EXPEDITED REVIEW

DATE APPLICATION RECEIVED: March 2, 2012; Additional information for the application received on March 23, 2012.

DATE OF LAST INSPECTION: This is a new (Greenfield) facility which will be located in the City of Rowesville, Orangeburg County

FACILITY DESCRIPTION Klausner Holding USA Inc. (Klausner) is proposing to construct a greenfield lumber production facility (Standard Industrial Classification [SIC] Code 2421) in Orangeburg County, South Carolina (Orangeburg mill). The proposed Orangeburg mill will include a log receiving and storage area, log debarkers, saw mill, indirectly heated drying kilns utilizing hot water generated by six (6) boilers, planer mill, and lumber loadout area. The Orangeburg mill will be located at a rural catalyst site at 3374 Rowesville Road, Rowesville in Orangeburg County. The approximate Universal Transverse Mercator (UTM) coordinates of the mill are 514.5 kilometers east and 3,695.9 kilometers north (UTM Zone 18, NAD83).

PROJECT DESCRIPTION This is a Prevention of Significant Deterioration (PSD) construction project for a new lumber production facility (lumber mill). The lumber mill will produce multi-dimensional, dried lumber and byproducts, such as bark, wood chips, sawdust and dry shavings. The facility will operate up to 8,760 hours per year (continuous operation), and at full-scale operations the mill will have a maximum annual production of 700 MMBF/yr. The proposed Lumber Production Facility (Orangeburg Mill) will include the following emission units and activities:

- Log Storage and Processing
- Saw Mill Operations
- Sorter line operations
- Biomass-fired hot water heaters (boilers)
- Natural gas fired hot water heaters (boilers)
- Drying kilns
- Planer mill operations
- Lumber loadout
- Support equipment (i.e. emergency engines)
- Exempt activities (i.e. diesel storage tanks)
- Coatings (Inks, Colors, Lacquers)

PROCESS DESCRIPTION
The proposed mill will process tree-length saw logs received from local sources into multidimensional lumber. The raw materials will be received via trucks or rail, and the lumber produced, as well as saleable by-products, will be shipped off-site via trucks or railcars.

LOG STORAGE AND PROCESSING
Wood is transported to the Orangeburg mill as tree-length saw logs (Southern Yellow Pine). The trucks are weighed upon arrival at the facility. Log trucks are unloaded via mobile equipment to the on-site log storage area.

The logs are either brought directly to the in-feed of the debarking process, or they are stacked and remain in the storage area (approximate area of 430,000 ft^2) until required for the lumber mill production operation. Received logs will be stored in rows comprising a total storage capacity of approximately 17,500 tons. Incoming logs include a moisture content of approximately 50% or greater.

A log loader transfers wood from the log storage area onto the in-feed table of the two (2) debarking units, which removes the tree bark from the logs processed.

The bark gravity feeds onto a conveyor underneath. Separated bark is transferred to a storage area (approximate area of 40,000 ft^2) located outside the log processing building – to be used as fuel for the biomass boilers or sold as a byproduct. These debarkers are able to generate approximately 211,000 tons of bark per year depending on the diameter of the logs. The bark will have a moisture content greater than 40%.

Debarked logs are assessed for quality by cutting and root reducing, as necessary. The cutting and root reducing activities occur inside the log processing building. The debarked logs are conveyed out of the log processing building into boxes. Once segregated into boxes, the debarked logs are transferred by mobile equipment to intermediate storage stacks, prior to feeding the saw mill.

SAW MILL OPERATIONS

A log loader transfers the debarked logs from the storage area into the saw mill building. A conveyor system inside the processing building transfers the wood through the saw lines. The two (2) saw lines process the wood into the required lumber sizes. The two (2) saw lines process the wood into the required lumber sizes.

Chips and sawdust generated from the saw lines feed via gravity onto a separate enclosed conveyance system from the processed wood (lumber). A vibrating belt (screening system) separates the chips and sawdust generated in the saw mill building. The potential throughput for the vibrating belt is approximately 4 million (m^3/yr).

The wood chips (wet) are transferred out of the byproduct screening building via conveyor directly into an outdoor storage area with a storage size of approximately 12,000 ft^2. The sawdust (wet) is transferred to a separate covered storage area adjacent to the byproduct screening building. The maximum output of sawdust is approximately 1.7 million m^3/yr. The wood chips and sawdust are either used as fuel for the biomass boilers or sold as a byproduct. Both the wood chips and sawdust will have a moisture content of approximately 50%.

SORTER LINE OPERATIONS

Following the saw lines, the cut green lumber is sorted according to quality and length in one of four (4) sorting lines, located inside the sorter line building. Each sorter line has trimmers for trimming the board length. The trim ends gravity feed to a conveyance system, which transfers the trim ends to a hogger. The hogger is powered by an electric motor and is located inside the byproduct screening building. The chipped wood from the hogger is transferred into the byproduct screening building to be combined with the chips (wet) from the saw mill. In addition, an exhaust ventilation extraction system collects sawdust generated from the trimmers. The extraction system conveys the sawdust (wet) to the byproduct screening building, and is controlled by a fabric filter, to minimize emissions of PM.

BIOMASS BOILERS

Hot water is used as the heat transfer fluid to indirectly provide heat to the drying kilns. The hot water is generated by six (6) boilers. Two of the boilers are wood-fired (biomass) units with maximum heat input capacities of approximately 120 million British thermal units per hour (MMBtu/hr) each.

The biomass boilers are fueled with wet bark, wood chips, and sawdust generated from the mill that is not sold as a byproduct. The biomass is transferred via front end loader from the respective storage areas for the bark, wood chips and sawdust, to an open-top fuel storage bin. The fuel is conveyed from the storage bin to the boiler furnace at a controlled rate. It should be noted that the proposed units will not utilize a supplemental fuel, such as natural gas or fuel oil.

The biomass boilers utilize a dutch oven furnace design that is common to the wood products industry due to the fuel type (high moisture bark, wood chips, and sawdust). The following delineates the combustion process in the dutch oven furnace:

1. Fuel is introduced via a gravity drop to a hydraulic ram.
2. The hydraulic ram pushes the fuel onto a step grate system within the initial refractory-lined primary chamber, where a three-stage process of drying, pyrolysis and final combustion begins.
3. In the first step, the wet fuel is dried and heated by the combustion gases and radiation from the refractory-lined chamber.
4. Once the fuel is dry midway down the step grates, the fuel undergoes a pyrolysis process, reducing the wood to hydrocarbon and CO gases.
5. The hydrocarbon and CO gases are carried into the secondary chamber, where the combustion process is completed with the introduction of secondary combustion air.

Each biomass boiler is equipped with selective non-catalytic reduction (SNCR).2 Reductant for the SNCR control will be injected into the furnace in order to reduce emissions of NO_X.

Exhaust gases from the furnace pass through the hot water heater, a combustion air heater, and then to a multiple cyclone collector. Ash that drops out of the combustion gases in the furnace, the hot water heater, combustion air heater, and cyclone are discharged onto the ash conveyor. The ash conveyor transfers the ash to a storage bin, prior to shipment of the ash off-site for disposal.

Following the cyclone, each boiler will be controlled by an electrostatic precipitator (ESP) to reduce emissions of PM, PM_{10}, $PM_{2.5}$ and particulate HAP. Flyash collected in the ESP will be transferred via enclosed conveyors (e.g., screw conveyors) to an ash silo. Approximately two times a week, the silo will be unloaded into trucks via gravity feed, for transport of the flyash offsite. A fabric filter will control emissions from the ash truck loading process.

The design of the dutch oven furnace relies on a large amount of refractory for thermal inertia. As such, these units can efficiently sustain combustion of wet biomass, but are unable to respond quickly to changes in heat demand. Similarly, the start-up process will occur over several hours.

The boilers are intended to operate year round on essentially full capacity with only one scheduled shutdown per year; however, it is possible that if unexpected events such as unplanned maintenance occur that up to a few such occurrences are possible. During startup, the temperature of the boiler is raised steadily, largely to protect the boilers' refractories. To get to proper operating temperature for the ESP may require up to 8 to 10 hours. The ESP is not started until the exhaust temperature reaches approximately 275 ^{o}F to avoid condensation and particulate agglomeration on the collector electrodes. Shutdown requires approximately 6 hours in which heat load is quickly bought down to only 10% of its normal feed rate to allow a controlled burndown for equipment protection. During this shutdown period, the ESP is shut down to avoid condensation/particulate agglomeration.

During startup or shutdown, injection of SNCR reagent for NOx emissions does not begin until the boilers reach 60% capacity. From 60 to 100% of capacity, SNCR controls emissions to no more than 0.14 lb/MMBtu. Below 60% capacity, emissions do not exceed 0.15 lb/MMBtu, so total mass emissions during reduced load situations occurring during startup shutdown are well below the emission rates occurring during normal operation. Even though the boiler emission profile does not vary significantly during startup/shutdown events, Klausner will minimize startup/shutdown times and use good combustion practices during that time period in order to minimize emissions.

NATURAL GAS BOILERS

In addition to the two biomass boilers, the Orangeburg mill also utilizes four natural gas-fired hot water heaters (natural gas boilers), each with a maximum heat input capacity of 46 MMBtu/hr. The natural gas boilers will be equipped with low NO_X burners and flue gas recirculation to mitigate NO_X emissions. The natural gas boilers will exhaust through two stacks (two boilers per stack). The natural gas boilers are equipped to burn No.2 fuel oil. Klausner has requested an operational limit of 500 hours per year when the boilers utilize No. 2 fuel oil as fuel.

DRYING KILNS

The indirectly-heated drying kilns process the lumber to reduce the moisture content under carefully controlled temperature and relative humidity conditions to between approximately 8 and 20%, depending on customer specification. The lumber drying kilns at the proposed mill will utilize hot water from the six (6) boilers to reduce the moisture content of the lumber.

The lumber is transferred into one of the 60 drying kilns located in four (4) separate blocks via mobile equipment from the saw mill building.

▲ Block No. 1 – 12 kilns
▲ Block No. 2 – 16 kilns
▲ Block No. 3 – 16 kilns
▲ Block No. 4 – 16 kilns

The total duration for one cycle in the kiln is dependent upon the customer-specified product, ranging from 56 hours to 10 days. Condensate from the drying kilns is collected in basins and reused in the kilns during equalization. Equalization is the process used to increase the equilibrium moisture content in the drying kilns via hot water (condensation). Each drying kiln is designed with its own basin and the basins in each kiln section (or block) are connected so that condensate can be used in each of the drying kilns. The reduction in moisture content to between 8% and 20% in the dryer kilns will result in the required lumber product specifications.

The total kiln volume is 250 m^3 for each drying cycle. The dried lumber is either directly graded and packaged, or the lumber is transported from the kilns via mobile equipment to the planer mill building for further processing.
Exhaust gases from the lumber drying process contain VOC and organic HAP released during the drying process due to increased temperature. Each of the drying kilns includes two (2) exhaust vents to the atmosphere with a total of 120 vents from the 60 drying kilns.

Drying kilns operational control scheme and operational parameters

Following the green lumber sorter lines, the rough cut lumber is stacked with spacer blocks between the boards. The stacked lumber is transported into a kiln chamber via mobile source. Once loaded with stack lumber, the kiln doors are closed and air flow is generated by fans mounted on top of the chamber. The air flow is directed to an indirect heat exchanger to provide heat, raising the temperature of the circulated air up to approximately 300°F. Heat is provided by hot water from the boilers. The warm air is circulated throughout the kiln chamber around the stacked boards. The spacer blocks between the boards promote circulation and laminar air flow around each board for more consistent and even drying. Throughout the drying process, which is tailored to the product and customer specifications, temperature and humidity are measured in the chamber. As well, the electrical resistance of some kiln vents are measured, which also provides an indication of the moisture content. Each of these measurements and controls are the inputs and outputs of a programmable logic controller (PLC) which provides control of the kiln drying process.

PLANER MILL

The dried lumber is transported from the drying kilns to the planer mill building. Individual boards are planed and trimmed in the planer mill. There are two (2) parallel planer lines, with the planers located in the planer mill building. Subsequent to the planers, each line has trimmers, which are located downstream of the planers, and inside the sorter line building. The sorter line building will be equipped with an open chain conveyor system to move the final lumber board on the two (2) sorter lines. Final lumber board is packaged and then transported to a designated storage area

In addition to being located inside a building, the planer operations are equipped with local exhaust ventilation to collect dry wood shavings and sawdust. An open belt conveyor system is used to transfer the trim ends from the trimmers to a hogger in the byproduct screening building. Klausner estimates that a maximum of 15,500 m3/yr of sawdust and 640,000 m3/yr of shavings could be generated from the planer mill operations.

PLANER MILL EXHAUST VENTILATION SYSTEM

Collected shavings (dry) and sawdust (dry) from the two (2) planer and sorter lines are transferred via the exhaust ventilation system into two (2) storage silos located outside the planer mill building, each with a storage capacity of approximately 56,000 ft3. Shavings/sawdust from both planer/sorter lines can be transferred to either storage silo. The

exhaust ventilation system and silos are controlled by fabric filters, one on top of each silo. From the storage silos, shavings and sawdust will be gravity fed into trucks for shipment offsite.

Trim ends which are not collected by the exhaust ventilation system will be fed through a hogger and conveyed to a covered storage area adjacent to the byproduct screening building. The hogger is powered by an electric motor and is located inside the byproduct screening building

SUPPORT EQUIPMENT
Five (5) diesel-fired emergency engines will be installed at the mill. The power output capacity for each engine is 343 kW. Klausner will limit the operation of each emergency engine for maintenance checks and readiness testing to no more than 100 hr/yr. Small diesel storage tanks will complement each engine.

Three (3) Site-Wide Electric Powered Hoggers (All three hoggers are enclosed)
The saw lines include chippers, profilers, and saws. The chips and sawdust generated from these saw line operations feed onto an enclosed conveyance system and to a vibrating belt, which separates the chips and sawdust into separate chip and sawdust piles. Following the saw lines, the cut green lumber is sorted in one of four sorter lines and the length of the board is trimmed by the 8 trimmers (2 per line). The trim ends feed to a conveyance system which transfer the trim ends to an electric hogger located inside the byproduct screening building.

The chipped wood from the hogger is transferred to the byproduct screening building to be combined with the chips from the saw lines. In addition, whole logs that are sorted out from log processing are sent to a separate hogger in the byproduct screening building. The chipped wood from this second hogger is also transferred to the byproduct screening building to be combined with the chips from the saw lines and sorter lines.

A third hogger chips trim ends from the four planer line trimmers. However, because the trim ends hogged in this third hogger are dry, it is assumed that VOCs have already been driven off in the drying kilns, and these emissions have already been accounted for with the kilns.

EXEMPT EMISSION UNITS
The facility includes insignificant emissions units and activities that meet the exemptions from construction permitting under SC Regulation 61-62.1 Section II (B) – applicable subsections delineated below corresponding to each insignificant activity.

a) Three (3) 265 gallon emergency engine diesel storage tanks
b) Two (2) 10,000 gallon emergency engine diesel storage tanks
c) Two (2) 14,000 gallon boiler No. 2 fuel oil storage tanks
d) One (1) 10,000 gallon reductant (e.g., ammonia or urea) storage tank
e) One (1) 26,400 gallon mold protection / blue stain protection storage tank
f) One (1) 27 gallon mold protection storage tank
g) On-site vehicle diesel refueling station and 16,000 gallon storage tank
h) Green logs and wet wood, bark, chips, and sawdust handling and processing
i) Space heaters
j) Laboratory equipment
k) Maintenance brazing, soldering, and welding equipment
l) Fire suppression systems and fire extinguishers
m) Three (3) Site-wide electric powered hoggers

EQUIPMENT FOR CONSTRUCTION PERMIT 1860-0128-CA

Equipment ID	Equipment Description	Control Device ID	Emission Point ID
EU001	120 x 10^6 BTU/hr Biomass Boiler (fuel type and grade: wet bark & wood)	ESP1 MC1 SNCR1	EP001

EQUIPMENT FOR CONSTRUCTION PERMIT 1860-0128-CA

Equipment ID	Equipment Description	Control Device ID	Emission Point ID
EU002	120 x 10^6 BTU/hr Biomass Boiler (fuel type and grade: wet bark & wood)	ESP2 MC2 SNCR2	EP002
EU003	46 x 10^6 BTU/hr Natural Gas-fired Boiler (No.2 fuel oil w/ 0.05% maximum sulfur content by weight) as back-up fuel	N/A	EP003
EU004	46 x 10^6 BTU/hr Natural Gas-fired Boiler (No.2 fuel oil w/ 0.05% maximum sulfur content by weight) as back-up fuel	N/A	EP004
EU005	46 x 10^6 BTU/hr Natural Gas-fired Boiler (No.2 fuel oil w/ 0.05% maximum sulfur content by weight) as back-up fuel	N/A	EP005
EU006	46 x 10^6 BTU/hr Natural Gas-fired Boiler (No.2 fuel oil w/ 0.05% maximum sulfur content by weight) as back-up fuel	N/A	EP006
EU007	Sixty Drying Kilns (indirectly heated) Block No. 1 – 12 Kilns Block No. 2 – 16 Kilns Block No. 3 – 16 Kilns Block No. 4 – 16 Kilns	N/A	EP007
EU008	Planar Mill Line No.1 Planar Mill Line No. 2	*N/A	EP008
EU009	Shavings/Sawdust (Dry) Storage Silo No.1	FF9	EP009
EU010	Shavings/Sawdust (Dry) Storage Silo No.2	FF10	EP010
EU011	(Green Wood Sorter Line) Trimmers Extraction System - Line No.1 (Green Wood Sorter Line) Trimmers Extraction System - Line No. 2	FF11	EP011
EU012	One (1) Biomass Fly Ash Storage Silo	FF12	EP012
EU013	Coatings (Colors, Inks, Lacquers)	N/A	EP013
EU014	Log Storage, Processing and Saw Mill Operations Debarker No. 1; Debarker No. 2 Sawline No. 1; Sawline No. 2	N/A	EP014
Engine 1	3.22 MM Btu/hr, input , Diesel Powered, Emergency Engine	N/A	Engine 1
Engine 2	3.22 MM Btu/hr, input , Diesel Powered, Emergency Engine	N/A	Engine 2
Engine 3	3.22 MM Btu/hr, input , Diesel Powered, Emergency Engine	N/A	Engine 3
Engine 4	3.22 MM Btu/hr, input , Diesel Powered, Emergency Engine	N/A	Engine 4
Engine 5	3.22 MM Btu/hr, input , Diesel Powered, Emergency Engine	N/A	Engine 5

*Emissions from the Planar Mill are exhausted to FF9 and FF10 (baghouses)

COLLOCATION DETERMINATION This facility is not collocated with any other facilities

SOURCE TEST REQUIREMENTS

- An initial Source Test (and thereafter every two years) for particulate matter (PM) shall be required for the two biomass boilers (EU001, EU002) to ensure compliance with the PM limit of SC Regulation 61-62.5 Standard 1, the PM limit of the New Source Performance Standards Subpart Db (applicable to the biomass boilers, only) and the PSD BACT limit for PM/PM_{10}/$PM_{2.5}$.

- An initial Source Test (and thereafter every two years) for NOx, CO, and VOC shall be required for the two biomass boilers

(EU001, EU002) to ensure compliance with the PSD BACT limit for each these pollutants.

- An initial source test (and thereafter every two years) for Methane (CH_4) and Nitrous Oxide (N_2O) shall be required for the biomass boilers (EU001, EU002), to ensure compliance with the PSD BACT limit for Methane and Nitrous Oxide. Note: The emissions established by the source testing will be added to the other calculated pollutants to establish the total emissions for CO_2e.

- An initial source test (and thereafter every two years) for particulate matter (PM) shall be required for the four natural gas fired boilers (EU003, EU004, EU005, EU006), to ensure compliance with the PM limit of SC Regulation 61-62.5 Standard 1 and the PSD BACT limit for $PM/PM_{10}/PM_{2.5}$.

- An initial Source Test (and thereafter every two years) for NOx, CO, and VOC shall be required for the two natural as fired boilers (EU003, EU004, EU005, EU006) to ensure compliance with the PSD BACT limit for each of these pollutants.

- An initial source test (only) for carbon dioxide (CO_2) shall be required for the four natural gas fired boilers (EU003, EU004, EU005, EU006), to ensure compliance with the PSD BACT limit for CO_{2e}.. Note: The CO_2 emissions established by the source testing will be added to the other calculated pollutants to establish the total emissions for CO_2e.

- At this time a source test for volatile organic compounds (VOCs) will not be required for the drying kilns for the following reasons:

  Exhaust stream parameters for the proposed Orangeburg mill kilns are variable throughout the drying process (i.e., flow rate, VOC emissions profile, and moisture content). Furthermore, while the kiln doors will be closed during the drying cycle, the kiln chambers are not completely sealed.

  Although there are only two vents on each drying kilns (60 drying kilns total), testing on Klausner's low temperature kilns is complicated by the fact that cycle times on products range from 56 hours to 10 days, depending upon client specifications. Long term testing is both expensive and exposes the test to more uncertainty and opportunities for error.

  The Klausner drying kilns are indirect heated and hence, there is little airflow. Hence, conducting a source test is not feasible. This is a different operating scenario than a direct fired drying kiln which has airflow from its combustion unit.

  The Klausner drying kilns (which are indirect heated) do not recycle the air as is the case with some direct fired batch kilns. Therefore, there is no duct work to capture and measure the pollutants which are emitted in the drying process and hence a proper source test can not be conducted.

- An initial Source Test for $PM/PM_{10}/PM_{2.5}$ shall be required for a representative (worse case) baghouse for EU008 or EU009, or EU010 or EU011 or EU012, to ensure compliance with the PSD BACT limit for $PM/PM_{10}/PM_{2.5}$.

The following table includes all equipment (process, equipment ID and description) that is subject to source testing as part of this permit.

PROCESS	EQUIPMENT ID	DESCRIPTION
Biomass Boilers (a), (b) (c)	EU001-EU002	120 x 10^6 Btu/hr biomass boilers
Natural Gas Fired Boilers (a)	EU003-EU006	46 x 10^6 Btu/hr natural gas fired boilers
Planar Mill (a)	EU008	Planar Mill
Silos for Sawdust Storage (a)	EU009-EU010	Two (2) silos for sawdust storage (each silo, approximately 56,000 ft^3)
Sorter Line Trimmers (a)	EU011	Sorter Line Trimmers
Silo for Ash Storage (a)	EU012	Silo for Ash Storage

Source testing is required by: (a) PSD/BACT, (b) NSPS, Subpart Db, (c) SC Regulation Standard 1

PROCESS	POLLUTANT	*TEST METHOD	Averaging Period
Biomass Boilers (a), (b) (c)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM and Method 202 for condensable PM	3-hour average
	NOx	EPA Method 7, 7A-7E	3-hour average for the lb/MM Btu limit
			1 hour average for the lb/hr limit
	CO	EPA Method 10	3-hour average
	VOC	EPA Method 18, 25, 25A	3-hour average
Natural Gas Fired Boilers (a) (c)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM and Method 202 for condensable PM	3-hour average
	NOx	EPA Method 7, 7A-7E	3-hour average for the lb/MM Btu limit
			1 hour average for the lb/hr limit
	CO	EPA Method 10	3-hour average
	VOC	EPA Method 18, 25, 25A	3-hour average
	CO_2	EPA Method 3A, 3B, 3C	3-hour average
Planar Mill (a) (Silos for Dry Shavings)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM and Method 202 for condensable PM	3-hour average
Silos for Sawdust Storage (a)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM	3-hour average
(Green Wood Sorter Line) Trimmers Extraction System (a)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM	3-hour average
Silo for Ash Storage (a)	PM, PM_{10}, $PM_{2.5}$	EPA Method 5 for filterable PM	3-hour average

*Test method as referenced in the table **or** equivalent test method as specified and determined appropriate by the Department

The boilers shall comply with both the lb/MM Btu limit and the lb/hr limit at all times except during startup/shutdown periods. During startup/shutdown periods, the boilers hall comply with the lb/hr limit. The lb/MM Btu limit will ensure compliance with the PSD BACT limit and the lb/hr limit will ensure compliance with the National Ambient Air Quality Standards (NAAQS) 1-hour limit for NOx.

Boiler Thermal Efficiency Test
CO_2 has been deferred for greenhouse gas (GHG) pollutants but the remaining five GHG pollutants (nitrous oxide (N_2O), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6)) have not been deferred. Therefore the biomass boilers are required to go through BACT and establish PSD BACT limits for the greenhouse pollutants (CH_4 and N_2O) which are emitted from the combustion of biomass. Each of the biomass boilers will be required to perform an initial thermal efficiency test and subsequent thermal efficiency test every two (2) years to ensure a thermal efficiency of at least 70%. The thermal efficiency test is being required to ensure compliance with the established PSD BACT limit for greenhouse gas emissions of, Methane (CH_4) = 37.1 tpy and Nitrous Oxide (N_2O) = 4.9 tpy.

Each of the natural gas boilers will be required to perform an initial thermal efficiency test and subsequent thermal efficiency test every two (2) years to ensure a thermal efficiency of at least 80%. The thermal efficiency test is being required to ensure compliance with the established PSD BACT limit for greenhouse gas pollutant carbon dioxide equivalent (CO_2e) limit of 146 lb CO_2e / MM Btu output.

SPECIAL CONDITIONS, MONITORING, LIMITS
Biomass Boilers (EU001-EU002) - The SNCR shall be in place and operational whenever processes controlled by the SNCR are running, except during periods of startup/shutdown, SNCR malfunction or mechanical failure.

Biomass Boilers (EU001-EU002)
The owner/operator shall install and operate a continuous opacity monitoring system (COMS) as Per 40 CFR 60.48b Emission Monitoring For Particulate Matter And Nitrogen Oxides and per 40 CFR 60.43b.

The owner/operator shall install conduct fuel analysis sampling in accordance with SC Regulation 61-62.5 Standard 1, Section VI, to demonstrate compliance with the sulfur dioxide emissions limit. BAQ has established a frequency of semi-annual, due to the fact that this construction project will be incorporated into a Title V operating permit.

The owner/operator shall conduct performance test every two (2) years in accordance with SC Regulation 61-62.5 Standard 1, Section VI, to demonstrate compliance with the particulate matter emissions limit

Coatings (Colors, Inks, Lacquers)
The owner/operator shall keep records of all VOCs and calculate VOCs emissions on a monthly basis and calculate a 12-month rolling average shall be calculated for the Coatings (Colors, Inks, Lacquers) process (EU013) to verify emission estimates, as presented in the PSD application (11.5 tpy) and also to ensure compliance with the PSD BACT limit 0.03 lb VOC /MMBF (12-month rolling average).

PUBLIC NOTICE

This construction permit will undergo a 30-day public notice period to establish PSD limits in accordance with SC Regulation 61-62.1, Section II(N). This permit was placed in the *Times and Democrat* newspaper on September 21, 2012. The comment period was open from September 21, 2012 to October 20, 2012 and was placed on the BAQ website during that time period. The comment period was then extended until November 5, 2012, a public hearing was held on December 13, 2012 with the final comment period closing on December 20, 2012. Comments were received during the comment period and are address in the Department's Response to Comment document.

ADDITIONAL PUBLIC PARTICIPATION A public hearing was held on December 13, 2012. Citizens were notified through e-mail and in the *Times and Democrat* newspaper. Flyers were also distributed to homes and business in the area.

EU001-EU002

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
120 x 10^6 BTU/hr Biomass Boiler				
ID	**Pollutant**	**Controlled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY**
CA	CO	0.60	72.0	315
	NOx	0.22	26.4	115.6
	PM (filterable)	0.22	26.4	115.6
	PM (condensible)	0.017	2.04	8.9
	PM_{10} (filterable, condensible)	0.217	26.0	114.1
	PM2.5 (filterable, condensible)	0.137	16.4	72.0
	SO_2	0.025	3.00	13.1
	VOC	0.017	2.04	8.9
	H_2SO_4	9.919E-04	0.11	0.5
	Lead	4.8E-05	0.01	0.03
	CH_4	7.1E-02	8.47	37.1
	N_2O	9.3E-03	1.11	4.9
	CO2e	4.4	522	2,287

- Uncontrolled emission factors for biomass (bark and wet wood) combustion from AP-42, Section 1.6 - Wood Residue Combustion, Table 1.6-1 (9/03). Greenhouse Gas uncontrolled emission factors for biomass combustion from 40 CFR Part 98.30 Tables C-1 and C-2. Filterable PM estimates based on filterable multicyclone control.

- Assumed SO_3 emissions from wood combustion is approximately 3% of SO_2 emissions, analogous with maximum of range for fuel oil combustion, specified in AP-42, Section 1.3 (9/98). Molecular weight ratio of SO 3 to H2SO4 is approximately 80:98.

- Uncontrolled emission factor for biomass (wood residue) combustion from AP-42, Section 1.6 - Wood Residue Combustion, Table 1.6-4 (9/03).

- CO_2 emissions from biomass combustion is not included in total CO_2e estimates due to Biomass Deferral Rule. Global warming potential (GWP) for CH 4 is 21 and N2O is 310 for estimating CO_2e emissions.

EU001-EU002

CONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
120 x 10^6 BTU/hr Biomass Boiler				
ID	**Pollutant**	**Controlled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY**
CA	CO	0.40	48.0	210
	NOx	0.140	16.80	73.6
	PM (filterable)	0.015	1.80	7.9
	PM (condensible)	0.017	2.04	8.9
	PM_{10} (filterable + condensible)	0.032	3.84	16.8
	$PM_{2.5}$ (filterable + condensible)	0.032	3.84	16.8
	SO_2	0.025	3.00	13.1
	VOC	0.017	2.04	8.9
	H_2SO_4	9.919E-04	0.11	0.5
	Lead	4.8E-05	0.01	0.03
	CH_4	7.1E-02	8.47	37.1
	N_2O	9.3E-03	1.11	4.9
	CO_2e	4.4	522	2,287

- Controlled emission factor based on utilizing pollution reduction technology, including Selective NOx Catalytic Reduction (SNCR) and a Electrostatic Precipitator (ESP)
- The emission rates above are for one boiler. The facility will have a total of two (2) - 120 x 10^6 BTU/hr Biomass Fired Boilers.

EMISSION UNIT: EU003, EU004, EU005, EU006

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
46 x 10^6 BTU/hr Natural Gas Fired Boiler				
ID	**Pollutant**	**Uncontrolled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY**
CA	CO	0.082	3.79	16.6
	NOx	0.098	4.5	19.8
	PM (filterable)	0.002	0.09	0.38
	PM (condensible)	0.006	0.26	1.13
	PM_{10} (filterable)	0.002	0.34	1.50
	PM_{10} (condensable)	0.006		
	$PM_{2.5}$ (filterable)	0.002	0.34	1.50

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
46 x 10^6 BTU/hr Natural Gas Fired Boiler				
ID	**Pollutant**	**Uncontrolled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY**
	$PM_{2.5}$ (condensable)	0.006		
	SO_2	5.9E-04	0.03	0.12
	VOC	0.005	0.25	1.09
	Lead	4.9E-07	0.00	9.9E-05
	CH_4	2.2E-03	0.10	0.44
	N_2O	2.2E-04	0.01	0.04
	CO_2	116.9	5,380	23,565
	CO_2e	117.0	5,385	23,588

EMISSION UNIT: EU003, EU004, EU005, EU006

CONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
46 x 10^6 BTU/hr Natural Gas Fired Boiler				
ID	**Pollutant**	**Controlled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY**
CA	CO	0.039	1.80	7.86
	NOx	0.036	1.66	7.26
	PM (filterable)	0.002	0.09	0.38
	PM (condensible)	0.006	0.26	1.13
	PM10 (condensable; filterable)	0.005	0.23	1.01
	$PM_{2.5}$ (condensable; filterable)	0.005	0.23	1.01
	SO_2	5.9E-04	0.03	0.12
	VOC	0.003	0.14	0.60
	Lead	4.9E-07	2.3E-05	9.9E-05
	CH_4	2.2E-03	0.10	0.44
	N_2O	2.2E-04	0.01	0.04
	CO_2	116.9	5,380	23,565
	CO_2e	117.0	5,385	23,588

- Emission factors for natural gas combustion from AP-42, Section 1.4 - Natural Gas Combustion, Tables 1.4-1 and 1.4-2 (7/98). Greenhouse gas uncontrolled emission factors for natural gas combustion from 40 CFR Part 98.30 Tables C-1 and C-2.

- The emission rates above are for one boiler. The facility will have a total of four (4) - 46 x 10^6 BTU/hr Natural Gas Fired Boilers.
- Controlled emission factor based on utilized pollution reduction technology, including low NO X burners and FGR.

- Global warming potential (GWP) for CH 4 is 21 and N2O is 310 for estimating CO2e emissions.

EMISSION UNIT: EU003, EU004, EU005, EU006

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
46 x 10^6 BTU/hr Boiler fired on No. 2 fuel oil (0.05% maximum sulfur content by weight)				
ID	**Pollutant**	**Controlled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY @ 500 hr/yr maximum operation**
CA	CO	0.036	1.64	0.41

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
46 x 10^6 BTU/hr Boiler fired on No. 2 fuel oil (0.05% maximum sulfur content by weight)				
ID	**Pollutant**	**Controlled Emission Factor (lb/MM Btu)**	**lb/hr**	**TPY @ 500 hr/yr maximum operation**
	NOx	0.143	6.58	1.64
	PM (filterable)	0.014	0.66	0.16
	PM (condensible)	0.009	0.43	0.11
	PM10 (filterable)	0.007	0.33	0.08
	PM10 (condensable)	0.007	0.43	0.11
	PM2.5 (filterable)	0.002	0.08	0.02
	PM2.5 (condensable;)	0.009	0.43	0.11
	SO2	5.1E-02	2.33	0.58
	VOC	0.001	0.07	0.02
	Lead	1.1E-05	5.0E-04	1.2E-04
	CH_4	6.6E-03	0.30	0.08
	N_2O	1.3E-03	0.06	0.02
	CO_2	163.1	7,505	1,876
	CO_2e	163.6	7,530	1,883

- Emission factors for No. 2 fuel oil combustion from AP-42, Section 1.3 - Fuel Oil Combustion, Tables 1.3-1 through 1.3-12 (7/98). Greenhouse gas uncontrolled emission factors for fuel oil combustion from 40 CFR Part 98.30 Tables C-1 and C-2.

- The Controlled emission factors for No.2 fuel oil are equivalent to the uncontrolled emission factor. Hence, controlled emission rates are equal to the uncontrolled.

- The emission rates above are for one boiler. Each of the 46 x 10^6 BTU/hr Boilers (natural gas fired as primary fuel) will be equipped to utilize No.2 fuel oil (0.05% max. sulfur content by weight) as back-up fuel. No. 2 fuel oil will be utilized as a back-up fuel, during periods of natural gas curtailment, only. The facility estimated that 500 hours per year maximum operating hours (per boiler) as a worse case. From a regulatory perspective, equipment utilized for emergency purposes, i.e. emergency generators, emergency engines, have previously established 500 hours as a baseline for expected operating hours. Hence, the facility's request to utilize No. 2 fuel oil as a back-up fuel, during periods of natural gas curtailment, only (operating hours, not to exceed 500 hours (per boiler)) is consistent with equipment for use during emergency's.

EU007

POTENTIAL EMISSIONS (PROJECT ONLY)				
Drying Kilns				
ID	**Pollutant**	**Emission Factor (lb/MBF)**	**lb/hr**	**TPY**
CA	PM	0.022	1.76	7.70
	PM_{10}	0.013	1.02	4.47
	$PM_{2.5}$	0.004	0.33	1.46
	VOC	3.73	297.74	1,304
	Formaldehyde	0.016	1.28	5.60
	Methanol	0.21	16.78	73.5
	Acetaldehyde	0.0078	0.62	2.73

- PM Emission factor for softwood, steam heated lumber kilns obtained from the North Carolina Department of Environment and Natural Resources emissions spreadsheet for lumber kilns: http://www.ncair.org/permits/spreadsheets/

- PM_{10} and $PM_{2.5}$ emissions 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) and Fir: Sapwood: Steam-fired Dryer (SCC 30700711).

- VOC, Formaldehyde, and Methanol emission factors based on average values from NCASI Technical Bulletin No. 845. VOC emission factor represents the sum of the NCASI VOC, methanol, and formaldehyde emission factors since methanol and formaldehyde may not be fully detected by EPA Method 25A (as carbon).

- Acetaldehyde Emission factors based on EPA "Baseline Emission Estimates for the Plywood and Composite Wood Products", (9/00).

EU008, EU009-EU010, EU011, EU012

UNCONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
Dust Control Systems PM Emissions				
ID	**Emission Unit**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Ash Storage	21.0	12.0	6.3
	Sorter Line Trimmers	481.8	183.1	91.5
	Dry Shavings Storage Silo No. 1	965.8	367.0	183.5
	Dry Shavings Storage Silo No. 2	965.8	367.0	183.5
	Total Emissions	2,434.4	929.1	464.8

- Potential hourly emissions are calculated based on: PM Emissions (lb/hr) = Mass Concentration (gr/dscf) x Air Flow Rate (dscf/min) x 60 (min/hr) x 1/7000 (lb/grain)

- For PM_{10} speciation, the facility used the following ratio of controlled PM_{10} and PM emissions:
  38.0% Determined from EPA's "PM Calculator" on http://www.epa.gov/ttn/chief/eiinformation.html for SCC 30703001 (wood waste storage bin vent) controlled by a fabric filter.

  57.0% Determined from EPA's "PM Calculator" on http://www.epa.gov/ttn/chief/eiinformation.html for SCC 30500618 (cement storage silo) controlled by a fabric filter.

- For $PM_{2.5}$ speciation, the facility used the following ratio of controlled PM2.5 and PM10 emissions:
  50.0% Determined from EPA's "PM Calculator" on http://www.epa.gov/ttn/chief/eiinformation.html for SCC 30703001 (wood waste storage bin vent) controlled by a fabric filter.

  52.6% Determined from EPA's "PM Calculator" on http://www.epa.gov/ttn/chief/eiinformation.html for SCC 30500618 (cement storage silo) controlled by a fabric filter.

- A PM control efficiency of 99% is applied for the baghouses to calculate controlled potential emissions.

EU008, EU009-EU010, EU011, EU012

CONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
Dust Control Systems PM Emissions				
ID	**Emission Unit**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Ash Storage	0.10	0.06	0.03
	Sorter Line Trimmers	5.75	2.18	1.09

CONTROLLED POTENTIAL EMISSIONS (PROJECT ONLY)				
Dust Control Systems PM Emissions				
ID	**Emission Unit**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
	Dry Shavings Storage Silo No. 1	9.4	3.57	1.79
	Dry Shavings Storage Silo No. 2	9.4	3.57	1.79
	Total Emissions	24.7	9.4	4.7

EU013

POTENTIAL EMISSIONS (PROJECT ONLY)				
Colors				
ID	**Pollutant**	**Emission Factor (lb/gal)**	**lb/hr**	**TPY**
CA	VOC	5.49	0.22	0.96
	2-(2-butoxyethoxl)-	0.36	0.01	0.06
	Butylglycol	--	--	--
	Diethylene glycol	--	--	--
	Cobalt 2-ethylhex	--	--	--
	Dioctyl phthalate	--	--	--
	Ethyl benzene	0.04	0.00	0.01
	Formaldehyde	--	--	--
	Methanol	--	--	
	Methyl ethyl ketone	--	--	--
	Methyl isobutyl ketone	0.32	0.01	0.06
	Phenol	--	--	--
	Toluene	1.23	0.05	0.21
	Triethylamine	--	--	--
	Xylenes	0.19	0.01	0.03

Emissions are based on worse case concentration from MSDS for each color

EU013

POTENTIAL EMISSIONS (PROJECT ONLY)				
Inks				
ID	**Pollutant**	**Emission Factor (lb/gal)**	**lb/hr**	**TPY**
CA	VOC	7.57	0.30	1.32
	2-(2-butoxyethoxl)-	--	--	--
	Butylglycol	--	--	--
	Diethylene glycol	--	--	--
	Cobalt 2-ethylhex	--	--	--
	Dioctyl phthalate	--	--	--
	Ethyl benzene	--	--	--
	Formaldehyde	--	--	--
	Methanol	5.14	0.21	0.90
	Methyl ethyl ketone	6.1	0.24	1.07
	Methyl isobutyl ketone	--	--	--
	Phenol	--	--	--

POTENTIAL EMISSIONS (PROJECT ONLY)				
Inks				
ID	**Pollutant**	**Emission Factor (lb/gal)**	**lb/hr**	**TPY**
	Toluene	--	--	--
	Triethylamine	--	--	--
	Xylenes	--	--	--

Emissions are based on worse case concentration from MSDS for each ink

EU013

POTENTIAL EMISSIONS (PROJECT ONLY)				
Lacquers (lb/gal)				
ID	**Pollutant**	**Emission Factor**	**lb/hr**	**TPY**
CA	VOC	5.12	2.10	9.22
	2-(2-butoxyethoxl)-	--	--	--
	Butylglycol	--	--	--
	Diethylene glycol	0.59	0.24	1.06
	Cobalt 2-ethylhex	0.01	0.00	0.01
	Dioctyl phthalate	0.53	0.22	0.96
	Ethyl benzene	--	--	--
	Formaldehyde	0.07	0.03	0.13
	Methanol	--	--	--
	Methyl ethyl ketone	1.93	0.79	3.48
	Methyl isobutyl ketone	3.00	1.23	5.40
	Phenol	0.07	0.03	0.13
	Toluene	--	--	--
	Triethylamine	0.03	0.01	0.05
	Xylenes	0.80	0.33	1.44

Emissions are based on worse case concentration from MSDS for each lacquers

EU014

POTENTIAL EMISSIONS (PROJECT ONLY)				
Whole Log Debarking				
ID	**Pollutant**	**Emission Factor (lb/ton)**	**Throughput**	**TPY**
CA	PM	5.72E-05	3,002,692	2.17E-02
	PM_{10}	2.71E-05	3,002,692	1.03E-02
	$PM_{2.5}$	4.10E-06	3,002,692	1.56E-03
	Sawline Operations			
	PM	3.02E-05	2,792.504	1.07E-02
	PM_{10}	1.43E-05	2,792.504	5.05E-03
	$PM_{2.5}$	2.16E-06	2,792.504	7.63E-04

Sawing and Debarking

Based on calculations the particulate emissions from the sawing & debarking operations are negligible. The debarking operation occurs in the Log Yard and also includes log arrival, log storage, log measuring off and, storing barkless. The sawing operation occurs in the Saw Mill and also includes: producing of sawn lumber, first assortment, second assortment, packaging and producing of virgin (clean) wood waste. Because these operations represent the start of the entire lumber mill process, this process is designated as EU014 - Log Storage, Processing and Sawmill.

The emission factor (0.35 pound of PM per ton of wood processed) for sawing and debarking which is currently listed Emission Inventory Improvement Program (EIIP) has been revoked by the EPA. As an alternative approach to calculate the emissions from the sawing and debarking operations Klausner utilized the EPA's drop point equation, Equation 13.2.1 of AP-42. Details as follows:

For the proposed Klausner operations, the sawing and debarking operations will both occur inside structures. Also, the operations occur within contained equipment, capturing sawdust or bark as valuable byproducts. The captured sawdust/bark is diverted to enclosed belt conveyors to be transferred to storage (the storage piles included in the application emissions estimates). Because of the nature of these operations for the proposed mill, as well as the high moisture content (~ 50%) of sawdust and bark (, sawdust and bark quickly fall to the ground. The small amount of particulate emissions that may be released to the atmosphere would be more appropriately described as releases due to sawdust and bark material transfer out of the contained sawing and debarking operations. As a result of these operation characteristics, an alternative approach to estimating emissions for the sawline operations and debarkers is to apply EPA's drop point equation, Equation 13.2.1 of AP-42.

Average wind speed for Columbia, SC based on 62 years worth of data through 2010 from NCDC website.
http://www1.ncdc.noaa.gov/pub/data/ccd-data/wndspd10.txt

Average moisture content for bark and sawdust (wet) based on sampling analysis of state-specific materials.

Emission factor calculation based on formula from AP-42, Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 13.2.1, (11/06).

$E = k\,(0.0032)\,(U/5)^{1.3} / (M/2)^{1.4}$ (lb/ton)
where: E = emission factor (lb/ton)
k = particle size multiplier (dimensionless) for PM 0.74
k = particle size multiplier (dimensionless) for PM_{10} 0.35
k = particle size multiplier (dimensionless) for $PM_{2.5}$ 0.053
U = mean wind speed (mph) 6.8
M = material moisture content (%)
PM_{10} control efficiency of 74.7% applied for three-sided enclosed structure with 50% porosity per Sierra Research "Final BACM Technological and Economic Feasibility Analysis. The control efficiency is assumed equivalent for PM10 and PM2.5 emissions.

Emergency Engines 1-5

POTENTIAL EMISSIONS (PROJECT ONLY)				
Emergency Engines				
ID	**Pollutant**	**Emission Factor (g/kW-hr)**	**lb/hr**	**TPY**
CA	CO	3.5	2.6	0.7
	NOx	4.0	3.0	0.8
	PM	0.2	0.2	3.8E-02
	PM_{10}	0.2	0.2	3.8E-02
	$PM_{2.5}$	0.2	0.2	3.8E-02
	SO_2	15	5.0E-03	1.2E-03
	VOC (NMHC)	4.0	3.0	0.8
	CH4	0.01	2.13E-02	5.32E-03
	N_2O	0.00	4.26E-03	1.06E-03
	CO_2	165.57	533	133.3
	CO_2e	166.12	535	133.7

- Criteria and GHG Pollutant Emissions are for Each Engine
- Emission factors from USEPA AP-42 Table 3.3-1 and Table 3.3-2(Oct 1996).
- Greenhouse gas uncontrolled emission factors for fuel oil combustion from 40 CFR Part 98.30 Tables C-1 and C-2.

- Global warming potential (GWP) for CH 4 is 21 and N2O is 310 for estimating CO2e emissions.

POTENTIAL EMISSIONS (PROJECT ONLY)				
Drop Point Potential Emissions (Fugitive Emissions)				
ID	**Transfer Activity**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Transfer Bark to Outdoor Storage Area	1.52E-03	7.21E-04	1.09E-04
	Transfer Bark into Trucks	6.01E-03	2.85E-03	4.31E-04
	Transfer Sawdust (wet) to Outdoor Storage Area	5.74E-05	2.72E-05	4.10E-06
	Transfer Wood Chips (wet) to Outdoor Storage Area	1.44E-04	6.80E-05	1.39E-05
	Transfer Sawdust (wet) into Trucks	2.27E-04	1.07E-04	1.62E-05
	Transfer Wood Chips (wet) into Trucks	5.69E-04	2.69E-04	4.08E-05
	Transfer Wood Chips (dry) to Storage Area	3.85E-04	1.82E-04	2.75E-05
	Transfer Wood Chips (dry) into Trucks	1.52E-03	7.19E-04	1.09E-04
	Total Emissions	1.04E-02	4.94E-03	7.48E-04

POTENTIAL EMISSIONS (PROJECT ONLY)				
Storage Areas Wind Erosion Potential Emissions (Fugitive Emissions)				
ID	**Transfer Activity**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Bark	4.6E-02	2.3E-02	3.4E-03
	Bark	4.6E-02	2.3E-02	3.4E-03
	Sawdust (Wet)	2.20E-02	1.1E-02	1.60E-03
	Wood Chips (Wet)	2.7E-02	1.3E-02	2.0E-03
	Wood Chips (Dry)	6.2E-03	3.1E-03	4.6E-04
	Total Emissions	0.15	0.07	0.01

POTENTIAL EMISSIONS (PROJECT ONLY)				
Unpaved Road Potential Fugitive PM Emissions				
ID	**Transfer Activity**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Logs Delivery	10.77	2.75	0.27
	Transfer Sawdust (Wet) to Trucks	0.0E+00	0.0E+00	0.0E+00
	Transfer Wood Chips (Wet) to Trucks	0.0E+00	0.0E+00	0.0E+00

POTENTIAL EMISSIONS (PROJECT ONLY)				
Unpaved Road Potential Fugitive PM Emissions				
ID	**Transfer Activity**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
	Transfer off-site for Wood Products	0.0E+00	0.0E+00	0.0E+00
	Total Emissions	10.77	2.75	0.27

POTENTIAL EMISSIONS (PROJECT ONLY)				
Paved Road Potential Fugitive PM Emissions				
ID	**Transfer Activity**	**PM (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
CA	Logs delivery	0.63	0.13	3.1E-02
	Transfer bark on-site to storage delivery	0.00	0.00	0.00
	Misc material delivery	0.01	1.2E-03	2.9E-04
	Transfer logs on-site to Debarkers	0.21	0.04	1.0E-02
	Transfer debarked logs on-site to sawlines	0.64	0.13	3.1E-02
	Transfer bark on-site biomass boilers	0.09	1.7E-02	4.2E-03
	Transfer cut lumber on-site to Kilns	0.12	0.02	5.73E-03
	Transfer dried lumber on-site to Planer Mill	0.10	0.02	5.1E-03
	Transfer on-site for finished lumber to shed	0.01	1.2E-03	2.8E-04
	Transfer on-site for finished lumber to Trucks/Railcars	0.05	9.2E-03	2.3E-03
	Transfer off-site for finished lumber, sawdust, shavings, bark, wood chips	2.01	0.40	9.8E-02
	Total Emissions	3.84	0.77	0.19

POTENTIAL EMISSIONS (PROJECT ONLY)				
Site-Wide Electric Powered Hogger Emissions				
ID	**Pollutant**	**Emission Factor (lb/dry wood tons)**	**lb/hr**	**TPY**
CA	THC as carbon	0.35	5.879E-01	2.57
	THC as alpha-Pinene (VOC)	0.3973	6.672E-01	2.92
	PM	3.500E-03	5.879E-03	0.03
	Methanol	0.0010	1.680E-03	0.01

Max Annual Logs Delivered to Site 3,002,692 tons/yr

Estimate of Chips (Wet) Byproduct 1% of total logs delivered
Annual Production of Chips (Wet) 30,027 tons/yr (wet basis)
Moisture Content (approx.) 51% of total chip (wet) weight (based on an analysis of the wood)
Annual Throughput 14,713 tons/yr (dry basis)
Short-term Throughput 1.68 tons/hr (dry wood)
Maximum Annual Operation 8,760 hour

THC as carbon emission factor based on NCASI Technical Bulletin No. 723, Table 7; Emission factor for Ponderosa (Pine) wood used as it most coincides with Southern Yellow Pine

The THC/VOC makeup of wood is primarily composed of terpenes $(C_5H_8)n$ [where n = 2, 3, or 4 typically]…..but to convert from carbon to the equivalent weight in THC/VOC, the assumption was that alpha-pinene (AP) would be the representative THC/VOC (molecular weight = 136.2 lb/lb-mol).
The following equation shows the conversion: lb VOC/ODT = lb C/ODT * (136.2 lb/mol AP / 12 lb/mol C) * (1 mol AP / 10 mol C)

POTENTIAL EMISSIONS (PROJECT ONLY)				
Storage Tank Potential Fugitive VOC Emissions				
ID		**(A) Working Loss**	**(B) Breathing Loss**	**(A + B) Total Emissions**
CA	lb/yr	0.86	1.28	2.14
	tons/yr	0.00043	0.00064	0.00107

FACILITY WIDE EMISSIONS		
Pollutant	**Uncontrolled (TPY)**	**Controlled (TPY)**
PM	2,712	87.0
PM_{10}	1,171	55.3
$PM_{2.5}$	617.0	44.5
VOC	1,343	1,343
NOx	314.1	180.0
CO	700.4	455.2
SO_2	26.8	26.8
Lead	0.05	0.05
H_2SO_4	0.97	0.97
Total HAPs	130.7	130.7
CO_2e	99.597	99,597

Note: The facility-wide emissions are based on the natural gas fired boilers operating 8,760 hr/yr. The natural gas fired boilers will be permitted to use No. 2 fuel oil (0.05% maximum sulfur content by weight) during periods of natural gas curtailment; operating hours (per boiler) while firing on No.2 fuel oil shall not exceed 500 hours per year. PSD applicability is not affected because, the emission rates (tpy) while utilizing No.2 fuel oil are less than the PSD Significance thresholds for SO_2

Sample Calculation of 46 MM Btu/hr Boiler while using No.2 fuel oil @ 500 hours per year : 46 MM Btu/hr x 0.051 lb/MM Btu x 500 hr/yr x 1 ton/2000 lbs = 0.5865 tons/yr (each); 2.346 tons/year (total of four 46 MM Btu/hr boilers)

Due to the GHG Tailoring Rule, GHG emissions from all combustion sources are also quantified using emission factors from EPA's Mandatory Reporting Rule (40 CFR Part 92). The only GHG emissions from biomass combustion included in the facility-wide total include methane (CH4) and nitrous oxide (N2O) because CO2 emissions from biomass combustion are not required to be permitted under PSD due to the Biomass Deferral Rule.

PROJECT REGULATORY APPLICABILITY REVIEW			
Regulation	**Applicable**		**Comments**
	Yes	**No**	
Section II(E): Synthetic Minor		X	This project is a PSD Construction Permit application. Currently, the facility-wide potential to emit of SO_2 is less than the PSD significant threshold (i.e. less than 40 tons). However, the facility has requested to utilize No. 2 fuel oil as a back-up fuel in the natural gas fired boilers, during periods of natural gas curtailment. In order to ensure that the PSD threshold is not triggered for SO_2, this construction project will establish a facility-wide synthetic limit on SO_2 Facility-wide SO_2 emissions shall be less than 40 tons per year to avoid triggering PSD review for the pollutant SO_2.
Section II(G): Conditional Major		X	This project is a PSD Construction Permit application.
Standard 1: Fuel Burning Operations	X		This Standard will apply to the two 120 million BTU/hr biomass boilers and the four 46 million BTU/hr natural gas fired boilers.
Standard 2: Ambient Air Quality Standards	X		This facility has demonstrated compliance through modeling; see modeling summary dated April 26, 2012. Note: Although the natural gas boilers will be operated 8760 hours per year, in order to ensure compliance with NAAQS, the facility has modeled the highest (worse case) emission rate between No.2 and natural gas. emission rates.
Standard 3: Waste Combustion/Reduction (state only)		X	This process does not contain waste combustion or reduction sources. **Note:** The biomass boilers (EU001-EU002) are not subject CISWI because they utilize virgin fuel, only (wet bark and wood chips from the log processing operations; sawdust and wood shavings from the lumber milling process as fuel).
Standard 3.1: HMI Waste Incinerators		X	No medical waste incineration.
Standard 4: Emissions from Process Industries	X		The following emission sources have opacity limits (including any fugitives) and Particulate Matter (PM) allowable emissions rates (based on a process weight rate in tons per hour) imposed by this standard: EU007-EU014 (details are included in the table below)
Standard 5: Volatile Organic Compounds		X	The facility was not in existence in 1979 or 1980 and also, while the facility will have the PTE of > 100 TPY of VOC, none of the processes which are regulated by this regulation apply.
Standard 5.1: BACT/LAER For VOC (state only)	X		The proposed VOC emissions for this project exceeds 100 tons per year, therefore Standard 5.1 applies. Standard 5.1 will be met for the proposed project by applying BACT to VOC emissions.

PROJECT REGULATORY APPLICABILITY REVIEW			
Regulation	**Applicable**		**Comments**
	Yes	**No**	
Standard 5.2: Control of Oxides of Nitrogen		X	Standard 5.2, Section I(a) The provisions of this regulation shall apply to any stationary source that emits or has the potential to emit oxides of nitrogen (NOx) generated from fuel combustion that has not undergone a Best Available Control Technology (BACT) analysis for NOx in accordance with SC Regulation 61-62.5, Standard No. 7 and that meets one or more of the criteria specified in paragraphs (a)(1), (a)(2), and (a)(3) of this part: (1) Any new source that is constructed after June 25, 2004; This PSD Permit will have a detailed NOx BACT analysis. For that reason, this standard will not apply.
Standard 7: Prevention of Significant Deterioration	X		This facility is subject to PSD permitting for PM/ PM_{10} / $PM_{2.5}$, CO, NOx, VOC, and GHGs.
Standard 7(c): Ambient Air Increments	X		A baseline for PM_{10}, SO_2, and NO_2 was set on 12/27/2007. The Class II Incremental Analysis was completed.
Standard 7.1: Standards for Non Attainment Areas		X	This area is in attainment.
Standard 8: Toxic Air Pollutants (state only)	X		This facility has demonstrated compliance through modeling; see modeling summary dated April 26, 2012. Note: All TAPs from this project which were modeled or are de minimis are from the Inks, Colors and Lacquers process (EU013). The drying kilns, biomass boilers, natural gas boilers and , emergency engines are subject to a MACT and are exempt from Standard 8. The boilers are exempt from Standard 8 also, because they burn virgin fuel. The following MACT standards are applicable: drying kilns - 40 CFR 63 Subpart (4D); biomass boilers – 40 CFR 63 Subpart (5D); natural gas boilers – 40 CFR 63 Subpart (5D); emergency engines – 40 CFR 63 Subpart (4Z).
Regulation 61-62.6: Control of Fugitive Particulate Matter	X		The fugitive PM emissions are controlled in a manner that should not produce undesirable levels of PM emissions.

PROJECT REGULATORY APPLICABILITY REVIEW			
Regulation	**Applicable**		**Comments**
	Yes	**No**	
40 CFR 60 - NSPS and **Regulation 61-62.60:** SC Designated Facility Plan and NSPS	X		The following New Source Performance Standards are Applicable: 40 CFR 60 Subpart Db - Standards Of Performance For Industrial-Commercial-Institutional Steam Generating Units The biomass boilers (EU001, EU002) are subject to the PM and Opacity limits of this subpart. Per 60.42b(k)(2) the boilers are exempt from the SO_2 limit specified in Subpart Db. Per 60.44b(a) the NOx limit specified in Subpart Db is not applicable for non-fossil fuels. The natural gas boilers will not be subject to Subpart Db as the maximum heat input capacity of each unit is less than 100 million BTU/hr. 40 CFR 60 Subpart Dc - Standards Of Performance For Small Industrial-Commercial-Institutional Steam Generating Units. The natural gas boilers (EU003, EU004, EU005, and EU006) are subject to the this subpart. Because (EU003, EU004, EU005, and EU006) will combust natural gas with a sulfur content of less than 0.5% by weight and No.2 fuel oil with a sulfur content of les than 0.5% by weight as back-up, these units are not subject to emission standards under NSPS Subpart Dc. However, NSPS Dc requires fuel supplier certification that states the oil complies with the specifications under the definition of distillate oil in 40 CFR 60.41c. The Five Emergency Engines (3.22 MM Btu/hr, heat input, each) (Diesel fuel, maximum sulfur content of 0.0015 weight percent), are subject to 40 CFR 60 Subpart IIII - Standards Of Performance For Stationary Compression Ignition Internal Combustion Engines. The CO, PM, and NOx + NMHC limits are applicable as specified in 60.4205 (c). The No.2 fuel oil storage tanks for this proposed project have a minimum size of 265 gallons and a maximum size of 16,000 gallons. These storage tanks are not subject to 40 CFR 60 Subpart Kb because they are less than the size threshold (19,813 gallons) as defined by Subpart Kb. The Mold protection/ blue stain protection storage tank (26,400 gallons) is not subject to Subpart Kb because the maximum true vapor pressure of the mold protection is less than 15.0 kPa.
40 CFR 61 - NESHAP and **Regulation 61-62.61:** NESHAP		X	This operation does not emit the pollutants subject to this standard (asbestos, benzene, beryllium, coke oven emissions, arsenic, mercury, radio nuclide, radon, or vinyl chloride).

PROJECT REGULATORY APPLICABILITY REVIEW			
Regulation	**Applicable**		**Comments**
	Yes	**No**	
40 CFR 63 – MACT and Area Source Standards and **Regulation 61-62.63:** NESHAP For Source Categories	X		The facility is a major source for hazardous air pollutants. The following MACT and Area Source MACTs are applicable: The Biomass boilers (EU001, EU002) and Natural Gas fired boilers (EU003-EU006) are subject to 40 CFR 63 Subpart DDDDD – National Emission Standards For Hazardous Air Pollutants For Industrial, Commercial, And Institutional Boilers And Process Heaters. The Drying Kilns (EU007) are subject to 40 CFR 63 Subpart DDDD – Plywood and Composite Wood Products. Although the drying kilns are subject to the Plywood MACT there are no applicable requirements (i.e. no emission limits, monitoring and record keeping, reporting) for drying kilns for this MACT. The Emergency Engines are subject to 40 CFR 63 Subpart ZZZZ- National Emission Standards For Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines
Regulation 61-62.68: Chemical Accident Prevention	X		The facility has not decided if it will use ammonia or urea as a reagent for the biomass boilers, selective non-catalytic reductions (SNCR). If the facility uses or stores ammonia in quantities greater than the thresholds specified in the regulation, the facility will be subject to the regulation. Threshold quantities: Ammonia (anhydrous) = 10,000 lbs. Ammonia (aq) (conc.: EPA >= 20%) 20,000 lbs. Permit condition 5.C.1 has language to address 61-62.68.
Regulation 61-62.70: Title V	X		The facility will be a major source. A Title V permit application must be received within 12 months of commencement of operations
Regulation 61-62.72: Acid Rain		X	None of the sources are an industrial utility unit.
Regulation 61-62.96: Nitrogen Oxides (NO_X) and Sulfur Dioxide (SO_2) Budget Trading Program		X	None of the sources are an industrial utility unit.
Regulation 61-62.99: Nitrogen Oxides (NO_X) Budget Program Requirements for Stationary Sources Not In the Trading Program		X	None of the sources are an industrial utility unit.

PROJECT REGULATORY APPLICABILITY REVIEW			
Regulation	**Applicable**		**Comments**
	Yes	**No**	
40 CFR 64 - Compliance Assurance Monitoring (CAM)	X		CAM applies to Pollutant Specific Emission Units (PSEU's) that are located at a major source, subject to an emission limitation from an non-exempt regulation and uses a control device to meet the limitation and has pre-controlled emissions greater than the major source threshold. CAM is applicable to the Biomass Boilers (EU001, EU002) for the pollutants PM_{10} and NOx. The biomass boilers have a post-controlled emissions less than 100 tpy NOx and less than 100 tpy of PM_{10} and will be considered a small pollutant specific emission unit (PSEU). SNCR will be used to control NOx emissions, and a multiclone and ESP units will be used to control filterable PM_{10} emissions. Per 64.5 a CAM plan is not required to be submitted until the first Title V permit renewal. CAM plans will be submitted as part of the Title V renewal application.

SC Regulation 61-62.5, Standard No. 1								
ID	**Opacity**	**PM Allowable (0.6 lb/10^6 BTU) lb/hr**	**SO_2 Allowable (3.5 lb/10^6 BTU) lb/hr**	**Uncontrolled Emissions (lb/hr)**		**Controlled Emissions (lb/hr)**		**Monitoring**
				PM	**SO_2**	**PM**	**SO_2**	
EU001-EU002	20%	72.0 lb/hr (each)	420 lb/hr (each)	28.44 (each)	3.0 (each)	4.44 (each)	3.00 (each)	Source Testing for PM & record keeping required. Visual Inspection to monitor Opacity
EU003-EU006	20%	27.6 lb/hr (each)	161 lb/hr (each)	*1.09 (each)	*2.33 (each)	N/A	N/A	Record keeping required. Visual Inspection to monitor Opacity

*lb/hr emission rates for PM and SO_2 are based on No. 2 fuel oil (because the No. 2 fuel oil emission rates for PM and SO_2 are more conservative than for natural gas).

SC Regulation 61-62.5, Standard No. 4						
ID	**Opacity (%)**	**PM Allowable (lb/hr)**	**Process Weight Rate (tons/hr)**	**Uncontrolled PM Emissions (lb/hr)**	**Controlled PM Emissions (lb/hr)**	**Monitoring**
EU008-EU12	20%	64.52 (lbs/hr)	342.8 (tons/hr)	555.8 (lbs/hr)	5.6 (lbs/hr)	Operation of the baghouses at all times during which the processes (which are controlled by the control device) are operating shall be required to ensure compliance with the PM allowable limit

The process weight rate in tons per hour is defined as the total weight of all materials introduced into a source operation. Per Guidance document for Standard 4, Section VIII – PM Emission Limitations, "source operation" includes all the process emission units and/or group of process emission units used to make a "finished identifiable output." The planer lines and dry shavings silos (EU008-EU010), as well as the sorter line trimmers (EU011) are directly used to make a "finished identifiable output" in produced lumber from the mill. The total weight of all materials introduced into these processes would be equivalent to the maximum hourly rate of log throughput.

The ash storage silo (EU012) will store captured flyash from the biomass boilers, which will consume biomass byproducts produced from processed logs at the mill. While the biomass boilers may also consume clean woody biomass from other off-site sources, the produced byproducts may also be sold instead of used directly in the biomass boilers. As well, the biomass boilers will be utilized based on hot water demand from the lumber drying kilns. Both the boiler fuel and the boiler production demand – and thus the total ash collected – are directly tied to the amount of log throughput at the mill. It is appropriate to utilize the maximum hourly log throughput as the basis for the process weight for the ash storage silo. By utilizing the same process weight rate for the ash storage silo as the other processes, the calculation of the maximum allowable emission rate is conservative.

The process weight rate, P, in tons per hour is calculated to be 342.8 tons per hour, determined as the total maximum annual log throughput (3,002,692 tpy) divided by 8,760 hours per year. Total controlled particulate matter emissions for the planer lines and dry shavings silos (EU008-EU010), sorter line trimmers (EU011), and the ash storage silo (EU012) are calculated to be 5.6 pounds per hour which is well under the allowable emission rate.

SC Regulation 61-62.5, Standard No. 5.1 *BACT/ LAER*

BACT/LAER Baseline (TPY)	BACT/LAER Trigger Value (Baseline + 100 TPY)	Actual Facility-Wide VOC Emissions (TPY)*	Actual VOC Emissions from Non-LAER Sources (TPY)
0.0	100.0	0.0	0.0

*****As of April 2012; This is a Greenfield Lumber Mill (Klausner Orangeburg Mill). Potentially, the largest emitter of VOCs will be from the Drying Kilns (EU007).

Note: This project is also subject to SC Regulation 61-62.5, Standard No. 5.1 *BACT/ LAER*. Under this regulation, BACT applies because the construction permit is being issued after June 25, 2004. The BACT requirement under SC Regulation 61-62.5, Standard No. 5.1 is equivalent to the BACT required under PSD; therefore, this BACT determination will satisfy the requirements of PSD and SC Regulation 61-62.5, Standard No. 5.1.

PERIODIC MONITORING					
ID	**Pollutant/ Parameter**	**Limit**	**Required Monitoring Frequency**	**Reporting Frequency**	**Monitoring Basis/ Justification***
EU001-EU002	PM/ COMS	0.030 (lb/MM Btu)	Continuous	Quarterly	40 CFR 60.48b (a) installation of a Continuous Opacity Monitoring System (COMS) will ensure compliance with the PM limit
EU001-EU002	PM (total) PM_{10} (total) $PM_{2.5}$ (total)	0.032 (lb/MM Btu) (each)	Continuous	Semi Annual	PSD BACT / To ensure compliance with the PM limit primary and secondary voltage shall be measured across the ESP.
EU001-EU002	PM (filterable) PM_{10} (filterable) $PM_{2.5}$ (filterable)	0.0032 (lb/MM Btu) (each)	Continuous	Semi Annual	PSD BACT / To ensure compliance with the PM limit primary and secondary voltage shall be measured across the ESP.

PERIODIC MONITORING					
ID	**Pollutant/ Parameter**	**Limit**	**Required Monitoring Frequency**	**Reporting Frequency**	**Monitoring Basis/ Justification***
EU001-EU002	Opacity/ COMS	20% (except for 1 six minute period per hour of not more than 27% opacity)	Continuous	Quarterly	40 CFR 60.48b installation of a Continuous Monitoring System (COMS)/ Opacity monitoring will ensure compliance with NSPS Subpart Db Opacity limit
EU001-EU002	PM/ primary and secondary voltage (ESP)	0.6 lb/MM Btu input	Each Shift	Semi Annual	To ensure compliance with the Std. 1 PM limit primary and secondary voltage shall be measured across the ESP.
EU001-EU002	SO_2	3.5 lb/MM Btu input	Semi Annual	Semi Annual	Fuel sample analysis will ensure compliance with the Std. 1 SO_2 emissions limit.
EU001-EU002	SO_2	Subpart Db SO_2 limit Not applicable if firing low sulfur fuel with a potential SO_2 emission rate of 140 ng/J (0.32 lb/MM Btu input)	Monthly	Semi Annual	As per 60.49b (r)(1) Records of fuel receipts shall be maintained. Therefore, per 60.42b (k)(2) the biomass boilers are exempt from the SO_2 emission limit of Subpart Db
EU001-EU002	NOx/reductant injection rate	0.14 lb/MM Btu and 16.8 lb/MM Btu	Continuous	Semi Annual	Installation and operation of a flow meter to measure and record the reductant injection rate for the SNCR system to demonstrate continuous compliance with the PSD BACT limit for NOx.
EU001-EU002	VOCs	0.017 lb/MM Btu	At all times the boilers are operating	On-Site	PSD BACT / Operation and Maintenance plan for Good Combustion Practices.
EU001-EU002	CH_4	37.1 tpy	On going Good Combustion Practices	Semi Annual	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU001-EU002	N_2O	4.9 tpy	On going Good Combustion Practices	Semi Annual	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	Opacity	20%	Semi Annual	Semi Annual	Natural gas fired boilers (w/ No.2 fuel oil as back-up during periods of natural gas curtailment) - Weekly opacity monitoring will ensure compliance with Standard 1 and NSPS Dc opacity

PERIODIC MONITORING					
ID	**Pollutant/ Parameter**	**Limit**	**Required Monitoring Frequency**	**Reporting Frequency**	**Monitoring Basis/ Justification***
EU003-EU006	SO_2	3.5 lb/MM Btu	On going Good Combustion Practices	On-Site	Standard 1/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	SO_2/No. 2 fuel oil Sulfur content	3.5 lb/MM Btu/ fuel oil 0.05% max. sulfur content by weight	Each batch of fuel oil received	Every six months	Fuel certification records will ensure compliance with the Standard 1 and Subpart Dc SO_2 limit
EU003-EU006	SO_2/Maximum yearly operating hour	500 hours/year (each)	During any periods of natural gas curtailment record keeping of boiler operating hours when using No. 2 fuel oil as fuel,	Semi Annual	Standard 1/ Tracking the boiler operating hours when using No. 2 fuel oil, will ensure that the facility does not trigger the PSD significance threshold (40 tpy) for SO_2
EU003-EU006	PM	0.6 lb/MM Btu/	On going Good Combustion Practices	On-Site	Standard 1/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	NOx	0.036 lb/MM Btu and 1.66 lb/hr	On going Good Combustion Practices	On-Site	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	CO	0.039 lb/MM Btu	On going Good Combustion Practices	On-Site	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	VOCs	0.003 lb/MM Btu	On going Good Combustion Practices	On-Site	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	Total PM Total PM_{10} Total $PM_{2.5}$	0.005 lb/MM Btu (each)	On going Good Combustion Practices	On-Site	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU003-EU006	CO_2e	146 lb CO_2e / MM Btu (output)	On going Good Combustion Practices	Semi Annual	PSD BACT/ Operation and Maintenance plan for Good Combustion Practices
EU007	VOCs	3.5 lb/MBF	Work practice standards; daily, weekly, monthly, and semi-annually	Semi Annual	PSD BACT/ Good Work Practices, to include routine maintenance and will ensure compliance with the BACT limit
EU007	VOCs/ Yearly Production	7000000 million board feet per year	Monthly	Semi Annual	PSD BACT/ Record keeping of the monthly and yearly production will ensure compliance with the BACT limit
EU007	PM filterable PM_{10} filterable $PM_{2.5}$filterable	0.022 lb/MBF 0.013 lb/MBF 0.004 lb/MBF	Work practice standards; daily, weekly, monthly, and semi-annually	Semi Annual	PSD BACT/ Good Work Practices, to include routine maintenance and will ensure compliance with the BACT limit
EU008	Opacity/ Visual Inspection	20%	Weekly	Semi Annual	Standard 4/ Opacity monitoring will ensure compliance with the Standard 4 limit

PERIODIC MONITORING					
ID	**Pollutant/ Parameter**	**Limit**	**Required Monitoring Frequency**	**Reporting Frequency**	**Monitoring Basis/ Justification***
EU008	PM PM_{10} $PM_{2.5}$ / Pressure Drop	0.004 gr/dscf (each)	Each Shift	Semi Annual	PSD BACT/ Monitoring the Baghouse Pressure Drop each shift will compliance with PSD BACT limit
EU008	PM/Pressure Drop	64.52 lbs/hr (EU008-EU012 process total)	Each Shift	Semi Annual	Standard 4/ Monitoring the Baghouse Pressure Drop each shift will compliance with the PM limit
EU009-EU010	PM PM_{10} $PM_{2.5}$ / Pressure Drop	0.004 gr/dscf (each)	Each Shift	Semi Annual	PSD BACT/ Monitoring the Baghouse Pressure Drop each shift will compliance with PSD BACT limit
EU009-EU010	Opacity/ Visual Inspection	20% (each)	Weekly	Semi Annual	Standard 4/ Opacity monitoring will ensure compliance with the Standard 4 limit
EU011	PM PM_{10} $PM_{2.5}$ / Pressure Drop	0.005 gr/dscf (each)	Each Shift	Semi Annual	PSD BACT/ Monitoring the Baghouse Pressure Drop each shift will compliance with PSD BACT limit for particulate matter
EU011	Opacity/ Visual Inspection	20% (each)	Weekly	Semi Annual	Standard 4/ Opacity monitoring will ensure compliance with the Standard 4 limit
EU012	PM PM_{10} $PM_{2.5}$ / Pressure Drop	0.005 gr/dscf (each)	Each Shift	Semi Annual	PSD BACT/ Monitoring the Baghouse Pressure Drop each shift will compliance with PSD BACT limit for particulate matter
EU012 (Ash Collection System)	PM/ Operation & Maintenance	64.52 lbs/hr (EU008-EU012 process total)	Monthly	Semi Annual	Standard 4 / Operation and Maintenance checks on the ash collection system will ensure that the PM limit is being achieved.
EU012	Opacity/ Visual Inspection	20% (each)	Weekly	Semi Annual	Standard 4/ Opacity monitoring will ensure compliance with the Standard 4 limit
EU013	Opacity/ Visual Inspection	20%	Semi Annual	Semi Annual	Visual inspections of the coating (inks, colors, lacquers) and good operating practices will ensure compliance with the opacity limit. The inks, colors, lacquers operations emit VOCs only (no particulate matter emissions)
EU013	VOCs	0.03 lb VOC / MBF	Monthly	Semi Annual	PSD BACT/ Record keeping and Good Work Practices to confirm potential VOC emissions form the coating (paints, inks, lacquers) process

PERIODIC MONITORING					
ID	**Pollutant/ Parameter**	**Limit**	**Required Monitoring Frequency**	**Reporting Frequency**	**Monitoring Basis/ Justification***
EU014	Opacity/ Visual Inspection	20%	Weekly	Semi Annual	Standard 4/ Visual inspections of the log processing and sawmill operations will ensure compliance with the Standard 4 limit
EU014	Fugitive Particulate	N/A	N/A	N/A	Standard 4 & 62.6/ non-enclosed operations shall be conducted in such a manner that a minimum of particulate matter becomes airborne
Emergency Engines	Opacity/ Visual Inspection	20%	Semi Annual (during source operation)	Semi Annual	Standard 4/ Visual inspections of emergency engines will ensure compliance with the opacity limit

* Where multiple regulations with emission limits are applicable to the same emission unit, the facility shall comply with the most stringent applicable limit for the emission unit.

KLAUSNER HOLDING USA INC. - Summary of BACT			
Process	**BACT**	**BACT Limit**	**Control Method**
Two Biomass Boilers	Particulate Matter	Total PM = 0.032 lb/MM Btu Filterable PM = 0.0032 lb/MM Btu	Multiclone/ESP
		Total PM_{10} = 0.032 lb/MM Btu Filterable PM_{10} = 0.0032 lb/MM Btu	
		Total $PM_{2.5}$ = 0.032 lb/MM Btu Filterable $PM_{2.5}$ = 0.0032 lb/MM Btu	
	NO_X	0.14 lb/MM Btu	Selective Non-Catalytic Reduction (SNCR)
	NO_X	16.8 lb/hr	Selective Non-Catalytic Reduction (SNCR)
	CO	0.40 lb/MM Btu	Good Operating Practices
	VOC	0.017 lb/MM Btu	Good Operating Practices
	CH_4	37.1 tpy	Good Design Combustion Practices
	N_2O	4.9 tpy	Good Design Combustion Practices
Four Natural Gas-Fired Boilers	Particulate Matter	Total PM = 0.005 lb/MM Btu Filterable PM = 0.002 lb/MM Btu	Good Operating Practices
		Total PM_{10} = 0.005 lb/MM Btu Filterable PM = 0.002 lb/MM Btu	
		Total $PM_{2.5}$ = 0.005 lb/MM Btu Filterable PM = 0.002 lb/MM Btu	
	NO_X	0.036 lb/MM Btu	LNB/FGR/Good Operating Practices
	NO_X	1.66 lb/hr	LNB/FGR/Good Operating Practices
	CO	0.039 lb/MM Btu	Good Operating Practices
	VOC	0.003 lb/MM Btu	Good Operating Practices
	CO_{2e}	146 lb CO_2e/ MM Btu (output)	Good Design Combustion Practices

KLAUSNER HOLDING USA INC. - Summary of BACT			
Sixty Lumber Drying Kilns	Particulate Matter	PM = 0.022 lb/MBF	Good Operating Practices
		PM_{10} = 0.013 lb/MBF	
		$PM_{2.5}$ = 0.004 lb/MBF	
	VOC	3.50 lb/MBF	Good Operating Practices
Planer Mill / Two (2) Silos for Dry Shavings Storage	Particulate Matter	Filterable PM = 0.004 gr/dscf	Baghouse
		Filterable PM_{10} = 0.004 gr/dscf	
		Filterable $PM_{2.5}$ = 0.004 gr/dscf	
Sorter Line Trimmers	Particulate Matter	Filterable PM = 0.005 gr/dscf	Baghouse
		Filterable PM_{10} = 0.005 gr/dscf	
		Filterable $PM_{2.5}$ = 0.005 gr/dscf	
One (1) Silo for Ash Storage	Particulate Matter	Filterable PM = 0.005 gr/dscf	Baghouse
		Filterable PM_{10} = 0.005 gr/dscf	
		Filterable $PM_{2.5}$ = 0.005 gr/dscf	
Coatings (Colors, Inks, Lacquers)	VOCs	0.03 lb VOC /MBF	Good Operating Practices
Emergency Engines	NOx + NHMC	3.0 g/bhp-hr	Good Operating Practices
	PM	0.15 g/bhp-hr	
	PM_{10}	0.15 g/bhp-hr	
	$PM_{2.5}$	0.15 g/bhp-hr	
	CO	2.6 g/bhp-hr	
Storage Tanks	VOC	VOC = 0.02 tpy	Good Operating Practices

ADDITIONAL INFORMATION ON VENDOR GUARANTEE OF EMISSION RATES:
At this time, the facility has not yet selected the preferred vendor for each component of the Orangeburg Mill. Accordingly, specifications with formal emissions guarantees are not yet available. Once a final PSD permit is issued for the project, the facility will issue formal solicitations for the various process and pollution control equipment from competing vendors to ensure that BACT emission rates are achieved. In preparation of the application, the consulting firm which prepared the application (Trinity Consultants) and the facility engaged potential vendors of emissions-generating equipment as well as pollution control equipment. While some vendors are based in the United States, others are based overseas. Communication with the varied vendors often required translations and specification formats that were unique. In order to facilitate development of the PSD Permit Application, Trinity Consultants prepared requests for information for the facility and the potential vendors to complete, which requested "controlled" emission rates.

Soliciting this necessary information directly from the varied vendors both domestic and international in a consistent format enabled the identification of vendor guarantees without risking misrepresentation of values from other interpretations of bid specifications. Trinity and Klausner used the vendor provided controlled (i.e., guaranteed) emissions rates in the emissions calculations submitted with the PSD permit application, summarized as "Controlled Emission Factor" throughout Appendix C (Emissions Calculations).

The following information as provided in the PSD permit application represented vendor guarantees:

Table C-1, column identified by the heading "Controlled Emission Factor (lb/MMBtu)" represents the vendor guarantees for the natural gas

boilers including the BACT selected pollution mitigation technology (low NOX burners, flue gas recirculation, and good combustion practices).

Table C-5, column identified by the heading "Controlled Emission Factor (lb/MMBtu)" represents the vendor guarantees for the biomass boilers including the BACT selected pollution control technology (SNCR, multiclone, ESP, and good combustion practices).

Table C-8, column identified by the heading "Pollutant Loading (gr./dscf)" represents the not-to-exceed vendor guarantees for the ash storage silo baghouse, the green sorter line trimmers extraction system baghouse, and the baghouses on top of each of the two dry shavings silos.

In regards to the baghouses on the extraction systems – one for the green sorter line trimmers and the second for the planer mill lines (planers and dry sorter line trimmers) – a potential vendor provided previously sampled emission rates for similar systems. Trinity and Klausner reviewed these rates with the potential vendor through telephone conversations, and the vendor agreed these measured rates did not represent guaranteed, not-to-exceed rates, but possible actual rates. This potential vendor noted that the grain outlet loading rates presented in Table C-8 were appropriate guaranteed not-to-exceed rates.

In addition to the vendor emission guarantees presented in Appendix C (Emissions Calculations), Klausner also received emission guarantees for the control technologies evaluated in the BACT analysis of Section 5 of the PSD permit application. Similarly, these rates were solicited by Klausner and Trinity via a request for information in a table format. The RSCR/Oxidation Catalyst and ESP potential vendor responses are presented in the PSD permit application in Appendix F (BACT Supporting Information).

Table F-2, Rows "Target NOX Outlet Emissions," "Target CO Outlet Emissions," and "Target VOC Outlet Emissions" represent the RSCR/Oxidation Catalyst vendor guarantees for the natural gas boiler controls.

Table F-3, Rows "Target NOX Outlet Emissions," "Target CO Outlet Emissions," and "Target VOC Outlet Emissions" represent the RSCR/Oxidation Catalyst vendor guarantees for the biomass boiler controls.

Table F-9, column identified by the heading "Control Options (lb/MMBtu)" represents the vendor guaranteed total PM emission rate (filterable and condensable) for each PM control configuration, a 5-field ESP and multiclone, a 4-field ESP and multiclone, and only a multiclone (no ESP).

Cost Analysis Information

The cost analysis information presented in application was based on the sixth edition of the EPA Air Pollution Control Cost Manual as prepared by the Office of Air Quality Planning and Standards (OAQPS).

Supporting information for the control technology, Selective Non-Catalytic Reduction (SNCR), as presented in the BACT analysis, was based on the document "Alternative Control Techniques Document—NOx Emissions from Industrial/Commercial/Institutional (ICI) Boilers. The documents states "SNCR cost are not likely to vary with type of reagent used (aqueous ammonia or urea). The document also provides additional technical information such as SNCR reaction times, temperatures, etc.

SAMPLE CALCULATIONS:

Biomass Boilers

Potential Annual CO Emissions – Biomass Boiler No. 1:
Potential Annual CO Emissions = Heat Input (MM Btu/hr x Emission Factor (lb/MM Btu) x (ton/2,000 lb) x (8,760 hr/yr)
Potential Annual CO Emissions = 120 (MM Btu/hr x 0.40 (lb/MM Btu) x (ton/2,000 lb) x (8,760 hr/yr) = 210 tons/yr

Note: It is assumed that the biomass boilers will operate 8,760 hr/yr at 100% load to estimate potential worst-case emissions.

Natural Gas Boilers

Potential Annual CO Emissions – Natural Gas Fired Boiler No. 1:
Potential Annual CO Emissions = Heat Input (MM Btu/hr x Emission Factor (lb/MM Btu) x (ton/2,000 lb) x (8,760 hr/yr)
Potential Annual CO Emissions = 46 (MM Btu/hr x 0.40 (lb/MM Btu) x (ton/2,000 lb) x (8,760 hr/yr) = 7.86 tons/yr

Drying Kilns
Potential Annual VOC Emissions – Drying Kilns
Potential Annual VOC emissions = emission factor (lb/MBF) x potential throughput (MBF/yr) x (ton/2,000 lb)
Potential Annual VOC emissions = 3.50 (lb/MBF) x 700,000 (MBF/yr) x (ton/2,000 lb) = 1,225 tons/yr

Dry Material Handling and Storage (Fabric Filter Control Device, 99.0 % removal efficiency)
PM (controlled) Emissions – Planer Mill Extraction System/Dry Shavings Silo No. 1:
PM (controlled) Emissions = grain loading (gr/dscf) x flow rate (dscf/min) x (lb/7,000 gr) x (60 min/hr) x (8760 hr/yr) x (ton/2,000 lb)
PM (controlled) Emissions = 0.004 (gr/dscf) x 62,625 (dscf/min) x (lb/7,000 gr) x (60 min/hr) x (8760 hr/yr) x (ton/2,000 lb) = 9.4 tons/yr

Emissions of PM_{10} and $PM_{2.5}$ from the planer extraction system/dry shavings storage silos and sorter extraction systems were estimated as 38% and 19% of total PM, respectively, based on EPA's PM Calculator Database for wood waste storage bin vents controlled by a fabric filter (SCC 30703001). PM_{10} and $PM_{2.5}$ from the ash storage silo was estimated as 57% and 30% of total PM, respectively, based on EPA's PM Calculator Database for cement storage silos controlled by a fabric filter (SCC 30500618).

Note: Fugitive emissions from the planer not captured by the extraction system and other dry material handling shall be minimized due to the enclosed design of all operations occurring inside buildings.

Colors, Inks, and Lacquers
Potential VOC Emissions – Lacquers:
Potential VOC emissions = potential lacquer usage (gal/yr) x emission factor (lb/gal) x (ton/2,000 lb)
Potential VOC emissions = 3,600 (gal/yr) x 5.12 (lb/gal) x (ton/2,000 lb) = 9.22 tons/yr

Note: Potential emissions from the use of colors, inks, and lacquers are estimated based on a maximum usage of 350 gallons per year of colors, 350 gallons per year of ink, and 3,600 gallons per year of lacquers, and the worst case VOC content of each, based on the Material Safety Data Sheet (MSDS).

Emergency Engines
Diesel combustion in the emergency engines will result in emissions of CO, NO_X, $PM/PM_{10}/PM_{2.5}$, SO_2, VOC, and GHG. Potential criteria pollutant emissions are based on Tier 3 emission standards for several criteria pollutants (PM, CO, and NO_X) and AP-42 Section 3.3 (VOC). SO_2 emissions are based on a maximum fuel sulfur content of 15 ppm by weight (as required by NSPS Subpart IIII). A maximum operating schedule of 500 hr/yr is assumed for estimating potential emissions from the emergency engines. Note that PM_{10} and $PM_{2.5}$ are assumed to be equal to PM for the emergency engines.

Potential operation includes non-emergency service (readiness testing and maintenance as recommended by the manufacturer and limited to 100 hrs/yr by 40 CFR §60.4211(e)) and an estimate of annual emergency usage.

Storage Tanks
AP-42 Section 7.1 recommends usage of EPA's TANKS 4.0 program to calculate the VOC and HAP emissions associated with fixed-roof or floating-roof organic liquid storage tanks. The program is based on the emission estimation procedures outlined in AP-42 Section 7.1 and uses chemical, meteorological, and tank-specific information (e.g., diameter, height, volume, color, throughput) to estimate the emissions from both standing and working losses. The TANKS 4.0 program (version 4.09d) is utilized to estimate the emissions for the storage tanks at the facility.

HAP and TAP Emissions Quantification

Biomass Boilers
The biomass boilers are a source of particulate and organic HAP and TAP emissions. All HAP and TAP emissions generated from the combustion of biomass in the boilers have been quantified based on AP-42 Section 1.6. It has been assumed that there is no control or reduction of emissions from the pollution control equipment on the biomass boilers. Potential emissions are based on the maximum heat input of 120 MMBtu/hr for each unit and continuous operation (8,760 hr/yr).

Natural Gas/ No. 2 Fuel Oil Boilers
The natural gas fired boilers, with No. 2 fuel oil as a backup fuel (during periods of natural gas curtailment, only), are a source of particulate and organic HAP and TAP emissions. Particulate and organic HAP and TAP emissions generated from the combustion of natural gas have been quantified based on AP-42 Section 1.4 emission factors. Particulate and organic HAP and TAP emissions generated from the combustion of No. 2 fuel oil have been quantified based on AP- 42 Section 1.3 emission factors. Potential emissions for each natural gas boiler are based on the heat input of 46 MMBtu/hr for each unit and continuous operation (8,760 hr/yr).

Drying Kilns
Organic HAP and TAP emissions from the drying kilns are estimated based on EPA ("baseline Emission Estimates for the Plywood and Composite Wood Products", (9/00)) and NCASI (Technical Bulletin No. 845) emission factors and the potential annual lumber production (MBF).

Emergency Engines
HAP potential emissions from the emergency engines are based on AP-42, 5th editions, volume I, Section 3.3 emission factors. Up to 500 hr/yr of operation is assumed for each engine.

Colors, Inks, and Lacquers
HAP and TAP emissions estimates were based on the worst case individual HAP and TAP content of each color, ink, and lacquer. This is a conservative approach to estimating emissions, as a single color, ink, or lacquer is unlikely to be the only material used, and the worst case of each individual HAP and/or TAP does not necessarily occur in a single material.

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.