2014	EP-3K - Wood-Fired Dry Kiln No. 1	Wood	60000	MBF/YR	Proper kiln design & operation; annual production limit	29.27	LB/H	BACT-PSD	U
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	1/31/2014	EP-4K - Wood-Fired Dry Kiln No. 2	Wood	60000	MBF/YR	Proper kiln design & operation; annual production limit	29.27	LB/H	BACT-PSD	U
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	1/31/2014	EP-5K - Wood-Fired Dry Kiln No. 3	Wood	60000	MBF/YR	Proper kiln design & operation; annual production limit	29.27	LB/H	BACT-PSD	U
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	1/31/2014	EP-6K - Wood-Fired Dry Kiln No. 4	Wood	60000	MBF/YR	Proper kiln design & operation; annual production limit	29.27	LB/H	BACT-PSD	U
AR-0120	OLA	2/11/2015	Drying Kiln No. 4 (SN-12)	None	105	MMBF/yr		33.2	LB/H	BACT-PSD	N
AR-0127	DELTIC TIMBER CORPORATION - OLA	10/13/2015	STEAM HEATED CONTINUOUS KILN NO. 3		79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFACTURER'S SPECIFICATIONS	33.3	LB/H	BACT-PSD	N
AR-0127	DELTIC TIMBER CORPORATION - OLA	10/13/2015	STEAM HEATED CONTINUOUS KILN NO. 4		79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFACTURER'S SPECIFICATIONS	33.3	LB/H	BACT-PSD	N
AR-0120	OLA	2/11/2015	Dry Kiln No. 3 (SN-06)	None	105	MMBF/yr		33.3	LB/H	BACT-PSD	N

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AR-0154	ANTHONY TIMBERLANDS, INC	8/2/2018	Continuous Drying Kiln		200	MMBF		36.8	LB/HR VOC	BACT-PSD	U
AR-0127	DELTIC TIMBER CORPORATION - OLA	10/13/2015	DIRECT-FIRED CONTINUOUS KILN NO. 5		79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFACTURER'S SPECIFICATIONS	38.2	LB/H	BACT-PSD	N
AR-0123	DELTIC TIMBER CORPORATION WALDO	10/18/2013	KILN NO. 4	Steam (wood)	0			46.2	LB/H	BACT-PSD	
AR-0143	CADDO RIVER LLC	2/8/2017	CONTINUOUS LUMBER DRYING KILNS	WOOD	116000000	BOARD FEET		53.2	LB/H	BACT-PSD	U
LA-0294	DODSON DIVISION	12/30/2013	Dry Kiln 1 (033, EQT 15)	Steam (wood)	14	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	79.4	LB/H	BACT-PSD	U
LA-0294	DODSON DIVISION	12/30/2013	Dry Kiln 2 (034, EQT 16)	Steam (wood)	14	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	79.4	LB/H	BACT-PSD	U
LA-0294	DODSON DIVISION	12/30/2013	Dry Kiln 3 (035, EQT 17)	Steam (wood)	16	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	90.74	LB/H	BACT-PSD	U
LA-0294	DODSON DIVISION	12/30/2013	Dry Kiln 4 (051, EQT 32)	Steam (wood)	16	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	90.74	LB/H	BACT-PSD	U

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
AR-0164	GP WOOD PRODUCTS SOUTH LLC GURDON PLYWOOD & LUMBER COMPLEX	11/22/2019	#4 Lumber Kiln	Steam (wood)	130000000	board feet of lumber per consecutive 12 month period		92	LB/HR	OTHER CASE-BY-CASE	U
SC-0136	SIMPSON LUMBER COMPANY, LLC	8/29/2012	DIRECT-FIRED LUMBER DRYING KILN NO. 4	DRY WOOD WASTE	34	MMBTU/H	WORK PRACTICE STANDARDS	104	T/YR	BACT-PSD	U
AR-0164	GP WOOD PRODUCTS SOUTH LLC GURDON PLYWOOD & LUMBER COMPLEX	11/22/2019	#1 Lumber Kiln and #3 Lumber Kiln	Steam (wood)	172000000	board feet of lumber per consecutive 12 month period		113.5	LB/HR	OTHER CASE-BY-CASE	U
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	6/18/2013	DKN5	WOOD WASTE	75	MMBF/YR	PROPER MAINTENANCE AND OPERATION	141	T/YR	BACT-PSD	N
SC-0169	CAMDEN PLANT	6/18/2014	DKN6 - DIRECT FIRED CONTINUOUS LUMBER DRYING KILN	WOOD	80	MMBD-FT/YR		150.4	T/YR	BACT-PSD	N
SC-0164	SIMPSON LUMBER COMPANY, LLC	6/20/2014	LUMBER KILNS	Steam	166	MMBF/YR	PROPER OPERATION AND MAINTENANCE	156	T/YR	BACT-PSD	
SC-0163	KAPSTONE CHARLESTON KRAFT LLC-SUMMERVILLE	1/20/2015	LUMBER KILNS		194.83	MMBF/YR	PROPER MAINTENANCE AND OPERATION	225.6	T/YR	BACT-PSD	
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	6/18/2013	DKN1	STEAM HEATED	60	MMBF/YR	PROPER OPERATION AND MAINTENANCE	343.98	T/YR	BACT-PSD	N

RBLCID	FACILITY NAME	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD	EMISSION LIMIT	EMISSION LIMIT UNIT	CASE-BY-CASE BASIS	COMPLIANCE VERIFIED
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	6/18/2013	DKN4	STEAM HEATED	60	MMBF/YR	MAINTENACE AND OPERATING PRACTICES	343.98	T/YR	BACT-PSD	N
SC-0165	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	10/15/2014	LUMBER KILNS		295.6	MMBF/YR	PROPER MAINTENANCE AND OPERATION	602	T/YR	BACT-PSD	
SC-0135	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	9/24/2012	LUMBER KILNS		380.56	MMBD-FT/YR	PROPER MAINTENANCE AND OPERATION	799.18	T/YR	BACT-PSD	N
LA-0252	JOYCE MILL	8/16/2011	Lumber kilns	Steam (wood)	300	million board feet/yr	properly design and operation	930	T/YR	BACT-PSD	U

Appendix B
Public Notice

Appendix C
Entities To Be Notified and Documents To be Sent

NEWSPAPER	The Daily Herald 1025 Roanoke Avenue Roanoke Rapids, NC 27870 (252) 537-7253	Public Notice
OFFICIALS	Mr. Tony Brown Manager, Halifax County P. O. Box 38 Halifax, NC 27839 (252) 583-1131 brownt@halifaxnc.com	Public Notice
	Ms. Shanelle Harris Clerk, Town of Weldon P. O. Box 551 Weldon, NC 27890 (252) 536-4836 townclerk@historicweldonnc.com	Public Notice
SOURCE	Mr. Jake Elston Sr. Vice President - Operations 290 Power Place Drive Weldon, NC 27890 (541) 679-3311 JakeE@rfpco.com	Preliminary Determination, Draft Permit & Public Notice
EPA	Mr. Michael Sparks Air Permitting Section U.S. EPA Region 4 Sam Nunn Atlanta Federal Building 61 Forsyth Street, S.W. Atlanta, Georgia 30303-3104 (404) 562-8857	Preliminary Determination, Draft Permit & Public Notice
	Preliminary Determination, Draft Permit, and Public Notice, via electronic mail to: Michael.Sparks@epa.gov with cc to: shepherd.lorinda@epa.gov	
FLMs	Ms. Andrea Stacy US National Park Service	None
	Mr. Pleasant J. McNeel US Forest Service	None
RALEIGH REGIONAL OFFICE	Ms. Taylor Hartsfield NC DAQ Air Quality Regional Supervisor 3800 Barrett Drive Raleigh, NC 27609 (919) 791-4289 Taylor.Hartsfield@ncdenr.gov	Preliminary Determination, Draft Permit, & Public Notice