S.C. Department of Health and Environmental Control

Bureau of Air Quality
Prevention of Significant Deterioration
Preliminary Determination

Canfor Southern Pine – Camden Plant
1281 Sanders Creek Road
Cassatt, South Carolina 29032
Kershaw County

Permit No. 1380-0025-CK
July 18, 2018

This review was performed by the Bureau of Air Quality of the South Carolina Department of Health and Environmental Control in accordance with South Carolina Regulations for the Prevention of Significant Air Quality Deterioration.

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1.0 Time Line (Permitting Action History)

March 27, 2018	A Prevention of Significant Deterioration (PSD) pre-application meeting was held with representatives from Canfor Southern Pine – Camden Plant, Kathy Ferry, and the South Carolina Department of Health and Environmental Control (SC DHEC), Bureau of Air Quality (BAQ).
May 02, 2018	SC DHEC received a PSD permit application from Canfor Southern Pine – Camden Plant
May 09, 2018	Air Permitting of BAQ emailed a copy of the application to Heather Ceron and Lorinda Shepherd of the Environmental Protection Agency (EPA) and informed him that BAQ had deemed the application complete.
May 09, 2018	Air Permitting of BAQ mailed a letter to Robert Byrd informing him that BAQ had deemed the application complete; the application will undergo a preliminary determination.
May 09, 2018	Air Permitting of BAQ mailed out to Catherine Collins of the US Fish and Wildlife Service and Melanie Pitrolo of the USDA Forest Service letters informing them that BAQ was in receipt of and was currently reviewing a PSD application from Canfor Southern Pine – Camden Plant.
May 22, 2018	Air Permitting of BAQ received email correspondence from Lorinda Shepherd of EPA stating that EPA had reviewed the draft Preliminary Determination and did not have any comments at that time.
May 21, 2018 – June 20, 2018	B. Lindler emailed K. Ferry requesting additional information regarding the inability to test the kiln burners for NO_x emissions. Response were received on May 25, 2018 and June 20, 2018.
July 18, 2018	The BAQ placed the PSD Preliminary Determination and PSD Construction Permit No. 1380-0025-CK on public notice for a thirty-(30) day comment period. All appropriate Federal and State Officials were notified.

2.0 Introduction and Preliminary Determination

2.1 Project Overview

Due to emissions increases associated with this proposal, the project is subject to S.C. Regulation 61-62.5, Standard No. 7, "Prevention of Significant Deterioration (PSD)." As stated, the proposed project is subject to review under S.C. Regulation 61-62.5, Standard No. 7, "Prevention of Significant Deterioration." This regulation is equivalent to the Federal Prevention of Significant Deterioration of Air Quality regulations in Title 40 Code of Federal Regulations (CFR) Section 52.21. Pursuant to these regulations, new major stationary sources and modifications to major stationary sources of air pollution must demonstrate that they will not significantly deteriorate the air quality in their region. Canfor Southern Pine – Camden Plant has potential emissions for Volatile Organic Compounds (VOCs), which exceed the significance levels allowed in this regulation. The PSD review was conducted for VOCs and includes a Best Available Control Technology (BACT) determinations and Ambient Air Impact Analyses.

2.2 Regulatory Applicability

The increased production capacity results in potential emissions that exceed the PSD significant thresholds. By virtue of the proposed increase, this project is subject to review under the following standards in S.C. Regulation 61-62 and Federal standards:

- S.C. Regulation 61-62.5, Standard No. 2, *Ambient Air Quality Standards*
- S.C. Regulation 61-62.5, Standard No. 4, *Emissions from Process Industries*
- S.C. Regulation 61-62.5, Standard No. 5.2, *Control of Oxides of Nitrogen*
- S.C. Regulation 61-62.5, Standard No. 7, *Prevention of Significant Deterioration*
- S.C. Regulation 61-62.5, Standard No. 8, *Toxic Air Pollutants*
- S.C. Regulation 61-62.6, *Control of Fugitive Particulate Matter*
- S.C. Regulation 61-62.7, *Good Engineering Practice Stack Height*
- S.C. Regulation 61-62.60, *South Carolina Designated Facility Plan and New Source Performance Standards*
- S.C. Regulation 61-62.63 and 40 CFR 63, *National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories*, Subpart A, *General Provisions*
- 40 CFR 63, *National Emission Standards For Hazardous Air Pollutants For Source Categories*, Subpart DDDD, *National Emission Standards For Hazardous Air Pollutants Plywood and Composite Wood Products*
- S.C. Regulation 61-62.70, *Title V Operating Permit Program*

3.0 Detailed Process Description

Canfor Southern Pine – Camden Plant plans to make modifications to several emissions units throughout the plant and construct a new continuous lumber drying kiln (DKN7). The facility's current lumber drying capacity is provided by five (5) indirect-fired, batch lumber drying kilns (DKN 1-5) and one (1) direct-fired, continuous lumber drying kiln (DKN6). The steam heat for the five (5) indirect-fired kilns is provided by the facility's one (1) wood residual boiler, the heat for the one (1) direct-fired kiln is provided by a burner designed to burn green sawdust. Following the construction of the new kiln (DKN7) one of the batch kilns will be shut down (DKN5). The proposed project will increase the facility's lumber drying capacity from 262.1 million board-feet per year (MMbd-ft/yr) to 360.6 MMbd-ft/yr.

Green End Operations

The green end operations at the facility involve the processing of whole logs into rough sawn lumber of various dimensions. Process in this area include; log debarking, log sawing, lumber sawing, and byproduct material collection, conveyance, and storage. In the Green End Operations the primary logs are showered with water to control the temperature, this practice also limits the PM emissions from the process. The majority of the Sawmill operations occur in the sawmill building this further increases control of fugitive PM emissions from these sources. Belt and chain conveyors are used to transport the wood byproducts generated in the Sawmill, which include bark and sawdust, to an enclosed hog that will break down the large pieces of wood prior to conveying the byproducts to the boiler fuel house. The scrap wood generated at the Sawmill is conveyed to chippers the resultant chips are transferred by chain conveyors to storage bins for shipping.

With this proposed project the facility will replace the existing debarker with a new unit (or two units) to modernize the equipment in this process and allow an increase in the log processing rate from 200 tons per hour (tph) to 300 tph. The facility will also complete modifications in the Sawmill to improve product flow, the processing rate will increase from 40 thousand board-foot per hour (MBF/hr) to 70 MBF/hr. The existing sawmill chippers will be modified to increase their capacity from 55tph to 77tph. The increases in annual throughput for the green end operations is to accommodate the increase in lumber drying capacity.

Steam Generation

All the steam generations at the facility is accomplished by one wood residual boiler, which is equipped with a multicyclone and electrostatic precipitator for emission control. Fuels that are combusted in the boiler include green sawdust and bark, which is typically generated on site but may also be delivered to the site by rail or truck. The facility is allowed to use diesel or other similar oils as fuel during startup, but dry wood from the planer mill is typically used for this purpose.

The facility's existing wood residual boiler will not be modified as a part of this project and this project will have no impact on steam demand or boiler operation.

Lumber Drying

Currently the facility has six (6) lumber drying kilns with a total drying capacity of 262.1 MMbd-ft/yr. Five (5) of the current lumber drying kilns are steam-heated, batch kilns; two (2) of these kilns have a drying capacity of 55.8 MMb-ft/yr, the remaining three (3) kilns can process 32.0 MMbd-ft/yr, 27 MMbd-ft/yr, and 11.5 MMbd-ft/yr respectively. The final and smallest of these five (5) lumber drying kilns has not operated in several years and will be removed from the facility as a part of this project. The facility also has currently has one (1) existing direct-fired, continuous lumber drying kilns which has a capacity of 80 MMbd-ft/yr.

Table 1 shows the facility's current lumber drying capacity and the facility's proposed future lumber drying capacity.

Table 1 – Current and Future Lumber Drying Capacity

Kiln Equipment ID	Current Drying Capacity (MMbd-ft/yr)	Future Drying Capacity (MMbd-ft/yr)
Kiln #1 (DKN1)	55.8	55.8
Kiln #2 (DKN2)	55.8	55.8
Kiln #3 (DKN3)	32.0	32.0
Kiln #4 (DKN4)	27.0	27.0
Kiln #5 (DKN5)	11.5	N/A
Kiln #6 (DKN6)	80.0	80.0
Kiln #7 (DKN7)	N/A	110.0
Total Drying Capacity	262.1	360.6

The facility is proposing to install a new direct-fired, continuous lumber drying kiln (DKN7), which will have a design capacity of 110.0 million board feet per year (MMBd-ft/yr) the associated burner assembly for this new kiln will have a maximum heat input of 40 MMBtu/hr and is designed to burn green sawdust and bark. Also as a part of this project, the exhaust hoods and stack on the existing direct-fired, continuous lumber drying kiln (DKN6) will be modified to direct more steam and kiln exhaust through the stacks and away from ground level work areas. This additional lumber drying kilns and the removal of one (1) of the steam-heated, batch kilns will result in a facility wide total drying capacity increase to 360.6 MMbd-ft/yr.

Planer Mill

Planer Mill operations involve processing the rough, kiln dried lumber into finished dimensional lumber. The processes in this area include; planing of rough lumber and byproduct material collection, conveyance, and storage. Planer Mill operations are all

conducted in the Planer Mill building limiting the fugitive PM emissions generated by this process. Byproducts from the processes are pneumatically transferred to material handling cyclones for separation into storage. Process emissions from the material handling cyclones are controlled by a baghouse.

The Planer Mill will be modified to improve product flow and quality to accommodate the increased lumber drying capacity. The short-term capacity of 80.0 MBF/hr is not expected to increase, however the annual throughput will increase. There are no modifications planned for the dust collection system and baghouse.

Additional Mill Operations

Fugitive PM and PM_{10} emissions from loading and handling wood byproducts, such as chips, sawdust, planer shavings, and back, and from haul road will increase as a result of the proposed project and the increase in the annual throughputs of these sources.

4.0 Significant Emission Rates

As shown in Table 2, this project exceeds the significant threshold as defined under PSD for VOC emissions.

Table 2 - PSD Applicability Analysis

Pollutant	Controlled Emissions Increase	PSD Significant Threshold	Significant Increase?
	TPY	TPY	
PM	22.458	25	No
PM_{10}	11.602	15	No
$PM_{2.5}$	8.865	10	No
SO_2	4.38	40	No
NO_X	15.40	40	No
CO	40.15	100	No
VOC	320.10	40	Yes
Lead	0.0031	0.6	No
CO_2e	36,714	75,000	No
Fluorides	0.00	3.0	No

5.0 Best Available Control Technology (BACT) Determination

5.1 BACT Requirement

BACT is defined as "an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant, taking into account energy, environmental, and economic impacts." As per S.C. Regulation 61-62.5, Standard No. 7, the BACT requirement applies to each individual new or modified affected emissions unit and pollutant emitting activity at which a net emissions increase would occur. In no case can the application of BACT result in emissions of any pollutant which would exceed emissions allowed under any applicable standard under 40 CFR 60, *New Source Performance Standard (NSPS)*, 61, *NESHAP,* or 63, *NESHAP for Source Categories*.

Chapter B of the draft *New Source Review Workshop Manual* (October 1990) defines the BACT determination process as a 5-step process.

Step 1 - Identify All Control Technologies
Step 2 - Eliminate Technically Infeasible Options
Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Step 4 - Evaluate Most Effective Controls and Document Results
Step 5 - Select BACT

Opacity is not considered to be a PSD pollutant and therefore, opacity itself does not require a BACT evaluation and establishment of a BACT limit. However, BACT can include the use of visible emission limitations or work practice standards for regulated PSD pollutants. Opacity limits have been included in the draft permit as required by State and Federal regulations. BACT cannot be less stringent than an applicable NSPS or NESHAP as outlined in 40 CFR 60, 61, and 63.

The primary resource for establishing BACT is the RACT/BACT/LAER Clearinghouse (RBLC) on the Technology Transfer Network (TTN) maintained by the EPA. To establish BACT for a PSD source, state regulatory agencies query the RBLC. This database contains information about available control technologies for specific industry sources and lists the limits that other pollution control agencies have established for similar source types.

BAQ queried the RBLC for all process types and NSR applicable pollutants. An RBLC advanced search was queried using a standard industrial classification (SIC) code of 2421. In addition to the RBLC, operating permits for existing facilities with similar processes and the various control options used by those facilities were reviewed.

5.2 BACT for VOC

Table 3 lists the VOC emissions resulting from the following process/point sources.

1. Kiln 7 (DKN7): A direct-fired, continuous lumber drying kiln. This kiln will have a drying capacity of 110.0 MMbd-ft/yr and will be heated by a 40 MMBtu/hr gasifier burner designed to combust green sawdust.

Table 3 - Potential Uncontrolled VOC Emissions	
Equipment	**Uncontrolled VOC Emissions (lb/hr)**
DKN7	73.082

As stated in the regulatory definition, BACT is "an emissions limitation … based on the maximum degree of reduction for each regulated NSR pollutant … taking into account energy, environmental, and economic impacts …." When BAQ determines that the imposition of an emissions limitation is not feasible, then "a design, equipment, work practice, operational standard, or combination thereof, may be prescribed" as BACT instead.

5.2.1 Step 1: Identify All Available Control Technologies

The BACT analysis identifies the following control technologies that could reduce VOC emissions:

1. Proper Maintenance and Operation

Proper Maintenance and Operation can be effective in lumber drying kilns to reduce VOC emissions. Proper maintenance and operating practices relies on efficient operation of the kilns coupled with properly maintaining the equipment through periodic checks and inspections to minimize VOC emissions without the use of add-on controls. Manufacturer specifications and moisture content should dictate proper operation; drying schedule and temperature. Routine maintenance should be accomplished based on manufacturer's recommendations.

2. Condensation

Condensation requires the cooling of the exhaust stream to condense the organic compounds and remove them. Condensation is dependent on vapor pressure of the compound and the temperature of the condenser. Condensers are used for recovering product or raw materials and are typically used on exhaust streams with little to no particulate matter.[1] Condensed VOCs from condensation process can either be destroyed in a separate combustion device or the recovered material can be sold.

[1] Sources and Control of Volatile Organic Air Pollutants, APTI, Course 482, Student Manual, 3rd Ed., November 2002, pg 13-20

3. Thermal or catalytic oxidation

Oxidation is used to control VOC emissions from a variety of sources by increasing the exhaust stream temperature and completely combusting all the volatile compounds to carbon dioxide and water. There are different designs for thermal oxidizers; conventional thermal units, recuperative units, or regenerative thermal oxidizers. In a conventional unit there is no sort of heat recovery in the system, while a recuperative unit preheats the contaminated air by the combustion exhaust gases. A regenerative thermal oxidizer (RTO) stores heat in a refractory bed to provide heat to the incoming contaminated air. A regenerative catalytic oxidizer (RCO) is similar to a RTO, where heat is stored in beds to provide heat for combustion to the contaminated air, but with a RCO a catalyst is used to lower the activation energy needed for oxidation allowing this process to take place at a lower temperature than a RTO. Factors that can affect the operation of any oxidizer are; air flow rates, temperature entering the oxidizer, and pollutant loading. Any particulate matter in the pollutant stream can interfere with oxidation in these devices and affect their effectiveness in the removal of containments.

4. Carbon adsorption

Adsorption is used for controlling VOC emissions by removing the volatile organic compounds from contaminated gas streams by adhering the compounds to the adsorbents surface. Activated carbon is a commonly used adsorbent bed material for removing VOC emissions from a gas stream, "since it has a strong attraction and large capacity for adsorbing hydrocarbon vapors and odorous or toxic organic compounds."[2] Many factors can affect the efficiency of adsorption like, temperature, pressure, gas velocity, moisture content, particulate matter content, and depending on the molecular size of the VOCs adsorbent pore size.

Prior to an adsorption bed becoming saturated, the adsorbent will need to be desorbed or regenerated to remove the VOC molecules. Typical adsorption systems utilize multiple beds so that one bed can be regenerated while the other bed is controlling VOC emissions in the gas stream.

5. Biofiltration

Biofiltration uses microbes to consume organic compounds in contaminated air streams. Biofiltration systems pass the contaminated air streams through a filter bed media, where the contaminants are absorbed by the moisture in a thin film throughout the media and the microbes reduce the contaminant concentrations by consuming and metabolizing the contaminant. Biofiltration beds usually consist of organic materials that microbes can grow on and obtain nutrients from. Therefore biofiltration beds must be well taken care of to

[2] Air Pollution Control Systems for Selected Industries, APTI, Course SI: 431, Self-Instruction Guidebook, EPA 450/2-82-006

ensure the microbe population remains stable; important operating parameters are bed moisture, feeding, and acidity. Biofiltration is "used primarily for gas streams with a low organic vapor and where the compounds are soluble in water and biodegradable."[3]

5.2.2 Step 2: Technical Feasibility of Options

After the identification of control options, the second step in the BACT assessment is to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that would prohibit the implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

1. Condensation

Condensation requires emissions to be cooled to a temperature in which condensation will occur. The primary constituent of lumber drying emissions will be terpenes, in order to condense these emissions, the exhaust stream would have to be cooled to below 32° F. Lumber drying emissions also contain a high amount of moisture, if the exhaust were to be cooled to temperatures below the freezing point of water, ice would be formed and clog the condenser. Condensation is a technically infeasible VOC emission control technology for exhaust streams that contain a significant quantity of moisture, like lumber kiln exhaust.

2. Thermal or Catalytic Oxidation

Thermal and Catalytic Oxidation requires the capturing of all emissions from the kiln to route through the control device, this is very difficult with a lumber drying kiln and can impact the quality of product being produced by the kiln. The majority of the exhaust escapes from the open ends where the lumber enters and exits, these must remain open to support the continuous process. The venting of kiln air flow to a control device will disrupt the ventilation and circulation patterns required to maintain the proper moisture content and temperature during various drying cycles. The addition of forced exhaust inside the kiln will disrupt the humidity and temperature gradients required for heat transfer and lumber conditioning.

Temperature is another factor with the use of oxidation technologies, and the ability to control the oxidation process temperatures. Oxidation units utilize burners that are sized to bring the oxidation chamber to a desired operating temperature in a reasonable amount of time while the unit is drawing ambient air with no VOC. These burners are turned down during normal operation and is used to keep the process at the desired temperature. Burners have a limited turn down ratio, they cannot be operated below a certain temperature. When the VOCs are oxidized they also supply heat to keep the temperature high. If the heat input from the oxidized VOCs and the burner raise the combustion temperature above a safe operating range the unit will shut down. There is potential to

[3] Using Bioreactors to Control Air Pollution, EPA-456/R-03-003, September 2003, pg 3

thermally overload the oxidizer due to the high variability of emission flow rates and VOC concentrations from lumber drying operations. The oxidizer must be designed to accommodate the highest kiln exhaust flow rate with the lowest VOC concentration and the lowest kiln exhaust flow rate with the highest VOC concentration. However, with a broad range of exhaust flows and VOC concentrations, the oxidation unit will thermally overload and shut down at a low exhaust flow and high VOC concentration.

The combustion of an auxiliary fuel, for the burner of the oxidizer, would increase the NO_x emissions from the project.

Oxidation, both thermal and catalytic, are technically infeasible VOC emission control technologies for exhaust streams with variable flow rates and VOC concentrations, like lumber kiln exhaust.

3. Carbon Adsorption

Carbon Adsorption is not recommended for exhaust streams with high relative humidity, greater than 50%, and high temperatures, greater than 150° F. At high temperatures the activated carbon is less efficient at capturing hydrocarbons and, with a high moisture content, the water molecule will compete with the hydrocarbons for adsorptions sites on the carbon. The exhaust from a lumber drying kilns is saturated with moisture through periods of the drying cycle. Temperatures of kiln exhaust is typically about 120° F, but there are times during the drying cycle that the exhaust temperatures can regularly exceed 200° F. Carbon Adsorption is a technically infeasible VOC emission control technology for exhaust stream that contain high moisture contents and are high in temperature, like lumber kiln exhaust.

4. Biofiltration

As with Thermal or Catalytic Oxidation, there is a difficulty in capturing exhaust from a lumber kiln and routing them to a control device without adversely impacting product quality. Directing kiln vent air to a control device would disrupt the air flow and circulation patterns that are necessary to maintain the proper moisture content and temperature during each drying cycle. Also, potential back pressure from a control device, or a vacuum created by a blower would disrupt the controlled drying environment.

Biofiltration is limited to temperature ranges below 105° F, the typical exhaust stream of a lumber drying kiln is 120° F with periods where the exhaust stream temperature can be in excess of 200° F. Evaporative cooling systems or other options that can be used to reduce the exhaust stream temperature would create additional back pressure and would increase the difficulties of maintaining proper air flow and circulation patterns in the lumber kiln.

For proper biofilter operation contaminates in the gas stream must be soluble in water. The VOC contaminants in lumber kiln exhaust gases mainly consist of terpene emissions which have very low water solubility, so biofilters would have limited control over these VOC

emissions and the non-reacted terpenes would form a sludge that would foul the biofilter media. The fouling and sludge buildup would increase back pressure from the control system and reduce the system efficiency toward other pollutants in the gas stream. The fouling will decrease the useful life of the biofilter media and increase the frequency of needed replacements. According to the EPA, these bed replacement can take from two (2) to six (6) weeks. The frequent and lengthy bed replacements would not support the continuous nature of this lumber drying process. The facility would either lose access to the process during the filter bed replacement or would need to build multiple control devices to decrease the kiln down time during filter bed replacement. Additional control devices would increase the space necessary for both the biofilters and any necessary exhaust cooling systems.

Biofiltration is a technically infeasible VOC emission control device for lumber drying kilns.

5.2.3 Step 3: Ranking of Control Technologies by Control Effectiveness

Based on the results found in Step 2 of the BACT analysis all control technologies were deemed technically infeasible except Proper Maintenance and Operation. Therefore Proper Maintenance and Operation represents BACT control of VOC emissions from Kiln 7.

5.2.4 Step 4: Evaluation of Most Effective Controls

The top-down approach for determining BACT suggests that all available control technologies be ranked in descending order of control effectiveness. No ranking was conducted as Proper Maintenance and Operation has been determined to be the only control technology technically feasible in this case. BACT controls for VOC emissions from Kiln 7 is Proper Maintenance and Operation.

5.2.5 Step 5: Select BACT Controls and Limits

BACT is the most-effective control technology not eliminated by the previous four steps of the analysis. The remaining VOC control technology for the three continuous, direct-fired lumber kilns is proper maintenance and operating practices. Proper maintenance and operating practices is consistent with recent permitting actions in the RBLC database and recent SC permitting actions.

There is limited data concerning the level of emissions reduction achieved through proper maintenance and operating of a lumber drying kiln. To maximize the lumber drying capacity for each unit of fuel combusted proper maintenance on a kiln is required. VOCs are the main pollutant from lumber kilns, the VOCs from combustion of fuel are very small in comparison to VOC emissions from the process. Reductions in combustion related VOC emissions would be slight versus the overall VOC emissions from the lumber kilns.

Proper operation for a kiln involves maintaining a desired temperature profile throughout the kiln and selecting a final lumber moisture content. Operating at higher temperatures will drive off more VOC and moisture from the lumber but has the potential to over dry it and increase operating costs. So, minimizing emissions from the kilns will also minimize costs and improve profitability.

BACT controls for the new lumber kiln has been determined to be Proper Maintenance and Operation through work practice standards. VOC emission rates are based on an emission factor of 5.82 lb/thousand bd-ft. See Table 4.

Table 4 - Selection of VOC BACT and Proposed Limits

Process/Equipment	Control Method	Proposed BACT Limit
Kiln 7	Proper Maintenance and Operation	Work Practice Standards VOC emissions based on the following emission factor: 5.82 lb/10^3bd-ft

Canfor proposes work practice standards for the direct-fired continuous kiln, DKN7, VOC emissions are based on an emission factor of 5.82 lb/10^3 bd-ft. This factor corresponds to the weight of VOC as terpene plus methanol plus formaldehyde. The proposed work practice standards entail proper operation and maintenance of the kiln, which is consistent with previous BACT determinations made by other lumber mills around the country and recent determinations made in the state. There are no add on controls or other controls applied and kiln exhaust is released directly to the atmosphere.

The proposed work practice standards are as follows:

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 detailed in a monitoring plan based on manufacturer's recommendations or at least the minimum:

<u>Daily Routine</u>

- 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 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 facility will be required to record keep and report as follows:

Reports shall be manually kept for each day the kiln is in operation. These reports will contain at a minimum, the date, dry-bulb actual, and set-point temperatures. These reports shall be maintained and kept on site for a period of five (5) years and shall be made available to a Department representative upon request.

For each visual inspection, a log book will contain the date, the initials of the personnel conducting the inspection, results of the inspection, documentation of any maintenance performed and any calibration performed on the kiln operation control equipment. These reports shall be maintained and kept on-site for a period of five (5) years and shall be made available to a Department representative upon request.

All required reports, including exceedances of the work practice standards and corrective actions taken to prevent any future exceedances, shall be submitted semiannually.

6.0 Summary of BACT Limits

The BACT Determinations are summarized in Table 5.

Table 5 - Summary of BACT

Process	Pollutant	BACT Control Method	BACT Limit
DKN7	VOC (as terpene + methanol + formaldehyde)	Proper Maintenance and Operation	Work Practice Standards VOC emissions are based on the following emission factor: 5.82 lb/10^3 bd-ft

7.0 Air Quality Impact Analysis

For a major facility, PSD regulations require an applicant to analyze the impact from the construction of a proposed new source(s) on the following areas:

1. Compliance with the National Ambient Air Quality Standards (NAAQS);
2. Compliance with the PSD Increments;
3. Significant impact on PSD Class I Areas, including Class I PSD increments;
4. Impairments to visibility, soil, and vegetation; and
5. Air Quality impact of general growth associated with the source.

All major sources proposing new construction or construction modifications in South Carolina (SC) are also required to demonstrate that their facility will remain in compliance with SC Regulation 61-62.5 Standards 2 (AAQS), 7 (Class II PSD Increments) and 8 (Air Toxics). The facility is PSD major only for VOCs. Therefore, Significant Impact, Full Impact, and Class I modeling will not be required.

7.1 PSD Class II Modeling Analysis

The PSD Review requires pollutants, which are determined to be "major", be evaluated by an Air Quality Impact Analysis and Additional Impacts Analysis. The Air Quality Impact Analysis consists of (1) a Preliminary Modeling Analysis to determine which pollutants from the proposed project at the facility only**,** exceed their Class II Significant Impact Levels (SIL); and (2) a more comprehensive Full Impact Analysis based on concentrations of pollutants that exceed the SIL for the facility and additional 'facility-wide' impacts from other facilities that may impact the Significant Impact Area (SIA). The Additional Impacts Analysis evaluates the impacts on soils, vegetation, and visibility effects.

VOC is the only pollutant that exceeds the major source threshold, and VOC is the only pollutant that requires further assessment beyond comparison to PSD significant emission rates. No PSD Class II Modeling Analysis is required specifically for VOC; however, ozone is considered major as determined in Table 2 and (although not modeled) an impact assessment is made to address possible impacts to ozone as a result of this construction.

7.1.1 Ozone Assessment and MERPs

The facility is major for ozone (Table 2). Due to the highly complex reactions involving formation of ozone in the atmosphere, there is no "preferred" EPA guideline model for individual NO_x source emissions.

The Southeastern United States, including SC, is NO_x limited with regards to ozone formation. This means that there is an excess of VOC in the atmosphere due to the number of natural sources of VOC in the environment. Thus, increases in VOC do not lead to significant

increases in ozone production. Ambient impacts from NO_x are addressed in NO_2 modeling in Section 7.4.

In order to estimate impacts on ozone, an analysis was conducted using Modeled Emission Rates for Precursors (MERPs) based on Section 7 of EPA's draft guidance of December 2, 2016 (*Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program)* and the revised Table 7.1 of that guidance issued on February 23, 2017. The analysis combined the impacts of NO_x and VOC emissions to determine the potential contribution to ozone production. The 8-hr ozone MERP values from the revised Table 7.1 for NO_x and VOC are 170 TPY and 1159 TPY, respectively. Those values and the project emission increases for NO_x and VOC (15.40 TPY and 320.10 TPY, respectively) were used to calculate the combined percentage increase of project emissions versus the MERPs as follows:

(15.40 TPY NO_x {source}/170 TPY NO_x {MERP}) + (320.10 TPY VOC {source}/1159 TPY VOC {MERP}) = 37%

Since the percentage increase is less than 100%, the project should not have a significant impact on ozone formation.

Sandhill, the representative ozone monitoring station for this area, located approximately 35 km to the southwest from the project location, is the closest monitor and is located in Richland County. The most recent (2011-2013) design value of 0.069 ppm for this station shows that the area is currently in attainment with the 8-hour ozone standard of 0.070 ppm. In fact, all SC ozone monitoring data shows that the entire state is meeting this standard.

Based on the insignificant impact estimated from the proposed increase in NO_x and VOCs, and the current ozone attainment status of the area near the facility, it is estimated that this project will have minimal impact on overall ozone formation within the surrounding area and should not cause or contribute to an exceedance of the current 8-hr ozone standard.

In addition, the Sandhill monitor is operated by DHEC in support of NAAQS attainment activities and meets the quality assurance requirements for this work. These activities require the data to be quality assured, and the level of quality assurance for these monitors meets the requirements for PSD modeling. Therefore, in accordance with Chapter C, Section III of the New Source Review Manual (Draft document, dated October 1990), DHEC approves the use of this data to fulfill pre-construction monitoring requirements.

7.2 Additional Impacts Analysis

PSD review requires an analysis of any potential impairment to visibility, soils, and vegetation that may occur as a result of the proposed or modified facility/sources. The review also

requires an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the expansion.

7.2.1 Growth

The SC PSD rules require the applicant to provide information relating to the nature and extent of air quality impacts from all commercial, residential, industrial and other growth in the area the facility, or modification, would affect. The proposed project will result in less than 50 new full-time employees at the facility and it is anticipated that this workforce will come from already existing local population. Commercial/industrial growth associated with the project should be negligible since the facility already exists with infrastructure in place. Therefore, the modification of the facility and any workforce growth and associated residential and commercial growth is not expected to cause or contribute to a quantifiable adverse impact on local ambient air quality.

7.2.2 Soils and Vegetation

No sensitive aspects of the soil and vegetation in the area surrounding the facility have been identified. Although an evaluation of the secondary NAAQS can be used to show that the increase in pollutants will not result in harmful effects, there are no secondary NAAQS established for VOCs. The projected VOC emissions increase for this project is not expected to increase ozone impacts in the area, as discussed in Section 7.1 above. Thus, the project is not expected to result in harmful effects on soil and vegetation.

7.2.3 Visibility

Pollutants known to cause visibility impairment or regional haze are PM, NO_x, and SO_2. Since VOCs are the only pollutant of concern for this proposed project, no visibility screening analysis was performed. No adverse impact to visibility degradation is expected as a result of this project.

7.3 PSD Class I Impact Analysis

According to EPA and FLAG 2010 guidance, Class I increment and AQRV analyses are not warranted for this project on the basis that the Class I related emissions (NO_x, SO_2, PM_{10}) from the project are below the significance threshold for PSD major. The project emissions will be significant for only VOC. In the case of VOC, a precursor to ozone, there is no Class I PSD increment established for either ozone or VOC. Therefore, a Class I analysis is not applicable to this project.

7.4 South Carolina Facility-Wide Compliance Demonstration

All minor and major sources proposing new construction or construction modifications in South Carolina are required to demonstrate compliance with South Carolina Regulation No. 62.5 Standards 2 (NAAQS), 7 (Class II PSD Increment), and 8 (Air Toxics).

Facility-wide emissions from the facility only were considered to demonstrate compliance with Standard 2, the results of which are shown in the tables below. Standard 7 for Class II PSD Increment is not applicable to Kershaw County.

Since the facility is subject to MACT Subpart DDDD (Plywood and Composite Wood Products Manufacture MACT) and will be required to be in compliance with this regulation upon startup of the proposed project, the facility is exempt from Standard 8 and corresponding Standard 8 modeling requirements for the facility's lumber kilns. The wood-fired boiler (1001ESP) is exempt from Standard 8 because it is a virgin-fueled source.

Table 6 - Standard No. 2 - Ambient Air Quality Standards Modeling Analysis

Pollutant	Averaging Time	Model Used	Maximum Modeled Concentration ($\mu g/m^3$) (1)	Background Concentration ($\mu g/m^3$)	Total ($\mu g/m^3$)	Standard ($\mu g/m^3$)	% of Standard
PM_{10}	24 Hour	AERMOD	16.3	31	47	150	32
$PM_{2.5}$	24 Hour	AERMOD	8.8(2)	17	26	35	74
	Annual	AERMOD	2.7(3)	8.9	12	12	100
SO_2	1 Hour	AERMOD	21.0(4)	96.9	118	196	60
	3 Hour	AERMOD	16.2	87.8	104	1300	8
NO_2	1 Hour	AERMOD	67.2(5)	83.4	151	188	80
	Annual	AERMOD	5.0	8.8	14	100	14
CO	1 Hour	AERMOD	572.6	1450.3	2023	40,000	5
	8 Hour	AERMOD	255.0	916.0	1171	10,000	12

1) The highest-first-high modeled concentration was used for annual averaging periods and the highest-second-high was used for all other averaging periods, except Lead and Fluorides.

2) The five year average of the eighth-high concentrations.

3) The maximum annual results averaged over each of the five years.

4) The five year average of the fourth-high SO_2-1hr daily maximum concentrations.

5) The five year average of the eighth-high NO_2-1hr daily maximum concentrations.

Table 7 - Background Monitoring Data ($\mu g/m^3$)

Pollutant	Site Name	County	Year	1-Hr	3-Hr	8-Hr	24-Hr	3-Mo	Annual
PM_{10}	Chesterfield	Chesterfield	11-13				31		
$PM_{2.5}$	Parklane	Richland	12-14				17		8.9

Table 7 - Background Monitoring Data ($\mu g/m^3$)									
Pollutant	**Site Name**	**County**	**Year**	**1-Hr**	**3-Hr**	**8-Hr**	**24-Hr**	**3-Mo**	**Annual**
SO_2	Irmo	Lexington	11-13	96.9	87.8				
NO_2	Sandhill	Richland	11-13	83.4					8.8
CO	Parklane	Richland	11-13	1450.3		916.0			
PM_{10} 24-hr is the fourth-high over three-year period.									
Annual for pollutants other than $PM_{2.5}$ is the average of the annual averages over the three-year period.									
All other averaging periods are the average of the three year second-high values.									

Appendix A - PSD Permit Application

Kathy R. Ferry, P.E.
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May 2, 2018

Mr. Steve McCaslin, P.E.
Director, Engineering Services Division
Bureau of Air Quality
SC Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Re: PSD Permit Application for a Continuous Kiln
Canfor Southern Pine – Camden Plant (TV-1380-0025)

Dear Mr. McCaslin,

As previously discussed in our March 27, 2018 pre-application meeting, Canfor Southern Pine (previously known as New South Lumber Company, Inc.) proposes to increase the facility's lumber processing capacity through the installation of one new direct-fired continuous kiln. The facility also proposes to replace or modify equipment in the log yard, sawmill and planer mill to incorporate newer technology and improve product flow. The proposed future lumber drying capacity is 360.6 million board-feet per year. The planned modifications trigger permitting requirements under the PSD regulations due to a significant increase in Volatile Organic Compound (VOC) emissions. The enclosed application is intended to meet PSD permitting requirements under South Carolina Regulation 61-62.5, Standard 7, as well as State air construction permitting requirements under South Carolina Regulation 61-62.1, Section II.

Canfor - Camden requests processing of this application under the Bureau of Air Quality's Expedited Review Program. We are including the appropriate Expedited Review Request form in Section 7 of the application document. We look forward to working with you and your staff on this project. Please call me (803-708-6205 or 803-530-6178) or the facility's Plant Manager, Mr. Robert Byrd (803-424-2800 or 843-907-0296), if you have any questions or require additional information to proceed with this application.

Sincerely,

Kathy R. Ferry, P.E.
Project Consultant

c: Robert Byrd / Canfor Southern Pine
Tim Papa / Canfor Southern Pine

Enclosures:
Kiln Expansion PSD Permit Application (original plus 2 bound copies, 1 unbound copy)

Prepared for:
Canfor Southern Pine – Camden Plant
Cassatt, South Carolina

Kiln Expansion PSD Permit Application

April 2018

Prepared by:
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1.0 Introduction

Canfor Southern Pine – Camden Plant (Canfor – Camden) is located at 1281 Sanders Creek Road in Kershaw County near Cassatt, South Carolina. Kershaw County is currently designated as in attainment or non-classifiable for all National Ambient Air Quality Standards (NAAQS). The Canfor – Camden facility is a lumber mill that produces structural lumber from pine logs and is an existing major source under Prevention of Significant Deterioration (PSD) and Title V. The facility operates under South Carolina Department of Health and Environmental Control (SC DHEC) Bureau of Air Quality (BAQ) operating permit number TV-1380-0025. Canfor operations include debarking, sawing, steam generation, kiln drying, and planing.

Canfor – Camden currently has five (5) steam-heated, batch lumber drying kilns, with a total permitted drying capacity of 182.1 million board feet per year (MMbd-ft/yr) and one (1) direct-fired, continuous lumber drying kiln with a permitted capacity of 80.0 MMbd-ft/yr. Canfor proposes to increase the facility's permitted lumber drying capacity to 360.6 MMbd-ft/yr. The expansion will be accomplished by installing one new continuous, direct-fired kiln (110 MMbd-ft/yr). The proposed new kiln will be heated by a 40 MMBtu/hr gasifier burner combusting green sawdust. In addition, the facility proposes to replace or modify equipment in the log yard (debarkers), sawmill and planer mill to incorporate newer technology and improve product flow. One steam kiln (DKN5, 11.5 MMbd-ft/yr) will be removed from the permit. The project will have no impact on the existing boiler, direct-fired kiln or remaining steam-heated lumber drying kilns.

Drying capacity has historically represented a bottleneck in this facility's operations. By increasing the kiln capacity, annual throughput is expected to increase and impact fugitive emissions associated with byproduct handling and facility roads.

The proposed modifications at Canfor – Camden trigger permitting requirements under the PSD regulations due to a significant increase in Volatile Organic Compound (VOC) emissions. This report is intended to meet PSD permitting requirements under South Carolina Regulation 61-62.5, Standard 7, as well as State air construction permitting requirements under South Carolina Regulation 61-62.1, Section II.

The remainder of the document is organized as follows:

- Section 2 presents a brief description of the existing facility and the proposed modifications.
- Section 3 presents estimated future potential emissions for the facility following the proposed modifications.
- Section 4 contains the regulatory applicability analysis.
- Section 5 presents the Best Available Control Technology (BACT) analysis.
- Section 6 presents the Additional PSD Requirements.
- Section 7 contains the SC DHEC construction permit application forms.

The report appendices include figures, detailed documentation of all emissions calculations and site operating records, and information concerning recent, similar permitting determinations. Appendix C presents a discussion of the air dispersion modeling analyses and results prepared for the project. Appendix D summarizes similar permitting decisions identified in the Environmental Protection Agency's RACT/BACT/LAER Clearinghouse.

2.0 Site and Project Description

Canfor Southern Pine owns and operates a lumber mill in Kershaw County, South Carolina. The mill is located near Cassatt, South Carolina at 1281 Sanders Creek Road. A site location map is presented in Figure 1. The facility is an existing major source of air pollutants and is operating under SC DHEC Title V permit number TV-1380-0025. Kershaw County is currently designated as in attainment or non-classifiable for all National Ambient Air Quality Standards (NAAQS).

The mill processes raw southern pine logs into planed pine lumber and wood chips/pine shavings. Pine logs are delivered to the plant and stored outside. The saw mill transforms, through debarking and rough sawing, the pine logs into green rough cut lumber. Scraps from this process, which include bark, sawdust, and partial lumber pieces, are sent to either the wood residue boiler fuel house, the kiln fuel silo or to one of the three chippers. The chippers transform scrap wood into saleable wood chips.

Rough cut lumber enters a system of stackers where it is prepared for the drying kilns. There are five steam-heated, batch drying kilns which dry the lumber to customer and industry specified criteria for minimum drying temperature and maximum moisture content. The batch kilns are heated with steam from the wood residue boiler. Facility operations also include a direct-fired, continuous lumber drying kiln. The fuel for the wood residue boiler and the direct-fired kiln comes from plant operations. Dried rough cut lumber from the drying kilns is sent to the planer mill for final processing. Some planed lumber was historically sent to the co-located wood treatment process and other planed lumber is stacked for delivery to customers. Canfor has recently discontinued treating lumber at this location.

Offices, warehouses and maintenance areas are co-located with the main manufacturing operations. Figure 2 is a plot plan that delineates the location of buildings, process areas and emission points. A source-wide process flow diagram showing the relationship between each intermediate process at the Canfor – Camden Mill is provided in Figure 3.

For the purposes of this submittal, the Canfor – Camden mill operations have been divided into several areas: Green Lumber Operations, Steam Generation, Lumber Drying, Planer Mill and Additional Mill Operations. The following sections briefly describe each of these areas.

Green Lumber Operations

Green lumber operations at Canfor – Camden involve the processing of whole logs into rough sawn lumber of various dimensions. Processes included in this mill area are log debarking, log sawing, lumber sawing, and byproduct material collection, conveyance, and storage. The primary lumber saws are showered with water to control temperature. This practice has the added benefit of limiting the emissions of PM from the process. The majority of sawmill operations are conducted within the sawmill building, further limiting the emissions of fugitive PM. Belt and chain conveyors are used to transport wood byproducts generated in sawmill operations, including bark, sawdust and scrap wood. The green bark and sawdust pass through an enclosed hog, which uses hammers to break down large pieces of wood residue prior to conveying this byproduct stream to the boiler fuel house. The scrap wood generated in the sawmill is conveyed to chippers. The resultant wood chips are transferred by chain conveyors to storage bins to await shipping.

The facility proposes to replace the existing debarker with a new unit (or 2 units) to modernize the equipment and increase the log processing rate from 200 tons/hour (tph) to 300 tph. Various modifications are also planned in the sawmill to improve product flow. The lumber processing rate in the sawmill is expected to increase from approximately 45 thousand board-foot per hour (MBF/hr) to approximately 70 MBF/hr. The existing sawmill chippers will be modified to increase their capacity from 55 tph to 77 tph. Annual throughput in the green lumber operations will increase to accommodate the new lumber drying capacity.

Steam Generation

Steam generation at Canfor – Camden is accomplished with one wood residue boiler, equipped with a multicyclone and electrostatic precipitator (ESP). The boiler is rated at 98.3 million British thermal units per hour (MMBtu/hr) heat input. The boiler provides steam to heat the mill's lumber drying kilns. Fuels combusted in the boiler include green sawdust and bark. The fuels are typically generated at the site; however, supplemental fuel may be delivered to the site by truck or rail. Fuel is supplied to the boiler through a direct screw and fuel storage shed, which is filled using a mechanical conveyance system and a cyclone to transfer sawdust and/or bark from the sawmill. The permit allows the use of diesel or other similar oils as fuel in the boiler during startup. However, the facility typically uses dry wood from the planer mill for this purpose.

The proposed project does not involve any physical modifications to the boiler, and the project will have no impact on steam demand or boiler operations.

Lumber Drying

There are five steam-heated lumber drying kilns at the Canfor – Camden mill. Two of the kilns have a capacity of 55.8 million board feet per year (MMbd-ft/yr), each. The other three kilns can each process 32.0 MMbd-ft/yr, 27.0 MMbd-ft/yr, and 11.5 MMbd-ft/yr respectively. Rough lumber from the sawmill is charged to the kilns in a batch process. The kiln charge time is variable, depending on the initial moisture content of the lumber and other physical and operational variables, and typically ranges from 21 to 24 hours per charge. Kiln #5 (DKN5) has not operated in several years and will be removed from the facility's permit.

The facility installed a new direct-fired, continuous lumber drying kiln in 2014. Kiln #6 (DKN6) has a design drying capacity of 80.0 MMbd-ft/yr and dries the lumber with a 35 MMBtu/hr gasifier burner combusting green sawdust. The proposed project will have no impact on the capacity or operation of DKN6. However, the kiln exhaust hoods and stacks will be modified to direct more steam and exhaust through the stacks and away from ground-level work areas.

In the proposed project, a new kiln (DKN7) will be added at the facility. The new kiln will be a direct-fired, continuous kiln with a design drying capacity of 110.0 MMbd-ft/yr. The burner assembly associated with DKN7 will be a gasifier unit designed to combust green sawdust and bark with a rated maximum heat input of 40 MMBtu/hr.

Table 2.1 Current and Future Lumber Drying Kiln Capacity

Kiln Equipment ID	Current Drying Capacity (MMbd-ft/yr)	Future Drying Capacity (MMbd-ft/yr)
Kiln #1 (DKN1)	55.8	55.8
Kiln #2 (DKN2)	55.8	55.8
Kiln #3 (DKN3)	32.0	32.0
Kiln #4 (DKN4)	27.0	27.0
Kiln #5 (DKN5)	11.5	0.0
Kiln #6 (DKN6)	80.0	80.0
Kiln #7 *DKN7)	N/A	110.0
Total Drying Capacity	**262.1**	**360.6**

Planer Mill

Planer mill operations involve the processing of rough, kiln dried dimensional lumber into finished lumber. Processes included in this mill area are the planing of rough lumber and byproduct material collection, conveyance, and storage. All planer mill operations are conducted within the planer mill building, limiting the

emissions of fugitive PM. Pneumatic conveyance systems are used to transport wood byproducts generated in planer mill operations. These byproducts, primarily planer shavings, are separated from the conveyance systems for storage using cyclones. The cyclones are designed for material handling, not particulate control. Therefore, the cyclones are not to be considered emission control devices. Emissions from the cyclones are controlled with a baghouse.

The Planer Mill will be modified to improve product flow and quality. The short-term capacity of 80.0 MBF/hr is not anticipated to increase; however, annual throughput will increase to accommodate the increased lumber drying capacity. No modifications are planned or required for the dust collection system or baghouse.

Wood Treatment Process

The Canfor – Camden facility has historically operated a Wood Treatment process. The Wood Treatment process takes planed lumber and treats it with preservatives for extended life in outdoor applications. This process has been shut down and the equipment removed from the site. The Wood Treatment process will be removed from the facility's permit with this project.

Additional Mill Operations

Additional mill operations include handling and loading wood byproducts and fugitive emissions from haul roads. Fugitive PM/PM_{10} from loading/handling wood byproducts (chips, sawdust, planer shavings, and bark), is emitted throughout the mill. Logs, lumber, chips, sawdust, bark, and shavings are all shipped into or out of the mill by truck or rail. The proposed project will result in increased annual throughput in these sources of fugitive particulate matter.

3.0 Facility Emissions

The emission calculations presented in this application utilize the methodology and emissions factors described in Appendix B. There have been a few updates to the emissions estimates since the last submittal for this facility. Boiler estimates were updated to reflect CO emission limits under Boiler MACT; however, estimates of other boiler pollutants were not changed. Updates were made in the estimated byproduct (saw dust, planer shavings) generation rates and production yields to reflect recent site operating experience. Road fugitive calculations were updated to reflect current traffic patterns and rail transport activity. As such, emission rates for some existing, unmodified sources may differ from previous submittals.

Appendix B.1 provides a detailed discussion of the emissions calculations for each source, including documenting the selection of emissions factors and operating rates for each operating scenario. Spreadsheets are presented showing estimated current facility-wide potential emissions and future facility-wide potential emissions, based on the proposed kiln expansion project. The emission rates presented in this application are based upon available short-term capacity data for each process. The facility operations are limited by drying capacity (both now and in the future). Therefore, it is not possible for all of the processes to operate continuously at their rated capacities. Therefore, annual capacity rates for each process reflect the proposed lumber drying capacity.

Table 3.1 presents a summary of the equipment operating parameters used in the emissions calculations, and Table 3.2 presents the estimated current and future facility-wide potential emissions and, by difference, the impact of the project on facility-wide potential emissions. Table 4.2 in Section 4.2 presents the PSD Applicability Analysis. Appendix B presents the detailed spreadsheets used to estimate emissions from the equipment and processes at Canfor – Camden. Documentation of the basis for the emission factors is presented in Appendix B.1 and within the spreadsheets.

Table 3.1 Summary of Operating Parameters for Emissions Calculations

Parameter	Current PTE		Future PTE		Project Impact
	Hourly	Annual	Hourly	Annual	
Boiler Heat Input (MMBtu)	98.3	861,108	98.3	861,108	N.A.
Kiln Capacity (10^3 bd-ft)	29.9	262,100	41.2	360,600	110,000
Planer Mill Capacity (10^3 bd-ft)	80	262,100	80	360,600	183,784.8*
Sawmill (10^3 bd-ft)	45	288,310	70	396,660	204,943.4*
Sawmill Chippers (tons chips)	55	340,730	77	468,780	230,816*
Debarkers (tons logs)	200	1,100,820	300	1,514,520	717,809*

* Project impact reflects difference between future potential throughput and baseline actual throughput.

Table 3.2 Project Emissions Comparison – Facility Total (Tons/yr)

Pollutant	Current PTE	Future PTE	Project Impact
TSP	97.66	118.08	20.42
PM_{10}	65.61	76.60	10.99
$PM_{2.5}$	55.74	64.35	8.61
NO_X	106.26	121.66	15.40
CO	1,209.85	1,250.00	40.15
SO_2	14.60	18.98	4.38
VOC	622.84	918.68	295.84
Lead	0.017	0.020	0.003
GHG (mass)	120,763	156,998	36,234
CO_2e *	122,362	159,076	36,714
Max. HAP (Methanol)	27.81	38.43	10.62
Total HAP	57.89	68.83	10.94

* Total greenhouse gas emissions, on a CO_2 – equivalent basis.

4.0 Regulatory Applicability

4.1 Federal Regulations

This section discusses key federal regulations applicable to the project.

4.1.1 Prevention of Significant Deterioration – 40 CFR 52

Canfor – Camden is located in an area that is in attainment or non-classifiable with respect to the National Ambient Air Quality Standards (NAAQS). The Camden mill is an existing major source under PSD. The facility is subject to South Carolina's SIP-approved PSD regulations. Federal PSD regulations do not apply.

4.1.2 New Source Performance Standards (NSPS) – 40 CFR 60

The wood residue boiler was installed and commenced operation in 1982. Therefore, it is not subject to NSPS Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, which has an applicability date of June 9, 1989. No modifications are proposed to the boiler; therefore, there is no change in applicability of NSPS Subpart Dc.

One new kiln will be installed as part of the proposed project. Lumber drying kilns are not included within the defined source categories of the New Source Performance Standards.

4.1.3 National Emission Standards for Hazardous Air Pollutants (NESHAPs) – 40 CFR 63

Sources subject to National Emission Standards for Hazardous Air Pollutants promulgated in 40 CFR Part 63 shall comply with the provisions as required therein. Subpart DDDD – National Emission Standards for Plywood and Composite Wood Products Manufacture applies to the existing kilns and the proposed new kiln. Initial notification was submitted on November 1, 2004 for the existing kilns. Additional notification will be submitted, as required, for the new kiln. Canfor is in compliance with requirements applicable to the kilns.

Subpart DDDDD – National Emission Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters applies to the facility's boiler. The boiler meets the definition of an existing unit, and the proposed project will not change that designation. Canfor submitted their Initial Notification under Subpart DDDDD on May 16, 2013. No modifications are proposed to the boiler, and the facility is in compliance with the requirements applicable to the boiler.

4.1.4 Continuous Assurance Monitoring (CAM) – 40 CFR 64

The proposed new kiln does not utilize a control device to comply with an applicable emissions limitation. Therefore, it is not subject to CAM. No other equipment affected by this project is subject to CAM.

4.1.5 Title V Operating Permits – 40 CFR 70 / SC Regulation 61-62.70

The facility is classified as a major source and has a Title V Operating Permit (TV-1380-0025). The proposed modifications will be incorporated into the facility's Title V Operating Permit through the Administrative Amendment process upon completion of construction activities.

4.2 South Carolina Air Pollution Control Regulations

This section discusses key state regulations applicable to the facility.

4.2.1 SC Regulation 61-62.5: Air Pollution Control Standards

Standard 1: Emissions from Fuel Burning Operations

The proposed project does not impact any fuel burning operations. The boiler will not be modified under the project, and the burner for the proposed direct-fired kiln does not meet the definition of a fuel burning operation under Standard 1.

Standard 2: Ambient Air Quality Standards

Standard 2 is a general requirement, applicable to all facilities with the potential to emit criteria pollutants above de minimis levels. The facility has previously submitted air dispersion modeling to demonstrate compliance with Standard 2. An updated modeling analysis is presented in Appendix C.

Based on South Carolina's modeling guidance, sources with controlled or uncontrolled emission rates less than 1.14 lb/hr or 5 tons/year of each criteria pollutant (10 lb/hr for CO) are exempt from modeling and are not required to be included in the facility-wide compliance demonstration. Table 4.1 summarizes the hourly maximum criteria pollutant emission rates for each source and shows which sources were exempted from the modeling demonstration. In addition, facility-wide emissions of lead total 0.0046 lb/hr, which is less than the modeling exemption threshold of 0.114 lb/hr.

Table 4.1 Potential Emission Rates and Model Input (lb/hr)

Source	PM_{10}	$PM_{2.5}$	NO_X	SO_2	CO	Modeled?
Boiler	12.29	11.01	21.63	2.46	269.54 [a]	Yes
Kiln 1	0.08	0.025	--	--	--	No[b]
Kiln 2	0.08	0.025	--	--	--	No[b]
Kiln 3	0.05	0.015	--	--	--	No[b]
Kiln 4	0.04	0.012	--	--	--	No[b]
Kiln 5	--	--	--	--	--	No[b]
Kiln 6	1.64	1.37	2.56	0.88	6.67	Yes
Kiln 7	2.26	1.88	3.52	1.00	9.17	Yes
Planer Mill	0.06	0.011	--	--	--	No[b]
Chippers	0.08	0.031	--	--	--	No[b]
Kiln 6 Fuel Cyclone	0.004	0.002	--	--	--	No[b]
Kiln 7 Fuel Cyclone	0.004	0.002				
Sawmill	0.09	0.043	--	--	--	No[b]
Debarkers	0.60	0.30	--	--	--	No[b]
Haul Roads	0.27	0.06	--	--	--	No[b]
Byproduct Handling	0.21	0.03	--	--	--	No[b]
Holtec Saw	0.07	0.03	--	--	--	No[b]
Emergency Fire Pump	0.47	0.47	6.67	0.009	1.44	No[c]

[a] Boiler CO emissions were modeled at the allowable emission rate under Boiler MACT.

[b] Emissions from this source are <1.14 lb/hr for each criteria pollutant (10 lb/hr for CO); therefore, the source is exempt from modeling.

[c] The Emergency Fire Pump is an exempt source based on size and restricted operating hours limiting emissions to < 5 tpy for each criteria pollutant; therefore, the source is exempt from modeling.

Standard 4: Emissions from Process Industries

Section VIII – Other Manufacturing: Emissions from the green lumber operations, planer mill and kilns are limited under this Standard. The emission limits are is based on the following equations:

$E = (F) * 4.10 * P^{0.67}$ (for $P \leq 30$)

$E = (F) (55.0P^{0.11} - 40)$ (for $P > 30$)

Where: E = the allowable emission rate in pounds per hour.

P = the process weight rate in tons per hour.

F = the effect factor (e.g., 1.0) listed in Table B of the regulation.

The green lumber operations have a process weight rate of 300 tons/hr, based on the maximum log throughput. This corresponds to an allowable PM emission rate of 63.00 lb/hr. Total potential PM emissions are 2.37 lb/hr from the green lumber sources (debarkers, sawmill and chippers).

The planer mill has a process weight rate of 100 tons/hr (80,000 bd-ft/hr * 2.5 lb/bd-ft / 2000 lb/ton) and an allowable PM emission rate of 51.28 lb/hr. The proposed project will not change the process weight rate or allowable PM emission rate. Potential, controlled PM emissions from the planer mill are 0.21 lb/hr.

The lumber drying kilns (existing and proposed) have a total process weight rate of 51.46 tons/hr (2.5 lb/bd-ft * 360.6 MMbd-ft/yr / 8760 hr/yr / 2000 lb/ton). The corresponding allowable PM emission rate is 44.84 lb/hr. Potential PM emissions from the kilns are 6.94 lb/hr.

Section IX – Visible Emissions: Visible emissions are limited to ≤ 20% opacity under Section IX. This 20% opacity limit applies to the existing kilns and the planer mill. The same limit will apply to the proposed new kiln. Compliance is achieved through good operational practices and use of a baghouse on the planer mill.

Standard 5.2: Control of Oxides of Nitrogen (NO_X)

Standard 5.2 does not apply to the existing boiler since the burner assemblies have not been replaced since the effective date of the rule (SC Reg. 61-62.5, Standard 5.2, Section I (a)). No modifications are planned to this existing source.

Standard 5.2 does apply to the existing and proposed direct-fired burners on DKN6 and DKN7, respectively. These kilns are both direct-fired and combust green wood waste. This falls under the category of *Fuel Combustion Sources Not Otherwise Specified* in Table 1 of Standard 5.2; therefore, the equipment is required to utilize low NO_X burners or equivalent technology that will achieve 30% reduction of NO_X from uncontrolled levels. AP-42 lists an uncontrolled NO_X emission factor of 0.22 lb/MMBtu for the combustion of green wood waste. An emission rate of 0.154 lb/MMBtu, or 6.16 lb/hr, would represent a 30% reduction below these uncontrolled levels, with the proposed DKN7 burner size of 40 MMBtu/hr. The proposed gasifier burners offer enhanced fuel-air mixing, which results in less thermal NO_X production than a standard stoker-type wood combustion system. Emissions from Kiln 7 are anticipated to be 3.52 lb/hr NO_X (based on 110,000 MBF capacity and an emission factor of 0.28 lb/MBF).

As discussed in Section 6, stack testing for lumber drying kilns is not practical and is not expected to provide an accurate measure of compliance. It is not possible to capture 100% of the kiln exhaust, and it is not possible to accurately determine the fraction of the exhaust captured. Therefore, Canfor proposes to demonstrate compliance with Standard 5.2 through monitoring fuel consumption and completion of burner maintenance and tune-up activities recommended by the manufacturer.

Standard 7: Prevention of Significant Deterioration

Canfor – Camden is located in an area that is in attainment of the current NAAQS, and the facility is classified as an existing major source under PSD regulations (SC Reg. 61-62.5, Standard 7). A major modification is defined in SC Reg. 61-62.5, Standard 7 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Federal Clean Air Act.

The proposed project involves installing one new lumber drying kiln. The new kiln will be a direct-fired, continuous kiln. Additional modifications are planned in the green lumber operations (debarkers, sawmill, chippers) and planer mill to incorporate modern equipment and improve product flow. The facility is currently limited by lumber drying capacity. Following implementation of this project, the facility will continue to be limited by lumber drying capacity. The project will have no impact on the existing kilns and boiler.

Potential project aggregation was considered for this project and the 2014 permitting of Kiln 6. These projects have been considered independent of one another in internal planning documents and capital budget requests. In addition, Kiln 6 commenced operation in December 2014, approximately 3.5 years ago. EPA guidance only considers projects within a 24-month time window for aggregation. Therefore, the current project should be considered as an independent action.

Table 4.2 presents the estimated baseline actual to future potential emissions increase associated with the project for PSD applicability. Detailed emissions calculations are provided in Appendix B. As shown, the estimated emissions increase for VOC is above the PSD Significant Emission Rate. The estimated increase for each other pollutant is below the PSD Significant Emission Rate. Therefore, PSD only applies to the VOC increase from this project.

Table 4.2 PSD Potential Project Emissions Increase (tons/year)

Source	PM	PM_{10}	$PM_{2.5}$	Lead	SO_2	NO_X	CO	VOC	CO_{2e}
New Kiln 7 PTE	16.500	9.900	8.250	0.0031	4.38	15.40	40.15	320.10	36,714
New Kiln 7 Silo PTE	0.078	0.019	0.008	--	--	--	--	--	--
Other Impacts:	(Future Potential – Baseline Actual for Planer Mill, Chippers, Sawmill and Debarker; Debottleneck for Roads and Byproducts)								
Planer Mill	0.244	0.065	0.013	--	--	--	--	--	--
Chippers	0.462	0.115	0.046	--	--	--	--	--	--
Sawmill	1.256	0.126	0.062	--	--	--	--	--	--
Debarkers	1.436	0.718	0.359	--	--	--	--	--	--
Roads	1.877	0.371	0.083	--	--	--	--	--	--
Byproduct Handling	0.607	0.287	0.043	--	--	--	--	--	--
Total Project Impacts	**22.458**	**11.602**	**8.865**	**0.0031**	**4.38**	**15.40**	**40.15**	**320.10**	**36,714**
PSD SER	25	15	10	0.6	40	40	100	**40**	75,000
Significant?	No	No	No	No	No	No	No	**Yes**	No

Standard 8: Toxic Air Pollutants

Standard 8 is a general requirement applicable to SC facilities with the potential to emit toxic air pollutants above de minimis levels. Canfor – Camden's lumber kilns are an affected source under MACT Subpart DDDD (Plywood and Composite Wood Products Manufacture MACT), and Canfor is in compliance with the applicable requirements under that MACT. Therefore, the lumber kilns are exempt from modeling under Standard 8, as allowed under Standard 8 (D)(1). The wood-fired boiler is exempt from Standard 8 because it is a virgin fuel-fired source. Therefore, the facility does not have any sources subject to modeling under Standard 8.

5.0 Best Available Control Technology (BACT) Analysis

The requirement to conduct a BACT analysis is set forth in the PSD regulations (SC Regulation 61-62.5, Standard 7(j)(2)). BACT is defined in the regulations as:

> *...an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by an applicable standard under 40 CFR Parts 60 and 61.*
>
> *If the administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*

VOC emissions associated with the proposed continuous kiln project are expected to cause an increase in emissions above the PSD significance threshold. Therefore, a BACT analysis is presented below for VOC emissions from the continuous lumber drying kilns. There will be no other new or modified sources of VOC at the facility as a result of this project.

5.1 BACT Methodology

A BACT analysis is done on a case-by-case basis and is typically performed using a "top-down" method, as outlined in the EPA's October 1990 Draft New Source Review Workshop Manual. The following steps detail the top-down approach.

1. Identify all potential control technologies
2. Eliminate technically infeasible options
3. Rank the technically feasible control technologies based upon emission reduction potential
4. Evaluate the ranked controls based on energy, environmental and/or economic considerations
5. Select BACT

BACT is required to be at least as stringent as any applicable NSPS or NESHAP standard. However, lumber drying kilns are not included in any source category subject to an NSPS. Lumber drying kilns are subject to a NESHAP standard under 40 CFR 63 Subpart DDDD; however, that regulation does not include emission limits for kilns. In particular, EPA determined that the MACT floor for lumber drying kilns was no emission reduction.

It is important to note that the top-down BACT analysis is a procedural approach suggested by EPA policy, this approach is not specifically mandated as a statutory requirement of the BACT determination. EPA has clarified that "the case-by-case analysis is far more complex than merely pointing to a lower emissions limit or higher control efficiency elsewhere in a permit or a permit application. The BACT determination must take into

account all of the factors affecting the facility, such as the choice of [fuel],... The BACT analysis, therefore, involves judgment and balancing."

BACT is to be set at the lowest value that is achievable. However, it is important to note that both EPA and the courts have clarified that the emission rate must be achievable over the lifetime of the unit and not simply an emission rate that has been achieved by a specific source at a specific point in time.

5.2 Volatile Organic Compound Formation in 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 type and the amount of compounds released will 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 the kiln, as well as from the open ends of a continuous kiln, where the lumber enters and exists. Directing the kiln vent air 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.

5.3 Identification of Potential Control Technologies

The United States (US) Environmental Protection Agency (EPA) provides an online, searchable summary of New Source Review (NSR) and PSD permitting decisions in the RACT/BACT/LAER Clearinghouse. Permitting decisions involving lumber drying kilns (RBLC Code 30.800) from 01/01/2000 through 6/21/2017 were searched to determine the available control options for VOC emissions from the kiln proposed for Canfor – Camden. A printout of the search results is included as Appendix D. Recent permit applications in South Carolina that contain proposed VOC limits for lumber drying kilns under PSD BACT were also reviewed for potential control options. No determinations were identified that required control devices to reduce VOC emissions from lumber drying kilns.

In addition to the technologies identified in the RBLC database, potentially applicable VOC control technologies were identified by considering VOC control technologies in use at other types of wood products manufacturing facilities. The candidate control technologies are listed below:

- Proper maintenance and operation
- Condensation
- Thermal or catalytic oxidation
- Carbon adsorption
- Biofiltration

These control technologies are described in the following sections.

5.3.1 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.

5.3.2 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.

5.3.3 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.

5.3.4 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.

5.3.5 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.

5.4 Elimination of Technically Infeasible Control Options

A control option is eliminated from consideration if there are process-specific conditions that would prohibit implementation of the control or if the highest control efficiency of the option would result in an emission level that is higher than an applicable regulatory limit. With the exception of proper maintenance and operation, all of the control technologies identified in Section 5.3 are technically infeasible for application to the proposed lumber drying kiln exhaust streams. Reasons for eliminating each technology are identified below.

5.4.1 Condensation

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 vapor pressure of terpenes to 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. This VOC removal technology is not technically feasible for emission streams containing significant quantities of water vapor, like a kiln.

5.4.2 Thermal or Catalytic Oxidation

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 earlier, directing the kiln vent air 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 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.

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 back-pressure 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 NO_X emissions. Generating NO_X emissions in an effort to reduce VOC emissions is unlikely to yield an environmental benefit, as both pollutants contribute to ambient ozone formation. Additional NO_X emissions are of particular concern in areas like the Southeast, where ozone formation is NO_X-limited.

For the reasons discussed above, neither thermal oxidation nor catalytic oxidation is a feasible control technology for lumber drying kiln VOC emissions.

5.4.3 Carbon Adsorption

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 temperature vary according to the drying cycle but can regularly exceed 200 °F.

For the reasons discussed above, carbon adsorption is not a feasible control technology for lumber drying kiln VOC emissions.

5.4.4 Biofiltration

As with oxidation controls, several factors make the use of biofiltration 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 earlier, directing the kiln vent air 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.

Biofiltration systems pass the contaminated exhaust flow through filter bed media. As the exhaust flows through the system, pollutants are absorbed by moisture in a thin film throughout the media. The moisture holds the pollutants to provide contact with microbes. The microbes then reduce pollutant concentrations by consuming and metabolizing the pollutants. As such, EPA has reached the conclusion that "compounds not soluble in water are not good candidates for [bioreactor] technology." (Using Bioreactors to Control Air Pollution, EPA, September 2003, EPA-456/R-03-003). The primary VOC constituent in kiln exhaust is terpenes, which have very limited water solubility. As such, a biofilter would have limited capacity to control terpene emissions. Terpenes are highly viscous; therefore, any accumulation of non-reacted terpenes would form a sludge within the biofilter and foul the filter media. This would increase backpressure from the system and reduce the system efficiency toward other pollutants in the system. This fouling would also decrease the useful life of the biofilter media and increase the frequency of replacements. According to EPA, bed replacement can take 2 to 6 weeks, depending on bed size.

In addition, biofiltration systems are extremely sensitive to temperature. 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, with frequent periods in excess of 200 °F. Evaporative cooling systems or other options to reduce the kiln exhaust temperature would create additional back pressure and further exasperate the challenges discussed above in maintaining proper air flow and circulation patterns within the kiln.

For the reasons discussed above, biofiltration is not a feasible control technology for lumber drying kiln VOC emissions.

5.5 Rank of Remaining Control Technologies

Based on the discussion in Section 5.4, all control technologies except "Proper Maintenance and Operation" were eliminated as technically infeasible. Therefore, "Proper Maintenance and Operation" represents BACT for the control of VOC emissions from lumber drying kilns. This determination is consistent with other BACT determinations in the RBLC database for lumber kilns and consistent with other recent SC permitting actions, as shown in Appendix D.

5.6 Evaluate the Most Effective Controls

The VOC emission level achievable by a properly designed and operated lumber drying kiln can vary due to many factors. First, the method of heating the kiln (direct or indirect) and the fuel may impact kiln emission rates. In addition, VOC emission rates from lumber kilns vary throughout the year because the VOC content of lumber varies throughout the year with changes in temperature and moisture content. Also, terpene content of wood, the main VOC constituent in lumber kiln emissions, varies with the location and age of trees harvested. The range of factors in recent lumber kiln permits reflects the variability in emissions that can exist between different facilities.

5.7 Selection of BACT

Per EPA guidance, BACT is the most-effective control technology not eliminated by the previous four steps of the analysis. Proper maintenance and operation is the remaining VOC control technology for this application and is proposed as BACT for the direct-fired, continuous lumber drying kiln at Canfor – Camden. Proper maintenance and operation is consistent with recent permitting actions in the EPA RBLC database and recent SC permitting actions.

Data is limited concerning the level of emissions reduction expected through proper maintenance and operation of a kiln. Proper maintenance will maximize the lumber drying capacity achieved from a given quantity of fuel combustion (for both direct-fired and indirect-fired kilns). The impacts on heating efficiency can be dramatic; however, VOCs are the primary pollutant of concern from a kiln, and fuel combustion contributes a very small portion of the VOC emitted by a kiln. Therefore, even a large percent reduction in combustion-related VOC emissions would have minimal impact on the overall lumber kiln VOC emissions.

Proper operation of the kiln primarily involves the thoughtful design of temperature profiles throughout the kiln and selection of final lumber moisture content. Operating the kiln at higher than ideal temperatures has the potential to drive off additional, higher molecular weight organic constituents from the wood. Similarly, drying the wood for a longer period of time to reach a lower final moisture content has the potential to increase volatilization of organic constituents. However, increasing the operating temperature of the kiln and over-drying the lumber both increase the cost of operating a lumber drying kiln. As such, the same conditions needed to minimize emissions from a kiln also minimize costs and improve profitability. Wholesale lumber market specifications generally establish the maximum allowable moisture content for a given grade of lumber or end-use of the product. Due to these factors, the impact on kiln emissions associated with formal, written operating procedures is likely to be small. Our best estimate of the emissions reduction is 10-15%, relative to a kiln with no formal, written operating procedures.

Canfor proposes an annual BACT emission limit of 320.10 tons/yr VOC for the proposed Kiln 7. The emission rates are based on an emission factor of 5.82 lb/10^3 bd-ft for lumber drying. The lumber drying factor corresponds to the weight of VOC as terpene plus methanol plus formaldehyde, in keeping with EPA methodology. The proposed emission rate will be achieved through proper maintenance and operation of the kilns. BACT determinations made by other lumber mills around the country over the past 10 years range from 2.49 to 7.0 lb/10^3 bd-ft, as presented in Appendix D. 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.

Very few of the BACT determinations in the RBLC database have been verified through stack testing. However, 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 at Canfor fire green sawdust. However, the wood dried in these kilns is the same species as the Canfor facility (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/10^3 bd-ft in 2012 and 5.71

lb/10^3 bd-ft in 2013. The West Frasier kiln was tested in March 2015, with measured VOC at 4.55 lb/10^3 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. BACT emission limits are intended to represent the rate at which a source will consistently emit a pollutant with proper design and operation. Therefore, Canfor – Camden proposes as BACT the higher of these measured emission rates (5.82 lb/10^3 bd-ft), to be accomplished through work practice standards.

Stack testing is not practical and not expected to provide an accurate measure of compliance. It is not possible to capture 100% of the kiln exhaust, and it is not possible to accurately determine the fraction of the exhaust captured. Due to the difficulties in conducting stack tests on lumber kilns, Canfor – Camden proposes to demonstrate compliance through monitoring the kilns throughput and monitoring the completion of good operating practices.

Based on previously issued PSD permits by SC DHEC, Canfor - Camden proposes the following work practice standards as BACT Kiln 7:

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 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.

Recordkeeping:

Reports shall be manually kept for each day the kiln is in operation. These reports will contain as a minimum, the date and dry-bulb actual and set-point temperature. These reports will be maintained and kept on-site for a period of five (5) years and shall be made available to a SC DHEC representative upon request.

Reporting:

A semiannual report will be submitted, within 30-days following the end of each reporting period, to the Manager of the Technical Management Section, Bureau of Air Quality. This report will document any exceedances of the work practice standards and corrective actions taken to prevent any future exceedances.

6.0 Additional PSD Requirements

6.1 Ozone Ambient Impact Analysis

The proposed project is expected to increase VOC emissions by more than 100 tons/yr, which is the Significant Impact Level trigger for ozone. The southeastern U.S. is considered a NO_X-limited atmosphere with respect to ozone formation. Therefore, increases in VOC emissions are not normally expected to contribute to ground-level ozone formation.

On December 2, 2016, EPA released Guidance on the Development of Modeled Emissions Rates for Precursors (MERP) as a Tier 1 Demonstration Tool for Ozone (O_3) and $PM_{2.5}$ under the PSD Permitting Program. The guidance provides a most conservative MERP for each precursor based on modeling of hypothetical sources by the EPA. The NO_X and VOC emissions from the project are well below these conservative O_3 MERP values provide in the guidance for sources in the eastern United States. In this case, air quality impacts of O_3 from this project would be expected to be below the critical air quality threshold. However, the NO_X and VOC precursor contributions to 8-hr daily maximum O_3 are considered together to determine if the project's air quality impact would exceed the critical air quality threshold. In such a case, the proposed emissions increase can be expressed as a percent of the lowest MERP for each precursor and then summed. A value less than 100% indicates that the critical air quality threshold will not be exceeded when considering the combined impacts of these precursors on 8-hr daily maximum O_3.

$$(15.40 \text{ tpy } NO_{X\text{-project}} / 107 \text{ tpy } NO_{X\text{-MERP}}) + (320.1 \text{ tpy VOC}_{\text{project}} / 814 \text{ tpy VOC}_{\text{MERP}})$$

$$(0.14) + (0.39) = 0.53 * 100 = 53\%$$

As shown in the calculation, the value is below 100%, therefore the O_3 would not be affected by the project.

6.2 Additional Impacts Analysis

Per SC Regulation 61-62.5, Standard 7 (o), an additional impacts analysis is required and must consider an analysis of impairment to visibility, soils and vegetation, and growth associated with the proposed project.

Pollutants known to cause visibility impairment or regional haze are particulate matter, NO_X, and SO_2. Since VOCs are the only pollutant of concern for this project, no visibility screening analysis was performed. No adverse impact to visibility degradation is expected as a result of the project.

No sensitive aspects of the soil and vegetation in the area surrounding the facility have been identified. Consequently, an evaluation of the secondary NAAQS can be used to demonstrate that the increase in pollutants from the proposed project will not result in harmful effects. There are no secondary NAAQS established for VOCs. Potential ozone impacts from increased VOC emissions are negligible, as discussed in Section 6.1 above. Therefore, significantly harmful effects on soil or vegetation are not expected as a result of this project.

A growth analysis is intended to quantify the amount of new growth that is likely to occur in support of the proposed project, including residential growth and commercial/industrial growth. Residential growth depends upon the number of new employees and the availability of housing in the area. The proposed project is expected to result in less than 50 new full-time positions at the mill. Most of these positions are expected to be filled from the local employment pool, as the site is located in an area with high unemployment. In addition, commercial/industrial growth associated with the project will be negligible, as the existing infrastructure is already in place.

7.0 SC DHEC Construction Permit Application Forms

dhec

Bureau of Air Quality
Facility Information Update

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FACILITY IDENTIFICATION	
SC Air Permit Number (8-digits only) *(Request cannot be processed without this number)* 1380 - 0025	Request Date April 2018

FACILITY NAME AND/OR TAX ID CHANGED *(If the name change is due to a transfer of ownership, then form D-2954 should be submitted instead)*	
Current Facility Name *(This should be the name on the Current Permit)* New South Lumber Co., Inc. - Camden Plant	New Facility Name *(This should be the name used to identify the facility at the physical address.)* Canfor Southern Pine - Camden Plant
Current Facility Federal Tax Identification Number *(Established by the U.S. Internal Revenue Service to identify a business entity)* 57-1128613	New Facility Federal Tax Identification Number *(Established by the U.S. Internal Revenue Service to identify a business entity)*

FACILITY PHYSICAL ADDRESS CHANGED *(If address is changing due to a relocation, then form D-0662 should be submitted instead)* ☒ Postal Address Change ☐ Correction ☐ Other: Explain Facility no longer uses P.O. Box		
Current Physical Address: 1281 Sanders Creek Road	New Physical Address: 1281 Sanders Creek Road	
Current City: Cassatt	New City: Cassatt	
State: SC	State: SC	
Current Zip Code: 29032	New Zip Code: 29032	
Current County: Kershaw	New County: Kershaw	
Facility Coordinates *(Facility coordinates should be based at the front door or main entrance of the facility.)*		
Latitude: 34° 19' 39.89"	Longitude: 80° 32' 25.58"	☐ NAD27 *(North America Datum of 1927)* Or ☒ NAD83 *(North America Datum of 1983)*

FACILITY'S PRODUCTS / SERVICES CHANGED SIC Code *(Standard Industrial Classification Codes)* and NAICS Code *(North American Industry Classification System)*	
Current Primary Products / Services: Lumber	New Primary Products / Services:
Current Other Products / Services:	New Other Products / Services:
Current Primary SIC Code: 2421	New Primary SIC Code:
Current Other SIC Code(s):	New Other SIC Code(s):
Current Primary NAICS Code: 321113	New Primary NAICS Code:
Current Other NAICS Code(s):	New Other NAICS Code(s):

Bureau of Air Quality
Facility Information Update

NEW AIR PERMIT CONTACT *(Person who can answer technical questions about the facility and permitted activities.)*			
Title/Position: Dry End Supervisor	Salutation: Mr.	First Name: Rick	Last Name: Starnes
Mailing Address: 1281 Sanders Creek Road			
City: Cassatt		State: SC	Zip Code: 29032
E-mail Address: Rick.Starnes@canfor.com		Phone No.: 803-424-4075	Cell No.: 803-272-9980

OWNER OR OPERATOR *(*This application must be signed by a Responsible Official if this facility is currently operating under a Title V permit.)*			
Title/Position: Plant Manager	Salutation: Mr.	First Name: Robert	Last Name: Byrd
Mailing Address: 1281 Sanders Creek Road			
City: Cassatt		State: SC	Zip Code: 29032
E-mail Address: Robert.Byrd@canfor.com		Phone No.: 803-424-2800	Cell No.: 843-907-0296
OWNER OR OPERATOR SIGNATURE			
As a duly authorized representative of this facility, with the responsibility to ensure that this facility is in compliance with the requirements any air permits issued by the Department, I certify that the information in this facility information update form are true, accurate, and complete.			

Robert Byrd — 04/27/2018

*Signature of Owner or Operator — Date

Note For Title V Facilities: Submittal of this form satisfies the requirements of the Administrative Permit Amendment process. The South Carolina Department of Health and Environmental Control may modify the permit as described on this form through the administrative permit amendments process described in S. C. Regulation 61-62.70.7(d).

Bureau of Air Quality
Expedited Review Request Instructions
Construction Permits

APPLICATION IDENTIFICATION		
Facility Name *(This should be the name used to identify the facility)*	SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)*	Request Date
Canfor Southern Pine - Camden Plant	1380 - 0025	2018-04-27

PRIMARY AIR PERMIT CONTACT			
Title/Position: Plant Manager	Mr.	First Name: Robert	Last Name: Byrd
E-mail Address: Robert.Byrd@canfor.com		Phone No.: (803) 424-2800	Cell No.: (843) 907-0296

SECONDARY AIR PERMIT CONTACT *(If the Department is unable to contact the primary air permit contact please provided a secondary contact.)*			
Title/Position: Consultant	Ms.	First Name: Kathy	Last Name: Ferry
E-mail Address: kathy_ferry@yahoo.com		Phone No.: (803) 708-6205	Cell No.: (803) 530-6178

Check One	Permit Type	Expedited Review Days*	Fee**
☐	Minor Source Construction Permit	30	$3,000
☐	Synthetic Minor Construction Permit	65	$4,000
☒	Prevention of Significant Deterioration (PSD) not impacting a Class I Area (no Class I modeling required)	120	$20,000
☐	Prevention of Significant Deterioration (PSD) Modification not impacting a Class I Area (no Class I modeling required) No BACT limit change but requires Public Notice	120	$5,000
☐	Prevention of Significant Deterioration (PSD) Modification not impacting a Class I Area (no Class I modeling required) Number of BACT Pollutants ☐ X $5,000 per BACT modification	120	Total Fee $ Maximum of $20,000
☐	Prevention of Significant Deterioration (PSD) impacting a Class I Area (Class I modeling required)	150	$25,000
☐	Prevention of Significant Deterioration (PSD) Modification impacting a Class I Area (Class I modeling required) No BACT limit change but requires Public Notice	150	$5,000
☐	Prevention of Significant Deterioration (PSD) Modification impacting a Class I Area (Class I modeling required) Number of BACT Pollutants ☐ X $5,000 per BACT modification	150	Total Fee $ Maximum of $25,000
☐	**Concrete** Minor Source Construction Permit Relocation Request	10	$1,500
☐	**Asphalt** Synthetic Minor Construction Permit Relocation Request	15	$3,500

*All days above are calendar days, but exclude State holidays, and building closure dates due to severe weather or other emergencies. Expedited days for asphalt and concrete also exclude weekends.

****DO NOT SEND PAYMENT UNTIL THE APPLICATION HAS BEEN ACCEPTED INTO THE EXPEDITED PROGRAM.** If chosen for expedited review, you will be notified by phone for verbal acceptance into the program. Fees must be paid within five business days of acceptance.

PRIMARY AIR PERMIT CONTACT SIGNATURE
I have read the most recent version of the Expedited Review Program Standard Operating Procedures and accept all of the terms and conditions within. I understand that it is my responsibility to ensure an application of the highest quality is submitted in a timely manner, and to address any requests for additional information by the deadline specified. I understand that submittal of this request form is not a guarantee that expedited review will be granted.

Robert Byrd — 2018-04-27

Signature of Primary Air Permit Contact — Date

Bureau of Air Quality
Construction Permit Application
Facility Information

FACILITY IDENTIFICATION	
SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)* 1380 - 0025	Application Date 04/27/2018
Facility Name *(This should be the name used to identify the facility at the physical address listed below)* Canfor Southern Pine - Camden Plant	Facility Federal Tax Identification Number *(Established by the U.S. Internal Revenue Service to identify a business entity)* 57-1128613

FACILITY PHYSICAL ADDRESS		
Physical Address: 1281 Sanders Creek Road		County: Kershaw
City: Cassatt	State: SC	Zip Code: 29032
Facility Coordinates *(Facility coordinates should be based at the front door or main entrance of the facility.)*		
Latitude: 34° 19' 39.89"	Longitude: 80° 32' 25.58"	☐ NAD27 *(North American Datum of 1927)* Or ☒ NAD83 *(North American Datum of 1983)*

CO-LOCATION DETERMINATION
Are there other facilities in close proximity that could be considered co-located? ☒ No ☐ Yes*
List potential co-located facilities, including air permit numbers if applicable:

**If yes, please submit co-location applicability determination details in an attachment to this application.*

COMMUNITY OUTREACH
What are the potential air issues and community concerns? Please provide a brief description of potential air issues and community concerns about the entire facility and/or specific project. Include how these issues and concerns are being addressed, if the community has been informed of the proposed construction project, and if so, how they have been informed. There are no known concerns.

FACILITY'S PRODUCTS / SERVICES	
Primary Products / Services *(List the primary product and/or service)* Lumber	
Primary SIC Code *(Standard Industrial Classification Codes)* 2421	Primary NAICS Code *(North American Industry Classification System)* 321113
Other Products / Services *(List any other products and/or services)*	
Other SIC Code(s):	Other NAICS Code(s):

AIR PERMIT FACILITY CONTACT *(Person at the facility who can answer technical questions about the facility and permit application.)*			
Title/Position: Dry End Supervisor	Salutation: Mr.	First Name: Rick	Last Name: Starnes
Mailing Address: 1281 Sanders Creek Road			
City: Cassatt		State: SC	Zip Code: 29032
E-mail Address: Rick.Starnes@canfor.com		Phone No.: 803-424-4075	Cell No.: 803-272-9980

Bureau of Air Quality
Construction Permit Application
Facility Information
Page 2 of 3

The signed permit will be e-mailed to the designated Air Permit Contact. If additional individuals need copies of the permit, please provide their names and e-mail addresses.	
Name	**E-mail Address**
Kathy Ferry	kathy_ferry@yahoo.com

CONFIDENTIAL INFORMATION / DATA
Does this application contain confidential information or data? ☒ No ☐ Yes*

If yes, include a sanitized version of the application for public review and **ONLY ONE COPY OF CONFIDENTIAL INFORMATION SHOULD BE SUBMITTED*

LIST OF FORMS INCLUDED *(Identify all forms included in the application package)*	
Form Name	**Included (Y/N)**
Expedited Review Request (DHEC Form 2212)	☒ Yes ☐ No
Equipment/Processes (DHEC Form 2567)	☒ Yes
Emissions (DHEC Form 2569)	☒ Yes
Regulatory Review (DHEC Form 2570)	☒ Yes
Emissions Point Information (DHEC Form 2573)	☒ Yes ☐ No (If No, Explain)

OWNER OR OPERATOR			
Title/Position: Plant Manager	Salutation: Mr.	First Name: Robert	Last Name: Byrd
Mailing Address: 1281 Sanders Creek Road			
City: Cassatt		State: SC	Zip Code: 29032
E-mail Address: Robert.Byrd@canfor.com		Phone No.: 803-424-2800	Cell No.: 843-907-0296
OWNER OR OPERATOR SIGNATURE			
I certify, to the best of my knowledge and belief, that no applicable standards and/or regulations will be contravened or violated. I certify that any application form, report, or compliance certification submitted in this permit application is true, accurate, and complete based on information and belief formed after reasonable inquiry. I understand that any statements and/or descriptions, which are found to be incorrect, may result in the immediate revocation of any permit issued for this application.			

→ Robert Byrd — 04/27/2018

Signature of Owner or Operator — Date

PERSON AND/OR FIRM THAT PREPARED THIS APPLICATION *(If not the same person as the Professional Engineer who has reviewed and signed this application.)*			
Consulting Firm Name:			
Title/Position:	Salutation:	First Name:	Last Name:
Mailing Address:			
City:		State:	Zip Code:
E-mail Address:		Phone No.:	Cell No.:
SC Professional Engineer License/Registration No. (if applicable):			

Bureau of Air Quality
Construction Permit Application
Facility Information

PROFESSIONAL ENGINEER INFORMATION			
Consulting Firm Name: KJF Consulting Inc.			
Title/Position: President	Salutation: Ms.	First Name: Kathy	Last Name: Ferry
Mailing Address: 501 Chatham Avenue			
City: Columbia		State: SC	Zip Code: 29205
E-mail Address: kathy_ferry@yahoo.com		Phone No.: 803-708-6205	Cell No.: 803-530-6178
SC License/Registration No.: 20924			
PROFESSIONAL ENGINEER SIGNATURE			
I have placed my signature and seal on the engineering documents submitted, signifying that I have reviewed this construction permit application as it pertains to the requirements of *South Carolina Regulation 61-62, Air Pollution Control Regulations and Standards.*			

Kathy R. Ferry 4/27/2018

Signature of Professional Engineer Date

KRF 4/27/18

Bureau of Air Quality
Construction Permit Application
Equipment / Processes
Page 1 of 3

APPLICATION IDENTIFICATION *(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)*		
Facility Name *(This should be the name used to identify the facility)* Canfor Southern Pine - Camden Plant	SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)* 1380 - 0025	Application Date 04/27/2018

PROJECT DESCRIPTION
Brief Project Description (What, why, how, etc.): Canfor proposes to increase the facility's permitted lumber drying capacity to 360.6 MMbd-ft/yr by installing one new continuous, direct-fired kiln (110 MMbd-ft/yr). In addition, the facility proposes to replace or modify equipment in the log yard (debarkers), sawmill and planer mill to incorporate newer technology and improve product flow.

ATTACHMENTS	
☒ Process Flow Diagram	Location in Application: Appendix A, Figure 3
☒ Detailed Project Description	Location in Application: Section 2

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Bureau of Air Quality
Construction Permit Application
Equipment / Processes

EQUIPMENT / PROCESS INFORMATION							
Equipment ID Process ID	**Action**	**Equipment / Process Description**	**Maximum Design Capacity (Units)**	**Control Device ID(s)**	**Pollutants Controlled (Include CAS#)**	**Capture System Efficiency and Description**	**Emission Point ID(s)**
02-DKN7	☒ Add ☐ Remove ☐ Modify ☐ Other	Direct-fired continuous lumber drying kiln with sawdust-fired gasifier burner	110.0 MMbd-ft/yr 40.0 MMBtu/hr	N/A	N/A	N/A	KLN7_A1 KLN7_A2 KLN7_B1 KLN7_B2 KLN7_S1 KLN7_S2
02-DKN5	☐ Add ☒ Remove ☐ Modify ☐ Other	11.5 MMbd-ft/yr steam-heated batch lumber drying kiln	11.5 MMbd-ft/yr	N/A	N/A	N/A	008
IA-SILO2	☒ Add ☐ Remove ☐ Modify ☐ Other	Kiln 7 Fuel Silo & Cyclone	4.44 tons/hr	N/A	N/A	N/A	SILO2
05-DEBARK	☐ Add ☐ Remove ☒ Modify ☐ Other	Debarkers	300 tons/hr	N/A	N/A	N/A	Fugitive
IA-SMC1, IA SMC2	☐ Add ☐ Remove ☒ Modify ☐ Other	Sawmill Chippers	77 tons/hr	N/A	N/A	N/A	SMC1, SMC2
IA-SAWMILL	☐ Add ☐ Remove ☒ Modify ☐ Other	Sawmill	$45.0x10^3$ bd-ft/hr	N/A	N/A	N/A	SAWMILL
03-PLANER	☐ Add ☐ Remove ☒ Modify ☐ Other	Planer Mill No. 1	80.0 10^3 bd-ft/hr	CD-SBAG	PM, PM_{10}, $PM_{2.5}$	100% Capture, 99.9% Control	011

CONTROL DEVICE INFORMATION					
Control Device ID	**Action**	**Control Device Description**	**Maximum Design Capacity (Units)**	**Inherent/Required/Voluntary (Explain)**	**Destruction/Removal Efficiency Determination**
CD-SBAG	☐ Add ☐ Remove ☐ Modify ☒ Other	Planer Mill Baghouse (No change to baghouse)	$80.0x10^3$ bd-ft/hr	Required	System design and manufacturer's information

RAW MATERIAL AND PRODUCT INFORMATION			
Equipment ID Process ID Control Device ID	**Raw Material(s)**	**Product(s)**	**Fuels Combusted**
DEBARK, SAWMILL, CHIPPERS	Logs	Green rough-cut lumber, bark, sawdust	N/A
02-DKN7	Green rough-cut lumber	Dried rough-cut lumber	Green sawdust Dry wood (startup only)
03-Planer	Dried rough-cut lumber	Finished lumber	N/A

MONITORING AND REPORTING INFORMATION					
Equipment ID Process ID Control Device ID	**Pollutant(s)/Parameter(s) Monitored**	**Monitoring Frequency**	**Reporting Frequency**	**Monitoring/Reporting Basis**	**Averaging Period(s)**
02-DKN7	See current Title V conditions for DKN6 (Conditions C.11 - C.15)				
No change anticipated for monitoring or reporting for modified equipment (debarkers, chippers, sawmill, planer mill)					

Bureau of Air Quality
Construction Permit Application
Emissions

APPLICATION IDENTIFICATION *(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)*		
Facility Name *(This should be the name used to identify the facility)*	SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)*	Application Date
Canfor Southern Pine - Camden Plant	1380 - 0025	04/27/2018

ATTACHMENTS *(Check all the appropriate checkboxes if included as an attachment)*	
☒ Sample Calculations, Emission Factors Used, etc.	☒ Detailed Explanation of Assumptions, Bottlenecks, etc.
☒ Supporting Information: Manufacturer's Data, etc.	☒ Source Test Information
☒ Details on Limits Being Taken for Limited Emissions	☒ NSR Analysis

SUMMARY OF PROJECTED CHANGE IN FACILITY WIDE POTENTIAL EMISSIONS
(Calculated at maximum design capacity.)

Pollutants	**Emission Rates Prior to Construction / Modification (tons/year)**			**Emission Rates After Construction / Modification (tons/year)**		
	Uncontrolled	**Controlled**	**Limited**	**Uncontrolled**	**Controlled**	**Limited**
Particulate Matter (PM)	310.31	97.66	97.66	343.67	118.08	118.08
Particulate Matter <10 Microns (PM_{10})	243.56	65.61	65.61	258.00	76.60	76.60
Particulate Matter <2.5 Microns ($PM_{2.5}$)	202.01	55.74	55.74	211.11	64.35	64.35
Sulfur Dioxide (SO_2)	14.60	14.60	14.60	18.98	18.98	18.98
Nitrogen Oxides (NO_x)	106.26	106.26	106.26	121.66	121.66	121.66
Carbon Monoxide (CO)	1209.85	1209.85	1209.85	1250.00	1250.00	1250.00
Volatile Organic Compounds (VOC)	622.84	622.84	622.84	918.68	918.68	918.68
Lead (Pb)	0.017	0.017	0.017	0.020	0.020	0.020
Highest HAP Prior to Construction (CAS #: Methanol)	27.81	27.81	27.81	38.43	38.43	38.43
Highest HAP After Construction (CAS #: Methanol)	27.81	27.81	27.81	38.43	38.43	38.43
Total HAP Emissions*	49.24	49.24	49.24	68.83	68.83	68.83

Include emissions from exempt equipment and emission increases from process changes that were exempt from construction permits.
(*All HAP emitted from the various equipment or processes must be listed in the appropriate "Potential Emission Rates at Maximum Design Capacity" Table)

POTENTIAL EMISSION RATES AT MAXIMUM DESIGN CAPACITY									
Equipment ID / Process ID	**Emission Point ID**	**Pollutants** (Include CAS #)	**Calculation Methods / Limits Taken / Other Comments**	**Uncontrolled**		**Controlled**		**Limited**	
				lbs/hr	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**
02-DKN7	DKN7	PM	NCASI	3.767	16.50	3.767	16.50	3.767	16.50
02-DKN7	DKN7	PM_{10}	EPA PM Calculator	2.260	9.90	2.260	9.90	2.260	9.90
02-DKN7	DKN7	$PM_{2.5}$	EPA PM Calculator	1.884	8.25	1.884	8.25	1.884	8.25
02-DKN7	DKN7	SO_2	AP-42 Section 1.6	1.000	4.38	1.000	4.38	1.000	4.38
02-DKN7	DKN7	NO_X	NCASI	3.516	15.40	3.516	15.40	3.516	15.40
02-DKN7	DKN7	CO	NCASI	9.167	40.15	9.167	40.15	9.167	40.15
02-DKN7	DKN7	VOC	GP McCormick Stack Test	73.082	320.10	73.082	320.10	73.082	320.10
02-DKN7	DKN7	Lead	NCASI	0.0007	0.0031	0.0007	0.0031	0.0007	0.0031
02-DKN7	DKN7	GHG CO_{2e}	40CFR98	8382.8	36,717	8382.8	36,717	8382.8	36,717
02-DKN7	DKN7	Acrolein	NCASI	0.0076	0.033	0.0076	0.033	0.0076	0.033
02-DKN7	DKN7	Acetaldehyde	TRI Workbook	0.728	3.19	0.728	3.19	0.728	3.19
02-DKN7	DKN7	Formaldehyde	GP McCormick Stack Test	0.804	3.52	0.804	3.52	0.804	3.52
02-DKN7	DKN7	Methanol	GP McCormick Stack Test	2.712	11.88	2.712	11.88	2.712	11.88
02-DKN7	DKN7	MIBK	NCASI	0.013	0.055	0.013	0.055	0.013	0.055
02-DKN7	DKN7	Propionaldehyde	NCASI	0.024	0.103	0.024	0.103	0.024	0.103
02-DKN7	DKN7	Toluene	NCASI	0.0013	0.0055	0.0013	0.0055	0.0013	0.0055
02-DKN7	DKN7	Xylene	NCASI	0.0076	0.0333	0.0076	0.0333	0.0076	0.0333
IA-SILO2	SILO2	PM	NCASI	0.018	0.078	0.018	0.078	0.018	0.078
IA-SILO2	SILO2	PM_{10}	Engineering judgement	0.004	0.019	0.004	0.019	0.004	0.019
IA-SILO2	SILO2	$PM_{2.5}$	Engineering judgement	0.002	0.008	0.002	0.008	0.002	0.008
05-DEBARK	Fugitive	PM	Engineering judgement, Annual operation is limited by facility drying capacity	1.20	5.26	1.20	5.26	1.20	3.03
05-DEBARK	Fugitive	PM_{10}	Engineering judgement	0.60	2.63	0.60	2.63	0.60	1.51
05-DEBARK	Fugitive	$PM_{2.5}$	Engineering judgement	0.30	1.31	0.30	1.31	0.30	0.76
IA-SMC1/SMC2	SMC1/SMC2	PM	NCASI, Annual operation is limited by facility drying capacity	0.308	1.35	0.308	1.35	0.308	0.938
IA-SMC1/SMC2	SMC1/SMC2	PM_{10}	Engineering judgement	0.077	0.34	0.077	0.34	0.077	0.234
IA-SMC1/SMC2	SMC1/SMC2	$PM_{2.5}$	Engineering judgement	0.031	0.13	0.031	0.13	0.031	0.094

POTENTIAL EMISSION RATES AT MAXIMUM DESIGN CAPACITY									
Equipment ID / Process ID	**Emission Point ID**	**Pollutants** (Include CAS #)	**Calculation Methods / Limits Taken / Other Comments**	**Uncontrolled**		**Controlled**		**Limited**	
				lbs/hr	**tons/yr**	**lbs/hr**	**tons/yr**	**lbs/hr**	**tons/yr**
IA-SAWMILL	SAWMILL	PM	EIIP, Annual operation is limited by facility drying capacity	0.858	3.76	0.858	3.76	0.858	2.43
IA-SAWMILL	SAWMILL	PM_{10}	Engineering judgement	0.086	0.38	0.086	0.38	0.086	0.24
IA-SAWMILL	SAWMILL	$PM_{2.5}$	Engineering judgement	0.043	0.19	0.043	0.19	0.043	0.12
03-Planer	011	PM	NCASI, Annual operation is limited by facility drying capacity	21.22	92.94	0.21	0.93	0.21	0.48
03-Planer	011	PM_{10}	NCASI	5.66	24.79	0.057	0.25	0.057	0.128
03-Planer	011	$PM_{2.5}$	NCASI	1.13	4.95	0.011	0.050	0.011	0.026

Bureau of Air Quality
Construction Permit Application
Regulatory Review

APPLICATION IDENTIFICATION *(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)*		
Facility Name *(This should be the name used to identify the facility)*	SC Air Permit Number (8-digits only) *(Leave blank if one has never been assigned)*	Application Date
Canfor Southern Pine - Camden Plant	1380 - 0025	04/27/2018

STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS
(If not listed below add any additional regulations that are triggered.)

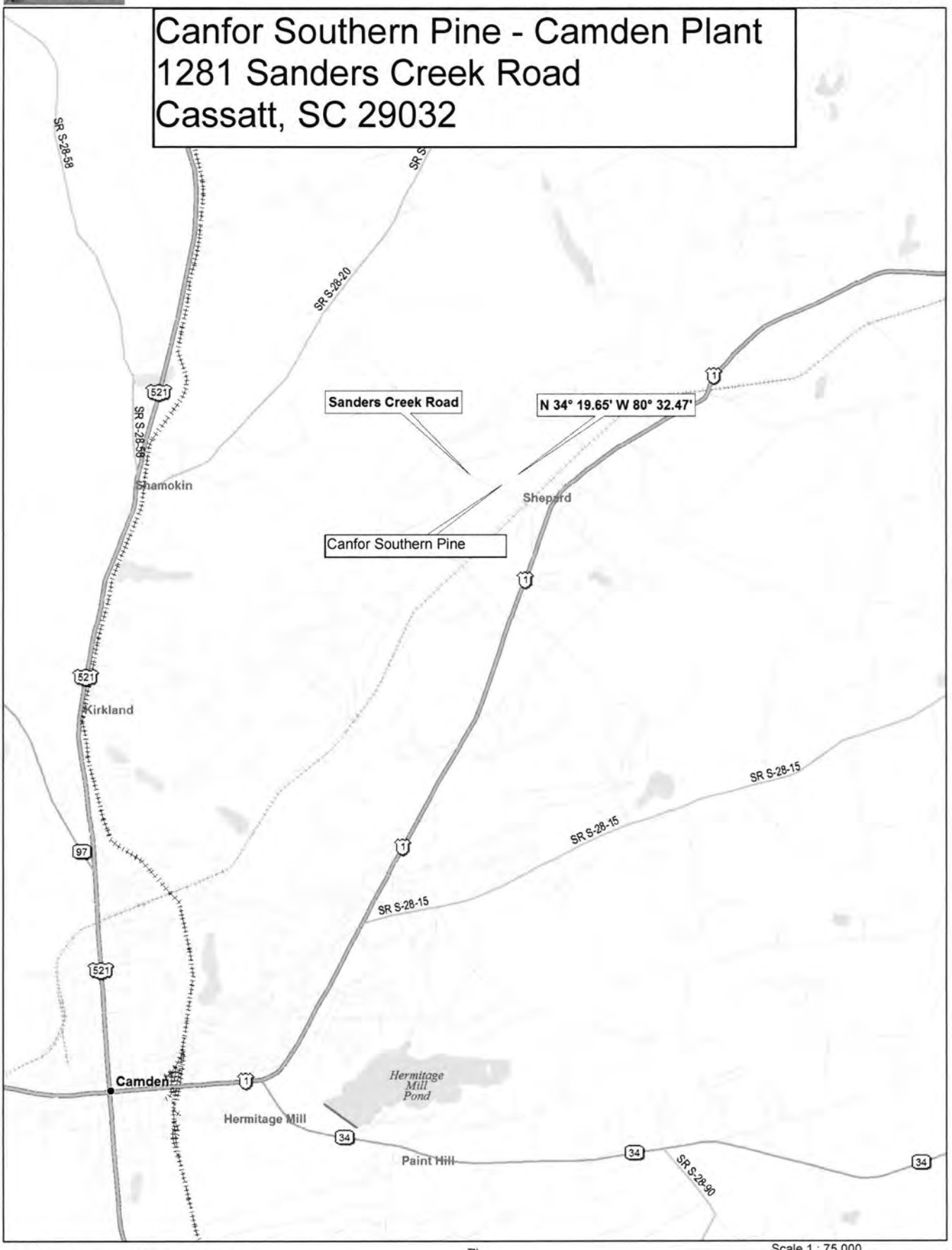
Regulation	**Applicable**		**Include all limits, work practices, monitoring, record keeping, etc.**		
	Yes	**No**	**Explain Applicability Determination**	**List the specific limitations and/or requirements that apply.**	**How will compliance be demonstrated?**
Regulation 61-62.1, Section II(E) Synthetic Minor Construction Permits	☐	☒	No limits requested to avoid otherwise applicable regulations	N/A	N/A
Regulation 61-62.1, Section II(G) Conditional Major Operating Permits	☐	☒	Facility is a Title V major source	N/A	N/A
Regulation 61-62.5, Standard No. 1 Emissions from Fuel Burning Operations	☐	☒	Proposed kiln is direct-fired and does not fall under Std. 1.	N/A	N/A
Regulation 61-62.5, Standard No. 2 Ambient Air Quality Standards	☒	☐	General requirement	No limits	See Appendix C Modeling
Regulation 61-62.5, Standard No. 3 Waste Combustion and Reduction	☐	☒	No wastes will be combusted, as defined in Std. 3.	N/A	N/A
Regulation 61-62.5, Standard No. 4 Emissions from Process Industries	☒	☐	Applies to DKN7	Opacity ≤ 20%, PM ≤ 34.46 lb/hr	Opacity: Visual inspections PM: PTE < allowable
Regulation 61-62.5, Standard No. 5 Volatile Organic Compounds	☐	☒	Std. 5 does not apply to sources in Kershaw county or to lumber drying kilns	N/A	N/A
Regulation 61-62.5, Standard No. 5.2 Control of Oxides of Nitrogen	☒	☐	Applies to the direct-fired burner on KLN7	30% reduction below uncontrolled level	The burner design will achieve low NOx.
Regulation 61-62.5, Standard No. 7 Prevention of Significant Deterioration*	☒	☐	VOC emissions increase >40 tpy	Annual VOC <320.1 tons	Monitor 12-month rolling sum lumber throughput and follow established O&M practices

STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS *(If not listed below add any additional regulations that are triggered.)*					
Regulation	**Applicable**		**Include all limits, work practices, monitoring, record keeping, etc.**		
	Yes	**No**	**Explain Applicability Determination**	**List the specific limitations and/or requirements that apply.**	**How will compliance be demonstrated?**
Regulation 61-62.5, Standard No. 7.1 Nonattainment New Source Review*	☐	☒	Kershaw County is not a non-attainment area	N/A	N/A
Regulation 61-62.5, Standard No. 8 Toxic Air Pollutants	☒	☐	General requirement	No limits apply	No modeling required for sources complying with MACT.
Regulation 61-62.6 Control of Fugitive Particulate Matter	☒	☐	General requirement	Minimize fugitive PM	Ongoing facility dust control practices
Regulation 61-62.68 Chemical Accident Prevention Provisions	☐	☒	No materials are stored above the applicable threshold	N/A	N/A
Regulation 61-62.70 Title V Operating Permit Program	☒	☐	Facility is a major source under Title V	Incorporate project into current Title V upon startup	Submit administrative amendment request upon startup
40 CFR Part 64 - Compliance Assurance Monitoring (CAM)	☐	☒	Kilns do not utilize a control device to comply with an applicable limit	N/A	N/A
40 CFR 60 Subpart A - General Provisions	☐	☒	The kilns are not subject to requirements under NSPS.	N/A	N/A
	☐	☐			
40 CFR 61 Subpart A - General Provisions	☐	☒	The facility is not in the applicable source category	N/A	N/A
	☐	☐			
40 CFR 63 Subpart A - General Provisions	☒	☐	The boiler and kilns are subject.	An updated initial notification will be submitted.	N/A
Subpart DDDD - Plywood and Composite Wood Products	☒	☐	The existing and proposed kilns and affected sources under Subpart DDDD.	None - lumber drying kilns are only subject to initial notification.	N/A

* Green House Gas emissions must be quantified if these regulations are triggered.

Appendix A
Figures

Canfor Southern Pine - Camden Plant
1281 Sanders Creek Road
Cassatt, SC 29032



TN
MN (7.0°W)

Scale 1 : 75,000

1" = 1.18 mi

Data Zoom 11-4

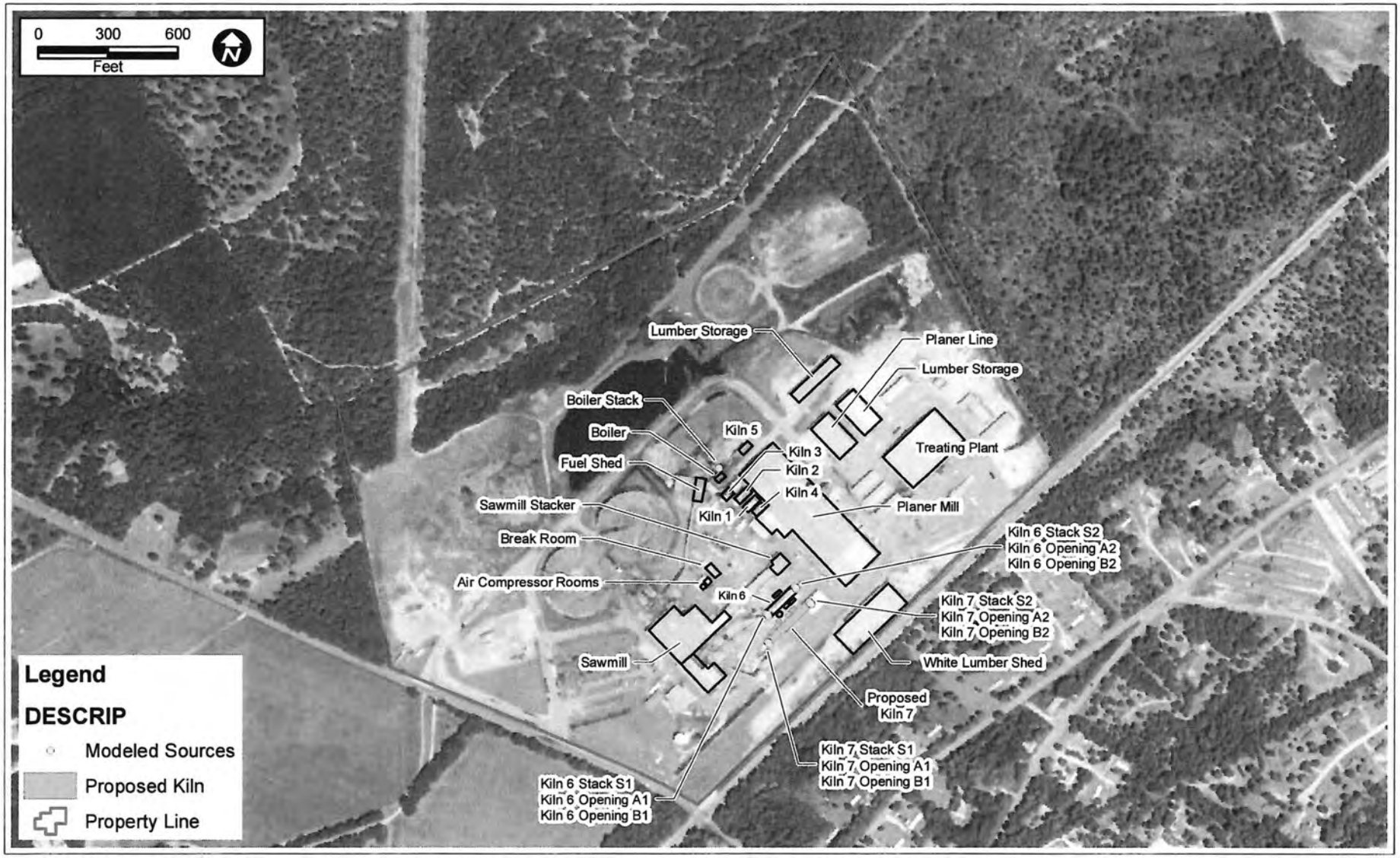


FIGURE 2.

FACILITY LAYOUT - SOURCES AND BUILDING LOCATIONS IN AERMOD

Sources: 2017 NAIP Imagery, Canfor Southern Pine 2018, ECT 2018.

ECT Environmental Consulting & Technology, Inc.

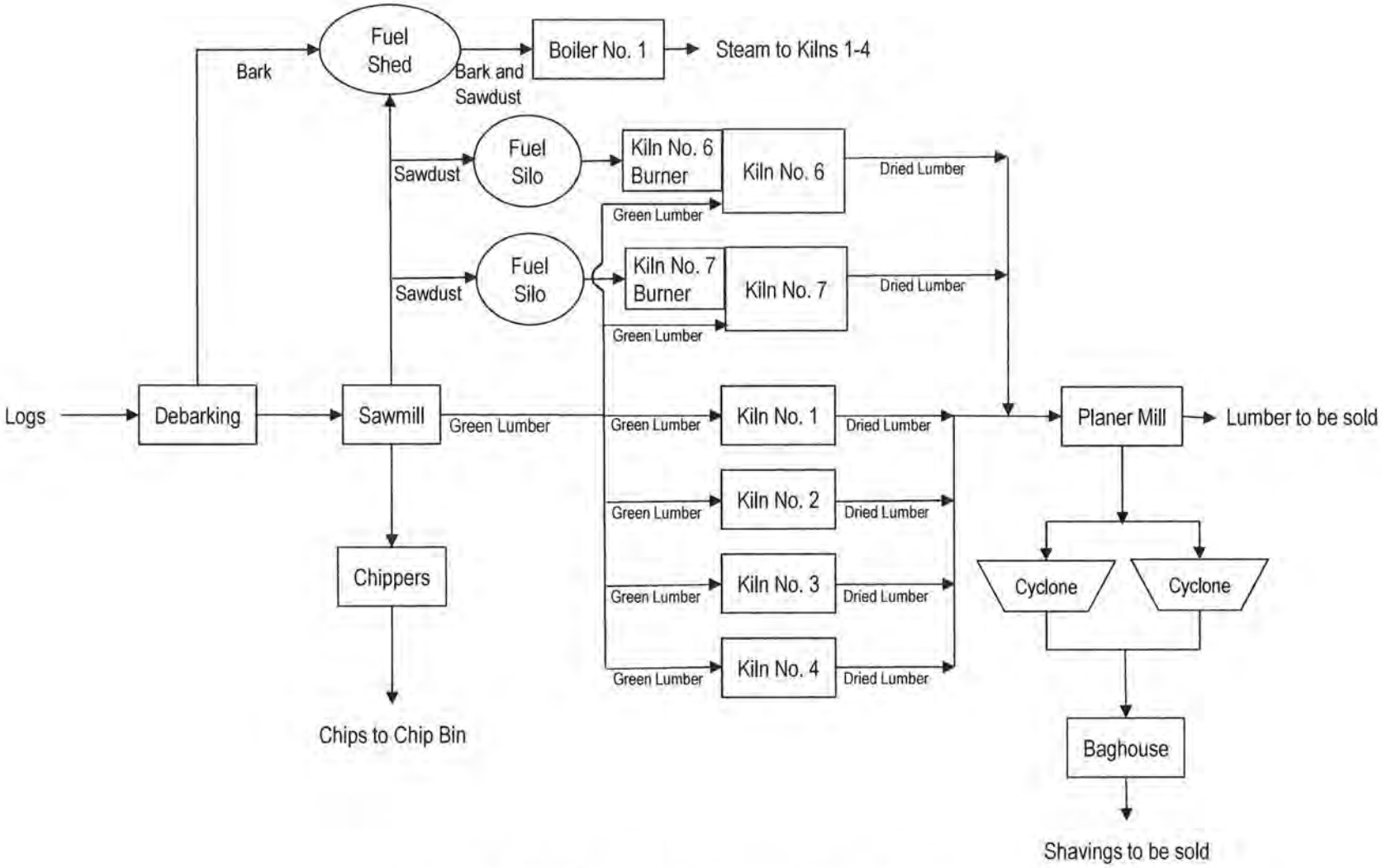


Figure 3. Overall Process Flow Diagram

Appendix B
Detailed Emissions Calculations

Appendix B.1
Basis of Emissions Calculations

This section documents the basis for the emissions calculations used in the Canfor Southern Pine – Camden Plant (Canfor – Camden) air construction permit application. Emission factors and operating rates for the boiler, lumber drying kilns, planer mill, sawmill, chippers and debarkers are discussed.

Fugitive emissions associated with facility roadways and byproducts handling are included in the emissions estimates for the facility. Those calculations include a discussion of the basis of the estimates and sources used. No additional discussion of the fugitive sources will be provided here.

Several updates have been made relative to emissions calculations presented for the facility in previous permit applications. These updates are intended to reflect new emission limits or emission factors applicable to the relevant source. Copies of reference documents are included in Appendix B.8.

Boiler

The boiler contributes emissions of criteria pollutants (PM, PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO, VOC), greenhouse gas pollutants (CO_2, N_2O, CH_4) and various HAPs. Boiler emission estimates are based on a combination of applicable emission limits, U.S. EPA emission factors, and site-specific data.

The applicable emission limits and U.S. EPA emission factors are presented below.

Pollutant	Emission Factor	Reference or Basis
$PM_{filterable}$ (Uncontrolled)	0.56 lb/MMBtu	Bark and Wet Wood, No Control, EPA AP-42, Table 1.6-1, (09/03)
$PM_{10\ filterable}$ (Uncontrolled)	0.50 lb/MMBtu	
$PM_{2.5\ filterable}$ (Uncontrolled)	0.43 lb/MMBtu	
$PM_{condensable}$	0.017 lb/MMBtu	All Fuels, All Controls/No Control, EPA AP-42, Table 1.6-1, (09/03)
$PM_{filterable}$ (Controlled, Potential)	0.146 lb/MMBtu	Expected worst-case with ESP in place based on previous test data and permit
PM Size Distribution (Controlled)	$PM_{10\ filterable}$ = 74% $PM_{filterable}$ $PM_{2.5\ filterable}$ = 65% $PM_{filterable}$	Wood/Bark-Fired Boilers, Dry Electrostatic Filter, EPA AP-42, Table 1.6-5 (09/03)
SO_2	0.025 lb/MMBtu	Bark and Wet Wood, EPA AP-42, Table 1.6-2 (09/03)
NO_X	0.22 lb/MMBtu	
CO	2.742 lb/MMBtu	Boiler MACT, Hybrid Sloped Grate burning biofuel (equivalent to 3500 ppmvd @ 3% O_2)
VOC	0.0174 lb/MMBtu	Wood Residue Combustion, EPA AP-42, Table 1.6-3 (09/03) VOC factor with the addition of formaldehyde
CO_2	93.80 kg/MMBtu	40 CFR 98, Table C-1, Wood and Wood Residuals
N_2O	3.6×10^{-3} kg/MMBtu	40 CFR 98, Table C-2, Wood and Wood Residuals
CH_4	7.2×10^{-3} kg/MMBtu	
Lead	3.36×10^{-5} lb/MMBtu	2005 Stack Test
Organic HAPs	Various	Wood Residue Combustion, EPA AP-42, Table 1.6-3 (09/03)
Inorganic HAPs	Various	Wood Residue Combustion, EPA AP-42, Table 1.6-4 (09/03)

Site-specific data is available to document emissions of hydrogen chloride and several metal HAPs. A copy of the test data is included in Appendix B.8. The test report was previously reviewed and approved by SC DHEC Source Evaluation staff.

The table below summarizes the operating rates used with the above emission factors for each emissions scenario.

Emissions Scenario	Operating Rate	Basis
Short-term, Hourly	98.3 MMBtu/hr	Permitted Hourly Boiler Capacity
Potential Annual	861,108 MMBtu/yr	Hourly Capacity * 8760 hr/yr
Project-related increase	None	The proposed project has no impact on boiler operations.

Steam-heated Lumber Drying Kilns

The original lumber drying kilns at Canfor – Camden are all steam-heated units drying southern yellow pine lumber. No publically-available, published emission factors are available from federal, state or industry sources. The kiln emission factors used in this application are consistent with those used in the facility's 2015 Title V permit renewal application and were taken from the North Carolina Department of Environment and Natural Resources (NC DENR) Lumber Kiln Estimator Spreadsheet. The factors were originally established using data from NCASI Technical Bulletin 845 (TB845), with adjustments made to the VOC factor following procedures recommended by the EPA for wood products industry sources to correct for low analytical response factors of methanol and formaldehyde (two major component of lumber kiln exhaust). Emission factors for individual HAPs were also taken from NCASI TB845, as reproduced by NC DENR. NCASI technical bulletins are not publicly-available; therefore, TB845 is not reproduced herein. However, NC DENR includes most of the NCASI lumber kiln data in the documentation provided for their Lumber Kiln Estimator Spreadsheet. A copy of the NC DENR documentation is included in Appendix B.8.

The specific emission factors and operating rates used for steam-heated lumber drying kiln emissions in this application are summarized below, with a brief explanation of the basis for each value.

Summary of Steam-heated Lumber Kiln Parameters

Parameter	Value	Basis
Emission Factors		
VOC (as terpene + formaldehyde + methanol)	4.20 lb/10^3 bd-ft	NCASI TB845 & EPA guidance
PM	0.022 lb/10^3 bd-ft	NC DENR Kiln Spreadsheet (07/07)
PM_{10}	0.013 lb/10^3 bd-ft	PM_{10} and $PM_{2.5}$ estimated as 58% and 19% of total PM, respectively, based on EPA's PM Calculator database for uncontrolled Southern Pine Plywood Veneer Dryers (SCC 30700715)
$PM_{2.5}$	0.004 lb/10^3 bd-ft	
Acrolein	0.006 lb/10^3 bd-ft	NCASI TB845 & NC DENR Kiln Spreadsheet
Acetaldehyde	0.039 lb/10^3 bd-ft	
Formaldehyde	0.016 lb/10^3 bd-ft	
Methanol	0.21 lb/10^3 bd-ft	
Methyl Isobutyl Ketone	0.001 lb/10^3 bd-ft	
Propionaldehyde	0.001 lb/10^3 bd-ft	
Toluene	0.0001 lb/10^3 bd-ft	
Xylene	0.0002 lb/10^3 bd-ft	

Parameter	Value	Basis
Operating Rates		
Short-term, Hourly	DKN1: 6.37 10^3 bd-ft /hr DKN2: 6.37 10^3 bd-ft /hr DKN3: 3.65 10^3 bd-ft /hr DKN4: 3.08 10^3 bd-ft /hr DKN5: 1.31 10^3 bd-ft /hr	Kiln Capacity / 8760 hr/yr
Potential Annual	DKN1: 55,800 10^3 bd-ft /yr DKN2: 55,800 10^3 bd-ft /yr DKN3: 32,000 10^3 bd-ft /yr DKN4: 27,000 10^3 bd-ft /yr DKN5: 11,500 10^3 bd-ft /yr	Individual Kiln Capacities NOTE: DKN5 will be removed from the permit as part of this project.
Project-related Increase	None	DKN5 will be removed from the permit; however, this equipment has not operated for several years and did not operate during the baseline period. The operation of the other steam kilns is completely independent of the direct-fired kilns.

Direct-Fired Lumber Drying Kilns

The facility installed a direct, wood-fired, continuous kiln (DKN6) in late 2014 and proposes to install a second (DKN7) with this project. Extremely limited emissions data for direct-fired lumber kilns are available from public sources. As such, other recent construction permit applications for direct, wood-fired, continuous kilns drying southern yellow pine lumber were reviewed to determine acceptable emission factors. In particular, the Continuous Kiln Construction Permit Application submitted by the West Frasier – Newberry, SC lumber mill in November 2012 was used as the primary source of direct, wood-fired lumber kiln emission factors. A copy of the relevant pages from that application document is included in Appendix B.8. That document, as well as our spreadsheet in Appendix B.6, provides detailed information concerning the source for each factor used. That information will not be repeated here.

Source testing has been conducted for a limited pollutant set on two direct-fired, continuous lumber kilns in South Carolina – Georgia Pacific McCormick and West Frasier Newberry. The kilns operated by these facilities fire dry shavings, rather than green sawdust, so many of the measurements are not expected to transfer to the units at Canfor. However, the measured VOC, methanol and formaldehyde emissions are believed to be primarily a function of the lumber dried (southern yellow pine), rather than the burner fuel. Therefore, the source test data for these pollutants should be representative. In each case, the emission rates measured by Georgia Pacific were slightly higher than those measured by West Frasier. These higher values were used in our calculations to provide a conservative estimate. Copies of the relevant sections from the source test reports are included in Appendix B.8.

The specific operating rates used for the direct, wood-fired, continuous drying kilns in this application are summarized below, with a brief explanation of the basis for each value.

Summary of Direct-Fired Lumber Kiln Parameters

Parameter	Value	Basis
Operating Rates		
Short-term, Hourly	DKN6: 9.132 10^3 bd-ft /hr 35 MMBtu/hr burner Proposed: DKN7: 12.557 10^3 bd-ft /hr 40 MMBtu/hr burner	Kiln 6 Capacity / 8760 hr/yr Burner nameplate capacity Proposed Kiln 7 Capacity / 8760 hr/yr Proposed burner nameplate
Potential Annual	DKN6: 80,000 10^3 bd-ft /yr 306,600 MMBtu/yr Proposed: DKN7: 110,000 10^3 bd-ft /yr 350,400 MMBtu/yr	Kiln Manufacturer's Estimated Kiln Capacity
Project-related Increase	DKN6: None DKN7: 110,000 10^3 bd-ft /yr 350,400 MMBtu/yr	DKN6 operates independent of the other kilns on site and will be unaffected by the project. DKN7 is a new source to be installed.

Planer Mill

The Planer Mill is a source of PM emissions. Wood waste and dust generated throughout the Planer Mill is captured by the dust collection system and cyclone. The waste transfer air then passes through a baghouse to control particulate matter emissions to the atmosphere. Estimates of uncontrolled PM, PM_{10}, and $PM_{2.5}$ from the Planer Mill are based on emissions data taken from NCASI SR-08-01, cyclone handling dry planer shavings. Data from the baghouse vendor indicates a fairly high control efficiency of 99.9% is expected for this installation. However, we have based our controlled emissions estimates on 99% efficiency to maintain a conservative estimate of potential emissions.

The rate at which shavings are produced in the Planer Mill vary somewhat depending upon dimensions of the lumber being processed. Facility records (January 2013 through December 2017) were reviewed to develop an average rate of 0.221 tons shavings produced per 1000 board-foot processed through the Planer Mill.

Summary of Planer Mill Parameters

Parameter	Value	Basis
Emission Factors		
PM (uncontrolled)	1.2 lb / ton shavings	NCASI SR-08-01 worksheet
PM_{10} (uncontrolled)	0.32 lb/ton shavings	NCASI SR-08-01 worksheet
$PM_{2.5}$ (uncontrolled)	0.064 lb/ton shavings	NCASI SR-08-01 worksheet
PM (controlled)	0.012 lb / ton shavings	99% control
PM_{10} (controlled)	0.0032 lb/ton shavings	99% control
$PM_{2.5}$ (controlled)	0.00064 lb/ton shavings	99% control
Operating Rates		
Short-term, Hourly	80 10^3 bd-ft /hr	Site data concerning Planer Mill Capacity
Current Potential Annual	262,100 10^3 bd-ft/yr	Based on current facility-wide permitted kiln capacity

Parameter	Value	Basis
Future Potential Annual	360,600 10^3 bd-ft/yr	Based on proposed future facility-wide permitted kiln capacity
Baseline Actual Throughput	176,815 10^3 bd-ft/yr	Actual planer mill throughput in baseline period (May 2015 – April 2017)
Shavings Production Rate	0.221 tons shavings / 10^3 bd-ft	Average actual rate of shavings production from facility records (January 2013 – December 2017)

Sawmill and Sawmill Chippers

The sawmill and the associated chippers are a source of particulate matter emissions. The chippers are enclosed units, processing wood with a typical water content of ~50%. Emissions to the atmosphere are expected to be extremely limited.

The sawdust generated by the green lumber saws is extremely wet, due to the high moisture content of the wood (approximately 50% water) and due to the use of water sprays to cool the cutting blade in several locations within the sawmill. In addition, the green lumber saws are located within the sawmill building which limits the tendency for the dust to become airborne. Facility records were reviewed to develop an average rate of 0.35 tons sawdust produced per 1000 board-foot processed through the Sawmill. Airborne dust in the immediate vicinity of the saws, and in the sawmill building as a whole, is negligible during operation of the sawmill. However, to be conservative, the following estimate is provided of particulate matter emissions from log sawing in the sawmill.

Summary of Sawmill Parameters

Parameter	Value	Basis
Emission Factors		
PM	0.035 lb PM / ton sawdust	EIIP Uncontrolled factor, Log Sawing, 3-07-008-02, adjusted for water spray and building enclosure
PM_{10}	0.0035 lb PM_{10} / ton sawdust	PM_{10} = 10% of PM, NC DENR Wood Working Emissions Calculator, PM distribution for rough sawing
$PM_{2.5}$	0.00175 lb $PM_{2.5}$ / ton sawdust	$PM_{2.5}$ = 5% of PM, NC DENR Wood Working Emissions Calculator, PM distribution for rough sawing
Operating Rates		
Current Short-term, Hourly	45.0 10^3 bd-ft/hr 15.75 tons sawdust/hr	Site data concerning saw mill capacity 0.35 tons sawdust / MBF * 45 MBF/hr
Current Potential Annual	288,310 10^3 bd-ft/yr 100,909 tons sawdust/yr	Site capacity, as limited by drying kilns
Future Short-term, Hourly	70.0 10^3 bd-ft/hr 24.50 tons sawdust/hr	Proposed future saw mill capacity 0.35 tons sawdust / MBF * 70 MBF/hr
Future Potential Annual	396,660 10^3 bd-ft/yr 138,831 tons sawdust/yr	Site capacity, as limited by drying kilns
Baseline Actual Throughput	191,716.553 10^3 bd-ft/yr 67,101 tons sawdust/yr	Actual sawmill throughput in baseline period (May 2015 – April 2017)

Summary of Sawmill Chipper Parameters

Parameter	Value	Basis
Emission Factors		
PM	0.004 lb PM / ton chip	NCASI worksheet title "Particulate Emissions From Miscellaneous Sources Including Saw and Sanders." Test code 214-081189A, cyclone for green chips and sawdust.
PM_{10}	0.001 lb PM_{10} / ton chip	Engineering judgment, assumed PM_{10} = 25% of PM
$PM_{2.5}$	0.0004 lb $PM_{2.5}$ / ton chip	Engineering judgment, assumed PM_{10} = 10% of PM
Operating Rates		
Current Short-term, Hourly	55 tons chips /hr	Site data concerning chipper capacity
Current Potential Annual	340,730 tons chips/yr	Site capacity, as limited by drying kilns
Future Short-term, Hourly	77 tons chips /hr	Proposed future chipper capacity
Future Potential Annual	468,780 tons chips/yr	Site capacity, as limited by drying kilns
Baseline Actual Throughput	237,964 tons chips/yr	Actual chipper throughput in baseline period (May 2015 – April 2017)

Debarkers

The debarkers are a source of particulate matter emissions. The debarkers used at each of the Canfor facilities are a design called a ring debarker. In this design, a metal ring pulls knife-tipped arms, which slide along the exterior of the log, scraping the bark off in large chunks, which then fall to a conveyor beneath. The actual bark removal occurs within a metal enclosure that covers the top and sides of the log and ring. There is no visible airborne dust in the area of the debarker when it is in operation.

Other segments of the wood products industry use different types of debarkers. For instance, many papermills use drum debarkers, which pound the bark off the logs. Many hardwood facilities use roserhead debarkers, which grind the bark off the logs. In each of these cases, the bark is reduced to small particles which may readily become airborne. In short, the debarkers at Canfor have minimal emissions and any emissions that do occur would be of such large particle size and have such limited lift (due to both size and the partial enclosure) that they would not reach the property line.

The only published emission factors identified for debarkers was located in the Emissions Inventory Improvement Project (EIIP) *Uncontrolled Emission Factor Listing for Criteria Pollutant* (July 2001). However, the listed emission factor was also previously included in the EPA FIRE database and has since been retracted by EPA as being unrepresentative of typical source emissions. Therefore, emissions from the Canfor – Camden debarkers have been estimated through engineering judgment and knowledge of the source.

Summary of Debarker Parameters

Parameter	Value	Basis
Emission Factors		
PM	0.004 lb PM / ton logs	Engineering judgment & process knowledge
PM_{10}	0.002 lb PM_{10} / ton logs	Engineering judgment, assumed PM_{10} = 50% of PM
$PM_{2.5}$	0.001 lb $PM_{2.5}$ / ton logs	Engineering judgment, assumed $PM_{2.5}$ = 25% of PM
Operating Rates		
Current Short-term, Hourly	200 tons logs/hr	Site data concerning debarker capacity
Current Potential Annual	1,100,820 tons logs/yr	Site capacity, as limited by drying kilns
Future Short-term, Hourly	300 tons logs/hr	Proposed future debarker capacity
Future Potential Annual	1,514,520 tons logs/yr	Site capacity, as limited by drying kilns
Baseline Actual Throughput	796,711 tons logs/yr	Actual throughput during baseline period (May 2015 – April 2017)
Log Demand	4.2 tons logs / MBF dried	Average yield, site operating records January 2013 – December 2017

Appendix B.2

Project Impacts on Facility-wide Potential Emissions and PSD Applicability

Canfor Southern Pine - Camden Plant
Project Impacts on Facility-wide Potential Emissions

Pollutant	Future Potential Emissions		Current Potential Emissions		Project Emissions Impact	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Facility-wide Project Emissions Impact						
PM	28.56	118.08	23.53	97.66	**5.03**	**20.42**
PM_{10}	18.30	76.60	15.67	65.61	**2.63**	**10.99**
$PM_{2.5}$	15.32	64.35	13.29	55.74	**2.03**	**8.61**
SO_2	4.34	18.98	3.34	14.60	**1.00**	**4.38**
NO_X	34.36	121.66	30.85	106.26	**3.52**	**15.40**
CO	286.81	1,250.00	277.64	1,209.85	**9.17**	**40.15**
VOC	210.28	918.68	142.74	622.84	**67.54**	**295.84**
CO_2	36,083	156,980	27,811	120,749	**8,271.73**	**36,230.20**
N_2O	1.38	6.02	1.06	4.63	**0.32**	**1.39**
CH_4	2.76	12.05	2.13	9.27	**0.63**	**2.78**
GHG_{mass}	36,087	156,998	27,814	120,763	**8,273**	**36,234**
CO_2e	36,562	159,076	28,180	122,362	**8,382**	**36,714**
Lead	0.005	0.020	0.004	0.017	**0.001**	**0.003**
Methanol	8.77	38.43	6.35	27.81	**2.42**	**10.62**
Total HAP	15.71	68.83	13.22	57.89	**2.50**	**10.94**
Breakdown of Facility Emissions						
Boiler Emissions						
PM	16.02	70.18	16.02	70.18	0.00	0.00
PM_{10}	12.29	53.82	12.29	53.82	0.00	0.00
$PM_{2.5}$	11.01	48.22	11.01	48.22	0.00	0.00
SO_2	2.46	10.76	2.46	10.76	0.00	0.00
NO_X	21.63	94.72	21.63	94.72	0.00	0.00
CO	269.54	1,180.58	269.54	1,180.58	0.00	0.00
VOC	1.71	7.49	1.71	7.49	0.00	0.00
CO_2	20,328	89,036	20,328	89,036	0.00	0.00
N_2O	0.78	3.42	0.78	3.42	0.00	0.00
CH_4	1.56	6.83	1.56	6.83	0.00	0.00
CO_2e	20,599	90,225	20,599	90,225	0.00	0.00
Lead	0.0033	0.014	0	0		
Methanol	0.00	0.00	0.00	0.00	0.00	0.00
Total HAP	1.98	8.65	1.98	8.65	0.00	0.00
Kiln Emissions (including fuel silos)						
PM	6.97	30.52	3.21	14.07	3.76	16.45
PM_{10}	4.17	18.25	1.92	8.40	2.25	9.84
$PM_{2.5}$	3.33	14.61	1.45	6.37	1.88	8.23
SO_2	1.88	8.21	0.88	3.83	1.00	4.38
NO_X	6.07	26.60	2.56	11.20	3.52	15.40
CO	15.83	69.35	6.67	29.20	9.17	40.15
VOC	208.03	911.16	140.46	615.21	67.57	295.95
CO_2	15,510	67,932	7,238	31,701	8,272	36,230
N_2O	0.60	2.61	0.28	1.22	0.32	1.39
CH_4	1.19	5.21	0.56	2.43	0.63	2.78
CO_2e	15,717	68,839	7,334	32,125	8,382	36,714
Lead	0.0013	0.0058	0.0006	0.0027	0.0007	0.0031
Methanol	6.77	38.43	6.34	27.76	2.44	10.67
Total HAP	13.74	60.17	11.23	49.17	2.51	11.00
Planer Mill Emissions						
PM	0.21	0.48	0.21	0.35	0.00	0.13
PM_{10}	0.06	0.13	0.06	0.09	0.00	0.03
$PM_{2.5}$	0.01	0.03	0.01	0.02	0.00	0.00
Chipper Emissions						
PM	0.31	0.94	0.22	0.68	0.09	0.26
PM_{10}	0.08	0.23	0.06	0.17	0.02	0.06
$PM_{2.5}$	0.03	0.09	0.02	0.07	0.01	0.03
Sawmill Emissions						
PM	0.86	2.43	0.55	1.77	0.31	0.66
PM_{10}	0.09	0.24	0.06	0.18	0.03	0.07
$PM_{2.5}$	0.04	0.12	0.03	0.09	0.02	0.03
Debarker Emissions						
PM	1.20	3.03	0.80	2.20	0.40	0.83
PM_{10}	0.60	1.51	0.40	1.10	0.20	0.41
$PM_{2.5}$	0.30	0.76	0.20	0.55	0.10	0.21
Road Fugitives						
PM	1.38	6.06	1.03	4.51	0.35	1.55
PM_{10}	0.27	1.20	0.20	0.89	0.07	0.31
$PM_{2.5}$	0.06	0.27	0.05	0.20	0.02	0.07
Byproducts Handling, Wood Treatment, Holtec Saw and Emergency Fire Pump						
PM	1.61	4.44	1.48	3.90	0.12	0.54
PM_{10}	0.76	1.22	0.70	0.96	0.06	0.26
$PM_{2.5}$	0.53	0.26	0.52	0.22	0.01	0.04
SO_2	0.009	0.000	0.009	0.000	0.00	0.00
NO_X	6.67	0.33	6.67	0.33	0.00	0.00
CO	1.44	0.07	1.44	0.07	0.00	0.00
VOC	0.54	0.03	0.57	0.14	-0.03	-0.11
CO_2	245.40	12.27	245.40	12.27	0.00	0.00
N_2O	0.0020	0.0001	0.0020	0.0001	0.00	0.00
CH_4	0.0100	0.0005	0.0100	0.0005	0.00	0.00
CO_2e	246.25	12.31	246.25	12.31	0.00	0.00
Methanol	0.00	0.00	0.01	0.05	-0.01	-0.05
Total HAP	0.00	0.00	0.01	0.06	-0.01	-0.06

Canfor Southern Pine - Camden Plant
PSD Applicability Analysis

Source	PM	PM10	PM2.5	SO2	NOX	CO	VOC	CO2e	Lead
New/Modified Sources (PTE)									
New Kiln 7	16.500	9.900	8.250	4.38	15.40	40.15	320.10	36,714.09	3.10E-03
New Kiln 7 Silo/Cyclone	0.078	0.019	0.008	--	--	--	--	--	--
New or Modified Debarkers	3.029	1.515	0.757	--	--	--	--	--	--
Modified Sawmill	2.430	0.243	0.121	--	--	--	--	--	--
Modified Planer Mill	0.478	0.128	0.026	--	--	--	--	--	--
Modified Sawmill Chippers	0.938	0.234	0.094	--	--	--	--	--	--
Future PTE for New/Modified Sources	23.452	12.039	9.256	4.38	15.40	40.15	320.10	36,714.09	0.0031
Baseline Actuals for Modified Sources									
Modified Debarker	1.593	0.797	0.398	--	--	--	--	--	--
Modified Sawmill	1.174	0.117	0.059	--	--	--	--	--	--
Modified Planer Mill	0.234	0.063	0.013	--	--	--	--	--	--
Modified Sawmill Chippers	0.476	0.119	0.048	--	--	--	--	--	--
Total Baseline Actuals	3.478	1.096	0.517	0.00	0.00	0.00	0.00	0.00	0.00
Future PTE - Baseline Actuals	**19.974**	**10.943**	**8.739**	**4.38**	**15.40**	**40.15**	**320.10**	**36,714.09**	**0.00**
Other Upstream/Downstream Increases (caused by debottlenecking through 110 MMBd-ft/yr increase throughput)									
Roads	1.877	0.371	0.083	--	--	--	--	--	--
Byproduct Handling	0.607	0.287	0.043	--	--	--	--	--	--
Total Upstream/Downstream Increases	2.484	0.658	0.126	0.00	0.00	0.00	0.00	0.00	0.00
Total Project Impacts	**22.458**	**11.602**	**8.865**	**4.38**	**15.40**	**40.15**	**320.10**	**36,714.09**	**0.0031**
PSD Significance Level	25	15	10	40	40	100	40	75000	0.6
Significant Impacts? (Yes or No)	No	No	No	No	No	No	**Yes**	No	No

Appendix B.3
Future Potential to Emit

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

PM Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	861,108	MMBtu/yr	0.577	lb/MMBtu	0.163	lb/MMBtu	56.72	248.43	16.02	70.18	Uncontrolled: AP-42, Table 1.6-1, Controlled: ESP Worst-case
02	DKN1	Lumber Drying Kiln No. 1	55,800		55,800						0.140	0.614	0.140	0.614	
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.140	0.614	0.140	0.614	NC DENR Kiln Spreadsheet
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	32,000	1000 bd-ft/yr	0.022	lb/1000 bd-ft	0.022	lb/1000 bd-ft	0.080	0.352	0.080	0.352	
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.068	0.297	0.068	0.297	
02	DKN5	Lumber Drying Kiln No. 5	0		0						0.000	0.000	0.000	0.000	Kiln 5 to be removed from permit
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.30	lb/1000 bd-ft	0.30	lb/1000 bd-ft	2.74	12.00	2.74	12.00	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	110,000	1000 bd-ft/yr	0.30	lb/1000 bd-ft	0.30	lb/1000 bd-ft	3.77	16.50	3.77	16.50	See Kiln 7 Detail
03		Planer Mill	80,000	bd-ft/hr	360,600	10^3 bd-ft/yr	1.2	lb/ton shavings	0.012	lb/ton shavings	21.22	47.82	0.21	0.48	NCASI SR-08-01 worksheet
IA		Chippers	77	tons chips/hr	468,780	tons chips/yr	0.004	lb/ton chips	0.004	lb/ton chips	0.308	0.938	0.308	0.938	NCASI TB884 Table 8.2
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.004	lb/ton	0.004	lb/ton	0.016	0.068	0.016	0.068	NCASI TB884 Table 8.2
IA		Kiln 7 Feed Silo Cyclone	4.44	tons/hr	38,933	tons/yr	0.004	lb/ton	0.004	lb/ton	0.018	0.078	0.018	0.078	NCASI TB884 Table 8.2
IA		Sawmill	24.50	tons dust/hr	138,831	tons dust/yr	0.035	lb/ton dust	0.035	lb/ton dust	0.858	2.430	0.858	2.430	EIIP uncontrolled factor, log sawing (3-07-008-02)
04		Debarker	300	tons/hr	1,514,520	tons/yr	0.004	lb/ton logs	0.004	lb/ton logs	1.20	3.03	1.20	3.03	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								1.38	6.06	1.38	6.06	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.68	2.44	0.68	2.44	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.45	1.98	0.45	1.98	AP-42
		Total									**90.26**	**343.67**	**28.56**	**118.08**	

PM10 Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	861,108	MMBtu/yr	0.517	lb/MMBtu	0.125	lb/MMBtu	50.82	222.60	12.29	53.82	Size distribution from AP-42
02	DKN1	Lumber Drying Kiln No. 1	55,800		55,800						0.083	0.363	0.083	0.363	
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.083	0.363	0.083	0.363	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	32,000	1000 bd-ft/yr	0.013	lb/1000 bd-ft	0.013	lb/1000 bd-ft	0.047	0.208	0.047	0.208	58% of PM per EPA PM Calculator database
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.040	0.176	0.040	0.176	
02	DKN5	Lumber Drying Kiln No. 5	0		0						0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.18	lb/1000 bd-ft	0.18	lb/1000 bd-ft	1.64	7.20	1.64	7.20	
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	110,000	1000 bd-ft/yr	0.18	lb/1000 bd-ft	0.18	lb/1000 bd-ft	2.26	9.90	2.26	9.90	
03		Planer Mill	80,000	bd-ft/hr	360,600	10^3 bd-ft/yr	0.32	lb/ton shavings	0.0032	lb/ton shavings	5.66	12.75	0.057	0.128	NCASI SR-08-01 worksheet
IA		Chippers	77	tons chips/hr	468,780	tons chips/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.077	0.234	0.077	0.234	Assumed 25% of TSP
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.004	0.017	0.004	0.017	Assumed 25% of TSP
IA		Kiln 7 Feed Silo Cyclone	4.44	tons/hr	38,933	tons/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.004	0.019	0.004	0.019	Assumed 25% of TSP
IA		Sawmill	24.50	tons dust/hr	138,831	tons dust/yr	0.0035	lb/ton dust	0.0035	lb/ton dust	0.086	0.243	0.086	0.243	
04		Debarker	300	tons/hr	1,514,520	tons/yr	0.002	lb/ton logs	0.002	lb/ton logs	0.60	1.51	0.60	1.51	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								0.27	1.20	0.27	1.20	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.07	0.26	0.07	0.26	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.21	0.94	0.21	0.94	AP-42
		Total									**62.44**	**258.00**	**18.30**	**76.60**	

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

PM2.5 Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Uncontrolled Units	Controlled Emission Factor	Controlled Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	861,108	MMBtu/yr	0.447	lb/MMBtu	0.112	lb/MMBtu	43.94	192.46	11.01	48.22	Size distribution from AP-42
02	DKN1	Lumber Drying Kiln No. 1	55,800		55,800						0.025	0.112	0.025	0.112	
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.025	0.112	0.025	0.112	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	32,000	1000 bd-ft/yr	0.004	lb/1000 bd-ft	0.004	lb/1000 bd-ft	0.015	0.064	0.015	0.064	19% of PM per EPA PM Calculator database
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.012	0.054	0.012	0.054	
02	DKN5	Lumber Drying Kiln No. 5	0		0						0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.15	lb/1000 bd-ft	0.15	lb/1000 bd-ft	1.37	6.00	1.37	6.00	
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	110,000	1000 bd-ft/yr	0.15	lb/1000 bd-ft	0.15	lb/1000 bd-ft	1.88	8.25	1.88	8.25	
03		Planer Mill	80,000	bd-ft/hr	360,600	10^3 bd-ft/yr	0.064	lb/ton shavings	0.00064	lb/ton shavings	1.13	2.55	0.011	0.026	NCASI SR-08-01 worksheet
IA		Chippers	77	tons chips/hr	468,780	tons chips/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.031	0.094	0.031	0.094	Assumed 10% of TSP
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.002	0.007	0.002	0.007	Assumed 10% of TSP
IA		Kiln 7 Feed Silo Cyclone	4.44	tons/hr	38,933	tons/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.002	0.008	0.002	0.008	Assumed 10% of TSP
IA		Sawmill	24.50	tons dust/hr	138,831	tons dust/yr	0.00175	lb/ton dust	0.00175	lb/ton dust	0.043	0.121	0.043	0.121	
04		Debarker	300	tons/hr	1,514,520	tons/yr	0.001	lb/ton logs	0.001	lb/ton logs	0.30	0.76	0.30	0.76	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								0.06	0.27	0.06	0.27	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.03	0.10	0.03	0.10	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.03	0.14	0.03	0.14	AP-42
		Total									**49.37**	**211.11**	**15.32**	**64.35**	

NOx Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.22	lb/MMBtu	21.63	94.72	21.63	94.72	AP-42 Table 1.6-2 (09/03)
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	0.28	lb/1000 bd-ft	2.56	11.20	2.56	11.20	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	0.03	lb/hp-hr	6.67	0.33	6.67	0.33	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	0.28	lb/1000 bd-ft	3.52	15.40	3.516	15.40	See Kiln 7 Detail
		Total					**34.36**	**121.66**	**34.36**	**121.66**	

CO Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	2.742	lb/MMBtu	269.54	1,180.58	269.54	1,180.58	MACT Limit
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	0.73	lb/1000 bd-ft	6.67	29.20	6.67	29.20	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	0.00668	lb/hp-hr	1.44	0.07	1.44	0.07	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	0.73	lb/1000 bd-ft	9.17	40.15	9.17	40.15	See Kiln 7 Detail
		Total					**286.81**	**1,250.00**	**286.81**	**1,250.00**	

SO2 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.025	lb/MMBtu	2.46	10.76	2.46	10.76	AP-42 Table 1.6-2 (09/03)
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.025	lb/MMBtu	0.88	3.83	0.88	3.83	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	4.05E-05	lb/hp-hr	0.0087	0.0004	0.0087	0.0004	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	0.025	lb/MMBtu	1.00	4.38	1.00	4.38	See Kiln 7 Detail
		Total					**4.34**	**18.98**	**4.34**	**18.98**	

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

VOC Emissions

Unit ID	Equipment ID	Description	Potential Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0174	lb/MMBtu	1.71	7.49	1.71	7.49	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	4.2	lb/1000 bd-ft	26.75	117.18	26.75	117.18	NCASI TB845, adjusted to as pinene basis
02	DKN2	Lumber Drying Kiln No. 2	55,800				26.75	117.18	26.75	117.18	
02	DKN3	Lumber Drying Kiln No. 3	32,000				15.34	67.20	15.34	67.20	
02	DKN4	Lumber Drying Kiln No. 4	27,000				12.95	56.70	12.95	56.70	
02	DKN5	Lumber Drying Kiln No. 5	-				0.00	0.00	0.00	0.00	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	5.82	lb/1000 bd-ft	53.15	232.80	53.15	232.80	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	5.82	lb/1000 bd-ft	73.08	320.10	73.08	320.10	See Kiln 7 Detail
IA		Emergency Fire Pump	215	hp	2.51E-03	lb/hp-hr	0.5397	0.0270	0.5397	0.0270	NC DENR Spreadsheet
		Wood Treatment	Treating Plant Shut Down				0.00	0.00	0.00	0.00	Permanently Shutdown
		Total					**210.28**	**918.68**	**210.28**	**918.68**	

Lead Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	3.36E-05	lb/MMBtu	3.30E-03	1.45E-02	3.30E-03	1.45E-02	2005 Stack Test
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	1.77E-05	lb/MMBtu	6.20E-04	2.71E-03	6.20E-04	2.71E-03	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	1.77E-05	lb/MMBtu	7.08E-04	3.10E-03	7.08E-04	3.10E-03	See Kiln 7 Detail
		Total					**4.63E-03**	**2.03E-02**	**4.63E-03**	**2.03E-02**	

CO2 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	93.8	kg/MMBtu	20,327.79	89,035.71	20,327.79	89,035.71	40CFR98 Table C-1
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	93.8	kg/MMBtu	7,237.77	31,701.42	7,237.77	31,701.42	40CFR98 Table C-1
IA		Emergency Fire Pump	215	hp	See Title V		245.40	12.27	245.40	12.27	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	93.8	kg/MMBtu	8,271.73	36,230.20	8,271.73	36,230.20	40CFR98 Table C-1
		Total					**36,082.69**	**156,979.59**	**36,082.69**	**156,979.59**	

N2O Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0036	kg/MMBtu	0.78	3.42	0.78	3.42	40CFR98 Table C-2
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.0036	kg/MMBtu	0.28	1.22	0.28	1.22	40CFR98 Table C-2
IA		Emergency Fire Pump	215	hp	See Title V		0.0020	0.0001	0.0020	0.0001	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	0.0036	kg/MMBtu	0.32	1.39	0.32	1.39	40CFR98 Table C-2
		Total					**1.38**	**6.02**	**1.38**	**6.02**	

CH4 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0072	kg/MMBtu	1.56	6.83	1.56	6.83	40CFR98 Table C-2
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.0072	kg/MMBtu	0.56	2.43	0.56	2.43	40CFR98 Table C-2
IA		Emergency Fire Pump	215	hp	See Title V		0.0100	0.0005	0.0100	0.0005	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	0.0072	kg/MMBtu	0.63	2.78	0.63	2.78	40CFR98 Table C-2
		Total					**2.76**	**12.05**	**2.76**	**12.05**	

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

Acrolein Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	4.00E-03	lb/MMBtu	0.393	1.722	0.393	1.722	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.038	0.167	0.038	0.167	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.038	0.167	0.038	0.167	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.006	lb/1000 bd-ft	0.022	0.096	0.022	0.096	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.018	0.081	0.018	0.081	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	1.90E-04	lb/MMBtu	0.007	0.029	0.007	0.029	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	1.90E-04	lb/MMBtu	0.008	0.033	0.008	0.033	See Kiln 7 Detail
		Total					**0.52**	**2.30**	**0.52**	**2.30**	

Acetaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	8.30E-04	lb/MMBtu	0.082	0.357	0.082	0.357	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.248	1.088	0.248	1.088	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.248	1.088	0.248	1.088	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.039	lb/1000 bd-ft	0.142	0.624	0.142	0.624	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.120	0.527	0.120	0.527	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	5.80E-02	lb/1000 bd-ft	0.530	2.320	0.530	2.320	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	5.80E-02	lb/1000 bd-ft	0.728	3.190	0.728	3.190	See Kiln 7 Detail
		Total					**2.10**	**9.19**	**2.10**	**9.19**	

Formaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	4.40E-03	lb/MMBtu	0.433	1.894	0.433	1.894	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.102	0.446	0.102	0.446	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.102	0.446	0.102	0.446	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.016	lb/1000 bd-ft	0.058	0.256	0.058	0.256	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.049	0.216	0.049	0.216	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	6.40E-02	lb/1000 bd-ft	0.584	2.560	0.584	2.560	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	6.40E-02	lb/1000 bd-ft	0.804	3.520	0.804	3.520	See Kiln 7 Detail
		Total					**2.13**	**9.34**	**2.13**	**9.34**	

Methanol Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
02	DKN1	Lumber Drying Kiln No. 1	55,800				1.338	5.859	1.338	5.859	
02	DKN2	Lumber Drying Kiln No. 2	55,800				1.338	5.859	1.338	5.859	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.21	lb/1000 bd-ft	0.767	3.360	0.767	3.360	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.647	2.835	0.647	2.835	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	2.16E-01	lb/1000 bd-ft	1.973	8.640	1.973	8.640	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	2.16E-01	lb/1000 bd-ft	2.712	11.880	2.712	11.880	See Kiln 7 Detail
		Wood Treatment	Removed from site				0.00	0.00	0.00	0.00	Permanently Shutdown
		Total					**8.77**	**38.43**	**8.77**	**38.43**	

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

Methyl Isobutyl Ketone Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.006	0.028	0.006	0.028	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.006	0.028	0.006	0.028	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.001	lb/1000 bd-ft	0.004	0.016	0.004	0.016	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.003	0.014	0.003	0.014	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	1.00E-03	lb/1000 bd-ft	0.009	0.040	0.009	0.040	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	1.00E-03	lb/1000 bd-ft	0.013	0.055	0.013	0.055	See Kiln 7 Detail
		Total					**0.041**	**0.180**	**0.041**	**0.180**	

Propionaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	6.10E-05	lb/MMBtu	0.006	0.026	0.006	0.026	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.006	0.028	0.006	0.028	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.006	0.028	0.006	0.028	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.001	lb/1000 bd-ft	0.004	0.016	0.004	0.016	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.003	0.014	0.003	0.014	
02	DKN5	Lumber Drying Kiln No. 5	-				0.000	0.000	0.000	0.000	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	5.90E-04	lb/MMBtu	0.021	0.090	0.021	0.090	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	5.90E-04	lb/MMBtu	0.024	0.103	0.024	0.103	See Kiln 7 Detail
		Total					**0.070**	**0.305**	**0.070**	**0.305**	

Toluene Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	9.20E-04	lb/MMBtu	0.0904	0.3961	0.0904	0.3961	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.0006	0.0028	0.0006	0.0028	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.0006	0.0028	0.0006	0.0028	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.0001	lb/1000 bd-ft	0.0004	0.0016	0.0004	0.0016	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.0003	0.0014	0.0003	0.0014	
02	DKN5	Lumber Drying Kiln No. 5	-				0.0000	0.0000	0.0000	0.0000	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	1.00E-04	lb/1000 bd-ft	0.0009	0.0040	0.0009	0.0040	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	110,000	1000 bd-ft/yr	1.00E-04	lb/1000 bd-ft	0.0013	0.0055	0.0013	0.0055	See Kiln 7 Detail
		Total					**0.095**	**0.414**	**0.095**	**0.414**	

Xylene Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	2.50E-05	lb/MMBtu	0.0025	0.0108	0.0025	0.0108	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.0013	0.0056	0.0013	0.0056	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.0013	0.0056	0.0013	0.0056	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.0002	lb/1000 bd-ft	0.0007	0.0032	0.0007	0.0032	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.0006	0.0027	0.0006	0.0027	
02	DKN5	Lumber Drying Kiln No. 5	-				0.0000	0.0000	0.0000	0.0000	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	2.60E-06	lb/MMBtu	0.0067	0.0291	0.0067	0.0291	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	40.00	MMBtu/hr	2.60E-06	lb/MMBtu	0.0076	0.0333	0.0076	0.0333	See Kiln 7 Detail
		Total					**0.021**	**0.090**	**0.021**	**0.090**	

Canfor Southern Pine - Camden Plant
Facility-Wide Future Potential Emissions

Total HAP Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled		Potential Controlled		Reference/Notes
							lb/hr	ton/yr	lb/hr	ton/yr	
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr			1.98	8.65	1.98	8.65	See Boiler HAP Calculations
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr			1.74	7.63	1.74	7.63	Sum of individual HAPs
02	DKN2	Lumber Drying Kiln No. 2	55,800				1.74	7.63	1.74	7.63	
02	DKN3	Lumber Drying Kiln No. 3	32,000				1.00	4.37	1.00	4.37	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.84	3.69	0.84	3.69	
02	DKN5	Lumber Drying Kiln No. 5	-				0.00	0.00	0.00	0.00	
02	DKN6	Direct-fired Kiln No. 6	80,000				3.57	15.64	3.57	15.64	
02	DKN7	Direct-fired Kiln No. 7	110,000				4.85	21.22	4.85	21.22	
		Wood Treatment	Removed from site				0.00	0.00	0.00	0.00	Removed from site
		Total					**15.71**	**68.83**	**15.71**	**68.83**	

Canfor Southern Pine - Camden Plant
Road Fugitive Emissions - Future Potential

Emission Calculations for Haul Roads New South Lumber - Camden											
	Log Truck Full (Inbound)	Log Truck Empty (Outbound)	Lumber Truck Empty	Lumber Truck Full	Bark/Sawdust Truck Empty	Bark/Sawdust Truck Full	Shavings Truck Empty	Shavings Truck Full	Chip Truck Empty	Chip Truck Full	TOTAL
Mean Vehicle Speed (mph)	5	5	5	5	5	5	5	5	5	5	
Mean Vehicle Weight (ton)	41	15	16	39	18	36	15	39	15	39	
Mean Number of Wheels	18	18	18	18	18	18	18	18	18	18	
Percent Transport by Railcar (%)	0	0	25	25	0	0	0	0	15	15	
Unpaved Road Silt Content (%)	4	4	4	4	4	4	4	4	4	4	
Paved Road Silt Loading (g/m^2)	3	3	3	3	3	3	3	3	3	3	
Distance on Unpaved Rd (miles)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Number of Trucks (Unpaved Rds)	0	0	0	0	0	0	0	0	0	0	
Distance on Paved Rd (miles)	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Number of Trucks (Paved Rds)	58,251	58,251	14,698	14,698	2,649	2,649	3,321	3,321	16,603	16,603	
Vehicle Miles Traveled - Unpaved Road	0	0	0	0	0	0	0	0	0	0	
Vehicle Miles Traveled - Paved Road	8,738	8,738	5,144	5,144	927	927	1,162	1,162	6,641	6,641	
Unpaved Road Emissions											
PM (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Paved Road Emissions											
TSP (lb/yr)	3511.35	1259.06	791.74	1964.56	160.90	326.30	167.47	443.82	956.95	2536.09	
PM-10 (lb/yr)	694.55	249.05	156.61	388.59	31.83	64.54	33.13	87.79	189.29	501.64	
PM-2.5 (lb/yr)	154.34	55.34	34.80	86.35	7.07	14.34	7.36	19.51	42.06	111.48	
TSP (lb/hr, annual average)	0.40	0.14	0.09	0.22	0.02	0.04	0.02	0.05	0.11	0.29	
PM-10 (lb/hr, annual average)	0.08	0.03	0.02	0.04	0.00	0.01	0.00	0.01	0.02	0.06	
PM-2.5 (lb/hr, annual average)	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	
Maximum Uncontrolled Emissions (lb/hr)											
TSP	0.40	0.14	0.09	0.22	0.02	0.04	0.02	0.05	0.11	0.29	**1.38**
PM10	0.08	0.03	0.02	0.04	0.00	0.01	0.00	0.01	0.02	0.06	**0.27**
PM-2.5	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	**0.06**
Maximum Uncontrolled Emissions (TPY)											
TSP	1.76	0.63	0.40	0.98	0.08	0.16	0.08	0.22	0.48	1.27	**6.06**
PM10	0.35	0.12	0.08	0.19	0.02	0.03	0.02	0.04	0.09	0.25	**1.20**
PM-2.5	0.08	0.03	0.02	0.04	0.00	0.01	0.00	0.01	0.02	0.06	**0.27**

Paved Road Emissions Estimates (based on AP-42, Section 13.2.1, Paved Roads, 1/11):

$$E_{ext} = k * (sL)^{0.91} * (W)^{1.02} * [1 - (p/(4*365))] * (S/15)$$

k = Particle size multiplier (lb/VMT). K= 0.0022 lb/VMT for PM-10. K = 0.011 lb/VMT for TSP. K = 0.00054 lb/VMT for PM-2.5
sL = road surface silt loading (g/m^2) = 3 g/m^2 (assumed)
W = mean vehicle weight (tons), from site data above
p = number of days with at least 0.01 inches of precipitation per year = 130 days
S = mean vehicle speed, if less than 15 mph.

Canfor Southern Pine - Camden Plant
Byproducts Handling Emissions - Future Potential

Emission Source	Percent Moisture	Max. Transfer Rates (TPY)	Calculated Emission Factors (lb/ton/transfer)			Emissions (TPY)		
			PM	PM10	PM2.5	PM	PM10	PM2.5
Chip Truck Loading	4.8	468,780	1.04E-03	4.94E-04	7.48E-05	0.245	0.116	0.018
Bark and Sawdust Truck Loading	4.8	47,681	1.04E-03	4.94E-04	7.48E-05	0.025	0.012	0.002
(includes all dry trim)								
Bark and Sawdust Transfer (assume 5 transfers)	4.8	216,360	1.04E-03	4.94E-04	7.48E-05	0.565	0.267	0.040
Shavings Transfer (assumes 4 transfers)	4.8	79,693	1.04E-03	4.94E-04	7.48E-05	0.167	0.079	0.012
Chips Transfer (assume 4 transfers)	4.8	468,780	1.04E-03	4.94E-04	7.48E-05	0.979	0.463	0.070
TOTAL						**1.981**	**0.937**	**0.142**

Formula to calculate emission factor for byproduct handling taken from AP-42, 2005.
$E=k*((0.0032)*(U/5)^1.3))/(M/2)^1.4$

E = emission factor (lb/ton)
k = particle size multiplier, 0.74 for PM, 0.35 for PM10 and 0.053 for PM2.5.
U = mean wind speed (mph) 6.84 Taken from TANKS Program 4.0 meteorological data for Columbia, S.C.
M = material moisture content (%) 4.8 Engineering estimate
EXEMPT based on total emissions < 5 TPY

Lumber and Byproducts Production	
Maximum Wood Throughput (TPY)	1,514,520
Bark and Sawdust	216,360
Chips	468,780
Total Shavings	79,693

Appendix B.4
Current Potential to Emit

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

PM Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	861,108	MMBtu/yr	0.577	lb/MMBtu	0.163	lb/MMBtu	56.72	248.43	16.02	70.18	Uncontrolled: AP-42, Table 1.6-1, Controlled: ESP Worst-case
02	DKN1	Lumber Drying Kiln No. 1	55,800		55,800						0.140	0.614	0.140	0.614	
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.140	0.614	0.140	0.614	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	32,000	1000 bd-ft/yr	0.022	lb/1000 bd-ft	0.022	lb/1000 bd-ft	0.080	0.352	0.080	0.352	NC DENR Kiln Spreadsheet
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.068	0.297	0.068	0.297	
02	DKN5	Lumber Drying Kiln No. 5	11,500		11,500						0.029	0.127	0.029	0.127	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.30	lb/1000 bd-ft	0.30	lb/1000 bd-ft	2.74	12.00	2.74	12.00	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0	1000 bd-ft/yr	0	1000 bd-ft/yr	0.30	lb/1000 bd-ft	0.30	lb/1000 bd-ft	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
03		Planer Mill	80,000	bd-ft/hr	262,100	10^3 bd-ft/yr	1.2	lb/ton shavings	0.012	lb/ton shavings	21.22	34.75	0.21	0.35	NCASI SR-08-01 worksheet
IA		Chippers	55	tons chips/hr	340,730	tons chips/yr	0.004	lb/ton chips	0.004	lb/ton chips	0.220	0.681	0.220	0.681	NCASI TB884 Table 8.2
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.004	lb/ton	0.004	lb/ton	0.016	0.068	0.016	0.068	NCASI TB884 Table 8.2
IA		Kiln 7 Feed Silo Cyclone	0.00	tons/hr	0	tons/yr	0.004	lb/ton	0.004	lb/ton	0.000	0.000	0.000	0.000	NCASI TB884 Table 8.2
IA		Sawmill	15.75	tons dust/hr	100,909	tons dust/yr	0.035	lb/ton dust	0.035	lb/ton dust	0.551	1.766	0.551	1.766	EIIP uncontrolled factor, log sawing (3-07-008-02)
04		Debarker	200	tons/hr	1,100,820	tons/yr	0.004	lb/ton logs	0.004	lb/ton logs	0.80	2.20	0.80	2.20	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								1.03	4.51	1.03	4.51	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.68	2.44	0.68	2.44	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.33	1.44	0.33	1.44	AP-42
		Total									**85.23**	**310.31**	**23.53**	**97.66**	

PM10 Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	861,108	MMBtu/yr	0.517	lb/MMBtu	0.125	lb/MMBtu	50.82	222.60	12.29	53.82	Size distribution from AP-42
02	DKN1	Lumber Drying Kiln No. 1	55,800		55,800						0.083	0.363	0.083	0.363	
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.083	0.363	0.083	0.363	58% of PM per EPA PM Calculator database
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	32,000	1000 bd-ft/yr	0.013	lb/1000 bd-ft	0.013	lb/1000 bd-ft	0.047	0.208	0.047	0.208	
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.040	0.176	0.040	0.176	
02	DKN5	Lumber Drying Kiln No. 5	11,500		11,500						0.017	0.075	0.017	0.075	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.18	lb/1000 bd-ft	0.18	lb/1000 bd-ft	1.64	7.20	1.64	7.20	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0	1000 bd-ft/yr	0	1000 bd-ft/yr	0.18	lb/1000 bd-ft	0.18	lb/1000 bd-ft	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
03		Planer Mill	80,000	bd-ft/hr	262,100	10^3 bd-ft/yr	0.32	lb/ton shavings	0.0032	lb/ton shavings	5.66	9.27	0.057	0.093	NCASI SR-08-01 worksheet
IA		Chippers	55	tons chips/hr	340,730	tons chips/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.055	0.170	0.055	0.170	Assumed 25% of TSP
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.004	0.017	0.004	0.017	
IA		Kiln 7 Feed Silo Cyclone	0.00	tons/hr	0	tons/yr	0.001	lb/ton chips	0.001	lb/ton chips	0.000	0.000	0.000	0.000	
IA		Sawmill	15.75	tons dust/hr	100,909	tons dust/yr	0.0035	lb/ton dust	0.0035	lb/ton dust	0.055	0.177	0.055	0.177	
04		Debarker	200	tons/hr	1,100,820	tons/yr	0.002	lb/ton logs	0.002	lb/ton logs	0.40	1.10	0.40	1.10	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								0.20	0.89	0.20	0.89	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.07	0.26	0.07	0.26	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.16	0.68	0.16	0.68	AP-42
		Total									**59.81**	**243.56**	**15.67**	**65.61**	

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

PM2.5 Emissions

Unit ID	Equipment ID	Description	Short Term Maximum	Units	Annual Maximum	Units	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	661,108	MMBtu/yr	0.447	lb/MMBtu	0.112	lb/MMBtu	43.94	192.46	11.01	48.22	Size distribution from AP-42
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	55,800	1000 bd-ft/yr	0.004	lb/1000 bd-ft	0.004	lb/1000 bd-ft	0.025	0.112	0.025	0.112	19% of PM per EPA PM Calculator database
02	DKN2	Lumber Drying Kiln No. 2	55,800		55,800						0.025	0.112	0.025	0.112	
02	DKN3	Lumber Drying Kiln No. 3	32,000		32,000						0.015	0.064	0.015	0.064	
02	DKN4	Lumber Drying Kiln No. 4	27,000		27,000						0.012	0.054	0.012	0.054	
02	DKN5	Lumber Drying Kiln No. 5	11,500		11,500						0.005	0.023	0.005	0.023	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	80,000	1000 bd-ft/yr	0.15	lb/1000 bd-ft	0.15	lb/1000 bd-ft	1.37	6.00	1.37	6.00	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0	1000 bd-ft/yr	0	1000 bd-ft/yr	0.15	lb/1000 bd-ft	0.15	lb/1000 bd-ft	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
03		Planer Mill	80,000	bd-ft/hr	262,100	10^3 bd-ft/yr	0.064	lb/ton shavings	0.00064	lb/ton shavings	1.25	2.05	0.013	0.02	NCASI SR-08-01 worksheet
IA		Chippers	55	tons chips/hr	340,730	tons chips/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.022	0.068	0.022	0.068	Assumed 10% of TSP
IA		Kiln 6 Feed Silo Cyclone	3.89	tons/hr	34,067	tons/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.002	0.007	0.002	0.007	
IA		Kiln 7 Feed Silo Cyclone	0.00	tons/hr	0	tons/yr	0.0004	lb/ton chips	0.0004	lb/ton chips	0.000	0.000	0.000	0.000	
IA		Sawmill	15.75	tons dust/hr	100,909	tons dust/yr	0.00175	lb/ton dust	0.00175	lb/ton dust	0.028	0.088	0.028	0.088	
04		Debarker	200	tons/hr	1,100,820	tons/yr	0.001	lb/ton logs	0.001	lb/ton logs	0.20	0.55	0.20	0.55	Engineering Judgement
05		Road Fugitives	See attached detailed calculations								0.05	0.20	0.05	0.20	AP-42 13.2.1 (11/06)
IA		Emergency Fire Pump	Calculations submitted with Title V renewal								0.47	0.024	0.47	0.024	NC DENR IC Engine Spreadsheet
IA		Holtec Saw	Calculations submitted with Title V renewal								0.03	0.10	0.03	0.10	Engineering Estimate
IA		Byproducts Handling	See attached detailed calculations								0.02	0.10	0.02	0.10	AP-42
		Total									**47.47**	**202.01**	**13.29**	**55.74**	

NOx Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.22	lb/MMBtu	21.63	94.72	21.63	94.72	AP-42 Table 1.6-2 (09/03)
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	0.28	lb/1000 bd-ft	2.56	11.20	2.56	11.20	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	0.03	lb/hp-hr	6.67	0.33	6.67	0.33	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	0	1000 bd-ft/yr	0.28	lb/1000 bd-ft	0.00	0.00	0.000	0.00	Kiln 7 does not yet exist
		Total					**30.85**	**106.26**	**30.85**	**106.26**	

CO Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	2.742	lb/MMBtu	269.54	1,180.58	269.54	1,180.58	MACT Limit
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	0.73	lb/1000 bd-ft	6.67	29.20	6.67	29.20	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	0.00668	lb/hp-hr	1.44	0.07	1.44	0.07	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	0	1000 bd-ft/yr	0.73	lb/1000 bd-ft	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
		Total					**277.64**	**1,209.85**	**277.64**	**1,209.85**	

SO2 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.025	lb/MMBtu	2.46	10.76	2.46	10.76	AP-42 Table 1.6-2 (09/03)
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.025	lb/MMBtu	0.88	3.83	0.88	3.83	See Kiln 6 Detail
IA		Emergency Fire Pump	215	hp	4.05E-05	lb/hp-hr	0.0087	0.0004	0.0087	0.0004	NC DENR Spreadsheet
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	0.025	lb/MMBtu	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
		Total					**3.34**	**14.60**	**3.34**	**14.60**	

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

VOC Emissions

Unit ID	Equipment ID	Description	Potential Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0174	lb/MMBtu	1.71	7.49	1.71	7.49	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				26.75	117.18	26.75	117.18	
02	DKN2	Lumber Drying Kiln No. 2	55,800				26.75	117.18	26.75	117.18	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	4.2	lb/1000 bd-ft	15.34	67.20	15.34	67.20	NCASI TB845, adjusted to as pinene basis
02	DKN4	Lumber Drying Kiln No. 4	27,000				12.95	56.70	12.95	56.70	
02	DKN5	Lumber Drying Kiln No. 5	11,500				5.51	24.15	5.51	24.15	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	5.82	lb/1000 bd-ft	53.15	232.80	53.15	232.80	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	5.82	lb/1000 bd-ft	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
IA		Emergency Fire Pump	215	hp	2.51E-03	lb/hp-hr	0.5397	0.0270	0.5397	0.0270	NC DENR Spreadsheet
		Wood Treatment	See attached calculation				0.03	0.11	0.03	0.11	See attached calculation
		Total					**142.74**	**622.84**	**142.74**	**622.84**	

Lead Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	3.36E-05	lb/MMBtu	3.30E-03	1.45E-02	3.30E-03	1.45E-02	2005 Stack Test
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	1.77E-05	lb/MMBtu	6.20E-04	2.71E-03	6.20E-04	2.71E-03	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	1.77E-05	lb/MMBtu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Kiln 7 does not yet exist
		Total					**3.92E-03**	**1.72E-02**	**3.92E-03**	**1.72E-02**	

CO2 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	93.8	kg/MMBtu	20,327.79	89,035.71	20,327.79	89,035.71	40CFR98 Table C-1
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	93.8	kg/MMBtu	7,237.77	31,701.42	7,237.77	31,701.42	40CFR98 Table C-1
IA		Emergency Fire Pump	215	hp	See Title V		245.40	12.27	245.40	12.27	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	93.8	kg/MMBtu	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
		Total					**27,810.95**	**120,749.40**	**27,810.95**	**120,749.40**	

N2O Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0036	kg/MMBtu	0.78	3.42	0.78	3.42	40CFR98 Table C-2
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.0036	kg/MMBtu	0.28	1.22	0.28	1.22	40CFR98 Table C-2
IA		Emergency Fire Pump	215	hp	See Title V		0.0020	0.0001	0.0020	0.0001	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	0.0036	kg/MMBtu	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
		Total					**1.06**	**4.63**	**1.06**	**4.63**	

CH4 Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	0.0072	kg/MMBtu	1.56	6.83	1.56	6.83	40CFR98 Table C-2
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	0.0072	kg/MMBtu	0.56	2.43	0.56	2.43	40CFR98 Table C-2
IA		Emergency Fire Pump	215	hp	See Title V		0.0100	0.0005	0.0100	0.0005	See Title V Renewal
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	0.0072	kg/MMBtu	0.00	0.00	0.00	0.00	Kiln 7 does not yet exist
		Total					**2.13**	**9.27**	**2.13**	**9.27**	

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

Acrolein Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	4.00E-03	lb/MMBtu	0.393	1.722	0.393	1.722	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.038	0.167	0.038	0.167	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.038	0.167	0.038	0.167	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.006	lb/1000 bd-ft	0.022	0.096	0.022	0.096	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.018	0.081	0.018	0.081	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.008	0.035	0.008	0.035	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	1.90E-04	lb/MMBtu	0.007	0.029	0.007	0.029	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	1.90E-04	lb/MMBtu	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Total					**0.52**	**2.30**	**0.52**	**2.30**	

Acetaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	8.30E-04	lb/MMBtu	0.082	0.357	0.082	0.357	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.248	1.088	0.248	1.088	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.248	1.088	0.248	1.088	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.039	lb/1000 bd-ft	0.142	0.624	0.142	0.624	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.120	0.527	0.120	0.527	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.051	0.224	0.051	0.224	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	5.80E-02	lb/1000 bd-ft	0.530	2.320	0.530	2.320	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	5.80E-02	lb/1000 bd-ft	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Total					**1.42**	**6.23**	**1.42**	**6.23**	

Formaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	4.40E-03	lb/MMBtu	0.433	1.894	0.433	1.894	AP-42, Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800				0.102	0.446	0.102	0.446	
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.102	0.446	0.102	0.446	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.016	lb/1000 bd-ft	0.058	0.256	0.058	0.256	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.049	0.216	0.049	0.216	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.021	0.092	0.021	0.092	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	6.40E-02	lb/1000 bd-ft	0.584	2.560	0.584	2.560	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	6.40E-02	lb/1000 bd-ft	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Total					**1.35**	**5.91**	**1.35**	**5.91**	

Methanol Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
02	DKN1	Lumber Drying Kiln No. 1	55,800				1.338	5.859	1.338	5.859	
02	DKN2	Lumber Drying Kiln No. 2	55,800				1.338	5.859	1.338	5.859	
02	DKN3	Lumber Drying Kiln No. 3	32,000	1000 bd-ft/yr	0.21	lb/1000 bd-ft	0.767	3.360	0.767	3.360	NCASI TB845
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.647	2.835	0.647	2.835	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.276	1.208	0.276	1.208	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	2.16E-01	lb/1000 bd-ft	1.973	8.640	1.973	8.640	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	2.16E-01	lb/1000 bd-ft	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Wood Treatment	Removed from site				0.012	0.053	0.012	0.053	Permanently Shutdown
		Total					**6.35**	**27.81**	**6.35**	**27.81**	

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

Methyl Isobutyl Ketone Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	0.001	lb/1000 bd-ft	0.006	0.028	0.006	0.028	NCASI TB845
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.006	0.028	0.006	0.028	
02	DKN3	Lumber Drying Kiln No. 3	32,000				0.004	0.016	0.004	0.016	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.003	0.014	0.003	0.014	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.001	0.006	0.001	0.006	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	1.00E-03	lb/1000 bd-ft	0.009	0.040	0.009	0.040	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	1.00E-03	lb/1000 bd-ft	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Total					**0.030**	**0.131**	**0.030**	**0.131**	

Propionaldehyde Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	6.10E-05	lb/MMBtu	0.006	0.026	0.006	0.026	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	0.001	lb/1000 bd-ft	0.006	0.028	0.006	0.028	NCASI TB845
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.006	0.028	0.006	0.028	
02	DKN3	Lumber Drying Kiln No. 3	32,000				0.004	0.016	0.004	0.016	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.003	0.014	0.003	0.014	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.001	0.006	0.001	0.006	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	5.90E-04	lb/MMBtu	0.021	0.090	0.021	0.090	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	5.90E-04	lb/MMBtu	0.000	0.000	0.000	0.000	Kiln 7 does not yet exist
		Total					**0.047**	**0.208**	**0.047**	**0.208**	

Toluene Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	9.20E-04	lb/MMBtu	0.0904	0.3961	0.0904	0.3961	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	0.0001	lb/1000 bd-ft	0.0006	0.0028	0.0006	0.0028	NCASI TB845
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.0006	0.0028	0.0006	0.0028	
02	DKN3	Lumber Drying Kiln No. 3	32,000				0.0004	0.0016	0.0004	0.0016	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.0003	0.0014	0.0003	0.0014	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.0001	0.0006	0.0001	0.0006	
02	DKN6	Direct-fired Kiln No. 6	80,000	1000 bd-ft/yr	1.00E-04	lb/1000 bd-ft	0.0009	0.0040	0.0009	0.0040	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	-	1000 bd-ft/yr	1.00E-04	lb/1000 bd-ft	0.0000	0.0000	0.0000	0.0000	Kiln 7 does not yet exist
		Total					**0.093**	**0.409**	**0.093**	**0.409**	

Xylene Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled lb/hr	Potential Uncontrolled ton/yr	Potential Controlled lb/hr	Potential Controlled ton/yr	Reference/Notes
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr	2.50E-05	lb/MMBtu	0.0025	0.0108	0.0025	0.0108	AP-42 Table 1.6-3
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr	0.0002	lb/1000 bd-ft	0.0013	0.0056	0.0013	0.0056	NCASI TB845
02	DKN2	Lumber Drying Kiln No. 2	55,800				0.0013	0.0056	0.0013	0.0056	
02	DKN3	Lumber Drying Kiln No. 3	32,000				0.0007	0.0032	0.0007	0.0032	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.0006	0.0027	0.0006	0.0027	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.0003	0.0012	0.0003	0.0012	
02	DKN6	Direct-fired Kiln No. 6	35.00	MMBtu/hr	2.60E-06	lb/MMBtu	0.0067	0.0291	0.0067	0.0291	See Kiln 6 Detail
02	DKN7	Direct-fired Kiln No. 7	0.00	MMBtu/hr	2.60E-06	lb/MMBtu	0.0000	0.0000	0.0000	0.0000	Kiln 7 does not yet exist
		Total					**0.013**	**0.058**	**0.013**	**0.058**	

Canfor Southern Pine - Camden Plant
Facility-Wide Current Potential Emissions

Total HAP Emissions

Unit ID	Equipment ID	Description	Maximum Capacity	Units	Emission Factor	Units	Potential Uncontrolled		Potential Controlled		Reference/Notes
							lb/hr	ton/yr	lb/hr	ton/yr	
01	WWB1	Wood Waste Boiler	98.30	MMBtu/hr			1.98	8.65	1.98	8.65	See Boiler HAP Calculations
02	DKN1	Lumber Drying Kiln No. 1	55,800	1000 bd-ft/yr			1.74	7.63	1.74	7.63	Sum of individual HAPs
02	DKN2	Lumber Drying Kiln No. 2	55,800				1.74	7.63	1.74	7.63	
02	DKN3	Lumber Drying Kiln No. 3	32,000				1.00	4.37	1.00	4.37	
02	DKN4	Lumber Drying Kiln No. 4	27,000				0.84	3.69	0.84	3.69	
02	DKN5	Lumber Drying Kiln No. 5	11,500				0.36	1.57	0.36	1.57	
02	DKN6	Direct-fired Kiln No. 6	80,000				3.57	15.64	3.57	15.64	
02	DKN7	Direct-fired Kiln No. 7	-				0.00	0.00	0.00	0.00	
		Wood Treatment	See attached				0.01	0.06	0.01	0.06	See attached calculations.
		Total					**11.24**	**49.24**	**11.24**	**49.24**	

Canfor Southern Pine - Camden Plant
Road Fugitive Emissions - Current Potential

Emission Calculations for Haul Roads New South Lumber - Camden											
	Log Truck Full (Inbound)	Log Truck Empty (Outbound)	Lumber Truck Empty	Lumber Truck Full	Bark/Sawdust Truck Empty	Bark/Sawdust Truck Full	Shavings Truck Empty	Shavings Truck Full	Chip Truck Empty	Chip Truck Full	TOTAL
Mean Vehicle Speed (mph)	5	5	5	5	5	5	5	5	5	5	
Mean Vehicle Weight (ton)	41	15	16	39	18	36	15	39	15	39	
Mean Number of Wheels	18	18	18	18	18	18	18	18	18	18	
Percent Transport by Railcar (%)	0	0	20	20	0	0	0	0	10	10	
Unpaved Road Silt Content (%)	4	4	4	4	4	4	4	4	4	4	
Paved Road Silt Loading (g/m^2)	3	3	3	3	3	3	3	3	3	3	
Distance on Unpaved Rd (miles)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Number of Trucks (Unpaved Rds)	0	0	0	0	0	0	0	0	0	0	
Distance on Paved Rd (miles)	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Number of Trucks (Paved Rds)	42,339	42,339	11,396	11,396	1,529	1,529	2,414	2,414	12,777	12,777	
Vehicle Miles Traveled - Unpaved Road	0	0	0	0	0	0	0	0	0	0	
Vehicle Miles Traveled - Paved Road	6,351	6,351	3,988	3,988	535	535	845	845	5,111	5,111	
Unpaved Road Emissions											
PM (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Paved Road Emissions											
TSP (lb/yr)	2552.20	915.14	613.83	1523.12	92.85	188.29	121.72	322.58	736.47	1951.77	
PM-10 (lb/yr)	504.83	181.02	121.42	301.28	18.37	37.24	24.08	63.81	145.68	386.06	
PM-2.5 (lb/yr)	112.18	40.23	26.98	66.95	4.08	8.28	5.35	14.18	32.37	85.79	
TSP (lb/hr, annual average)	0.29	0.10	0.07	0.17	0.01	0.02	0.01	0.04	0.08	0.22	
PM-10 (lb/hr, annual average)	0.06	0.02	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.04	
PM-2.5 (lb/hr, annual average)	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	
Maximum Uncontrolled Emissions (lb/hr)											
TSP	0.29	0.10	0.07	0.17	0.01	0.02	0.01	0.04	0.08	0.22	**1.03**
PM10	0.06	0.02	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.04	**0.20**
PM-2.5	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	**0.05**
Maximum Uncontrolled Emissions (TPY)											
TSP	1.28	0.46	0.31	0.76	0.05	0.09	0.06	0.16	0.37	0.98	**4.51**
PM10	0.25	0.09	0.06	0.15	0.01	0.02	0.01	0.03	0.07	0.19	**0.89**
PM-2.5	0.06	0.02	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.04	**0.20**

Paved Road Emissions Estimates (based on AP-42, Section 13.2.1, Paved Roads, 1/11):

$$E_{ext} = k * (sL)^{0.91} * (W)^{1.02} * [1 - (p/(4*365))] *(S/15)$$

k = Particle size multiplier (lb/VMT). K= 0.0022 lb/VMT for PM-10. K = 0.011 lb/VMT for TSP. K = 0.00054 lb/VMT for PM-2.5
sL = road surface silt loading (g/m^2) = 3 g/m^2 (assumed)
W = mean vehicle weight (tons), from site data above
p = number of days with at least 0.01 inches of precipitation per year = 130 days
S = mean vehicle speed, if less than 15 mph.

Canfor Southern Pine - Camden Plant
Byproducts Handling Emissions - Current Potential

Emission Source	Percent Moisture	Max. Transfer Rates (TPY)	Calculated Emission Factors (lb/ton/transfer)			Emissions (TPY)		
			PM	PM10	PM2.5	PM	PM10	PM2.5
Chip Truck Loading	4.8	340,730	1.04E-03	4.94E-04	7.48E-05	0.178	0.084	0.013
Bark and Sawdust Truck Loading	4.8	27,515	1.04E-03	4.94E-04	7.48E-05	0.014	0.007	0.001
(includes all dry trim)								
Bark and Sawdust Transfer (assume 5 transfers)	4.8	157,260	1.04E-03	4.94E-04	7.48E-05	0.411	0.194	0.029
Shavings Transfer (assumes 4 transfers)	4.8	57,924	1.04E-03	4.94E-04	7.48E-05	0.121	0.057	0.009
Chips Transfer (assume 4 transfers)	4.8	340,730	1.04E-03	4.94E-04	7.48E-05	0.712	0.337	0.051
TOTAL						**1.436**	**0.679**	**0.103**

Formula to calculate emission factor for byproduct handling taken from AP-42, 2005.
E=k*((0.0032)*(U/5)^1.3))/(M/2)^1.4

E = emission factor (lb/ton)
k = particle size multiplier, 0.74 for PM and 0.35 for PM10
U = mean wind speed (mph) 6.84 Taken from TANKS Program 4.0 meteorological data for Columbia, S.C.
M = material moisture content (%) 4.8 Engineering estimate
EXEMPT based on total emissions < 5 TPY

Lumber and Byproducts Production	
Maximum Wood Throughput (TPY)	1,100,820
Bark and Sawdust	157,260
Chips	340,730
Total Shavings	57,924

Appendix B.5

Baseline Actual Emissions and Project Impacts

Canfor Southern Pine - Camden Plant
Baseline Actual Emissions for Modified Sources (May 2015 - April 2017)

PM Emissions

					Controlled			
Unit ID	Equipment ID	Description	Annual Maximum	Units	Emission Factor	Units	Controlled ton/yr	Reference/Notes
03		Planer Mill	176,815	10^3 bd-ft/yr	0.012	lb/ton shavings	0.23	NCASI SR-08-01 worksheet
		Chippers	237,964	tons chips/yr	0.004	lb/ton chips	0.48	NCASI TB884 Table 8.2
		Sawmill	67,101	tons dust/yr	0.035	lb/ton dust	1.17	
04		Debarker	796,711	tons/yr	0.004	lb/ton logs	1.59	Engineering Judgement
	Total						**3.48**	

PM10 Emissions

					Controlled			
Unit ID	Equipment ID	Description	Annual Maximum	Units	Emission Factor	Units	Controlled ton/yr	Reference/Notes
03		Planer Mill	176,815	10^3 bd-ft/yr	0.0032	lb/ton shavings	0.06	NCASI SR-08-01 worksheet
		Chippers	237,964	tons chips/yr	0.001	lb/ton chips	0.12	Assumed 25% of TSP
		Sawmill	67,101	tons dust/yr	0.0035	lb/ton dust	0.12	
04		Debarker	796,711	tons/yr	0.002	lb/ton logs	0.80	Engineering Judgement
	Total						**1.10**	

PM2.5 Emissions

					Controlled			
Unit ID	Equipment ID	Description	Annual Maximum	Units	Emission Factor	Units	Controlled ton/yr	Reference/Notes
03		Planer Mill	176,815	10^3 bd-ft/yr	0.00064	lb/ton shavings	0.01	NCASI SR-08-01 worksheet
		Chippers	237,964	tons chips/yr	0.0004	lb/ton chips	0.05	Assumed 10% of TSP
		Sawmill	67,101	tons dust/yr	0.00175	lb/ton dust	0.06	
04		Debarker	796,711	tons/yr	0.001	lb/ton logs	0.40	Engineering Judgement
	Total						**0.52**	

Canfor Southern Pine - Camden Plant
Road Fugitive Emissions - Project Impacts

Emission Calculations for Haul Roads											
	Log Truck Full (Inbound)	Log Truck Empty (Outbound)	Lumber Truck Empty	Lumber Truck Full	Bark/Sawdust Truck Empty	Bark/Sawdust Truck Full	Shavings Truck Empty	Shavings Truck Full	Chip Truck Empty	Chip Truck Full	TOTAL
Mean Vehicle Speed (mph)	5	5	5	5	5	5	5	5	5	5	
Mean Vehicle Weight (ton)	41	15	16	39	18	36	15	39	15	39	
Mean Number of Wheels	18	18	18	18	18	18	18	18	18	18	
Percent Transport by Railcar (%)	0	0	25	25	0	0	0	0	15	15	
Unpaved Road Silt Content (%)	4	4	4	4	4	4	4	4	4	4	
Paved Road Silt Loading (g/m^2)	3	3	3	3	3	3	3	3	3	3	
Distance on Unpaved Rd (miles)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Number of Trucks (Unpaved Rds)	0	0	0	0	0	0	0	0	0	0	
Distance on Paved Rd (miles)	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Number of Trucks (Paved Rds)	17,769	17,769	4,484	4,484	1,120	1,120	1,013	1,013	5,065	5,065	
Vehicle Miles Traveled - Unpaved Road	0	0	0	0	0	0	0	0	0	0	
Vehicle Miles Traveled - Paved Road	2,665	2,665	1,569	1,569	392	392	355	355	2,026	2,026	
Unpaved Road Emissions											
PM (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-10 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PM-2.5 (lb/hr, annual average)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Paved Road Emissions											
TSP (lb/yr)	1071.13	384.07	241.52	599.28	68.05	138.00	51.09	135.38	291.92	773.63	
PM-10 (lb/yr)	211.87	75.97	47.77	118.54	13.46	27.30	10.10	26.78	57.74	153.02	
PM-2.5 (lb/yr)	47.08	16.88	10.62	26.34	2.99	6.07	2.25	5.95	12.83	34.01	
TSP (lb/hr, annual average)	0.12	0.04	0.03	0.07	0.01	0.02	0.01	0.02	0.03	0.09	
PM-10 (lb/hr, annual average)	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.02	
PM-2.5 (lb/hr, annual average)	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Maximum Uncontrolled Emissions (lb/hr)											
TSP	0.12	0.04	0.03	0.07	0.01	0.02	0.01	0.02	0.03	0.09	**0.43**
PM10	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.02	**0.08**
PM-2.5	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**
Maximum Uncontrolled Emissions (TPY)											
TSP	0.54	0.19	0.12	0.30	0.03	0.07	0.03	0.07	0.15	0.39	**1.88**
PM10	0.11	0.04	0.02	0.06	0.01	0.01	0.01	0.01	0.03	0.08	**0.37**
PM-2.5	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.02	**0.08**

Paved Road Emissions Estimates (based on AP-42, Section 13.2.1, Paved Roads, 1/11):

$$E_{ext} = k * (sL)^{0.91} * (W)^{1.02} * [1 - (p/(4*365))] * (S/15)$$

k = Particle size multiplier (lb/VMT). K= 0.0022 lb/VMT for PM-10. K = 0.011 lb/VMT for TSP. K = 0.00054 lb/VMT for PM-2.5
sL = road surface silt loading (g/m^2) = 3 g/m^2 (assumed)
W = mean vehicle weight (tons), from site data above
p = number of days with at least 0.01 inches of precipitation per year = 130 days
S = mean vehicle speed, if less than 15 mph.

Canfor Southern Pine - Camden Plant
Byproducts Handling Emissions - Project Impacts

Emission Source	Percent Moisture	Max. Transfer Rates (TPY)	Calculated Emission Factors (lb/ton/transfer)			Emissions (TPY)		
			PM	PM10	PM2.5	PM	PM10	PM2.5
Chip Truck Loading	4.8	143,000	1.04E-03	4.94E-04	7.48E-05	0.075	0.035	0.005
Bark and Sawdust Truck Loading	4.8	20,166	1.04E-03	4.94E-04	7.48E-05	0.011	0.005	0.001
(includes all dry trim)								
Bark and Sawdust Transfer (assume 5 transfers)	4.8	66,000	1.04E-03	4.94E-04	7.48E-05	0.172	0.082	0.012
Shavings Transfer (assumes 4 transfers)	4.8	24,310	1.04E-03	4.94E-04	7.48E-05	0.051	0.024	0.004
Chips Transfer (assume 4 transfers)	4.8	143,000	1.04E-03	4.94E-04	7.48E-05	0.299	0.141	0.021
TOTAL						**0.607**	**0.287**	**0.043**

Formula to calculate emission factor for byproduct handling taken from AP-42, 2005.
E=k*((0.0032)*(U/5)^1.3))/(M/2)^1.4

E = emission factor (lb/ton)
k = particle size multiplier, 0.74 for PM, 0.35 for PM10 and 0.053 for PM2.5.
U = mean wind speed (mph) 6.84 Taken from TANKS Program 4.0 meteorological data for Columbia, S.C.
M = material moisture content (%) 4.8 Engineering estimate
EXEMPT based on total emissions < 5 TPY

Lumber and Byproducts Production	
Maximum Wood Throughput (TPY)	462,000
Bark and Sawdust	66,000
Chips	143,000
Total Shavings	24,310

Appendix B.6

Emissions Details for Kilns, Boiler and Insignificant Activities

Canfor Southern Pine - Camden Plant
Existing Direct-fired Continuous Kiln (Kiln 6)

Drying Capacity:	**80,000**	**MBF/yr**	
Burner Capacity:	**35**	**MMBtu/hr**	
	3.89	**tons fuel/hr**	Assumes Fuel HHV of 4500 Btu/lb

Direct-fired Kiln Potential Emissions:

Pollutant	Factor	Units	lb/hr	TPY	Reference
NO_x	0.28	lb/MBF	2.557	11.20	3
VOC	5.82	lb/MBF	53.151	232.80	4
CO	0.73	lb/MBF	6.667	29.20	5
PM	0.30	lb/MBF	2.740	12.00	6
PM_{10}	0.18	lb/MBF	1.644	7.20	6,7
PM2.5	0.15	lb/MBF	1.370	6.00	6,8
SO_2	0.025	lb/MMBtu	0.875	3.83	9
CO_2 (biogenic)	93.80	kg/MMBtu	7,237.767	31,701.42	10
CH_4	0.0072	kg/MMBtu	0.556	2.43	10
N_2O	0.0036	kg/MMBtu	0.278	1.22	10
HAPs/TAPs					
Acetaldehyde	5.80E-02	lb/MBF	5.30E-01	2.32E+00	11
Acetophenone	2.60E-07	lb/MMBtu	9.10E-06	3.99E-05	12
Acrolein	1.90E-04	lb/MMBtu	6.65E-03	2.91E-02	13
Antimony	7.90E-06	lb/MMBtu	2.77E-04	1.21E-03	9
Arsenic	3.70E-06	lb/MMBtu	1.30E-04	5.67E-04	14
Benzene	2.70E-04	lb/MMBtu	9.45E-03	4.14E-02	14
Beryllium	8.20E-07	lb/MMBtu	2.87E-05	1.26E-04	12
Di(2-ethylhexyl)phthalate	4.70E-08	lb/MMBtu	1.65E-06	7.21E-06	12
Cadmium	4.70E-07	lb/MMBtu	1.65E-05	7.21E-05	12
Carbon disulfide	1.30E-04	lb/MMBtu	4.55E-03	1.99E-02	14
Carbon tetrachloride	8.90E-07	lb/MMBtu	3.12E-05	1.36E-04	14
Chlorine	7.90E-04	lb/MMBtu	2.77E-02	1.21E-01	9
Chlorobenzene	5.50E-10	lb/MMBtu	1.93E-08	8.43E-08	12
Chloroform	3.70E-05	lb/MMBtu	1.30E-03	5.67E-03	14
Chromium	6.60E-06	lb/MMBtu	2.31E-04	1.01E-03	14
Chromium VI	7.30E-06	lb/MMBtu	2.56E-04	1.12E-03	12,16
Cobalt	4.20E-04	lb/MMBtu	1.47E-02	6.44E-02	12
Cumene	1.80E-05	lb/MMBtu	6.30E-04	2.76E-03	14
Dibutylphthalate	3.30E-05	lb/MMBtu	1.16E-03	5.06E-03	12
2,4-Dinitrophenol	2.60E-07	lb/MMBtu	9.10E-06	3.99E-05	12
2,4-Denitrotoluene	9.40E-07	lb/MMBtu	3.29E-05	1.44E-04	12
Dioxin (as 2,3,7,8-TCDD)	8.60E-12	lb/MMBtu	3.01E-10	1.32E-09	9
Ethyl benzene	6.80E-06	lb/MMBtu	2.38E-04	1.04E-03	12
Ethylene dichloride	2.90E-05	lb/MMBtu	1.02E-03	4.45E-03	12
Formaldehyde	6.40E-02	lb/MBF	5.84E-01	2.56E+00	17
Hexachlorobenzene	1.00E-06	lb/MMBtu	3.50E-05	1.53E-04	12
Hexane	2.90E-04	lb/MMBtu	1.02E-02	4.45E-02	14
Hydrochloric acid	2.30E-03	lb/MMBtu	8.05E-02	3.53E-01	13
Lead	1.77E-05	lb/MMBtu	6.20E-04	2.71E-03	13
Manganese	1.81E-03	lb/MMBtu	6.34E-02	2.77E-01	13
Mercury	5.00E-07	lb/MMBtu	1.75E-05	7.67E-05	13
Methanol	2.16E-01	lb/MBF	1.97E+00	8.64E+00	17
Methyl bromide	1.50E-05	lb/MMBtu	5.25E-04	2.30E-03	12
Methyl chloride	2.30E-05	lb/MMBtu	8.05E-04	3.53E-03	14
Methyl chloroform	4.20E-05	lb/MMBtu	1.47E-03	6.44E-03	14
Methyl isobutyl ketone	1.00E-03	lb/MBF	9.13E-03	4.00E-02	15
Methylene chloride	3.50E-04	lb/MMBtu	1.23E-02	5.37E-02	14
Naphthalene	2.80E-05	lb/MMBtu	9.80E-04	4.29E-03	13
Nickel	4.80E-06	lb/MMBtu	1.68E-04	7.36E-04	14
4-Nitrophenol	1.20E-07	lb/MMBtu	4.20E-06	1.84E-05	12
Pentachlorophenol	4.80E-08	lb/MMBtu	1.68E-06	7.36E-06	12
Phenol	2.20E-02	lb/MBF	2.01E-01	8.80E-01	11
Phosphorus	9.90E-05	lb/MMBtu	3.47E-03	1.52E-02	11
POM	2.88E-05	lb/MMBtu	1.01E-03	4.42E-03	9,12
Proprionaldehyde	5.90E-04	lb/MMBtu	2.07E-02	9.04E-02	13
Propylene dichloride	3.30E-05	lb/MMBtu	1.16E-03	5.06E-03	12
Selenium	6.20E-06	lb/MMBtu	2.17E-04	9.50E-04	12
Styrene	3.20E-05	lb/MMBtu	1.12E-03	4.91E-03	14
Tetrachloroethylene	3.82E-05	lb/MMBtu	1.34E-03	5.86E-03	1
Toluene	1.00E-04	lb/MBF	9.13E-04	4.00E-03	15
1,2,4-Trichlorobenzene	5.50E-05	lb/MMBtu	1.93E-03	8.43E-03	12
Trichloroethylene	3.90E-05	lb/MMBtu	1.37E-03	5.98E-03	14
2,4,6-Trichlorophenol	2.40E-08	lb/MMBtu	8.40E-07	3.68E-06	12
Vinyl Chloride	1.80E-05	lb/MMBtu	6.30E-04	2.76E-03	12
Xylenes	2.60E-06	lb/MMBtu	9.10E-05	3.99E-04	12
Total HAPs			**3.57E+00**	**1.56E+01**	**Sum of HAPs**

Canfor Southern Pine - Camden Plant
Proposed Direct-fired Continuous Kiln (Kiln 7)

Drying Capacity:	**110,000**	**MBF/yr**	
Burner Capacity:	**40**	**MMBtu/hr**	
	4.44	**tons fuel/hr**	Assumes Fuel HHV of 4500 Btu/lb

Direct-fired Kiln Potential Emissions:

Pollutant	Factor	Units	lb/hr	TPY	Reference
NO_X	0.28	lb/MBF	3.516	15.40	3
VOC	5.82	lb/MBF	73.082	320.10	4
CO	0.73	lb/MBF	9.167	40.15	5
PM	0.30	lb/MBF	3.767	16.50	6
PM_{10}	0.18	lb/MBF	2.260	9.90	6,7
PM2.5	0.15	lb/MBF	1.884	8.25	6,8
SO_2	0.025	lb/MMBtu	1.000	4.38	9
CO_2 (biogenic)	93.80	kg/MMBtu	8,271.734	36,230.20	10
CH_4	0.0072	kg/MMBtu	0.635	2.78	10
N_20	0.0036	kg/MMBtu	0.317	1.39	10
HAPs/TAPs					
Acetaldehyde	5.80E-02	lb/MBF	7.28E-01	3.19E+00	11
Acetophenone	2.60E-07	lb/MMBtu	1.04E-05	4.56E-05	12
Acrolein	1.90E-04	lb/MMBtu	7.60E-03	3.33E-02	13
Antimony	7.90E-06	lb/MMBtu	3.16E-04	1.38E-03	9
Arsenic	3.70E-06	lb/MMBtu	1.48E-04	6.48E-04	14
Benzene	2.70E-04	lb/MMBtu	1.08E-02	4.73E-02	14
Beryllium	8.20E-07	lb/MMBtu	3.28E-05	1.44E-04	12
Di(2-ethylhexyl)phthalate	4.70E-08	lb/MMBtu	1.88E-06	8.23E-06	12
Cadmium	4.70E-07	lb/MMBtu	1.88E-05	8.23E-05	12
Carbon disulfide	1.30E-04	lb/MMBtu	5.20E-03	2.28E-02	14
Carbon tetrachloride	8.90E-07	lb/MMBtu	3.56E-05	1.56E-04	14
Chlorine	7.90E-04	lb/MMBtu	3.16E-02	1.38E-01	9
Chlorobenzene	5.50E-10	lb/MMBtu	2.20E-08	9.64E-08	12
Chloroform	3.70E-05	lb/MMBtu	1.48E-03	6.48E-03	14
Chromium	6.60E-06	lb/MMBtu	2.64E-04	1.16E-03	14
Chromium VI	7.30E-06	lb/MMBtu	2.92E-04	1.28E-03	12,16
Cobalt	4.30E-04	lb/MMBtu	1.72E-02	7.53E-02	12
Cumene	1.80E-05	lb/MMBtu	7.20E-04	3.15E-03	14
Dibutylphthalate	3.30E-05	lb/MMBtu	1.32E-03	5.78E-03	12
2,4-Dinitrophenol	2.60E-07	lb/MMBtu	1.04E-05	4.56E-05	12
2,4-Denitrotoluene	9.40E-07	lb/MMBtu	3.76E-05	1.65E-04	12
Dioxin (as 2,3,7,8-TCDD)	8.60E-12	lb/MMBtu	3.44E-10	1.51E-09	9
Ethyl benzene	6.80E-06	lb/MMBtu	2.72E-04	1.19E-03	12
Ethylene dichloride	2.90E-05	lb/MMBtu	1.16E-03	5.08E-03	12
Formaldehyde	6.40E-02	lb/MBF	8.04E-01	3.52E+00	17
Hexachlorobenzene	1.00E-06	lb/MMBtu	4.00E-05	1.75E-04	12
Hexane	2.90E-04	lb/MMBtu	1.16E-02	5.08E-02	14
Hydrochloric acid	2.30E-03	lb/MMBtu	9.20E-02	4.03E-01	13
Lead	1.77E-05	lb/MMBtu	7.08E-04	3.10E-03	13
Manganese	1.81E-03	lb/MMBtu	7.24E-02	3.17E-01	13
Mercury	5.00E-07	lb/MMBtu	2.00E-05	8.76E-05	13
Methanol	2.16E-01	lb/MBF	2.71E+00	1.19E+01	17
Methyl bromide	1.50E-05	lb/MMBtu	6.00E-04	2.63E-03	12
Methyl chloride	2.30E-05	lb/MMBtu	9.20E-04	4.03E-03	14
Methyl chloroform	4.20E-05	lb/MMBtu	1.68E-03	7.36E-03	14
Methyl isobutyl ketone	1.00E-03	lb/MBF	1.26E-02	5.50E-02	15
Methylene chloride	3.50E-04	lb/MMBtu	1.40E-02	6.13E-02	14
Naphthalene	2.80E-05	lb/MMBtu	1.12E-03	4.91E-03	13
Nickel	4.80E-06	lb/MMBtu	1.92E-04	8.41E-04	14
4-Nitrophenol	1.20E-07	lb/MMBtu	4.80E-06	2.10E-05	12
Pentachlorophenol	4.80E-08	lb/MMBtu	1.92E-06	8.41E-06	12
Phenol	2.20E-02	lb/MBF	2.76E-01	1.21E+00	11
Phosphorus	9.90E-05	lb/MMBtu	3.96E-03	1.73E-02	11
POM	2.88E-05	lb/MMBtu	1.15E-03	5.05E-03	9,12
Proprionaldehyde	5.90E-04	lb/MMBtu	2.36E-02	1.03E-01	13
Propylene dichloride	3.30E-05	lb/MMBtu	1.32E-03	5.78E-03	12
Selenium	6.20E-06	lb/MMBtu	2.48E-04	1.09E-03	12
Styrene	3.20E-05	lb/MMBtu	1.28E-03	5.61E-03	14
Tetrachloroethylene	3.82E-05	lb/MMBtu	1.53E-03	6.69E-03	1
Toluene	1.00E-04	lb/MBF	1.26E-03	5.50E-03	15
1,2,4-Trichlorobenzene	5.50E-05	lb/MMBtu	2.20E-03	9.64E-03	12
Trichloroethylene	3.90E-05	lb/MMBtu	1.56E-03	6.83E-03	14
2,4,6-Trichlorophenol	2.40E-08	lb/MMBtu	9.60E-07	4.20E-06	12
Vinyl Chloride	1.80E-05	lb/MMBtu	7.20E-04	3.15E-03	12
Xylenes	2.60E-06	lb/MMBtu	1.04E-04	4.56E-04	12
Total HAPs			**4.85E+00**	**2.12E+01**	**Sum of HAPs**

References for Direct-fired Kiln Emission Factors

1. All direct-fired kiln emission factors were taken from the West Frasier - Newberry Continuous Kiln Permit application dated November 2012.
2. The West Frasier - Newberry calculations reference a permit application previously submitted by Weyerhauser - Plymouth, NC in May 2010 and the associated NCDAQ Air Permit Review and Preliminary Determination.
3. Provided by Mr. David Word of NCASI to the Weyerhauser facility.
4. Total VOC (lb/MBF) is based upon stack testing of a direct-fired CDK at GP McCormick on 2/15/2012 and the following equation:
VOC as terpene + methanol + formaldehyde = VOC as Carbon (lb/MBF) * 1.133 + (1-0.65)* Methanol (lb/MBF) + Formaldehyde (lb/MBF)
5. Based on the average of NCASI test results as provided via email from Dr. Word of NCASI to NCDAQ, as published in the Air Permit Review/Preliminary Determination, p. 8.
6. Based on unpublished NCASI values for direct-fired kilns, provided in the NCDAQ Air Permit Review / Preliminary Determination, p. 9.
7. Based on the air permit document for Bibler Brothers, dated May 2008, which used EPA's PM Calculator software for the ratio of PM to PM10 for various wood dryer source classification codes.
8. Based on Weyerhauser's Particulate Matter Estimating Guide, 2003, as referenced in the May 2010 Weyerhauser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.
9. Per US EPA's AP-42, Section 1-6 (September 2003).
10. Emission factors for GHGs were taken from Subpart C of the Maditory Reporting Rule (40CFR98).
11. Lumber-Plywood TRI Workbook 2001, Revision 2, June 2002, by Weyerhauser Environmental Technology and Science, as referenced in the May 2010 Weyerhauser Plymouth permit application.
12. Per NCASI TB 858, Tables 20A and 20B, February 2003, as published in the Weyerhauser Plymouth 2010 application.
13. Per NCASI SARA 313 Guidance - Wood Products - April 2009, as published in the Weyerhauser Plymouth 2010 application.
14. Per NCASI TB 858, Tables 20A and 20B, as used in the Title V renewal application for the West Frasier facility in August, Georgia (March 2011).
15. Per NCASI TB845, as used in the Title V renewal application for the West Frasier facility in August, Georgia (March 2011).
16. Based on a July 7, 1999 memo from NCDAQ, the chromium VI compounds represented are chromic acid emissions calculated in terms of the chromium VI equivalents, as referenced in the May 2010 Weyerhauser Plymouth permit application.
17. Based on average of stack test results on direct-fired CDK at GP McCormick conducted on 2/15/2012 and 7/18/2013.

Canfor Southern Pine - Camden Plant
Boiler Potential HAP Emissions

Boiler 1 Potential Heat Input (98.3 MMBtu/hr x 8760 hr/yr) = 861,108 MMBtu/yr

Calculations of Boiler HAP and TAP Emissions are based upon the site-specific fuel heat content and emission factors found in AP-42, Table 1.6-3 updated September 2003 unless otherwise noted. Factors for HCl, As, Be, Cd, Cr, Cr6, Pb, Mn, Ni, Se and Hg were calculated using the stack test performed October 11-12, 2005.

Pollutant	CAS No.	Boiler Emission Factors lb/10^6 Btu	Boiler Emissions tons/yr
Formaldehyde	50000	4.40E-03	1.894E+00
2,4-Dinitrophenol	51285	1.80E-07	7.750E-05
Carbon tetrachloride	56235	4.50E-05	1.937E-02
Chloroform	67663	2.80E-05	1.206E-02
Benzene	71432	4.20E-03	1.808E+00
1,1,1-Trichloroethane (Methyl chloroform)	71556	3.10E-05	1.335E-02
Methyl bromine	74839	1.50E-05	6.458E-03
Methyl chloride	74873	2.30E-05	9.903E-03
Vinyl chloride	75014	1.80E-05	7.750E-03
Acetaldehyde	75070	8.30E-04	3.574E-01
Dichloromethane	75092	2.90E-04	1.249E-01
Propylene dichloride	78875	3.30E-05	1.421E-02
Trichloroethylene	79016	3.00E-05	1.292E-02
Ethane, 1,1,2,2-tetrachloro-	79345	3.80E-05	1.636E-02
Pentachlorophenol	87865	5.10E-08	2.196E-05
2,4,6-Trichlorophenol	88062	2.20E-08	9.472E-06
Naphthalene	91203	9.70E-05	4.176E-02
Acetophenone	98862	3.20E-09	1.378E-06
4-Nitrophenol	100027	1.10E-07	4.736E-05
Ethyl benzene	100414	3.10E-05	1.335E-02
Styrene	100425	1.90E-03	8.181E-01
Acrolein	107028	4.00E-03	1.722E+00
Ethylene dichloride	107062	2.90E-05	1.249E-02
Toluene	108883	9.20E-04	3.961E-01
Chlorobenzene	108907	3.30E-05	1.421E-02
Phenol	108952	5.10E-05	2.196E-02
Bis(2-ethylhexyl)phthalate	117817	4.70E-08	2.024E-05
Propionaldehyde	123386	6.10E-05	2.626E-02
Tetrachloroethylene (perchloroethylene)	127184	3.80E-05	1.636E-02
Xylene (mixed isomers)	1330207	2.50E-05	1.076E-02
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin	1746016	8.60E-12	3.703E-09
Hydrochloric acid	7647010	9.00E-04	3.875E-01
Chlorine	7782505	7.90E-04	3.401E-01
Chromium (CR6PT)	18540299	1.55E-06	6.675E-04
Polychlorinated Biphenyls (PCBs)	PCB	8.15E-09	3.509E-06
Polycyclic Organic Matter (POM)	POM	1.24E-04	5.339E-02
Antimony Compounds		7.90E-06	3.401E-03
Arsenic & Compounds	AS	3.37E-06	1.451E-03
Beryllium & Compounds	BE	7.71E-08	3.320E-05
Cadmium & Compounds	CD	5.30E-06	2.282E-03
Chromium Compounds	CRC	9.24E-06	3.978E-03
Cobalt Compounds		6.50E-06	2.799E-03
Mercury & Compounds	HG	4.39E-07	1.890E-04
Manganese & Compounds	MNC	1.01E-03	4.349E-01
Phosphorus Metal & Compounds		2.70E-05	1.162E-02
Selenium & Compounds	SE	1.51E-06	6.501E-04
Nickel & Compounds	NI	8.96E-06	3.858E-03
Lead & Compounds	PB	3.36E-05	1.447E-02

Total Boiler HAPs **8.652E+00 tons/yr**

Canfor Southern Pine - Camden Plant
Wood Treatment Emissions

Emission calculations are documented in the "New South Wood Preserving Co., LLC - Camden Plant, TV-1380-0025; Request for a Construction Permit Exemption for the Use of MicroPro 200C as a Wood Preserving Chemical," letter from Donald E. Olson of New South Companies, Inc. to Ms. Hetal Patel of the Department dated August 18, 2006.

For each charge of ACQ in Treating Cylinder #1, the emissions are the following:	1.31E-02 lb VOC 5.99E-03 lb methanol 2.44E-03 lb ethanolamine
For each charge of MCQ in Treating Cylinder #1 and #2, the emissions are the following:	1.31E-02 lb VOC 6.00E-03 lb methanol
For each charge of MTZ in Treating Cylinder #2, the emissions are the following:	0.00E+00 lb VOC

Treating Cylinder #1 is authorized to use ACQ and MCQ.
Treating Cylinder #2 is authorized to use MCQ and MTZ.

For the potential to emit calculations, it is assumed that Treating Plants #1 and #2 operate 8,760 hours/year and that a charge takes 1 hour to complete, i.e., 8,760 charges can be run per year.

Treatment Plant #1 - Potential to Emit

	ACQ Emissions		MCQ Emissions		Maximum Emissions	
Pollutant	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOC	1.31E-02	5.74E-02	1.31E-02	5.72E-02	1.31E-02	5.74E-02
Methanol	5.99E-03	2.62E-02	6.00E-03	2.63E-02	6.00E-03	2.63E-02
Ethanolamine	2.44E-03	1.07E-02			2.44E-03	1.07E-02

Treatment Plant #2 - Potential to Emit

	MCQ Emissions	
Pollutant	lb/hr	ton/yr
VOC	1.31E-02	5.72E-02
Methanol	6.00E-03	2.63E-02

Appendix B.7
Facility Operating Records

Canfor Southern Pine - Camden
Operating Records

Year	Month	Tons Logs Consumed	Amount of Chips Produced	Amount of Shavings Produced	Sawmill Production (Green)	Steam Kiln Dried Lumber	CDK Dried Lumber	Planer Mill Production	Wood Dust Sold	Wood Dust Burned Boiler	Wood Dust Burned Burner	Tons Logs/ MBF Dried	Tons Chips/ MBF Dried	Tons Shavings/ MBF Planed
		Tons	Tons	Tons	Bd-Ft		Bd-Ft	Bd-Ft	Tons	Tons	Tons	Ton/MBF	Ton/MBF	Ton/MBF
2013	Jan	70,562	22,292	3,352	16,251,327	13,772,026		13,086,012	3,919	5,646		4.44	1.37	0.2562
	Feb	56,097	17,771	2,983	13,220,401	12,990,858		11,644,723	1,642	6,282		4.44	1.38	0.2562
	Mar	55,636	17,947	2,972	13,142,133	13,080,429		11,916,524	1,605	5,453		4.44	1.39	0.2494
	Apr	70,717	21,035	3,608	16,720,639	16,001,797		15,143,398	1,643	6,488		4.44	1.38	0.2382
	May	55,570	16,119	2,699	13,404,095	12,892,071		11,709,654	1,642	5,859		4.44	1.39	0.2305
	Jun	52,618	15,738	2,520	13,200,765	11,478,340		12,479,779	1,112	4,608		4.44	1.38	0.2019
	Jul	53,799	15,805	2,388	13,039,535	13,126,864		11,271,806	677	5,781		4.43	1.38	0.2119
	Aug	53,730	16,923	2,520	13,304,002	12,381,624		11,583,316	1,127	5,453		4.43	1.38	0.2176
	Sep	54,084	15,461	2,670	13,296,918	14,064,764		11,947,893	817	5,243		4.40	1.36	0.2235
	Oct	68,375	21,416	3,225	16,744,993	16,255,487		14,544,855	1,366	6,338		4.35	1.35	0.2217
	Nov	50,860	15,754	2,469	12,397,149	12,675,411		10,915,989	1,326	5,495		4.35	1.34	0.2262
	Dec	48,920	15,154	2,257	11,412,256	10,192,465		10,609,561	522	5,828		4.35	1.33	0.2127
2014	Jan	38,324	14,059	2,547	9,565,764	14,280,757		13,195,147	229	4,597		4.13	1.27	0.1930
	Feb	50,054	16,668	2,468	12,218,884	12,016,966		10,745,249	122	5,541		4.12	1.28	0.2297
	Mar	51,072	15,365	2,678	12,141,121	12,673,645		11,680,156	573	5,797		4.10	1.26	0.2293
	Apr	56,909	18,045	2,756	14,093,904	13,656,061		12,856,736	1,152	5,314		4.07	1.26	0.2144
	May	52,492	15,645	2,608	13,645,781	13,230,329		12,655,164	1,761	5,275		4.05	1.26	0.2061
	Jun	55,900	16,973	2,478	14,446,160	13,802,535		12,725,536	624	5,460		4.01	1.25	0.1947
	Jul	68,093	20,420	3,198	17,176,267	16,978,871		15,856,222	790	6,440		4.00	1.24	0.2017
	Aug	55,593	17,909	2,390	14,105,401	13,072,294		12,001,757	944	5,434		3.99	1.25	0.1991
	Sep	51,271	15,906	2,235	12,972,094	12,728,868		11,869,786	902	5,192		4.01	1.26	0.1883
	Oct	64,092	20,854	2,495	15,881,215	14,987,227		14,072,541	993	7,454		4.01	1.26	0.1773
	Nov	50,407	16,999	2,306	12,580,228	13,358,199		11,174,230	989	6,451		4.00	1.27	0.2054
	Dec	52,368	16,747	2,222	12,976,383	11,541,467	579,426	10,930,339	189	6,585	247	3.97	1.26	0.2033
2015	Jan	73,853	22,239	3,801	18,505,456	11,350,123	6,562,950	16,967,884	479	6,333	2,795	4.10	1.28	0.2240
	Feb	62,223	20,938	3,369	15,463,149	9,204,088	5,757,159	14,046,830	149	5,225	2,452	4.10	1.29	0.2398
	Mar	64,514	20,834	3,676	16,045,344	10,229,174	5,577,088	14,357,772	286	5,531	2,375	4.10	1.29	0.2561
	Apr	65,276	22,775	3,383	16,113,605	12,208,338	4,334,948	14,242,986	2,476	5,712	1,846	4.08	1.30	0.2375
	May	64,369	16,878	3,168	15,662,875	9,955,446	5,079,360	14,183,313	1,735	5,145	2,163	4.11	1.29	0.2234
	Jun	67,979	20,130	3,416	16,561,650	9,774,959	6,176,472	15,101,147	3,056	5,235	2,630	4.12	1.30	0.2262
	Jul	82,424	24,755	4,143	20,166,832	11,591,455	7,730,958	17,855,751	2,370	6,638	3,292	4.15	1.30	0.2320
	Aug	62,947	19,184	3,152	15,126,382	11,032,692	3,583,403	13,988,775	2,317	6,024	1,526	4.15	1.30	0.2253
	Sep	56,507	16,002	2,767	13,754,713	9,223,400	4,815,628	12,098,837	1,732	5,204	2,051	4.15	1.29	0.2287
	Oct	76,499	23,075	3,946	18,581,991	10,652,949	7,586,060	16,934,558	2,695	6,206	3,230	4.15	1.28	0.2330
	Nov	53,195	17,913	2,816	13,007,673	8,127,887	5,995,037	11,855,918	2,946	5,089	2,553	4.15	1.28	0.2375
	Dec	68,269	20,165	3,373	16,765,262	9,793,926	6,529,473	15,115,894	3,208	5,983	2,781	4.14	1.27	0.2232
2016	Jan	76,830	25,591	3,929	18,554,470	10,219,135	7,552,485	17,093,657	4,372	6,099	3,216	4.16	1.29	0.2299
	Feb	60,284	18,597	3,093	14,138,207	8,672,472	5,810,315	13,897,759	4,762	4,546	2,474	4.15	1.28	0.2226
	Mar	67,163	20,686	2,835	15,596,875	9,468,375	5,219,700	13,613,947	3,249	4,803	2,223	4.19	1.28	0.2082
	Apr	72,713	22,869	3,202	17,163,066	10,014,076	7,454,226	15,894,787	3,209	4,785	3,174	4.21	1.28	0.2014
	May	59,262	18,244	2,878	12,244,819	9,358,492	5,225,350	13,956,772	2,940	5,572	2,225	4.19	1.29	0.2062
	Jun	63,363	19,149	2,825	15,220,704	9,181,295	4,517,621	12,849,976	2,657	5,233	1,924	4.22	1.30	0.2198
	July	76,704	23,010	3,537	18,694,128	12,526,987	6,867,686	17,358,627	2,373	5,966	2,925	4.19	1.29	0.2038
	Aug	64,272	18,270	2,677	15,588,528	9,491,175	6,009,305	14,361,603	2,055	5,921	2,559	4.17	1.28	0.1864
	Sep	61,659	18,043	2,941	14,972,148	8,565,369	6,188,676	13,956,425	1,670	5,011	2,635	4.18	1.28	0.2107
	Oct	77,926	23,663	3,699	18,853,397	12,768,434	6,420,390	17,810,785	3,580	6,243	2,734	4.17	1.28	0.2077
	Nov	55,134	16,436	2,686	13,729,709	8,359,910	5,863,581	12,764,449	2,396	4,977	2,497	4.18	1.27	0.2104
	Dec	56,831	17,085	2,613	14,290,065	6,616,089	5,700,992	12,062,561	3,540	4,796	2,428	4.21	1.28	0.2166
2017	Jan	74,994	22,908	3,767	18,002,108	12,165,955	7,286,769	16,951,085	2,711	6,083	3,103	4.16	1.26	0.2222
	Feb	60,314	16,883	3,270	14,445,392	9,988,501	4,480,741	14,143,062	1,724	5,682	1,908	4.17	1.25	0.2312
	Mar	60,177	16,066	3,117	14,571,928	9,161,745	5,480,078	13,937,287	2,059	5,809	2,334	4.13	1.23	0.2236
	Apr	73,607	20,326	3,473	17,740,184	11,117,607	7,180,063	15,842,531	3,417	4,884	3,058	4.12	1.21	0.2192
	May	57,578	17,356	2,893	14,335,390	8,836,906	4,823,052	13,359,533	2,334	5,620	2,054	4.13	1.21	0.2166
	Jun	58,341	18,180	3,233	14,547,225	9,364,530	5,571,354	13,701,132	2,627	5,608	2,373	4.07	1.20	0.2359
	Jul	73,850	20,070	3,588	18,426,851	10,558,363	7,209,188	16,512,888	3,011	5,537	3,070	4.09	1.19	0.2173
	Aug	61,829	18,543	3,274	15,534,957	10,009,468	5,039,457	13,993,827	2,509	6,167	2,146	4.09	1.19	0.2340
	Sep	57,031	16,636	3,006	14,774,316	9,771,071	5,662,170	13,681,165	2,389	5,997	2,411	4.05	1.18	0.2197
	Oct	76,039	19,902	3,894	18,565,040	11,396,992	6,833,165	16,530,670	3,274	5,994	2,910	4.06	1.17	0.2356
	Nov	46,644	13,291	2,390	11,330,510	7,589,653	4,166,986	10,335,880	1,942	4,865	1,774	4.07	1.17	0.2312
	Dec	55,807	14,513	3,053	14,103,120	8,393,636	4,928,131	11,896,920	2,338	5,286	2,099	4.04	1.15	0.2566
Baseline May 2015 - Apr 2017	**12-Mo**	**796,711**	**237,964**	**38,662**	**191,716,553**	**119,014,166**	**72,377,185**	**176,814,753**	**33,386**	**65,967**	**30,821**			
											5-yr Avg	4.172	1.280	0.221

Appendix B.8

Background Documents Used for Emission Factor Development

1.6 Wood Residue Combustion In Boilers

1.6.1 General[1-6]

The burning of wood residue in boilers is mostly confined to those industries where it is available as a byproduct. It is burned both to obtain heat energy and to alleviate possible solid residue disposal problems. In boilers, wood residue is normally burned in the form of hogged wood, bark, sawdust, shavings, chips, mill rejects, sanderdust, or wood trim. Heating values for this residue range from about 4,500 British thermal units/pound (Btu/lb) of fuel on a wet, as-fired basis, to about 8,000 Btu/lb for dry wood. The moisture content of as-fired wood is typically near 50 weight percent for the pulp, paper and lumber industries and is typically 10 to 15 percent for the furniture industry. However, moisture contents may vary from 5 to 75 weight percent depending on the residue type and storage operations. Generally, bark is the major type of residue burned in pulp mills; either a mixture of wood and bark residue or wood residue alone is burned most frequently in the lumber, furniture, and plywood industries.

1.6.2 Firing Practices[5, 7, 8]

Various boiler firing configurations are used for burning wood residue. One common type of boiler used in smaller operations is the Dutch oven. This unit is widely used because it can burn fuels with very high moisture content. Fuel is fed into the oven through an opening in the top of a refractory-lined furnace. The fuel accumulates in a cone-shaped pile on a flat or sloping grate. Combustion is accomplished in two stages: (1) drying and gasification, and (2) combustion of gaseous products. The first stage takes place in the primary furnace, which is separated from the secondary furnace chamber by a bridge wall. Combustion is completed in the secondary chamber before gases enter the boiler section. The large mass of refractory helps to stabilize combustion rates but also causes a slow response to fluctuating steam demand.

In another boiler type, the fuel cell oven, fuel is dropped onto suspended fixed grates and is fired in a pile. Unlike the Dutch oven, the refractory-lined fuel cell also uses combustion air preheating and positioning of secondary and tertiary air injection ports to improve boiler efficiency. Because of their overall design and operating similarities, however, fuel cell and Dutch oven boilers have many comparable emission characteristics.

The firing method most commonly employed for wood-fired boilers with a steam generation rate larger than 100,000 lb/hr is the spreader stoker. In this boiler type, wood enters the furnace through a fuel chute and is spread either pneumatically or mechanically across the furnace, where small pieces of the fuel burn while in suspension. Simultaneously, larger pieces of fuel are spread in a thin, even bed on a stationary or moving grate. The burning is accomplished in three stages in a single chamber: (1) moisture evaporation; (2) distillation and burning of volatile matter; and (3) burning of fixed carbon. This type of boiler has a fast response to load changes, has improved combustion control, and can be operated with multiple fuels. Natural gas, oil, and/or coal, are often fired in spreader stoker boilers as auxiliary fuels. The fossil fuels are fired to maintain constant steam production when the wood residue moisture content or mass rate fluctuates and/or to provide more steam than can be generated from the residue supply alone. Although spreader stokers are the most common stokers among larger wood-fired boilers, overfeed and underfeed stokers are also utilized for smaller units.

Another boiler type sometimes used for wood combustion is the suspension-fired boiler. This boiler differs from a spreader stoker in that small-sized fuel (normally less than 2 mm and normally low moisture) is blown into the boiler and combusted by supporting it in air rather than on fixed grates. Rapid changes in combustion rate and, therefore, steam generation rate are possible because the finely divided fuel particles burn very quickly.

A later innovation in wood firing is the fluidized bed combustion (FBC) boiler. A fluidized bed consists of inert particles through which air is blown so that the bed behaves as a fluid. Wood residue enters in the space above the bed and burns both in suspension and in the bed. Because of the large thermal mass represented by the hot inert bed particles, fluidized beds can handle fuels with moisture contents up to near 70 percent (total basis). Fluidized beds can also handle dirty fuels (up to 30 percent inert material). Wood fuel is pyrolyzed faster in a fluidized bed than on a grate due to its immediate contact with hot bed material. As a result, combustion is rapid and results in nearly complete combustion of the organic matter, thereby minimizing the emissions of unburned organic compounds.

1.6.3 Emissions And Controls[7-12]

The major emission of concern from wood boilers is particulate matter (PM). These emissions depend primarily on the composition of the residue fuel burned, and the particle control device. Oxides of nitrogen (NO_x) may also be emitted in significant quantities when certain types of wood residue are combusted or when operating conditions are poor.

1.6.3.1 Criteria Pollutants

The composition of wood residue and the characteristics of the resulting emissions depend largely on the industry from which the wood residue originates. Pulping operations, for example, produce great quantities of bark that may contain more than 70 weight percent moisture, sand, and other non-combustibles. As a result, bark boilers in pulp mills may emit considerable amounts of particulate matter to the atmosphere unless they are controlled. On the other hand, some operations, such as furniture manufacturing, generate a clean, dry wood residue (2 to 20 weight percent moisture) which produces relatively low particulate emission levels when properly burned. Still other operations, such as sawmills, burn a varying mixture of bark and wood residue that results in PM emissions somewhere between these two extremes. Additionally, NO_x emissions from wet bark and wood boilers are typically lower (approximately one-half) in comparison to NO_x emissions from dry wood-fired boilers.

Furnace operating conditions are particularly important when firing wood residue. For example, because of the high moisture content that may be present in wood residue, a larger than usual area of refractory surface is often necessary to dry the fuel before combustion. In addition, sufficient secondary air must be supplied over the fuel bed to burn the volatiles that account for most of the combustible material in the residue. When proper drying conditions do not exist, or when secondary combustion is incomplete, the combustion temperature is lowered, and increased PM, CO, and organic compound emissions may result from any boiler type. Significant variations in fuel moisture content can cause short-term emissions to fluctuate.

1.6.3.2 Greenhouse Gases[13-18]

Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions are all produced during wood residue combustion. Nearly all of the fuel carbon (99 percent) in wood residue is converted to CO_2 during the combustion process. This conversion is relatively independent of firing configuration. Although the formation of CO acts to reduce CO_2 emissions, the amount of CO produced is insignificant compared to the amount of CO_2 produced. The majority of the fuel carbon not converted to CO_2, due to incomplete combustion, is entrained in the bottom ash. CO_2 emitted from this source is generally not

counted as greenhouse gas emissions because it is considered part of the short-term CO_2 cycle of the biosphere.

Formation of N_2O during the combustion process is governed by a complex series of reactions and its formation is dependent upon many factors. Formation of N_2O is minimized when combustion temperatures are kept high (above 1475°F) and excess air is kept to a minimum (less than 1 percent).

Methane emissions are highest during periods of low-temperature combustion or incomplete combustion, such as the start-up or shut-down cycle for boilers. Typically, conditions that favor formation of N_2O also favor emissions of CH_4.

1.6.4 Controls

Currently, the four most common control devices used to reduce PM emissions from wood-fired boilers are mechanical collectors, wet scrubbers, electrostatic precipitators (ESPs), and fabric filters. The use of multitube cyclone (or multiclone) mechanical collectors provides particulate control for many wood-fired boilers. Often, two multiclones are used in series, allowing the first collector to remove the bulk of the dust and the second to remove smaller particles. The efficiency of this arrangement varies from 25 to 65 percent. The most widely used wet scrubbers for wood-fired boilers are venturi scrubbers. With gas-side pressure drops exceeding 15 inches of water, particulate collection efficiencies of 85 percent or greater have been reported for venturi scrubbers operating on wood-fired boilers.

ESPs are employed when collection efficiencies above 90 percent are required. When applied to wood-fired boilers, ESPs are often used downstream of mechanical collector precleaners which remove larger-sized particles. Collection efficiencies of 90 to 99 percent for PM have been observed for ESPs operating on wood-fired boilers.

A variation of the ESP is the electrostatic gravel bed filter. In this device, PM in flue gases is removed by impaction with gravel media inside a packed bed; collection is augmented by an electrically charged grid within the bed. Particulate collection efficiencies are typically over 80 percent.

Fabric filters (i. e., baghouses) have had limited applications to wood-fired boilers. The principal drawback to fabric filtration, as perceived by potential users, is a fire danger arising from the collection of combustible carbonaceous fly ash. Steps can be taken to reduce this hazard, including the installation of a mechanical collector upstream of the fabric filter to remove large burning particles of fly ash (i. e., "sparklers"). Despite complications, fabric filters are generally preferred for boilers firing salt-laden wood. This fuel produces fine particulates with a high salt content having a quenching effect, thereby reducing fire hazards. Particle collection efficiencies are typically 80% or higher.

For stoker and FBC boilers, overfire air ports may be used to lower NO_x emissions by staging the combustion process. In those areas of the U. S. where NO_x emissions must be reduced to their lowest levels, the application of selective noncatalytic reduction (SNCR) to residue wood-fired boilers has been accomplished; the application of selective catalytic reduction (SCR) is being contemplated. Both systems are postcombustion NO_x reduction techniques in which ammonia (or urea) is injected into the flue gas to selectively reduce NO_x to nitrogen and water. In one application of SNCR to an industrial wood-fired boiler, NO_x reduction efficiencies varied between 35 and 75 percent as the ammonia-to-NO_x ratio increased from 0.4 to 3.2.

Emission factors and emission factor ratings for wood residue boilers are summarized in Tables 1.6-1, 1.6-2, 1.6-3, 1.6-4. The factors are presented on an energy basis (pound of pollutant per million Btu of heat input). Factors for wet wood represent facilities that burn wood residue with a

moisture content of 20 percent or greater. Factors for dry wood represent wood residue with less than 20 percent moisture content. Cumulative particle size distribution data and associated emission factors are presented in Table 1.6-5. Uncontrolled and controlled size-specific emission factors are plotted in Figure 1.6-1.

1.6.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the background report for this section. This and other documents can be found on the CHIEF Web Site at http://www.epa.gov/ttn/chief/, or by calling the Info CHIEF Help Desk at (919)541-1000.

Supplement A, February 1996

- Significant figures were added to some PM and PM-10 emission factors.
- In the table with NO_x and CO emission factors, text was added in the footnotes to clarify meaning.

Supplement B, October 1996

- SO_x, CH_4, N_2O, CO_2, speciated organics, and trace elements emission factors were corrected.
- Several HAP emission factors were updated.

Supplement D, February 1998

- Table 1.6-1, the PM-10 and one PM emission factors were revised to present two significant figures and the PM-10 emission factor for wood-fired boilers with mechanical collectors without flyash reinjection was revised to 2.6 lb/ton to reflect that these values are based on wood with 50% moisture. A typographical error in the wet scrubber emission factor for PM-10 was corrected.
- Table 1.6-2, the SO_x emission factors for all boiler categories were revised to 0.075 lb/ton to reflect that these factors are based on wood with 50% moisture.
- Tables 1.6-4 and 1.6-5 were re-titled to reflect that the speciated organic and trace element analysis presented in these tables are compiled from wood-fired boilers equipped with a variety of PM control technologies.

Supplement D, August 1998

- Table 1.6-4, the emission factor for trichlorotrifluoroethane was removed. The phenol emission factor was corrected to 1.47E-04; the phenanthrene factor was corrected to 5.02E-05; the chrysene factor was corrected to 4.52E-07; and, the polychlorinated dibenzo-p-furans factor was corrected to 2.9E-08.

Supplement E, February 1999

- In the footnotes of tables 1.6-1, 2, 3, 4, 5, 6, 7, some text was removed that described how to adjust the factors when burning wood with moisture and thermal content significantly different from 50% or 4500 Btu/lb, respectively. The EPA is revising Section 1.6 and, in the interim, consistent with EPA's recommendations regarding proper use of AP-42, the EPA encourages users of the wood combustion emission factors to account for the specific assumptions included in the factors and to convert the factors to a thermal content basis (i.e., lb/MMBtu) to estimate emissions when burning wood that differs significantly from 4500 Btu/lb or 50% moisture.

July 2001

- All emission factors were revised and new factors were added. In some cases separate factors were developed for wet wood (greater than or equal to 20 percent moisture content) and dry wood (less than 20 percent moisture).
- Separate PM and NOx emission factors are provided for dry wood combustion.
- All emission factors have been converted to units of lb/MMBtu.
- PM emission factors are specified by fuel type and control device type but not by boiler type.
- NOx, SOx and CO emission factors are specified by fuel type and not by boiler type.
- Additional toxic emission factors have been added.
- The general quality rating for PM factors are higher than before.
- TOC and CO2 emission factors are specified by all wood types and not by boiler type.
- New Source Classification Codes (SCC) were assigned for dry wood.

March 2002

- The VOC and TOC emission factors in Table 1.6-3 were calculated incorrectly. This has been corrected. The correct factors are 0.013 and 0.039, respectively.

September 2003

- The VOC emission factor in Table 1.6-3 was calculated incorrectly. This has been corrected. The correct factor is 0.017.

Table 1.6-1. EMISSION FACTORS FOR PM FROM WOOD RESIDUE COMBUSTION[a]

Fuel	PM Control Device	Filterable PM		Filterable PM-10[b]		Filterable PM-2.5[b]	
		Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING
Bark/Bark and Wet Wood	No Control[c]	0.56[d]	C	0.50[e]	D	0.43[e]	D
Dry Wood	No Control[c]	0.40[f]	A	0.36[e]	D	0.31[e]	D
Wet Wood	No Control[c]	0.33[g]	A	0.29[e]	D	0.25[e]	D
Bark	Mechanical Collector*	0.54[h]	D	0.49[e]	D	0.29[e]	D
Bark and Wet Wood	Mechanical Collector*	0.35[i]	C	0.32[e]	D	0.19[e]	D
Dry Wood	Mechanical Collector*	0.30[j]	A	0.27[e]	D	0.16[e]	D
Wet Wood	Mechanical Collector*	0.22[k]	A	0.20[e]	D	0.12[e]	D
All Fuels[m]	Electrolyzed Gravel Bed	0.1[m]	D	0.074[e]	D	0.065[e]	D
All Fuels[m]	Wet Scrubber	0.066[n]	A	0.065[e]	D	0.065[e]	D
All Fuels[m]	Fabric Filter	0.1[o]	C	0.074[e]	D	0.065[e]	
All Fuels[m]	Electrostatic Precipitator	0.054[p]	B	0.04[e]	D	0.035[e]	
		Condensible PM					
All Fuels[m]	All Controls/No Controls	0.017[q]	A				

Table 1.6-1. (cont.)

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. CPM = Condensible Particulate Matter. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] PM-10 = particulate matter less than or equal to 10 microns in aerodynamic diameter. PM-2.5 = particulate matter less than or equal to 2.5 microns in aerodynamic diameter. Filterable PM = PM captured and measured on the filter in an EPA Method 5 (or equivalent) sampling train. Condensible PM = PM captured and measured in an EPA Method 202 (or equivalent) sampling train.

[c] Factor represents boilers with no controls, Breslove separators, Breslove separators with reinjection, and mechanical collectors with reinjection.

[*] Mechanical collectors include cyclones and multiclones. (Asterisk added 4/2012 to denote separate notation in the table.)

[d] References 19-21, 88.

[e] Cumulative mass % provided in Table 1.6-6 for Bark and Wet Wood-fired boilers multiplied by the Filterable PM factor.

[f] References 22-32, 88.

[g] References 26, 33-36, 88.

[h] References 37, 38, 88.

[i] References 26, 39-41, 88.

[j] References 26, 27, 34, 42-54, 88.

[k] Reference 55-57, 88.

[l] All fuels = Bark, Bark and Wet Wood, Dry Wood, and Wet Wood.

[m] References 27, 58, 88.

[n] References 26, 59-66, 88.

[o] References 26, 67-70, 88.

[p] References 26, 71-74, 88.

[q] References 19-21, 25, 28, 29, 31, 32, 36-41, 46, 51, 53-60, 62 - 65, 67-69, 72-75, 88.

Table 1.6-2. EMISSION FACTORS FOR NO_x, SO_2, AND CO FROM WOOD RESIDUE COMBUSTION[a]

Source Category[c]	NO_x[b]		SO_2[b]		CO[b]	
	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMBtu)	EMISSION FACTOR RATING	Emission Factor (lb/MMbtu)	EMISSION FACTOR RATING
Bark/bark and wet wood/wet wood-fired boiler	0.22[d]	A	0.025[e]	A	0.60[f,g,i,j]	A
Dry wood-fired boilers	0.49[h]	C	0.025[e]	A	0.60[f,g,i,j]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. NO_x = Nitrogen oxides, SO_2 = Sulfur dioxide, CO = Carbon monoxide.

[b] Factors represent boilers with no controls or with particulate matter controls.

[c] These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[d] References 19, 33, 34, 39, 40, 41, 55, 62-64, 67, 70, 72, 78, 79, 88-89.

[e] References 26, 45, 50, 72, 88-89.

[f] References 26, 59, 88-89.

[g] References 19, 26, 39-41, 60-64, 67, 68, 70, 75, 79, 88-89.

[h] References 30, 34, 45, 50, 80, 81, 88-89.

[i] References 26, 30, 45-51, 80-82, 88-89.

[j] Emission factor is for stokers and dutch ovens/fuel cells. References 26, 34, 36, 55, 60, 65, 71, 72, 75. **CO Factor for fluidized bed combustors is 0.17 lb/MMbtu.** References 26, 72, 88-89.

Table 1.6-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS, TOC, VOC, NITROUS OXIDE, AND CARBON DIOXIDE FROM WOOD RESIDUE COMBUSTION[a]

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Acenaphthene	**9.1 E-07**[c]	B
Acenaphthylene	**5.0 E-06**[d]	A
Acetaldehyde	**8.3 E-04**[e]	A
Acetone	**1.9 E-04**[f]	D
Acetophenone	**3.2 E-09**[g]	D
Acrolein	**4.0 E-03**[h]	C
Anthracene	**3.0 E-06**[i]	A
Benzaldehyde	**<8.5 E-07**[j]	D
Benzene	**4.2 E-03**[k]	A
Benzo(a)anthracene	**6.5 E-08**[l]	B
Benzo(a)pyrene	**2.6 E-06**[m]	A
Benzo(b)fluoranthene	**1.0 E-07**[l]	B
Benzo(e)pyrene	**2.6 E-09**[f]	D
Benzo(g,h,i)perylene	**9.3 E-08**[n]	B
Benzo(j,k)fluoranthene	**1.6 E-07**[o]	D
Benzo(k)fluoranthene	**3.6 E-08**[p]	B
Benzoic acid	**4.7 E-08**[q]	D
bis(2-Ethylhexyl)phthalate	**4.7 E-08**[g]	D
Bromomethane	**1.5 E-05**[f]	D
2-Butanone (MEK)	**5.4 E-06**[f]	D
Carbazole	**1.8 E-06**[f]	D
Carbon tetrachloride	**4.5 E-05**[r]	D
Chlorine	**7.9 E-04**[s]	D
Chlorobenzene	**3.3 E-05**[f]	D
Chloroform	**2.8 E-05**[f]	D
Chloromethane	**2.3 E-05**[f]	D
2-Chloronaphthalene	**2.4 E-09**[f]	D
2-Chlorophenol	**2.4 E-08**[u]	C
Chrysene	**3.8 E-08**[c]	B
Crotonaldehyde	**9.9 E-06**[j]	D
Decachlorobiphenyl	**2.7 E-10**[r]	D
Dibenzo(a,h)anthracene	**9.1 E-09**[l]	B
1,2-Dibromoethene	**5.5 E-05**[f]	D
Dichlorobiphenyl	**7.4 E-10**[r]	C
1,2-Dichloroethane	**2.9 E-05**[r]	D
Dichloromethane	**2.9 E-04**[v]	D
1,2-Dichloropropane	**3.3 E-05**[f]	D
2,4-Dinitrophenol	**1.8 E-07**[w]	C
Ethylbenzene	**3.1 E-05**[f]	D
Fluoranthene	**1.6 E-06**[x]	B
Fluorene	**3.4 E-06**[i]	A
Formaldehyde	**4.4 E-03**[y]	A
Heptachlorobiphenyl	**6.6E-11**[r]	D

Table 1.6-3. (cont.)

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Hexachlorobiphenyl	**5.5 E-10**[r]	D
Hexanal	**7.0 E-06**[z]	D
Heptachlorodibenzo-p-dioxins	**2.0 E-09**[aa]	C
Heptachlorodibenzo-p-furans	**2.4 E-10**[aa]	C
Hexachlorodibenzo-p-dioxins	**1.6 E-06**[aa]	C
Hexachlorodibenzo-p-furans	**2.8 E-10**[aa]	C
Hydrogen chloride	**1.9 E-02**[j]	C
Indeno(1,2,3,c,d)pyrene	**8.7 E-08**[l]	B
Isobutyraldehyde	**1.2 E-05**[z]	D
Methane	**2.1 E-02**[f]	C
2-Methylnaphthalene	**1.6 E-07**[r]	D
Monochlorobiphenyl	**2.2 E-10**[r]	D
Naphthalene	**9.7 E-05**[ab]	A
2-Nitrophenol	**2.4 E-07**[w]	C
4-Nitrophenol	**1.1 E-07**[w]	C
Octachlorodibenzo-p-dioxins	**6.6 E-08**[aa]	B
Octachlorodibenzo-p-furans	**8.8 E-11**[aa]	C
Pentachlorodibenzo-p-dioxins	**1.5 E-09**[aa]	B
Pentachlorodibenzo-p-furans	**4.2 E-10**[aa]	C
Pentachlorobiphenyl	**1.2 E-09**[r]	D
Pentachlorophenol	**5.1 E-08**[ac]	C
Perylene	**5.2 E-10**[f]	D
Phenanthrene	**7.0 E-06**[ad]	B
Phenol	**5.1 E-05**[ac]	C
Propanal	**3.2 E-06**[z]	D
Propionaldehyde	**6.1 E-05**[f]	D
Pyrene	**3.7 E-06**[ar]	A
Styrene	**1.9 E-03**[f]	D
2,3,7,8-Tetrachlorodibenzo-p-dioxins	**8.6 E-12**[aa]	C
Tetrachlorodibenzo-p-dioxins	**4.7 E-10**[ag]	C
2,3,7,8-Tetrachlorodibenzo-p-furans	**9.0 E-11**[aa]	C
Tetrachlorodibenzo-p-furans	**7.5 E-10**[aa]	C
Tetrachlorobiphenyl	**2.5 E-09**[r]	D
Tetrachloroethene	**3.8 E-05**[t]	D
o-Tolualdehyde	**7.2 E-06**[j]	D
p-Tolualdehyde	**1.1 E-05**[z]	D
Toluene	**9.2 E-04**[v]	C
Trichlorobiphenyl	**2.6 E-09**[r]	C
1,1,1-Trichloroethane	**3.1 E-05**[t]	D
Trichloroethene	**3.0 E-05**[t]	D
Trichlorofluoromethane	**4.1 E-05**	D
2,4,6-Trichlorophenol	**<2.2 E-08**[ak]	C

Table 1.6-3. (cont.)

Organic Compound	Average Emission Factor[b] (lb/MMBtu)	EMISSION FACTOR RATING
Vinyl Chloride	**1.8 E-05**[r]	D
o-Xylene	**2.5 E-05**[v]	D
Total organic compounds (TOC)	**0.039**[ai]	D
Volatile organic compounds (VOC)	**0.017**[aj]	D
Nitrous Oxide (N_2O)	**0.013**[ak]	D
Carbon Dioxide (CO_2)	**195**[al]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] Factors are for boilers with no controls or with particulate matter controls.

[c] References 26, 34, 36, 59, 60, 65, 71-73, 75.

[d] References 26, 33, 34, 36, 59, 60, 65, 71-73, 75.

[e] References, 26, 35, 36, 46, 50, 59, 60, 65, 71-75.

[f] Reference 26.

[g] Reference 33.

[h] Reference 26, 50, 83.

[i] References 26, 34, 36, 59, 60, 65, 71-73, 75.

[j] References 26, 50.

[k] References 26, 35, 36, 46, 59, 60, 65, 70, 71-75.

[l] References 26, 36, 59, 60, 65, 70-75.

[m] References 26, 33, 36, 59, 60, 65, 70-73, 75.

[n] References 26, 33, 36, 59, 60, 65, 71-73, 75.

[o] Reference 34.

[p] References 26, 36, 60, 65, 71-75.

[q] References 26, 33.

[r] References 26.

[s] Reference 83.

[t] References 26, 72.

[u] References 35, 60, 65, 71, 72.

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[w] References 35, 60, 65, 71, 72.

[x] References 26, 33, 34, 59, 60, 65, 71-75.

[y] References 26, 28, 35, 36, 46 - 51, 59, 60, 65, 70, 71-75, 79, 81, 82.

[z] Reference 50.

[aa] Reference 26, 45.

[ab] References 26, 33, 34, 36, 59, 60, 65, 71-75, 83.

[ac] References 26, 35, 60, 65, 71, 72.

[ad] References 26, 33, 34, 36, 59, 60, 65, 71 - 73.

[ae] References 26, 33, 34, 35, 60, 65, 70, 71, 72.

[af] References 26, 33, 34, 36, 59, 60, 65, 71 - 73, 83.

[ag] References 26, 45.

[ah] References 26, 35, 60, 65, 71.

[ai] TOC = total organic compounds. Factor is the sum of all factors in table except nitrous oxide and carbon dioxide.

[aj] VOC volatile organic compounds. Factor is the sum of all factors in table except hydrogen chloride, chlorine, formaldehyde, tetrachloroethene, 1,1,1,-trichloroethane, dichloromethane, acetone, nitrous oxide, methane, and carbon dioxide.

[ak] Reference 83.

[al] References 19 - 26, 33 - 49, 51- 57, 77, 79 - 82, 84 - 86.

Table 1.6-4. EMISSION FACTORS FOR TRACE ELEMENTS FROM WOOD RESIDUE COMBUSTION[a]

Trace Element	Average Emission Factor (lb/MMBtu)[b]	EMISSION FACTOR RATING
Antimony	**7.9 E-06**[c]	C
Arsenic	**2.2 E-05**[d]	A
Barium	**1.7 E-04**[c]	C
Beryllium	**1.1 E-06**[e]	B
Cadmium	**4.1 E-06**[f]	A
Chromium, total	**2.1 E-05**[g]	A
Chromium, hexavalent	**3.5 E-06**[h]	C
Cobalt	**6.5 E-06**[i]	C
Copper	**4.9 E-05**[g]	A
Iron	**9.9 E-04**[k]	C
Lead	**4.8 E-05**[l]	A
Manganese	**1.6 E-03**[d]	A
Mercury	**3.5 E-06**[m]	A
Molybdenum	**2.1 E-06**[c]	D
Nickel	**3.3 E-05**[n]	A
Phosphorus	**2.7 E-05**[c]	D
Potassium	**3.9 E-02**[c]	D
Selenium	**2.8 E-06**[o]	A
Silver	**1.7 E-03**[p]	D
Sodium	**3.6 E-04**[c]	D
Strontium	**1.0 E-05**[c]	D
Tin	**2.3 E-05**[c]	D
Titanium	**2.0 E-05**[c]	D
Vanadium	**9.8 E-07**[c]	D
Yttrium	**3.0 E-07**[c]	D
Zinc	**4.2 E-04**[o]	A

[a] Units of lb of pollutant/million Btu (MMBtu) of heat input. To convert from lb/MMBtu to lb/ton, multiply by (HHV * 2000), where HHV is the higher heating value of the fuel, MMBtu/lb. To convert lb/MMBtu to kg/J, multiply by 4.3E-10. These factors apply to Source Classification Codes (SCC) 1-0X-009-YY, where X = 1 for utilities, 2 for industrial, and 3 for commercial/institutional, and where Y = 01 for bark-fired boiler, 02 for bark and wet wood-fired boiler, 03 for wet wood-fired boiler, and 08 for dry wood-fired boiler.

[b] Factors are for boilers with no controls or with particulate matter controls.

[c] Reference 26.

[d] References 26, 33, 36, 46, 59, 60, 65, 71-73, 75, 81.

[e] References 26, 35, 36, 46, 59, 60, 65, 71-73, 75.

[f] References 26, 35, 36, 42, 46, 59, 60, 65, 71-73, 75, 81.

[g] References 26, 34, 35, 36, 42, 59, 60, 65, 71-73, 75, 81.

[h] References 26, 36, 46, 59, 60, 71, 72, 73, 75.

[i] References 26, 34, 83.

[j] References 26, 33-36, 46, 59, 60, 65, 71-73, 75, 81.

[k] References 26, 71, 72, 81.

[l] References 26, 33-36, 46, 59, 60, 65, 71-73, 75.

[m] References 26, 35, 36, 46, 59, 60, 65, 71-73, 75, 81.

[n] References 26, 33 - 36, 46, 59, 60, 65, 71-73, 75, 81.

[o] References 26, 33, 35, 46, 59, 60, 65, 71-73, 75, 81.

[p] Reference 34.

Table 1.6-5. CUMULATIVE PARTICLE SIZE DISTRIBUTION AND SIZE-SPECIFIC EMISSION FACTORS FOR WOOD/BARK-FIRED BOILERS[a]

EMISSION FACTOR RATING: E

Particle Size[b] (μm)	Cumulative Mass % ≤ Stated Size				
		Controlled			
	Uncontrolled[c]	Multiple Cyclone[d]	Multiple Cyclone[e]	Scrubber[f]	Dry Electrostatic Granular Filter (DEGF)
15	94	96	35	98	77
10	90	91	32	98	74
6	86	80	27	98	69
2.5	76	54	16	98	65
1.25	69	30	8	96	61
1.00	67	24	6	95	58
0.625	ND	16	3	ND	51
Total	100	100	100	100	100

[a] Reference 89.
[b] Expressed as aerodynamic equivalent diameter.
[c] From data on underfeed stokers. May also be used as size distribution for wood-fired boilers.
[d] From data on spreader stokers with flyash reinjection.
[e] From data on spreader stokers without flyash reinjection.
[f] From data on Dutch ovens. Assumed control efficiency is 94%.

Figure 1.6-1. Cumulative size-specific particulate matter emission factors for wood/bark-fired boilers.

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82. *Emission Test Program on the Wood-Fired Boiler at Goodman Forest Industries, Ltd. Goodman, Wisconsin.* Air Environmental. Inc. December 14, 1995.

83. Emission Factor Documentation for AP-42 Section 1.6- Wood Waste Combustion in Boilers. Technical Support Division, Office of Air Quality Planning and Standards. U.S. Environmental Protection agency. Research Triangle Part, NC. April, 1993.

84. *Report to Eggers Industries, Inc., Two Rivers, Wisconsin for Stack Emission Test, West Plant Wood-Fired Boiler.* Environmental Technology And Engineering Corporation. February 27, 1996.

85. *Lamico, Inc., Emission test at 474 Mariod Road, Oshkosh, WI, October 5 & 6, 1989.* Badger Laboratories & Engineering Co., Inc. November 1, 1989.

86. *Cleaver-Brooks Boiler Stack Particulate Emission Testing on November 8, 1994.* Environmental Services of America, Inc. December 7, 1994.

87. *Inhalable Particulate Source Category Report for External Combustion Sources*, EPA Contract No. 68-02-3156, Acurex Corporation, Mountain View, CA, January 1985.

88. Oregon Department of Environmental Quality Database, Process data. State of Oregon, 2001.

89. *Wood Products in The Waste Stream - Characterization and Combustion Emissions,* U.S. Environmental Protection Agency, Control Technology Center, October 1996.

Title 40: Protection of Environment
PART 98—MANDATORY GREENHOUSE GAS REPORTING
Subpart A—General Provision

TABLE A-1 TO SUBPART A OF PART 98—GLOBAL WARMING POTENTIALS

[100-Year Time Horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
Chemical-Specific GWPs			
Carbon dioxide	124-38-9	CO_2	1
Methane	74-82-8	CH_4	[a]25
Nitrous oxide	10024-97-2	N_2O	[a]298

Table C-1 to Subpart C of Part 98—Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

DEFAULT CO_2 EMISSION FACTORS AND HIGH HEAT VALUES FOR VARIOUS TYPES OF FUEL

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27

Fuel type	Default high heat value	Default CO_2 emission factor
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products—liquid	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG)[1]	0.092	61.71
Propane[1]	0.091	62.87
Propylene[2]	0.091	67.77
Ethane[1]	0.068	59.60
Ethanol	0.084	68.44
Ethylene[2]	0.058	65.96
Isobutane[1]	0.099	64.94
Isobutylene[1]	0.103	68.86
Butane[1]	0.103	64.77
Butylene[1]	0.105	68.72
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22
Pentanes Plus	0.110	70.02
Petrochemical Feedstocks	0.125	71.02
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22

Fuel type	Default high heat value	Default CO_2 emission factor
Aviation Gasoline	0.120	69.25
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36
Crude Oil	0.138	74.54
Petroleum products—solid	mmBtu/short ton	kg CO_2/mmBtu.
Petroleum Coke	30.00	102.41.
Petroleum products—gaseous	mmBtu/scf	kg CO_2/mmBtu.
Propane Gas	2.516×10^{-3}	61.46.
Other fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Municipal Solid Waste	9.95[3]	90.7
Tires	28.00	85.97
Plastics	38.00	75.00
Other fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Blast Furnace Gas	0.092×10^{-3}	274.32
Coke Oven Gas	0.599×10^{-3}	46.85
Fuel Gas[4]	1.388×10^{-3}	59.00
Biomass fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Wood and Wood Residuals (dry basis)[5]	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Landfill Gas	0.485×10^{-3}	52.07
Other Biomass Gases	0.655×10^{-3}	52.07
Biomass Fuels—Liquid	mmBtu/gallon	kg CO_2/mmBtu
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

[1]The HHV for components of LPG determined at 60 °F and saturation pressure with the exception of ethylene.
[2]Ethylene HHV determined at 41 °F (5 °C) and saturation pressure.
[3]Use of this default HHV is allowed only for: (a) Units that combust MSW, do not generate steam, and are allowed to use Tier 1; (b) units that derive no more than 10 percent of their annual heat input from MSW and/or tires; and (c) small batch incinerators that combust no more than 1,000 tons of MSW per year.
[4]Reporters subject to subpart X of this part that are complying with §98.243(d) or subpart Y of this part may only use the default HHV and the default CO_2 emission factor for fuel gas combustion under the conditions prescribed in §98.243(d)(2)(i) and (d)(2)(ii)

and §98.252(a)(1) and (a)(2), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

[5]Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100)*HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.

[78 FR 71950, Nov. 29, 2013; as amended at 81 FR 89252, Dec. 9, 2016]

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Table C-2 to Subpart C of Part 98—Default CH_4 and N_2O Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum Products (All fuel types in Table C-1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Other Fuels—Solid	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels—Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels—Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels—Liquid (All fuel types in Table C-1)	1.1×10^{-03}	1.1×10^{-04}

Note: Those employing this table are assumed to fall under the IPCC definitions of the "Energy Industry" or "Manufacturing Industries and Construction". In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC "Energy Industry" category may employ a value of 1g of CH_4/mmBtu.

[78 FR 71952, Nov. 29, 2013 as amended at 81 FR 89252, Dec. 9, 2016]

ENTEC SERVICES, INC.
STACK TESTING AND POLLUTION CONTROL SYSTEM EVALUATION

BI-ANNUAL COMPLIANCE EMISSIONS TESTING

ON THE

McBURNEY WOOD WASTE-FIRED BOILER EXHAUST (ID-01)

OCTOBER 8, 2013

PROJECT NO.: 413422 CAMDEN

PREPARED FOR

NEW SOUTH FOREST COMPANIES, INC.

3700 Claypond Road
Myrtle Beach, South Carolina 29578

Table 2-1
Emissions Summary

Test Performed For: New South Lumber Company, Inc.
Camden, SC

Source(s) Tested: McBurney Wood-fired Boiler (ID - 01)
Test Condition: Compliance Testing
Test(s) Performed: US EPA Reference Method 5

Project Manager: Keith Poole

Run Number	Run 1	Run 2	Run 3	Average	
Date of Run	10/8/13	10/8/13	10/8/13	-	
Emission Test Run Time Began - Ended	0822-0924	1000-1102	1138-1240	-	
Boiler Heat Input, mmBtu/Hr*	98.54	94.95	97.64	97.05	
Oxygen Concentration, %	10.1	10.3	10.2	10.2	
Carbon Dioxide Concentration, %	10.5	10.0	10.0	10.2	
Isokinetic Sampling Rate, %	93.91	98.41	98.02	96.78	
Stack Temperature, °F	479	479	479	479	
Moisture Content, % volume	16.88	17.48	17.34	17.23	
Stack Gas Velocity, F/S	64.46	64.17	64.93	64.52	
Stack Gas Flow, SCFM	34,478	34,304	34,692	34,491	
Stack Gas Flow, ACFM	61,509	61,232	61,957	61,566	**Permit**
Volumetric Flow Rate, DSCFM	28,659	28,307	28,676	28,547	**Limits**
Filterable Particulate Emissions **gr/dscf**	**0.0432**	**0.0815**	**0.0489**	**0.0579**	
Filterable Particulate Emissions **Lbs/Hr**	**10.62**	**19.77**	**12.03**	**14.14**	
Filterable Particulate Emissions **lbs/mmBTU**	**0.108**	**0.208**	**0.123**	**0.146**	0.6

The lbs/mmBTU (Heat Input) filterable particulate emissions from this source were below **the applicable standards.**

3.0 PROCESS DESCRIPTION

Wood waste generated from the production of dimensional lumber is utilized in firing the 98.3 mmBtu/hr McBurney steam generating boiler (installed in 1983). The boiler is equipped with primary and secondary Zurn multi-cyclones followed by a PPC dry ESP for particulate control. The treated gases exhaust through the 54" diameter vertical exhaust stack. The maximum operating capacity of the boiler is 98.3 mmBtu/hr. The boiler exhaust is also equipped with a COMs unit for opacity determinations.

Process data is presented in the following table. True copies of the process logs and steam charts are provided in the Appendix to this report.

Table 3-1 Process Data

NSLC - Camden
Camden, SC
10/8/2013

Process Data				
Parameter	**Run #1**	**Run #2**	**Run #3**	**Test Average**
Steam Flow, #/hr	61111.0	59455.4	59922	**60162.8**
Multi-clone PD Primary, inches H_2O	3.00	3.00	3.00	**3.00**
Multi-clone PD Secondary, inches H_2O	3.5	3.5	3.5	**3.5**
ESP Field #1 Primary, VAC	183.6	189	208.8	**193.8**
ESP Field #1 Secondary, KVDC	32.6	32.6	33.2	**32.8**
ESP Field #2 Primary, VAC	172.0	166.8	187.2	**175.3**
ESP Field #2 Secondary, KVDC	30.60	29.80	31.80	**30.73**

F-FACTOR CALCULATION

CLIENT:	New South Lumber Co., Inc.
LOCATION:	Camden, SC
SOURCE:	McBurney Wood-fired Boiler (ID - 01)
SAMPLING DATE:	10/8/2013

THE DRY F-FACTOR, Fd IN DSCF/MMBTU, CAN BE DETERMINED BY THE FOLLOWING FORMULA: Fd= (E6*(3.64*%H+1.53*%C+0.57*%S+0.14*%N-0.46*%O))/GCV

Sample #	composite	As received, %		Dry Basis, %
MOISTURE		49.62		XX
ASH		1.11		2.2
SULFUR		0.1		0.19
CARBON		26.68		52.96
HYDROGEN		2.97		5.9
NITROGEN		0.18		0.35
OXYGEN(DIFF)		19.34		38.4
BTU/LB		4729		9387
			Fd (scf/mmBtu)=	9,055

Multiple Metals Emission Rate Summary

Client: New South Companies, Inc.
Location: Camden, South Carolina
Date: 10/11/2005
Source: Boiler Exhaust Stack (#01)

Metal		Lbs/hr	Lbs/24 Hr	Lbs/year Potential	Tons/year Potential	Lbs/mmBtu
Arsenic (As 7440-38-2)		3.18E-04	7.63E-03	2.78E+00	1.39E-03	3.37E-06
Beryllium (Be 7440-41-7)		7.28E-06	1.75E-04	6.38E-02	3.19E-05	7.71E-08
Cadmium (Cd 7440-43-9)		5.00E-04	1.20E-02	4.38E+00	2.19E-03	5.30E-06
Chromium (Cr 7440-47-3)		8.72E-04	2.09E-02	7.64E+00	3.82E-03	9.24E-06
Lead (Pb 7439-92-1)		3.17E-03	7.60E-02	2.77E+01	1.39E-02	3.36E-05
Manganese (Mn 7439-96-5)		9.52E-02	2.28E+00	8.34E+02	4.17E-01	1.01E-03
Mercury (Hg 7439-97-6)		4.14E-05	9.95E-04	3.63E-01	1.82E-04	4.39E-07
Nickel (Ni 7440-02-0)		8.45E-04	2.03E-02	7.41E+00	3.70E-03	8.96E-06
Selenium (Se 7782-49-2)		1.43E-04	3.43E-03	1.25E+00	6.25E-04	1.51E-06

Combined emissions of all Metals Except Manganese and Mercury **6.042E-05**
Total for all **1.071E-03**

Subpart DDDDD allowables

PM < 0.07 lbs/mmBtu (Surrogate standard)
-or-
Total selected metals < 1.0-03 lbs/mmBtu
Mercury (Hg) < 7.0 e-06 lbs/mmBtu

FACTORS:

Hardwood VOC factor changed from 0.34 to 0.409 to maintain 10% of softwood factor (REF: Kiln Factors per June 1999 DAQ letter to AFMA - posted on DAQ website)
Hardwood toxics - there are no HAP/TAPS from hardwood kilns reported on this spreadsheet

Softwood: VOC, toxics, and PM from Wallace Pitts (DAQ-RCO) analysis of NCASI/EPA data summarized below (see full spreadsheet on DAQ website for factor documentation):

Note: NCASI data is based on shorter kiln cycles than for lumber kiln cycles at typical wood furniture manufacturing facilities. The emission factors may not be applicable.

Revised, references
Southern Yellow Pine Emission Factors
MBF is 1000 board feet

	emission factor, pounds per MBF		
	Steam heated	Suspension burner	Gasifier
PM	0.022 (1)	0.40 (2)	0.14 (3)
PM_{10}	~	~	~
VOC			
as carbon	3.51 (4)	3.83 (5)	3.83 (5)
as VOC (pinene)	4.09	4.34	4.34
Methanol	0.199 (6)	0.161 (7)	0.161 (7)
Phenol	0.01(8)	0.01 (8)	0.01 (8)
Formaldehyde	0.0183 (9)	0.103 (10)	0.103 (10)
Acetaldehyde (11)	0.052	0.052	0.052
Acrolein (12)	0.0075	0.0075	0.0075

	emission factor, pounds per MBF-hour		
	Steam heated	Suspension burner	Gasifier
Acetaldehyde	0.00377 (13)	0.00377	0.00377
Acrolein	0.00051 (14)	0.00051	0.00051
formaldehyde	0.0014 (15)	0.01185 (16)	0.01185 (16)

For TAPs, the emissions on an hourly basis are given by
(Charge in 1000 board feet)* (emission factor)
Example: 140,000 BF kiln charge = (140)*(0.00140) = 0.196 lb formaldehyde per hour

Note: for hourly emissions of phenol, use emission factor in lb/MBF.

REFERENCES

(1)

PRODUCT	FIRING TYPE	MILLS/UNITS/RUNS	RATIO OF NON-DETECTS	RANGE		MEDIAN	MEAN	UNITS
Southern Pine Lur	Steam Heated	3/3/16	0/16 nd	2.00E-03 to	1.70E-01	9.30E-03	2.20E-02	lb/MBF
Southern Pine Lur	Direct Fired	6/7/24	0/24 nd	2.30E-02 to	1.30E+00	3.20E-01	3.70E-01	lb/MBF

(2) personal Communication, D Word, NCASI, May 31, 2005
Kiln 1K181

Suspension Burner	Run	M 5 lb/MBF	Production	Cycle time, hrs
1K181	1	0.4175	133	20.3
1K181	2	0.3480	133	20.3
1K181	1	0.4800	131	20
1K181	2	0.4100	131	20
1K181	3	0.3500	131	20
		0.40	131.80	20.12

(3) personal Communication, D Word, NCASI, May 31, 2005
Kiln 098 DF

Gasifier	Run	M 5 lb/MBF	Production	Cycle time, hrs
1K098	1	0.2670	130	26.45
1K098	2	0.2010	130	26.45
1K098	3	0.2250	130	26.45
2K098	1	0.1520	129	17.52
2K098	2	0.1810	129	17.52
2K098	3	0.0980	129	17.52
2K098	1	0.0540	104.5	17.25
2K098	2	0.0548	104.5	17.25
2K098	3	0.0466	104.5	17.25
		0.143	120.83	20.41

(4) NCASI Technical Bulletin 845 Table 8.2 Steam heated average of all kilns
(5) NCASI Technical Bulletin 845 Table 8.1 Direct fired (gasifier) full scale kiln only
(6) NCASI Technical Bulletin 845 Table 9.6 Steam heated all kilns
(7) NCASI Technical Bulletin 845 Table 9.4 Direct fired (gasifier) full scale kiln
(8) Table 2A to Appendix B Emission factors for Plywood and Composite Wood Product MACT (Subpart DDDD)
(9) NCASI Technical Bulletin 845 Table 9.5 steam heated full scale kiln and OSU small scale runs. MSU not used. See spreadsheet tab for statistical test
(10) NCASI Technical Bulletin 845 Table 9.3 Direct fired full scale kiln only
(11) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 and BB7 OSU INDF3
(12) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 and BB7 OSU INDF3
(13) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 run # 10 and BB7 OSU INDF3 Run # 2
(14) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 run # 10 and BB7 OSU INDF3 Run # 2
(15) NCASI Technical Bulletin 845 Appendix Y7 FSK INDF1 run # 9, BB6 FSK INDF3 run # 10, App Y9 OSU INDF1 run # 4, BB7 OSU INDF3 run # 6
(16) NCASI Technical Bulletin 845 Appendix Y1 FSK DF2 run # 6, Y2 FSK DF5 run # 6

D H E C

PROMOTE PROTECT PROSPER

Catherine B. Templeton, Director

Promoting and protecting the health of the public and the environment

August 15, 2012

Mr. Jeff Hondorp
Georgia-Pacific
1664 South Main Street Ext.
McCormick, SC 29835

RE: Continuous Kiln PM, NO_x, CO, VOC Methanol, and Formaldehyde Testing Conducted February 14, 2012
Batch Kiln CO, NO_x, VOC, Methanol, and Formaldehyde Testing Conducted February 15, 2012

Dear Mr. Hondorp,

The results of the referenced tests have been reviewed by the Department and the emission rates and operating parameters have been summarized below:

Continuous Kiln

Pollutants	Production Board Ft./Hour	Emission Rate lb/kbf	Emission Rate lbs/hr	Allowable Rate lbs/hr
PM	8308.50	0.605	5.03	35.2
PM -2.5[1]	8308.50	0.58	5.041	N/A
PM-10[1]	8308.50	0.795	6.602	N/A
NO_x	8308.50	0.374	3.10	N/A
CO	8308.50	0.314	2.61	N/A
Methanol	8308.50	0.219	1.81	N/A
Formaldehyde	8308.50	0.041	0.34	N/A
VOC as Carbon[2]	8308.50	4.605	38.26	N/A
VOC[3]	8308.50	5.824	48.39	N/A

[1]Includes filterable and condensable fractions. Filterable fraction determined from Coulter Counter.
[2]Method 25A
[3]VOC per OTM 26

Batch Kiln

Pollutants	Production Board Ft./Hour	Emission Rate lb/kbf	Emission Rate lbs/hr	Allowable Rate
CO	3895.62	1.429	5.57	N/A
NO_x	3895.62	0.668	2.60	N/A
Methanol	3895.62	0.202	0.79	N/A
Formaldehyde	3895.62	0.124	0.48	N/A
VOC as Carbon[2]	3895.62	4.443	17.31	N/A
VOC[3]	3895.62	5.696	22.42	N/A

[2] Method 25A
[3]VOC per OTM 26

Continuous Kiln Average Fuel quality (as rec'd): 0.46% Ash, 0.01% Sulfur, 10.55% Moisture@7929 BTU/lb.
Batch Kiln Average Fuel quality (as rec'd): 0.41% Ash, 0.01% Sulfur, 8.16% Moisture @ 8871 BTU/lb.

PM-2.5 and PM-10 filterable emissions estimates were not determined using EPA Reference Test Methods and may not be sufficient for determination of compliance with emission limitations.

Compliance Status for Continuous Kiln: PM SC Regulation 61-62.5, Standard No. 4.....Compliance.

If I can be of further assistance, please call me at (803) 898-3901 or email me at garrettf@dhec.sc.gov.

Sincerely,

Tondrae F. Garrett

Tondrae F. Garrett
Environmental Health Manager
Source Evaluation Section
SC DHEC Bureau of Air quality

CC: Compliance File: 1600-0002
Mark Harvley, Region 1 EQC, Greenwood

EC: Michael Shroup, BAQ Carol Boney, BAQ Linda Morgan, BAQ
Dawn Jordan, BAQ Michael Daugherty, BAQ

Stack Test Observation Summary

Observer: Tondrae F. Garrett
Permit #: 1600-0002
Facility: GP McCormick
Facility Contact: Mike O'Brien
Location: 1664 South Main Street Extension, McCormick, SC 29835
Date: 2/14/12
Source: Kiln BDK and CDK
Type of Testing: VOCs

Facility Contact Phone number: (864) 465-2026
Test Team: Environmental Monitoring Laboratories, Inc. (601) 865-3092

Departure Time from DHEC: 7:30 am
Arrive Time: ~9:15 am
Depart Time: ~6:30 pm
Arrival Time at DHEC: 8:19 pm

Summary:

Cyclonic flow check was performed before testing started. I checked the data signed and initialed the sheet. Parametric monitoring readings were taken by GP McCormick personnel. Because of loading issues the test didn't start until 12:38pm.

Parameters	Run 1	Run 2	Run 3
Start/Stop Time	12:38 pm/13:46	14:48 pm/16:08pm	16:57pm/18:18pm
Push Rate/Bd Ft	1.42	1.42	1.42
Burner Fuel Usage	38.69 lbs/min	39.60 lbs/min	40.60 lbs/min

D H E C

PROMOTE PROTECT PROSPER

Catherine B. Templeton, Director

Promoting and protecting the health of the public and the environment

October 11, 2013

Mr. Jeff Hondorp
Georgia-Pacific
1664 South Main Street Ext.
McCormick, SC 29835

RE: Continuous Kiln PM, NO_x, CO, VOC, Methanol, and Formaldehyde Testing, Conducted July 17, 2013
Batch Kiln CO, NO_x, VOC, Methanol, and Formaldehyde Testing, Conducted July 18, 2013

Dear Mr. Hondorp,

The results of the referenced tests have been reviewed by the Department and the emission rates and operating parameters have been summarized below:

Continuous Kiln

Pollutants	Production Board Ft./Hour	Emission Rate lb/kbf	Emission Rate lbs/hr	Allowable Rate lbs/hr
PM	8425.56	0.451	3.80	35.2
PM -2.5[1]	8425.56	0.282	2.38	N/A
PM-10[1]	8425.56	0.398	3.35	N/A
NO	8425.56	0.411	3.47	N/A
NO_2	8425.56	0.0166	0.140	N/A
NO_x	8425.56	0.424	3.57	N/A
CO	8425.56	0.372	3.02	N/A
Methanol	8425.56	0.212	1.78	N/A
Formaldehyde	8425.56	0.0859	0.724	N/A
VOC as Carbon[2]	8425.56	4.51	38.0	N/A
VOC[3]	8425.56	5.71	48.1	N/A

[1]Includes filterable and condensable fractions. Filterable fraction determined from Coulter Counter.
[2]Method 25A
[3]VOC per OTM 26

Batch Kiln

Pollutants	Production Board Ft./Hour	Emission Rate lb/kbf	Emission Rate lbs/hr	Allowable Rate
CO	3734.53	0.843	3.13	N/A
NO	3734.53	0.359	1.34	N/A
NO_2	3734.53	0.01	0.03	N/A
NO_x	3734.53	0.368	1.37	N/A
Methanol	3734.53	0.174	0.634	N/A
Formaldehyde	3734.53	0.093	0.345	N/A
VOC as Carbon[2]	3734.53	4.68	17.4	N/A
VOC[3]	3734.53	5.94	22.0	N/A

[2] Method 25A
[3]VOC per OTM 26

Continuous Kiln Average Fuel quality (as rec'd): 0.59% Ash, 0.005% Sulfur, Moisture Free@8800 BTU/lb.
Batch Kiln Average Fuel quality (as rec'd): 1.14% Ash, 0.005% Sulfur, Moisture Free@8769 BTU/lb.

PM-2.5 and PM-10 filterable emissions estimates were not determined using EPA Reference Test Methods and may not be sufficient for determination of compliance with emission limitations.

Compliance Status for Continuous Kiln: PM SC Regulation 61-62.5, Standard No. 4.....Compliance.

If I can be of further assistance, please call me at (803) 898-3901 or email me at garrettf@dhec.sc.gov.

Sincerely,

Tondrae Garrett

Tondrae F. Garrett
Environmental Health Manager
Source Evaluation Section
SC DHEC Bureau of Air quality

CC: Compliance File: 1600-0002

EC: Michael Shroup, BAQ Carol Boney, BAQ Mark Harvley, BES
Dawn Jordan, BAQ Michael Daugherty, BAQ

CONSTRUCTION PERMIT APPLICATION
Newberry Mill > Newberry, South Carolina

West Fraser Timber Co. Ltd

Continuous Kiln Construction Permit Application

Prepared By:

Tony Jabon – Principal Consultant
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November 2012

Project 123402.0047

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emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source.

West Fraser is not installing a new planer mill, but rather replacing the control device associated with the planer mill. Since the planer mill is an existing source, the proposed planer mill upgrade qualifies as a modification to an existing facility. Therefore, projected actual emissions must be compared to past actual emissions in order to determine the net emissions increase from this portion of the project. Since the continuous kilns are new sources West Fraser must use potential emissions to calculate the net emissions increase from this portion of the project.

3.1.5. Potential Emissions (D)

Potential emissions are defined by 40 CFR 52.21(b)(4):

> *...means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable...*

The continuous kilns are new units as defined in 52.21(b)(7)(i). Since the kilns are new units, West Fraser must use potential emissions to determine if the project will result in a significant emissions increase.

Any modification (i.e., a physical change or change in method of operation) to the facility that has the potential to increase emissions of any air pollutant(s) regulated under the PSD or NNSR program must be evaluated to determine if the changes are subject to PSD or NNSR. The proposed continuous kiln installations at the Newberry Mill qualify as a potential modification and require evaluation under the NSR permitting program.

3.2. PROPOSED PROJECT EMISSIONS INCREASES

The following sections summarize the methods to estimate the emissions increases from the proposed project for comparison to the NSR permitting major modification thresholds. Although HAP are not PSD-regulated pollutants, emissions increases of HAP from the project were also evaluated and are presented in the following sections.

3.2.1. Direct-Fired Continuous Kilns (New)

Potential emissions from the new continuous kilns were evaluated using the maximum production capacities of the kilns (MMBF/yr) and the burner heat input capacities (MMBtu/hr) in conjunction with either National Council for Air and Stream Improvements (NCASI) emission factors or AP-42 factors.[3] Continuous lumber kilns represent relatively new process technology, particularly to West Fraser. Theoretical design capacities of the kilns as presented by vendors have a general range between 1 – 1.5 MMBf annually per foot of primary drying chamber length. Presently, West Fraser believes that a design capacity of 1.3 MMBf/yr/ft of primary drying chamber length is a realistic estimate of what can be achieved. Hence, annual capacities of the kilns are based on the 1.3 MMBf/yr/ft of primary drying chamber length and the design length for the primary drying chamber of each new continuous kiln.

[3] All NCASI values used in the application were either provided to Trinity by West Fraser or were obtained from publicly available sources (e.g. air permit applications submitted by wood lumber facilities to state environmental agencies). Detailed references are provided in Appendix B.

Potential emissions of acetaldehyde, formaldehyde, methanol, methyl isobutyl ketone (MIBK), phenol, toluene, and all criteria pollutants (except SO_2) from the direct-fired continuous kilns were calculated by multiplying the maximum production capacity of dried lumber from the kilns (MBF/year) by the appropriate emission factor (lb/MBF). Potential emissions of SO_2 and all other HAP, except polycyclic aromatic compounds (PAC), were calculated based on the heat input of the wood combusted (MMBtu/year) multiplied by the pollutant emission factor (lb/MMBtu). Potential PAC emissions were calculated by multiplying the amount of wood combusted annually (MMBtu/year) by the pollutant emission factor (lb/ton) and dividing by the average heating value of the wood (MMBtu/ton).

All of the criteria pollutant emission factors, with the exception of SO_2, are based on NCASI values for direct-fired kilns that were either provided to Trinity Consultants by West Fraser or were obtained from publicly available sources. The emission factor for SO_2 is from AP-42, Section 1.6, *Wood Residue Combustion* for a boiler with no controls.[4] HAP emission factors are based on a combination of AP-42, Section 1.6 values and factors developed by NCASI. Table 8-1 in Appendix B provides a detailed list of emission factors and their sources.

The NCASI emission factors that are used in the emission calculations were initially developed for batch lumber kilns. Since continuous kilns are a new technology, there is limited testing data. No NCASI publicly available reviewed testing data was located for continuous kilns.[5] The emission factors for a continuous kiln are expected to be equal to or less than that of a batch kiln.

The majority of VOC emitted by the lumber kilns are a result of compounds being released from the wood during the drying process. Relatively few VOC are a result of combustion. VOC emissions from drying releases likely depend on a number of factors, including the type of wood being dried, the size of the wood, the season of the year, kiln operating conditions, and the original and final moisture contents of the wood. The main type of VOC emitted from the wood is in the form of terpenes, primarily alpha-pinene, from southern yellow pine. There are also water soluble VOC released from the kilns such as methanol and formaldehyde, which could potentially be entrained in the significant quantities of water discharged from continuous kilns.[6]

For NSR purposes, U.S. EPA requires the total mass of VOC be relied upon for permitting assessments. Given the unique nature of exhaust streams from wood product facilities, U.S. EPA has established a protocol for adjusting traditional VOC as carbon emission factors to a total mass VOC basis. The protocol is intended to address limitations and challenges in VOC testing methods. Per the methodology established, the VOC emission factor for continuous kilns is calculated using the following equation:[7]

$$Total\ VOC = VOC\ as\ C \times 1.133 + (1 - 0.65) \times Methanol + Formaldehyde$$

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 amu) to the molecular weight of the carbon in pinene (120 amu). As the Method 25/25A test method does not register oxygenated compounds well, emissions of formaldehyde and methanol must be added to appropriately account for their presence in exhaust streams from wood product facilities. Accordingly, U.S. EPA has agreed to "response factors" for these chemicals that

---

[4] U.S. EPA AP-42, Section 13.2.2, *Wood Residue Combustion*, September 2003.

[5] Emissions testing has been completed on a continuous gasifier-combustor kiln operated by Bibler Bros. in Arkansas. However, this testing represents a limited data set from which overall trends cannot be reasonably established.

[6] Installed kilns have been generating between 2-6 gallons of water per minute at the end of the kiln. Per conversation with Mr. Gary Vande Linde (West Fraser) and Ms. Deanna L. Duram (Trinity), March 28, 2012.

[7] U.S. EPA, document entitled, "Interim VOC Measurement Protocol for the Wood Products Industry – July 2007," page 2.

account for what the Method 25/25A tests would observe. For example, formaldehyde is not typically "recognized" in the VOC test method. Therefore, it has a 0% response factor; whereas 65% of methanol present in an exhaust stream is captured within the VOC as C emission factor. Hence, to avoid double-counting of emissions, the speciated methanol emission factor is reduced by 65%.

There is limited data available regarding the level of total PM_{10} and total $PM_{2.5}$ emissions from direct-fired lumber kilns. The total PM, total PM_{10}, and total $PM_{2.5}$ emission factors are represented as the sum of filterable and condensable particulate emission factors. The ratio of total PM to total PM_{10} is estimated using U.S. EPA's "PM Calculator" software for various wood dryer source classification codes. The ratio of total PM to total $PM_{2.5}$ is based on Weyerhaeuser NR's Particulate Estimating Guide, 2003, as referenced in a May 2010 PSD permit application for the Plymouth, North Carolina facility.[8]

The emission factors for CO_2e emissions from wood combustion were based on factors established in the Greenhouse Gas Mandatory Reporting (MRR) rule in 40 CFR 98, Table C-1 and C-2. Per the biomass deferral, the CO_2e emission factor for the combustion of biomass excludes emissions of CO_2.[9] Detailed emission calculations from the continuous kilns are provided in Appendix B.

3.2.2. Planer Mill (existing)

Emissions increases from the planer mill were calculated based on the exit grain loading, design air flow rates, and the projected increase in hours of operation of the proposed new planer mill cyclone. The exit grain loading rate was obtained from the U.S. EPA's WebFIRE database for planing and trimming sawmill operations controlled by a cyclone (SCC Code 3-07-008-05). Emissions from the new cyclone were calculated using the same grain loading rate as the existing cyclone. However, the new cyclone will have a higher potential air flow, which was accounted for in the calculations. West Fraser calculated the projected actual hours of operation for the new cyclone by scaling hours of operation for the planer mill from 2007 to 2008 based on the ratio of past actual kiln throughput to projected continuous kiln throughput. The increases in air flow and hours of operation were then used to calculate the net emissions increase from the planer mill portion of the project.

3.2.3. Ancillary Equipment Emission Increases

In addition to emissions from the kilns, the proposed project will result in emissions increases from ancillary equipment at the mill associated with the kilns. Note that only filterable PM, filterable PM_{10}, and filterable $PM_{2.5}$ are emitted from the ancillary equipment associated with the proposed project. Detailed emission calculations for each process are included in Appendix B.

3.2.3.1. Sawing and Debarking

Increases in fugitive PM emissions from sawing and debarking were based on the increased lumber throughput through those portions of the facility. A control efficiency of 50 percent was applied to account for the activities being performed in a partial enclosure. Note that this control efficiency does not take into account that the wood being cut has a high moisture content and would therefore generate less emissions than dry materials. The PM emission factors used are from U.S. EPA's EIIP Uncontrolled Emission Factors document for the processes of sawing and debarking, respectively.[10,11]

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[8] "Final Report - Revised Air Permit Application for Energy Project," Weyerhaeuser NR Company - Lumber Technologies, Plymouth, NC, May 2010 (Permit# 06389/T19).

[9] Federal Register Vol. 76, No. 139 (pages 43490 – 43508).

[10] U.S. EPA's EIIP Uncontrolled Emission Factors (July 2001), per the Factor Information Retrieval (FIRE) database management system, version 6.23 for SCC Code 3-07-008-02, Log Sawing.

Table 8-1. NCASI Values for Direct-Fired Batch Kilns (Fuel: Green Sawdust)

As printed in the May 2010 Weyerhaeuser - Plymouth, NC permit application [1] and the NCDAQ Air Permit Review/Preliminary Determination document [2]

Pollutant	Emission Factor	Reference
Criteria		
NO_X	0.28 lb/MBF	3
VOC	3.76 lb/MBF	4
CO	0.73 lb/MBF	5
Total PM	0.30 lb/MBF	6
Total PM_{10}	0.18 lb/MBF	6, 7
Total $PM_{2.5}$	0.15 lb/MBF	6, 8
SO_2	0.025 lb/MMBtu	9
Biogenic CO_2	206.79 lb/MMBtu	10
Non-biogenic CO_2	--	--
CH_4	7.05E-02 lb/MMBtu	10
N_2O	9.26E-03 lb/MMBtu	10
HAPs/TAPS		
Acetaldehyde	0.058 lb/MBF	11
Acetophenone	2.60E-07 lb/MMBtu	12
Acrolein	1.90E-04 lb/MMBtu	13
Antimony	7.90E-06 lb/MMBtu	9
Arsenic	3.70E-06 lb/MMBtu	14
Barium	2.00E-05 lb/MMBtu	14
Benzene	2.70E-04 lb/MMBtu	14
Benzo(a)pyrene	2.60E-06 lb/MMBtu	9
Beryllium	8.20E-07 lb/MMBtu	12
n-Butyraldehyde	6.10E-05 lb/MMBtu	14
Di(2-ethylhexyl)phthalate	4.70E-08 lb/MMBtu	12
Cadmium	4.70E-06 lb/MMBtu	12
Carbon disulfide	1.30E-04 lb/MMBtu	14
Carbon tetrachloride	8.90E-07 lb/MMBtu	14
Chlorine	7.90E-04 lb/MMBtu	9
Chlorobenzene	5.50E-10 lb/MMBtu	12
Chloroform	3.70E-05 lb/MMBtu	14
Chromium	6.60E-06 lb/MMBtu	14
Chromium VI	7.30E-06 lb/MMBtu	12,17
Cobalt	4.20E-04 lb/MMBtu	12
Copper	1.30E-05 lb/MMBtu	14
Crotonaldehyde	1.10E-05 lb/MMBtu	14
Cumene	1.80E-05 lb/MMBtu	14
Dibutylphthalate	3.30E-05 lb/MMBtu	12
2,4-Dinitrophenol	2.60E-07 lb/MMBtu	12
2,4-Dinitrotoluene	9.40E-07 lb/MMBtu	12
Dioxin (as 2,3,7,8-TCDD)	8.60E-12 lb/MMBtu	9
Ethyl benzene	6.80E-06 lb/MMBtu	12
Ethylene dichloride	2.90E-05 lb/MMBtu	12
Formaldehyde	0.04 lb/MBF	13
Hexachlorobenzene	1.00E-06 lb/MMBtu	12
Hexane	2.90E-04 lb/MMBtu	14
Hydrochloric acid	2.30E-03 lb/MMBtu	13
Isopropanol	3.00E-03 lb/MMBtu	14
Lead	1.77E-05 lb/MMBtu	13
Manganese	1.81E-03 lb/MMBtu	13
Mercury	5.00E-07 lb/MMBtu	13
Methanol	0.16 lb/MBF	13

Pollutant	Emission Factor	Reference
Methyl bromide	1.50E-05 lb/MMBtu	12
Methyl chloride	2.30E-05 lb/MMBtu	14
Methyl chloroform	4.20E-05 lb/MMBtu	14
Methyl ethyl ketone	2.40E-08 lb/MMBtu	12
Methyl isobutyl ketone	0.001 lb/MBF	15
Methylene chloride	3.50E-04 lb/MMBtu	14
Naphthalene	2.80E-05 lb/MMBtu	13
Nickel	4.80E-06 lb/MMBtu	14
2-Nitrophenol	4.20E-08 lb/MMBtu	14
4-Nitrophenol	1.20E-07 lb/MMBtu	12
PAC	7.83E-05 lb/ton	16
Pentachlorophenol	4.80E-08 lb/MMBtu	12
Phenol	0.022 lb/MBF	11
Phosphorus	9.90E-05 lb/MMBtu	12
POM	2.88E-05 lb/MMBtu	9,12
Propionaldehyde	5.90E-04 lb/MMBtu	13
Propylene dichloride	3.30E-05 lb/MMBtu	12
Selenium	6.20E-06 lb/MMBtu	12
Silver	9.90E-07 lb/MMBtu	14
Styrene	3.20E-05 lb/MMBtu	14
Tetrachloroethylene	3.82E-05 lb/MMBtu	1
Thallium	1.90E-06 lb/MMBtu	14
Toluene	0.0001 lb/MBF	15
1,2,4-Trichlorobenzene	5.50E-05 lb/MMBtu	12
1,1,2-Trichloroethane	1.20E-04 lb/MMBtu	12
Trichloroethylene	3.90E-05 lb/MMBtu	14
Trichlorofluoromethane	4.10E-05 lb/MMBtu	14
2,4,6-Trichlorophenol	2.40E-08 lb/MMBtu	12
Vinyl chloride	1.80E-05 lb/MMBtu	12
Xylenes	2.60E-06 lb/MMBtu	12

1. "Final Report - Revised Air Permit Application for Energy Project," Weyerhaeuser NR Company - Lumber Technologies, Plymouth, NC, May 2010 (Permit # 06389/T19).
2. North Carolina Division of Air Quality (NCDAQ) Air Permit Review/Preliminary Determination for the Weyerhaeuser NR Company, Plymouth, NC facility permit application (May 2010), written by Jenny Kelvington of NCDAQ.
3. Provided by Dr. David Word of NCASI to the Weyerhaeuser facility.
4. Total VOC (lb/MBF)is computed based on the following equation:

VOC as terpene + methanol + formaldehyde = VOC as Carbon [lb/MBF] * 1.133 + (1 - 0.65) * Methanol [lb/MBF] + Formaldehyde [lb/MBF]

The VOC as Carbon emission factor is based on the average of unpublished and published NCASI test results as provided by Dr. David Word of NCASI to NCDAQ and published in the NCDAQ Air Permit Review/Preliminary Determination for the Weyerhaeuser application, pp. 7-8. It is multiplied by 1.133, which is the ratio of the molecular weight of pinene ($C_{10}H_{16}$, 136 amu) to the molecular weight of carbon in pinene (120 amu). The factors for methanol and formaldehyde are multiplied by the response factors, defined as the FIA response divided by the actual compound concentration. According to an NCASI study and as printed in the NCDAQ Air Permit Review/Preliminary Determination, the response factors for formaldehyde and methanol are 0% and 65%, respectively. This methodology is supported in an EPA document entitled *Interim VOC Measurement Protocol for the Wood Products Industry* (July 2007).

5. Based on the average of NCASI test results as provided via email from Dr. Word of NCASI to NCDAQ, as published in the Air Permit Review/Preliminary Determination, p. 8.
6. Based on unpublished NCASI values for direct-fired kilns, provided in the NCDAQ Air Permit Review/Preliminary Determination, p. 9.
7. Based on the air permit document for Bibler Brother, dated May 2008, which used EPA's "PM Calculator" software for the ratio of PM to PM_{10} for various wood dryer source classification codes.
8. Based on Weyerhaeuser's Particulate Matter Estimating Guide, 2003, as referenced in the May 20120 Weyerhaeuser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.
9. Per U.S. EPA's AP-42, Section 1-6 (September 2003).
10. Emisison factors for GHGs were taken from Subpart C of the Manditory Reporting Rule (40 CFR 98).
11. Lumber-Plywood TRI Workbook 2001, Revision 2, June 2002, by Weyerhaeuser Environmental Technology and Science, as referenced in the May 20120 Weyerhaeuser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.
12. Per NCASI TB No. 858, Tables 20A and 20B, February 2003, as published in the Weyerhaeuser air permit application.
13. Per NCASI SARA 313 Guidance - Wood Products - April 2009, as published in the Weyerhaeuser air permit application.
14. Per NCASI TB No. 858, Tables 20A and 20B, as used in the Title V renewal application for the West Fraser facility in Augusta, Georgia (March 2011, permit 2421-245-0047-V-04-0).
15. Per NCASI TB 845, as used in the Title V renewal application for the West Fraser facility in Augusta, Georgia (March 2011, permit 2421-245-0047-V-04-0).
16. Per the NCASI publication for Wood Products Facilities, , as used in the Title V renewal application for the West Fraser facility in Augusta, Georgia (March 2011, permit 2421-245-0047-V-04-0).
17. Based on a July 7, 1999 memo from NCDAQ, the chromium VI compounds represented are chromic acid emissions calculated in terms of the chromium VI equivalents, as referenced in the May 20120 Weyerhaeuser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.

WOODWORKING FACTORS AND CALCULATIONS

	PERCENT OF WOODWASTE THAT IS:						
	GREEN WOOD				DRY WOOD		
	PM	PM10	PM2.5		PM	PM10	PM2.5
PLANING	0.00	0.00	0.00		2.60	0.00	0.00
SHAVING/CHIPPING	0.56	0.00	0.00		0.56	0.00	0.00
ROUGH SAWING	18.00	1.89	0.70		18.00	1.89	0.70
FINE SAWING	31.00	0.37	0.14		31.00	0.37	0.14
MILLING	10.00	0.00	0.00		10.00	0.00	0.00
MOLDING	5.20	0.00	0.00		5.20	0.00	0.00
SANDING	76.00	23.80	8.81		76.00	23.80	8.81
	USING GREEN WOOD ?:				USING DRY WOOD?:		
	FALSE				TRUE		

ACTUAL YEARLY TONS			
IN DUCT WASTE:		5486.25	TPY
	PM	PM10	PM2.5
	0.00	0.00	0.00
	0.00	0.00	0.00
	296.26	31.11	11.51
	510.22	5.09	2.25
	27.43	0.00	0.00
	28.53	0.00	0.00
	1042.39	326.43	120.78
TOTAL UNC:	1904.83	363.63	134.54
CONTROL:	99.90	99.50	99.00
TPY:	1.90	1.82	1.35
% OUTSIDE	100.00	100.00	100.00
TPY:	1.90	1.82	1.35

POTENTIAL HOURLY POUNDS			
IN DUCT WASTE:		2310	LB/HR
	PM	PM10	PM2.5
	0	0	0
	0	0	0
	124.74	13.0977	4.84815
	214.83	2.5641	0.94872
	11.55	0	0
	12.012	0	0
	438.9	137.445	50.8547
	802.032	153.107	56.6495
UNCONTROLLED LB/HR EACH			

WOOD WASTE % ABOVE LEFT FOR PM AND PM10 FROM DAQ MEMOS DATED APRIL 26, 1995 AND APRIL 18, 1996. ** FOR PM2.5: PER AP-42 APPENDIX B-1 PG B.1-49 : FOR THE OUTLET OF A CYCLONE INSTALLED ON A BELT SANDER HOOD EXHAUST THE CUMULATIVE WEIGHT % of PM2.5 WAS 29.5 % AND PM10 WAS 52.9%. THIS IS A RATIO OF (29.5/52.9) OR 0.558 (55.8%) PM10 IS PM2.5 FOR OUTLET FROM A CYCLONE INSTALLED ON A BELT SANDER. CALCULATING INLET LOADING, ASSUME 100 MASS "UNITS" AND BACK CALCULATE USING CONTROL EFFICIENCY (ASSUME 10% PM2.5 AND 40 % PM10 CYCLONE CONTROL EFFICIENCY PER BELOW DISCUSSION): PM2.5 - 29.5 OUTLET "UNITS" IS (29.5/(1-0.10)) 32.8 INLET "UNITS". PM10 - 52.9 OUTLET "UNITS" IS (52.9/(1-0.40)) 88.2 INLET "UNITS". THE BEFORE CONTROL RATIO IS THEN CALCULATED AS 32.8 / 88.2 = 0.37 (I.E. PM2.5 IS 37 % OF PM10 FOR THE INLET). AS SIDE NOTE, THE AP-42 CITATION ABOVE ALSO INDICATES AFTER A CYCLONE AND BAGFILTER IN SERIES, THE OUTLET RATIO IS (14.3/32.1) OR 44.5 % PM10 IS PM2.5.

** The output sheet corrects itself if PM < PM10, to make PM = PM10 (this can happen if non-default efficiencies are used). Same for PM10 and PM2.5

DEFAULT CONTROL EFFICIENCY DISCUSSION:

TRAILER: CONSERVATIVELY NO CONTROL FOR PM100 AND LOWER IS REASONABLE EXPECTED FOR A TRAILER
BAGFILTER: FROM AP-42 TABLE B.2-3, PM10 EFFICIENCY IS ~ 99.5 AND PM2.5 IS 99. 99.9 IS REASONABLY CONSERVATIVE FOR PM100 - DAQ CONTROL SPREADSHEETS TYPICALLY INDICATE 99.99 AND ABOVE.

CYCLONE: AP-42 TABLE B.2-3 INDICATES THE FOLLOWING EFFICIENCIES: 10% FOR PM0-PM2.5, 35% FOR PM2.5-PM6, AND 50% FOR PM6-PM10. 10% WILL BE USED FOR PM2.5. 40% WAS PICKED AS A CONSERVATIVE NUMBER FOR PM10 (SINCE THE DAQ WOOD DISTIBUTION DATA ALREADY ASSUMES PM10=PM44.) PM100 IS 85% (NO DATA TO WORK WITH - DAQ CONTROL DEVICE SPREADSHEET SEEMS TO INDICATE THIS IS CONSERVATIVE - 85% RETAINED FROM LAST SPREADSHEET

Appendix C
Air Dispersion Modeling Report

ECT Environmental Consulting & Technology, Inc.
7208 Falls of Neuse Road, Suite 102, Raleigh, North Carolina 27615

AIR DISPERSION MODELING REPORT FOR PROPOSED CONTINUOUS KILN CONSTRUCTION PERMIT APPLICATION

CANFOR SOUTHERN PINE

April 2018

ECT No. 170730-0100

ECT Environmental Consulting & Technology, Inc.

7208 Falls of Neuse Road, Suite 102, Raleigh, North Carolina 27615

AIR DISPERSION MODELING REPORT FOR PROPOSED CONTINUOUS KILN CONSTRUCTION PERMIT APPLICATION

CANFOR SOUTHERN PINE

April 2018

ECT No. 170730-0100

Document Review

The dual signatory process is an integral part of Environmental Consulting & Technology, Inc.'s (ECT's) Document Review Policy No. 9.03. All ECT documents undergo technical/peer review prior to dispatching these documents to any outside entity.

This document has been authored and reviewed by the following employees:

Jeff Marcinkowski	Joshua Ralph
Author	Peer Review
Signature	Signature
April 27, 2018	April 27, 2018
Date	Date

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1.0 Introduction

Canfor Southern Pine – Camden Plant (Canfor – Camden) is submitting this air dispersion modeling report to support the construction permit application for a proposed continuous kiln at its Camden Facility located in the Camden area, near Cassatt, Kershaw County, South Carolina.

The facility is an existing major source of air pollutants and is operating under the South Carolina Department of Health and Environmental Control (SC DHEC) Title V permit number TV-1380-0025.

General information about the applicant and the location of the project site are presented in the following subsection. To facilitate the South Carolina Bureau of Air Quality's (SC BAQ's) review of this document, individuals familiar with both the facility and the preparation of this modeling report have been identified in the following section. SC BAQ should contact these individuals if additional information or clarification is required during the review process.

1.1 General Application Information

The following lists the applicant's primary points of contact and addresses and telephone numbers where they can be reached. As this permit application has been prepared by a third party under the direction of Canfor Southern Pine personnel, a contact has also been included for the air permitting consultant:

- Canfor - Camden Facility Contact

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  Canfor Southern Pine – Camden Plant
  1281 Sanders Creek Road
  Cassatt, South Carolina, 29032
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  Robert.Byrd@canfor.com

- Air Permitting Consultant

  Kathy R. Ferry, P.E.
  KJF Consulting, Inc.
  501 Chatham Avenue
  Columbia, South Carolina 29205
  Telephone: (803) 708-6205 Fax: (803) 708-6205
  kathy_ferry@yahoo.com

•	Air Dispersion Modeling Consultants	Thomas Pritcher, P.E. Environmental Consulting & Technology, Inc. 7208 Falls of Neuse Road, Suite 102 Raleigh, North Carolina 27615 Telephone: (919) 861-8888 Fax: (919) 615-2102 tpritcher@ectinc.com

1.2 Project Location

Canfor – Camden is located near Cassatt, South Carolina, at 1281 Sanders Creek Road. Figure 1 presents a regional topographic map showing the site location.

Figure 1 shows the land use within the 3-kilometer (km) region surrounding the Canfor – Camden site. From review of Figure 1, it is noted that the 3-km region surrounding the site is characterized as rural. Within this predominantly rural area are wetlands, undeveloped land, and widely scattered businesses and/or residences.

1.3 Contents of the Air Dispersion Model Report

This report document consists of three sections. Section 1.0 provides an introductory presentation. Section 2.0 provides a detailed description of the modeling approach used in evaluating air quality impacts of Canfor – Camden, including model selection criteria, good engineering practice stack height determination, refined modeling analyses, and ambient air quality compliance. Section 3.0 provides the results of the modeling analysis to demonstrate compliance with SC Regulation 61-62.5, Standard No. 2 – Ambient Air Quality Standards (AAQS). A minor source baseline date has not been established for Kershaw County; therefore Standard 7 – Prevention of Significant Deterioration (PSD) Ambient Air Increments does not apply.

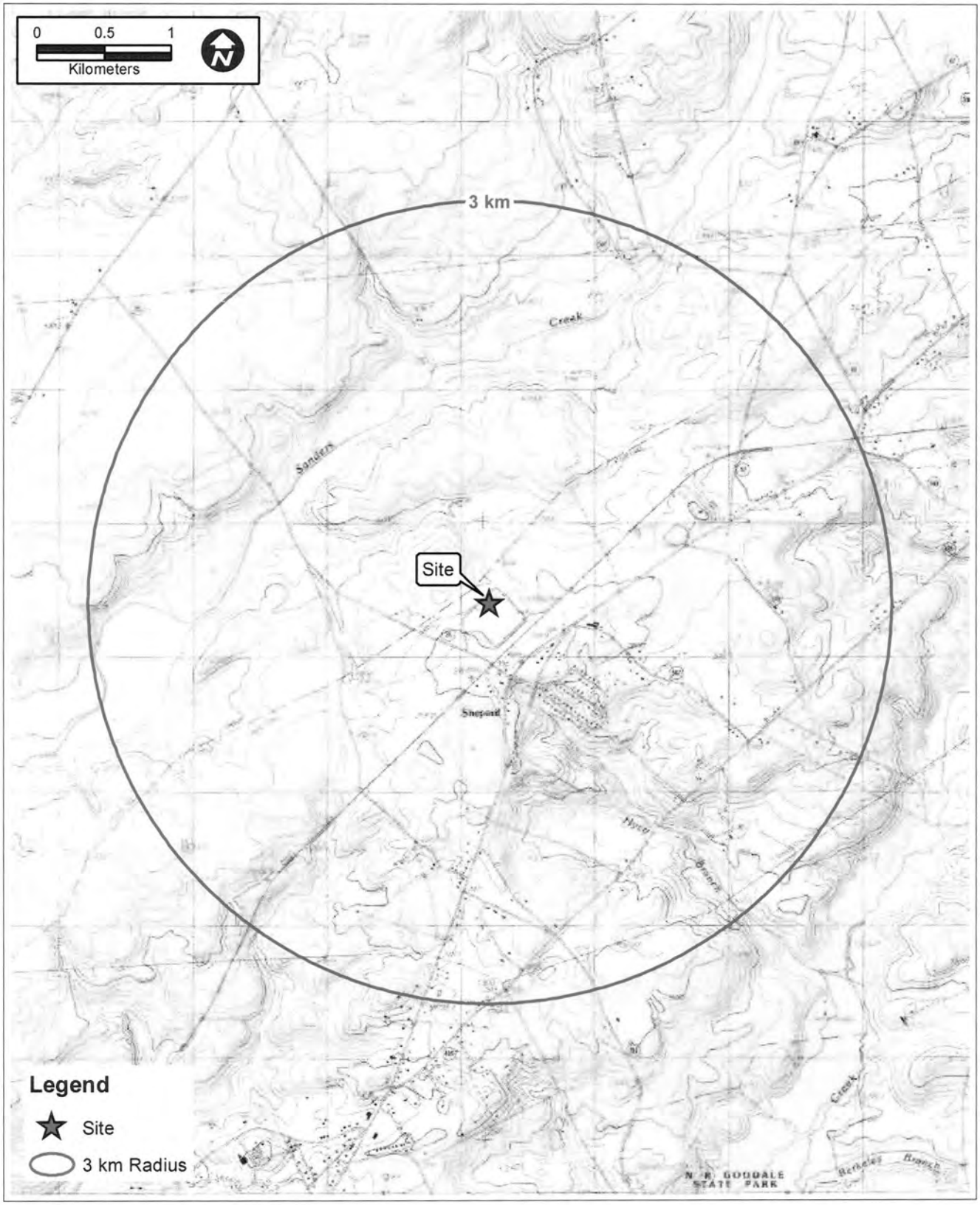

FIGURE 1.
REGIONAL TOPOGRAPHIC MAP

Sources: Esri Basemap USGS Topographic Quadrangle, ECT 2018.

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2.0 Modeling Methodology

2.1 General Overview

The dispersion modeling analyses conducted for this project adhere to the U.S. Environmental Protection Agency (EPA) Guideline on Air Quality Models (GAQM), dated 2017, and direction received from the SC DHEC BAQ Modeling Section. The following subsections present the source data modeled, the procedures used to assess ambient air impacts for the updated emissions estimates, and the standards to which the predicted impacts were compared.

The dispersion modeling for this project was conducted in a manner that utilized the worst-case ambient and operating conditions in an effort to predict the highest potential impact for each pollutant and averaging period. Maximum predicted impacts from these worst-case scenarios were compared to SC Regulation 61-62.5, Standard No. 2 – AAQS, as presented in Table 1.

2.2 Model Selection

For this modeling analysis, the American Meteorological Society/EPA Regulatory Model Improvement Committee (AERMIC) model (AERMOD) air dispersion model was used. AERMOD was developed by the AERMIC work group and was intended to incorporate improved understanding of planetary boundary layer (PBL) meteorology into air dispersion calculations. The current version of AERMOD is 16216r and includes the Plume Rise Model Enhancement (PRIME) building downwash algorithms. The AERMOD model was used to demonstrate compliance with SC Regulation 61-62.5, Standard No. 2.

The procedures used in conducting the air quality modeling analyses followed the requirements outlined in the Code of Federal Regulations (CFR), Chapter 40, Part 51, Appendix W, Guidelines on Air Quality Models; SC DHEC's Air Quality Modeling Guidelines, January 2017; SC DHEC BAQ AERMOD Guidance, February 2018; and direction received from the SC DHEC BAQ Modeling Section. Supporting information for the air quality modeling study

included building downwash analyses, meteorological data, and terrain data. This section of the air quality modeling report contains a discussion of the technical information incorporated into the air quality modeling analysis.

Table 1. S.C. Regulation 61-62.5. Standard 2, AAQS

Pollutant	Averaging Period	AAQS ($\mu g/m^3$)
PM_{10}	24-Hour	150
$PM_{2.5}$	24-Hour	35
	Annual	12
SO_2	1-Hour	196
	3-Hour	1,300
NO_x	1-Hour	188
	Annual	100
CO	1-Hour	40,000
	8-Hour	10,000

Note: $\mu g/m^3$ = microgram per cubic meter.
CO = carbon monoxide.
NO_x = nitrogen oxides.
$PM_{2.5}$ = particulate matter less than or equal to 2.5 micrometers.
PM_{10} = particulate matter less than or equal to 10 micrometers.
SO_2 = sulfur dioxide.

Source: S.C. Regulation 61-62.5, Standard No. 2.

2.2.1 Physical Source Geometry/Good engineering practice Stack Height Analysis

A good engineering practice (GEP) stack height/building wake effect analysis was conducted to identify which building structures influence plume dispersion from each emissions source. Based on the formula, GEP stack height and region of influence, the Building Profile Input Program (BPIP) PRIME program was run for the point source emissions points and related building structures. Figure 2 shows the facility layout (including the modeled sources) and the property lines. The BPIP PRIME (Version 04274) program was used to calculate the GEP height and wind direction-specific building dimensions for input to the air dispersion model.

The GEP analysis was used to identify critical buildings and to determine wind direction-specific building dimensions for use in the modeling analysis. GEP was also used to demonstrate compliance with applicable state and federal stack height regulations. Following the Guideline for Determination of GEP Stack Height (Technical Document for the Stack Height Regulation), GEP height was calculated using the following equation:

$$Hg = H + 1.5\ L$$

where: Hg = good engineering practice stack height.
H = height of the structure or nearby structure.
L = lesser dimension (height or projected width of the structure or nearby building).

In a situation where a nearby structure consists of multiple tiers or there are several structures nearby, the GEP height was calculated for each tier or structure, and the one resulting in the greatest calculated GEP height determined both the GEP height and the wind direction-specific building dimension used when modeling a stack that is lower than the GEP height.

FIGURE 2.

FACILITY LAYOUT - SOURCES AND BUILDING LOCATIONS IN AERMOD

Sources: 2017 NAIP Imagery, Canfor Southern Pine 2018, ECT 2018.

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Canfor – Camden's stacks are less than 65 meters tall; therefore, dispersion modeling using the actual stack height is in compliance with GEP regulations. The direction-specific building dimensions obtained from the BPIP PRIME analysis were put into the air dispersion model to simulate the effects of building-induced downwash.

2.2.2 Local Topography

Local topography played an important role in the selection of the appropriate dispersion model. Available dispersion models can be divided into two general categories: those applicable to terrain that is below stack top (simple terrain) and terrain that is above stack top (complex terrain). The terrain near the facility can be described as rolling terrain. A model that simulated both simple and complex terrain was used.

2.3 AERMOD Model Application

The AERMOD modeling system consists of two preprocessors and the dispersion model. AERMET is the meteorological preprocessor component, and AERMAP is the terrain preprocessor component that characterizes the terrain and generates receptor elevations along with critical hill heights for those receptors.

AERMOD has the following capabilities applicable to this study:

- Handles all terrain features.
- Simulates PRIME aerodynamic building downwash.
- Simulates both short- and long-term averaging periods.
- Handles large numbers of receptors.
- Calculates concentrations within the building cavity and within 5L of the stack.

2.3.1 Source Location

As previously indicated, Figure 1 is a regional topographic map showing the site location and the area around the facility. The majority of the area in the vicinity of the facility is rural. Therefore, rural dispersion coefficients were used in the modeling analysis.

2.3.2 Meteorological Data

For this project, refined modeling analyses were conducted using a data set downloaded from the SC DHEC website that consisted of five years (2002 through 2006) of hourly meteorological data from Columbia, South Carolina (surface), and Greensboro, North Carolina (upper air). This data set was processed by SC DHEC BAQ and is consistent with guidance stated in Section 8.4 of 40 CFR 51, Appendix W (EPA modeling guidelines).

2.3.3 Receptors and Topography for AERMOD

A single Cartesian receptor grid was generated for use in the AERMOD refined modeling. Receptors were spaced 50 meters apart along the property boundary. Receptors were spaced 100 meters apart extending from the property boundary out to 1,500 meters. Receptors were spaced 500 meters apart extending from 1,500 meters out to 5,000 meters. The receptor grid used in the modeling analysis was based on North American Datum of 1983 (NAD 83) and in Zone 17. The AERMAP (Version 11103) processor program was used to calculate terrain elevations and critical hill heights for the receptor grid (NAD 83 and Zone 17) and base elevations for sources, buildings and tanks using National Elevation Data (NED). The NED dataset was downloaded from the SC DHEC Website.

2.3.4 Physical Source and Emissions Data

The air dispersion modeling analysis was conducted with emissions rates and exhaust characteristics (flow rate and temperature) that are expected to represent the worst-case parameters for this project. The model setup was adjusted to reflect facility and process modifications discussed in Section 2 of the application document.

The proposed kiln is being fed a constant flow of exhaust gases associated with the combustion air and fuel combustion process in the associated burner/gasification assembly. As a result, the kiln operates under a slight positive pressure, and hot (buoyant) exhaust gases flow out through the kiln openings. The majority of the area represented by the kiln openings is blocked by lumber stacks entering and exiting the kilns on a nearly continuous basis. Rubber flaps are present on each side of the lumber stacks, discouraging exhaust flow along these sides. A relatively large (8-inch) gap is present between the top of the lumber stacks and the top of the kiln openings. The buoyant nature of the exhaust gases and the relatively large size of the gap

cause the vast majority of the exhaust to leave through the top of the kiln openings. Upon leaving the kiln, most of the exhaust gases rise through a hood and emit through a single stack at each end of the kiln.

The proposed kiln emits from two stacks (one at each end of the kiln) and from the ends which remain open during the continuous operation. A total stack flow rate of 50,000 actual cubic feet per minute (acfm) will be achieved through installation of forced draft fans on the stacks and will be unrelated to the air flows inside the kiln itself. The total stack flow will be split between the 2 stacks. The open ends are expected to each have 5,000 acfm flow, with a primarily horizontal velocity profile.

The total emissions from the kiln were split between four (4) openings (90% out the two stacks plus 10% out the two open ends). The emissions from the kiln stacks (one stack on each end of the kiln) were modeled using typical stack parameters and the proportional air flow. The emissions from the kiln openings were modeled as pseudo-point sources represented by the open area above the lumber stack, horizontal air flow (using the POINTHOR option in AERMOD), and kiln operating temperature (120 degrees Fahrenheit [°F]). The release height was represented to correspond to the gap between the top of the lumber stacks and the top of the kiln openings. This approach preserves the effects of buoyant plume rise from the kiln openings and subjects the emissions to building downwash due to the kiln and nearby structures. Figure 3 illustrates the exhaust points of the kiln openings in more detail.

Table 2 provides a summary of the exhaust data. Table 3 presents a summary of emissions rates for the air pollutants addressed in this modeling analysis.

2.3.5 Ambient Background Concentration Data

Table 4 presents the monitored background concentrations, downloaded from the SC DHEC website, that were added to the highest (annual pollutants) and high second-high (short-term pollutants) impacts to obtain the total impacts. For particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$), the background concentrations were added to the 8th highest maximum daily 24-hour value averaged over 5 years received from the SC DHEC BAQ Modeling Section. These total impacts were then compared to the AAQS values to demonstrate compliance.

For those pollutants and averaging periods with multiple monitor stations, background concentrations were taken from the closest monitor to the project site. In the case if carbon monoxide (CO), only one monitoring stations was available.

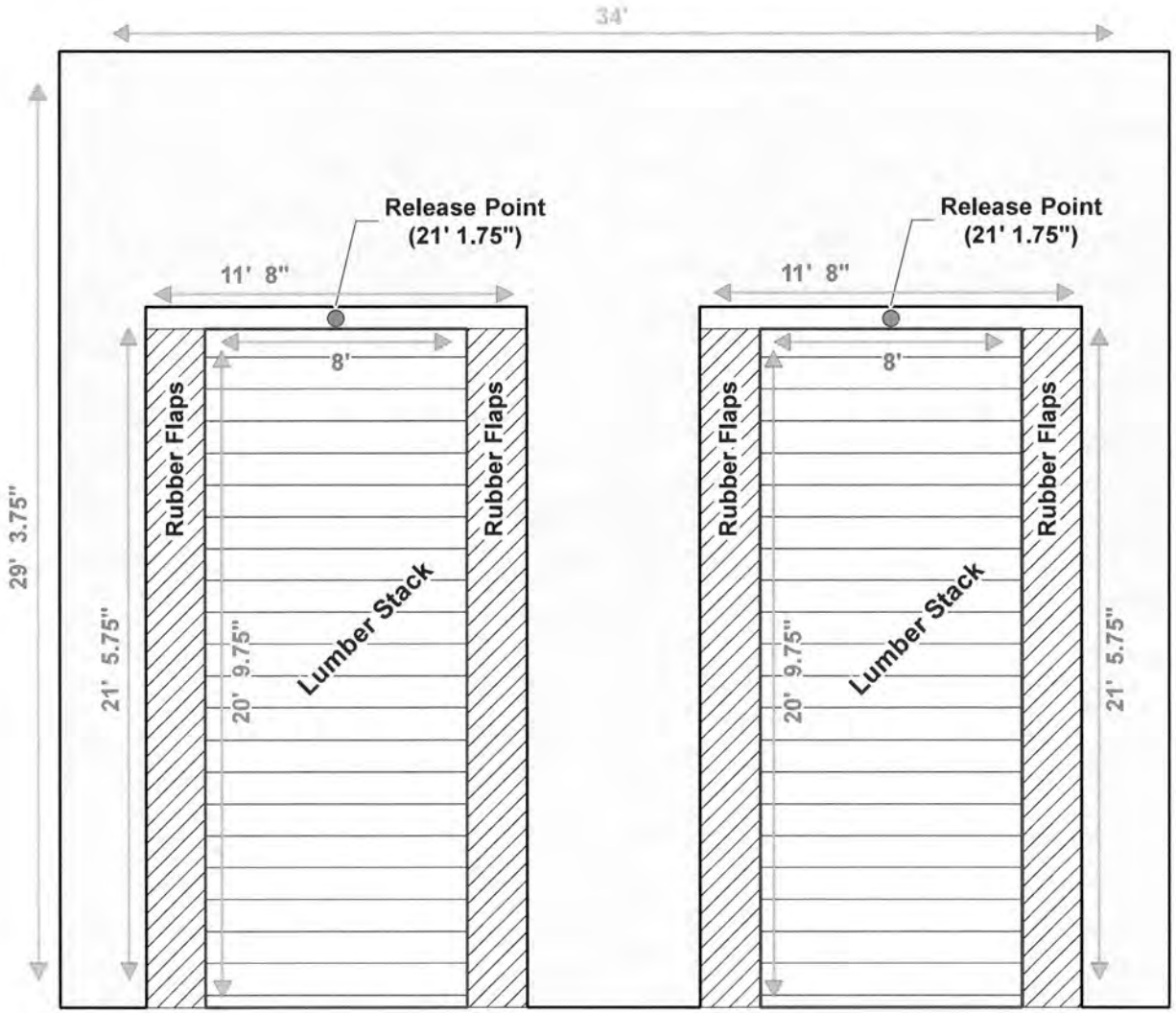

FIGURE 3.

KILN OPENING RELEASE POINTS

Sources: Canfor Southern Pine 2018, ECT 2018.

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Table 2. Source Parameters—Point Sources

Source ID and Description	Stack Height (ft)	Stack Diameter (ft)	Temperature (°F)	Exit Velocity (fps)
1001ESP - Boiler with ESP	75.00	4.50	553	64.18
KLN6_A1 - Kiln Opening A1	21.146	3.147*	120	5.36†
KLN6_A2 - Kiln Opening A2	21.146	3.147*	120	5.36†
KLN6_B1 - Kiln Opening B1	21.146	3.147*	120	5.36†
KLN6_B2 - Kiln Opening B2	21.146	3.147*	120	5.36†
KLN6_S1 - Kiln Stack 1	50.00	1.75	120	173.23‡
KLN6_S2 - Kiln Stack 2	50.00	1.75	120	173.23‡
KLN7_A1 - Kiln Opening A1	21.146	3.147*	120	5.36†
KLN7_A2 - Kiln Opening A2	21.146	3.147*	120	5.36†
KLN7_B1 - Kiln Opening B1	21.146	3.147*	120	5.36†
KLN7_B2 - Kiln Opening B2	21.146	3.147*	120	5.36†
KLN7_S1 - Kiln Stack 1	50.00	1.75	120	173.23‡
KLN7_S2 - Kiln Stack 2	50.00	1.75	120	173.23‡

Note: °F = degree Fahrenheit.
fps = foot per second.
ft = foot.

*Equivalent Stack Diameter represents the opening between the top of the lumber stack and the top of the kiln opening.
† Kiln opening exit velocity based on 5,000 acfm at each end divided equally to each of the two openings. The openings were modeled as a horizontal stack using the POINTHOR option in AERMOD.
‡Kiln stack exit velocity based on 50,000 acfm divided equally to each of the two stacks

Source: ECT, 2018.

Table 3. Modeled Emissions Rates—S.C. Regulation 61-62.5, Standard No. 2

Pollutant	Averaging Period	Emissions Rates (lb/hr)						
		1001ESP	KLN6_A1*	KLN6_A2*	KLN6_B1*	KLN6_B2*	KLN6_S1†	KLN6_S2†
PM_{10}	24-hour	12.29	0.0410	0.0410	0.0410	0.0410	0.7380	0.7380
$PM_{2.5}$	24-hour, annual	11.01	0.0343	0.0343	0.0343	0.0343	0.6165	0.6165
SO_2	1-hour, 3-hour	2.46	0.0220	0.0220	0.0220	0.0220	0.3960	0.3960
NO_x	1-hour, annual	21.63	0.0640	0.0640	0.0640	0.0640	1.1520	1.1520
CO	1-hour, 8-hour	269.54	0.1668	0.1668	0.1668	0.1668	3.0015	3.0015
			KLN7_A1*	KLN7_A2*	KLN7_B1*	KLN7_B2*	KLN7_S1†	KLN7_S2†
PM_{10}	24-hour		0.0565	0.0565	0.0565	0.0565	1.0170	1.0170
$PM_{2.5}$	24-hour, annual		0.0471	0.0471	0.0471	0.0471	0.8478	0.8478
SO_2	1-hour, 3-hour		0.0250	0.0250	0.0250	0.0250	0.4500	0.4500
NO_x	1-hour, Annual		0.0879	0.0879	0.0879	0.0879	1.5822	1.5822
CO	1-hour, 8-hour		0.2292	0.2292	0.2292	0.2292	4.1252	4.1252

Note: CO = carbon monoxide.
lb/hr = pound per hour.
NO_x = nitrogen oxides.
$PM_{2.5}$ = particulate matter less than or equal to 2.5 micrometers.
PM_{10} = particulate matter less than or equal to 10 micrometers.
SO_2 = sulfur dioxide.

* Kiln opening emissions based on 10% of total kiln emissions divided equally to each of the four openings.
† Kiln stack emissions based on 90% of total kiln emissions divided equally to each of the two stacks.

Source: ECT, 2018.

Table 4. Proposed Ambient Background Concentrations

Pollutant	Averaging Period	Background Concentrations ($\mu g/m^3$)	Monitoring Station*	AAQS ($\mu g/m^3$)
Chesterfield County, South Carolina				
PM_{10}	24-Hour†	31.00	Chesterfield	150
Richland County, South Carolina				
$PM_{2.5}$	24-Hour‡	17.00	Parklane	35
	Annual	8.90	Parklane	12
CO	1-Hour¥	1,450.30	Parklane	40,000
	8-Hour¥	916.00	Parklane	10,000
NO_x	1-Hour‡	83.40	Sandhill	188
	Annual	8.80	Sandhill	100
Lexington County, South Carolina				
SO_2	1-Hour§	96.90	Irmo	196
	3-Hour¥	87.80	Irmo	1,300

Note: $\mu g/m^3$ = microgram per cubic meter.
CO = carbon monoxide.
NO_x = nitrogen oxides.
$PM_{2.5}$ = particulate matter less than or equal to 2.5 micrometers.
PM_{10} = particulate matter less than or equal to 10 micrometers.
SO_2 = sulfur dioxide.
Background data is taken from the 2011 to 2013, plus 2014 $PM_{2.5}$ data available on the SC DHEC Website.

*For those pollutants and averaging periods with multiple monitoring stations, background concentrations were taken from the closest monitor to the project site. In the case of CO, only one monitoring station was available.
†2011-2013 design value
‡Average of the 3-year 98th percentiles
§Average of the 3-year 99th percentiles
¥Second highest maximum value used.

Source: ECT, 2018.

3.0 Modeling Results

This section presents the results of the air quality impact analyses performed for Canfor – Camden. These air quality analyses were conducted using the inputs and methodologies described previously. Methodologies and protocols adhere to the EPA and SC DHEC BAQ Guidelines. In accordance with SC DHEC requirements, modeling input and output files are included on a compact disc. A DVD containing the modeling files is included in this submittal for your review.

The emissions from the equipment were modeled with AERMOD to estimate the maximum concentrations for the pollutants and corresponding averaging period for each year of meteorological data. Tables 5 and 6 provide summaries of the AERMOD modeling results for each pollutant and averaging period for the Cartesian grid and fenceline receptors discussed in Section 2.0. Background concentrations were added to the maximum impacts where applicable.

Based on the results discussed in this report, Canfor – Camden demonstrates compliance with S.C. Regulation 61-62.5, Standard No. 2 for particulate matter less than or equal to 10 micrometers (PM_{10}), particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon monoxide (CO).

Table 5. Results of AERMOD Dispersion Modeling—S.C. Regulation 61-62.5, Standard No. 2

Pollutant	Pollutant ID	Averaging Period	Rank	Modeled Impact (µg/m³) 2002	2003	2004	2005	2006	Background Concentration (µg/m³)	Total Concentration (µg/m³)	AAQS (µg/m³)	Complies (Yes/No)
PM_{10}	PM_{10}	24-hour	H2H	13.94	12.70	13.94	**16.32**	13.26	31.00	47.32	150	Yes
$PM_{2.5}$	$PM_{2.5}$	Annual	H	2.32	**2.65**	2.42	2.47	2.57	8.90	11.55	12	Yes
SO_2	SO_2	3-hour	H2H	14.42	15.62	14.79	**16.18**	12.89	87.80	103.98	1,300	Yes
NO_x	NO_x	Annual	H	4.36	**4.98**	4.55	4.64	4.83	8.80	13.78	100	Yes
CO	CO	1-hour	H2H	515.43	520.65	539.06	**572.64**	567.21	1,450.30	2,022.94	40,000	Yes
	CO	8-hour	H2H	246.22	246.93	236.71	**255.02**	241.25	916.00	1,171.02	10,000	Yes

Note: µg/m³ = microgram per cubic meter.
H = highest.
H2H = highest 2nd highest.

Source: ECT, 2018.

Table 6. Results of AERMOD Dispersion Modeling—S.C. Regulation 61-62.5, Standard No. 2

Pollutant	Pollutant ID	Averaging Period	Rank	Modeled Impact 2002 through 2006 ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$)	Complies (Yes/No)
$PM_{2.5}$	$PM_{2.5}$	24-Hour	H8H*	8.80	17.00	25.80	35	Yes
NO_2	NO_2	1-hour	H8H†	67.18	83.40	150.58	188	Yes
SO_2	SO_2	1-hour	H4H‡	20.97	96.90	117.87	196	Yes

Note: $\mu g/m^3$= microgram per cubic meter.

*Eighth highest maximum daily 24-hour value averaged over 5 years.
†Eighth highest maximum daily 1-hour result averaged over five years.
‡Fourth highest maximum daily 1-hour result averaged over five years.

Source: ECT, 2018.

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A. APPLICATION IDENTIFICATION	
1. Facility Name: Canfor Southern Pine - Camden Plant	
2. SC Air Permit Number (if known; 8-digits only): 1380 - 0025	3. Application Date: 04/27/2018
4. Project Description: Canfor plans to increase the Camden Plant permitted lumber drying capacity by installing one new continuous direct-fired kiln. In addition, the facility proposes to replace or modify equipment in the log yard, sawmill and planer mill to incorporate newer technology and improve product flow. The project will have no impact on the existing boiler or steam-heated lumber drying kilns.	

B. FACILITY INFORMATION	
1. Is your company a Small Business? ☐ Yes ☒ No	2. If a Small Business or small government facility, is Bureau assistance being requested? ☐ Yes ☐ No
3. Are other facilities collocated for air compliance? ☐ Yes ☒ No	4. If Yes, provide permit numbers of collocated facilities:

C. AIR CONTACT			
Consulting Firm Name (if applicable): Environmental Consulting & Technology, Inc. (ECT)			
Title/Position: Senior Engineer	Salutation:	First Name: Thomas	Last Name: Pritcher
Mailing Address: 7208 Falls of Neuse Road, Suite 102			
City: Raleigh		State: NC	Zip Code: 27615
E-mail Address: tpritcher@ectinc.com		Phone No.: 919-861-8888	Cell No.: 919-631-1537

D. EMISSION POINT DISPERSION PARAMETERS
Source data requirements are based on the appropriate source classification. Each emission point is classified as a point, area, volume, or flare source. Contact the Bureau of Air Quality for clarification of data requirements. Include sources on a scaled site map. Also, a picture of area or volume sources would be helpful but is not required. A user generated document or spreadsheet may be substituted in lieu of this form provided all of the required emission point parameters are submitted in the same order, units, etc. as presented in these tables.
Abbreviations / Units of Measure: UTM = Universal Transverse Mercator; °N = Degrees North; °W = Degrees West; m = meters; AGL = Above Ground Level; ft = feet; ft/s = feet per second; ° = Degrees; °F = Degrees Fahrenheit

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E. POINT SOURCE DATA

(Point sources such as stacks, chimneys, exhaust fans, and vents.)

Emission Point ID	Description/Name	Point Source Coordinates Projection:				Release Height AGL (ft)	Temp. (°F)	Exit Velocity (ft/s)	Inside Diameter (ft)	Discharge Orientation	Rain Cap? (Y/N)	Distance To Nearest Property Boundary (ft)	Building		
		UTM E (m)	UTM N (m)	Lat (°N)	Long (°W)								Height (ft)	Length (ft)	Width (ft)
	See attached spreadsheet														

F. AREA SOURCE DATA

(Area sources such as storage piles, and other sources that have low level or ground level releases with no plumes.)

Emission Point ID	Description/Name	Area Source Coordinates Projection:				Release Height AGL (ft)	Easterly Length (ft)	Northerly Length (ft)	Angle From North (°)	Distance To Nearest Property Boundary (ft)
		UTM E (m)	UTM N (m)	Lat (°N)	Long (° W)					

G. VOLUME SOURCE DATA

(Volume sources such as building fugitives that have initial dispersion vertical depth prior to release.)

Emission Point ID	Description/Name	Volume Source Coordinates Projection:				Release Height AGL (ft)	Initial Horizontal Dimension (ft)	Initial Vertical Dimension (ft)	Distance To Nearest Property Boundary (ft)
		UTM E (m)	UTM N (m)	Lat (°N)	Long (° W)				

H. FLARE SOURCE DATA

(Point sources where the combustion takes place at the tip of the stack.)

Emission Point ID	Description/Name	Flare Source Coordinates Projection:				Release Height AGL (ft)	Heat Release Rate (BTU/hr)	Distance To Nearest Property Boundary (ft)	Building		
		UTM E (m)	UTM N (m)	Lat (°N)	Long (° W)				Height (ft)	Length (ft)	Width (ft)

I. AREA CIRCULAR SOURCE DATA

Emission Point ID	Description/Name	Area Circular Source Coordinates Projection:				Release Height AGL (ft)	Radius of Area (ft)	Distance To Nearest Property Boundary (ft)
		UTM E (m)	UTM N (m)	Lat (°N)	Long (° W)			

J. AREA POLY SOURCE DATA

Emission Point ID	Description/Name	Area Poly Source Coordinates Projection:		Release Height AGL (ft)	Number of Vertices
		UTM E (m)	UTM N (m)		

K. OPEN PIT SOURCE DATA

Emission Point ID	Description/Name	Open Pit Source Coordinates Projection:		Release Height AGL (ft)	Easterly Length (ft)	Northerly Length (ft)	Volume (ft^3)	Angle From North (°)
		UTM E (m)	UTM N (m)					

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L. EMISSION RATES						
Emission Point ID	**Pollutant Name**	**CAS #**	**Emission Rate (lb/hr)**	**Same as Permitted (1)**	**Controlled or Uncontrolled**	**Averaging Period**
	See attached spreadsheet			☐ Yes ☐ No		
				☐ Yes ☐ No		
				☐ Yes ☐ No		
				☐ Yes ☐ No		
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				☐ Yes ☐ No		
				☐ Yes ☐ No		
				☐ Yes ☐ No		
				☐ Yes ☐ No		

(1) Any difference between the rates used for permitting and the air compliance demonstration must be explained in the application report.

E. Point Source Data																
Emission Point ID	Description/Name	Stack Coordinates Projection: NAD83				Release Height AGL (ft)	Temp. (°F)	Exit Flow Rate (acfm)	Exit Velocity (ft/s)	Diameter or Equivalent Diameter (ft)	Discharge Orientation	Rain Cap (Y/N)	Distance to Nearest Property Boundary (ft)	Building		
		UTM E (m)	UTM N (m)	Lat (°N)	Long (°W)									Height (ft)	Length (ft)	Width (ft)
1001ESP	Boiler with ESP	542263.36	3798615.10	-	-	75	553	61244.33	64.18	4.5	Vertical	N	See Modeling Files			
KLN6_A1	Direct-Fire Kiln 6 - Opening A1	542325.47	3798424.95	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN6_A2	Direct-Fire Kiln 6 - Opening A2	542362.23	3798460.14	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN6_B1	Direct-Fire Kiln 6 - Opening B1	542328.22	3798422.07	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN6_B2	Direct-Fire Kiln 6 - Opening B2	542364.99	3798457.26	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN6_S1	Direct-Fire Kiln 6 - Stack 1	542326.84	3798423.51	-	-	50	120	25000	173.23	1.75	Vertical	N	See Modeling Files			
KLN6_S2	Direct-Fire Kiln 6 - Stack 2	542363.61	3798458.70	-	-	50	120	25000	173.23	1.75	Vertical	N	See Modeling Files			
KLN7_A1	Proposed Direct-Fire Kiln 7 - Opening A1	542327.09	3798388.66	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN7_A2	Proposed Direct-Fire Kiln 7 - Opening A2	542381.14	3798440.39	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN7_B1	Proposed Direct-Fire Kiln 7 - Opening B1	542329.85	3798385.78	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN7_B2	Proposed Direct-Fire Kiln 7 - Opening B2	542383.90	3798437.51	-	-	21.146	120	2500	5.36	3.147	Horizontal	-	See Modeling Files			
KLN7_S1	Proposed Direct-Fire Kiln 7 - Stack 1	542328.47	3798387.22	-	-	50	120	25000	173.23	1.75	Vertical	N	See Modeling Files			
KLN7_S2	Proposed Direct-Fire Kiln 7 - Stack 2	542382.52	3798438.95	-	-	50	120	25000	173.23	1.75	Vertical	N	See Modeling Files			

Note:

A total stack flow rate of 50,000 acfm will be achieved through installation of forced draft fans on the stacks and will be unrelated to the air flows inside the kiln itself. The total stack flow will be split between the 2 stacks

50,0000 acfm / 2 stacks = 25,000 acfm per stack

Kiln opening exit velocity based on 5,000 acfm at each end divided equally to each of the two openings. The openings were modeled as a horizontal stack using the POINTHOR option in AERMOD

L. Modeled Emission Rates						
Emission Point ID	Pollutant Name	CAS #	Emission Rate (lb/hr)	Same as Permitted (Y/N)	Controlled or Uncontrolled	Averaging Period
1001ESP	PM_{10}		12.29	Y		24-hr
1001ESP	$PM_{2.5}$		11.01	Y		24-hr, Annual
1001ESP	SO_2		2.46	Y		1-hr, 3-hr
1001ESP	NO_x		21.63	Y		1-hr, Annual
1001ESP	CO		269.54	N		1-hr, 8-hr
KLN6_A1	PM_{10}		0.0410 *	N	Uncontrolled	24-hr
KLN6_A1	$PM_{2.5}$		0.0343 *	N	Uncontrolled	24-hr, Annual
KLN6_A1	SO_2		0.0220 *	N	Uncontrolled	1-hr, 3-hr
KLN6_A1	NO_x		0.0640 *	N	Uncontrolled	1-hr, Annual
KLN6_A1	CO		0.1668 *	N	Uncontrolled	1-hr, 8-hr
KLN6_A2	PM_{10}		0.0410 *	N	Uncontrolled	24-hr
KLN6_A2	$PM_{2.5}$		0.0343 *	N	Uncontrolled	24-hr, Annual
KLN6_A2	SO_2		0.0220 *	N	Uncontrolled	1-hr, 3-hr
KLN6_A2	NO_x		0.0640 *	N	Uncontrolled	1-hr, Annual
KLN6_A2	CO		0.1668 *	N	Uncontrolled	1-hr, 8-hr
KLN6_B1	PM_{10}		0.0410 *	N	Uncontrolled	24-hr
KLN6_B1	$PM_{2.5}$		0.0343 *	N	Uncontrolled	24-hr, Annual
KLN6_B1	SO_2		0.0220 *	N	Uncontrolled	1-hr, 3-hr
KLN6_B1	NO_x		0.0640 *	N	Uncontrolled	1-hr, Annual
KLN6_B1	CO		0.1668 *	N	Uncontrolled	1-hr, 8-hr
KLN6_B2	PM_{10}		0.0410 *	N	Uncontrolled	24-hr
KLN6_B2	$PM_{2.5}$		0.0343 *	N	Uncontrolled	24-hr, Annual
KLN6_B2	SO_2		0.0220 *	N	Uncontrolled	1-hr, 3-hr
KLN6_B2	NO_x		0.0640 *	N	Uncontrolled	1-hr, Annual
KLN6_B2	CO		0.1668 *	N	Uncontrolled	1-hr, 8-hr
KLN6_S1	PM_{10}		0.7380 *	N	Uncontrolled	24-hr
KLN6_S1	$PM_{2.5}$		0.6165 *	N	Uncontrolled	24-hr, Annual
KLN6_S1	SO_2		0.3960 *	N	Uncontrolled	1-hr, 3-hr
KLN6_S1	NO_x		1.1520 *	N	Uncontrolled	1-hr, Annual
KLN6_S1	CO		3.0015 *	N	Uncontrolled	1-hr, 8-hr
KLN6_S2	PM_{10}		0.7380 *	N	Uncontrolled	24-hr
KLN6_S2	$PM_{2.5}$		0.6165 *	N	Uncontrolled	24-hr, Annual
KLN6_S2	SO_2		0.3960 *	N	Uncontrolled	1-hr, 3-hr
KLN6_S2	NO_x		1.1520 *	N	Uncontrolled	1-hr, Annual
KLN6_S2	CO		3.0015 *	N	Uncontrolled	1-hr, 8-hr
KLN7_A1	PM_{10}		0.0565 *		Uncontrolled	24-hr
KLN7_A1	$PM_{2.5}$		0.0471 *		Uncontrolled	24-hr, Annual
KLN7_A1	SO_2		0.0250 *		Uncontrolled	1-hr, 3-hr
KLN7_A1	NO_x		0.0879 *		Uncontrolled	1-hr, Annual
KLN7_A1	CO		0.2292 *		Uncontrolled	1-hr, 8-hr
KLN7_A2	PM_{10}		0.0565 *		Uncontrolled	24-hr
KLN7_A2	$PM_{2.5}$		0.0471 *		Uncontrolled	24-hr, Annual
KLN7_A2	SO_2		0.0250 *		Uncontrolled	1-hr, 3-hr
KLN7_A2	NO_x		0.0879 *		Uncontrolled	1-hr, Annual
KLN7_A2	CO		0.2292 *		Uncontrolled	1-hr, 8-hr
KLN7_B1	PM_{10}		0.0565 *		Uncontrolled	24-hr
KLN7_B1	$PM_{2.5}$		0.0471 *		Uncontrolled	24-hr, Annual
KLN7_B1	SO_2		0.0250 *		Uncontrolled	1-hr, 3-hr
KLN7_B1	NO_x		0.0879 *		Uncontrolled	1-hr, Annual
KLN7_B1	CO		0.2292 *		Uncontrolled	1-hr, 8-hr
KLN7_B2	PM_{10}		0.0565 *		Uncontrolled	24-hr
KLN7_B2	$PM_{2.5}$		0.0471 *		Uncontrolled	24-hr, Annual
KLN7_B2	SO_2		0.0250 *		Uncontrolled	1-hr, 3-hr
KLN7_B2	NO_x		0.0879 *		Uncontrolled	1-hr, Annual
KLN7_B2	CO		0.2292 *		Uncontrolled	1-hr, 8-hr
KLN7_S1	PM_{10}		1.0170 *		Uncontrolled	24-hr
KLN7_S1	$PM_{2.5}$		0.8478 *		Uncontrolled	24-hr, Annual
KLN7_S1	SO_2		0.4500 *		Uncontrolled	1-hr, 3-hr
KLN7_S1	NO_x		1.5822 *		Uncontrolled	1-hr, Annual
KLN7_S1	CO		4.1252 *		Uncontrolled	1-hr, 8-hr
KLN7_S2	PM_{10}		1.0170 *		Uncontrolled	24-hr
KLN7_S2	$PM_{2.5}$		0.8478 *		Uncontrolled	24-hr, Annual
KLN7_S2	SO_2		0.4500 *		Uncontrolled	1-hr, 3-hr
KLN7_S2	NO_x		1.5822 *		Uncontrolled	1-hr, Annual
KLN7_S2	CO		4.1252 *		Uncontrolled	1-hr, 8-hr

*Emisions calculated by splitting each pollutants total lb/hr 90% for the kiln stacks and 10% for the kiln openings.
The 90% and 10% split was then divided equally to each of the two (2) kiln stack and four (4) kiln opening emission points

Sample Calculation:

Kiln 6 PM2.5 total emissions: 1.370 lb/hr

1.370 * 0.90 = 1.233 lb/hr / 2 stacks = 0.6165 lb/hr per stack

1.370 * 0.10 = 0.137 lb/hr / 4 openings = 0.0343 lb/hr per opening

AIR DISPERSION MODELING
Canfor Southern Pine

Camden Plant
Kershaw County,
South Carolina

April
2018

Modeling Input/
Output Files

ECT Environmental Consulting & Technology, Inc.
Raleigh, North Carolina
ECT No.170730-0100

Appendix D
EPA RBLC Database Printout

RBLC Database Search Results
Lumber Kilns - VOC Limits
Permit Dates: 01/01/2008 - 04/23/2018

RBLCID	FACILITY_NAME	COUNTY	STATE	PERMIT_NUM	APPLICATION DATE	PERMIT ISSUED	PROCESS_NAME	PRIMARY_FUEL
AR-0148	CADDO RIVER LLC	PIKE	AR	0189-AOP-R8	10/2/2017	1/29/2018	Dual Path Kiln # 3	Wood
*AL-0318	TALLADEGA SAWMILL	TALLADEGA COUN	AL	309-0075	10/7/2017	12/18/2017	Dry Kiln 1	natural gas
*AL-0318	TALLADEGA SAWMILL	TALLADEGA COUN	AL	309-0075	10/7/2017	12/18/2017	Dry Kiln 2	Natural Gas
*AL-0318	TALLADEGA SAWMILL	TALLADEGA COUN	AL	309-0075	10/7/2017	12/18/2017	Dry Kiln 3	Natural Gas
AR-0147	ANTHONY FOREST PRODUCTS COMPANY, LLC	UNION COUNTY	AR	1681-AOP-R15	4/12/2017	10/2/2017	Dual Path Kiln #3	sawdust
AR-0146	WEST FRASER, INC.	POPE	AR	PERMIT #: 1628-AOP-R1	4/3/2017	9/14/2017		22 wood
AL-0310	FULTON SAWMILL	CLARKE	AL	X007 & X008	3/6/2017	6/8/2017	11.4 MBF/HR CONTINUOUS DIRECT-FIRED LUMBER DRY KILN, 40 MMBTU/HR NATURAL GAS BURNER, & 4 MMBTU/HR NATU	NATURAL GAS
AR-0143	CADDO RIVER LLC	PIKE	AR	0189-AOP-R6	9/27/2016	2/8/2017	CONTINUOUS LUMBER DRYING KILNS	WOOD
AL-0308	TWO RIVERS LUMBER CO., LLC	MARENGO	AL	105-S007-X002	10/17/2016	1/3/2017	15.4 MBF/HR CDK (DPK-1) W/ 38.8 MMBTU/HR NATURAL GAS BURNER	NATURAL GAS
AL-0308	TWO RIVERS LUMBER CO., LLC	MARENGO	AL	105-S007-X002	10/17/2016	1/3/2017	15.4 MBF/HR CDK (DPK-2) W/ 38.8 MMBTU/HR NATURAL GAS BURNER	NATURAL GAS
*SC-0176	GEORGIA PACIFIC - MCCORMICK SAWMILL	MCCORMICK	SC	1600-0002-CD	4/21/2016	10/27/2016	Direct fired continuous lumber kiln	Wood Fired
AL-0311	MILLPORT WOOD PRODUCTS FACILITY	LAMAR	AL	X023	5/9/2016	8/30/2016	THREE CONTINUOUS DIRECT-FIRED LUMBER DRY KILNS, CDK-4/X023A, CDK-5/X023B, CDK-6/X023C	WOOD SAWDUST
FL-0358	GRACEVILLE LUMBER MILL	JACKSON	FL	0630011-016-AC	3/25/2016	7/14/2016	Direct-fired continuous lumber drying Kiln No. 5	Sawdust
AL-0312	BELK CHIP-N-SAW FACILITY	FAYETTE	AL	X006, X008, X009	12/17/2015	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
AL-0312	BELK CHIP-N-SAW FACILITY	FAYETTE	AL	X006, X008, X009	12/17/2015	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
SC-0166	NEW SOUTH LUMBER COMPANY - DARLINGTON INC.	DARLINGTON	SC	0820-0045-CK	11/18/2015	1/26/2016	TWO KILNS - KLN5 AND KLN6	GREEN SAWDUST
AR-0127	DELTIC TIMBER CORPORATION - OLA	YELL	AR	0592-AOP-R10	3/26/2015	10/13/2015	STEAM HEATED CONTINUOUS KILN NO. 3	
AR-0127	DELTIC TIMBER CORPORATION - OLA	YELL	AR	0592-AOP-R10	3/26/2015	10/13/2015	STEAM HEATED CONTINUOUS KILN NO. 4	
AR-0127	DELTIC TIMBER CORPORATION - OLA	YELL	AR	0592-AOP-R10	3/26/2015	10/13/2015	DIRECT-FIRED CONTINUOUS KILN NO. 5	
*AL-0322	COTTONTON SAWMILL	RUSSELL	AL	211-S005-X007	6/11/2015	8/5/2015	Continuous Direct-fired lumber Dry Kiln with 34 MMBtu/hr Wood-fired burner	Biomass
AR-0124	EL DORADO SAWMILL	UNION	AR	2348-AOP-R0	1/12/2015	8/3/2015	LUMBER DRYING KILN SN-01	NATURAL GAS
AR-0124	EL DORADO SAWMILL	UNION	AR	2348-AOP-R0	1/12/2015	8/3/2015	LUMBER DRYING KILN SN-02	NATURAL GAS
AR-0124	EL DORADO SAWMILL	UNION	AR	2348-AOP-R0	1/12/2015	8/3/2015	LUMBER DRYING KILN SN-03	NATURAL GAS
AL-0305	RESOLUTE FOREST PRODUCTS - ALABAMA SAWMILL	TALLADEGA	AL	309-0072-X002	1/16/2015	6/24/2015	Continuous Direct-Fired Lumber Dry Kilns with 35 mmbtu/hr Wood Fired Burner	Wood
AR-0120	OLA	YELL	AR	0592-AOP-R10	1/28/2014	2/11/2015	Dry Kiln No. 3 (SN-06)	None
AR-0120	OLA	YELL	AR	0592-AOP-R10	1/28/2014	2/11/2015	Drying Kiln No. 4 (SN-12)	None
AR-0120	OLA	YELL	AR	0592-AOP-R10	1/28/2014	2/11/2015	Drying Kiln No. 5 (SN-21)	wood residue
AR-0122	GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PLYWOOD /	CLARK	AR	463-AOP-R8	1/31/2014	2/6/2015	SN-09 #4 LUMBER KILN	NATURAL GAS
SC-0163	KAPSTONE CHARLESTON KRAFT LLC- SUMMERVILLE	DORCHESTER	SC	0900-0017-CE	8/13/2014	1/20/2015	LUMBER KILNS	
AL-0273	MILLPORT WOOD PRODUCTS FACILITY	LAMAR	AL	406-S003-X022	6/11/2014	12/30/2014	Continuous direct-lumber dry kiln	Green sawdust
SC-0165	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	HORRY	SC	1340-0029-CH-R2	4/25/2014	10/15/2014	LUMBER KILNS	
SC-0172	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	HORRY	SC	1340-0029-CH-R2	4/25/2014	10/15/2014	LUMBER KILNS	
FL-0343	WHITEHOUSE LUMBER MILL	DUVAL	FL	0310197-012-AC	5/27/2014	9/9/2014	Direct-Fired Continuous Kilns	Wood waste
SC-0164	SIMPSON LUMBER COMPANY, LLC	GEORGETOWN	SC	1140-0008-CH	1/13/2014	6/20/2014	LUMBER KILNS	
SC-0169	CAMDEN PLANT	KERSHAW	SC	1380-0025-CJ	3/15/2014	6/18/2014	DKN6 - DIRECT FIRED CONTINUOUS LUMBER DRYING KILN	WOOD
FL-0340	PERRY MILL	TAYLOR	FL	1230033-012-AC	12/12/2013	4/1/2014	Direct-fired lumber drying kiln	Waste wood
LA-0293	CHOPIN MILL	NATCHITOCHES	LA	PSD-LA-784	11/12/2013	3/18/2014	Lumber Dry Kilns Nos. 1 & 2 (EQT 37 & 38)	
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	BEAUREGARD	LA	PSD-LA-770	5/21/2012	1/31/2014	EP-3K -Wood-Fired Dry Kiln No. 1	Wood
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	BEAUREGARD	LA	PSD-LA-770	5/21/2012	1/31/2014	EP-4K â€“ Wood-Fired Dry Kiln No. 2	Wood
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	BEAUREGARD	LA	PSD-LA-770	5/21/2012	1/31/2014	EP-5K â€“ Wood-Fired Dry Kiln No. 3	Wood
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	BEAUREGARD	LA	PSD-LA-770	5/21/2012	1/31/2014	EP-6K â€“ Wood-Fired Dry Kiln No. 4	Wood
LA-0294	DODSON DIVISION	WINN	LA	PSD-LA-627(M-3)	7/30/2013	12/30/2013	Dry Kiln 1 (033, EQT 15)	
LA-0294	DODSON DIVISION	WINN	LA	PSD-LA-627(M-3)	7/30/2013	12/30/2013	Dry Kiln 2 (034, EQT 16)	
LA-0294	DODSON DIVISION	WINN	LA	PSD-LA-627(M-3)	7/30/2013	12/30/2013	Dry Kiln 3 (035, EQT 17)	
LA-0294	DODSON DIVISION	WINN	LA	PSD-LA-627(M-3)	7/30/2013	12/30/2013	Dry Kiln 4 (051, EQT 32)	
AL-0257	WEST FRASER-OPELIKA LUMBER MILL	LEE	AL	206-S004-X005	9/11/2013	11/1/2013	Two(2) 87.5 MMBF/YR Continuous kilns with a 35 MMBtu/hr direct-fired wood burner	Wood Shavings
AR-0123	DELTIC TIMBER CORPORATION WALDO	COLUMBIA	AR	697-AOP-R13	11/19/2012	10/18/2013	KILN NO. 3	
AR-0123	DELTIC TIMBER CORPORATION WALDO	COLUMBIA	AR	697-AOP-R13	11/19/2012	10/18/2013	KILN NO. 4	
AR-0123	DELTIC TIMBER CORPORATION WALDO	COLUMBIA	AR	697-AOP-R13	11/19/2012	10/18/2013	KILN NO. 5	
AL-0259	THE WESTERVELT COMPANY	HALE	AL	406-S003-X016	4/15/2013	8/21/2013	Three (3) 93 MMBF/Y Continous, Dual path, Indirect fired kilns	Steam (indirect heat)
AR-0135	WEST FRASER, INC. (LEOLA LUMBER MILL)	GRANT	AR	57-AOP-R6	3/4/2013	8/5/2013	LUMBER KILN, CONTINUOUS, INDIRECT	
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	DARLINGTON	SC	0820-0045-CJ	1/10/2013	6/18/2013	DKN1	STEAM HEATED
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	DARLINGTON	SC	0820-0045-CJ	1/10/2013	6/18/2013	DKN4	STEAM HEATED
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	DARLINGTON	SC	0820-0045-CJ	1/10/2013	6/18/2013	DKN5	WOOD WASTE
SC-0151	WEST FRASER - NEWBERRY LUMBER MILL	NEWBERRY	SC	1780-0007-CG	11/29/2012	4/30/2013	TWO - 35 MMBTU/H DUAL PATH, DIRECT FIRED, CONTINUOUS LUMBER KILNS, 15 THOUSAND BF/H, EACH	SAWDUST
AL-0258	WEST FRASER, INC. - MAPLESVILE MILL	CHILTON	AL	403-S005-X010	1/14/2013	4/15/2013	Two(2) 100 MMBF/Y Continuous direct fired kiln	Wood Residuals
SC-0149	KLAUSNER HOLDING USA, INC.	ORANGEBURG	SC	1860-0128-CA	3/28/2012	1/3/2013	LUMBER DRYING KILNS EU007	
SC-0135	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	HORRY	SC	1340-0029-CH	6/21/2012	9/24/2012	LUMBER KILNS	
SC-0136	SIMPSON LUMBER COMPANY, LLC	GEORGETOWN	SC	1140-0008-CG	4/12/2012	8/29/2012	DIRECT-FIRED LUMBER DRYING KILN NO. 4	DRY WOOD WASTE
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	EFFINGHAM	GA	2421-103-0004-V-04-1	10/14/2011	4/25/2012	KILN 3	WASTE WOOD
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	EFFINGHAM	GA	2421-103-0004-V-04-1	10/14/2011	4/25/2012	KILN 4	WASTE WOOD
TX-0607	LUMBER MILL	BOWIE	TX	PSDTX892M1	12/17/2010	12/15/2011	Continuous lumber kilns (2)	wood
LA-0252	JOYCE MILL	WINN	LA	PSD-LA-701(M1)	2/7/2011	8/16/2011	Lumber kilns	
TX-0584	TEMPLE INLAND PINELAND MANUFACTURING COMPLEX	SABINE	TX	1037/PSDTX924M2	7/23/2010	8/12/2011	Dry studmill kilns 1 and 2	wood
AR-0102	ANTHONY TIMBERLANDS, INC.	OUACHITA	AR	456-AOP-R4	1/2/2009	9/16/2009	KILN #3 INDIRECT-FIRED	NONE
AR-0102	ANTHONY TIMBERLANDS, INC.	OUACHITA	AR	456-AOP-R4	1/2/2009	9/16/2009	KILN #4 INDIRECT-FIRED	NONE
AR-0102	ANTHONY TIMBERLANDS, INC.	OUACHITA	AR	456-AOP-R4	1/2/2009	9/16/2009	KILN #5 INDIRECT-FIRED	NONE
FL-0315	NORTH FLORIDA LUMBER/BRISTOL SAW MILL	LIBERTY	FL	0770007-014-AC (PSD-FL	5/26/2009	8/4/2009	Wood lumber kiln	steam heated
SC-0138	ELLIOTT SAWMILLING COMPANY	HAMPTON	SC	1280-0004-CK	7/28/2008	4/14/2009	DIRECT FIRED LUMBER DRYING KILN NO.5	SAWDUST
AR-0101	BIBLER BROTHERS LUMBER COMPANY	POPE COUNTY	AR	1628-AOP-R5	5/14/2008	8/25/2008	SN-07G AND SN-13G CONTINOUS OPERATING KILNS	WOOD RESIDUE
AL-0235	ALBERTVILLE SAWMILL	MARSHALL	AL	711-S001-X004	1/2/2008	4/9/2008	TWO 182.14 MBF, STEAM-HEADED LUMBER DRY KILNS (NORTH & SOUTH - K100/K101)	

RBLC Database Search Results
Lumber Kilns - VOC Limits
Permit Dates: 01/01/2008 - 04/23/2018

RBLCID	FACILITY_NAME	THROUGHPUT	UNITS	CONTROL_METHOD_DESCRIPTION	STANDARDIZED LIMIT OR E.F. LB/MBF	RBLC LIMIT	UNITS
AR-0148	CADDO RIVER LLC	185000	MBF		3.80	3.8	LB/MBF
*AL-0318	TALLADEGA SAWMILL	343530	MCF/hr		5.49	5.49	LB/MBF AS WPP1 VOC
*AL-0318	TALLADEGA SAWMILL	343530	MCF/hr		5.49	5.49	LB/MBF AS WPP1 VOC
*AL-0318	TALLADEGA SAWMILL	257648	MCF/hr		5.49	5.49	LB/MBF AS WPP1 VOC
AR-0147	ANTHONY FOREST PRODUCTS COMPANY, LLC	31.5	MMBtu/hr		3.80	3.8	LB/MBF
AR-0146	WEST FRASER, INC.	0			3.80	3.8	LB/MMBOARD FEET
AL-0310	FULTON SAWMILL	11.4	MBF/H	BACT DETERMINED AS PROPER KILN OPERATION AND MAINTENANCE PRACTICES	4.00	4	LB/MBF
AR-0143	CADDO RIVER LLC	116000000	BOARD FEET		3.80	53.2	LB/H
AL-0306	TWO RIVERS LUMBER CO., LLC	15.4	MBF/H		3.80	3.8	LB/MBF
AL-0308	TWO RIVERS LUMBER CO., LLC	15.4	MBF/H		3.80	3.8	LB/MBF
*SC-0176	GEORGIA PACIFIC - MCCORMICK SAWMILL	26	MMBTU/HR		5.84	0	
AL-0311	MILLPORT WOOD PRODUCTS FACILITY	385	MMBF/YR	OPERATING AND MAINTENANCE PRACTICES	4.70	4.7	LB/MBF AS WPP1
FL-0358	GRACEVILLE LUMBER MILL	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	3.50	3.5	LB/THOUSAND BF
AL-0312	BELK CHIP-N-SAW FACILITY	115	MMBF/YR	OPERATING AND MAINTANCE PRACTICESMEASURE LUMBER MOISTURE CONTENT	5.49	5.49	LB/MBF AS WPPI VOC
AL-0312	BELK CHIP-N-SAW FACILITY	115	MMBF/YR	OPERATING AND MAINTENANCE PRACTICESLUMBER MOISTURE CONTENT MEASUREMENT	5.49	5.49	LB/MBF AS WPP1 VOC
SC-0166	NEW SOUTH LUMBER COMPANY - DARLINGTON INC.	85	MILLION BD-FT/'	PROPER OPERATION AND MAINTENANCE	*	0	
AR-0127	DELTIC TIMBER CORPORATION - OLA	79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFAC	3.50	33.3	LB/H
AR-0127	DELTIC TIMBER CORPORATION - OLA	79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFAC	3.50	33.3	LB/H
AR-0127	DELTIC TIMBER CORPORATION - OLA	79000	MBF/YR	PROPER DRYING SCHEDULE AND A TEMPERATURE BASED ON MOISTURE CONTENT OF THE LUMBER TO BE DRIED AND THE MANUFAC	3.50	38.2	LB/H
*AL-0322	COTTONTON SAWMILL	16.4	MBF/hr	Good combustion practices and proper maintenance	4.21	4.21	LB/MBF
AR-0124	EL DORADO SAWMILL	45	MMBTU/H	PROPER MAINTENANCE AND OPERATION	3.80	3.8	LB/MBF
AR-0124	EL DORADO SAWMILL	45	MMBTU/H		3.80	3.8	LB/MBF
AR-0124	EL DORADO SAWMILL	45	MMBTU/H		3.80	3.8	LB/MBF
AL-0305	RESOLUTE FOREST PRODUCTS - ALABAMA SAWMILL	108.33	mmbf/yr - each		3.76	3.76	LB/MBF
AR-0120	OLA	105	MMBF/yr		5.55	33.3	LB/H
AR-0120	OLA	105	MMBF/yr		5.55	33.2	LB/H
AR-0120	OLA	60	MMBF/yr		3.43	23.5	LB/H
AR-0122	GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PLYWOOD)	130	MILLION BOARD FEET		3.80	3.8	LB/MBF
SC-0163	KAPSTONE CHARLESTON KRAFT LLC- SUMMERVILLE	194.83	MMBF/YR	PROPER MAINTENANCE AND OPERATION	3.76	225.6	T/YR
AL-0273	MILLPORT WOOD PRODUCTS FACILITY	140000	mbf/yr	Proper maintenance & operating practice requirements.Test method information: Method 18/25.	4.70	4.7	LB/MBF AS WPP1
SC-0165	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	295.6	MMBF/YR	PROPER MAINTENANCE AND OPERATION	4.20	602	T/YR
SC-0172	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	295.6	MMBD-FT/YR	PROPER MAINTENANCE AND OPERATION	4.20	602	T/YR
FL-0343	WHITEHOUSE LUMBER MILL	40	MMBTU/H	Proper Maintenance and Operating Procedures:â€¢Minimize over-drying the lumber.â€¢Maintain consistent moisture content for the	3.76	3.76	LB/THOUSAND BOARD F
SC-0164	SIMPSON LUMBER COMPANY, LLC	166	MMBF/YR	PROPER OPERATION AND MAINTENANCE	3.76	156	T/YR
SC-0169	CAMDEN PLANT	80	MMBD-FT/YR		*	150.4	T/YR
FL-0340	PERRY MILL	90	million board ft/	At a minimum, the permittee shall operate the kiln in accordance with the following best operating practices (BMP): a Minimize over-	3.50	3.5	LB/THOUSAND BOARD F
LA-0293	CHOPIN MILL	25000	M BD-FT/YR	Good operating practices to limit VOC emissions to 4.29 lb/M bd ft (12-month rolling average).	4.29	24.51	LB/H
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	60000	MBF/YR	Proper kiln design & operation; annual production limit	2.96	29.27	LB/H
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	60000	MBF/YR	Proper kiln design & operation; annual production limit	2.96	29.27	LB/H
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	60000	MBF/YR	Proper kiln design & operation; annual production limit	2.96	29.27	LB/H
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	60000	MBF/YR	Proper kiln design & operation; annual production limit	2.96	29.27	LB/H
LA-0294	DODSON DIVISION	14	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	5.67	79.4	LB/H
LA-0294	DODSON DIVISION	14	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	5.67	79.4	LB/H
LA-0294	DODSON DIVISION	16	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	5.67	90.74	LB/H
LA-0294	DODSON DIVISION	16	M BD-FT/H	Good operating practices, including proper design, operation, and maintenance	5.67	90.74	LB/H
AL-0257	WEST FRASER-OPELIKA LUMBER MILL	175	MMBF/YR		3.76	3.76	LB/MBF
AR-0123	DELTIC TIMBER CORPORATION WALDO	0		PROPER KILN OPERATION	3.51	27	LB/H
AR-0123	DELTIC TIMBER CORPORATION WALDO	0			3.50	46.2	LB/H
AR-0123	DELTIC TIMBER CORPORATION WALDO	0			3.51	27	LB/H
AL-0259	THE WESTERVELT COMPANY	0			4.57	4.57	LB/MMBF
AR-0135	WEST FRASER, INC. (LEOLA LUMBER MILL)	275	MMBF/YR		3.50	3.5	LB/MBF
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	60	MMBF/YR	PROPER OPERATION AND MAINTENANCE	4.20	343.98	T/YR
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	60	MMBF/YR	MAINTENACE AND OPERATING PRACTICES	4.20	343.98	T/YR
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	75	MMBF/YR	PROPER MAINTENANCE AND OPERATION	3.76	141	T/YR
SC-0151	WEST FRASER - NEWBERRY LUMBER MILL	0		PROPER OPERATION AND GOOD OPERATING PRACTICES	3.76	3.76	LB/MBF
AL-0258	WEST FRASER, INC. - MAPLESVILE MILL	200	MMBF/YR		3.76	3.76	LB/MBF
SC-0149	KLAUSNER HOLDING USA, INC	700	MILLION BOARD FOOT PER YEAR		3.50	3.5	LB/MBF
SC-0135	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	380.56	MMBD-FT/YR	PROPER MAINTENANCE AND OPERATION	4.20	799.18	T/YR
SC-0136	SIMPSON LUMBER COMPANY, LLC	34	MMBTU/H	WORK PRACTICE STANDARDS	3.80	104	T/YR
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	65000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.83	3.83	LB/MBF
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	73000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.93	3.93	LB/MBF
TX-0607	LUMBER MILL	275	MMBF/YR	proper temperature and process management; drying to appropriate moisture content	3.50	3.5	LB/MBF
LA-0252	JOYCE MILL	300	million board fe	properly design and operation	6.20	930	T/YR
TX-0584	TEMPLE INLAND PINELAND MANUFACTURING COMPLEX	156000	boardfeet per ch	good operating practice and maintenance	2.49	2.49	LB VOC/1000 BOARDFEE
AR-0102	ANTHONY TIMBERLANDS, INC.	200	MMBF/YR		3.50	3.5	LB/MBF
AR-0102	ANTHONY TIMBERLANDS, INC.	200	MMBF/YR		3.50	3.5	LB/MBF
AR-0102	ANTHONY TIMBERLANDS, INC.	200	MMBF/YR		3.50	3.5	LB/MBF
FL-0315	NORTH FLORIDA LUMBER/BRISTOL SAW MILL	92000000	board-f lumber/	Best operating practices: 1) minimize over-drying lumber; 2) maintain consistent moisture content for processed lumber charge; and	2.54	116.93	T/YR
SC-0138	ELLIOTT SAWMILLING COMPANY	35	MMBTU/H	WORK PRACTICE STANDARDS	4.50	119	T/YR
AR-0101	BIBLER BROTHERS LUMBER COMPANY	25	MMBTU/H		3.80	3.8	LB/MBF VOC
AL-0235	ALBERTVILLE SAWMILL	182.14	MBF	OPERATE W/ WET BULB SET POINT DRYING SCHEDULE OF LESS THAN OR EQUAL TO 185F; DAILY AND MONTHLY KILN I/M PROCEDURE	7.00	7	LB/MBF

RBLC Database Search Results
Lumber Kilns - VOC Limits
Permit Dates: 01/01/2008 - 04/23/2018

RBLCID	FACILITY_NAME	POLLUTANT_COMPLIANCE_NOTES
AR-0148	CADDO RIVER LLC	
*AL-0318	TALLADEGA SAWMILL	
*AL-0318	TALLADEGA SAWMILL	
*AL-0318	TALLADEGA SAWMILL	
AR-0147	ANTHONY FOREST PRODUCTS COMPANY, LLC	
AR-0146	WEST FRASER, INC.	
AL-0310	FULTON SAWMILL	VOC MEASURED AS WPP1, WHERE WPP1 = [(VOC AS C) X 1.13] FORMALDEHYDE [0.35 X METHANOL]
AR-0143	CADDO RIVER LLC	Based on 3.8 lb VOC/MBF
AL-0308	TWO RIVERS LUMBER CO., LLC	
AL-0308	TWO RIVERS LUMBER CO., LLC	
*SC-0176	GEORGIA PACIFIC - MCCORMICK SAWMILL	VOC emission are based on an emission factor of 5.84 lb VOC/1000 board feet (AS THC AS PROPANE + METHANOL + FORMALDEHYDE). Good work practices consisting of target final moisture content of 12% or greater, kiln wet bulb temperature
AL-0311	MILLPORT WOOD PRODUCTS FACILITY	
FL-0358	GRACEVILLE LUMBER MILL	No add-on VOC controls. Lumber moisture content testing used as a proxy for VOC. No VOC tests required.
AL-0312	BELK CHIP-N-SAW FACILITY	
AL-0312	BELK CHIP-N-SAW FACILITY	
SC-0166	NEW SOUTH LUMBER COMPANY - DARLINGTON INC.	THERE IS NO EMISSION LIMIT. BACT HAS BEEN DETERMINED TO BE WORK PRACTICE STANDARDS. VOC EMISSIONS BASED ON EMISSION FACTOR OF 5.824 LB/MBF (AS TERPENE METHANOL FORMALDEHYDE BASIS).
AR-0127	DELTIC TIMBER CORPORATION - OLA	AN EMISSION FACTOR OF 3.5 LB/MBF WAS USED TO DETERMINE THE BACT LIMIT
AR-0127	DELTIC TIMBER CORPORATION - OLA	AN EMISSION FACTOR OF 3.5 LB/MBF WAS USED TO DETERMINE THE BACT LIMIT
AR-0127	DELTIC TIMBER CORPORATION - OLA	AN EMISSION FACTOR OF 3.5 LB/MBF WAS USED TO DETERMINE THE BACT LIMIT
*AL-0322	COTTONTON SAWMILL	
AR-0124	EL DORADO SAWMILL	
AR-0124	EL DORADO SAWMILL	
AR-0124	EL DORADO SAWMILL	
AL-0305	RESOLUTE FOREST PRODUCTS - ALABAMA SAWMILL	Emissions Limits: 3.76 lb/mbf as Terpene and Methanol and Formaldehyde rolling 12 months.
AR-0120	OLA	
AR-0120	OLA	
AR-0120	OLA	
AR-0122	GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PLYWOOD)	
SC-0163	KAPSTONE CHARLESTON KRAFT LLC- SUMMERVILLE	
AL-0273	MILLPORT WOOD PRODUCTS FACILITY	* (VOC as propane, determined as VOC as C x 1.225 + ((1-0.65) x Methane) + Formaldehye)
SC-0165	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	
SC-0172	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	
FL-0343	WHITEHOUSE LUMBER MILL	3.76 lb VOC per thousand board feet limitBased on emissions factors, records, and proper maintenance and operation
SC-0164	SIMPSON LUMBER COMPANY, LLC	
SC-0169	CAMDEN PLANT	PROPER OPERATION AND MAINTENANCE TONS/YEAR LIMIT BASED ON AN EMISSION FACTOR OF 3.76 LB VOC/1000 BOARD FEET (AS TERPENE METHANOL FORMALDEHYDE)
FL-0340	PERRY MILL	VOC released from wood as it dries. No add-on controls. just best operating practices
LA-0293	CHOPIN MILL	*Annual emissions from both kilns are limited to 53.68 TPY. Hourly emission limits are per kiln.
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	The maximum emission rates presented above are the average rates for each kiln over the drying cycle.
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	The maximum emission rates presented above are the average rates for each kiln over the drying cycle.
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	The maximum emission rates presented above are the average rates for each kiln over the drying cycle.
LA-0281	SOUTHWEST LOUISIANA LUMBER OPERATIONS	The maximum emission rates presented above are the average rates for each kiln over the drying cycle.
LA-0294	DODSON DIVISION	* 481.37 TPY is an aggregate limit for all four dry kilns.
LA-0294	DODSON DIVISION	* 481.37 TPY is an aggregate limit for all four dry kilns.
LA-0294	DODSON DIVISION	* 481.37 TPY is an aggregate limit for all four dry kilns.
LA-0294	DODSON DIVISION	* 481.37 TPY is an aggregate limit for all four dry kilns.Kiln 4 not constructed. See below.Subsequent to the issuance of PSD-LA-627(M-3), Weyerhaeuser determined that the Dodson Division could produce 265 million board feet
AL-0257	WEST FRASER-OPELIKA LUMBER MILL	
AR-0123	DELTIC TIMBER CORPORATION WALDO	
AR-0123	DELTIC TIMBER CORPORATION WALDO	
AR-0123	DELTIC TIMBER CORPORATION WALDO	
AL-0259	THE WESTERVELT COMPANY	Emission limit is for each kiln
AR-0135	WEST FRASER, INC. (LEOLA LUMBER MILL)	130.2 LB/H TOTAL FOR BOTH KILNSBOTH KILNS ARE GROUPED TOGETHER FOR THE HOURLY AND ANNUAL EMISSION LIMITS.
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	INCLUDES KILNS 1-4
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	LIMIT INCLUDES KINS 1 -4 COMBINED
SC-0162	NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	
SC-0151	WEST FRASER - NEWBERRY LUMBER MILL	THE VOC LIMITS ARE TOTAL VOC, NOT ON AN ‘‘AS CARBON‘‘ BASIS.FACILITY WILL BE REQUIRED TO TEST ONE KILN TO VERIFY THE VOC EMISSION FACTOR USED.
AL-0258	WEST FRASER, INC. - MAPLESVILE MILL	Emissions limit is for each kiln. Combined emissions limit is 376 tpy based on maximum capacity of 200MMBF/Y.
SC-0149	KLAUSNER HOLDING USA, INC.	OTHER CASE-BY-CASE
SC-0135	NEW SOUTH COMPANIES, INC. - CONWAY PLANT	
SC-0136	SIMPSON LUMBER COMPANY, LLC	
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	
GA-0146	SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	
TX-0607	LUMBER MILL	
LA-0252	JOYCE MILL	
TX-0584	TEMPLE INLAND PINELAND MANUFACTURING COMPLEX	
AR-0102	ANTHONY TIMBERLANDS, INC.	
AR-0102	ANTHONY TIMBERLANDS, INC.	
AR-0102	ANTHONY TIMBERLANDS, INC.	
FL-0315	NORTH FLORIDA LUMBER/BRISTOL SAW MILL	This is the maximum annual emissions expected for BACT best operating practices.
SC-0138	ELLIOTT SAWMILLING COMPANY	
AR-0101	BIBLER BROTHERS LUMBER COMPANY	
AL-0235	ALBERTVILLE SAWMILL	

Whiteside, Pamela

From: Starnes, Rick <Rick.Starnes@canfor.com>
Sent: Wednesday, May 02, 2018 2:41 PM
To: Whiteside, Pamela
Cc: Byrd, Robert
Subject: RE: [External] Construction Permit Application 1380-0025

Good afternoon,

I will be the contact in place of Don Day going forward. In regards to the request to update the facility name, I don't know where that came from nor do I have the authority to make that call. I know there are some licenses etc. that, for some reason, require us to continue as New South while some things are indeed updated to Canfor or some combination of the two.

My plant manager is out of town. I will follow up with him and get back in touch with you with what I learn if that's ok?

Thanks,
Rick Starnes

From: Whiteside, Pamela [mailto:whitespw@dhec.sc.gov]
Sent: Wednesday, May 02, 2018 1:21 PM
To: Starnes, Rick <Rick.Starnes@canfor.com>
Cc: Day, Don <Don.Day@canfor.com>; Lindler, Breanna L. <lindlebl@dhec.sc.gov>
Subject: [External] Construction Permit Application 1380-0025

I currently have the air permit contact listed as Don Day and you are listed on the construction permit application. Who should be listed? Also there is a request to update the facility name. Is it just a name change or a transfer of ownership? Please let me know as soon as you can.

Thanks.

Pamela Whiteside

S.C. Dept. of Health & Environmental Control
Bureau of Air Quality – Air Permitting Division

Appendix B - Draft Construction Permit

S.C. Department of Health and Environmental Control

Bureau of Air Quality
PSD Construction Permit

Canfor Southern Pine – Camden Plant
1281 Sanders Creek Road
Cassatt, South Carolina 29032
Kershaw County

In accordance with the provisions of the Pollution Control Act, Sections 48-1-50(5), 48-1-100(A), and 48-1-110(a), the 1976 Code of Laws of South Carolina, as amended, and South Carolina Regulation 61-62, Air Pollution Control Regulations and Standards, the Bureau of Air Quality authorizes the construction of this facility and the equipment specified herein in accordance with the plans, specifications, and other information submitted in the construction permit application received on May 2, 2018, as amended. All official correspondence, plans, permit applications, and written statements are an integral part of the permit. Any false information or misrepresentation in the application for a construction permit may be grounds for permit revocation.

The construction and subsequent operation of this facility is subject to and conditioned upon the terms, limitations, standards, and schedules contained herein or as specified by this permit and its accompanying attachments.

Permit Number: **1380-0025-CK**
Issue Date: **DRAFT**

Steve McCaslin, P. E., Director
Air Permitting Division
Bureau of Air Quality

RECORD OF REVISIONS	
Date	**Description of Changes**

A. PROJECT DESCRIPTION

Permission is hereby granted to make modifications to several emissions units throughout the plant and construct a new continuous lumber drying kiln (DKN7). The facility's current lumber drying capacity is provided by five (5) indirect-fired, batch lumber drying kilns (DKN 1-5) and one (1) direct-fired, continuous lumber drying kiln (DKN6). The steam heat for the five (5) indirect-fired kilns is provided by the facility's one (1) wood residual boiler, the heat for the one (1) direct-fired kiln is provided by a burner designed to burn green sawdust. Following the construction of the new kiln (DKN7) one of the batch kilns will be shut down (DKN5). The proposed project will increase the facility's lumber drying capacity from 262.1 million board-feet per year (MMbd-ft/yr) to 360.6 MMbd-ft/yr.

Green End Operations:
The facility will replace the existing debarker with a new unit (or two units) to modernize the equipment in this process and allow an increase in the log processing rate from 200 tons per hour (tph) to 300 tph. The facility will also complete modifications in the Sawmill to improve product flow, the processing rate will increase from 40 thousand board-foot per hour (MBF/hr) to 70 MBF/hr. The existing sawmill chippers will be modified to increase their capacity from 55tph to 77tph.

Lumber Drying:
The facility will install a new direct-fired, continuous lumber drying kiln (DKN7), which will have a design capacity of 110.0 million board feet per year (MMBd-ft/yr) the associated burner assembly for this new kiln will have a maximum heat input of 40 MMBtu/hr and is designed to burn green sawdust and bark. Also as a part of this project, the exhaust hoods and stack on the existing direct-fired, continuous lumber drying kiln (DKN6) will be modified to direct more steam and kiln exhaust through the stacks and away from ground level work areas. The smallest of the lumber drying kilns has not operated in several years and will be removed from the facility as a part of this project

Planer Mill:
The Planer Mill will be modified to improve product flow and quality to accommodate the increased lumber drying capacity. The short-term capacity of 80.0 MBF/hr is not expected to increase, however the annual throughput will increase.

Additional Mill Activities:
Fugitive PM and PM_{10} emissions from loading and handling wood byproducts, such as chips, sawdust, planer shavings, and back, and from haul road will increase as a result of this project and the increase in the annual throughputs of these sources.

There are no modifications as a part of the project for the dust collection system and baghouse at the Planer Mill or the Wood Residual Boiler.

B.1 EQUIPMENT

Equipment ID	Equipment Description	Control Device ID	Emission Point ID
Emission Unit 02 – Lumber Drying Kilns			
02 – DKN7	Direct-fired, continuous lumber drying kiln with a drying capacity of 110.0 MMbd-ft/yr and a 40 MMBtu/hr sawdust fired gasifier burner *Equipment is being added with this project*	None	KLN7_A1 KLN7_A2 KLN7_B1 KLN7_B2 KLN7_S1 KLN7_S2
02 – DKN5	Steam-heated, batch lumber drying kiln with a drying capacity of 11.5 MMbd-ft/yr *Equipment is being removed with this project*	None	008
Emission Unit 05 – Debarker			
DEBARK	Debarker, with a maximum design capacity of 300 tons/hour *Equipment is being added with this project*	None	Fugitive
Emission Unit 03 – Planer Mill No. 1, with a maximum design capacity of 80 10^3 bd-ft/hr *Equipment is being modified with this project*			
CPLN	Coastal Planer No. 1 – Primary Cyclone	SBAG	011
ICMC	Planer Infeed – Primary Cyclone	SBAG	011
HULA	Hula Saw (Rework Saw) - Primary Cyclone	SBAG	011
PMTS	Trimmer/Sorter – Secondary Cyclone	SBAG	011
PMKS	Shavings Hog – Secondary Cyclone	SBAG	011
PMSS	Shop Saw (Chop Saw) – Secondary Cyclone (behind planer room)	SBAG	011
PMPS	Package Saw – Secondary Cyclone (at strapper)	SBAG	011
Insignificant Activities			
IA – SMC1 IA – SMC2	Insignificant Activity – Sawmill Chippers, with a maximum design capacity of 77 tons/hr *Equipment is being modified with this project*	None	SMC1, SMC2
IA – SAWMILL	Sawmill, with a maximum design capacity of 45 10^3 bd-ft/hr *Equipment is being modified with this project*	None	SAWMILL
IA – SILO2	Insignificant Activity – Kiln 7 Fuel Silo and Cyclone *Equipment is being added with this project*	None	SILO2

B.2 CONTROL DEVICES

Control Device ID	Control Device Description	Pollutant(s) Controlled
CD - SBAG	Planer Mill Baghouse	PM, PM_{10}, $PM_{2.5}$

B.2 CONTROL DEVICES

Control Device ID	Control Device Description	Pollutant(s) Controlled
	Control Device is not being modified as a part of this project	

C. LIMITATIONS, MONITORING AND REPORTING CONDITIONS

Condition Number	Conditions
C.1	**Equipment ID:** All **Control Device ID:** All (S.C. Regulation 61-62.1, Section II.J.1.g) A copy of the Department issued construction and/or operating permit must be kept readily available at the facility at all times. The owner or operator shall maintain such operational records; make reports; install, use, and maintain monitoring equipment or methods; sample and analyze emissions or discharges in accordance with prescribed methods at locations, intervals, and procedures as the Department shall prescribe; and provide such other information as the Department reasonably may require. All records required to demonstrate compliance with the limits established under this permit shall be maintained on site for a period of at least 5 years from the date the record was generated and shall be made available to a Department representative upon request.
C.2	**Equipment ID:** **Control Device ID:** The owner/operator shall inspect, calibrate, adjust, and maintain continuous monitoring systems, monitoring devices, and gauges in accordance with manufacturer's specifications or good engineering practices. The owner/operator shall maintain on file all measurements including continuous monitoring system or monitoring device performance measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required in a permanent form suitable for inspection by Department personnel.
C.3	**Equipment ID:** **Control Device ID:** All gauges shall be readily accessible and easily read by operating personnel and Department personnel (i.e. on ground level or easily accessible roof level). Monitoring parameter readings (i.e., pressure drop readings, etc.) and inspection checks shall be maintained in logs (written or electronic), along with any corrective action taken when deviations occur. Each incidence of operation outside the operational ranges, including date and time, cause, and corrective action taken, shall be recorded and kept on site. Exceedance of operational range shall not be considered a violation of an emission limit of this permit, unless the exceedance is also accompanied by other information demonstrating that a violation of an emission limit has taken place. Reports of these incidences shall be submitted semiannually. If no incidences occurred during the reporting period then a letter shall be submitted

C. LIMITATIONS, MONITORING AND REPORTING CONDITIONS

<table>
<tr><th>Condition Number</th><th>Conditions</th></tr>
<tr><td></td><td>to indicate such.

Any alternative method for monitoring control device performance must be preapproved by the Department and shall be incorporated into the permit as set forth in S.C. Regulation 61-62.70.7.</td></tr>
<tr><td>C.4</td><td>Equipment ID: All
Control Device ID: All

The owner or operator shall continue to operate under all applicable requirements, including emission limits and standards, testing, monitoring, record keeping, and reporting of the existing Title V Operating Permit (TV-1380-0025) that are not changed or contravened by this construction permit.</td></tr>
<tr><td>C.5</td><td>Equipment ID: DKN7, CPLN, ICMC, HULA, PMTS, PMKS, PMSS, PMPS, DEBARK
Control Device ID: SBAG

(S.C. Regulation 61-62.5, Standard No. 4, Section VIII) Particulate matter emissions shall be limited to the rate specified by use of the following equations:

For process weight rates less than or equal to 30 tons per hour
$E = (F)\ 4.10P^{0.67}$ and
For process weight rates greater than 30 tons per hour
$E = (F)\ 55.0P^{0.11} - 40$
Where E = the allowable emission rate in pounds per hour
P = process weight rate in tons per hour
F = effect factor from Table B in S.C. Regulation 61-62.5, Standard No. 4

For the purposes of compliance with this condition, the process boundaries are defined as follows:

<table><tr><th>Process/Equipment IDs</th><th>Max Process Weight Rate (tons/hr)</th></tr><tr><td>DKN7</td><td>11.42</td></tr><tr><td>Planer Mill</td><td>100</td></tr><tr><td>Debarker</td><td>300</td></tr></table></td></tr>
<tr><td>C.6</td><td>Equipment ID: DKN7, DEBARK, CPLN, ICMC, HULA, PMTS, PMKS, PMSS, PMPS
Control Device ID: SBAG

(S.C. Regulation 61-62.5, Standard No. 4, Section IX) Where construction or modification began after December 31, 1985, emissions from this/these source(s) (including fugitive emissions) shall not exhibit an opacity greater than 20%, each.

The owner/operator shall perform a visual inspection on a semiannual basis during source operation. No periodic monitoring for opacity will be required during periods of burning natural gas or propane</td></tr>
</table>

C. LIMITATIONS, MONITORING AND REPORTING CONDITIONS

Condition Number	Conditions
	only. Logs shall be kept to record all visual inspections, noting color, duration, density (heavy or light), cause, and corrective action taken for any abnormal emissions. If a source did not operate during the required visual inspection time frame, the log shall indicate such. The owner/operator shall submit semiannual reports. The report shall include records of abnormal emissions, if any, and corrective actions taken. If only natural gas or propane was combusted or if the unit did not operate during the semiannual period, the report shall state so. Visual inspection means a qualitative observation of opacity during daylight hours. The observer does not need to be certified to conduct valid visual inspections. However, at a minimum, the observer should be trained and knowledgeable about the effects on visibility of emissions caused by background contrast, ambient lighting, and observer position relative to lighting, wind, and the presence of uncombined water.
C.7	**Equipment ID:** DKN7 (S.C. Regulation 61-62.5, Standard No. 5.2, Section III) The allowable discharge of NO_X resulting from this source is 0.154 lb/MMBtu.
C.8	**Equipment ID:** DKN7 (S.C. Regulation 61-62.5, Standard No. 5.2, Section IV) The owner or operator shall perform tune-ups every twenty-four (24) months in accordance with manufacturer's specifications or with good engineering practices. The first tune-up shall be conducted no more than twenty-four (24) months from replacement of a burner assembly for affected existing sources. Each subsequent tune-up shall be conducted no more than twenty-four (24) months after the previous tune-up. All tune-up records are required to be maintained on site and available for inspection by the Department for a period of five (5) years from the date generated. The owner or operator shall develop and retain a tune-up plan on file.
C.9	**Equipment ID:** DKN7 (S.C. Regulation 61-62.5, Standard No. 5.2, Section IV) The owner or operator shall record monthly the amounts and types of each fuel combusted by the affected sources and maintain these records on site. The owner or operator shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected source; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative.
C.10	**Equipment ID:** DKN7 (S.C. Regulation 61-62.5, Standard No. 7) Volatile Organic Compounds (VOC) Best Available Control

C. LIMITATIONS, MONITORING AND REPORTING CONDITIONS

Condition Number	Conditions
	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/10^3 bd–ft (as terpene + methanol + formaldehyde) The owner/operator shall maintain records of all VOC emissions. These records shall include any documentation necessary to determine VOC emissions. VOC emissions shall be calculated on a monthly basis and a twelve-month rolling sum shall be calculated for total VOC emissions. Reports of the calculated values shall be submitted semiannually. An algorithm, including example calculations and emission factors, explaining the method used to determine emission rates shall be included in the initial report. Subsequent submittals of the algorithm and example calculations are unnecessary, unless the method of calculation is found to be unacceptable by the Bureau or if the facility changes the method of calculating emissions and/or changes emission factors. **Work Practice Standards for DKN7** 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 detailed in a monitoring plan based on manufacturer's recommendations or at least the minimum: <u>Daily Routine</u> • 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. <u>Weekly Routine</u> • Drain water from transducers and air supplies. <u>Monthly Routine</u> • 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.

C. LIMITATIONS, MONITORING AND REPORTING CONDITIONS

Condition Number	Conditions
	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 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. Reports shall be manually kept for each day the kiln is in operation. These reports will contain at a minimum, the date, dry-bulb actual, and set-point temperatures. These reports shall be maintained and kept on site for a period of five (5) years and shall be made available to a Department representative upon request. All required reports, including exceedances of the work practice standards and corrective actions taken to prevent any future exceedances, shall be submitted semiannually.

D. NESHAP PERIODIC REPORTING SCHEDULE SUMMARY

NESHAP Part	NESHAP Subpart	Compliance Monitoring Report Submittal Frequency	Reporting Period	Report Due Date
63	DDDD	Initial Notification only	N/A	Initial Notification is due within 120 days of startup.

1. This table summarizes only the periodic compliance reporting schedule. Additional reports may be required. See specific NESHAP Subpart for additional reporting requirements and associated schedule.
2. This reporting schedule does not supersede any other reporting requirements including but not limited to 40 CFR Part 60, 40 CFR Part 61, 40 CFR Part 63, and/or Title V. The MACT reporting schedule may be adjusted to coincide with the Title V reporting schedule with prior approval from the Department in accordance with 40 CFR 63.10(a)(5). This request may be made 1 year after the compliance date for the associated MACT standard.

E. NESHAP – CONDITIONS

Condition Number	Conditions
E.1	All NESHAP notifications and reports shall be sent to the Manager of the Air Toxics Section, South Carolina Department of Health and Environmental Control - Bureau of Air Quality.
E.2	All NESHAP notifications and the cover letter to periodic reports shall be sent to the United States Environmental Protection Agency (US EPA) at the following address or electronically as required by the specific subpart: **US EPA, Region 4** **Air, Pesticides and Toxics Management Division** **61 Forsyth Street SW** **Atlanta, GA 30303**
E.3	This facility has processes subject to the provisions of S.C. Regulation 61-62.63 and 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants, Subparts A and Subpart DDDD. Existing affected sources shall be in compliance with the requirements of these Subparts by the compliance date, unless otherwise noted. Any new affected sources shall comply with the requirements of these Subparts upon initial start-up unless otherwise noted.

F. AMBIENT AIR STANDARDS REQUIREMENTS

Condition Number	Conditions
F.1	Air dispersion modeling (or other method) has demonstrated that this facility's operation will not interfere with the attainment and maintenance of any state or federal ambient air standard. Any changes in the parameters used in this demonstration may require a review by the facility to determine continuing compliance with these standards. These potential changes include any decrease in stack height, decrease in stack velocity, increase in stack diameter, decrease in stack exit temperature, increase in building height or building additions, increase in emission rates, decrease in distance between stack and property line, changes in vertical stack orientation, and installation of a rain cap that impedes vertical flow. Parameters that are not required in the determination will not invalidate the demonstration if they are modified. The emission rates used in the determination are listed in Attachment - Emission Rates for Ambient Air Standards of this permit. Higher emission rates

F. AMBIENT AIR STANDARDS REQUIREMENTS

Condition Number	Conditions
	may be administratively incorporated into Attachment - Emission Rates for Ambient Air Standards of this permit provided a demonstration using these higher emission rates shows the attainment and maintenance of any state or federal ambient air quality standard or with any other applicable requirement. Variations from the input parameters in the demonstration shall not constitute a violation unless the maximum allowable ambient concentrations identified in the standard are exceeded. The owner/operator shall maintain this facility at or below the emission rates as listed in Attachment - Emission Rates for Ambient Air Standards, not to exceed the pollutant limitations of this permit. Should the facility wish to increase the emission rates listed in Attachment - Emission Rates for Ambient Air Standards, not to exceed the pollutant limitations in the body of this permit, it may do so by the administrative process specified above. This is a State Only enforceable requirement.

G. PERIODIC REPORTING SCHEDULE

Compliance Monitoring Report Submittal Frequency	Reporting Period (Begins on the startup date of the source)	Report Due Date
Quarterly	January-March April-June July-September October-December	April 30 July 30 October 30 January 30
Semiannual	January-June April-September July-December October-March	July 30 October 30 January 30 April 30
Annual	January-December April-March July-June October-September	January 30 April 30 July 30 October 30
Note: This reporting schedule does not supersede any federal reporting requirements including but not limited to 40 CFR Part 60, 40 CFR Part 61, and 40 CFR Part 63. All federal reports must meet the reporting time frames specified in the federal standard unless the Department or EPA approves a change.		

H. REPORTING CONDITIONS

Condition Number	Conditions
H.1	Reporting required in this permit, shall be submitted in a timely manner as directed in the Periodic

H. REPORTING CONDITIONS

Condition Number	Conditions
	Reporting Schedule of this permit.
H.2	All reports and notifications required under this permit shall be submitted to the person indicated in the specific condition at the following address: **2600 Bull Street** **Columbia, SC 29201** The contact information for the local Environmental Affairs Regional office can be found at: **http://www.scdhec.gov**
H.3	The owner/operator shall submit written notification to the Director of Air Permitting of the date construction is commenced, postmarked within 30 days after such date.
H.4	Unless elsewhere specified within this permit, all reports required under this permit shall be submitted to the Manager of the Technical Management Section, Bureau of Air Quality.
H.5	(S.C. Regulation 61-62.1, Section II.J) For sources not required to have continuous emissions monitors, any malfunction of air pollution control equipment or system, process upset or other equipment failure which results in discharges of air contaminants lasting for one hour or more and which are greater than those discharges described for normal operation in the permit application shall be reported to the Department's local Environmental Affairs Regional office within 24 hours after the beginning of the occurrence. The owner/operator shall also submit a written report within 30 days of the occurrence. This report shall be submitted to the Manager of the Technical Management Section, Bureau of Air Quality and shall include, at a minimum, the following: 1. The identity of the stack and/or emission point where the excess emissions occurred; 2. The magnitude of excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the excess emissions; 3. The time and duration of excess emissions; 4. The identity of the equipment causing the excess emissions; 5. The nature and cause of such excess emissions; 6. The steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunction; 7. The steps taken to limit the excess emissions; and, 8. Documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions.

I. PERMIT EXPIRATION AND EXTENSION

Condition Number	Conditions
I.1	(S.C. Regulation 61-62.1, Section II.A.4) Approval to construct shall become invalid if construction: a. is not commenced within 18 months after receipt of such approval;

I. PERMIT EXPIRATION AND EXTENSION

Condition Number	Conditions
	b. is discontinued for a period of 18 months or more; or c. is not completed within a reasonable time as deemed by the Department. The Department may extend the construction permit for an additional 18-month period upon a satisfactory showing that an extension is justified. This request must be made prior to the permit expiration.
I.2	This provision does not apply to the time period between construction of the approved phases of a phased construction project; each phase must commence construction within 18 months of the projected and approved commencement date.

J. PERMIT TO OPERATE

Condition Number	Conditions
J.1	(S.C. Regulation 61-62.1 Section II.F.2) The owner/operator or professional engineer in charge of the project shall certify that, to the best of his/her knowledge and belief and as a result of periodic observation during construction, the construction under application has been completed in accordance with the specifications agreed upon in the construction permit issued by the Department.
J.2	If construction is certified as provided in S.C. Regulation 61-62.1 Section II.F.2, the owner or operator, may operate the source in compliance with the terms and conditions of the construction permit until the operating permit is issued by the Department.
J.3	If construction is not built as specified in the permit application and associated construction permit(s), the owner/operator must submit to the Department a complete description of modifications that are at variance with the documentation of the construction permitting determination prior to commencing operation. Construction variances that would trigger additional requirements that have not been addressed prior to start of operation shall be considered construction without a permit.
J.4	(S.C. Regulations 61-62.1 Section II.F.3 and 61-62.70.7) The owner or operator shall submit a written request to the Director of Air Permitting for a new or revised operating permit to cover any new or altered source postmarked within 15 days after the actual date of initial startup unless a more stringent time frame is required by regulation. The request should be made using the appropriate Title V modification form.

K. GENERAL CONDITIONS

Condition Number	Conditions
K.1	The permittee shall pay permit fees to the Department in accordance with the requirements of S.C. Regulation 61-30, Environmental Protection Fees.

K. GENERAL CONDITIONS

Condition Number	Conditions
K.2	In the event of an emergency, as defined in S.C. Regulation 61-62.1, Section II.L, the owner or operator may document an emergency situation through properly signed, contemporaneous operating logs, and other relevant evidence that verify: 1. An emergency occurred, and the owner or operator can identify the cause(s) of the emergency; 2. The permitted source was at the time the emergency occurred being properly operated; 3. During the period of the emergency, the owner or operator took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and 4. The owner or operator gave a verbal notification of the emergency to the Department within 24 hours of the time when emission limitations were exceeded, followed by a written report within 30 days. The written report shall include, at a minimum, the information required by S.C. Regulation 61-62.1, Section II.J.1.c.i through viii. The written report shall contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken. This provision is in addition to any emergency or upset provision contained in any applicable requirement.
K.3	(S.C. Regulation 61-62.1, Section II.O) Upon presentation of credentials and other documents as may be required by law, the owner or operator shall allow the Department or an authorized representative to perform the following: 1. Enter the facility where emissions-related activity is conducted, or where records must be kept under the conditions of the permit. 2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. 3. Inspect any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit. 4. As authorized by the Federal Clean Air Act and/or the S.C. Pollution Control Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit or applicable requirements.

L. EMISSIONS INVENTORY REPORTS - RESERVED

ATTACHMENT - Emission Rates for Ambient Air Standards

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The emission rates listed herein are not considered enforceable limitations but are used to evaluate ambient air quality impact. Until the Department makes a determination that a facility is causing or contributing to an exceedance of a state or federal ambient air quality standard, increases to these emission rates are not in themselves considered violations of these ambient air quality standards (see Ambient Air Standards Requirements).

AMBIENT AIR QUALITY STANDARDS – STANDARD NO. 2						
Emission Point ID	**Emission Rates (lbs/hr)**					
	PM_{10}	**$PM_{2.5}$**	**SO_2**	**NO_X**	**CO**	**Lead**
1001ESP	12.290	11.01	2.46	21.630	269.54	--
KLN6_A1	0.0410	0.0343	0.0220	0.0640	0.1668	--
KLN6_A2	0.0410	0.0343	0.0220	0.0640	0.1668	--
KLN6_B1	0.0410	0.0343	0.0220	0.0640	0.1668	--
KLN6_B2	0.0410	0.0343	0.0220	0.0640	0.1668	--
KLN6_S1	0.7380	0.6165	0.3956	1.1520	3.0015	--
KLN6_S2	0.7380	0.6165	0.3956	1.1520	3.0015	--
KLN7_A1	0.0565	0.0471	0.0250	0.0879	0.2292	--
KLN7_A2	0.0565	0.0471	0.0250	0.0879	0.2292	--
KLN7_B1	0.0565	0.0471	0.0250	0.0879	0.2292	--
KLN7_B2	0.0565	0.0471	0.0250	0.0879	0.2292	--
KLN7_S1	1.0170	0.8478	0.4500	1.5822	4.1252	--
KLN7_S2	1.0170	0.8478	0.4500	1.5822	4.1252	--

STANDARD NO. 2 – EXEMPTED AMBIENT AIR QUALITY STANDARDS EMISSION RATES (LBS/HR)						
Emission Point ID	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**Lead**
1001ESP						0.0033
Byproduct Handling	0.210	0.030	--	--	--	--
CHIPPERS	0.080	0.031	--	--	--	--
DEBARK	0.600	0.300	--	--	--	--
DKN1	0.080	0.025	--	--	--	--
DKN2	0.080	0.025	--	--	--	--
DKN3	0.050	0.015	--	--	--	--
DKN4	0.040	0.012	--	--	--	--
DKN6						0.00062
DKN7	--	--	--	--	--	0.0007
Kiln 6 Fuel Cyclone	0.004	0.002	--	--	--	--
Kiln 7 Fuel Cyclone	0.004	0.002	--	--	--	--
PLANER MILL	0.060	0.011	--	--	--	--

ATTACHMENT - Emission Rates for Ambient Air Standards

Canfor Southern Pine – Camden Plant
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STANDARD NO. 2 – EXEMPTED AMBIENT AIR QUALITY STANDARDS EMISSION RATES (LBS/HR)						
Emission Point ID	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**Lead**
ROADS	0.270	0.060	--	--	--	--
SAWMILL	0.070	0.030	--	--	--	--

Appendix C - Statement of Basis

Company Name:	Canfor Southern Pine – Camden Plant	**Permit Writer:**	Breanna Lindler
Permit Number:	1380-0025-CK	**Date:**	**DRAFT**

EXPEDITED REVIEW: Accepted on May 9, 2018
DATE APPLICATION RECEIVED: May 2, 2018

FACILITY DESCRIPTION
Canfor Southern Pine – Camden Plant is a lumber mill that produces structural lumber from pine logs. The facility operations include debarking, sawing, steam generation, kiln drying, and planing.

The facility currently has five (5) steam-heated, batch lumber drying kilns, one (1) direct-fired, continuous lumber drying kiln, one (1) wood residual boiler, one (1) log debarker, and the planer mill. The wood residual boiler is rated at 98.3 million British Thermal Units per hour (MMBtu/hr) with a multiclone and electrostatic precipitator equipped for emissions controls. The steam-heated, batch lumber drying kilns are rated at 55.8 million board-feet per year (MMbd-ft/yr) for Kiln 1, 55.8 MMbd-ft/yr for Kiln 2, 32 MMbd-ft/yr for Kiln 3, 27 MMbd-ft/yr for Kiln 4, and 11.5 MMbd-ft/yr for Kiln 5. The direct-fired continuous kiln is rated at 80.0 MMbd-ft/yr with a 35 MMBtu/hr burner designed to combust green sawdust. The maximum process capacity for the existing debarker is 200 tons per hour and the planer mill is 80 thousand board feet per hour (MBF/hr).

PROJECT DESCRIPTION
The facility is proposing to replace the existing debarker with a new unit (or two units) to modernize the equipment and increase the log processing rate from 200 tons per hour (tph) to 300 tph. Various modifications are planned in the Sawmill to improve product flow, the processing rate is expected to increase from 40 thousand board-foot per hour (MBF/hr) to 70 MBF/hr. The existing sawmill chippers will be modified to increase their capacity from 55tph to 77tph. The increase in annual throughput for the green end operating is to accommodate the increase in lumber drying capacity that will be a result of this project.

The facility's existing wood residual boiler will not be modified as a part of this project and this project will have no impact on steam demand or boiler operation.

The facility is proposing to install a new direct-fired, continuous lumber drying kiln (DKN7), which will have a design capacity of 110.0 million board feet per year (MMBd-ft/yr) the associated burner assembly for this new kiln will have a maximum heat input of 40 MMBtu/hr and is designed to burn green sawdust and bark. As a part of this project an existing indirect-fired, batch lumber drying kiln (DKN5) is be removed from the facility and the operating permit. Also, exhaust hoods and stacks on the existing direct-fired, continuous lumber drying kiln 6 (DKN6) will be modified to direct more steam and kiln exhaust through the stacks and away from ground level work areas.

The Planer Mill will be modified to improve product flow and quality to accommodate the increased lumber drying capacity. The short-term capacity of 80.0 MBF/hr is not expected to increase, however the annual throughput will increase. There are no modifications planned for the dust collection system and baghouse.

The facility has operated a Wood Treatment process, which takes the planned lumber and treats it for extended life in outdoor applications. This process is shut down and is no longer on site, as a part of this project this equipment will be removed from the permit.

Fugitive PM, PM_{10}, and $PM_{2.5}$ emissions from loading and handling wood byproducts, such as chips, sawdust, planer shavings, and back, and from haul road will increase as a result of the proposed project and the increase in the annual throughputs of these sources.

SOURCE TESTING REQUIREMENTS

Source testing continuous lumber drying kilns for VOC emissions has been completed a limited number of times on sources in South Carolina, Georgia, and Arkansas, which has shown that stack testing of kilns is difficult and does not capture total emissions from these sources accurately. The testing that has been completed has demonstrated wide variability in results state to state and source to source. The design of a lumber drying kiln makes it extremely difficult and costly to perform stack testing. Batch lumber drying kilns have multiple vents that open and close at different times throughout the batch cycle. The flow and composition of vent gases leaving each vent changes over the course of the drying cycle, and batch time can be 24 hours or more in duration. The variability with time is much lower with a continuous kiln; however, capturing the exhaust stream is even more challenging. The exhaust gases from continuous kilns leave the kiln through gaps between the lumber being dried and the openings on either end of the kiln through which the lumber passes. Therefore, it has been decided that stack testing of the kilns for VOCs will not be required.

Compliance demonstrations for Standard 5.2 through source testing for NO_x emissions would be accomplished through the completion of EPA Test Method 7 or 7E to measure NO_x concentration and EPA Test Methods 1-4 to determine gas flow rate and composition. The potential sampling point that is considered most representative of NO_x emissions is in the duct work downstream of the burner box, between the recirculation fan and the entrance to the kiln. However the configuration of the duct work at this location does not meet EPA Method 1 sampling criteria. Method 1 specifies that sampling should occur at a location at least eight (8) duct diameters downstream and two (2) diameters upstream of any flow disturbance. The duct work between the circulation fan and the kiln entrance cannot meet this requirement, due to the proposed Kiln 7 placement adjacent to Kiln 6. There is not enough space between the two kilns to increase the length of the duct work without impeding forklift traffic and creating additional safety concerns. In addition moving the Kilns further apart would place it closer to the property line having a negative impact on air dispersion modeling for the facility. Therefore, it has been decided that stack testing of the kilns for NO_x is not feasible on this source and will not be required.

Pollutant	Emission Factor	Units	Potential Emissions for Kiln 7	
			lb/hr	TPY
PM[1]	0.30	lb/MBF	3.767	16.50
PM_{10}[2]	0.18	lb/MBF	2.260	9.90
$PM_{2.5}$[3]	0.15	lb/MBF	1.884	8.25
NO_x[4]	0.28	lb/MBF	3.516	15.40
SO_2[5]	0.025	lb/MMBtu	4.38	9.00
CO[6]	0.73	lb/MBF	9.167	40.15
VOC[7]	5.82	lb/MBF	73.082	320.10
Lead[8]	1.77E-05	lb/MMBtu	7.08E-04	3.10E-03

NOTE:

1. Particulate Matter emissions are based on unpublished NCASI values for direct-fired kilns, provided in the NCDAQ Air Permit Review / Preliminary Determination, p. 9.

2. The PM_{10} emissions factor is based on the air permit document for Bibler Brothers, dated May 2008, which used EPA's PM Calculator software for the ratio of PM to PM10 for various wood dryer source classification codes.
3. The $PM_{2.5}$ emission factor is based on Weyerhauser's Particulate Matter Estimating Guide, 2003, as referenced in the May 2010 Weyerhauser Plymouth Lumber Mill Revised Air Permit Application for Energy Project.
4. The NO_x emission factor is based on information provided by Mr. David Word of NCASI to the Weyerhauser facility.
5. SO_2 emissions are calculated per US EPA's AP-42, Section 1-6 (September 2003).
6. CO emission factor is based on the average of NCASI test results as provided via email from Dr. Word of NCASI to NCDAQ, as published in the Air Permit Review/Preliminary Determination, p. 8.
7. VOC emissions are calculated using the total VOC (lb/MBF) value based upon stack testing of a direct-fired CDK at GP McCormick on 2/15/2012 and the following equation: VOC as terpene + methanol + formaldehyde = VOC as Carbon (lb/MBF) * 1.133 + (1-0.65)* Methanol (lb/MBF) + Formaldehyde (lb/MBF)
8. Lead emissions are calculated per NCASI SARA 313 Guidance - Wood Products - April 2009, as published in the Weyerhauser Plymouth 2010 application.

FACILITY WIDE EMISSIONS				
Pollutant	**Prior to Construction**		**Post Construction**	
	Uncontrolled Emissions	**Controlled/Limited Emissions**	**Uncontrolled Emissions**	**Controlled/Limited Emissions**
	TPY	**TPY**	**TPY**	**TPY**
PM	310.31	97.66	343.67	118.08
PM_{10}	243.56	65.61	258	76.60
$PM_{2.5}$	202.01	55.74	211.11	64.35
SO_2	14.60	14.60	18.98	18.98
NO_x	106.26	106.26	121.66	121.66
CO	1209.85	1209.85	1250	1250
VOC	622.84	622.84	918.68	918.68
Lead	0.017	0.017	0.020	0.020
Total HAPs	49.24	49.24	68.83	68.83
Highest HAPs: Methanol (CAS# 67-56-1)	27.81	27.81	38.43	38.43

OPERATING PERMIT STATUS

This facility operates under Title V Operating Permit; issued on October 26, 2016; effective on January 1, 2017; expires on December 31, 2021. An Administrative Amendment will be needed to incorporate this construction project into the facility's Title V operating permit.

Company Name:	Canfor Southern Pine – Camden Plant	**Permit Writer:**	Breanna Lindler
Permit Number:	1380-0025-CK	**Date:**	**DRAFT**

REGULATORY APPLICABILITY REVIEW

<table>
<tr><th>Regulations</th><th>Comments/Periodic Monitoring Requirements</th></tr>
<tr><td>Standard No. 4</td><td>The facility has existing and new equipment that is subject to the PM and Opacity requirements in this regulation.

<table>
<tr><th>Equipment ID</th><th>Process Weight Rate (ton/hr)</th><th>Allowed Emission Rate (lb/hr)</th><th>Emission Rate (lb/hr)</th><th>Opacity Limit (%)</th></tr>
<tr><td>Debarker</td><td>300</td><td>63</td><td>1.20</td><td>20</td></tr>
<tr><td>Planer Mill*</td><td>100</td><td>51.28</td><td>0.21</td><td>20</td></tr>
<tr><td>Lumber Drying Kilns (Kiln 1 - 7)</td><td>51.46</td><td>44.84</td><td>6.94</td><td>20</td></tr>
</table>

Compliance with these requirements are achieved through good operational practices and the use of a PM control device on the planer mill, Planer Mill Baghouse (SBAG).

*Potential PM emissions uncontrolled from the planer mill are 21.22 tons per year.</td></tr>
<tr><td>Standard No. 5.2</td><td>This standard will apply to the proposed burner on the new lumber kiln, DKN 7. It will fall under the category of Fuel Combustion Sources Not Otherwise Specified in Table 1 of this standard.

The equipment will utilize low NO_x burners or equivalent technology that will achieve a 30% reduction in NO_x emissions from uncontrolled levels. The AP-42 uncontrolled NO_x emission factor for the combustion of green wood waste is 0.22 lb/MMBtu, a rate of 0.154 lb/MMBtu would represent a 30% reduction in these uncontrolled emissions. Based on this emission factor the NO_x emissions must be limited to 6.16 pounds per hour for the 40 MMBtu/hr DKN7 burner. The proposed burner utilizes an enhanced fuel-air mixing that is designed to achieve lower thermal NO_x production than a standard stoker-type wood combustion system. The NO_x emissions from the new lumber kiln will be 3.52 pounds per hour and will be in compliance with this standard.

Source testing will not be required for the kiln, see discussion under Source Testing Requirements.</td></tr>
<tr><td>Standard No. 7</td><td>This facility is an existing major source for PSD. This project is subject to PSD as a major modification because VOC emissions for the project exceed the PSD significant emission rate (see summary below). The PSD Applicability and BACT analysis for VOC was performed and discussed in the preliminary determination. Proper Maintenance and Operation has been determined to be BACT for DKN7.</td></tr>
<tr><td>61-62.6</td><td>Fugitive PM emissions will be controlled to minimize emissions.</td></tr>
</table>

Company Name:	Canfor Southern Pine – Camden Plant	**Permit Writer:**	Breanna Lindler
Permit Number:	1380-0025-CK	**Date:**	**DRAFT**

REGULATORY APPLICABILITY REVIEW	
Regulations	**Comments/Periodic Monitoring Requirements**
40 CFR 63 and 61-62.63	Subpart DDDD – Plywood and Composite Wood Products (PCWP MACT): This subpart applies to existing and new lumber drying kilns. The only requirement of this subpart is to submit an initial notification upon startup of the new lumber kiln.

AMBIENT AIR STANDARDS REVIEW	
Regulations	**Comments/Periodic Monitoring Requirements**
Standard No. 2	The facility has completed a modeling compliance demonstration for this project. The facility is in compliance with this regulation, see modeling summary dated 6/6/2018.
Standard No. 7.c	The facility has completed a modeling compliance demonstration for this project. The facility is in compliance with this regulation, see modeling summary dated 6/6/2018.
Standard No. 8 (state only)	The facility's Lumber Drying Kilns are subject to 40 CFR 63 Subpart DDDD (National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products). Therefore, toxic air pollutant emissions from the kilns are exempt from Standard No. 8 modeling.

PUBLIC NOTICE
This construction permit(s) will undergo a 30-day public notice period to establish PSD limits in accordance with SC Regulation 61-62.1, Section II.N and SC Regulation 61-62.5, Standard 7(q). The comment period was open from July 18, 2018 to August 16, 2018 and was placed on the BAQ website during that time period.

SUMMARY AND CONCLUSIONS
It has been determined that this source, if operated in accordance with the submitted application, will meet all applicable requirements and emission standards.

PSD Review
The emissions for the PSD analysis are based on potential to emit of the new lumber drying kiln and the baseline to potential emissions for all other modified sources at the facility and the associated maximum project actual increase for all other upstream and downstream sources.

Source	PM	PM10	PM2.5	SO2	NOX	CO	VOC	CO2e	Lead
New/Modified Sources (PTE)									
Kiln 7	16.500	9.900	8.250	4.38	15.40	40.15	320.10	36,714.09	0.0031
Kiln 7 Silo/Cyclone	0.078	0.019	0.008	--	--	--	--	--	--
Modified Debarkers	3.029	1.515	0.757	--	--	--	--	--	--
Modified Sawmill	2.430	0.243	0.121	--	--	--	--	--	--
Modified Planer Mill	0.478	0.128	0.026	--	--	--	--	--	--
Modified Sawmill Chippers	0.938	0.234	0.094	--	--	--	--	--	--
Baseline Actuals for Modified Sources (BA)									

Company Name:	Canfor Southern Pine – Camden Plant	**Permit Writer:**	Breanna Lindler
Permit Number:	1380-0025-CK	**Date:**	**DRAFT**

Source	PM	PM10	PM2.5	SO2	NOX	CO	VOC	CO2e	Lead
Modified Debarker	1.593	0.797	0.398	--	--	--	--	--	--
Modified Sawmill	1.174	0.117	0.059	--	--	--	--	--	--
Modified Planer Mill	0.234	0.063	0.013	--	--	--	--	--	--
Modified Sawmill Chippers	0.476	0.119	0.048	--	--	--	--	--	--
Other Upstream/Downstream Increases (caused by debottlenecking, increased drying capacity of 110 MMBd-ft/yr)									
Roads	1.877	0.371	0.083	--	--	--	--	--	--
Byproduct Handling	0.607	0.287	0.043	--	--	--	--	--	--
Total Upstream/Downstream Increases	2.484	0.658	0.126	0.00	0.00	0.00	0.00	0.00	0.00
Total Project Impacts	**22.458**	**11.602**	**8.865**	**4.38**	**15.40**	**40.15**	**320.10**	**36,714.09**	**0.0031**
PSD Significance Level	25	15	10	40	40	100	40	75000	0.6
Significant Impacts? (Yes or No)	No	No	No	No	No	No	**Yes**	No	No

Total Project Impacts Calculation:

Kiln 7 **PTE** + Kiln 7 Silo/Cyclone **PTE** + (Modified Debarkers **PTE** – **BA**) + (Modified Sawmill **PTE** – **BA**) + (Modified Planer Mill **PTE** – **BA**) + (Modified Sawmill Chippers **PTE** – **BA**) + Road **Increases** + Byproduct Handling **Increases**

Example Calculation for PM Project Impacts:

$$16.5\,TPY + 0.078\,TPY + (3.029 - 1.593)TPY + (2.430 - 1.174)TPY + (0.478 - 0.234)TPY + (0.938 - 0.476)TPY + 1.877TPY + 0.607TPY = 22.458TPY$$

As the baseline to potential test was used for modified sources, reasonable possibility recordkeeping will not be required.

Project aggregation was considered for this project and the 2014 permit of lumber kiln 6. These two project were considered separate projects in internal planning documents and capital budget requests, additionally Kiln 6 began operation in December of 2014, almost 3.5 years ago. This current project is considered independent of the 2014 project and aggregation was not necessary.

Appendix D - Public Notice of Draft PSD Construction Permit

PUBLIC NOTICE

State of South Carolina (SC)
Department of Health and Environmental Control (DHEC)
Bureau of Air Quality (BAQ)
2600 Bull Street
Columbia, SC 29201
(803) 898-4123

Notice of a Draft Air Prevention of Significant Deterioration (PSD) Construction Permit
PUBLIC NOTICE #18-035-PSD

COMMENT PERIOD: Public Notice will begin on **July 18, 2018** and will end at close of business, which is 5:00 p.m. on **August 16, 2018**.

Canfor Southern Pine – Camden Plant
1281 Sanders Creek Plant
Cassatt, South Carolina 29032
(Kershaw County)
AIR PERMIT # 1380-0025-CK

Canfor Southern Pine-Camden Plant has applied to the SC DHEC, BAQ, for a Prevention of Significant Deterioration (PSD) air construction permit to replace, modify, and install equipment at its existing facility. A Preliminary Determination, draft construction permit, and Statement of Basis have been written by the BAQ outlining this proposed project and applicable regulations. In addition to other state and federal air quality regulations, the draft permit is subject to review under SC DHEC Regulation 61-62.5, Standard No. 7 "Prevention of Significant Deterioration (PSD)." This regulation is equivalent to Title 40 of the Code of Federal Regulations, Part 52.21 "Prevention of Significant Deterioration of Air Quality." Under these regulations, a facility must demonstrate that it will not significantly deteriorate the air quality in its region prior to constructing or modifying sources of air pollutants. The draft permit has not yet been approved and is open to comment from the public, the United States Environmental Protection Agency (EPA), the Federal Land Managers, the chief executives of Kershaw, the City of Cassatt, and the Santee-Lynches Council of Government.

Canfor Southern Pine – Camden Plant is a lumber mill that produces structural lumber from pine logs. The facility is proposing: to replace the existing debarker to modernize the equipment and increase the log processing rate from 200 tons per hour (tph) to 300 tph; to modify the Sawmill to increase the processing rate from 40 thousand board-foot per hour (MBF/hr) to 70 MBF/hr; to modify the existing sawmill chippers to increase the capacity from 55 tph to 77 tph; to install a new direct-fired, continuous lumber drying kiln designed to burn green sawdust and bark and remove an existing indirect-fired, batch lumber drying kiln; to modify the exhaust hoods and stack to redirect steam and kiln exhaust away from ground level work areas at an existing kiln; to modify the planer mill to improve product flow; and to remove the wood treatment process equipment. Emissions generated by this facility as a result of the proposed project will include: Particulate Matter (PM); Particulate Matter less than 10 micrometers in diameter (PM10); Particulate Matter less than 2.5 micrometers in diameter (PM2.5); Sulfur Dioxide (SO2); Nitrogen Oxides (NOx); Carbon Monoxide (CO); Volatile Organic Compounds (VOCs); Hazardous Air Pollutants (HAPs); and Lead (Pb).

Air dispersion modeling has indicated that the release of emissions from this facility will not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS). There will be no Class I Areas impacted and no degree of increment consumption resulting from this proposed project.

Pursuant to Part 70.7(d)(1)(v), this construction permit will be incorporated as an administrative amendment into the existing Title V permit with no additional public comment period. All public participation and EPA requirements were fulfilled with notice of the construction permit action. All emissions limitations and conditions in the draft PSD construction permit have been written in accordance with the SC Title V Operating Permit Program.

Interested persons may review the materials drafted and maintained by SC DHEC for this facility and submit written

comments on the draft permit by the end of the public notice period listed above, to the BAQ Public Notice Coordinator at the above SC DHEC address or by e-mail at AirPNComments@dhec.sc.gov. All comments received by the end of the notice period, will be considered when making a decision to approve, disapprove, or modify the draft permit. Where there is a significant amount of public interest, SC DHEC may hold a public hearing to receive additional comments. Public hearing requests should be made in writing to the BAQ Public Notice Coordinator at the above SC DHEC address or by e-mail. If a public hearing is requested and scheduled, notice will be given thirty (30) days in advance. If you have questions concerning the draft permit, please contact Breanna Lindler at the phone number listed above. A final review request may be filed after a permit decision has been made. Information regarding final review procedures is available from SC DHEC's legal office at the above address or by calling (803) 898-3350. Information relative to the draft permit will be made available for review through the end of the notice period listed above, at the SC DHEC Columbia Office listed above and at the following location:

SC DHEC, Sumter BEHS Office, 105 Magnolia Street, Sumter, SC 29151

Information on permit decisions and hearing procedures is available by contacting SC DHEC at either address listed above. Copies of a draft permit or other related documents may be requested in writing to the Freedom of Information Office; fees may apply. Please bring this notice to the attention of persons you know will be interested in this matter.

This public notice, along with the Preliminary Determination which includes the draft permit and draft statement of basis, may be viewed through the end of the notice period on SC DHEC's website at: http://www.scdhec.gov/PublicNotices/.

Appendix E - Correspondence

BAQ in receipt of an Expedited Prevention of Significant Deterioration (PSD) Air Permit Application for Canfor Southern Pine – Camden Plant (1380-0025)

Lindler, Breanna L.

Wed 5/9/2018 12:09 PM

To: Kathy Ferry (kathy_ferry@yahoo.com) <kathy_ferry@yahoo.com>; robert.byrd@canfor.com <robert.byrd@canfor.com>;

Cc: Watts, Regie <wattsrj@dhec.sc.gov>; Hardee, Christopher <hardeecd@dhec.sc.gov>; AIR_ENG_ADMIN <AIR_ENG_ADMIN@dhec.sc.gov>; Boyce, Lawra <boycelc@dhec.sc.gov>; Glass, John <glassjp@dhec.sc.gov>; Turner, Connie P. <turnercp@dhec.sc.gov>;

1 attachments (11 MB)

2018-05-02_1380-0025.CP.pdf;

The Bureau of Air Quality (BAQ) received an expedited PSD application from Canfor Southern Pine – Camden Plant, Cassatt, SC on May 2, 2018. The application was for the construction of a new direct-fired, continuous lumber drying kiln and additional modifications at other emissions units on site to incorporate newer technology and improve product flow. The proposed drying capacity will increase to 360.6 million board-feet per year. The completeness review period for the application officially began on this date and the application has been deemed technically complete as of May 9, 2018.

We need your assistance in meeting the time frame goals. We ask that you commit to assisting us with public participation activities, such as participating in answering questions from the public about the proposed project during any public meeting and/or public hearings that may be requested and held and helping us respond to any comments that may be received during the public comment period. We also ask that you commit to providing timely answers to any additional information that may be requested during the review. If you still wish to enter the expedited program and agree to the above conditions, please respond to this email and submit payment in the amount of $20,000.

If paying the expedited fee by check, make the check out to “SC DHEC.” The check should be received within 5 business days of this notification and should be sent to the attention of the “Director of Air Permitting Division – BAQ”.

If you wish to pay by electronic check, let us know who to email an invoice to. Once the invoice is created and emailed you will have one business day to pay. You will need the invoice number and then you may log on to the website at the address below to pay the expedited fee.

https://web.sc.gov/dheconlineinvoicepaymentsystem/invoicegroupselection.aspx

If you have questions, please contact me at (803) 898-0457 or by e-mail.

Breanna L. Lindler
Permit Writer, Sandhills and Pulp & Paper Section
Bureau of Air Quality- Air Permitting Division

S.C. Dept. of Health & Environmental Control
2600 Bull Street, Columbia, SC 29201
Office: (803) 898-0457
lindlebl@dhec.sc.gov
Connect: www.scdhec.gov Facebook Twitter

RE: Prevention of Significant Deterioration (PSD) Air Permit Application for Canfor Southern Pine – Camden Plant (1380-0025)

Shepherd, Lorinda <Shepherd.Lorinda@epa.gov>

Tue 5/22/2018 1:56 PM

To: Lindler, Breanna L. <lindlebl@dhec.sc.gov>;

Thank you, Breanna.

At present, EPA has not targeted this application for review. Let me know if you have any concerns with it or if any questions come up during your technical review.

Once completed, please send the draft documents, any public comments received, and the final permit to me to add to our records.

Regards,
Lori Shepherd
U.S. EPA Region 4
Air Permitting Section
(404)562-8435

From: Lindler, Breanna L. [mailto:lindlebl@dhec.sc.gov]
Sent: Wednesday, May 9, 2018 12:12 PM
To: Ceron, Heather <Ceron.Heather@epa.gov>; Shepherd, Lorinda <Shepherd.Lorinda@epa.gov>; NSRsubmittals <NSRsubmittals@epa.gov>
Subject: Prevention of Significant Deterioration (PSD) Air Permit Application for Canfor Southern Pine – Camden Plant (1380-0025)

The Bureau of Air Quality (BAQ) received a PSD permit application from Canfor Southern Pine – Camden Plant, Cassatt, SC on May 2, 2018. The application was for the construction of a new direct-fired, continuous lumber drying kiln and additional modifications at other emissions units on site to incorporate newer technology and improve product flow. The proposed drying capacity will increase to 360.6 million board-feet per year. The completeness review period for the application officially began on this date and the application has been deemed technically complete as of May 9, 2018. It will now undergo technical review for a preliminary determination under the requirements of SC Regulation 61-62.5, Standard No. 7 (PSD).

An electronic copy of the PSD construction permit application is attached for your review. Please direct all written comments to my attention at the address below. If I can be of further assistance, please contact me at (803) 898-0457 or by E-mail.

Breanna L. Lindler
Permit Writer, Sandhills and Pulp & Paper Section
Bureau of Air Quality- Air Permitting Division

S.C. Dept. of Health & Environmental Control
2600 Bull Street, Columbia, SC 29201
Office: (803) 898-0457
lindlebl@dhec.sc.gov
Connect: www.scdhec.gov Facebook Twitter


http://www.scdhec.gov/images/logo_email.jpg

Healthy People. Healthy Communities.

May 9, 2018

Catherine Collins
US Fish and Wildlife Service
7333 West Jefferson Ave
Suite 375
Lakewood, CO 80235

Re: Prevention of Significant Deterioration (PSD) Air Permit Application
Canfor Southern Pine – Camden Plant
Permit No. 1380-0025, Kershaw County

Dear Ms. Collins:

The Bureau of Air Quality (BAQ) received a PSD permit application from Canfor Southern Pine – Camden Plant, Cassatt, SC on May 2, 2018. The application was for the construction of a new direct-fired, continuous lumber drying kiln and additional modifications at other emissions units on site to incorporate newer technology and improve product flow. The proposed drying capacity will increase to 360.6 million board-feet per year. The completeness review period for the application officially began on this date and the application has been deemed technically complete as of May 9, 2018. It will now undergo technical review for a preliminary determination under the requirements of SC Regulation 61-62.5, Standard No. 7 (PSD).

An electronic copy of the PSD construction permit application is available for review upon your request. Please direct all written comments to my attention at the address below. If I can be of further assistance, please contact me at (803) 898-0457 or by E-mail at lindlebl@dhec.sc.gov.

Sincerely,

Breanna Lindler

Breanna Lindler
Air Permitting Division
Bureau of Air Quality

cc: Permit File: 1380-0025
ec: Regie Watts, BEHS

Healthy People. Healthy Communities.

May 9, 2018

Melanie Pitrolo
USDA Forest Service
160 A Zillicoa Street
Asheville, NC 28801

Re: Prevention of Significant Deterioration (PSD) Air Permit Application
Canfor Southern Pine – Camden Plant
Permit No. 1380-0025, Kershaw County

Dear Ms. Pitrolo:

The Bureau of Air Quality (BAQ) received a PSD permit application from Canfor Southern Pine – Camden Plant, Cassatt, SC on May 2, 2018. The application was for the construction of a new direct-fired, continuous lumber drying kiln and additional modifications at other emissions units on site to incorporate newer technology and improve product flow. The proposed drying capacity will increase to 360.6 million board-feet per year. The completeness review period for the application officially began on this date and the application has been deemed technically complete as of May 9, 2018. It will now undergo technical review for a preliminary determination under the requirements of SC Regulation 61-62.5, Standard No. 7 (PSD).

An electronic copy of the PSD construction permit application is available for review upon your request. Please direct all written comments to my attention at the address below. If I can be of further assistance, please contact me at (803) 898-0457 or by E-mail at lindlebl@dhec.sc.gov.

Sincerely,

Breanna Lindler

Breanna Lindler
Air Permitting Division
Bureau of Air Quality

cc: Permit File: 1380-0025
ec: Regie Watts, BEHS

Re: RE: Canfor Southern Pine - Camden Plant (1380-0025)

Kathy Ferry <kathy_ferry@yahoo.com>

Wed 6/20/2018 10:58 AM

To: Lindler, Breanna L. <lindlebl@dhec.sc.gov>;

Cc: Robert Byrd <robert.byrd@canfor.com>; Tim Papa <tim.papa@canfor.com>;

1 attachments (222 KB)

CDK Burner Schematic 1.pdf;

Breanna,

I have attached a schematic of the kiln duct work between the burner and the kiln itself. The schematic is labeled to point out the specific locations discussed previously as potential sampling points.

As previously mentioned, the most-representative sampling location would be Sample Point 1, downstream of the blend box, between the recirculation fan and the kiln. The duct work in this location is 8 ft x 7 ft (56 sq. ft. cross sectional area). The equivalent duct diameter is 8.444 ft. EPA Method 1 recommends a sampling location that is a minimum of 8 duct diameters downstream and 2 duct diameters upstream of any flow disturbance. Therefore, you would be required to provide a straight stretch of duct work total 10 duct diameters in length to meet this criteria. In the case of this equipment, that would mean extending the distance between the burner and the kiln by 84.44 ft.

EPA Method 1 does provide an alternate method for locating a test sampling location that requires a minimum of 2 duct diameters downstream and 0.5 duct diameters upstream of any flow disturbance. For our installation, this would require an extension of 21.1 ft. The proposed Kiln 7 will be placed adjacent to Kiln 6 for efficient product handling and to manage plant traffic and utilities. There is not enough room between Kilns 6 & 7 to increase the distance between the burner and kiln in that direction. Moving Kiln 7 or the burner in the opposite direction would impede forklift traffic moving lumber to and from the kilns and present safety concerns. In addition, moving the equipment further from Kiln 6 places it closer to the property line and is likely to have a negative impact on modeling.

I believe this answers your questions. Please let me know if there is any other information you require.

Thanks,
Kathy

On Friday, June 15, 2018, 3:08:29 PM EDT, Kathy Ferry <kathy_ferry@yahoo.com> wrote:

We'll work on it. -Kathy

On Friday, June 15, 2018, 2:24:15 PM EDT, Lindler, Breanna L. <lindlebl@dhec.sc.gov> wrote:

Kathy could you please elaborate a little more as to why the duct work between the circulation fan the kiln entrance cannot be designed to meet the requirements for the source tests? What are the limitations on the duct work design for the kiln that does not allow for more space to be added to meet the criteria in EPA Method 1?

If you could have an answer to me by early next I am going to try and finish the draft and have it ready for review before I leave for vacation starting on Thursday, June 21.

Thanks,

Breanna L. Lindler
Permit Writer, Sandhills and Pulp & Paper Section
Bureau of Air Quality- Air Permitting Division

S.C. Dept. of Health & Environmental Control
2600 Bull Street, Columbia, SC 29201
Office: (803) 898-0457
lindlebl@dhec.sc.gov
Connect: www.scdhec.gov Facebook Twitter

From: Kathy Ferry [mailto:kathy_ferry@yahoo.com]
Sent: Friday, May 25, 2018 3:03 PM
To: Lindler, Breanna L. <lindlebl@dhec.sc.gov>
Cc: Robert Byrd <robert.byrd@canfor.com>; Tim Papa <tim.papa@canfor.com>
Subject: Re: Canfor Southern Pine - Camden Plant (1380-0025)

Breanna,

Here is the information we have on the situation.

SC Reg. 61-62.5, Standard 5.2 includes a requirement to reduce NOx emissions from the kiln by 30% below uncontrolled levels. Based on data from EPA AP-42, uncontrolled combustion of green wood waste is expected to result in 0.22 lb NOx / MMBtu heat input. Therefore, Standard 5.2 requires the kiln emissions to be limited to 0.154 lb NOx / MMBtu heat input.

Demonstration of compliance through stack testing would require completion of EPA Test Method 7 or 7E to measure NOx concentration and EPA Test Methods 1-4 to determine the gas flow rate and composition (to allow calculation of the burner heat input through EPA Method 19).

The potential sampling point that is considered most representative of NOx emissions is in the duct work downstream of the burner blend box (where 2100 F burner exhaust is mixed with 200 F kiln exhaust), between the recirculation fan and the entrance to the kiln. However, the configuration of this duct work does not meet EPA Method 1 sampling criteria. Method 1 specifies that sampling should occur at a location at least 8 duct diameters downstream and 2 diameters upstream of any flow disturbance. This requirement cannot be met in the duct work between the recirculation fan and kiln entrance.

Please let me know if you have any questions or comments on this information or if you need any additional information.

Kathy

> The only upstream location that could potentially meet the Method 1 criteria would be a sample port installed on the bypass stack. The bypass stack is intended to be used for emergency shutdown situations where it is important to divert heat from the burner away from the kiln quickly. However, the stack is a much smaller diameter than the duct work entering the kiln. Therefore, the recirculation fan used to combine cool kiln exhaust with the hot burner exhaust is turned down upon opening the bypass stack. This is necessary to reduce flow through the small bypass stack and avoid unacceptable operating pressures. However, changing the operating conditions in the blend box is expected to impact NOx formation, and samples collected under this operating scenario would not be representative of normal operating conditions.

On Monday, May 21, 2018, 5:01:07 PM EDT, Lindler, Breanna L. <lindlebl@dhec.sc.gov> wrote:

Hi Kathy,

I will be out the rest of the week for training, and want to just get this one comment/question to you before then.

Regarding NOx testing in Std. 5.2 the testing would be for the burner in the kiln not the entire kiln emissions itself. I wanted your opinion on possible testing options of the burner itself before the stream enters the kiln. I understand for the VOC testing that a main concern is capturing all the emissions and the many different opening in a kiln. But this testing would it be possible to test the burner combustion gas before it enters the kiln?

I would like to get your feedback on this idea and why it would or would not be possible. If you could please have a response to me by the close of business on Monday, May 28, 2018.

Thanks,

Breanna L. Lindler
Permit Writer, Sandhills and Pulp & Paper Section
Bureau of Air Quality- Air Permitting Division

S.C. Dept. of Health & Environmental Control
2600 Bull Street, Columbia, SC 29201
Office: (803) 898-0457
lindlebl@dhec.sc.gov
Connect: www.scdhec.gov Facebook Twitter


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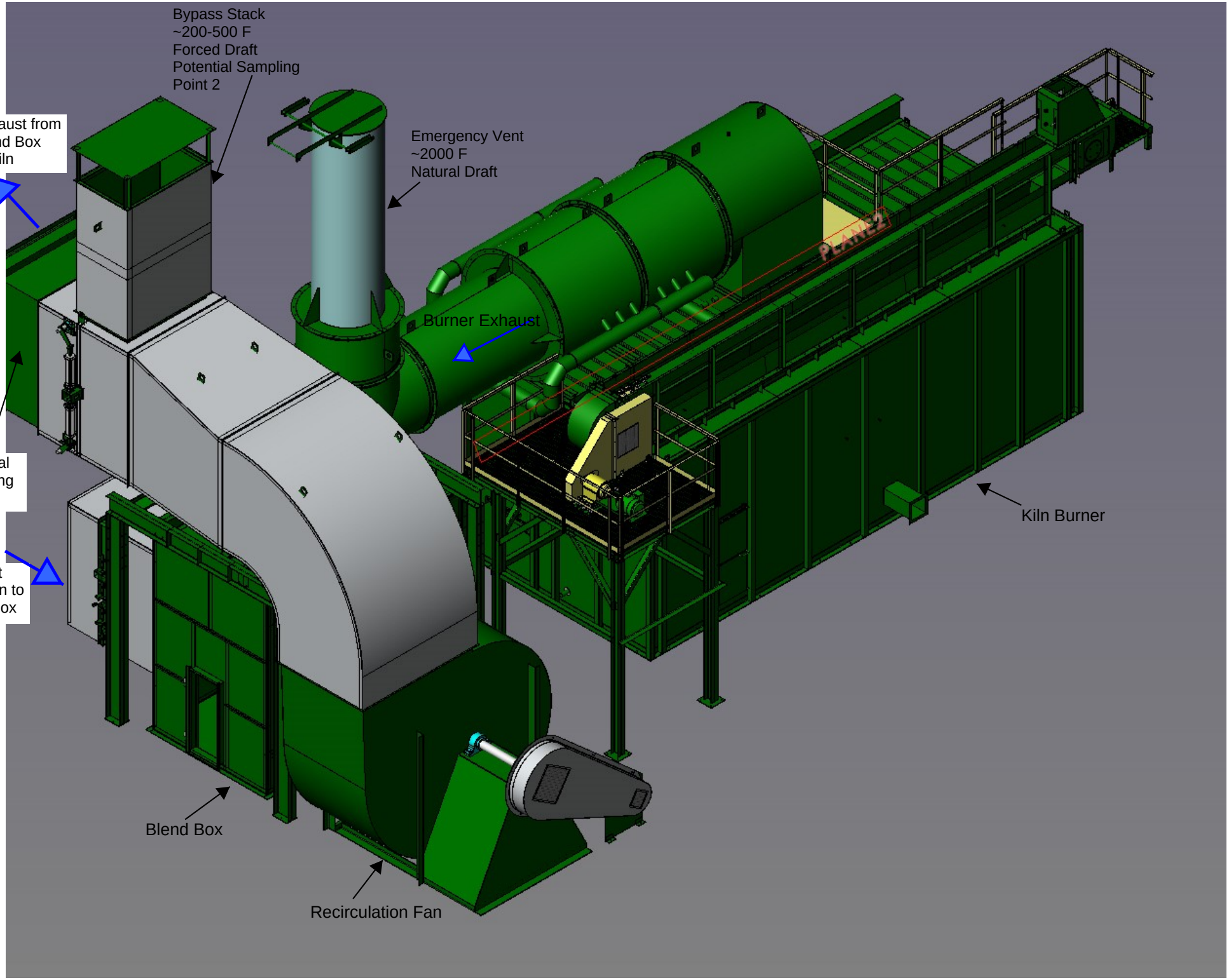
Bypass Stack
~200-500 F
Forced Draft
Potential Sampling
Point 2
Exhaust from
Blend Box
to Kiln
Emergency Vent
~2000 F
Natural Draft
Burner Exhaust
PLANE2
Potential
Sampling
Point 1
Kiln Burner
Exhaust
from Kiln to
Blend Box
Blend Box
Recirculation Fan