PSD CONSTRUCTION AND OPERATING PERMIT APPLICATION

HUBER ENGINEERED WOODS, LLC ▪ COMMERCE, GEORGIA

ORIENTED STRAND BOARD MILL

Prepared By:

HUBER ENGINEERED WOODS, LLC
P.O. Box 670
Commerce, GA 30529
(706) 336-3064

TRINITY CONSULTANTS
325 Arlington Avenue, Suite 500
Charlotte, North Carolina 28203
(704) 553-7747
Fax (704) 553-8838

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1. Executive Summary

Huber Engineered Woods (Huber) operates an oriented strand board (OSB) manufacturing facility (Standard Industrial Classification [SIC] Code 2493) in Jackson County near Commerce, Georgia (the Commerce mill). The Commerce mill consists of a wood-fired furnace used to provide heat to rotary dryers, a multi-opening press (heat provided via hot oil loop from furnace), finishing equipment, and raw material handling equipment associated with stranding, flaking, forming, handling, and storing wood. Particulate matter (PM) emissions from the furnace and dryers at the Commerce mill are controlled by wet electrostatic precipitators (WESPs). PM emissions from the screening, forming, trim and grade, sanding, and tongue and groove operations are controlled by baghouses. Volatile organic compound (VOC) emissions from the furnace, dryers, and the press are controlled by four regenerative thermal oxidizers (RTOs).

The maximum OSB production rate of the mill is 77 thousand square feet ($MSF_{3/8}$) per hour or 674,520 $MSF_{3/8}$ per year on a 12-month rolling basis. Dryers 1, 2, and 3 have a combined nominal throughput capacity of 50 tons of oven dried material per hour (ODT/hr).

The Commerce mill currently operates under Title V permit No. 2493-157-0014-V-02-0 and subsequent amendments, which limits criteria pollutant emissions to less than the Prevention of Significant Deterioration (PSD) major source threshold of 250 tons per year (tpy). To comply with this limit, Huber must limit the use of melamine urea phenol formaldehyde (MUPF) resin. Combustion of MUPF resin has greater emissions of VOC and nitrogen oxides (NO_X) than combustion of methylene di-isocyanate (MDI) and phenol formaldehyde (PF) resins, which are also used at the mill. Due to production demands, volatile supply, and price fluctuations, Huber requires the flexibility to use any permitted resin without limitation. Removing these limits from the permit will require several pollutants to undergo PSD review. These pollutants include particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), NO_X, carbon monoxide (CO), sulfur dioxide (SO_2), and VOC. The Georgia State Implementation Plan (SIP) does not require particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) to undergo PSD permitting, and the Georgia Environmental Protection Division (EPD) follows the interim guidance to regulate $PM_{2.5}$ as PM_{10}. Huber is submitting this PSD construction and operating permit application in accordance with Title 40 Code of Federal Regulations Part 52.21 and EPD Regulation 391-3-1-.02(7) to remove all PSD avoidance limits from the permit. Huber also requests that EPD add language to the permit to allow for operation flexibility to change resins, catalysts, and inks to other resins, catalysts, and inks that have an emissions profile that is equal to or less than the current resins, catalysts, and inks. Huber has provided a summary of requested changes to the Title V permit in Appendix G of this application.

The Commerce mill is located in Jackson County, which is designated as "attainment" or "unclassifiable" for all criteria pollutants with respect to the National Ambient Air Quality Standards (NAAQS). Therefore, nonattainment new source review (NNSR) does not apply to this proposed project, and PSD applicability must be evaluated for all criteria pollutants. OSB mills are not included in the list of 28 named source categories and therefore have a major source threshold level of 250 tpy of any regulated criteria pollutant.

The Commerce mill is also a major source with respect to the Title V permit program, as emissions of PM, CO, NO_X, and VOC exceed 100 tpy, emissions of formaldehyde, methanol, and phenol individually exceed 10 tpy, and emissions of total hazardous air pollutants (HAP) exceed 25 tpy. Huber has elected to submit a combined PSD construction permit and Title V modification application. Therefore, this permit application includes all required components of a PSD construction permit application, as well as a Title V permit application. The permit application includes the following sections:

- Section 2 – Process Description – Provides a detailed description of the OSB production process.
- Section 3 – Emission Calculations – Discusses emission calculation methodologies and provides sample calculations for each process.
- Section 4 – BACT Analysis – Provides a complete Best Available Control Technology (BACT) analysis for all emission units for each pollutant.
- Section 5 – Dispersion Modeling and Additional Impacts Analysis – Addresses the modeling required for the PSD application, as well as the growth, visibility impacts, and soil and vegetation impacts related to the construction and operation of the proposed facility.
- Section 6 – Regulatory Applicability Analysis – Discusses the applicability and non-applicability of state and federal regulations.

In addition, the following appendices are provided to provide supporting information:

- Appendix A – Georgia EPD Permit Application Forms
- Appendix B – Facility-wide Emissions Calculations
- Appendix C – RBLC Database Results
- Appendix D – BACT Economic Calculations
- Appendix E – Plot Plan and Flow Diagrams
- Appendix F – Title V Database and Certification Page
- Appendix G – Proposed Permit Changes

2. PROCESS DESCRIPTION

The Commerce mill uses pine and hardwood logs and various resins to manufacture OSB. The following paragraphs describe the OSB manufacturing process at the mill, and process flow diagrams are included in Appendix E.

2.1 MILL PROCESSES

2.1.1 LOG HANDLING

Tree length logs are delivered to the mill by transport truck from logging operations in the surrounding area. The trucks are weighed before and after unloading to determine the amount of wood delivered. Cranes are used to unload the trucks and place the wood in a line along a crane's axis of movement. A crane or loader moves the logs from the storage area onto a preparation area, typically on a "first in, first out" basis to preserve log quality. Log storage is orderly and performed in a manner designed to minimize fugitive dust generation.

2.1.2 LOG PREPARATION

Tree length logs are fed onto two conveyor systems that meter the flow of logs through the two debarkers, which remove the bark from the logs. The bark passes through a duct system to a silo where it is stored until needed as fuel for the furnace. The debarked logs continue on to the waferizers (stranders).

2.1.3 STRANDING, WET STORAGE, AND SCREENING

The debarked logs pass directly from the debarker via a transfer conveyor to the stranders, which then convert the logs into wood strands. The strands are then conveyed to the wet storage bins that meter the strands to the wet screens. There are two complete in-line strander systems from the debarker infeed to the strander outfeeds. The stranders, wet storage bins, and wet screening equipment are all considered as one fugitive emission source (Stranding and Green Bins).

2.1.4 DRYING

The wet strands (moisture content of approximately 50% oven dry basis), are fed through ductwork that feeds the strands to three rotary dryers (DRY1, DRY2, and DRY3). A hot air stream provides heat to the strands while they pass through the dryers to reduce the moisture content of the wood strands.

After drying, the strands and fines are conveyed to the product process cyclones, where they are separated from the exhaust gases. The dry strands and fines are then transferred to dry storage bins. The gases from the dryers are ducted to one of three wet electrostatic precipitators (WES1, WES2, and WES3) to control PM emissions. DRY1 is ducted to WES1, DRY2 is ducted to WES2, and DRY3 is ducted to WES3. The exhaust gases from the three WESPs are transferred to a common manifold. From this manifold, the gases are routed to the regenerative thermal oxidizers (HRTO, SRTO, and PRTO) to control VOC and HAP emissions. Huber typically operates two of the three RTOs at one time but requests the flexibility to operate all RTOs simultaneously. Emissions then exhaust to the atmosphere through three individual stacks. In emergency situations (i.e., in the event of a fire in the conveyance system) the strands from the dryer cyclones can be diverted to an outside storage area.

2.1.5 SCREENS

After the strands leave the dryers they enter one of three screening bins. One screening bin separates the fines and oversized pieces of wood from the strands that will make up the core of the OSB and the other two screening bins separate the fines and oversized pieces of wood from the strands that will make up the two surface layers. The fines are sent to the dry fuel storage silo where they will eventually be fed into the Wellons furnace as fuel. The oversized pieces are either reclaimed as process material or as fuel for the Wellons furnace.

Emissions from the screening operations are vented through ductwork to the Screening and Blending baghouse (S1BH), where PM and PM_{10} emissions are removed at 99%+ efficiency.

2.1.6 BLENDING AND FORMING

After the fines have been removed in the screens, the strands travel to the blenders where resin is added via an atomizer to ensure optimum coating. Any combination of three types of resin is used to coat the strands. MDI, mixed with the powder PF resin, is used primarily in the bin dedicated to producing the strands for the core of the board. MUPF is primarily used to coat the strands used on the surface of the board. A benefit of using MUPF on the surface instead of MDI is that the use of a release agent to prevent the board from sticking to the platens of the press is not required. The release agent causes corrosion and pitting of the platens, resulting in a decreased platen lifespan.

The emissions from the blending system are vented through a baghouse (S23BH) to control particulate emissions in the forming section and then to atmosphere. The stack for the forming baghouse is located outside the east wall of the main building.

The coated strands from the dry bins travel to the forming line where they are separated into distribution bins. The strands that have been coated with MUPF are separated into the bins that will make up the two outside surfaces of the board. The forming area is located along a 9 foot wide conveyor that runs up to the press area. The strands are dropped onto the conveyor in layers. The bottom layer is dropped onto the belt directly, lengthwise or parallel to the belt, and will make up one face of the board. Core layer strands are layered cross-wise or perpendicular to the belt. The last layer is the top layer and will make up the other face of the board, dropped lengthwise similar to the first face layer.

After all of the layers are dropped onto the belt, a saw moves along the line and cuts the continuous section of board into 25 foot long segments, referred to as master mats. A screen is pulled under each master mat to provide support until the mat exits the press. Should an operator need to reject a mat, there is a retractable section of the line that opens allowing the mat to fall prior to its placement on a screen. The mats that are rejected are either recycled back to the forming bins for reuse or burned as fuel in the Wellons furnace.

Particulate emissions from the forming area are controlled by a baghouse (Unit ID SC45).

2.1.7 PRESSING

The pressing step at the Commerce mill is a batch process. This process consists of five main areas: the acceleration belt, pre-loader, loader, board press, and unloader. The acceleration belt moves the mats from the forming belt to the pre-loader. The acceleration belt moves intermittently at a faster speed than the forming belt, to allow the pre-loader time to readjust its height when loading mats into each deck level. The pre-loader consists of several openings that accept 9 feet wide by 25 feet long mats. From the pre-loader, the mats then move into the loader where they await loading into the press.

During pressing, each mat is pulled into the press on top of a screen placed under it prior to the acceleration belt. The press uses heat and pressure to activate the resins, and compresses and holds the strands and fines into the final product thickness. The temperature of the press is approximately 400^0F. Press platens are heated by the Wellons wood-fired furnace via a thermal oil loop.

During pressing, the elevated temperatures cause the strands and binding resin to produce off-gases, including VOC. Off-gases accumulating within the press hood are exhausted via a fan to downstream treatment equipment. A portion of these off-gases are produced during the pressing cycle and a portion during the press unloading cycle. The pre-loader, unloader, and press are enclosed by a wood products enclosure, which has a design capture efficiency of 100%. The enclosure is designed such that all emission points are contained and are located a sufficient distance from any natural draft openings.

The process flow schematic for the pressing operations is shown in Appendix E. For emission control, the gases captured by the wood products enclosure are conveyed to the Durr RTO (DRTO) for VOC, CO, and HAP removal prior to discharge to the atmosphere through the DRTO stack on the east side of the building.

A bypass stack is located before the DRTO to allow for bypass of exhaust during an upset condition that occurs due to an emergency, start-up, shutdown or malfunction.

2.1.8 FINISHING AND SHIPPING

From the press unloader system, individual raw master panels are fed to the finishing end through a series of conveyors. The finishing process begins as the master mats exit the unloader onto the conveyor leading to the trimming saws. While on the conveyor, a density check is performed along the master mat and any areas with low density are marked with a small spot of ink. After the density check, the trim saw trims the edges and cuts the master mat to varying sizes based on customer specifications. As the boards leave the trim saw, they are sanded and or tongue and grooved for specialty applications. After all sanding, the boards receive a brand and stamp. Machinery stacks the boards for packaging before the edges are sealed to prevent the absorption of water. The coating is completed in enclosed booths equipped with air filters that vent inside the building. After edge sealing, the boards are sent to packaging where they are shipped via transport truck or rail.

The emissions from the sawing, sanding, and tongue and groove stations are controlled by two baghouses. These baghouses are vented though individual emission points on the west side of the building. The paint booth emissions are captured inside the booth and vented through filters into the building.

2.2 THERMAL HEAT GENERATION

2.2.1 FURNACE

A Wellons fixed-grate wood-fired furnace (WBNR) supplies the heat for the processes at the Commerce mill. Wet wood fuel from the debarkers (primarily bark), residual wood-waste (fines and sander dust recycled from the process), and unburned fuel collected in the WESPs provide heat as they burn in the furnace. The primary objective of the combustion is the production of sufficient direct heat to dry the strands used in the OSB process. This combustion also generates heat for the thermal oil heat transfer system, which supplies heat to the press. This heat is applied via an indirect hot oil loop. Ash is collected and shipped offsite for disposal. There is no land-filling on site.

Three RTOs (SRTO, HRTO, and PRTO) control VOC, CO, and volatile HAP emissions from the furnace and dryer system. Prior to the RTOs, three WESPs (WES1, WES2, and WES3) control PM and metal HAP emissions from the furnace and dryers. The products of combustion from the furnace are ducted directly through the dryers to the dedicated WESPs, and then to RTOs that exhaust to the atmosphere. An emergency bypass stack vents prior to the WESPs, but is only used during startup, shutdown, and malfunction (SSM) events.

2.3 OVERVIEW OF PRESS/DRYER/FURNACE EMISSION CONTROL DEVICES

The dryers and the wood-fired furnace are routed to three WESPs for particulate removal as shown in Appendix E. All of the emissions from the WESPs are then routed to a common manifold where they are sent to one of three RTOs operating in parallel, where VOC, CO, and volatile HAP emissions are reduced. Each RTO vents to atmosphere via its own dedicated stack. Press gases are ducted directly to the Durr RTO (DRTO) where VOC, CO, and volatile HAP are reduced prior to venting to atmosphere via the DRTO's dedicated stack.

2.3.1 WESP

The principal component of a WESP is an array of long, vertical, tube-like bundles through which the exhaust gas flows. These tube bundles function as precipitation electrodes, with discharge electrodes located in the center of each tube. The high DC voltage in the discharge electrodes causes a coronal discharge, which ionizes the gas. The residual particles of dust in the gas (including potential blue haze aerosols) take on a negative charge and are each attracted through the electric field to the grounded inside walls of the tubes with their positive charge. An array of water spray nozzles above the tubes periodically flushes the surfaces of the tube, washing the collected particles to the bottom of the WESP.

WESPs (WES1, WES2, and WES3) control particulate emissions from the air exiting the dryers. The most effective way of monitoring the WESP performance and operation is by monitoring the secondary voltage per the manufacturer's recommendation.

2.3.2 RTO

RTOs control CO, VOC, and HAP emissions exiting the dryers and press. Thermal oxidation takes place in the central burner chamber, under which several heat recovery chambers are arranged. These chambers are switched, with time lags, via an automatic control system from heat release to heat storage and back to heat release. In this way, energy from the purified exhaust air, which exits from the central oxidation chamber, is stored in the heat exchanger elements. This heat warms the incoming exhaust air to almost oxidation temperature. Additional burners in the oxidation chamber and the combustion of the organic compounds in the exhaust air supply the additional heat required to increase the exhaust air temperature to the oxidation temperature level. The exhaust air is exposed to the oxidation temperature for approximately one second to ensure destruction of VOC.

The four mill RTOs are primarily fueled by natural gas with liquid propane gas (LPG) as backup. The Durr RTO (DRTO) controls emissions from the press while the other three operate as control devices for the dryers and furnace. The Smith, Pro, and Huntington (SRTO, PRTO, and HRTO) operate in a rotation where at any given time two will be operating and the third will act as a backup. The emissions from the dryers and furnace are routed through the WESPs and then to a common manifold where they can be distributed to any of the three RTOs. Using this system allows Huber the flexibility to continue to operate if any given RTO goes down for maintenance.

Each RTO at the Commerce mill has a different maximum flow rate. The Smith RTO has a maximum flow rate of approximately 156,000 acfm, the Huntington RTO has a maximum flow rate of approximately 89,000 acfm, the Durr RTO has a design flow rate of approximately 100,000 acfm, and the Pro RTO has a maximum flow rate of approximately 118,000 acfm. Furthermore, the units are designed to trigger an automatic safety shutdown in the event that the airflow falls below safe operating levels in any given unit.

2.3.3 BAGHOUSES

The baghouses at the Commerce mill have filters. The material collected in the baghouses is either recycled to the wood-fired furnace as fuel or back to the process. The baghouses are self-cleaning with a reverse air rotating plenum.

2.3.4 EMERGENCY STACKS

Emissions associated with the drying and pressing operations vent through bypass stacks to the atmosphere during periods of startup, shutdown, and malfunction (SSM). While these events do happen, they are rare and their duration is short.

2.4 PROCESS STORAGE TANKS

The facility operates resin storage tanks, resin bulk containers, wax storage tanks, a release agent storage tank, release agent mix tank, and a large propane storage tank. The emissions from these tanks are minimal due to the low vapor pressure (<1 psia) of the stored materials. All of the tanks have fixed roofs. The MDI resin is not normally exposed to the atmosphere because the MDI tanks are sealed with a dry compressed air blanket. These tanks do not have emission control devices installed on them because the tank volumes are small and the vapor pressures of the materials contained within them are very low.

2.5 UTILITIES

There is a 225 hp diesel fire pump situated next to a fire water reservoir at the site. There is also one 600 hp diesel-fired emergency generator on site to provide critical power in the event of a power failure. In addition, a propane tank is located southeast of the dryer RTOs to provide propane for mill equipment, such as forklifts.

This section provides an overview of potential emission calculations for each emission point. The potential emissions were developed using emission factors from Huber stack test data, the current Title V Operating Permit for the Commerce facility, the South Carolina Department of Health and Environmental Control (SCDHEC) Statement of Basis for the Grant Forest Products Allendale Facility, and U.S. EPA Compilation of Emissions Factors, AP-42. If stack test data was not used to calculate the emission rates, potential emissions were calculated using AP-42 factors or the SCDHEC statement of basis for Grant Allendale, Inc. The table below summarizes the point and fugitive emission sources at the Commerce mill. Detailed calculations for each unit are provided in Appendix B.

TABLE 3-1. FACILITY EMISSION SOURCE DESCRIPTIONS

Emission Source	Type	Units that Vent to the Emission Point
DRTO	Point	Board Press
HRTO	Point	Dryers and Wellons Furnace
PRTO	Point	Dryers and Wellons Furnace
SRTO	Point	Dryers and Wellons Furnace
S1BH	Point	Flake Screening Bin and Blender
S23BH	Point	Forming, Cutoff Saw, and Mat Reject
S4BH	Point	Trim and Grade
S5BH	Point	Sanding and Tongue & Groove
SGB	Fugitive	Debarking, Stranding, and Green Bin
FUG	Fugitive	Building Fugitives, Piles, and Roads

This section provides example emissions calculations and discusses the emission factors used to determine potential emissions of criteria pollutants and HAP for the various emission units at the Commerce mill.

3.1 DEBARKING, STRANDING, AND GREEN BINS

Emissions from debarking, stranding, and the green bins consist of VOC, formaldehyde, and phenol. These emissions were calculated using factors from the SCDHEC Statement of Basis for the Grant Forest Products Allendale Facility. The emission factors are given in units of lb/MSF and an example calculation is provided as follows:

Hourly VOC Emissions – Debarking, Stranding, and Green Bins

$$\begin{aligned} \text{VOC Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) &= \text{Emission Factor }\left(\frac{\text{lb}}{\text{MSF}}\right)\times\text{Max Process Rate}\left(\frac{\text{MSF}}{\text{hr}}\right) \\ &= \left(\frac{1.06\text{ lb}}{\text{MSF}}\right)\times\left(\frac{77\text{ MSF}}{\text{hr}}\right) \\ &= 81.62\ \frac{\text{lb}}{\text{hr}} \end{aligned}$$

3.2 DRYER AND FURNACE EMISSIONS

The emissions from the dryers and the furnace vent through the WESPs and the RTOs. Therefore, due to the common exhaust point, any stack tests conducted on the RTOs include emissions from the dryers, furnace, and RTO natural gas combustion. Stack test data for CO, NO_X, VOC, and condensable PM/PM_{10} was used to calculated emissions of these pollutants from the dryers and the furnace. In order to calculate potential emissions using stack test data, the emission rate from the test run was divided by the production rate during the test to yield an appropriate emission factor. This factor was then multiplied by a safety factor of 1.33 to account for test variability, resulting in a corrected factor. The corrected factor was then multiplied by the maximum production rate (77 MSF/hr or 50 ODT/hr) at the Commerce mill to determine a maximum potential hourly emission rate in pounds per hour. A potential annual emission rate was obtained by multiplying the maximum hourly emission rate in pounds per hour by the total hours of operation per year (8,760 hr/yr). An example calculation using stack test data is provided as follows:

Hourly VOC Emissions (VOC as propane) – Dryer, Furnace, RTOs

$$\begin{aligned} \text{VOC Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) &= \text{Emission Factor }\left(\frac{\text{lb}}{\text{ODT}}\right)\times\text{ Saftey Factor}\times\text{Max Process Rate}\left(\frac{\text{ODT}}{\text{hr}}\right) \\ &= 0.645\ \left(\frac{\text{lb}}{\text{ODT}}\right)\times 1.33\times\left(\frac{50.0\text{ ODT}}{\text{hr}}\right) \\ &= 42.89\ \frac{\text{lb}}{\text{hr}} \end{aligned}$$

Filterable PM emissions from the dryer and furnace were calculated using the New Source Performance Standards (NSPS) Subpart Db limit for existing wood-fired boilers. The limit for the furnace, an existing unit under the rule, is 0.1pounds per million British thermal units (lb/MMBtu) of heat input. Although the NSPS Subpart Db emission limit applies only to the furnace the Commerce mill will demonstrate compliance with this limit by testing the dryer/furnace RTO stacks. Therefore, the potential emissions of the dryers and furnace are limited to 0.1 lb/MMBtu. An example calculation using a lb/MMBtu emission factor is provided as follows:

Hourly Filterable PM Emissions – Dryer/Furnace

$$\text{Filterable PM Emissions} = \text{NSPS Subpart Db Filterable PM Limit}\left(\frac{\text{lb}}{\text{MMBtu}}\right) \times \text{Maximum Process Rate}\left(\frac{\text{MMBtu}}{\text{hr}}\right)$$
$$= \left(\frac{0.1\ \text{lb}}{\text{MMBtu}}\right) \times \left(\frac{150\ \text{MMBtu}}{\text{hr}}\right)$$
$$= 15.00\frac{\text{lb}}{\text{hr}}$$

Hourly Sulfur Dioxide Emissions – Dryer/Furnace

Sulfur dioxide emissions from the furnace and dryers include emissions from wood combustion and emissions from the use of ammonium sulfate accelerant when using MUPF resin. The wood combustion emissions were calculated using the AP-42, Table 1.6-2 factor for SO_2 from wood residue combustion. A sample calculation is provided as follows:

SO_2 from Wood Combustion:

$$SO_2\ \text{Emissions} = \text{AP-42 Emission Factor}\left(\frac{\text{lb of pollutant}}{\text{MMBtu}}\right) \times \text{Maximum Process Rate}\left(\frac{\text{MMBtu}}{\text{hr}}\right)$$
$$= \left(\frac{0.025\ \text{lb}\ SO_2}{\text{MMBtu}}\right) \times \left(\frac{150\ \text{MMBtu}}{\text{hr}}\right)$$
$$= 3.75\left(\frac{\text{lb}\ SO_2}{\text{hr}}\right)$$

SO_2 from Catalytic Reduction:

The sulfate in the ammonium sulfate accelerant may convert to SO_2 in the presence of metal catalyst. Due to the high temperatures of combustion and the presence of metals that naturally occur in wood, Huber has conservatively assumed that one hundred percent of the sulfur in the accelerant is converted to SO_2. Huber used 2005 actual resin usage and board production data to calculate maximum potential resin usage at the mill. In 2005, Huber used 25,598,977 lbs (12,799 tons) of MDI resin to produce 391,000 MSF (437,194 tons) of OSB board. Using these values, scaled the actual 2005 resin usage to a potential usage, as shown in the calculation below:

$$\text{Potential MDI Usage} = \text{2005 Usage}\left(\frac{\text{tons MDI}}{\text{yr}}\right) \times \frac{\text{Potential Production}\left(\frac{\text{MSF}}{\text{yr}}\right)}{\text{2005 Production}\left(\frac{\text{MSF}}{\text{yr}}\right)}$$
$$= 12{,}799\left(\frac{\text{tons MDI}}{\text{yr}}\right) \times \frac{674{,}520\left(\frac{\text{MSF}}{\text{yr}}\right)}{391{,}000\left(\frac{\text{MSF}}{\text{yr}}\right)}$$
$$= 22{,}080\left(\frac{\text{tons MDI}}{\text{yr}}\right)$$

In 2005 Huber used MDI exclusively. However, the accelerant usage is based on the amount of MUPF resin used in the boards. Huber requests to replace up to 79% MDI resin with MUPF resin. In addition, MDI resin is replaced by MUPF resin at a ratio of 1.6 lbs MUPF per 1 lb MDI. Huber used these two ratios to project the maximum MUPF resin usage, as shown below:

$$\begin{aligned} \text{Max MUPF Usage}\left(\frac{\text{tons}}{\text{yr}}\right) &= \text{Max MDI Usage}\left(\frac{\text{tons}}{\text{yr}}\right)\times 79\% \times \frac{\text{1.6 tons MUPF}}{\text{1 ton MDI}} \\ &= 22{,}100\left(\frac{\text{tons MDI}}{\text{yr}}\right)\times 79\% \times \frac{\text{1.6 tons MUPF}}{\text{1 ton MDI}} \\ &= 27{,}910\left(\frac{\text{tons MUPF}}{\text{yr}}\right) \end{aligned}$$

Huber uses accelerant at a rate of 1.5% by weight of the MUPF resin usage, yielding a potential accelerant usage of 321.1 tpy, as shown below:

$$\begin{aligned} \text{Max accelerant Usage}\left(\frac{\text{tons}}{\text{yr}}\right) &= \text{Max MUPF Usage}\left(\frac{\text{tons}}{\text{yr}}\right)\times 1.5\% \text{ Accelerant Dosing Rate} \\ &= 27{,}910\left(\frac{\text{tons MUPF}}{\text{yr}}\right)\times 2.0\% \text{ Accelerant Dosing Rate} \\ &= 558.2\left(\frac{\text{tons Accelerant}}{\text{yr}}\right) \end{aligned}$$

On average, 90% by weight of the product pressed is shipped out as product. The other 10% is assumed to be burned in the Wellons furnace. Therefore, 10% of the accelerant used is assumed to be burned in the Wellons. Ammonium sulfate [$(NH_4)_2SO_4$] is approximately 24% sulfur by weight. Huber used this data to calculate the maximum potential sulfur throughput in the Wellons contributed via accelerant, as shown below:

$$\begin{aligned} \text{Max Sulfur Throughput}\left(\frac{\text{tons}}{\text{yr}}\right) &= \text{Max Accelerant Usage}\left(\frac{\text{tons}}{\text{yr}}\right)\times \%\text{Combusted} \times \text{Mass Fraction S}\left(\frac{\text{tons S}}{\text{ton Accelerant}}\right) \\ &= 558.2\left(\frac{\text{tons Accelerant}}{\text{yr}}\right)\times 10\% \times \frac{\text{0.242 tons S}}{\text{ton Accelerant}} \\ &= 13.5\left(\frac{\text{tons}}{\text{yr}}\right) \end{aligned}$$

Huber has conservatively assumed that 100% of the sulfur throughput is converted to SO_2. The calculation of SO_2 emissions is provided as follows:

$$\text{Max SO}_2\text{ Emissions}\left(\frac{\text{lbs}}{\text{hr}}\right) = \text{Max Sulfur Throughput}\left(\frac{\text{tons}}{\text{yr}}\right)\times \text{SO}_2\text{ Conversion}\left(\frac{\text{tons SO}_2}{\text{ton S}}\right)\times \text{Conversion Factor}$$

$$= 13.5\left(\frac{\text{tons S}}{\text{yr}}\right)\times\frac{2\text{ tons SO}_2}{\text{ton S}}$$

$$= 27.0\left(\frac{\text{tons SO}_2}{\text{yr}}\right)\times 2,000\left(\frac{\text{lbs}}{\text{ton}}\right)\div 8,760\left(\frac{\text{hr}}{\text{yr}}\right)$$

$$= 6.16\left(\frac{\text{lbs SO}_2}{\text{hr}}\right)$$

Based on these calculations, an emission factor for SO_2 emissions from accelerant during MUPF resin usage is calculated as follows:

$$\text{SO}_2\text{ Emission Factor}\left(\frac{\text{lbs}}{\text{MSF}}\right) = \text{Max SO}_2\text{ Emissions}\left(\frac{\text{tons}}{\text{yr}}\right)\div \text{Max Production}\left(\frac{\text{MSF}}{\text{yr}}\right)\times \text{Conversion Factor}$$

$$= 27.0\left(\frac{\text{tons}}{\text{yr}}\right)\div 674,520\left(\frac{\text{MSF}}{\text{yr}}\right)\times 2,000\left(\frac{\text{lbs}}{\text{ton}}\right)$$

$$= 0.080\left(\frac{\text{lbs}}{\text{MSF}}\right)$$

Hourly Methanol Emissions - Dryers

Emissions of formaldehyde, methanol, and phenol from the dryers are calculated using lb/ODT emission factors provided in the Commerce mill's current Title V permit. A sample calculation is provided as follows:

$$\text{Methanol Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) = \text{Permit Emission Factor}\left(\frac{\text{lb}}{\text{ODT}}\right)\times \text{Max Process Capacity}\left(\frac{\text{ODT}}{\text{hr}}\right)$$

$$= \left(\frac{0.0185\text{ lb}}{\text{ODT}}\right)\times\left(\frac{50\text{ ODT}}{\text{hr}}\right)$$

$$= 0.93\frac{\text{lb}}{\text{hr}}$$

Emissions of all other HAP were calculated using AP-42 emission factors. Rotary dryer emission factors in lb/ODT were obtained from AP-42 Chapter 10.6-1 – *Wood Products Industry – Waferboard Oriented Strandboard*. Furnace emission factors in lb/MMBtu were obtained from AP-42 Chapter 1.6 – *External Combustion Sources Wood Residue Combustion in Boilers*. Since the emission factors are given in units of lb/ODT and lb/MMBtu, the calculation methodology is similar to those in previous sample calculations for methanol and filterable PM.

3.3 BOARD PRESS

Emissions from the board press were calculated based on stack tests, permit limits, and AP-42. Stack test data was used to calculate PM emissions from the press. In order to calculate potential emissions using stack test data, the emission rate from the test run was divided by the production rate during the test to yield an appropriate emission factor. This factor was then multiplied by a safety factor of 1.33 to account for test variability, resulting in a corrected factor. The corrected factor was then multiplied by the maximum production rate (77 MSF/hr or 50 ODT/hr) at the Commerce mill to determine a maximum potential hourly emission rate in pounds per hour. Since the stack tests for the board press were conducted at the outlet of the Durr RTO, the factors include combustion emissions from RTO fuel combustion. An example of this calculation is shown below.

Hourly PM Emissions – Press/RTO

$$\text{PM Emissions} = \frac{\text{Stack Test Emission Rate}\left(\frac{\text{lb}}{\text{hr}}\right)\times \text{Safety Factor}}{\text{Production Rate}\left(\frac{\text{unit}}{\text{hr}}\right)} \times \text{Max Process Rate}\left(\frac{\text{units}}{\text{hr}}\right)$$

$$= \frac{\left(\frac{6.25\ \text{lb}}{\text{hr}}\right)\times 1.33}{\left(\frac{63.1\ \text{MSF}}{\text{hr}}\right)} \times \left(\frac{77\ \text{MSF}}{\text{hr}}\right)$$

$$= 10.14\ \frac{\text{lb}}{\text{hr}}$$

CO, VOC, formaldehyde, methanol, and phenol emissions from the press were calculated using emission factors detailed in the Commerce Title V permit. The emission factors for CO and VOC are provided in units of lb/MSF. An example calculation is included below.

Hourly VOC Emissions - Press

$$\text{VOC Emissions} = \text{Permitted Emission Limit}\left(\frac{\text{lb}}{\text{MSF}}\right) \times \text{Maximum Process Rate}\left(\frac{\text{MSF}}{\text{hr}}\right)$$

$$= \left(\frac{0.13\ \text{lb}}{\text{MSF}}\right)\times\left(\frac{77\ \text{MSF}}{\text{hr}}\right)$$

$$= 10.01\ \frac{\text{lb}}{\text{hr}}$$

The emissions factors for formaldehyde, methanol, and phenol are all listed in the permit as a pound per hour (lb/hr) limits.

There are no permit limits or stack test data for SO_2 or HAP other than formaldehyde, methanol, and phenol. Therefore, factors from AP-42 Chapter 10.6-1 were used for these pollutants. Since these factors represent uncontrolled emissions, the Durr RTO control efficiency was applied in the calculation provided below:

Hourly Acetaldehyde Emissions – Press

$$\begin{aligned}\text{Acetaldehyde Emissions} &= \text{AP-42 Emission Factor}\left(\frac{\text{lb}}{\text{MSF}}\right) \times \text{Max Process Rate}\left(\frac{\text{MSF}}{\text{hr}}\right)\times\left(\text{1- Control Efficiency}\right)\\ &= \left(\frac{0.01\ \text{lb}}{\text{MSF}}\right)\times\left(\frac{77\ \text{MSF}}{\text{hr}}\right)\times\left(1-0.9\right)\\ &= 0.077\ \frac{\text{lb}}{\text{hr}}\end{aligned}$$

3.4 RTOs

The potential emissions of pollutants from the RTOs not included in stack test factors were estimated using emission factors from AP-42, Section 1.4. The emission factors are provided in units of pounds of emissions per million standard cubic foot of natural gas throughput (lb/MMscf). The factors were multiplied by the maximum natural gas throughput of each RTO, yielding a maximum emission rate for each RTO in lb/hr. An example calculation for the Smith RTO is shown below:

Hourly SO_2 Emissions - RTO

$$SO_2\ \text{Emissions} = \text{Emission Factor}\left(\frac{\text{lb}}{\text{MMscf}}\right)\times \text{Heat Input Rating}\left(\frac{\text{MMBtu}}{\text{hr}}\right) \div \text{Heating Value of Natural Gas}\left(\frac{\text{Btu}}{\text{scf}}\right)$$

$$\begin{aligned}&= \left(\frac{0.6\ \text{lb}}{\text{MMscf}}\right)\times\left(\frac{16\ \text{MMBtu}}{\text{hr}}\right)\div\left(\frac{1020\ \text{Btu}}{\text{scf}}\right)\\ &= 0.01\frac{\text{lb}}{\text{hr}}\end{aligned}$$

3.5 Baghouses

The design of the baghouses at the Commerce mill is not conducive to stack testing. Therefore, no stack test data is available for the mill baghouses. Emissions from the baghouses consist of PM, VOC, formaldehyde and methanol. PM emissions were calculated based on the exit grain loading rate of the baghouses using the following methodology:

Hourly PM Emissions – SC45

$$\begin{aligned}\text{PM Emissions} &= \text{Grain Loading Rate}\left(\frac{\text{gr}}{\text{scf}}\right)\times\left(\frac{1\ \text{lb}}{7{,}000\ \text{gr}}\right)\times \text{Maximum Air Flow}\left(\frac{\text{scf}}{\text{hr}}\right)\\ &= \left(\frac{0.0038\ \text{gr}}{\text{scf}}\right)\times\left(\frac{1\ \text{lb}}{7{,}000\ \text{gr}}\right)\times\left(\frac{54{,}200\ \text{scf}}{\text{min}}\right)\times\left(\frac{60\,\text{min}}{\text{hr}}\right)\\ &= 1.77\ \frac{\text{lb}}{\text{hr}}\end{aligned}$$

The VOC, formaldehyde, and methanol emissions from the baghouses were based on stack tests conducted at Huber's Broken Bow mill, which is the most representative data available. The emission factors were in provided in units of lb/MSF, which was multiplied by the maximum hourly production capacity of the Commerce mill to arrive at the hourly emissions rate. This calculation is provided as follows:

Hourly VOC Emissions – SC08

$$\begin{aligned}\text{VOC Emissions} &= \text{Stack Testing Value}\left(\frac{\text{lb of pollutant}}{\text{MSF}}\right)\times\text{Safety Factor}\ \times\text{Maximum Process Rate}\left(\frac{\text{MSF}}{\text{hr}}\right)\\ &= \left(\frac{0.126\text{ lb}}{\text{MSF}}\right)\times 1.33\times\left(\frac{77\text{ MSF}}{\text{hr}}\right)\\ &= 12.90\ \frac{\text{lb}}{\text{hr}}\end{aligned}$$

3.6 EDGE SEALING, INK BRANDING, AND STAMPING

The Material Safety Data Sheets (MSDS) and actual 2008 usages for the ink branding and stamping, as well as edge sealing materials were used to determine the VOC emission factors for the edge sealing and ink application process. To determine the factors, the total emissions from sealant usage in 2008 was multiplied by the weighted average %VOC content and divided by the total production in MSF/yr for the 2008 calendar year. The resulting factor for VOC emissions in units of lb/MSF was then used in conjunction with the maximum production rates, both hourly and annual, to calculate the hourly and annual maximum emission rates for the ink application and edge sealing operations. An example calculation is provided below for the hourly emission rate:

Hourly VOC Emissions – Edge Sealing

$$\begin{aligned}\text{VOC Emissions} &= \frac{\text{VOC emissions}\left(\frac{\text{ton of pollutant}}{\text{yr}}\right)\times\left(\frac{2{,}000\text{ lbs}}{\text{ton}}\right)}{\text{Production Rate}\left(\frac{\text{MSF}}{\text{yr}}\right)}\times\text{Maximum Process Rate}\left(\frac{\text{MSF}}{\text{hr}}\right)\\ &= \frac{\left(\frac{9.95\text{ ton}}{\text{yr}}\right)\times\left(\frac{2{,}000\text{ lbs}}{\text{ton}}\right)}{\left(\frac{300{,}698\text{ MSF}}{\text{yr}}\right)}\times\left(\frac{77\text{ MSF}}{\text{hr}}\right)\times\left(2\text{ (Safety Factor)}\right)\\ &= 10.19\frac{\text{lb}}{\text{hr}}\end{aligned}$$

3.7 OTHER COMBUSTION

The emission factors for the emergency generator were taken from AP-42, Section 3.3 – *Gasoline and Diesel Industrial Engines*. The emissions factors for PM, CO, and non-methane hydrocarbon (NMHC) plus NO_X for the diesel-fired fire pump were taken from NSPS, Subpart IIII, Table 4 and the emission factor for SO_2 was taken from AP-42, Section 3.3 – *Gasoline and Diesel Industrial Engines*. The emission factors for the diesel-fired generator and the fire pump are based on horsepower (hp) for criteria pollutants and heat input (MMBtu/hr) for HAP. The fire pump is 225 hp and the emergency generator is 600 hp. The fire pump and emergency generator are only used in emergencies and power outages; as such, their operation is limited to less than 500 hours per year (hr/yr). An example calculation for PM emissions from the diesel fired emergency generator at the Commerce mill is provided below:

(hr/yr). An example calculation for PM emissions from the diesel fired emergency generator at the Commerce mill is provided below:

Hourly PM Emissions – Emergency Generator

$$\begin{aligned}\text{PM Emissions} &= \text{PM emissions}\left(\frac{\text{lb of pollutant}}{\text{hp}\times\text{hr}}\right)\times\text{Total Horsepower}\,(\text{hp})\\ &= \left(\frac{0.0022\text{ lbs}}{\text{hp}\times\text{hr}}\right)\times(600\text{ hp})\\ &= 1.82\ \frac{\text{lb}}{\text{hr}}\end{aligned}$$

HAP emissions from the diesel-fired fire pump were calculated based on AP-42 factors from Section 1.3, which are based on a heat input rating. The heat input for the fire pump was based on a conversion from horsepower (hp) to British thermal units (Btu) and assumed combustion efficiency of 75%. That heat input rating multiplied by the AP-42 factor yields the maximum hourly emissions, which can then be multiplied by the hours of operation to yield the maximum annual emissions. The example below shows how the maximum hourly emission rate was calculated.

Hourly Formaldehyde Emissions – Fire Pump

$$\begin{aligned}\text{Formaldehyde Emissions} &= \text{AP-42 factor}\left(\frac{\text{lbs}}{\text{MMBtu}}\right)\times(\text{hp})\times\text{Conversion}\left(\frac{\text{Btu/min}}{\text{hp}}\right)\times\left(\frac{60\,\text{min}}{\text{hr}}\right)\div\text{ Engine Efficiency}(75\%)\\ &= \left(\frac{1.18\text{E-3 lbs}}{\text{MMBtu}}\right)\times(225\text{ hp})\times\left(\frac{7{,}000\text{Btu}}{\text{hp-hr}}\right)\div\left(\frac{10^6\,\text{Btu}}{\text{MMBtu}}\right)\div(75\%)\\ &= 2.48\text{E-03}\ \frac{\text{lb}}{\text{hr}}\end{aligned}$$

The maximum hourly emission rate (calculation shown above) was multiplied by the total hours of operation for the equipment per year to calculate the annual emissions for formaldehyde from the diesel-fired fire pump. Below is an example calculation for the annual emission rate from the diesel-fired fire pump.

Annual Formaldehyde Emissions – Fire Pump

$$\begin{aligned}\text{Formaldehyde Emissions}\left(\frac{\text{ton}}{\text{yr}}\right) &= \text{Hourly Emission Rate}\left(\frac{\text{lb}}{\text{hr}}\right)\times\text{Hours of Operation}\left(\frac{\text{hr}}{\text{yr}}\right)\\ &= \left(\frac{2.48\text{E-03 lb}}{\text{hr}}\right)\times\left(\frac{500\text{ hr}}{\text{yr}}\right)\\ &= 6.20\text{E-04}\,\frac{\text{ton}}{\text{yr}}\end{aligned}$$

Detailed emission calculations for all emission units at the mill are provided in Appendix B of this application.

BACT analysis is required under the Clean Air Act (CAA), in the federal regulations implementing the PSD program, in the regulations governing federal approval of state PSD programs, and in Georgia regulations. As required in Georgia Regulation 391-3-1-.02(7)(b)(7), Huber is submitting a PSD construction and operating permit application and as such BACT must be considered for all pollutants under PSD review, which include PM_{10}, NO_X, CO, SO_2, and VOC.

4.1 BACT DETERMINATION PROCESS

In a memorandum dated December 1, 1987, the U.S. EPA stated their preference for a "top-down" analysis.[1] According to the memorandum a top-down analysis should begin by determining the most stringent control available for a source or source category. If it is shown that this level of control is technically, environmentally, or economically infeasible for the unit in question, then the next most stringent level of control should be determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections. The following paragraphs discuss the approach Huber used when completing top-down analyses for this application.

4.1.1 OVERVIEW OF BACT STEPS

Presented below are the five basic steps of a "top-down" BACT analysis procedure as identified by the U.S. EPA in the October 1990 Draft *New Source Review Workshop Manual*.[2]

STEP 1 - IDENTIFY ALL CONTROL TECHNOLOGIES

An applicant must identify the available control technologies for each emission unit in question. The following methods were used to identify potential technologies: 1) researching the Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC) database, 2) surveying regulatory agencies, 3) drawing from previous engineering experience, 4) surveying air pollution control equipment vendors, and 5) surveying available literature.

STEP 2 - ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

After the identification of available control options, the applicant can eliminate technically infeasible options. An applicant can eliminate a control option from consideration if there is a process-specific condition that prohibits the implementation of the control or if the

[1] U.S. EPA, Office of Air and Radiation. Memorandum from J.C. Potter to the Regional Administrators. Washington, D.C. December 1, 1987.

[2] U.S. EPA, Office of Air Quality Planning and Standards. *New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting*, *Draft*. Research Triangle Park, NC. October 1990.

highest control efficiency of the option results in emissions higher than any applicable regulatory limits, such as a NSPS.

STEP 3 - RANK REMAINING CONTROL TECHNOLOGIES BY CONTROL EFFECTIVENESS

After the applicant removes technically infeasible options from consideration, the applicant ranks the remaining options based on their control effectiveness. If there is only one remaining option, or if all of the remaining technologies achieve equivalent control efficiencies, ranking based on control efficiency is not required.

STEP 4 – EVALUATE THE MOST EFFECTIVE CONTROLS AND DOCUMENT RESULTS

Beginning with the most efficient control option in the ranking, the applicant should perform detailed economic, energy, and environmental impact evaluations. If a control option is determined economically feasible without adverse energy or environmental impacts, it is not necessary to evaluate the remaining options with lower control efficiencies.

The economic evaluation centers on the cost effectiveness of the control option. The applicant estimates and annualizes the costs of installing and operating control technologies following the methodologies outlined in the U.S. EPA's *OAQPS Control Cost Manual* (CCM)[3] and other industry resources. Cost effectiveness is expressed in dollars per ton of pollutant controlled. The applicant also completes objective analyses of energy and environmental impacts associated with each option.

STEP 5 - SELECT BACT

In the final step, the applicant proposes one pollutant specific control option and resulting emission limitation as BACT for each emission unit under review. These recommendations are based on evaluations from the previous step.

The technical aspect of a BACT evaluation is a fairly objective process. The same cannot be said for the economic feasibility. The definition of the limit of economic feasibility is the level at which the annual cost of owning and operating a control device or technology per ton of pollutant removed is considered an economic burden (infeasible). The actual monetary amount at which a control is considered infeasible varies on a case-by-case basis as determined by EPD.

4.1.2 ECONOMIC ANALYSIS

The applicant performs economic analyses to compare total costs (capital and annual) for potential control technologies as appropriate. Capital costs include the initial cost of the components intrinsic to the complete control system. Operating costs include the financial

[3] U.S. EPA, Office of Air Quality Planning and Standards. *OAQPS Control Cost Manual*, 6th edition. EPA 452/B-02-001. Research Triangle Park, NC. January 2002.

requirements to operate the control system on an annual basis. Annual operating costs include overhead, maintenance, outages, raw materials, and utilities.

The basis capital cost estimating technique is a factored method of determining direct and indirect installation costs. This technique is a modified version of the Lang Method whereby installation costs are expressed as a function of known equipment costs. This method is consistent with the latest U.S. EPA guidance manual on estimating control technology costs.[4]

Total purchased equipment cost represents the delivered cost of the control equipment, auxiliary equipment, and instrumentation. Auxiliary equipment consists of all the structural, mechanical and electrical components required for efficient operation of the device. The applicant estimates auxiliary equipment costs as a straight percentage of the basic equipment cost obtained directly from representative vendors. Direct installation costs consist of the direct expenditures for materials and labor for site preparation, foundations, structural steel, erection, piping, electrical, painting, and facilities.[5] Indirect installation costs include engineering and supervision of contractors, construction and field expenses, construction fees, and contingencies.[6] Other indirect costs include equipment startup, performance testing, working capital, and interest during construction.

Annualized costs consist of direct and indirect operating costs. Direct annual costs include labor, maintenance, replacement parts, raw materials, utilities, and waste disposal. Indirect operating costs include plant overhead, taxes, insurance, general administration, and capital charges. A typical estimation of labor supervision cost is 15% of operating labor cost. Raw material costs are estimated based upon the unit cost and annual consumption. Typically an applicant calculates the indirect operating costs, with the exception of overhead, as a percentage of the total capital costs. T capital recovery factor (CRF) is the basis for calculating indirect operating costs, and is defined as:

$$CRF = \frac{i(1+i)^n}{(1+i)^n - 1}$$

where *i* is the annual interest rate and *n* is the equipment life in years. The economic life of a control system is typically 10 to 20 years. For example, a 10-year equipment economic life with an average interest rate of 9.75 percent results in a CRF of 0.1610. Huber projects the economic life of proposed equipment to be 10 years based upon the time to upgrade equipment at existing mills owned by the company. Internal Revenue Service General Depreciation System for wood products is seven years; therefore, a ten year depreciation of equipment life is conservative. For the purposes of this application, Huber has conservatively estimated a seven percent interest rate for the CRF. This interest rate is based on the EPA's seven percent social interest rate from the CCM. Huber estimates

[4] U.S. EPA, Office of Air Quality Planning and Standards. *OAQPS Control Cost Manual*, 6th edition. EPA 452/B-02-001. Research Triangle Park, NC. January 2002.

[5] Ibid.

[6] Ibid.

utility costs of $0.0730 per kilowatt hour (kW-hr)[7] and a natural gas cost of $11.60 per dekatherm[8].

4.2 BACT APPLICABILITY

Huber has performed BACT review on the units and pollutants listed in Table 4-1. Any process unit not listed in the table is considered a relatively small source of emissions and is omitted from the "top-down" BACT analysis. In lieu of a "top-down" analysis, a RBLC comparison is performed.

TABLE 4-1. UNITS AND POLLUTANTS REQUIRING A TOP-DOWN BACT ANALYSIS

	Pollutant [1]				
Unit Description	**NO_X**	**CO**	**PM_{10}**	**SO_2**	**VOC**
Wood Fired Furnace [2]	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Dryers [2]	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Dry Screening and Bin & Blending	NA	NA	**Yes**	NA	**Yes**
Forming	No	NA	**Yes**	NA	**Yes**
Press	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Finishing	NA	NA	**Yes**	NA	**Yes**
Ink Branding and Stamping	NA	NA	NA	NA	**Yes**

1. "NA" indicates no emissions of this pollutant from the specified source(s).
2. The wood fired furnace and dryers are routed to a common manifold and exhaust to three separate RTO stacks (SRTO, HRTO, and PRTO). The units are evaluated separately for BACT in order to match the results of the RBLC database search.

The storage vessels have emissions of less than 7 tpy of VOC pollutants. Given the small quantity of emissions, the use of add-on controls is cost prohibitive for these units. RBLC entries for similar storage vessels show good design/operation as BACT. From this information, Huber proposes good design/operation as BACT for the storage vessels for regulated pollutants.

The edge sealing operations have emissions of less than 7 tpy for VOC and all other pollutants. Given the small quantity of emissions, add on controls would result in minimal emissions reductions. Therefore, the use of add-on controls is considered cost prohibitive for this unit. RBLC entries for similar operations show good design and operation as BACT for all pollutants. Based on this information, Huber proposes good design and operation as BACT for the edge sealing and ink branding operations.

The fire pump and emergency generator also have emissions less than 7 tpy of criteria pollutants when operating no more than 500 hours per year. The fire pump and emergency generator only operate intermittently for testing or emergency purposes. Therefore, use of add-on controls would be cost-prohibitive. The RBLC database provides utilization of good combustion practices as BACT for small diesel-fired sources like the emergency generator. Therefore, Huber proposes good design/operation as BACT for the fire pump and emergency generator and no further analysis is required.

[7] Cost of electricity calculated via monthly electricity bill for January 2009.
[8] Cost of natural gas calculated via monthly natural gas bill for January 2009.

Huber analyzed the units listed in Table 4-1 via the top-down approach requested by U.S. EPA. The remaining sections describe the proposed BACT resulting from "top-down" analysis.

For a complete list of emissions equipment and associated emission points, please see Table 3-1, Facility Emission Source Descriptions.

4.3 Stranding, Debarking, and Green Bins

There are no data available that quantify PM emissions from stranding, debarking, or green bin operations. It is assumed that these emissions are negligible due to the high moisture content of the wood. Furthermore, data was not available from AP-42 for PM emissions from these sources. Based upon the previously mentioned findings, Huber has not performed a top-down analysis for PM.

The stranding, debarking, and green bin operations at the Commerce mill are not enclosed; therefore, they are considered fugitive sources. Economic analysis is not required for fugitive sources. However, based on the findings from a recently permitted mill in South Carolina, Huber has determined that a top-down analysis for the stranding, debarking, and green bin equipment accordingly should be performed.

Huber has conducted an economic analysis for controlling VOC from this process. To conduct the analysis Huber explored two add-on control scenarios: biofiltration and thermal oxidation. In addition to the cost of the control equipment, controlling VOC from these sources would require that Huber enclose the area to allow the emissions to be captured by the control device. Huber's economic analysis did not include the cost of enclosing these units. Based on the economic analyses performed on these units, it was determined that enclosing the units and installing add on controls would not be cost effective. Therefore, Huber requests that this source remain fugitive and not subject to BACT.

4.4 BACT Determination for the Wellons Furnace/Dryer Exhaust

There is one wood-fired furnace at the Commerce mill, with a heat input capacity of 150 MMBtu/hr. The furnace provides heat to dry the wood strands in the three rotary dryers and to the hot oil loop. This heat is provided directly to the wood strands by routing the exhaust from the furnace through the dryers. The hot oil loop receives heat from the furnace via indirect heat exchanger. Emissions from the furnace consist primarily of PM_{10}, NO_X, CO, and SO_2.

BACT for the furnace/dryer exhausts was evaluated as a single emission source for all pollutants since these processes share airflows and exhaust through a common manifold.

4.4.1 Step 1 – Identify All Control Technologies

The first step in a BACT analysis identifying possible control technologies for each applicable pollutant based on previously demonstrated controls on comparable emissions sources. For most source types, the U.S. EPA's RBLC is the preferred reference. Table 4-2 lists commercially available controls, regardless of the industrial sector or process.

Consistent with U.S. EPA's top-down approach, Huber considered the control technologies for each pollutant in order of decreasing emission reduction potential.

TABLE 4-2. RBLC LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
NO_X	Selective Catalytic Reduction (SCR) Selective Non-Catalytic Reduction (SNCR) Water/Steam injection (WSI) Staged Combustion/Controlled Burn Flue Gas Recirculation Low NO_X Burners Reduced Air Preheat Low Excess Air Material Usage Good Design/Operation
CO	Regenerative Thermal Oxidation (RTO) Regenerative Catalytic Oxidation (RCO) Good Design/Operation
VOC	RTO RCO Biofilter Good Design/Operation
SO_2	Scrubber Good Design/Operation
PM_{10}	Baghouse Dry Electrostatic Precipitator (DESP) Wet Electrostatic Precipitator (WESP) Venturi Scrubber Good Design/Operation

4.4.2 STEP 2 – ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

The second step in a BACT analysis is eliminating any technically infeasible control technologies. Huber considers each control technology for each pollutant, and eliminates those that are clearly technically infeasible.

4.4.2.1 OXIDES OF NITROGEN

Selective Catalytic Reduction

SCR reduces NO_X by spraying ammonia over a catalyst in the presence of oxygen. On the catalyst surface, ammonia (NH_3) decomposes into NH_2 free radicals, reacts with NO_X molecules, and reduces to nitrogen and water as expressed in the following reaction:

$$2NO + 2NH_3 + \frac{1}{2}O_2 \longrightarrow 2N_2 + 3H_2O$$

The SCR process requires a reactor vessel, a catalyst, and an ammonia storage and injection system. Ammonia is a toxic substance whose storage above certain quantities requires the development of a Risk Management Plan (RMP). The presence of the catalyst effectively decreases the ideal reaction temperature for NO_X reduction to between 520 and 720 Kelvin (K) (approximately 475 and 850 degrees Fahrenheit [°F]) and increases the surface area available for NO_X reduction. As a post-combustion process, the SCR system is usually installed to receive flue gas after it has left the combustion chamber. The exact location of the SCR reactor will vary depending upon what other type of pollution control systems are also present.

The effectiveness of an SCR system is dependent on a variety of factors, including the inlet NO_X concentration, the exhaust temperature, the ammonia injection rate, the type of catalyst, and the presence of catalyst poisons, such as particulate matter and SO_2. SCR units typically achieve 70 to 90% NO_X reduction with an ammonia exhaust concentration (ammonia slip) of 5 to 10 parts per million by volume on a dry basis (ppm) at 15% oxygen.

Although SCR is a potential control technology in this BACT analysis, the use of such a system is not technically feasible for the wood fired furnace/dryer exhaust based on the following:

▲ The high particulate loading associated with the proper temperature range in the wood fired furnace reduces the number of active catalyst sites available for the reaction to occur and reduces the NO_X removal efficiency (i.e., blinds the catalyst).

▲ The alkalinity of wood ash can contaminate the catalyst and significantly reduce NO_X removal efficiency.

In wood fired operations, NO_X control efficiency and amount of ammonia slip are adversely affected due to catalyst blinding or poisoning, which is caused by the high particulate loading. Wood fired furnace fuel mixing and firing rate changes frequently to accommodate the rotary dryers' heat demand and conditions of the fuel. This would make it very difficult to optimize the ammonia injection rate. As a result, significant ammonia slip or more NO_X emissions will occur, which results in adverse environmental impacts. Therefore, the use of SCR on the wood fired furnace/dryer exhaust is not technically feasible and Huber will not consider it for the remainder of this analysis.

Selective Non Catalytic Reduction (SNCR)

SNCR reduces NO_X to molecular nitrogen (N_2) and water (H_2O) by injecting an ammonia or urea ($CO(NH_2)_2$) spray into the post-combustion area of the unit. Typically, injection nozzles are located in the upper area of the furnace and convective passes. Once injected, the urea or ammonia decomposes into NH_3 or NH_2 free radicals, reacts with NO_X molecules, and reduces to nitrogen and water. The ammonia and urea reduction equations are provided below. These reactions are endothermic and use the heat of the burners as energy to drive the reduction reaction:

$$2NO + 2NH_3 + \frac{1}{2}O_2 \longrightarrow 2N_2 + 3H_2O$$

$$2NO + CO(NH_2)_2 + \frac{1}{2}O_2 \longrightarrow 2N_2 + CO_2 + 2H_2O$$

Both ammonia and urea have been successfully employed as reagents in SNCR systems and have certain advantages and disadvantages. Ammonia is less expensive than urea and results in substantially less operating costs at comparable levels of effectiveness. Urea, however, is able to penetrate further into flue gas streams, making it more effective in larger scale burners and combustion units with high exhaust flow rates. In addition, ammonia is a toxic substance whose storage above certain quantities requires the development of a Risk Management Plan (RMP).

SNCR is considered a selective chemical process because, under a specific temperature range, the reduction reactions described above are favored over reactions with other flue gas components. Although other operating parameters such as residence time and oxygen availability can significantly affect performance, temperature remains one of the most prominent factors affecting SNCR performance.

The SNCR process requires the installation of reagent storage facilities, a system capable of metering and diluting the stock reagent into the appropriate solution, and an atomization/injection system at the appropriate locations in the combustion unit. The reagent solution is typically injected along the post-combustion section of the combustion unit. Injection sites around the unit must be optimized for reagent effectiveness and must balance residence time with flue gas stream temperature.

For ammonia, the optimum reaction temperature range is 879 to 1,100 degrees Celsius (°C) (1,615 to 2,000 °F), while optimum urea reaction temperature ranges are marginally higher at 900 to 1,150 °C (1,650 to 2,100 °F).[9] Although the overall chemistry is identical to that used in the SCR system, the absence of

[9] U.S. EPA, "Air Pollution Control Technology Fact Sheet; Selective Non-catalytic Reduction", EPA-452/F-03-031, p. 2.

a catalyst results in several differences. The un-catalyzed reaction requires a higher reaction temperature and is not as effective.

SNCR uses ammonia or urea that is introduced and mixed with the flue gas in the hot combustion zone to reduce NO_X to nitrogen, carbon dioxide, and water. This process is temperature sensitive. The reaction needs a certain minimum temperature (879 ^{0}C) to occur or the ammonia will not react. Temperatures below the temperature window cause the reduction rate to slow resulting in high ammonia slip and above the temperature window (>1,100 ^{0}C) the oxidation of ammonia to NO_X is too high, thus the process tends to produce NO_X instead of decreasing it.

Ammonia slip results in unreacted ammonia entering the dryers and directly contacting the wood flakes during the drying process. This exposure results in ammonia-based salts on the flakes which alter the pH of the flake surface and impede the bond between the resin and the flake. As a result, OSB mills are forced to increase its resin use to counter the salt effect on flake chemistry. The increase in resin use has the unfortunate result of increasing methanol and formaldehyde emissions from the forming line, and increasing NO_X formation in the RTOs since both resin generated ammonia and SNCR derived ammonia slip will be combusted in the RTOs.

Currently, only one wood products manufacturing facility appears in the RBLC utilizing SNCR for NO_X control. The facility (Homanit USA in Montgomery County, Mt. Gilead, NC) has opted to become a PSD minor facility and no longer operates the SNCR controls. In addition, the facility is a thin high-density fiberboard mill and does not produce OSB.

Huber is aware that Langboard, Quitman is a PSD minor source in Georgia that utilizes SNCR to control NO_X from its energy, drying and press areas. This system is a very unique technology in which the combustion gases do not come into contact with the flakes in the dryer. This system eliminates the need for RTOs by over sizing the combustor to accept dryer and press gases for combustion air, and destroying VOC in the process. Hot gases from the furnace go through heat exchangers to provide heat to ambient air, which is then used to dry the flakes. The combustor gases are then discharged to the atmosphere after a dry ESP. Utilizing SNCR on this system does not have any impact on the flakes, since the dryer gases never come into contact with ammonia. This Langboard system is unique and is not comparable to Huber's operations.

Huber is also aware of a PSD permitting review of Norbord's Cordele Georgia Mill where Georgia EPD acknowledged that the use of SNCR is not technically feasible while reviewing the plant expansion that included new debarkers, flakers, dryers and a wood fired furnace.[10] Like Huber, Norbord directs exhausts from the furnace to dry the flakes in the dryer.

Huber believes that ammonia slip from the SNCR system is an unavoidable consequence of operating this system. Ammonia slip will form a salt that builds up on the flake surface and has a negative impact on bond durability.

Huber is unaware of any attempts to utilize SNCR after the RTOs at a wood products facility. Temperature is thought to be the primary constraint preventing adequate NO_X reduction due to the exhaust temperatures outside the RTO combustion chamber.

Based on the information provided above, SNCR is deemed technically infeasible for direct fired dryers.

Water/Steam Injection

Water/steam injection (WSI) is not an add-on control technology. Water or steam is injected into the combustion chamber and provides thermal ballast to the combustion process. This ballast effectively lowers the combustion temperature helping to minimize thermal formation of NO_X.

Adding moisture to a system designed for drying wood wafers is counterintuitive to the purpose of the wood fired furnace and dryers. Thus, WSI is not considered a technologically feasible option for the wood fired furnace/dryer exhaust.

In addition, this technology is not identified in the RBLC database as a control alternative for similar units.

Material Usage

Nitrogen is a component of all current resin formulations used in OSB manufacturing. No non-nitrogen resins are available that are technically feasible for the OSB production process.

In 2005, the demand for MDI resin nearly exceeded the resin production capacity. This resulted in increased prices and difficulty obtaining the resin necessary to meet customer demand. Furthermore, MUPF resin is common within the wood products industry and has been incorporated in recent PSD permits for OSB mills. Since Huber's competitors use MUPF resin in their mills, Huber would be at a significant financial disadvantage and would not be able to maintain their current market share. Although MUPF resin results in the highest NO_X emissions of the resins used at the Commerce mill, economic

[10] Georgia EPD. "Prevention of Significant Air Quality Deterioration Review of Norbord Georgia OSB located in Cordele, Crisp County Georgia – Preliminary Determination". SIP Permit Application No. 15812, Title V Permit Application No. 15812, April 2005.

constraints and resin supply dynamics require Huber to have the flexibility to use this resin without limitation.

Huber acknowledges that combusting MUPF resin waste results in higher NO_X emissions when compared to alternative resins. Huber is and will continue to be mindful of the availability of other resins that have the potential to reduce or eliminate NO_X emissions. According to The New Source Review Workshop manual[11]:

Historically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives. For example, applicants proposing to construct a coal-fired electric generator, have not been required by EPA as part of a BACT analysis to consider building a natural gas-fired electric turbine although the turbine may be inherently less polluting per unit product (in this case electricity). However, this is an aspect of the PSD permitting process in which states have the discretion to engage in a broader analysis if they so desire. Thus, a gas turbine normally would not be included in the list of control alternatives for a coal-fired boiler.

Therefore, Huber wishes to use MUPF resin interchangeably so as not to be affected by resin availability restrictions, swings in resin pricing, and to reduce maintenance costs for the press. It is unlikely that the Commerce mill would use MUPF at all times, but the mill needs the flexibility to do so if necessary due to market demand and economic constraints.

4.4.2.2 CARBON MONOXIDE

Regenerative Catalytic Oxidation

RCO technology is widely used in the reduction of VOC emissions, and concurrently to reduce CO emissions. Catalytic oxidation systems employ a catalyst bed to reduce combustion temperatures to about 700 ^{o}F – 900 ^{o}F (from 1,300 ^{o}F – 1,800 ^{o}F seen in typical thermal oxidizers). RCOs utilize a ceramic bed to recapture the heat of the stream exiting the combustion zone.

RCO technology is not considered technically feasible for the wood fired furnace/dryer exhaust due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking can occur in this type of application and will significantly reduce the efficiency of the control device. Industry practice has illustrated that RCO technology has not been successfully applied to wood fired furnace and dryers.

[11] EPA Office of Air Quality Planning and Standards, <u>*New Source Review Workshop Manual.*</u> October 1990, pgs. B13-B14.

4.4.2.3 VOLATILE ORGANIC COMPOUNDS

Regenerative Catalytic Oxidation

In addition to CO control, RCO technology is widely used in the reduction of VOC emissions. As previously discussed, it is not considered technically feasible for wood fired furnace/dryer applications due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking can occur in this type of application and will significantly reduce the efficiency of the control device. Industry practice has illustrated that RCO technology has not been successfully applied to wood fired furnace or rotary-type wood chip dryers.

Biofilter

Biofiltration is a process in which living organisms are used to "consume" the VOC present in a waste stream. The microorganisms in a biofilter are highly temperature sensitive. The exhaust gases from the wood fired furnace/dryer are discharged at high flow rates with an exhaust temperature of approximately 320°F. Although a biofilter has been demonstrated as a technically feasible control option in OSB press applications, exhaust temperatures from the wood fired furnace/dryer are considerably higher than the press exhaust temperature. Exhaust temperatures in the range of the wood fired furnace/dryer would result in the death of significant portions of the active microorganisms in the biofilter. Biofilter control is therefore deemed technically infeasible on this exhaust stream and is not considered further in this BACT analysis for the wood fired furnace/dryers.

4.4.2.4 SULFUR DIOXIDE

Scrubber controls for SO_2 involve adding on either dry or wet scrubbing technology. SO_2 emissions from the energy system/dryer are approximately 10.6 lb/hr. Based upon unit exhaust rates, this corresponds to a control device inlet concentration of 25-30 ppm. This inlet concentration is comparable to most control device outlet SO_2 concentrations found in post-control exhaust streams. Therefore, the inlet concentrations are below the typical lower design limit for optimal control efficiency. The use of scrubbing technology as an add-on control is deemed to have minimal potential for SO_2 emission reduction and is not considered further in this BACT analysis.

4.4.2.5 PARTICULATE MATTER CONTROL

Baghouse

A baghouse, also referred to as a fabric filter, consists of a number of fabric bags placed in parallel. The gas stream is filtered when it passes through the bags, and PM/PM_{10} is collected on the surface of the fabric. The collected PM/PM_{10} is periodically removed from the bags to hoppers located beneath the bags. PM/PM_{10} removal from the filters is accomplished by reversing airflow or shaking the filters in an isolated compartment of the baghouse, or by short blasts of high-pressure air (pulsejet).

A baghouse can be designed to remove up to approximately 99 percent of PM/PM_{10} downstream of a primary dust collector. Baghouse efficiency is limited to dry exhaust streams at temperatures less than 1,000 ^{o}F. While the wood fired furnace/dryer exhaust has a temperature of approximately 320 ^{o}F, the exhaust contains a significant amount of moisture. The moisture content combined with the presence of condensable PM can cause "blinding" of the fabric filter. This will in turn result in lower airflow rates, greater pressure drop, and finally, reduced PM/PM_{10} control efficiency. Therefore, a baghouse is not considered technically feasible for the wood fired furnace/dryer exhaust.

4.4.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.4.2 are excluded from this step. Table 4-3 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-3. WOOD FIRED FURNACE/DRYER – REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
NO_X	Staged Combustion/Controlled Burn	40%
	Flue Gas Recirculation	40%
	Low NO_x Burners	<40%
	Reduced Air Preheat	25%
	Low Excess Air	10%
	Good Design/Operation	Base Case
CO	RTO	75%
	Good Design/Operation	Base Case
VOC	RTO	95%
	Good Design/Operation	Base Case
SO_2	Good Design/Operation	Base Case
PM_{10}	Dry Electrostatic Precipitator	95-98%
	Wet Electrostatic Precipitator	90+%
	Venturi Scrubber	50-90%
	Good Design/Operation	Base Case

4.4.4 STEP 4 – TOP-DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the “top-down” BACT approach, the highest ranked control option is evaluated first. If the highest ranked option is technically and economically feasible, and the option has acceptable energy and environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.4.4.1 OXIDES OF NITROGEN

Staged Combustion/Controlled Burn

Controlled burn is the highest ranked technology available for NO_X control on these process units. This technology is equivalent to staged combustion from a control efficiency standpoint. The Wellons furnace provides combustion air to each of four cells via two forced draft fans. Ductwork on the discharge of the forced draft fans routes air either below the fixed grates (under fire air, or UFA) or above the grate in the flame zone (over fire air, or OFA). OFA is split into a manifold and is introduced to the cell via "tweeter" holes that extend through the refractory into the combustion zone. UFA is introduced at a single inlet under the grate on each cell. The split between UFA and OFA can be adjusted using dampers, allowing optimal combustion and minimal fuel carryover to the dryers.

Huber is proposing the use of controlled burn technology on the wood fired furnace (WBNR). The controlled burn procedure achieves a similar level of control to staged combustion (~40%). Therefore, controlled burn is the highest rated of the remaining control technologies, and no further options are evaluated.

4.4.4.2 CARBON MONOXIDE

Regenerative Thermal Oxidation
An RTO has the highest control efficiency for CO and therefore, according to the top down approach, must be considered first. Huber has determined that the use of RTO technology is both technically feasible and cost effective at the facility, and is proposing the use of RTO technology on the wood fired furnace/dryer exhaust. Therefore, no further analysis is required for CO.

4.4.4.3 VOLATILE ORGANIC COMPOUNDS

Regenerative Thermal Oxidation
An RTO control device is the highest ranked technology available for VOC control on this process unit. RTO technology is widely used in the reduction of VOC emissions at wood products facilities. Huber is proposing the use of RTOs as BACT for VOC control on the wood fired furnace/dryers.

Huber proposes a 90% reduction of VOC emissions for the furnace/dryers. This reduction percentage is consistent with the new source control efficiency required in the PCWP MACT. Based on previous stack tests data and process knowledge, Huber believes that three RTOs will have to operate at all times, using a fourth RTO as a swing, to achieve VOC destruction efficiency of 95%. This would allow for longer residence times while accommodating the current airflow from the process. Two RTOs cannot reach 95% destruction efficiency at the maximum sustainable operating temperature of the RTOs. Huber performed an economic feasibility analysis and determined that the incremental cost of reducing VOC emissions from 90% using two RTOs with one back-up to 95% using three RTOs with one back-up was not justified. An analysis of incremental cost effectiveness is completed as part of a BACT analysis in order to evaluate a control technology as compared to the next most stringent control option. The abbreviated economic analysis provided in Table D-29 of Appendix D shows the annual cost of electricity and natural gas for each operating scenario. One scenario requires the simultaneous operation of three RTOs and the other scenario requires the operation of only two RTOs. Using the annual cost of electricity and natural gas, the incremental cost to achieve 95% control is not justified. Huber also developed complete top-down analyses including capital costs, which are included in Appendix D, Tables D-25 through D-28.

According to EPA's New Source Review Workshop Manual, incremental and top-down economic analyses should be considered concurrently when evaluating BACT.[12]

In addition to the average cost effectiveness of a control option, incremental cost effectiveness between control options should also be calculated. The incremental cost effectiveness should be examined in combination with the total cost effectiveness in order to justify elimination of a control option.

The manual goes on to state the following:

A comparison of incremental costs can also be useful in evaluating the economic viability of a specific control option over a range of efficiencies. For example, depending on the capital and operational cost of a control device, total and incremental cost may vary significantly (either increasing or decreasing) over the operation range of a control device.

In accordance with the New Source Review Workshop Manual guidance, Huber has provided both incremental and top-down economic analyses to demonstrate that the installation of new RTOs and increase to 95% control efficiency are economically infeasible.

4.4.4.4 SULFUR DIOXIDE

Good Design/Operation
Good design and operation is the only feasible control technology remaining in the analysis for SO_2. As such, no further analysis is required and Huber proposes good design and operations as BACT for the furnace and dryers.

4.4.4.5 PARTICULATE MATTER

Dry Electrostatic Precipitators
Dry electrostatic precipitators (DESP) are used in industry to control PM/PM_{10} emissions from process units with an average emission control efficiency of approximately 95-98%. DESP technology induces a charge on the particles in an exhaust stream. The charged particles are then collected onto oppositely charged electrodes where they are held until the electrodes are cleaned.

Cleaning is accomplished by "rapping" the electrodes and allowing the particles to fall into a collector below the electrodes. During rapping, a certain amount of collected particles re-enter the exiting exhaust stream.

[12] EPA Office of Air Quality Planning and Standards, *New Source Review Workshop Manual.* October 1990, pgs. B41, B43.

When handling streams with high adhesive content, like that of a rotary dryer operation, the adhesion results in “sticky” particles adhering to the electrode walls, requiring increased “rapping force” to clean them. Increased rapping leads to increased re-entrainment of particles and lowers the effectiveness of a DESP. Despite this decreased effectiveness, Huber’s Easton facility uses a DESP to control particulate emissions. Therefore an economic analysis was performed for the use of a DESP to control PM emissions from the dryers and furnace.

WESP

The WESP control device is the highest ranked technology remaining for PM/PM_{10} control on this process unit. Huber is proposing the use of WESPs prior to the RTOs on the wood fired furnace/dryers. As the highest rated of the remaining control devices, no further options are evaluated.

4.4.5 STEP 5 – SELECT BACT FOR FURNACE/DRYER SYSTEM

Step 5 is the selection of a BACT control strategy and emission limit for each unit and pollutant. The selected control technologies are those remaining from Step 4, and emission limits are proposed using data presented in Section 3 of this report (Facility Emissions).

An RTO is considered BACT for CO and VOC. Huber is aware that RTOs emit higher levels of carbon dioxide (CO_2) than other CO and VOC control methods, and while an RTO is BACT for CO and VOC at this time, Huber could reevaluate BACT if CO_2 becomes a regulated pollutant. WESPs are considered BACT for PM_{10}, and good design/operation is considered BACT for SO_2. Huber proposes the use of good design/operation as BACT for SO_2, WESPs as BACT for control of PM_{10}, and RTOs as BACT for control of CO and VOC. Huber proposes controlled burn as BACT for the wood fired furnace, as well as the use of low NO_X burners in the RTOs. The proposed BACT is consistent with similar entries in the RBLC database.

Huber completed an incremental analysis to determine the cost effectiveness of 90% control efficiency vs. 95% control efficiency for the wood fired furnace and dryers. Theoretically, operating three RTOs to achieve 95% destruction efficiency would require a large increase in fuel usage as compared to operating two RTOs. Huber performed an economic analysis of the additional emissions destruction and additional heat input costs, which proved that 95% control is economically infeasible. Huber has determined that this incremental cost is economically infeasible and is requesting a permit limit of 90% control on the RTOs.

4.5 BACT DETERMINATION FOR OSB PRESS VENT

The press has an OSB processing capacity of 77 MSF/hr and 674,520 MSF/yr. The wood fired furnace provides indirect heat to the press via a hot oil loop. VOC and PM emissions are emitted from the OSB press through an RTO during pressing operations; there are also NO_X and CO emissions from the press through the RTO.

4.5.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with previous analyses, the first step in the BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. Table 4-4 lists commercially available controls, regardless of the industrial sector or process.

Emissions of NO_X generated by the press (without any form of add-on control) stem from the resin formulation used during the board making process. Accordingly, the only method by which the NO_X emitted directly from the press could be controlled would be to reformulate the resins. NO_X control technology designed for combustion control is not appropriate for this application and is not considered in this BACT analysis.

TABLE 4-4. RBLC LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
NO_X	Material Usage Good Operating Practices
CO	RCO / RTO Good Operating Practices
PM_{10}	Baghouse Dry Electrostatic Precipitator (DESP) Wet Electrostatic Precipitator (WESP) Venturi Scrubber Good Design/Operation
VOC	RTO / RCO Biofilter Good Design/Operation

4.5.2 STEP 2 – ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

4.5.2.1 OXIDES OF NITROGEN

Material Usage

At present, current resin technology has nitrogen present to a degree in all available products. While Huber is mindful of the availability of other resins that have the potential to reduce or eliminate NO_X emissions, no non-nitrogen resins are available that are technically feasible for the production process. Although MUPF resin results in the highest NO_X emissions of the resins used at the Commerce mill, economic constraints and customer demand require Huber to have the flexibility to use this resin without limitation. The use of this resin is common within the wood products industry and has been incorporated in recent PSD permits for OSB mills.

4.5.2.2 PARTICULATE MATTER

Baghouse
A baghouse can remove up to 99 percent of PM/PM_{10} downstream of a primary dust collector. However, the waxes and resins used in the board have the potential to blind the baghouse filters. Blinding of the filters results in lower airflow rates, greater pressure drop, and reduced PM/PM_{10} control efficiency. Although a baghouse is effective at PM control in this context, it would only be able to operate for a short period of time until the bags are blinded. As a result, the use of a baghouse is considered technically infeasible for the press vent.

Dry Electrostatic Precipitator
A DESP on an OSB press must accommodate the presence of adhesive particles in the exhaust airstream. The increased "rapping" needed to clean the dry ESP of resins/waxes and requisite air stream conditioning would necessitate retrofit modifications to process equipment that are deemed technically infeasible. Therefore, the dry ESP is no longer considered in this BACT analysis.

4.5.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.5.2 are excluded from this step. Table 4-5 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. <u>These values are provided for informational and ranking purposes only</u>. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-5. OSB PRESS - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
NO_X	Good Operating Practices	Base Case
CO	RTO/RCO Good Operating Practices	75% Base Case
PM_{10}	Wet Electrostatic Precipitator Venturi Scrubber Good Design/Operation	80+% 50-90% Base Case
VOC	RTO /RCO Biofilter Good Design/Operation	95% 70% Base Case

4.5.4 Step 4 – Top Down Evaluation of Control Options

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible, and the option does not have unacceptable energy and adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.5.4.1 Nitrogen Oxides

Good Operating Practices

Huber proposes good operating practices as BACT for emissions of NO_X from the press, as it is the remaining control technology. It behooves Huber to efficiently utilize resins in order to maintain low operating expenses. By using resin efficiently, Huber will reduce NO_X emissions resulting from the combustion of MUPF resin.

4.5.4.2 Carbon Monoxide

RTO/RCO

The RTO is the highest ranked of the remaining control technologies for CO emissions. Huber currently operates an RTO for control of CO and VOC from the press. Therefore, Huber proposes the use of an RTO as BACT for CO.

4.5.4.3 Volatile Organic Compounds

RTO/RCO

The RTO is the highest ranked of the remaining control technologies for VOC emissions. Huber currently operates an RTO for control of CO and VOC from the press, which has 90% destruction efficiency. This RTO cannot reach 95% control. This is a similar scenario to the furnace and dryers at the Commerce mill, for which Huber performed an incremental analysis to prove the economic infeasibility of operating at 95% DRE. Since the VOC concentration in the press exhaust is less than in the furnace and dryer exhaust streams, an incremental analysis would have a similar result to the previous analysis performed on the furnace and dryer exhausts and show that increasing to 95% is cost prohibitive. Therefore, Huber proposes 90% control with an RTO as BACT for VOC.

4.5.4.4 Particulate Matter

WESP

The PM emissions from the press are not used as fuel for the wood fired furnace at the facility. Since the PM from the press is not used for furnace fuel, the use of a WESP would not impact the current fuel supply to the furnace and is considered technically feasible. A top-down economic analysis was completed using a WESP for PM control from the press. This analysis is provided in Appendix D, Tables D-30 and D-31. The result of the top-down analysis showed that installing a WESP would be economically infeasible as the PM emissions from the press are very low when compared to the flow of air out of the press (81,537 acfm). Due to the high cost of operating a WESP to control PM from the press, no further analysis of this control is required.

Venturi Scrubber

The next highest rated control is a Venturi scrubber, which is capable of achieving between 50 to 90% control depending upon particle size and inlet concentration. While technically feasible, the use of a Venturi scrubber is deemed environmentally infeasible for various reasons. Implementation of a Venturi scrubber would require significant additional quantities of fresh water, water disposal facilities (i.e., retention ponds) and, given the nature of OSB manufacturing, necessitate its handling as industrial waste. As a result of these additional adverse environmental impacts, a Venturi scrubber is eliminated from consideration as BACT.

4.5.5 STEP 5 – SELECT BACT FOR OSB PRESS

Step 5 is the selection of a BACT control strategy and emission limit for each unit and pollutant. The selected control technologies are those remaining from Step 4, and emission limits are proposed using data presented in Section 3 of this report (Facility Emissions).

An RTO is considered BACT for CO and VOC. Huber is aware that RTOs emit higher levels of carbon dioxide (CO_2) than other control methods, and while an RTO is BACT for CO and VOC at this time, Huber could reevaluate BACT if CO_2 becomes a regulated pollutant. Huber proposes good operating practice as BACT for control of PM_{10}, and NO_X. It behooves Huber to use resins efficiently in the process in order to maintain low operating costs. The proposed BACT is consistent with similar entries in the RBLC database.

4.6 BACT DETERMINATION FOR DRY SCREENING AND BLENDING

Dried strands from the dryers are screened to separate the fines from the strands and are stored in dry storage bins. The dry screening and blending operations result in emissions of PM and VOC. The dried strands are metered out of the dry strand storage bins onto weigh belts which control the amount of resin and wax added to one of two blenders. In the blenders, resin and wax are atomized to ensure even distribution.

4.6.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with the previous analyses, the first step in this BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. The list of commercially available control technologies as provided in Table 4-6 for PM_{10} and VOC is utilized for initial consideration.

TABLE 4-6. LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
PM_{10}	Baghouse Dry Electrostatic Precipitator (DESP) Wet Electrostatic Precipitator (WESP) Venturi Scrubber Multiclones Good Design/Operation
VOC	RTO RCO Biofilter Good Design/Operation

4.6.2 STEP2 – ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

4.6.2.1 PARTICULATE MATTER

WESP

The PM emissions that are collected from the dry screening and blending operations are used as fuel for the wood fired furnace at the facility. The use of a WESP would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a WESP to control dry screening and blending emissions is considered technically infeasible.

Venturi Scrubber

The PM emissions that are collected from the dry screening and blending operations are used as fuel for the wood fired furnace at the facility. The use of a Venturi scrubber would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a Venturi scrubber to control dry screening and blending emissions is considered technically infeasible.

4.6.2.2 VOLATILE ORGANIC COMPOUNDS

Regenerative Thermal Oxidation

Installation of a standalone RTO downstream of a baghouse/fabric filter is considered technically infeasible in wood products operations, which has high particulate loading. Having an RTO installed downstream from a baghouse poses a serious fire risk, as a rupture of the baghouse would force a very large amount of wood particulate into the RTO. As such the use of an RTO in combination with a baghouse is not technically feasible.

As previously discussed, it might be theoretically possible from a technical engineering standpoint to utilize an alternate particulate control technology such as a wet electrostatic precipitator or dry electrostatic precipitator for gas stream conditioning between a baghouse and an RTO to ensure PM control is maintained in the event of a baghouse rupture. Installing a WESP or DESP after the baghouse, prior to the RTO would allow the owner or operator to recover the dust from the baghouse and still achieve VOC destruction. These combinations of particulate controls and an RTO are considered technically feasible and will be examined further.

Regenerative Catalytic Oxidation

Installation of a standalone RCO is not considered technically feasible for the dry screening and blending exhaust due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking could occur if there was a baghouse failure. However, if a DESP or WESP was installed between the baghouse and RCO the DESP or WESP would provide sufficient protection of the catalyst in the event of a baghouse malfunction. Therefore, this combination of an RCO and DESP or WESP is considered technically feasible and will be examined further in this BACT analysis.

4.6.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.6.2 are excluded from this step. Table 4-6 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-7. DRY SCREENING AND DRY STORAGE - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
PM_{10}	Baghouse/Fabric Filter (for PM control from existing baghouses only)	99%
	Dry ESP	95%
	Multiple Cyclones	60%
	Good Design/Operation	Base Case
VOC	WESP/DESP + RTO/RCO	95%
	WESP/DESP + RTO/RCO	95%
	Biofilter	70%
	Good Design/Operation	Base Case

4.6.4 STEP 4 – TOP DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible, and the option does not have unacceptable energy and adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.6.4.1 PARTICULATE MATTER

Baghouse/Fabric Filter
The baghouse/fabric filter control device is the highest ranked technology remaining for PM_{10} control on the dry screening and blending operations. Huber proposes the use of baghouses as BACT for PM_{10} emissions and product recovery for beneficial fuel use from the dry screening and blending operations.

4.6.4.2 VOLATILE ORGANIC COMPOUNDS

WESP/RTO or DESP/RTO
An RTO would be an effective control device for VOC. As previously mentioned in Section 4.6.2.2, the RTO would pose a serious fire risk unless a WESP or DESP was installed between the baghouse and the RTO. The installation of the WESP and DESP after the baghouse would allow the RTO to control VOC emissions from the baghouse without introducing a fire hazard. The WESP or DESP essentially serves as a buffer between the baghouse and RTO in the event of a rupture in the baghouse. This combination was evaluated

for reducing VOC emissions from the dry screening and blending operations. Huber completed an abbreviated economic analysis conservatively assuming zero capital costs for the project. The cost effectiveness for annual operating costs of an RTO alone to control VOC emissions from the dry screening and blending operations is provided in Appendix D, Table D-11. The value provided is not economically feasible. This option was excluded prior to examining the capital cost of installing an RTO and WESP or DESP based on an abbreviated analysis using operating costs of an RTO alone, any costs for installing and operating a WESP or DESP would be in addition to those accounted for in the current analysis. Since the existing RTOs at the facility do not have the capacity to accommodate the airflow from the dry screening and blending equipment, a detailed economic analysis would include the capital costs for one RTO to accommodate the 50,000 acfm exhaust flow rate and one WESP or DESP to serve as a buffer between the baghouse and the RTO. However, since the abbreviated economic analysis shows that this option is economically infeasible based on annual operating costs alone, no further analysis is required.

WESP/RCO or DESP/RCO
An RCO and an RTO have the same control efficiency, and an RCO operates at a lower temperature than an RTO. However, the operational cost of an RCO is higher than the operational cost of an RTO due to the high cost of catalyst. Since an RTO has a lower operating cost than an RCO and an RTO has already been determined to be economically infeasible, an RCO is also considered economically infeasible, no further analysis is required.

Biofilter
Biofilters are an effective control device for VOC emissions. Biofilter control technology was evaluated for reducing VOC emissions from the dry screening and blending equipment. The cost of installing and operating a biofilter for VOC control on the dry screening and blending operations, as provided in Appendix D, Table D-18, is economically infeasible. A detailed economic analysis is included in Appendix D tables D-17 and D-18.

Good Design/Operation
The RBLC database contains several entries for material handling operations, which provide good design/operation as BACT for VOC. Thus, Huber proposes good design/operation as BACT for these sources.

4.6.5 STEP 5 – SELECT BACT

Huber proposes baghouses as BACT for the dry screening and blending equipment PM_{10} emissions. Due to the economic infeasibility of VOC controls, Huber proposes good design/operation as BACT for VOC from the dry screening and blending operation. This BACT proposal is consistent with other entries in the RBLC database for similar units at

OSB mills. The proposed BACT emission limits are provide in Table 4-13, at the end of this section.

4.7 BACT DETERMINATION FOR FORMING

After blending, the resinated strands are conveyed to distribution bins located at the mat forming line just before the press. After being distributed onto the mat forming line the mats are cut to length by the forming line saw. Any mats that are rejected are dropped into the mat reject bin and recycled. The forming process results in emissions of VOC and PM, as well as formaldehyde and methanol.

4.7.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with the previous analyses, the first step in this BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. The same list of commercially available control technologies as presented in Table 4-6 for PM_{10} and VOC is utilized for initial consideration.

4.7.2 STEP 2 – ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

4.7.2.1 PARTICULATE MATTER

WESP

The PM emissions that are collected from the forming operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a WESP would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a WESP to control forming emissions is considered technically infeasible.

Venturi Scrubber

The PM emissions that are collected from the forming operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a Venturi scrubber would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a Venturi scrubber to control forming emissions is considered technically infeasible.

4.7.2.2 VOLATILE ORGANIC COMPOUNDS

Regenerative Thermal Oxidation

Installation of a standalone RTO downstream of a baghouse/fabric filter is considered technically infeasible in wood products operations, which has high particulate loading. Having an RTO installed downstream from a baghouse poses a serious fire risk, as a rupture of the baghouse would force a very large amount of wood particulate into the RTO. As such the use of an RTO in combination with a baghouse is not technically feasible.

As previously discussed, it might be theoretically possible from a technical engineering standpoint to utilize an alternate particulate control technology such as a wet electrostatic precipitator for gas stream conditioning between a baghouse and an RTO to ensure PM control is maintained in the event of a baghouse rupture. Installing a WESP or DESP after the baghouse, prior to the RTO would allow the owner or operator to recover the dust from the baghouse and still achieve VOC destruction. These combinations of particulate controls and an RTO are considered technically feasible and will be examined further.

Regenerative Catalytic Oxidation

Installation of a standalone RCO is not considered technically feasible for the dry screening and blending exhaust due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking could occur if there was a baghouse failure. However, if a DESP or WESP was installed between the baghouse and RCO the DESP or WESP would provide sufficient protection of the catalyst in the event of a baghouse malfunction. Therefore, this combination of an RCO and DESP or WESP is considered technically feasible and will be examined further in this BACT analysis.

4.7.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.7.2 are excluded from this step. Table 4-8 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-8. FORMING - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
PM_{10}	Baghouse/Fabric Filter (for PM control from existing baghouses only)	99%
	Dry ESP	95%
	Multiple Cyclones	60%
	Good Design/Operation	Base Case
VOC	WESP/DESP + RTO/RCO	95%
	WESP/DESP + RTO/RCO	95%
	Biofilter	70%
	Good Design/Operation	Base Case

4.7.4 STEP 4 – TOP DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible, and the option does not have unacceptable energy and adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.7.4.1 PARTICULATE MATTER

Baghouse/Fabric Filter
The baghouse/fabric filter control device is the highest ranked technology remaining for PM_{10} control on the forming operations. Huber proposes the use of a baghouse as BACT for PM_{10} emissions and product recovery for beneficial fuel use from the forming operations.

4.7.4.2 VOLATILE ORGANIC COMPOUNDS

WESP/RTO or DESP/RTO
An RTO would be an effective control device for VOC. As previously mentioned in Section 4.7.2.2, an owner or operator would have to combine the RTO with a WESP or DESP to control VOC emissions from the baghouse. The WESP or DESP essentially serves as a buffer between the baghouse and RTO in the event of a rupture in the baghouse. This combination was evaluated for reducing VOC emissions from the dry screening and blending operations. Huber completed an abbreviated economic analysis conservatively assuming zero capital costs for the project. The cost effectiveness for annual operating costs of an RTO alone to control VOC emissions from the forming operations is provided in Appendix D, Table D-12. The value provided is not economically feasible. Huber completed an abbreviated analysis using operating costs alone to eliminate this option economically prior to analyzing the capital costs of installing an RTO to accommodate the exhaust streams. Since the existing RTOs at the facility do not have the capacity to accommodate the airflow from the blending, forming, and finishing equipment, a detailed economic analysis would include the capital costs for an RTO to accommodate the 54,200 acfm exhaust flow rate. Also, Huber would have to install a WESP or DESP to serve as a buffer between the baghouse and the RTO. However, since the abbreviated economic analysis shows that this option is economically infeasible based on annual operating costs alone, no further analysis is required.

WESP/RCO or DESP/RCO
An RCO and an RTO have the same control efficiency, and an RCO operates at a lower temperature than an RTO. However, the operational cost of an RCO is higher than the operational cost of an RTO due to the high cost of catalyst.

Since an RTO has a lower operating cost than an RCO and an RTO has already been determined to be economically infeasible, an RCO is also considered economically infeasible, no further analysis is required.

Biofilter
Biofilters are an effective control device for VOC emissions. Biofilter control technology was evaluated for reducing VOC emissions from the forming equipment. The cost of installing and operating a biofilter for VOC control on the forming operations, as provided in Appendix D, Table D-20, is economically infeasible. A detailed economic analysis is included in Appendix D tables D-19 and D-20.

Good Design/Operation
The RBLC database contains several entries for material preparation operations, which provide good design/operation as BACT for VOC. Thus, Huber proposes good design/operation as BACT for these sources.

4.7.5 STEP 5 – SELECT BACT

Huber proposes baghouses as BACT for the forming equipment PM_{10} emissions. Due to the economic infeasibility of VOC controls, Huber proposes good design/operation as BACT for VOC from the forming operations. This BACT proposal is consistent with other entries in the RBLC database for similar units at OSB mills. The proposed BACT emission limits are provide in Table 4-13, at the end of this section.

4.8 BACT DETERMINATION FOR TRIM AND GRADE EQUIPMENT

From the press unloader system, individual master panels are fed to the finishing end through a series of conveyors. The master panels are trimmed to size, sanded, stacked, edge sealed, branded, and strapped for shipment. The trim and grade operations make up the first half of the finishing operations and result in emissions of PM_{10} and VOC.

4.8.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with the previous analyses, the first step in this BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. The same list of commercially available control technologies as previously described in Table 4-9 for PM_{10} and VOC is utilized for initial consideration.

TABLE 4-9. RBLC LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
PM_{10}	Baghouse Dry Electrostatic Precipitator (DESP) Wet Electrostatic Precipitator (WESP) Venturi Scrubber Multiple Cyclones Good Design/Operation
VOC	RTO RCO Biofilter Good Design/Operation

4.8.2 STEP 2 ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

4.8.2.1 PARTICULATE MATTER

WESP

The PM emissions that are collected from the trim and grade operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a WESP would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a WESP to control PM emissions is considered technically infeasible.

Venturi Scrubber

The PM emissions that are collected from the trim and grade operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a Venturi scrubber would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a Venturi scrubber to control trim and grade emissions is considered technically infeasible.

4.8.2.2 VOLATILE ORGANIC COMPOUNDS

Regenerative Thermal Oxidation

Installation of a standalone RTO downstream of a baghouse/fabric filter is considered technically infeasible in wood products operations, which has high particulate loading. Having an RTO installed downstream from a baghouse poses a serious fire risk, as a rupture of the baghouse would force a very large amount of wood particulate into the RTO. As such the use of an RTO in combination with a baghouse is not technically feasible.

As previously discussed, it might be theoretically possible from a technical engineering standpoint to utilize an alternate particulate control technology such as a wet electrostatic precipitator for gas stream conditioning between a baghouse and an RTO to ensure PM control is maintained in the event of a baghouse rupture. Installing a WESP or DESP after the baghouse, prior to the RTO would allow the owner or operator to recover the dust from the baghouse and still achieve VOC destruction. This combination of a particulate controls and an RTO is considered technically feasible and will be examined further.

Regenerative Catalytic Oxidation

Installation of a standalone RCO is not considered technically feasible for the dry screening and blending exhaust due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking could occur if there was a baghouse failure. However, if a DESP or WESP was installed between the baghouse and RCO the DESP or WESP would provide sufficient protection of the catalyst in the event of a baghouse malfunction. Therefore, this combination of an RCO and DESP or WESP is considered technically feasible and will be examined further in this BACT analysis.

4.8.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.8.2 are excluded from this step. Table 4-10 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-10. TRIM AND GRADE EQUIPMENT - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
PM_{10}	Baghouse/Fabric Filter (for PM control from existing baghouses only)	99%
	Dry ESP	95%
	Multiple Cyclones	60%
	Good Design/Operation	Base Case
VOC	WESP/DESP + RTO/RCO	95%
	WESP/DESP + RTO/RCO	95%
	Biofilter	70%
	Good Design/Operation	Base Case

4.8.4 STEP 4 – TOP-DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible, and the option does not have unacceptable energy and adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.8.4.1 PARTICULATE MATTER

Baghouse/Fabric Filter

The baghouse/fabric filter control device is the highest ranked technology remaining for PM_{10} control on the trim and grade operations. Huber proposes the use of a baghouse as BACT for PM_{10} emissions and product recovery for beneficial fuel use from the trim and grade operations.

4.8.4.2 VOLATILE ORGANIC COMPOUNDS

WESP/RTO or DESP/RTO

An RTO would be an effective control device for VOC. As previously mentioned in Section 4.8.2.2, an RTO requires an upstream PM control device, such as a WESP or DESP, to reduce the risk of a fire. The WESP or DESP essentially serves as a buffer between the baghouse and RTO in the event of a rupture in the baghouse. This combination was evaluated for reducing VOC emissions from the dry screening and blending operations. Huber completed an abbreviated economic analysis assuming that the baghouse would be routed to an existing WESP or DESP and RTO. The cost effectiveness for annual operating costs of an RTO alone to control VOC emissions from the trim and grade operations is provided in Appendix D, Table D-10. The value provided is not economically feasible. An abbreviated economic analysis proves this option economically infeasible prior to examining the capital cost of installing an RTO to accommodate the exhaust stream or routing the emissions to an existing RTO. Since the existing RTOs at the facility do not have the capacity to accommodate the airflow from the trim and grade equipment, a detailed economic analysis would include the capital costs for one RTO to accommodate the combined 40,300 acfm exhaust flow rate from the trim and grade baghouse and one WESP to serve as a buffer between the baghouse and the RTO. However, since the abbreviated economic analysis shows that this option is economically infeasible based on annual operating costs alone, no further analysis is required.

WESP/RCO or DESP/RCO
An RCO and an RTO have the same control efficiency, and an RCO operates at a lower temperature than an RTO. However, the operational cost of an RCO is higher than the operational cost of an RTO due to the high cost of catalyst. Since an RTO has a lower operating cost than an RCO and an RTO has already been determined to be economically infeasible, an RCO is also considered economically infeasible, no further analysis is required.

Biofilter
Biofilters are an effective control device for VOC emissions. Biofilter control technology was evaluated for reducing VOC emissions from the trim and grade equipment. The cost of installing and operating a biofilter for VOC control on the trim and grade equipment, as provided in Appendix D, Table D-16, is economically infeasible. A detailed economic analysis is included in Appendix D tables D-15 through D-16.

Good Design/Operation
The RBLC database contains several entries for the trim and grade emission units, which provide good design/operation as BACT for VOC. Thus, Huber proposes good design/operation as BACT for these sources.

4.8.5 STEP 5 – SELECT BACT

Huber proposes baghouses as BACT for the trim and grade equipment PM_{10} emissions. Due to the economic infeasibility of VOC controls, Huber proposes good design/operation as BACT for VOC from the forming operations. This BACT proposal is consistent with other entries in the RBLC database for similar units at OSB mills. The proposed BACT emission limits are provide in Table 4-13, at the end of this section.

4.9 BACT DETERMINATION FOR SANDING AND TONGUE AND GROOVE EQUIPMENT

From the trim and grade process, individual master panels are fed to the sand and tongue and groove process by lift truck and conveyors. The master panels are sanded, tongue and grooved, stacked, edge sealed, branded, and strapped for shipment. The sand and tongue and groove operations result in emissions of PM_{10} and VOC.

4.9.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with the previous analyses, the first step in this BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. The same list of commercially available control technologies as previously described in Table 4-11 for PM_{10} and VOC is utilized for initial consideration.

TABLE 4-11. RBLC LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
PM_{10}	Baghouse Dry Electrostatic Precipitator (DESP) Wet Electrostatic Precipitator (WESP) Venturi Scrubber Multiple Cyclones Good Design/Operation
VOC	RTO RCO Biofilter Good Design/Operation

4.9.2 STEP 2 – ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

4.9.2.1 PARTICULATE MATTER

WESP

The PM emissions that are collected from the sand and tongue and groove operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a WESP would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a WESP to control baghouse emissions is considered technically infeasible.

Venturi Scrubber

The PM emissions that are collected from the sand and tongue and groove operations are used as fuel for the wood fired furnace at the facility. As stated previously, the use of a Venturi scrubber would render the collected wood fuel useless due to the volumes of moisture that would be added to the material stream. As a result, the application of a Venturi scrubber to control sand and tongue and groove emissions is considered technically infeasible.

4.9.2.2 VOLATILE ORGANIC COMPOUNDS

Regenerative Thermal Oxidation

Installation of a standalone RTO downstream of a baghouse/fabric filter is considered technically infeasible in wood products operations, which has high particulate loading. Having an RTO installed down stream from a baghouse poses a serious fire risk, as a rupture of the baghouse would force a very large amount of wood particulate into the RTO. As such the use of an RTO in combination with a baghouse is not technically feasible.

As previously discussed, it might be theoretically possible from a technical engineering standpoint to utilize an alternate particulate control technology such as a wet electrostatic precipitator for gas stream conditioning between a baghouse and an RTO to ensure PM control is maintained in the event of a baghouse rupture. Installing a WESP or DESP after the baghouse, prior to the RTO would allow the owner or operator to recover the dust from the baghouse and still achieve VOC destruction. This combination of a particulate controls and an RTO is considered technically feasible and will be examined further.

Regenerative Catalytic Oxidation

Installation of a standalone RCO is not considered technically feasible for the dry screening and blending exhaust due to the level of PM/PM_{10} loading. Even with highly efficient PM/PM_{10} control, catalyst blinding, poisoning, plugging, or masking could occur if there was a baghouse failure. However, if a DESP or WESP was installed between the baghouse and RCO the DESP or WESP would provide sufficient protection of the catalyst in the event of a baghouse malfunction. Therefore, this combination of an RCO and DESP or WESP is considered technically feasible and will be examined further in this BACT analysis.

4.9.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Infeasible technologies identified in Section 4.9.2 are excluded from this step. Table 4-12 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-12. SAND AND TONGUE AND GROOVE EQUIPMENT - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
PM_{10}	Baghouse/Fabric Filter (for PM control from existing baghouses only)	99%
	Dry ESP	95%
	Multiple Cyclones	60%
	Good Design/Operation	Base Case
VOC	WESP/DESP + RTO/RCO	95%
	WESP/DESP + RTO/RCO	95%
	Biofilter	70%
	Good Design/Operation	Base Case

4.9.4 STEP 4 – TOP-DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible, and the option does not have unacceptable energy and adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.9.4.1 PARTICULATE MATTER

Baghouse/Fabric Filter

The baghouse/fabric filter control device is the highest ranked technology remaining for PM_{10} control on the sand and tongue and groove operations. Huber proposes the use of a baghouse as BACT for PM_{10} emissions and product recovery for beneficial fuel use from the sand and tongue and groove operations.

4.9.4.2 VOLATILE ORGANIC COMPOUNDS

WESP/RTO or DESP/RTO

An RTO would be an effective control device for VOC. As previously mentioned in Section 4.9.2.2, an RTO requires an upstream PM control device, such as a WESP or DESP, to reduce the risk of a fire. The WESP or DESP essentially serves as a buffer between the baghouse and RTO in the event of a rupture in the baghouse. This combination was evaluated for reducing VOC emissions from the dry screening and blending operations. Huber completed an abbreviated economic analysis assuming that the baghouse would be routed to an existing WESP or DESP and RTO. The cost effectiveness for annual operating costs of an RTO alone to control VOC emissions from the sand and tongue and groove operations is provided in Appendix D, Table D-13. The value provided is not economically feasible. An abbreviated economic analysis proves this option economically infeasible prior to examining the capital cost of installing an RTO to accommodate the exhaust stream or routing the emissions to an existing RTO. Since the existing RTOs at the facility do not have the capacity to accommodate the airflow from the sand and tongue and groove equipment, a detailed economic analysis would include the capital costs for one RTO to accommodate the combined 71,600 acfm exhaust flow rate from the two sand and tongue and groove baghouses and one WESP or DESP to serve as a buffer between the baghouse and the RTO. However, since the abbreviated economic analysis shows that this option is economically infeasible based on annual operating costs alone, no further analysis is required.

WESP/RCO or DESP/RCO
An RCO and an RTO have the same control efficiency, and an RCO operates at a lower temperature than an RTO. However, the operational cost of an RCO is higher than the operational cost of an RTO due to the high cost of catalyst. Since an RTO has a lower operating cost than an RCO and an RTO has already been determined to be economically infeasible, an RCO is also considered economically infeasible, no further analysis is required.

Biofilter
Biofilters are an effective control device for VOC emissions. Biofilter control technology was evaluated for reducing VOC emissions from the sand and tongue and groove equipment. The cost of installing and operating a biofilter for VOC control on the sand and tongue and groove equipment, as provided in Appendix D, Table D-22, is economically infeasible. A detailed economic analysis is included in Appendix D tables D-21 through D-22.

Good Design/Operation
The RBLC database contains several entries for the sand and tongue and groove emission units, which provide good design/operation as BACT for VOC. Thus, Huber proposes good design/operation as BACT for these sources.

4.9.5 STEP 5 – SELECT BACT

Huber proposes baghouses as BACT for the sand and tongue and groove equipment PM_{10} emissions. Due to the economic infeasibility of VOC controls, Huber proposes good design/operation as BACT for VOC from the forming operations. This BACT proposal is consistent with other entries in the RBLC database for similar units at OSB mills. The proposed BACT emission limits are provide in Table 4-13, at the end of this section.

4.10 BACT DETERMINATION FOR INK BRANDING AND STAMPING

The ink branding and stamping operations have VOC emissions that total 20 tpy.

4.10.1 STEP 1 – IDENTIFY ALL CONTROL TECHNOLOGIES

As with the previous analyses, the first step in this BACT analysis is to identify the possible control technologies for each applicable pollutant for comparable emissions sources. The same list of commercially available control technologies as previously described in Table 4-11 for PM_{10} and VOC is utilized for initial consideration.

TABLE 4-11. RBLC LISTED CONTROL TECHNOLOGIES

Pollutant	Listed Control Technologies
VOC	RTO RCO Biofilter Good Design/Operation

4.10.2 STEP 2–ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

All of the control technologies listed in the RBLC for similar processes are technically feasible and will be examined in the following sections.

4.10.3 STEP 3 – RANK REMAINING CONTROL TECHNOLOGIES BY EFFECTIVENESS

Step 3 ranks the remaining technologies by control effectiveness. Table 4-12 lists the remaining technically feasible controls and their efficiencies. The efficiencies are vendor quotes when available, or accepted industry literature values. These values are provided for informational and ranking purposes only. They are not to be construed as emission limits or a request for enforceable restrictions.

TABLE 4-12. INK BRANDING AND STAMPING EQUIPMENT - REMAINING CONTROL TECHNOLOGIES RANKED BY EFFECTIVENESS

Pollutant	Listed Control Technologies	Potential Control Efficiency (%)
VOC	RTO	95%
	RCO	95%
	Biofilter	70%
	Good Design/Operation	Base Case

4.10.4 STEP 4 – TOP-DOWN EVALUATION OF CONTROL OPTIONS

Following the next step in the "top-down" BACT approach, the highest ranked control option is evaluated first. If this option is technically and economically feasible and does not have unacceptable energy or adverse environmental impacts, the option is deemed BACT. Otherwise, the next ranked control option is evaluated. The evaluation process continues until a control option is found that meets all of the BACT requirements. Once BACT is determined, it is unnecessary to evaluate any remaining options that are ranked below the selected BACT.

4.10.4.1 VOLATILE ORGANIC COMPOUNDS

RTO/RCO

An RTO or RCO would be an effective control device for VOC. For the purposes of this top-down analysis, it was assumed that the operational costs of these two control devices are equivalent, so only an RTO was evaluated for reducing VOC emissions from the ink branding and stamping operations. Huber completed an abbreviated economic analysis assuming that the emissions would be routed to an existing RTO. The annual operating costs of an RTO alone to control VOC emissions from the ink branding and stamping operations is provided in Appendix D, Table D-32. The value provided is not economically feasible. An abbreviated economic analysis proves this option economically infeasible prior to examining the capital cost of installing an RTO to accommodate the exhaust stream or routing the emissions to an existing RTO. Since the existing RTOs at the facility do not have the capacity to accommodate the airflow from the ink branding and stamping equipment, a detailed economic analysis would include the capital costs for one RTO to accommodate the exhaust flow rate from the ink branding and stamping operations. However, since the abbreviated economic analysis shows that this option is economically infeasible based on annual operating costs alone, no further analysis is required.

Biofilter

Biofilters are an effective control device for VOC emissions. Biofilter control technology was evaluated for reducing VOC emissions from the ink branding and stamping equipment. The cost of installing and operating a biofilter for VOC control on the ink branding and stamping equipment, as provided in Appendix D, Table D-34, is economically infeasible. A detailed economic analysis is included in Appendix D Tables D-33 and D-34.

Good Design/Operation

The RBLC database contains several entries for the ink branding and stamping emission units, which provide good design/operation as BACT for VOC. Thus, Huber proposes good design/operation as BACT for these sources.

4.10.5 STEP 5 – SELECT BACT

There are no feasible add-on controls for VOC from the ink branding and stamping operations at the Commerce Mill. Therefore, Huber has selected good design and operation as BACT for VOC.

4.11 BACT LIMITS

All units subject to BACT must have verifiable emission limits. As stated in previous sections, the furnace and dryers emit through the same emission point so emissions from those sources cannot be verified independently. Therefore, Huber is proposing combined BACT limits for the dryers and furnace. These emission limits are provided, along with limits for all other applicable sources, in Table 4-13.

TABLE 4-13. PROPOSED BACT EMISSION LIMITS

	Pollutant							
	PM_{10}		CO		NO_X		VOC	
Emission Point	**Limit**	**Units**	**Limit**	**Units**	**Limit**	**Units**	**Limit**	**Units**
Dryers & Furnace	21.65	lb/hr	64.30	lb/hr	142.55	lb/hr	42.89	lb/hr
Press	0.132	lb/MSF	0.12	lb/MSF	0.28	lb/MSF	0.13	lb/MSF
SC45	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	1.68E-01	lb/MSF
SC08	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	8.91E-02	lb/MSF
SC09	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	9.18E-02	lb/MSF
SC67	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	1.36E-01	lb/MSF

Huber proposes that the emission limits in Table 4-13 be used as the BACT limits for the facility. All necessary testing and monitoring (e.g. Compliance Assurance Monitoring) will be based on the individual stack emission limits.

5. DISPERSION MODELING AND ADDITIONAL IMPACTS ANALYSIS

In accordance with previous discussions with Georgia EPD, the dispersion modeling, growth impacts, soils and vegetation, and visibility analysis will be submitted under separate cover.

6. REGULATORY APPLICABILITY ANALYSIS

This section provides a demonstration and summary that the facility meets applicable Federal and State air regulations.

6.1 FEDERAL REGULATIONS

Applicability of federal regulations including PSD, Title V, New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) are reviewed herein.

6.1.1 PREVENTION OF SIGNIFICANT DETERIORATION, 40 CFR PART 52.21

Under the PSD regulations, a major stationary source for PSD is defined as any source in one of the 28 named source categories with the potential to emit 100 tpy or more of any regulated pollutant, or any source not in one of the 28 named source categories with the potential to emit 250 tpy or more of any regulated pollutant.[13] OSB manufacturing is not included in the "list of 28" source categories; therefore the applicable major source threshold is 250 tpy. Huber's Commerce mill presently operates under a synthetic minor permit limiting emissions of regulated pollutants to less than 250 tpy. The proposed project involves the removal of the synthetic minor limitations for necessary operational flexibility. Therefore, Huber is submitting this PSD construction and operating permit application in accordance with Title 40 CFR Part 52.21 and Georgia EPD Regulation 391-3-1-.02(7) to remove all PSD avoidance limits from the permit and to become a major PSD source.

6.1.2 TITLE V OPERATING PERMIT PROGRAM, 40 CFR PART 70

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. Georgia has incorporated the provisions of this federal program in its Title V operating permit program via Regulation 391-3-1-.02(10). The major source thresholds with respect to the Georgia Title V operating permit program regulations are 10 tons per year of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of other regulated pollutants.

As mentioned previously, the potential emissions of several criteria pollutants emitted by the Commerce mill exceed 100 tpy. Additionally, potential emissions of several individual HAP exceed 10 tpy, and potential emissions of combined HAP exceed 25 tpy. Therefore, the Commerce mill is classified as a major source of HAP. Thus, a Title V operating permit is required for the Commerce mill.

[13] 40 CFR §52.21(b)(1)(i)

6.1.3 CHEMICAL ACCIDENT PREVENTION PROVISIONS (112R), 40 CFR PART 68

The Chemical Accident Prevention Provisions in Section 112r of the Clean Air Act requires facilities with large amounts of certain hazardous chemicals on site to develop a Risk Management Plan (RMP). The Commerce facility could potentially store more than 10,000 lbs of propane onsite. However, all of the propane onsite is used as fuel for the mobile equipment and RTO back-up system, and is therefore exempt from the requirements to develop and implement a RMP. Huber will not store any other materials that exceed the RMP threshold, and 112r RMP requirements are not applicable. However, the mill is subject to the provisions of the CAA General Duty Clause, Section 112, as it pertains to accidental releases of hazardous materials.

6.1.4 40 CFR PART 60 NSPS

NSPS, located in 40 CFR Part 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted.

6.1.4.1 NSPS SUBPART DB

NSPS Subpart Db applies to steam generating units with heat input capacities greater than 100 MMBtu/hr constructed, reconstructed or modified after June 19, 1984. Huber has one wood fired furnace (WBNR) with a heat input capacity of 150 MMBtu/hr. The wood-fired furnace (WBNR) incorporates a heat recovery section after the combustion zone for the purpose of heating thermal oil to transfer heat indirectly to the press. In accordance with the applicability definition and recent EPA applicability guidance, the wood fired furnace (WBNR) is subject to the requirements of NSPS Subpart Db. NSPS Subpart Db references the general provisions of Subpart A, which requires the submittal of several notifications for NSPS-affected sources. Since the unit is subject to NSPS Subpart Db, the general provisions of Subpart A apply to this unit.

Huber recently discovered that the furnace is subject to NSPS Subpart Db due to recently published applicability guidance from EPA and has met with EPD to discuss the applicability determination. Since the unit was not considered subject to NSPS Subpart Db until the present time, Huber has not yet completed the initial notification or stack testing. Huber is working with the EPD to fulfill these requirements.

Under NSPS Subpart Db, the furnace is subject to a filterable PM limit of 0.1 lb/MMBtu and an opacity limit of 20%, except for one 6-minute period per hour of not more than 27% under 40 CFR 60.43b. A continuous opacity monitoring system (COMS) will be installed on each of the main furnace stacks (SRTO, HRTO, and PRTO) to monitor opacity. Since the furnace combusts only wood, it is not subject to NO_X or SO_2 limits under this NSPS.

The Commerce facility is required to maintain records of the amounts of each fuel combusted during each day under 40 CFR 60.49b(d), and is required to submit semi-annual reports by the 30th day following the end of the reporting period in accordance with 40 CFR 60.48b(j).

6.1.4.2 NSPS SUBPART KB

NSPS Subpart Kb applies to volatile organic liquid (VOL) storage vessels with a volume greater than 40 m^3 constructed, reconstructed, or modified after July 23, 1984. Storage vessels with a volume between 75 m^3 (19,813 gallons) and 151 m^3 (39,890 gallons) containing VOL with a vapor pressure less than 15 kPa (2.2 psia) are exempt from this NSPS. All storage vessels at the facility are either less than 10,567 gallons in volume or are between 19,813 and 39,890 gallons and contain VOL with a vapor pressure less than 15 kPa. Therefore, the storage vessels are not subject to NSPS Subpart Kb.

6.1.4.3 NSPS SUBPART IIII

NSPS Subpart IIII applies to owners or operators of compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006 that are not fire pump engines, and fire pump engines manufactured after July 1, 2006. Huber operates a 600 hp emergency generator and a 225 hp fire pump. The emergency generator was installed in May of 1988. Therefore, the emergency generator is not subject to the provisions of NSPS Subpart IIII.

The emergency fire pump was manufactured in November 2006. Therefore, the fire pump is subject to the provisions of NSPS Subpart IIII. The fire pump has a displacement of less than 30 liters per cylinder and must comply with the emissions limits established in Table 4 of the subpart. Table 4 contains a combined limit for NMHC and NO_X, as well as separate limits for PM and CO.

Subpart IIII does not require that owners or operators of emergency stationary internal combustion engines submit an initial notification. Subpart IIII provides multiple compliance options in 40 CFR 60.4211. Huber demonstrates compliance with NSPS Subpart IIII by operating a fire pump certified to the emission limits of Table 4.

6.1.5 40 CFR PART 61, NESHAP

The NESHAP listed in 40 CFR Part 61 are pollutant-specific regulations that limit emissions of HAP. Huber does not operate any emission units subject to these requirements. Therefore, the Part 61 NESHAP are categorically not applicable.

6.1.6 40 CFR PART 63, NESHAP

The NESHAP listed in 40 CFR Part 63 are source-category specific regulations that limit emissions of HAP. The NESHAP are generally only applicable to major sources of HAP.

Allowable emission limits are most often established on the basis of a Maximum Achievable Control Technology (MACT) determination for the particular major source category. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or 10 tpy for any individual HAP. The Commerce mill has potential emissions of several individual HAP greater than 10 tpy and combined HAP greater than 25 tpy. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific source type. As discussed in the following subsections, the Commerce facility is subject to 40 CFR Subpart DDDD – *Plywood and Composite Wood Products*, and the requirements of 40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines. Moreover, any source subject to a 40 CFR Part 63 NESHAP is also subject to the general provisions of 40 CFR Part 63 Subpart A, except where expressly noted.

6.1.6.1 40 CFR PART 63 SUBPART DDDD

OSB manufacturing equipment is included in the plywood and composite wood products (PCWP) manufacturing source category regulated under 40 CFR Part 63 Subpart DDDD. Subpart DDDD applies to any facility that manufactures plywood and/or composite wood products including plywood, veneer, particleboard, OSB, hardboard, fiberboard, medium density fiberboard, laminated strand lumber, laminated veneer lumber, wood I-joists, kiln dried, lumber, and glue-laminated beams. In addition, the PCWP manufacturing facility is located at a major source of HAP emissions. This regulation considers emissions of HAP from green end, drying, forming, pressing, board cooling, and finishing operations. HAP emissions from onsite storage units containing raw materials used in the manufacture of plywood and/or composite wood products, onsite wastewater treatment operations associated with plywood and/or composite wood products manufacturing, and miscellaneous coating operations are also regulated under the PCWP NESHAP.

The Commerce mill is an OSB manufacturing facility and operates OSB manufacturing equipment subject to the provisions of this regulation. The affected source includes the wood fired furnace (WBNR), rotary flake dryers (DRY1, DRY2, and DRY3), multi-opening press (BP), paint booths, green end equipment, forming equipment, finishing equipment, and resin storage tanks.

The dryers, furnace, and press comply with the PCWP NESHAP using the add-on control option. Huber has four RTOs that control the dryers, furnace, and the press. Huber complies with the NESHAP by reducing methanol, formaldehyde, or VOC by 90%. Each RTO has demonstrated control efficiency of 90% or higher during performance testing.

Huber is also subject to the work practice requirements listed in 40 CFR Part 63 Subpart DDDD Table 3. The work practice requirements for the paint booths include the use of non-HAP coatings. It is required that the material safety data sheets (MSDS) be maintained on-site and available. Huber complies with these work practice requirements.

In addition to the aforementioned requirements, Huber is required to develop and implement a startup, shutdown, and malfunction plan (SSMP) for the affected units in accordance with the provisions of 40 CFR Part 63.6(e)(3). A semi-annual compliance report must be submitted to EPD containing the information in 40 CFR 63.2281(c) through (g).

6.1.6.2 40 CFR Part 63 Subpart ZZZZ

40 CFR 63 Subpart ZZZZ applies to reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. Existing emergency power units are not required to meet the requirements of Subpart ZZZZ or Subpart A in accordance with 40 CFR 63.6590(b)(3). Emergency stationary RICE are defined in 40 CFR 63.6675 as any stationary RICE that operates in an emergency situation. These situations include engines used for power generation when power from the local utility is interrupted, or engines used to pump water in the case of fire or flood.

The emergency generator and the emergency fire pump at the Commerce mill are classified as emergency stationary RICE under the RICE NESHAP. In accordance with 40 CFR 63.6590(b)(3), existing emergency stationary RICE have no requirements under Subpart ZZZZ or Subpart A.

6.1.7 Compliance Assurance Monitoring, 40 CFR Part 64

Under 40 CFR 64, the Compliance Assurance Monitoring (CAM) regulations, facilities are required to prepare and submit monitoring plans for certain emissions units with the initial Title V operating permit application or Title V renewal application depending on the level of emissions from the unit. The CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation only applies to emission units that use a control device to achieve compliance with an emission limit and whose pre-controlled emission levels exceed the major source thresholds under the Title V operating permit program. If a subject unit's post-controlled emissions exceed the major source threshold, the owner or operator must submit a CAM plan with the initial Title V operating permit application. For a subject unit whose post-control emissions are less than the major source threshold, the owner or operator is not required to submit a CAM plan with the initial application, but must submit a CAM plan with the first Title V renewal application.

The emission units potentially subject to CAM are the wood fired furnace, the dryers, and the press, which are controlled by WESPs and RTOs, the screens, dry bins, and conveyors, which are controlled by a baghouse, and the forming, blending, and finishing processes, which are controlled by baghouses. CAM was addressed during the last Title V permit renewal, and has been incorporated into the current Title V permit, No.: 2493-157-0014-V-02-0. Huber is not requesting any changes to the CAM plans for any units covered under 40 CFR 64, and is not requesting any changes at the facility that would change the current applicability determinations under the CAM rule.

6.2 GEORGIA REGULATIONS (CHAPTER 391-3-1)

The Georgia Rules for Air Quality Control codified in Chapter 391-3-1, apply to any facility from which air contaminants are or may be emitted as provided under Official Code of Georgia Annotated (O.C.G.A). The requirements specific to Huber's Commerce mill are detailed herein; these requirements include both equipment specific and general requirements for the facility.

6.2.1 OPACITY (391-3-1-.02(2)(B))

Rule 391-3-1-.02(2)(b) states that no person shall allow emissions from any air contaminant source to emit into the air emissions of which the opacity is greater than 40%. This requirement also has the exception that any more restrictive or specific rules or subdivisions of this chapter shall take precedence over this limit. Huber will operate its equipment such that it does not allow any emissions from any air contaminant source to exceed 40% opacity.

6.2.2 FUEL BURNING EQUIPMENT (391-3-1-.02(2)(D))

This regulation limits PM emissions from fuel burning units on a pound per hour (lb/hr) basis. Fuel burning equipment constructed or significantly modified before January 1, 1972 is considered "existing" for the purpose of this regulation, and all other equipment (i.e. equipment which was built or modified after January 1, 1972) is considered "new" equipment.

All equipment at the Commerce mill is considered new under this regulation, as it was all constructed after January 1, 1972. The emission limits provided are dependent on the heat input capacity of the affected unit. The limits are calculated for three subcategories: units with heat input capacities less than 10 MMBtu/hr, units from 10 MMBtu/hr to 250 MMBtu/hr, and units with heat input capacities greater than 250 MMBtu/hr. Huber has permitted emission units with heat input capacities less than 10 MMBtu/hr and between 10 MMBtu/hr and 250 MMBtu/hr. The emission limits are as follows:

Units less than 10 MMBtu/hr

The diesel-fired emergency generator and fire pump are subject to the following standard where P is the emission rate in pounds per hour (lb/hr):

$$P = 0.5$$

The diesel fired emergency generator and fire pump are inherently in compliance with this emission limit.

Medium units (greater than or equal to 10 MMBtu/hr but less than 250 MMBtu/hr)

The wood fired furnace is subject to the following standard where P is the emission rate in pounds per hour (lb/hr) and R is the heat input rating of the emission source in MMBtu/hr:

$$P = 0.5\left(\frac{10}{R}\right)^{0.5}$$

Therefore, the wood fired furnace emission limit is 0.13 lb/hr. The furnace will comply with this emission limit by venting its emissions through the dryers to three WESPs that control PM.

This subpart also contains a provision that no fuel burning equipment will have emissions with opacity greater than 20%, except for one six minute period per hour of not more than 27% opacity. All fuel burning units will comply with this opacity limit.

6.2.3 PARTICULATE EMISSIONS FROM MANUFACTURING PROCESSES (391-3-1-.02(2)(E))

This section provides limitations for the emission of PM from sources other than fuel burning sources. The provisions within this subpart also distinguish between existing and new sources with a new source date of July 2, 1968. All sources at the Commerce mill were constructed after July 2, 1968, and as such are considered new for the purpose of this rule.

New sources are divided into two groups within this subpart, small and large. Small sources are those which have a process weight rating of less than or equal to 30 tons per hour (ton/hr). Large processes are those which have a process weight rating of greater than 30 ton/hr.

Small Processes (less than 30 ton/hr)

These units are subject to the following standard where E is the emission rate in lb/hr and P is the process weight rating in ton/hr.

$$P = 4.1(P)^{0.67}$$

Large Processes (greater than 30 ton/hr)

These units are subject to the following standard where E is the emission rate in lb/hr and P is the process weight rating in ton/hr.

$$P = 55(P)^{0.11} - 40$$

The dryers, press, material handling, and finishing equipment at the Commerce mill are subject to the large process PM emission limit provided under this regulation. The dryers are routed to WESPs to control PM emissions, and the material handling and finishing equipment are routed to baghouses. All other uncontrolled emission units are inherently in compliance with these limits.

6.2.4 SULFUR DIOXIDE (391-3-1-.02(2)(G))

This regulation lists sulfur dioxide emissions limits for fuel burning sources. Huber has no sources at the Commerce facility that have a heat input greater than 250 MMBtu/hr. As such, all fuel burning equipment at the facility is covered under 391-3-1.02(2)(g)(2), which states that:

> *All fuel burning sources below 100 million BTUs of heat input per hour shall not burn fuel containing more than 2.5 percent sulfur, by weight. All fuel burning sources having a heat input of 100 million BTUs per hour or greater shall not burn a fuel containing more than 3 percent sulfur, by weight.*

Huber has several fuel burning sources less than 100 MMBtu/hr heat input, of which only two burn fuel other than natural gas or propane. The fire pump and the emergency generator burn diesel fuel (distillate oil), and comply with this regulation by burning diesel fuel with less than 2.5 percent sulfur. The Wellons furnace has a heat input rating greater than 100 MMBtu/hr and will comply with this regulation by burning fuel with less than 3 percent sulfur.

APPENDIX A – GEORGIA EPD PERMIT APPLICATION FORMS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: ________________ Application No. ________________

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Huber Engineered Woods, LLC

AIRS No. (if known): 04-13- 157 - 00014

Facility Location: Street: 1442 Highway 334

City: Commerce Georgia Zip: 30530 County: Jackson

2. Facility Coordinates

Latitude: 34° 09' 42" **NORTH** Longitude: 83° 25' 56" **WEST**

UTM Coordinates: 3782762.31 **EAST** 275754.75 **NORTH** **ZONE** 17

3. Facility Owner

Name of Owner: Huber Engineered Woods, LLC

Owner Address Street: 1442 Highway 334

City: Commerce State: GA Zip: 30530

4. Permitting Contact and Mailing Address

Contact Person: Eric Reynolds Title: Environmental Manager

Telephone No.: 706-336-3064 Ext. ______ Fax No.: 706-335-7647

Email Address: eric.reynolds@huber.com

Mailing Address: Same as: Facility Location: ☐ Owner Address: ☐ Other: ☒

If Other: Street Address: P. O. Box 670

City: Commerce State: GA Zip: 30529

5. Authorized Official

Name: Kenneth Poe Title: Plant Manager

Address of Official Street: P. O. Box 670

City: Commerce State: GA Zip: 30529

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: ______________________ Date: ______________

6. Reason for Application: (Check all that apply)

☐ New Facility (to be constructed)

☒ Existing Facility (initial or modification application)

☐ Permit to Construct

☒ Permit to Operate

☐ Change of Location

☒ Permit to Modify Existing Equipment: Affected Permit No.: 2493-157-0014-V-02-0

☐ Revision of Data Submitted in an Earlier Application

Application No.: ____________

Date of Original Submittal: ____________

7. Permitting Exemption Activities (for permitted facilities only):

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. Has assistance been provided to you for any part of this application?

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: Trinity Consultants, Inc.

Name of Contact: Tony Jabon

Telephone No.: 704-553-7747 Fax No.: 704-553-8838

Email Address: tjabon@trinityconsultants.com

Mailing Address: Street: 325 Arlington Avenue, Suite 500

City: Charlotte State: NC Zip: 28203

Describe the Consultant's Involvement:

Permit Application Preperation

9. Submitted Application Forms: Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
1	2.02 Storage Tank Physical Data
0	2.03 Printing Operations
1	2.04 Surface Coating Operations
0	2.05 Waste Incinerators (solid/liquid waste destruction)
1	2.06 Manufacturing and Operational Data
1	3.00 Air Pollution Control Devices (APCD)
0	3.01 Scrubbers
1	3.02 Baghouses & Other Filter Collectors
1	3.03 Electrostatic Precipitators
3	4.00 Emissions Data
1	5.00 Monitoring Information
1	6.00 Fugitive Emission Sources
0	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: Upon reciept of permit

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☒ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	N/A	N/A
Nitrogen oxides (NOx)		
Particulate Matter (PM)		
PM <10 microns (PM10)		
PM <2.5 microns (PM2.5)		
Sulfur dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Total Hazardous Air Pollutants (HAPs)		
Individual HAPs Listed Below:		

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	237		333.13	
Nitrogen oxides (NOx)	233		730.11	
Particulate Matter (PM)	218		170.44	
PM <10 microns (PM10)	218		170.44	
PM <2.5 microns (PM2.5)	No Data		No Data	No Data
Sulfur dioxide (SO_2)	60		59.56	
Volatile Organic Compounds (VOC)	242		453.29	
Total Hazardous Air Pollutants (HAPs)	125		136.19	
Individual HAPs Listed Below:				
Formaldehyde	48		54.68	
Methanol	35		37.90	
Phenol	23		34.12	

14. 4-Digit Facility Identification Code:

SIC Code: 2493 SIC Description: Reconstituted Wood Products

NAICS Code: 321219 NAICS Description: Reconstituted Wood Products Manufacturing

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

Huber Engineered Woods (Huber) operates an oriented strand board (OSB) manufacturing facility (Standard Industrial Classification [SIC] Code 2493) in Jackson County in Commerce, Georgia (the Commerce mill). The Commerce mill consists of a wood fired furnace used to provide heat to rotary dryers, a multi-opening press, finishing equipment, and raw material handling equipment associated with stranding, flaking, forming, handling, and storing wood. The maximum OSB production rate is 77 thousand square feet (MSF3/8) per hour or 674,520 MSF3/8 per year on a 12-month rolling basis. Dryers 1, 2, and 3 at the have a combined nominal throughput capacity of 100,000 pounds of oven dried material per hour (lb OD/hr), or 50 oven dried tons per hour (ODT/hr). The Commerce mill currently operates under Title V permit No.: 2493-157-0014-V-02-0, which limits criteria pollutant emissions to less than the Prevention of Significant Deterioration (PSD) major source threshold of 250 tons per year (tpy).

Huber is submitting this permit application to remove all PSD synthetic minor emission limits from the permit. This will allow Huber increased operational flexibility at the mill.

16. Additional information provided in attachments as listed below:

Attachment A - See application text

Attachment B -

Attachment C -

Attachment D -

Attachment E -

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☒ Plot plan/map of facility location or date of previous submittal:

☒ Flow Diagram or date of previous submittal:

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
DRY1	Dryer No. 1	Single Pass Dryers	Wood Flake Dryer No. 1
DRY2	Dryer No. 2	Single PasS Dryers	Wood Flake Dryer No. 2
DRY3	Dryer No. 3	Single Pass Dryers	Wood Flake Dryer No. 3
BP	Board Press	Siempelkamp	Board Press
IA	Ink Application	Ink Application	Ink Application
WBNR	Wood-Fired Furnace	Wellons	Wood-fired furnace, burning wood and OSB waste.
ES	Edge Sealing	Edge Sealing	Edge Sealing
FP	Fire Pump Engine	Fire Pump Engine	Fire Pump Engine
EG	Emergency Generator	Emergency Generator	Emergency Generator
SYS1	System 1	PS&M	Flake Screening and Blending, Bin and Blender, and Weigh Belt
SY23	System 2 & 3	CAE and Siempelkamp	Forming, Cutoff Saw, and Mat Reject
SYS4	System 4	Globe Manufacturing	Trim and Grade
SYS5	System5	Globe Manufacturing	Sanding and Tongue and Groove

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
WBNR	Fixed Grate Wood Fired	Forced	150		1988	1988	
EG	Normal	Forced	5.6		1988	1988	
FP	Normal	Forced	2.1		2006	2006	
DRTO	Normal	Forced	25		1995	1995	
HRTO	Normal	Forced	8		1995	1995	
PRTO	Normal	Forced	24		2004	2004	
SRTO	Normal	Forced	16		1995	1995	

[1] This column does not have to be completed for natural gas only fired equipment.

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
WBNR	Bark	146,000	tons	0.42	0.58	16.7	6.9	4,500 Btu/lb	4,500 Btu/lb	2.5	N/A		
WBNR	Sanderdust	48,100	tons	0.42	0.58	9.4	5.5	8,000 Btu/lb	8,000 Btu/lb	2.5	N/A		
SRTO	Natural Gas	137,400	MCF	0.42	0.58	16	16	1,020 Btu/scf	1,020 Btu/scf	0	0	N/A	N/A
DRTO	Natural Gas	214,700	MCF	0.42	0.58	25	25	1,020 Btu/scf	1,020 Btu/scf	0	0	N/A	N/A
HRTO	Natural Gas	68,700	MCF	0.42	0.58	8	8	1,020 Btu/scf	1,020 Btu/scf	0	0	N/A	N/A
PRTO	Natural Gas	206,100	MCF	0.42	0.58	24	24	1,020 Btu/scf	1,020 Btu/scf	0	0	N/A	N/A
FP	Diesel	7,500	Gal	0.42	0.58	6	6	0.14 MMBtu/gal	0.14 MMBtu/gal	1.5	N/A	N/A	N/A
EG	Diesel	20,000	Gal	0.42	0.58	15	15	0.14 MMBtu/gal	0.14 MMBtu/gal	1.5	N/A	N/A	N/A

Fuel Supplier Information

Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip
Wood Waste	N/A -- Produced on site					
Natural Gas					GA	
Diesel					GA	

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 2.04 – SURFACE COATING OPERATIONS

Emission Unit ID	Emission Unit Name	Construction Date	Type of Coating Operation[1]	Item(s) Coated	Normal Operating Hours	Coating Method	VOC Potential to Emit (tons/yr)	VOC Max Actual Emissions (lb/day)
ES	Edge Sealing	1988	Other	OSB Boards	8,760	Spray Applicator	12.52	68.59
IA	Ink Applicator	2002	Other	OSB Boards	8,760	Stamping & Branding	44.64	244.6

[1] Indicate type of coating operation using the appropriate letter code from below:

A – Can Coating
B – Fabric and Vinyl Coating
C – Wire Coating
D – Pressure Sensitive Tape & label Surface Coating
E – Coil Coating
F – Metal Furniture Coating
G – Wood Furniture Coating
H – Magnetic Tape Coating
I – Polymeric Coating of Supporting Substrate
J – Paper Coating
K – Large Appliance Surface Coating
L – Misc. Metal Parts & Products Coating
M – Plastic Parts for Business Machines Coating
N – Automobile & Light Truck Manufacturing
O – Other (describe equipment coated under "Items Coated")

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 2.06 – MANUFACTURING AND OPERATIONAL DATA

Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr

Additional Data Attached? ☐ - No ☒ - Yes, please include the attachment in list on Form 1.00, Item 16.

Seasonal and/or Peak Operating Periods: N/A

Dates of Annually Occurring Shutdowns: N/A

PRODUCTION INPUT FACTORS

Emission Unit ID	Emission Unit Name	Const. Date	Input Raw Material(s)	Annual Input	Hourly Process Input Rate		
					Design	Normal	Maximum
WBNR	Wellons Wood-fired Furnace	1988	Bark	60,500 tons	16.7	6.9	16.7
			Sanderdust	48,091 tons	9.4	5.5	9.4
DRYR	3 Single Pass Dryers	1988	Wood Strands	438,000 ODT	50	50	50
BP	Board Press	1988	OSB Master Mats	674,520 MSF	77	77	77
FN	Board Finishing	2002	OSB Boards	674,520 MSF	77	77	77

PRODUCTS OF MANUFACTURING

Emission Unit ID	Description of Product	Production Schedule		Hourly Production Rate (Give units: e.g. lb/hr, ton/hr)			
		Tons/yr	Hr/yr	Design	Normal	Maximum	Units
BDFN	**OSB Board**	**674,520 MSF/yr**	**8,760**	**77**	**77**	**77**	**MSF/hr**

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
DRTO	BP	RTO	1995	Durr Environmental, 2146	No	80	293	82,000
HRTO	DRYR/WBNR	RTO	1995	Huntington Environmental Systems, 90901	No	80	283	89,000
PRTO	DRYR/WBNR	RTO	2004	Pro Environmental	No	80	283	118,000
SRTO	DRYR/WBNR	RTO	1995	Smith Engineering, AB95HX95	No	80	273	156,000
SC08	SYS1	Baghouse	1988	PNEU-AIRE, 60-20G1	No	80	80	50,000
SC45	SY23	Baghouse	1988	PNEU-AIRE,60-20G1	No	80	80	54,200
SC09	SYS4	Baghouse	2002	PNEU-AIRE,100-20	No	80	80	40,300
SC67	SYS5	Baghouse	1988	PNEU-AIRE,100-20 G5	No	80	80	71,600
WES1	DRYR/WBNR	WESP	1991	Geo Energy	No	80	80	42,000
WES2	DRYR/WBNR	WESP	1991	Geo Energy	No	80	80	42,000
WES3	DRYR/WBNR	WESP	1991	Geo Energy	No	80	80	42,000

Facility Name: Huber Engineered Wood Products, LLC **Date of Application:** June 2009

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
DRTO	VOC	90	90	101.4	Control efficiency calculation.	10.14	Permit Limit	N/A
	CO	75	75	45.8	Control efficiency calculation.	11.45	Permit Limit	N/A
	Organic HAP	90	90	89.1	Control efficiency calculation.	8.91	Permit Limits and AP-42	N/A
SRTO, HRTO, PRTO	VOC	90	90	428.9	Control efficiency calculation.	42.89	Stack Testing	N/A
	CO	75	75	257.2	Control efficiency calculation.	64.30	Stack Testing	N/A
	Organic HAP	90	90	143.1	Control efficiency calculation.	14.31	Permit Limits and AP-42	N/A
WES1	PM	75	75	28.87	Control efficiency calculation.	7.22	Stack Testing and NSPS Limit	N/A
WES2	PM	75	75	28.87	Control efficiency calculation.	7.22	Stack Testing and NSPS Limit	N/A
WES3	PM	75	75	28.87	Control efficiency calculation.	7.22	Stack Testing and NSPS Limit	N/A
SC08	PM	99+	99	163	Control efficiency calculation.	1.63	Grain Loading Rate	2
SC45	PM	99+	99	177	Control efficiency calculation.	1.77	Grain Loading Rate	2
SC09	PM	99+	99	131	Control efficiency calculation.	1.31	Grain Loading Rate	2
SC67	PM	99+	99	233	Control efficiency calculation.	2.33	Grain Loading Rate	2

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 3.02 – BAGHOUSES & OTHER FILTER COLLECTORS

APCD ID	Filter Surface Area (ft^2)	No. of Bags	Inlet Gas Dew Point Temp. (°F)	Inlet Gas Temp. (°F)	Bag or Filter Material	Pressure Drop (inches of water)	Cleaning Method	Gas Cooling Method	Leak Detection System Type
SC08	6,040	60	Variable	80	Bag	2			Pressure Drop Sensor
SC45	6,040	60	Variable	80	Bag	2			Pressure Drop Sensor
SC09	6,548	100	Variable	80	Bag	2			Pressure Drop Sensor
SC67	9,187	100	Variable	80	Bag	2			Pressure Drop Sensor

Attach a physical description, dimensions and drawings for each baghouse and any additional information available such as particle size, maintenance schedules, monitoring procedures and breakdown/by-pass procedures. Explain how collected material is disposed of or utilized. Include the attachment in the list on Form 1.00 *General Information*, Item 16

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
Dryers	SRTO, HRTO, PRTO	01, 02, 03	PM	No Data	6.65	No Data	29.13	See Appendix B
			PM10		6.65		29.13	See Appendix B
			CO		0.00		0.00	Included in Furnace
			NOx		0.00		0.00	Included in Furnace
			SO2		0.70		3.07	See Appendix B
			VOC		42.89		187.86	Includes Furnace & RTOs
			Total HAP		13.73		60.14	See Appendix B
Furnace	SRTO, HRTO, PRTO	01, 02, 03	PM		15.00		65.70	See Appendix B, includes RTO combustion
			PM10		15.00		65.70	See Appendix B, includes RTO combustion
			CO		64.30		281.64	Includes Dryers & RTOs
			NOx		142.55		624.36	Includes Dryers& RTOs
			SO2		9.91		43.41	Includes RTOs
			VOC		0.00		0.00	Included in Dryers
			Total HAP		0.64		2.79	Includes RTO HAP from natural gas combustion

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
Board Press	DRTO	04	PM		10.14		44.41	See Appendix B
			PM10		10.14		44.41	See Appendix B
			CO		11.45		50.16	Includes DRTO
			NOx		22.86		100.14	Includes DRTO
			SO2		2.86		12.54	Includes DRTO
			VOC		10.14		44.43	Includes DRTO
			Total HAP		8.91		39.03	Includes DRTO
SY23	SC45		PM		1.77		7.73	See Appendix B
			PM10		1.77		7.73	See Appendix B
			VOC		6.86		30.05	See Appendix B
			Total HAP		2.87		12.56	See Appendix B
SYS1	SC08		PM		1.63		7.13	See Appendix B
			PM10		1.63		7.13	See Appendix B
			VOC		12.90		56.52	See Appendix B
			Total HAP		0.20		0.90	See Appendix B
SYS4	SC09		PM		1.31		5.75	See Appendix B
			PM10		1.31		5.75	See Appendix B
			VOC		7.07		30.95	See Appendix B

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	**Hourly Potential Emissions** (lb/hr)	**Actual Annual Emission** (tpy)	**Potential Annual Emission** (tpy)	**Method of Determination**
SYS4	SC09		Total HAP		4.40		19.29	See Appendix B
SYS5	SC67		PM		2.33		10.21	See Appendix B
			PM10		2.33		10.21	See Appendix B
			VOC		10.49		45.93	See Appendix B
			Total HAP		0.31		1.35	See Appendix B
Edge Sealing			VOC		2.86		12.52	See Appendix B
Ink Branding			VOC		10.19		44.64	See Appendix B
Fire Pump/ Emergency Generator			PM		1.52		0.38	See Appendix B
			PM10		1.52		0.38	See Appendix B
			CO		5.30		1.32	See Appendix B
			NOx		22.47		5.62	See Appendix B
			SO2		1.69		0.42	See Appendix B
			VOC		1.51		0.38	See Appendix B
			Total HAP		0.03		0.01	See Appendix B

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
WES1	WESP #1	Secondary Voltage	Volts	4 times per hour
WES2	WESP #2	Secondary Voltage	Volts	4 times per hour
WES3	WESP #3	Secondary Voltage	Volts	4 times per hour
WES1	WESP #1	Outlet Temperature	Degrees F	4 times per hour
WES2	WESP #2	Outlet Temperature	Degrees F	4 times per hour
WES3	WESP #3	Outlet Temperature	Degrees F	4 times per hour
DRTO	Durr RTO	Combustion Zone Temperature	Degrees F	Continuous
HRTO	Huntington RTO	Combustion Zone Temperature	Degrees F	Continuous
PRTO	Pro RTO	Combustion Zone Temperature	Degrees F	Continuous
SRTO	Smith RTO	Combustion Zone Temperature	Degrees F	Continuous
DRTO	Durr RTO	Pressure Drop	Inches Water	Continuous
HRTO	Huntington RTO	Pressure Drop	Inches Water	Continuous
PRTO	Pro RTO	Pressure Drop	Inches Water	Continuous
SRTO	Smith RTO	Pressure Drop	Inches Water	Continuous
FP	Fire Pump	Hours of Operation	Hours	Monthly
EG	Emergency Generator	Hours of Operation	Hours	Monthly

Comments:

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
SC08	System 1 Baghouse	Pressure Drop	Inches Water	Continuous
SC45	Systems 2&3 Baghouse	Pressure Drop	Inches Water	Continuous
SC09	System 4 Baghouse	Pressure Drop	Inches Water	Continuous
SC67	System 5 Baghouse	Pressure Drop	Inches Water	Continuous

Comments:

Facility Name: Huber Engineered Woods, LLC **Date of Application:** June 2009

FORM 6.00 – FUGITIVE EMISSION SOURCES

Fugitive Emission Source ID	Description of Source	Emission Reduction Precautions	Pot. Fugitive Emissions	
			Amount (tpy)	Pollutant
STR	Debarker, Strander, and Green Bins	Good operating procedures	357.50	VOC
		Good operating procedures	3.77	Total HAP

APPENDIX B – EMISSION CALCULATIONS

Facility Wide Emissions Summary

Hourly Criteria Emissions (lb/hr)

Pollutant	Dryers and Furnace	Press DRTO	Forming (SC45)	Screening & Blending (SC08)	Trim & Grade (SC09)	Sanding and Tongue & Groove (SC67)	Edge Sealing	Ink Branding & Stamping	Fire Pump/ EG
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
PM	21.65	10.14	1.77	1.63	1.31	2.33	0.00	0.00	1.52
PM_{10}	21.65	10.14	1.77	1.63	1.31	2.33	0.00	0.00	1.52
CO	64.30	11.45	0.00	0.00	0.00	0.00	0.00	0.00	5.30
NO_X	142.55	22.86	0.00	0.00	0.00	0.00	0.00	0.00	22.47
SO_2	10.64	2.86	0.00	0.00	0.00	0.00	0.00	0.00	1.69
VOC	42.89	10.14	6.86	12.90	7.07	10.49	2.86	10.19	1.51

Annual Criteria Emissions (tpy)

Pollutant	Dryers and Furnace	Press DRTO	Forming (SC45)	Screening & Blending (SC08)	Trim & Grade (SC09)	Sanding and Tongue & Groove (SC67)	Edge Sealing	Ink Branding & Stamping	Fire Pump/ EG	Total
	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy
PM	94.83	44.41	7.73	7.13	5.75	10.21	0.00	0.00	0.38	170.44
PM_{10}	94.83	44.41	7.73	7.13	5.75	10.21	0.00	0.00	0.38	170.44
CO	281.64	50.16	0.00	0.00	0.00	0.00	0.00	0.00	1.32	333.13
NO_X	624.36	100.14	0.00	0.00	0.00	0.00	0.00	0.00	5.62	730.11
SO_2	46.59	12.54	0.00	0.00	0.00	0.00	0.00	0.00	0.42	59.56
VOC	187.86	44.43	30.05	56.52	30.95	45.93	12.52	44.64	0.38	453.29

Hourly HAP Emissions (lb/hr)

Pollutant	Dryers and Furnace	Press DRTO	Forming (SC45)	Screening & Blending (SC08)	Trim & Grade (SC09)	Sanding and Tongue & Groove (SC67)	Edge Sealing	Ink Branding & Stamping	Fire Pump & EG	Total
	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Acetaldehyde	0.56	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.65
Acetophenone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrolein	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Benzene	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10
Bis(2-ethylhexyl)phthalate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Butanone (MEK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon Tetrachloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorine	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Chlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cumene	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28
Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,4-Dinitrophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethyl benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Formaldehyde	6.99	4.78	0.20	0.10	0.31	0.10	0.00	0.00	0.01	12.49
n-Hexane	0.08	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
Hydrogen Chloride	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29
Methanol	0.93	0.66	2.66	0.10	4.10	0.20	0.00	0.00	0.00	8.65
Methylene Diphenyl Diisocyanate	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
MIBK	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Naphthalene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-Nitrophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phenol	4.45	3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.79
Propinonaldehyde	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Styrene	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
2,3,7,8-Tetrachlorodibenzo-p-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluene	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
2,4,6-Trichlorophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Antimony	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beryllium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manganese	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Mercury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molybdenum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nickel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phosphorus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanadium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zinc	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02

Annual HAP Emissions (tpy)

Pollutant	Dryers and Furnace	Press DRTO	Forming (SC45)	Screening & Blending (SC08)	Trim & Grade (SC09)	Sanding and Tongue & Groove (SC67)	Edge Sealing	Ink Branding & Stamping	Fire Pump/ EG	Total
	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy
Acetaldehyde	2.46	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.80
Acetophenone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrolein	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
Benzene	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43
Bis(2-ethylhexyl)phthalate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Butanone (MEK)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carbon Tetrachloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chlorine	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Chlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloroform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cumene	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20
Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,4-Dinitrophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethyl benzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Formaldehyde	30.62	20.92	0.90	0.45	1.35	0.45	0.00	0.00	0.00	54.68
n-Hexane	0.37	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56
Hydrogen Chloride	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25
Methanol	4.06	2.89	11.66	0.45	17.94	0.90	0.00	0.00	0.00	37.90
Methylene Diphenyl Diisocyanate	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
MIBK	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
Naphthalene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
4-Nitrophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pentachlorophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phenol	19.47	14.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.12
Propinonaldehyde	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
Styrene	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
2,3,7,8-Tetrachlorodibenzo-p-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluene	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
2,4,6-Trichlorophenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vinyl Chloride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Antimony	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beryllium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lead	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Manganese	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
Mercury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molybdenum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nickel	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Phosphorus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanadium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zinc	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08

Stranding and Green Bins

Equipment Capacities		
Strand & Green Bin	77	MSF/hr
Hours of Operation	8,760	hours/year

Criteria Pollutant Emissions

Pollutant	Emission Factor	Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency	Potential Emissions	
	lb/MSF			lb/MSF	%	lb/hr	tpy
PM	No Data		1.00	No Data	-	No Data	No Data
PM_{10}	No Data		1.00	No Data	-	No Data	No Data
VOC	1.06	1	1.00	1.06	-	81.62	357.50

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor	Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency	Potential Emissions	
	lb/MSF			lb/MSF	%	lb/hr	tpy
Formaldehyde	1.18E-03	1	1.00	1.18E-03	-	0.09	0.40
Methanol	1.00E-02	1	1.00	1.00E-02	-	0.77	3.37

[1] Emission factors taken from the South Carolina DHEC Statement of Basis for Grant Allendale, Inc., Permit No. 0160-0020-CB, November 24, 2008.

Wellons Furnace

Equipment Capacities		
Furnace (WBNR)	150.0	MMBtu/hr
Dryer (WBNR)	50.0	ODT/hr
Board Press Rate	77	MSF/hr
Hours of Operation	8,760	hours/year

Criteria Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)		Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[5]	Potential Emissions	
	Factor	Units			lb/Unit	%	lb/hr	tpy
PM	1.00E-01	lb/MMBtu	3	1.00	1.00E-01	-	15.00	65.70
PM_{10}	1.00E-01	lb/MMBtu	3	1.00	1.00E-01	-	15.00	65.70
CO	9.67E-01	lb/ODT	1	1.33	1.29E+00	-	64.30	281.64
NO_X	2.14E+00	lb/ODT	1	1.33	2.85E+00	-	142.55	624.36
SO_2	See Below	See Below	See Below	See Below	See Below	-	9.91	43.41
VOC	0.00E+00	lb/MMBtu	4	1.00	0.00E+00	-	0.00	0.00

SO_2 Emissions

Pollutant	Emission Factor (No Safety Factor)		Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[5]	Potential Emissions	
	Factor	Units			lb/Unit	%	lb/hr	tpy
SO_2 (From Accelerant)	8.00E-02	lb/MSF	6	1.00	0.080	-	6.16	26.98
SO_2 (From Wood Combustion)	2.50E-02	lb/MMBtu	2	1.00	2.50E-02	-	3.75	16.43

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[2]		Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[5]	Potential Emissions	
	Factor	Units		lb/MMBtu	%	lb/hr	tpy
Acetaldehyde	8.30E-04	lb/MMBtu	1.00	8.30E-04	90%	1.25E-02	5.45E-02
Acenaphthene	9.10E-07	lb/MMBtu	1.00	9.10E-07	90%	1.37E-05	5.98E-05
Acenaphthylene	5.00E-06	lb/MMBtu	1.00	5.00E-06	90%	7.50E-05	3.29E-04
Acetophenone	3.20E-09	lb/MMBtu	1.00	3.20E-09	90%	4.80E-08	2.10E-07
Acrolein	4.00E-03	lb/MMBtu	1.00	4.00E-03	90%	6.00E-02	2.63E-01
Anthracene	3.00E-06	lb/MMBtu	1.00	3.00E-06	90%	4.50E-05	1.97E-04
Benzene	4.20E-03	lb/MMBtu	1.00	4.20E-03	90%	6.30E-02	2.76E-01
Benzo(b,k)fluoranthene	1.00E-07	lb/MMBtu	1.00	1.00E-07	90%	1.50E-06	6.57E-06
Benzo(g,h,i)perylene	9.30E-08	lb/MMBtu	1.00	9.30E-08	90%	1.40E-06	6.11E-06
Bis(2-ethylhexyl)phthalate	4.70E-08	lb/MMBtu	1.00	4.70E-08	90%	7.05E-07	3.09E-06
Carbon Tetrachloride	4.50E-05	lb/MMBtu	1.00	4.50E-05	90%	6.75E-04	2.96E-03
Chlorine	7.90E-04	lb/MMBtu	1.00	7.90E-04	90%	1.19E-02	5.19E-02
Chlorobenzene	3.30E-05	lb/MMBtu	1.00	3.30E-05	90%	4.95E-04	2.17E-03
Chloroform	2.80E-05	lb/MMBtu	1.00	2.80E-05	90%	4.20E-04	1.84E-03
Chrysene	3.80E-08	lb/MMBtu	1.00	3.80E-08	90%	5.70E-07	2.50E-06
Dibenzo(a,h) anthracene	9.10E-09	lb/MMBtu	1.00	9.10E-09	90%	1.37E-07	5.98E-07
2,4-Dinitrophenol	1.80E-07	lb/MMBtu	1.00	1.80E-07	90%	2.70E-06	1.18E-05
Ethyl benzene	3.10E-05	lb/MMBtu	1.00	3.10E-05	90%	4.65E-04	2.04E-03
Fluoranthene	1.60E-06	lb/MMBtu	1.00	1.60E-06	90%	2.40E-05	1.05E-04
Fluorine	3.40E-06	lb/MMBtu	1.00	3.40E-06	90%	5.10E-05	2.23E-04
Formaldehyde	4.40E-03	lb/MMBtu	1.00	4.40E-03	90%	6.60E-02	2.89E-01
Hydrogen Chloride	1.90E-02	lb/MMBtu	1.00	1.90E-02	90%	2.85E-01	1.25E+00
Naphthalene	9.70E-05	lb/MMBtu	1.00	9.70E-05	90%	1.46E-03	6.37E-03
4-Nitrophenol	1.10E-07	lb/MMBtu	1.00	1.10E-07	90%	1.65E-06	7.23E-06
Pentachlorophenol	5.10E-08	lb/MMBtu	1.00	5.10E-08	90%	7.65E-07	3.35E-06

Toxic/Hazardous Air Pollutant Emissions (Continued)

Pollutant	Emission Factor (No Safety Factor)[2]		Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[5]	Potential Emissions	
	Factor	Units		lb/MMBtu	%	lb/hr	tpy
Phenol	5.10E-05	lb/MMBtu	1.00	5.10E-05	90%	7.65E-04	3.35E-03
Propinonaldehyde	6.10E-05	lb/MMBtu	1.00	6.10E-05	90%	9.15E-04	4.01E-03
Pyrene	3.70E-06	lb/MMBtu	1.00	3.70E-06	90%	5.55E-05	2.43E-04
Styrene	1.90E-03	lb/MMBtu	1.00	1.90E-03	90%	2.85E-02	1.25E-01
2,3,7,8-Tetrachlorodibenzo-p-	8.60E-12	lb/MMBtu	1.00	8.60E-12	90%	1.29E-10	5.65E-10
1,1,1-Trichloroethane	3.10E-05	lb/MMBtu	1.00	3.10E-05	90%	4.65E-04	2.04E-03
Toluene	9.20E-04	lb/MMBtu	1.00	9.20E-04	90%	1.38E-02	6.04E-02
2,4,6-Trichlorophenol	2.20E-08	lb/MMBtu	1.00	2.20E-08	90%	3.30E-07	1.45E-06
Vinyl Chloride	1.80E-05	lb/MMBtu	1.00	1.80E-05	90%	2.70E-04	1.18E-03
Xylenes	2.50E-05	lb/MMBtu	1.00	2.50E-05	90%	3.75E-04	1.64E-03
Antimony	7.90E-06	lb/MMBtu	1.00	7.90E-06	75%	2.96E-04	1.30E-03
Arsenic	2.20E-05	lb/MMBtu	1.00	2.20E-05	75%	8.25E-04	3.61E-03
Barium	1.70E-04	lb/MMBtu	1.00	1.70E-04	75%	6.38E-03	2.79E-02
Beryllium	1.10E-06	lb/MMBtu	1.00	1.10E-06	75%	4.13E-05	1.81E-04
Cadmium	4.10E-06	lb/MMBtu	1.00	4.10E-06	75%	1.54E-04	6.73E-04
Chromium	2.10E-05	lb/MMBtu	1.00	2.10E-05	75%	7.88E-04	3.45E-03
Chromium VI	3.50E-06	lb/MMBtu	1.00	3.50E-06	75%	1.31E-04	5.75E-04
Cobalt	6.50E-06	lb/MMBtu	1.00	6.50E-06	75%	2.44E-04	1.07E-03
Copper	4.90E-05	lb/MMBtu	1.00	4.90E-05	75%	1.84E-03	8.05E-03
Fluoride	0.00E+00	lb/MMBtu	1.00	0.00E+00	75%	0.00E+00	0.00E+00
Lead	4.80E-05	lb/MMBtu	1.00	4.80E-05	75%	1.80E-03	7.88E-03
Manganese	1.60E-03	lb/MMBtu	1.00	1.60E-03	75%	6.00E-02	2.63E-01
Mercury	3.50E-06	lb/MMBtu	1.00	3.50E-06	75%	1.31E-04	5.75E-04
Molybdenum	2.10E-06	lb/MMBtu	1.00	2.10E-06	75%	7.88E-05	3.45E-04
Nickel	3.30E-05	lb/MMBtu	1.00	3.30E-05	75%	1.24E-03	5.42E-03
Phosphorus	2.70E-05	lb/MMBtu	1.00	2.70E-05	75%	1.01E-03	4.43E-03
Selenium	2.80E-06	lb/MMBtu	1.00	2.80E-06	75%	1.05E-04	4.60E-04
Vanadium	9.80E-07	lb/MMBtu	1.00	9.80E-07	75%	3.68E-05	1.61E-04
Zinc	4.20E-04	lb/MMBtu	1.00	4.20E-04	75%	1.58E-02	6.90E-02

[1] Emission factor from stack test conducted between January 23, 2008 and January 31, 2008 at the Commerce, GA facility.

[2] Emission factors from AP-42, Table 1.6-2, 1.6-3, and 1.6-4 for wood residue combustion.

[3] Emission factor is the sum of the NSPS Subpart Db limit for wood fired boilers with heat inputs greater than 100 MMBtu/hr of 0.1 lb/MMBtu. The condensible portion of the PM emissions is accounted for under the dryer emissions because they use the stack test values from January 2008, which include the furnace condensibles.

[4] Emissions of VOC from the furnace are accounted for on the dryer emissions worksheet, as the majority of VOC emissions from the furnace and dryer common exhaust points originate in the dryer.

[5] Control efficiencies for PM, CO, NO_x, and VOC are incorporated into the emission factors. Volatile HAP/TAP control efficiency is 90%. Control efficiency for all metal HAPs is 75% from the WESP.

[6] Emisssions from the accelerant are based on a mass balance of sulfur usage in an ammonium sulfate accelerant. This accelerant contains 24.2% S by weight and is dosed at a rate of 1.5% of the MUPF resin usage. It is assumed that approximately 10% of the accelerant is burned in the furnace and that 100% of the sulfur is converted to SO_2.

Dryers

Equipment Capacities		
DRY1, DRY2, DRY3	50.0	ODT/hr
Hours of Operation	8,760	hr/yr

Dryer Emissions (DRY1, DRY2, DRY3)

Criteria Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[8]	Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[5]	Potential Emissions	
	lb/ODT			lb/ODT	%	lb/hr	tpy
PM	1.00E-01	1	1.33	1.33E-01	-	6.65	29.13
PM_{10}	1.00E-01	1	1.33	1.33E-01	-	6.65	29.13
CO	0.00E+00	2	1.33	0.00E+00	-	0.00	0.00
NO_X	0.00E+00	2	1.33	0.00E+00	-	0.00	0.00
SO_2	1.40E-02	3	1.00	1.40E-02	-	0.70	3.07
VOC	6.45E-01	1,7	1.33	8.58E-01	-	42.89	187.86

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[4]	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[6]	Potential Emissions	
	lb/ODT		lb/ODT	%	lb/hr	tpy
Acetaldehyde	1.10E-01	1.00	1.10E-01	90%	0.55	2.41
Acrolein	7.20E-02	1.00	7.20E-02	90%	0.36	1.58
Benzene	6.70E-03	1.00	6.70E-03	90%	0.03	0.15
Cumene	5.50E-02	1.00	5.50E-02	90%	0.28	1.20
Formaldehyde	1.38E-01	1.00	1.38E-01	-	6.92	30.32
Methanol	1.85E-02	1.00	1.85E-02	-	0.93	4.06
MIBK	7.80E-03	1.00	7.80E-03	90%	0.04	0.17
Phenol	8.89E-02	1.00	8.89E-02	-	4.44	19.47
Propinonaldehyde	1.10E-02	1.00	1.10E-02	90%	0.06	0.24
Toluene	1.50E-02	1.00	1.50E-02	90%	0.08	0.33
Xylenes	1.00E-02	1.00	1.00E-02	90%	0.05	0.22

1 Emission factor from stack test conducted between January 23, 2008 and January 31, 2008 at the Commerce, GA facility.
2 Emissions of CO and NO_x for the dryers are accounted for on the furnace emissions worksheet, as the majority of CO and NO_x emissions from the furnace and dryer common exhaust points originate in the furnace.
3 Emission factors taken from AP-42, Tables 10.6.1-2, 10.6.1-3, 10.6.1-5 and 10.6.1-6.
4 Emission factors for formaldehyde, methanol, and phenol taken from the Huber Engineered Wood LLC Title V Operating Permit No.: 2493-157-0014-V-02-0, Parts 4.2.2, 4.2.3, and 4.2.4. All other emission factors are taken from AP-42, Tables 10.6.1-2, 10.6.1-3, 10.6.1-5 and 10.6.1-6.
5 Control efficiencies for PM, PM_{10}, CO and VOC are incorporated into the emission factors.
6 Volatile HAP/TAP control efficiency is 90%.
7 VOC emission rates are calculated by converting the VOC as carbon emission rates from Method 25A testing to a VOC as propane value, adding formaldehyde and methanol emission rates, and subtracting the methanol response factor adjustment.
8 PM and PM_{10} emission factors only include condensables, filterable PM is accounted for in the NSPS limit on filterable PM of 0.1 lb/MMBtu.

Press

Equipment Capacities		
Board Press	77	MSF/hr
Hours of Operation	8,760	hrs/yr

Board Press Emissions

Criteria Pollutants

Pollutant	Emission Factor (No Safety Factor)	Emission Factor Reference	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[4]	Potential Emissions	
	lb/MSF			lb/MSF	%	lb/hr	tpy
PM	0.10	2	1.33	0.132	-	10.14	44.41
PM_{10}	0.10	2	1.33	0.132	-	10.14	44.41
CO	0.12	1	1.00	0.12	-	9.39	41.15
NO_X	0.28	1	1.00	0.28	-	21.64	94.77
SO_2	0.04	3	1.00	0.04	-	2.85	12.48
VOC	0.13	1	1.00	0.13	-	10.01	43.84

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[5]	Safety Factor	Emission Factor (w/ Safety Factor)	Control Efficiency[4]	Potential Emissions	
	lb/MSF		lb/MSF	%	lb/hr	tpy
Acetaldehyde	1.00E-02	1.00	0.01	90%	0.08	0.34
Formaldehyde	6.20E-02	1.00	0.06	-	4.77	20.91
Methanol	8.57E-03	1.00	0.01	-	0.66	2.89
Methylene Diphenyl Diisocyanate	1.10E-03	1.00	0.00	90%	0.01	0.04
Phenol	4.34E-02	1.00	0.04	-	3.34	14.65

[1] Emission factors taken from Title V Operating Permit No.: 2493-157-0014-V-02-0, Parts 4.2.2, 4.2.3, and 4.2.4.

[2] Emission factor from stack test conducted on January 29, 2008 and January 31, 2008.

[3] Emission factor based on information from AP-42, Table 10.6.1-5 and the addition of SO_2 from ammonium sulfate accelerant usage.

[4] Control efficiencies for PM, CO, NO_X, VOC, formaldehyde, methanol, naphthalene, and phenol are all incorporated into the emission factors from Title Operating Permit No.: 2493-157-0014-V-02-0.

[5] Factors for formaldehyde, methanol, and phenol are based on pound per hour emission limits provided in Permit No. 2493-157-0014-V-02-0. All other emissions factors are taken from AP-42 10.6.1, Table 10.6.1-6.

Regenerative Thermal Oxidizers

Equipment Capacities		
Smith RTO	16	MMBtu/hr
Huntington RTO	8	MMBtu/hr
Pro RTO	24	MMBtu/hr
Durr RTO	25	MMBtu/hr
Hours of Operation	8,760	hrs/yr
Heating Value of Natural Gas	1,020	Btu/scf

Smith RTO
Criteria Pollutant Emissions

Pollutant	Emission Factor[1]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
SO_2	0.6	0.01	0.04

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor [2]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
Benzene	2.10E-03	3.29E-05	1.44E-04
Dichlorobenzene	1.20E-03	1.88E-05	8.24E-05
Formaldehyde	7.50E-02	1.18E-03	5.15E-03
n-Hexane	1.80E+00	2.82E-02	1.24E-01
Naphthalene	6.10E-04	9.57E-06	4.19E-05
Toluene	3.40E-03	5.33E-05	2.34E-04
Cadmium	1.10E-03	1.73E-05	7.56E-05
Chromium	1.40E-03	2.20E-05	9.62E-05
Molybdenum	1.10E-03	1.73E-05	7.56E-05
Nickel	2.10E-03	3.29E-05	1.44E-04
Vanadium	2.20E-03	3.45E-05	1.51E-04
Zinc	2.90E-02	4.55E-04	1.99E-03

[1] Emissions of all criteria pollutants except SO_2 are accounted for in stack testing values for either the furnace or the dryers. This is because the stack tests are conducted after the RTO combustion zone and therefore include the natural gas combustion from the RTO. SO_2 emissions are calculated from AP-42

[2] Emission Factors for HAPs taken from AP-42 Section 1.4, Table 1.4-4.

Huntington RTO
Criteria Pollutant Emissions

Pollutant	Emission Factor[1]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
SO_2	0.6	0.00	0.02

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor[2]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
Benzene	2.10E-03	1.59E-05	6.94E-05
Dichlorobenzene	1.20E-03	9.06E-06	3.97E-05
Formaldehyde	7.50E-02	5.66E-04	2.48E-03
n-Hexane	1.80E+00	1.36E-02	5.95E-02
Naphthalene	6.10E-04	4.60E-06	2.02E-05
Toluene	3.40E-03	2.57E-05	1.12E-04
Cadmium	1.10E-03	8.30E-06	3.64E-05
Chromium	1.40E-03	1.06E-05	4.63E-05
Molybdenum	1.10E-03	8.30E-06	3.64E-05
Nickel	2.10E-03	1.59E-05	6.94E-05
Vanadium	2.20E-03	1.66E-05	7.27E-05
Zinc	2.90E-02	2.19E-04	9.59E-04

1 Emissions of all criteria pollutants except SO_2 are accounted for in stack testing values for either the furnace or the dryers. This is because the stack tests are conducted after the RTO combustion zone and therefore include the natural gas combustion from the RTO. SO_2 emissions are calculated from AP-42

2 Emission Factors for HAPs taken from AP-42 Section 1.4, Table 1.4-4.

Pro RTO
Criteria Pollutant Emissions

Pollutant	Emission Factor[1]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
SO_2	0.6	0.01	0.06

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor[2]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
Benzene	2.10E-03	4.94E-05	2.16E-04
Dichlorobenzene	1.20E-03	2.82E-05	1.24E-04
Formaldehyde	7.50E-02	1.76E-03	7.73E-03
n-Hexane	1.80E+00	4.24E-02	1.86E-01
Naphthalene	6.10E-04	1.44E-05	6.29E-05
Toluene	3.40E-03	8.00E-05	3.50E-04
Cadmium	1.10E-03	2.59E-05	1.13E-04
Chromium	1.40E-03	3.29E-05	1.44E-04
Molybdenum	1.10E-03	2.59E-05	1.13E-04
Nickel	2.10E-03	4.94E-05	2.16E-04
Vanadium	2.20E-03	5.18E-05	2.27E-04
Zinc	2.90E-02	6.82E-04	2.99E-03

[1] Emissions of all criteria pollutants except SO_2 are accounted for in stack testing values for either the furnace or the dryers. This is because the stack tests are conducted after the RTO combustion zone and therefore include the natural gas combustion from the RTO. SO_2 emissions are calculated from AP-42

[2] Emission Factors for HAPs taken from AP-42 Section 1.4, Table 1.4-4.

Durr RTO
Criteria Pollutant Emissions

Pollutant	Emission Factor[2]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
CO	84	2.06	9.02
NO_X	50	1.23	5.37
SO_2	0.6	0.01	0.06
VOC	5.5	0.13	0.59

Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor[1]	Potential Emissions	
	$lb/10^6$ scf	lb/hr	tpy
Benzene	2.10E-03	5.15E-05	2.25E-04
Dichlorobenzene	1.20E-03	2.94E-05	1.29E-04
Formaldehyde	7.50E-02	1.84E-03	8.05E-03
n-Hexane	1.80E+00	4.41E-02	1.93E-01
Naphthalene	6.10E-04	1.50E-05	6.55E-05
Toluene	3.40E-03	8.33E-05	3.65E-04
Cadmium	1.10E-03	2.70E-05	1.18E-04
Chromium	1.40E-03	3.43E-05	1.50E-04
Molybdenum	1.10E-03	2.70E-05	1.18E-04
Nickel	2.10E-03	5.15E-05	2.25E-04
Vanadium	2.20E-03	5.39E-05	2.36E-04
Zinc	2.90E-02	7.11E-04	3.11E-03

[1] Emission Factors for HAPs taken from AP-42 Section 1.4, Table 1.4-4.

[2] Emissions of all criteria pollutants except PM and PM_{10} are calculated using AP-42 factors from Section 1.4. PM and PM_{10} are accounted for in stack testing values for the press. Stack tests are conducted after the RTO combustion zone and therefore include any emissions from natural gas combustion inside the RTO.

Baghouse Emissions

Equipment Capacities[3]				
SC08	50,000	scfm	77	MSF/hr
SC45	54,200	scfm	77	MSF/hr
SC09	40,300	scfm	77	MSF/hr
SC67	71,600	scfm	77	MSF/hr
Hours of Operation	8,760	hrs/yr		

Baghouse - Forming (SC45)

Pollutant	Emission Factor (No Safety Factor)[1, 2]		Safety Factor	Emission Factor (w/ Safety Factor)		Potential Emissions	
	Factor	Units		Factor	Units	lb/hr	tpy
PM	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.77	7.73
PM_{10}	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.77	7.73
VOC	6.70E-02	lb/MSF	1.33	0.09	lb/MSF	6.86	30.05
Formaldehyde	2.00E-03	lb/MSF	1.33	0.00	lb/MSF	0.20	0.90
Methanol	2.60E-02	lb/MSF	1.33	0.03	lb/MSF	2.66	11.66

Baghouse - Screening and Blending (SC08)

Pollutant	Emission Factor (No Safety Factor)[1, 2]		Safety Factor	Emission Factor (w/ Safety Factor)		Potential Emissions	
	Factor	Units		Factor	Units	lb/hr	tpy
PM	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.63	7.13
PM_{10}	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.63	7.13
VOC	1.26E-01	lb/MSF	1.33	1.68E-01	lb/MSF	12.90	56.52
Formaldehyde	1.00E-03	lb/MSF	1.33	1.33E-03	lb/MSF	0.10	0.45
Methanol	1.00E-03	lb/MSF	1.33	1.33E-03	lb/MSF	0.10	0.45

[1] PM emission factors include filterable and condensible PM, and are calculated using an outlet grain loading rate of 0.0038 gr/dscf and a conversion factor of 7,000 grains per pound.
[2] Emission factors for VOC, formaldehyde, and methanol taken from August 2005, March 2006, and August 2006 stack testing at Huber's Broken Bow site.
[3] Baghouse flow rates taken from Title V Modification Application, submitted August 2005, resulting in Part 70 Permit Amendment 2493-157-0014-V-01-8.

Baghouse Emissions - cont.

Baghouse - Trim and Grade (SC09)

Pollutant	Emission Factor (No Safety Factor)[1, 2]		Safety Factor	Emission Factor (w/ Safety Factor)		Potential Emissions	
	Factor	Units		Factor	Units	lb/hr	tpy
PM	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.31	5.75
PM_{10}	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	1.31	5.75
VOC	6.90E-02	lb/MSF	1.33	9.18E-02	lb/MSF	7.07	30.95
Formaldehyde	3.00E-03	lb/MSF	1.33	3.99E-03	lb/MSF	0.31	1.35
Methanol	4.00E-02	lb/MSF	1.33	5.32E-02	lb/MSF	4.10	17.94

Baghouse - Sanding and Tongue & Groove (SC67)

Pollutant	Emission Factor (No Safety Factor)[1, 2]		Safety Factor	Emission Factor (w/ Safety Factor)		Potential Emissions	
	Factor	Units		Factor	Units	lb/hr	tpy
PM	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	2.33	10.21
PM_{10}	5.43E-07	lb/scf	1.00	5.43E-07	lb/scf	2.33	10.21
VOC	1.02E-01	lb/MSF	1.33	1.36E-01	lb/MSF	10.49	45.93
Formaldehyde	1.00E-03	lb/MSF	1.33	1.33E-03	lb/MSF	0.10	0.45
Methanol	2.00E-03	lb/MSF	1.33	2.66E-03	lb/MSF	0.20	0.90

[1] PM emission factors include filterable and condensible PM, and are calculated using an outlet grain loading rate of 0.0038 gr/dscf and a conversion factor of 7,000 grains per pound.

[2] Emission factors for VOC, formaldehyde, and methanol taken from August 2005, March 2006, and August 2006 stack testing at Huber's Broken Bow site.

[3] Baghouse flow rates taken from Title V Modification Application, submitted August 2005, resulting in Part 70 Permit Amendment 2493-157-0014-V-01-8.

Ink Branding and Stamping and Edge Sealing Emissions

Edge Seal Emissions

Equipment Capacities		
Max Produciton Rate	77	MSF/hr
Hours of Operation	8,760	MSF/hr

Pollutant	Emission Factor (No Safety Factor) [1]	Safety Factor[3]	Emission Factor (w/ Safety Factor)	Control Efficiency	Potential Emissions	
	lb/MSF		lb/MSF	%	lb/hr	tpy
VOC	1.86E-02	2.00	3.71E-02	-	2.86	12.52

Ink Branding and Stamping Emissions

Max Produciton Rate	77	MSF/hr
Hours of Operation	8,760	MSF/hr

Pollutant	Emission Factor (No Safety Factor) [2]	Safety Factor[3]	Emission Factor (w/ Safety Factor)	Control Efficiency	Potential Emissions	
	lb/MSF		lb/MSF	%	lb/hr	tpy
VOC	6.62E-02	2.00	1.32E-01	-	10.19	44.64

[1] Emissions factors for edge coating calculated from 2008 usage data and six MSDS for the different coatings. In 2008, there were 2.79 tons of VOC emissions from edge sealing. These emissions resulted from production of 300,698 MSF of board.

[2] Emissions factors for ink application calculated from 2008 usage data and the MSDS for the ink used for branding and stamping. In 2008, there were 9.95 tons of VOC emissions from ink branding and stamping. These emissions resulted from production of 300,698 MSF of board.

[3] A safety factor of 2.0 is used to account for variation in customer requests involving the size and/or type of branded or stamped logo on the side of the board.

Emergency Generator and Fire Pump Emissions

Equipment Capacities		
Fire Pump	225	hp
Emergency Generator	600	hp
Fire Pump[1]	2.10	MMBtu/hr
Emergency Generator[1]	5.60	MMBtu/hr
Heating Value (No. 2)[2]	0.14	MMBtu/gal
% Sulfur in No. 2	1.50%	S%
Hours of Operation	500	hrs/yr

Emergency Generator Criteria Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[3]	Potential Emissions	
	lb/hp-hr	lb/hr	tpy
PM	2.20E-03	1.32	0.33
PM_{10}	2.20E-03	1.32	0.33
CO	6.68E-03	4.01	1.00
NO_X	3.10E-02	18.60	4.65
SO_2	2.05E-03	1.23	0.31
VOC	2.51E-03	1.51	0.38

Emergency Generator Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[3]	Potential Emissions	
	lb/MMBtu	lb/hr	tpy
Acetaldehyde	7.67E-04	4.30E-03	1.07E-03
Acrolein	9.25E-05	5.18E-04	1.30E-04
Benzene	9.33E-04	5.22E-03	1.31E-03
Formaldehyde	1.18E-03	6.61E-03	1.65E-03
Naphthalene	8.48E-05	4.75E-04	1.19E-04
Toluene	4.09E-04	2.29E-03	5.73E-04
Xylenes	2.85E-04	1.60E-03	3.99E-04

[1] Heat input for fuel burning equipment based upon 7,000 Btu/hp-hr (output) and a 75% engine efficiency.

[2] Heating value for No. 2 oil from AP-42, Section 1.3, Table 1.3-2 reference d.

[3] Emission factors from AP-42, Tables 3.3-1 and 3.3-2 [for diesel fuel oil].

Fire Pump Criteria Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[1,2]	Potential Emissions	
	lb/hp-hr	lb/hr	tpy
PM	8.82E-04	0.20	0.05
PM_{10}	8.82E-04	0.20	0.05
CO	5.73E-03	1.29	0.32
NMHC + NO_X[3]	1.72E-02	3.87	0.97
SO_2	2.05E-03	0.46	0.12

Fire Pump Toxic/Hazardous Air Pollutant Emissions

Pollutant	Emission Factor (No Safety Factor)[1]	Potential Emissions	
	lb/MMBtu	lb/hr	tpy
Acetaldehyde	7.67E-04	1.61E-03	4.03E-04
Acrolein	9.25E-05	1.94E-04	4.86E-05
Benzene	9.33E-04	1.96E-03	4.90E-04
Formaldehyde	1.18E-03	2.48E-03	6.20E-04
Naphthalene	8.48E-05	1.78E-04	4.45E-05
Toluene	4.09E-04	8.59E-04	2.15E-04
Xylenes	2.85E-04	5.99E-04	1.50E-04

[1] Emission factors for SO_2 and HAP/TAP from AP-42, Tables 3.3-1 and 3.3-2 [for diesel fuel oil].

[2] Emission factors for NMHC + NO_X, CO, and PM/PM_{10} from NSPS, Subpart IIII, Table 4.

[3] NMHC + NO_X emisisons are shown as NO_X only in the facility summary table.

Appendix B - Detailed Emission Calculations
Huber - Commerce Mill

Building Vent/Fan Emissions

Building	Flow (cfm)	IH Concentration[1]		Emissions	
		Pollutant	mg/m^3	lb/hr	tons/yr
Warehouse	187,000	Formaldehyde	0.09	0.07	0.29
		Methanol	0.23	0.16	0.70
		VOC	3.45	2.42	10.60
		PM_{10}	0.06	0.04	0.18
Blending, Forming, & Screening	180,000	Formaldehyde	0.31	0.21	0.92
		MDI	0.01	0.01	0.04
		Methanol	6.32	4.27	18.69
		VOC	12.33	8.32	36.45
		PM_{10}	0.21	0.14	0.62
Total Emissions		Formaldehyde		0.28	1.21
		MDI		0.01	0.04
		Methanol		4.43	19.38
		VOC		10.74	47.05
		PM_{10}		0.18	0.81

[1] Building VOC concentrations are the result of Industrial Hygiene (IH) testing at HEW's Whites Creek Mill. VOC was calculated by converting to THC as propane and adding the formaldehyde concentration. PM are based Commerce actual respirable dust data from 12/00, and 08/04.

Road Emissions

Unpaved Roads

$$E = k\left(\frac{s}{12}\right)^a \left(\frac{W}{3}\right)^b \left(\frac{365-P}{365}\right)$$

Based upon AP-42 13.2.2 (12/03), Equation 1a (Industrial Roads) Where:

E = size specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
P = number of days with precipitation or snow covering 0.01" of roadway

Paved Roads

$$E_{ext} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C\right]\left(1 - \frac{P}{4N}\right)$$

Based upon AP-42 13.2.1 (13/03), Equation 2 Where:

Eext = annual or other long-term average emission factor in the same units as k (Eext denoted E below)
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m2)
W = mean vehicle weight (tons)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear
P = number of days with precipitation or snow covering 0.01" of roadway
N = number of days in the averaging period

Road Emissions (continued)

VMT Calculations

Route	Route Length (miles)	Trucks per Day	VMT/day	VMT/yr	% Paved
Log Delivery	1.41	150	211.5	77,197.50	85%
Waste Trucks	1.78	25	44.5	16,242.50	91%
Finished Product	1.77	85	150.45	54,914.25	99%
Employee Traffic	1.37	115	157.55	57,505.75	100%

PM_{10} Emissions

Vehicle Type	S (mph)	W (tons)	P[1] (days)	k[2] (lb/VMT)	a[2]	b[2]	s[3] (%)	sL[5]	C[4] (lb/VMT)	N	E (uncntrl) (lb/VMT)	E (ctrl)[6] (lb/VMT)	Distance Traveled (mile/yr)	PM_{10} (tpy)
Pine Log Trucks (unpaved)	10	25.0	120	1.50	0.90	0.45	8.40	--	--	--	1.90	1.90	11,498	10.90
Pine Log Trucks (paved)	10	25.0	120	0.02	--	--	--	0.26	4.70E-04	365	0.09	0.09	65,700	3.07
Waste Trucks (unpaved)	10	27.0	120	1.50	0.90	0.45	8.40	--	--	--	1.96	1.96	1,460	1.43
Waste Trucks (paved)	10	27.0	120	0.02	--	--	--	0.26	4.70E-04	365	0.10	0.10	14,783	0.77
Finished Product (unpaved)	10	37.5	120	1.50	0.90	0.45	8.40	--	--	--	2.28	2.28	621	0.71
Finished Product (paved)	10	37.5	120	0.02	--	--	--	0.26	4.70E-04	365	0.17	0.17	54,294	4.67
Employee Traffic (paved)	10	3.5	120	0.02	--	--	--	0.26	4.70E-04	365	4.48E-03	4.48E-03	57,506	0.13
Total PM_{10}														21.68

[1] Average number of days with sufficient rainfall/snow cover based upon conservative estimate from AP-42 (12/03), Figure 13.2.1-2 and 13.2.2-1
[2] Constants based upon AP-42, Table 13.2.1-1 and 13.2.2-2, Industrial Roads
[3] Surface material silt content based on AP-42, Table 13.2.2-1.
[4] Constants based upon AP-42, Table 13.2.1-2 and 13.2.1-4.
[5] Silt loading (sL) rate based on site specific data from Huber's Crystal Hill, VA mill.
[6] Assumed 0% control, no regular road watering or sweeping.

Storage Piles and Manual Transfers

AP-42 Section 13.2.4, Aggregate Handling and Storage Piles

$E = k(0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}$ for miscellaneous bulky materials (bark, strands, etc.)

where: E = emission factor (lb/ton)
k = particle size multiplier (dimensionless, 0.35 for PM_{10}, 0.74 for PM)
U = mean wind speed (mph)
M = material moisture content (%)

PM_{10} Emissions

Material Transferred[1]	ID	# Drops	Quantity (tons)	U[3]	M[4]	PM_{10} Emission Factor (lb/ton)[2]	PM_{10} Annual Emissions (tpy)
Bark	FD-1	3	5,250	6.41	4.8	4.54E-04	3.58E-03
Sander Dust	FD-2	3	11,250	6.41	3.0	2.90E-02	4.89E-01
Ash	FD-3	3	400	6.41	0.3	2.84E-02	1.71E-02
Flake	FD-4	3	7,500	6.41	4.8	4.54E-04	5.11E-03
Total PM_{10}							5.15E-01

[1] Emissions from bark and flake transfer is cacluated using the *Aggregate Handling and Storage Piles* equation from AP-42, Section 13.2.4.

[2] For sander dust: E = 0.029 lb/ton PM_{10} per AP-42 Table 9.9.1-1 for grain shipping by truck

[3] 6.41 mph is the average wind speed for Augusta, Georgia (closest city in EPA TANKS database).

[4] Moisture content of the bark is conservatively set to 4.8%, actual moisture content is approximately 47%.

APPENDIX C – RBLC DATABASE REPORT

Particulate Matter, <10 microns (PM_{10}) / Visible Emissions (VE)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		5.5 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		5.5 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER BYPASS (2)		5.34 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		10.17 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		10.17 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		10.17 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		10.17 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYER RTOS		9.17 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER RTOS (2)		7.34 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	DRYER SYSTEM, LINE I, LINE II		6.1 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	DRYER SYSTEM, LINE I, LINE II		6.1 LB/H			S14; P13, P14 MODIFIED UNDER 03-POY-070
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	DRYER, 5, EACH	475 MMSF/YR	14.89 LB/H	90		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, MDF, TUBE	454611 ODT/YR	1.4 LB/H	90		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, PB, ROT, SINGLE PASS	578861 ODT/YR	1.19 LB/H	90		
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	DRYER, PROCESS, 3	58 MMBTU/H	55.4 LB/H	95		
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	DRYERS	475 MMSF/YR	14.9 LB/H	90		
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYERS 1-5 BYPASS		20 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYERS 1-5 BYPASS		28 LB/H			
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	DRYERS AND BURNERS, WOOD CHI	108000 LB/H	0.03 GR/DSCF			Additional limit: 136.4 t/12 mo. RTO may be bypassed for maintenance, limits become 0.057 gr/dscf and 56.6 lb/h.
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) FEED MATERIAL DRYERS NOS 1-4, PB-40&-41		1.3 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) FEED MATERIAL DRYERS NOS 1-4, PB-40&-41		10 % OPACITY		10 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) FEED MATERIAL DRYERS NOS 1-4, PB-40&-41		1.3 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	FLAKE DRYERS		10 LB/H			SAME LIMIT APPLIES TO PM-10.
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	FLAKE DRYERS, 5	550216 T	33.8 LB/H	95		
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	FLAKE DRYERS, 5	550216 T	5 % OPACITY		5 % OPACITY	
HOMANIT - MT GILEAD	MONTGOMERY	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	11 LB/H			
HOMANIT - MT GILEAD	MONTGOMERY	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	20 % OPACITY		20 % OPACITY	
HOMANIT - MT GILEAD	MONTGOMERY	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	12.8 LB/H			
G-P MONTICELLO MDF PLANT	JASPER	GA	9/15/1999	FLASH TUBE DRYER AND PRESS	250 MMSF/YR	2.54 LB/H			
URANIA PLANT	LASALLE PARIS	LA	12/7/2000	FLASH TUBE DRYER NO.1 AND NO.2	15000 LB/H EACH	14.5 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	WOOD DRYERS, (5)	1636250 sqf/d	13.54 LB/H			THE EMISSION POINT FOR THIS PROCESS IS THE RTO.

Particulate Matter, <10 microns (PM_{10}) / Visible Emissions (VE)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
PARAGON PANELS OF ALABAMA, L.L.C.	BARBOUR	AL	4/12/2006	WOOD FIBER PREP/DRYING	151 mmsf/yr	20.57 LB/H	95		
PARAGON PANELS OF ALABAMA, L.L.C.	BARBOUR	AL	4/12/2006	WOOD FIBER PREP/DRYING	151 mmsf/yr	20.57 LB/H	95		
NORBORD GEORGIA	CRISP	GA	6/3/2005	WOOD FLAKE DRYERS	52 ODT/H	0.55 LB/ODT			2 FLAKE DRYERS AND WOOD-FIRED BOILER (ENERGY SYSTEM) EXHAUST THROUGH COMBINED STACK.
PLUM CREEK MANUFACTURING, L.P.	FLATHEAD	MT	12/23/1999	WOOD PRODUCTS, MEDIUM DENSIT	46500 T/YR	18 LB/H	99		
POTLATCH CORPORATION	ITASCA	MN	12/4/2000	WOOD WAFER DRYER, TRIPLE PASS	33000 LB/H	6 LB/H			
POTLATCH CORPORATION	ITASCA	MN	12/4/2000	WOOD WAFER DRYER, TRIPLE PASS	33000 LB/H	6 LB/H	95		
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRE DRYER	39 MMBTU/H	2.3 LB/H	90		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	ROTARY CHIP DRYER, (5)	600 MMSF/YR	18.82 LB/H	80		
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	ROTARY DRYER NOS. 1-3	300000 MSF/YR 3/8 ir	1.91 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	8.2 LB/H	93		
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	10 % OPACITY		10 % OPACITY	
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BURNER, START UP/SHUT DOWN, NO	30 MMBtu/h	0.22 LB/H		0.0075 LB/MMBTU	
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	EMERGENCY GENERATOR		1.85 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	EMERGENCY GENERATOR		4.5 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FIRE WATER PUMP		0.33 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FIRE WATER PUMP		1.58 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BOARD PRESS	85000 LB/H	6.2 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BOARD PRESS	85000 LB/H	10 % OPACITY		10 % OPACITY	
NORBORD GEORGIA	CRISP	GA	6/3/2005	OSB BOARD PRESS	650 MMSQF/YR	4 LB/H			OXIDIZER INSTALLED FOR VOC CONTROL PROVIDES CONTROL FOR PARTICULATE MATTER
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	OSB PRESS	900000 MSF/YR 3/8 I	7.97 LB/H			
URANIA PLANT	LASALLE PARIS	LA	12/7/2000	MDF PRESS VENTS	32 MMBTU/H	6.79 LB/H	95		
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		0.62 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		10 % OPACITY		10 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		0.62 LB/H			
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	PANEL PRESS W/ ONE RTO OR TCO	475000 SQF	2.8 LB/H	75		
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	PANEL PRESS W/ ONE RTO OR TCO	475000 SQF	5 % OPACITY		5 % OPACITY	
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	PRESS	1636250 sqf/D	9.58 LB/H			THE LIMIT CORRESPONDS TO THE EMISSIONS FROM RTO.
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	PRESS	475 MMSF/YR	2.83 LB/H	75		
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRESS		2.5 LB/H	90		
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS BYPASS		2.33 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		2.33 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		2.33 LB/H			

Particulate Matter, <10 microns (PM_{10}) / Visible Emissions (VE)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS BYPASS		4.66 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		4.66 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS RTO		4.02 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS RTO		4.02 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	PRESS SYSTEM	310000 T/F YR	11.2 T/YR			
KRONOTEX	BARNWELL	SC	4/8/2002	PRESS, CONTINUOUS, MDF	273312 MSF/YR-3/4	0.2673 LB/H	80		
KRONOTEX	BARNWELL	SC	4/8/2002	PRESS, CONTINUOUS, PB	433620 MSF/YR-3/4	0.2673 LB/H	80		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	PRESS, ORIENTED STRAND BOARD	475 MMSF/YR	2.83 LB/H	75		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	PRESS, ORIENTED STRANDBOARD	600 MMSF/YR	3.5 LB/H	75		
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	PRESSES, OSB LINE		0.01 GR/DSCF			Emission limits 1&2 and 12-mo rolling avg limit: 34.1 t/yr, apply when BAF is operating. When BAF is not operating, limits are: 24.7 lb/h and 8 t/yr.
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	WAFER PRESSES, LINE I, LINE II, S15	226849 TFP/YR	4.1 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	WAFER PRESSES, LINE I, LINE II, S15	226849 TFP/YR	4.1 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	EDGE SEAL PAINTING	20.74 GALS/H	0.98 LB/H			
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	EDGE SEALING/STENCILING BOOTH	102125 GAL/YR	5 % OPACITY		5 % OPACITY	
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	EDGE SEALING/STENCILING BOOTH	102125 GAL/YR	0.1 LB/H	98		
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	STENCIL PAINTING	0.42 GALS/H	0.17 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PAINT BOOTH		1.22 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PAINT BOOTH		0.68 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	T&G PAINT BOOTH		0.65 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	T&G PAINT BOOTH		0.65 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL FUEL REGRIND COLLECTOR		0.31 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL FUEL REGRIND COLLECTOR		0.39 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	AUXILIARY THERMAL OIL HEATER	66.5 MMBTU/H	0.59 LB/H		0.009 LB/MMBTU	
SAGOLA MILL	DICKSON	MI	1/31/2008	THERMAL OIL HEATER		11.55 LB/H			SAME LIMIT APPLIES TO PM-10
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL OIL HEATER BYPASS		0.24 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL OIL HEATER BYPASS		0.24 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL HEATER, BYPASS STACK, (2)		0.2 LB/H			LIMIT APPLIES WHEN BURNING NATURAL GAS ONLY. LIMIT AS LBS/MMBTU NOT AVAILABLE.
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERG	32 MMBTU/H	0.84 LB/H		0.15 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERG	32 MMBTU/H	1 LB/H		0.15 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS, S2	23.8 MMBTU/H	15 LB/H		0.5 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS, S2	23.8 MMBTU/H	15 LB/H		0.5 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS; S1	19.4 MMBTU/H	6.5 LB/H		0.5 LB/MMBTU	

Particulate Matter, <10 microns (PM $_{10}$) / Visible Emissions (VE)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS; S1	19.4 MMBTU/H	6.5 LB/H		0.5 LB/MMBTU	
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL REGRIND		0.39 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	THERMAL OIL SYSTEM ESP BYPASS	8.9 T/H	5 % OPACITY		5 % OPACITY	
KRONOTEX	BARNWELL	SC	4/8/2002	HEATERS, THERMAL OIL, 2	41 MMBTU/H E/	0.61 LB/H		0.6 LB/MBTU	
SAGOLA MILL	DICKSON	MI	1/31/2008	NATURAL GAS THERMAL OIL HEATER		0.17 LB/H			SAME LIMIT APPLIES TO PM-10.
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	BARK HANDLING SYSTEM (4)		0.16 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	BARK HANDLING SYSTEM (4)		0.47 LB/H			
DEL TIN FIBER LLC	UNION	AR	5/9/2001	RAW MATERIAL , HANDLING SOUR(	0	99.9 % REDUCT	99.9		
URANIA PLANT	LASALLE PARIS	LA	12/7/2000	RAW MATERIAL CLASSIFIER AND S	50000 LB/H	2.17 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	RAW MATERIAL OVERS HAMMERMILL, PB-59		5.2 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	RAW MATERIAL OVERS HAMMERMILL, PB-59		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	RAW MATERIAL OVERS HAMMERMILL, PB-59		5.2 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	COOLING VENT, PB-55		7.46 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	COOLING VENT, PB-55		10 % OPACITY		10 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	COOLING VENT, PB-55		7.46 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	VENT, COOLING WHEEL		0.7 LB/H			
HOMANIT - MT GILEAD	MONTGOMERY	NC	12/29/1999	FINE SANDERDUST CONVEYOR		0.0024 GR/DSCF			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 1, PB-57A		0.25 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 1, PB-57A		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 1, PB-57A		0.25 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 2, PB-57B		2.24 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 2, PB-57B		0 % OPACITY		0 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 2, PB-57B		2.24 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	SANDER 1		0.68 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	SANDER 2		1.24 LB/H			SAME LIMITS APPLY TO PM-10.
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST FUEL BIN, PB-46		0.68 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST FUEL BIN, PB-46		10 % OPACITY		10 % OPACITY	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST FUEL BIN, PB-46		0.68 LB/H			

Carbon Monoxide

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	20 LB/H	90		
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, COEN	35 MMBTU/H	28.4 LB/H		0.81 LB/MMBTU	
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, GEKA 200	20 MMBTU/H				no emission rate limit.
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, ROEMMC	50 MMBTU/H	11.3 LB/H		0.226 LB/MMBTU	control option is base case.
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST BOILER, PB-44	40 MMBTU/H	186.8 LB/H		4.67 LB/MMBTU	STANDARD EMISSIONS CALCULATED FROM HEAT RATING AND HOURLY EMISSION LIMIT
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BURNER, START UP/SHUT DOWN, NG	30 MMBtu/h	2.47 LB/H		0.0824 LB/MMBTU	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		4.32 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER BYPASS (2)		31.8 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		5.9 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		5.9 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYER RTOS		186.43 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER RTOS (2)		149.14 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	DRYER SYSTEM, LINE I, LINE II		110.9 LB/H			GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BURNER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BURNER SHALL BE A MINIMUM OF 0.10 SECONDS. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BURNER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7PERCENT OXYGEN (O2). C) THE OPERATION OF A THERMAL OXIDATION SYSTEM WHENEVER ONE OR MORE WAFER DRYERS OF A DRYER SYSTEM IS
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	DRYER, 5, EACH	475 MMSF/YR	6.72 LB/H	75		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, MDF, TUBE	454611 ODT/YR	0 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, PB, ROT, SINGLE PASS	578861 ODT/YR	0 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	DRYER, PROCESS, 3	58 MMBTU/H	56.5 LB/H			
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	DRYERS	475 MMSF/YR	6.72 LB/H	75		

Carbon Monoxide

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYERS 1-5 BYPASS		26.5 LB/H			
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	DRYERS AND BURNERS, WOOD CHIP	108000 LB/H	290 PPMDV			Additional limits (1-h avg): 676 ppmd ; 343.7 lb/h. Short term limits are based on 3 1-hr tests.
SAGOLA MILL	DICKSON	MI	1/31/2008	FLAKE DRYERS		680.5 T/YR		4.39 LB/T FINISHI	
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	FLAKE DRYERS, 5	550216 T	33.6 LB/H	75		
HOMANIT - MT GILEAD	MONTGOMERY	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	52 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	FLASH TUBE DRYER NO.1 AND NO.2	15000 LB/H EACH	9.84 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRE DRYER	39 MMBTU/H	38.2 LB/H			
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	ROTARY CHIP DRYER, (5)	600 MMSF/YR	52 LB/H	40		
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	ROTARY DRYER NOS. 1-3	300000 MSF/YR 3/8 in	11.46 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO, DRYER, MDF		15.97 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO, DRYER, PB		14.203 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	WOOD DRYERS, (5)	1636250 sqf/d	183.77 LB/H			THE EMISSION POINT FOR THIS PROCESS IS THE RTO.
NORBORD GEORGIA	CRISP	GA	6/3/2005	WOOD FLAKE DRYERS	52 ODT/H	0.28 LB/MMBTU			RTO INSTALLED FOR VOC CONTROL PROVIDES SOME CONTROL FOR CO
POTLATCH CORPORATION	ITASCA	MN	12/4/2000	WOOD WAFER DRYER, TRIPLE PASS ROTARY DRUM	33000 LB/H	5.88 LB/H			
PLUM CREEK MANUFACTURING, L.P.	FLATHEAD	MT	12/23/1999	WOOD PRODUCTS, MEDIUM DENSITY FIBERBOARD DRYER	46500 T/YR	722 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	EMERGENCY GENERATOR		5.42 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	EMERGENCY GENERATOR		5.42 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FIRE WATER PUMP		1.25 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FIRE WATER PUMP		4.54 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BOARD PRESS	85000 LB/H	4.8 LB/H			ODT: OVEN DRIED TONS
URANIA PLANT	LASALLE PARI	LA	12/7/2000	MDF PRESS VENTS	32 MMBTU/H	17.27 LB/H			
NORBORD GEORGIA	CRISP	GA	6/3/2005	OSB BOARD PRESS	650 MMSQF/YR				NO CO LIMIT, OXIDIZER FOR VOC CONTROL PROVIDES CO EMISSIONS REDUCTIONS
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	OSB PRESS	900000 MSF/YR 3/8 I	25.89 LB/H			
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	PANEL PRESS W/ ONE RTO OR TCO	475000 SQF	7.3 LB/H	75		
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		4.8 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRESS		12.4 LB/H	0		
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	PRESS	475 MMSF/YR	7.25 LB/H	75		
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		0.9 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS RTO		34.84 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS RTO		34.84 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	PRESS SYSTEM	310000 T/F YR	0.51 LB/T			
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	PRESS VENTS, LINE 2	75 MMSQF/YR				No emission rate limits.
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	PRESS, ORIENTED STRAND BOARD	475 MMSF/YR	7.25 LB/H	75		

Carbon Monoxide

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	PRESS, ORIENTED STRANDBOARD	600 MMSF/YR	9.2 LB/H	75		
KRONOTEX	BARNWELL	SC	4/8/2002	RTO/TCO, PRESS, MDF		16.694 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO/TCO, PRESS, PB		16.694 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	WAFER PRESSES, LINE I, LINE II, S15/S25; C15/C25; P15/P25	226849 TFP/YR	15 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	AUXILIARY THERMAL OIL HEATER	66.5 MMBTU/H	6.57 LB/H		0.099 LB/MMBTU	
KRONOTEX	BARNWELL	SC	4/8/2002	HEATERS, THERMAL OIL, 2	41 MMBTU/H E/	6.76 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	NATURAL GAS THERMAL OIL HEATER		1.98 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	THERMAL OIL HEATER		28.6 LB/H			PERMIT NO. 41-03D RE-EVALUATED BACT FOR CO.
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL OIL HEATER BYPASS		2.64 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL OIL HEATER BYPASS		2.64 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL HEATER, BYPASS STACK, (2)		1.12 LB/H			LIMIT APPLIES WHEN BURNING NATURAL GAS ONLY. LIMIT AS LBS/MMBTU NOT AVAILABLE.
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S31, B31	32 MMBTU/H	2.7 LB/H		0.084 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S32, B32	32 MMBTU/H	2.7 LB/H		0.084 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS, S21, C21, B21 & B22 -	23.8 MMBTU/H	52.5 LB/H		1.1 LB/MMBTU	B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS; S11, C11, B11 & B12	19.4 MMBTU/H	52.5 LB/H		1.35 LB/MMBTU	B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).

Nitrogen Oxides

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	61.3 LB/H			GOOD DESIGN/OPERATION
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, COEN	35 MMBTU/H	73.1 LB/H		2.09 LB/MMBTU	control is base case
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, GEKA 200	20 MMBTU/H				No emission rate limits.
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, ROEMMC	50 MMBTU/H	87 LB/H		1.74 LB/MMBTU	control is base case.
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST BOILER, PB-44	40 MMBTU/H	57.2 LB/H		1.43 LB/MMBTU	STANDARD EMISSIONS CALCULATED FROM HEAT RATING AND HOURLY EMISSION LIMIT
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BURNER, START UP/SHUT DOWN, NG	30 MMBtu/h	1.47 LB/H		0.049 LB/MMBTU	
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		4.62 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER BYPASS (2)		4.2 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		10.6 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		6.3 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYER RTOS		81.75 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER RTOS (2)		65.4 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	DRYER SYSTEM, LINE I, LINE II		21.9 LB/H			GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BURNER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BURNER SHALL BE A MINIMUM OF 0.10 SECONDS. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BURNER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7PERCENT OXYGEN (O2). C) THE OPERATION OF A THERMAL OXIDATION SYSTEM WHENEVER ONE OR MORE WAFER DRYERS OF A DRYER SYSTEM IS OPERATING.
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	DRYER, 5, EACH	475 MMSF/YR	14.66 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, MDF, TUBE	454611 ODT/YR	66.85 LB/H	50		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, PB, ROT, SINGLE PASS	578861 ODT/YR	154.68 LB/H	41.7		
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	DRYER, PROCESS, 3	58 MMBTU/H	55.9 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYERS 1-5 BYPASS		4.12 LB/H			

Nitrogen Oxides

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	DRYERS AND BURNERS, WOOD CHIP	108000 LB/H	27.8 PPMDV			additional limit: 101.4 t/yr, 12 mo rolling avg.
SAGOLA MILL	DICKSON	MI	1/31/2008	FLAKE DRYERS		192.2 T/YR		1.24 LB/T FINISEI	
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	FLAKE DRYERS, 5	550216 T	60 LB/H			
HOMANIT - MT GILEAD	MONTGOMER'	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	171.5 LB/H	40		COST EFFECTIVENESS @ 60% REDUCTION: 1512 $/TON
URANIA PLANT	LASALLE PARI	LA	12/7/2000	FLASH TUBE DRYER NO.1 AND NO.2	15000 LB/H EACH	32.33 LB/H			ADDITIONAL EMISSION LIMIT: 0.67 LB/MMBTU.
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRE DRYER	39 MMBTU/H	44.5 LB/H			
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	ROTARY CHIP DRYER, (5)	600 MMSF/YR	14.66 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	ROTARY DRYER NOS. 1-3	300000 MSF/YR 3/8 ii	69.77 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO, DRYER, MDF		13.12 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO, DRYER, PB		11.66 LB/H			
NORBORD GEORGIA	CRISP	GA	6/3/2005	WOOD FLAKE DRYERS	52 ODT/H	0.28 LB/MMBTU			
POTLATCH CORPORATION	ITASCA	MN	12/4/2000	WOOD WAFER DRYER, TRIPLE PASS ROTARY DRUM	33000 LB/H	8.25 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	WOOD DRYERS, (5)	1636250 sqf/d	30.19 LB/H			THE EMISSION POINT FOR THIS PROCESS IS THE RTO.
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	DRYERS	475 MMSF/YR	14.66 LB/H			
PLUM CREEK MANUFACTURING, L.P.	FLATHEAD	MT	12/23/1999	WOOD PRODUCTS, MEDIUM DENSITY FIBERBOARD DRYER	46500 T/YR	43.4 LB/H	23		
PARAGON PANELS OF ALABAMA, L.L.C.	BARBOUR	AL	4/12/2006	WOOD FIBER PREP/DRYING	151 mmsf/yr	80 LB/H	95		
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	EMERGENCY GENERATOR		11.84 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	EMERGENCY GENERATOR		11.84 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FIRE WATER PUMP		3.51 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FIRE WATER PUMP		4.54 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BOARD PRESS	85000 LB/H	5.3 LB/H			
NORBORD GEORGIA	CRISP	GA	6/3/2005	OSB BOARD PRESS	650 MMSQF/YR	15 LB/H			NOX RESULTS MAINLY FROM OXIDIZER- ONLY TRIVIAL AMOUNTS OF NOX FROM PRESS ITSELF
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	OSB PRESS	900000 MSF/YR 3/8 I	43.15 LB/H			
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	PANEL PRESS W/ ONE RTO OR TCO	475000 SQF	10.7 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		3.94 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		0.37 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS RTO		14.83 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS RTO		14.83 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	PRESS SYSTEM	310000 T/F YR	43 LB/H			RE-EVALUATED BACT DETERMINIATION FROM PERMIT 41-03A

Nitrogen Oxides

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	PRESS VENTS, LINE 2	75 MMSQF/YR				No emission rate limit
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	PRESS, ORIENTED STRAND BOARD	475 MMSF/YR	10.73 LB/H			
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	PRESS, ORIENTED STRANDBOARD	600 MMSF/YR	13.5 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO/TCO, PRESS, MDF		13.71 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	RTO/TCO, PRESS, PB		13.71 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	WAFER PRESSES, LINE I, LINE II, S15/S25; C15/C25; P15/P25	226849 TFP/YR	15.7 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRESS		6 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	PRESS	1636250 sqf/D	12.02 LB/H			THE LIMIT CORRESPONDS TO THE EMISSIONS FROM RTO.
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	PRESS	475 MMSF/YR	10.73 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	MDF PRESS VENTS	32 MMBTU/H	5.67 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	AUXILIARY THERMAL OIL HEATER	66.5 MMBTU/H	7.82 LB/H		0.118 LB/MMBTU	
KRONOTEX	BARNWELL	SC	4/8/2002	HEATERS, THERMAL OIL, 2	41 MMBTU/H E/	6.36 LB/H	60.6	0.0776 LB/MMBTU	
SAGOLA MILL	DICKSON	MI	1/31/2008	NATURAL GAS THERMAL OIL HEATER		2.83 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	THERMAL OIL HEATER		16.8 LB/H			PERMIT NO. 41-03D RE-EVALUATED BACT FOR NOX.
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL OIL HEATER BYPASS		3.14 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL OIL HEATER BYPASS		3.14 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S31, B31	32 MMBTU/H	4.24 LB/H		0.13 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S32, B32	32 MMBTU/H	3.2 LB/H		0.1 LB/MMBTU	
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS, S21, C21, B21 & B22 -	23.8 MMBTU/H	16.2 LB/H		0.34 LB/MMBTU	B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).

Nitrogen Oxides

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS; S11, C11, B11 & B12	19.4 MMBTU/H	8.9 LB/H		0.23 LB/MMBTU	B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL HEATER, BYPASS STACK, (2)		4.48 LB/H			LIMIT APPLIES WHEN BURNING NATURAL GAS ONLY. LIMIT AS LBS/MMBTU NOT AVAILABLE.

Sulfur Dioxide

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		0.05 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		0.07 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		0.07 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYER RTOS		2.18 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER RTOS (2)		2.68 LB/H			
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	DRYERS AND BURNERS, WOOD CHIP	108000 LB/H	4.3 PPMDV			Additional limit: 21.9 t/y. Short term limits are based on 3 1-hr tests. 12 month limits are rolling averages.
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	ROTARY DRYER NOS. 1-3	300000 MSF/YR 3/8 ii	4.18 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	WOOD DRYERS, (5)	1636250 sqf/d	1.09 LB/H			THE EMISSION POINT FOR THIS PROCESS IS THE RTO.
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	4.7 LB/H			POLLUTANT INFORMATION CONT.: OPACITY EMISSION LIMIT: 10%, 93% OVERALL EFFICIENCY ODT: OVEN DRIED TON
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST BOILER, PB-44	40 MMBTU/H	0.09 LB/H		0.002 LB/MMBTU	STANDARD EMISSIONS CALCULATED FROM HEAT RATING AND HOURLY EMISSION LIMIT
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BURNER, START UP/SHUT DOWN, NG	30 MMBtu/h	0.02 LB/H		0.0006 LB/MMBTU	
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	EMERGENCY GENERATOR		3.24 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	EMERGENCY GENERATOR		3.24 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FIRE WATER PUMP		1.23 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FIRE WATER PUMP		1.18 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		0.01 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	PRESS	1636250 sqf/D	0.01 LB/H			THE LIMIT CORRESPONDS TO THE EMISSIONS FROM RTO.
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		0.33 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS RTO		0.01 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS RTO		0.01 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL OIL HEATER BYPASS		0.02 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL OIL HEATER BYPASS		0.02 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL HEATER, BYPASS STACK, (2)		0.02 LB/H			LIMIT APPLIES WHEN BURNING NATURAL GAS ONLY. LIMIT AS LBS/MMBTU NOT AVAILABLE.
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	AUXILIARY THERMAL OIL HEATER	66.5 MMBTU/H	0.05 LB/H		0.001 LB/MMBTU	

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) DRYERS NO 1 & 2, PB-47 & -48		10.58 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	(2) FEED MATERIAL DRYERS NOS 1-4, PB-40&-41		30.06 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER BYPASS (2)		48.6 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 3, PB-49		3.33 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	DRYER NO 4, PB-50		21.15 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYER RTOS		5.25 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	DRYER RTOS (2)		4.2 LB/H			
LOUISIANA-PACIFIC HAYWARI	SAWYER	WI	6/17/2004	DRYER SYSTEM, LINE I, LINE II		13.05 LB/H			
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	DRYER, 5, EACH	475 MMSF/YR	25.25 LB/H	90		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, MDF, TUBE	454611 ODT/YR	18.16 LB/H	95		
KRONOTEX	BARNWELL	SC	4/8/2002	DRYER, PB, ROT, SINGLE PASS	578861 ODT/YR	29.6 LB/H	95		
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	DRYER, PROCESS, 3	58 MMBTU/H	88.8 LB/H	0		
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	DRYERS	475 MMSF/YR	25.25 LB/H	90		
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DRYERS 1-5 BYPASS		40.5 LB/H			
WEYERHAEUSER	CRAWFORD	MI	6/11/2002	DRYERS AND BURNERS, WOOD CHIP	108000 LB/H	18.6 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	FLAKE DRYERS		57.4 T/YR		0.37 LB/T FINISHI	
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	FLAKE DRYERS, 5	550216 T	63.1 LB/H	90		
HOMANIT - MT GILEAD	MONTGOMER'	NC	12/29/1999	FLASH TUBE DRYER	302000 SCFM	12.6 LB/H	95		
G-P MONTICELLO MDF PLANT	JASPER	GA	9/15/1999	FLASH TUBE DRYER AND PRESS	250 MMSF/YR	90 %	90		RTO CONTROLS VOC FROM BOTH THE DRYERS AND THE PRESS
URANIA PLANT	LASALLE PARI	LA	12/7/2000	FLASH TUBE DRYER NO.1 AND NO.2	15000 LB/H EACH	5.27 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRE DRYER	39 MMBTU/H	7.9 LB/H	95		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	ROTARY CHIP DRYER, (5)	600 MMSF/YR	31.9 LB/H	90		
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	ROTARY DRYER NOS. 1-3	300000 MSF/YR 3/8 i	6.08 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	WOOD DRYERS, (5)	1636250 sqf/d	14.77 LB/H			THE EMISSION POINT FOR THIS PROCESS IS THE RTO.
PARAGON PANELS OF ALABAMA, L.L.C.	BARBOUR	AL	4/12/2006	WOOD FIBER PREP/DRYING	151 mmsf/yr	27.35 LB/H	95		
NORBORD GEORGIA	CRISP	GA	6/3/2005	WOOD FLAKE DRYERS	52 ODT/H	1.2 LB/ODT			RTO CONTROLS COMBINED EXHAUST OF DRYERS AND BOILER
PLUM CREEK MANUFACTURING, L.P.	FLATHEAD	MT	12/23/1999	WOOD PRODUCTS, MEDIUM DENSITY FIBERBOARD DRYER	46500 T/YR	76.1 LB/H			
POTLATCH CORPORATION	ITASCA	MN	12/4/2000	WOOD WAFER DRYER, TRIPLE PASS ROTARY DRUM	33000 LB/H	8 LB/H			

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BARK BURNER/DRYER	85000 lb/h	23.5 LB/H	90		
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, COEN	35 MMBTU/H	0.25 LB/H			control is base case.
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, GEKA 200	20 MMBTU/H				no emission rate limits
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BURNER, ROEMMC	50 MMBTU/H	0.24 LB/H			Control is base case
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BURNER, START UP/SHUT DOWN, NG	30 MMBtu/h	0.2 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	10,000 GAL DIESEL TANK		0.001 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	5000 GAL GASOLINE TANKS (2)		0.15 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	DIESEL TANK		0.1 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	GASOLINE TANK		0.29 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	GASOLINE TANK		0.3 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	AUXILIARY THERMAL OIL HEATER	66.5 MMBTU/H	0.43 LB/H			
KRONOTEX	BARNWELL	SC	4/8/2002	HEATERS, THERMAL OIL, 2	41 MMBTU/H E.	0.442 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	NATURAL GAS THERMAL OIL HEATER		0.129 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL FUEL REGRIND COLLECTOR		0.95 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL FUEL REGRIND COLLECTOR		0.95 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL FUEL REGRIND COLLECTOR		0.95 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	THERMAL OIL HEATER		0.5 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	THERMAL OIL HEATER BYPASS		0.17 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	THERMAL OIL HEATER BYPASS		0.17 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL HEATER, BYPASS STACK, (2)		0.09 LB/H			LIMIT APPLIES WHEN BURNING NATURAL GAS ONLY.
LOUISIANA-PACIFIC HAYWARI	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S31, B31	32 MMBTU/H	0.18 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATER, GTS ENERGY, S32, B32	32 MMBTU/H	0.18 LB/H			

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS, S21, C21, B21 & B22 -	23.8 MMBTU/H	0.62 LB/H			B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	THERMAL OIL HEATERS, KONUS; S11, C11, B11 & B12	19.4 MMBTU/H	0.5 LB/H			B) GOOD COMBUSTION PRACTICES FOR BURNING WOOD FUEL: I) THE TEMPERATURE OF THE EXHAUST GAS EXITING THE BOILER SHALL BE MAINTAINED AT A MINIMUM OF 1250 DEGREES FAHRENHEIT. II) THE RESIDENCE TIME OF THE BOILER SHALL BE A MINIMUM OF 1 SECOND. III) THE 8-HOUR AVERAGE CARBON MONOXIDE CONCENTRATION OF THE EXHAUST GAS EXITING THE BOILER MAY NOT EXCEED 600 PARTS PER MILLION DRY VOLUME (PPMDV), AT 7% OXYGEN (O2).
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	THERMAL OIL REGRIND		2.42 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	BOARD PRESS	85000 LB/H	77 LB/H	75		POLLUTANT INFORMATION CONT.: OPACITY: 10%, NO CONTROLS FEASIBLE (GOOD DESIGN/OPERATION)
NORBORD GEORGIA	CRISP	GA	6/3/2005	OSB BOARD PRESS	650 MMSQF/YR	11.4 LB/H			PRESS REQUIRED TO BE IN PERMANENT TOTAL ENCLOSURE OXIDIZER CAN OPERATE IN EITHER THERMAL OR CATALYTIC MODE
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	OSB PRESS	900000 MSF/YR 3/8 I	1.21 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	MDF PRESS VENTS	32 MMBTU/H	2.17 LB/H	95		
GEORGIA PACIFIC - HOSFORD OSB PLANT	LIBERTY	FL	10/13/2000	PANEL PRESS W/ ONE RTO OR TCO	475000 SQF	10 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	PRESS		3.5 LB/H	95		
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	PRESS	1636250 sqf/D	5.23 LB/H			THE LIMIT CORRESPONDS TO THE EMISSIONS FROM RTO.
GEORGIA-PACIFIC	CALHOUN	AR	6/8/1999	PRESS	475 MMSF/YR	20.05 LB/H	90		
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS BYPASS		25.27 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PRESS RTO		1.94 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PRESS RTO		1.94 LB/H			
SAGOLA MILL	DICKSON	MI	1/31/2008	PRESS SYSTEM	310000 T/F YR	3.44 LB/H	90		RE-EVALUATED BACT DETERMINIATION FROM PERMIT 41-03A
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	PRESS VENTS, LINE 2	75 MMSQF/YR				No emission rate limit.
KRONOTEX	BARNWELL	SC	4/8/2002	PRESS, CONTINUOUS, MDF	273312 MSF/YR-3/4	2.64 LB/H	95		
KRONOTEX	BARNWELL	SC	4/8/2002	PRESS, CONTINUOUS, PB	433620 MSF/YR-3/4	6.13 LB/H	95		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	6/29/2000	PRESS, ORIENTED STRAND BOARD	475 MMSF/YR	20.05 LB/H	90		
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	CALHOUN	AR	1/7/2003	PRESS, ORIENTED STRANDBOARD	600 MMSF/YR	25.3 LB/H	90		
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	PARTICLE BOARD PRESS, PB-53		1.55 LB/H			
LOUISIANA-PACIFIC HAYWARI	SAWYER	WI	6/17/2004	WAFER PRESSES, LINE I, LINE II, S15/S25; C15/C25; P15/P25	226849 TFP/YR	3.33 LB/H			THE PRODUCTION RATE FROM EACH PRESS SYSTEM MAY NOT EXCEED; A) 25.9 TONS OF FINISHED PRODUCT PER HOUR BASED ON WEEKLY DATA; AND B) 226,849 TONS OF FINISHED PRODUCT IN ANY 12 CONSECUTIVE MONTHS. CURRENTLY EQUIPPED WITH AN RTO.
LOUISIANA-PACIFIC CORP	BARBOUR	AL	4/20/1999	MILL, FIBERBOARD, MEDIUM DENSITY	0	8.98 LB/H FROI	0	0	

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	EMERGENCY GENERATOR		0.15 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	EMERGENCY GENERATOR		0.15 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	RAW FUEL BIN		5.15 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	RAW FUEL BIN COLLECTOR		7.67 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	RAW FUEL BIN COLLECTOR		7.67 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	RAW MATERIAL CLASSIFIER AND SEPARATOR	50000 LB/H	0.062 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	RAW MATERIAL OVERS HAMMERMILL, PB-59		3.46 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	MAT REJECT		1.81 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
URANIA PLANT	LASALLE PARI	LA	12/7/2000	MATERIAL REJECT	13000 ACFM	0.5 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	MATERIAL REJECT COLLECTOR		2.54 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	MATERIAL REJECT COLLECTOR		2.54 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	MDF FORMING LINE ASPIRATION	22820 ACFM	0.73 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	FORMING AREA	88.4 T/H	5.5 LB/H			POLLUTANT INFORMATION CONT.: OPACITY: 5%, 99% EFFICIENCY, ADD-ON CONTROL DEVICE (BAGHOUSE)
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BOARD COOLER VENTS, LINE 2	75 MMSQF/YR				No emission rate limit
KRONOTEX	BARNWELL	SC	4/8/2002	BOARD COOLER, MDF	273312 MSF/YR-3/4	0.351 LB/H	95		
KRONOTEX	BARNWELL	SC	4/8/2002	BOARD COOLER, PB	433620 MSF/YR-3/4	1.56 LB/H	95		
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	COOLING VENT, PB-55		12.43 LB/H			
TEMPLE INLAND FOREST PRODUCTS CORP.	HEMPSTEAD	AR	11/19/1999	VENT, COOLING WHEEL		10.6 LB/H			
DEL TIN FIBER LLC	UNION	AR	5/9/2001	VENTS, BOARD COOLING (3)		9.33 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	HIGH PRESSURE SANDER DUST	470 ACFM	0.2 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 1, PB-57A		0.53 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	BOARD SANDING LINE NO 2, PB-57B		1.62 LB/H			
DIBOLL PARTICLEBOARD OPERATION	ANGELINA	TX	9/28/2001	SANDER DUST BOILER, PB-44	40 MMBTU/H	0.48 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	SANDERDUST RECEIVING BIN		0.03 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	SANDERDUST RECEIVING BIN BAG		1.47 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	T&G/SANDER TRANSFER BIG BAGHOUSE		1.47 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	TONGUE AND GROVE SANDER DUST COLLECTOR		1.47 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	TONGUE AND GROVE SANDER DUST COLLECTOR		1.47 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	T & G/SANDERDUST		1.81 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.

Volatile Organic Compounds (VOC)

Facility Name	County	State	Permit Date	Process Name	Throughput	Emision Limit	Control Efficiency	Standard Emission Limit	Notes
URANIA PLANT	LASALLE PARI	LA	12/7/2000	LOW PRESSURE SANDER DUST	58000 ACFM	1.35 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	HIGH PRESSURE SAW TRIM	470 ACFM	0.02 LB/H			
URANIA PLANT	LASALLE PARI	LA	12/7/2000	LOW PRESSURE SAW TRIM	16200 ACFM	0.2 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	SAW LINE		2.75 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	SAW LINE COLLECTOR		3.27 LB/H			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	FINISHING AREA	88.4 T/H	4.7 LB/H			POLLUTANT INFORMATION CONT.: OPACITY: 5%, 99% EFFICIENCY, ADD-ON CONTROL DEVICE (BAGHOUSE)
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	FINISH FUEL BIN		4.44 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FINISH FUEL BIN COLLECTOR		5.72 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FINISH FUEL BIN COLLECTOR		5.72 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FUEL PILE (4)		0.4 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FUEL PILE (4)		0.4 LB/H			
LOUISIANA-PACIFIC HAYWARD	SAWYER	WI	6/17/2004	FINISHING LINE (PAINT / INK), P17 -		1 LB/GAL			
LOUISIANA PACIFIC CORPORATION	CLARKE	AL	6/14/2006	PAINT BATHS	234207 GAL/YR	0.03 LB/GAL			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	PAINT BOOTH		1.18 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	PAINT BOOTH		1.54 LB/H			
OAKDALE OSB PLANT	ALLEN	LA	6/13/2005	STENCIL PAINTING	0.42 GALS/H	0.01 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	T&G PAINT BOOTH		1.46 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	T&G PAINT BOOTH		1.46 LB/H			
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	FIRE WATER PUMP		0.25 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	FIRE WATER PUMP		0.18 LB/H			
LOUISIANA-PACIFIC CORPORATION	JASPER	TX	7/6/1999	ASPIRATION SYSTEM		17.14 LB/H			EMISSIONS VENTED FROM ABORT COLLECTOR TO BAGHOUSE.
CARHAGE ORIENTED STRANDBOARD MILL	PANOLA	TX	3/16/2004	ASPIRATION SYSTEM BAGHOUSE		14.96 LB/H			
JASPER ORIENTED STRANDBOARD MILL	JASPER	TX	2/9/2004	ASPIRATION SYSTEM BAGHOUSE		14.96 LB/H			
LOUISIANA PACIFIC CORP. - MISSOULA PARTICLEBOARD	MISSOULA	MT	8/24/2001	BAGHOUSES, MISCELLANEOUS					No emission rate limits

APPENDIX D – BACT ECONOMIC CALCULATIONS

Table D-1. Direct Capital Costs for Biofilter to Control VOC - Stranding, Debarking, and Green Bins

Capital Cost Summary			**Capital Cost**
DIRECT COSTS			
Purchased Equipment and Direct Installation Costs			
Biofilter Equipment and installation [1]		$	7,450,204.91
Instrumentation (Included with the biofilter equipment and installation cost) [1]			$0
Sales Tax (7% in Georgia)			$521,514
Freight (Included with the biofilter equipment and installation cost)			$0
Biofilter Direct Cost (DC)	**PEC =**		$7,971,719
TOTAL DIRECT COST (DC)	**DC =**		**$7,971,719**
INDIRECT COSTS[2]			
Engineering (10% of PEC)			$797,172
Construction and field expenses (5% of PEC)			$398,586
Contractor fees (10% of PEC)			$797,172
Start-up (2% of PEC)			$159,434
Performance test (1% of PEC)			$98,969
Contingencies (3% of PEC)			$239,152
TOTAL INDIRECT COST (IC)	**IC =**		**$2,490,485**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**		**$10,462,204**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-2. Biofilter Cost Analysis to Control VOC - Stranding, Debarking, and Green Bins

Annual Cost Summary[1]		**Annual Cost**
DIRECT ANNUAL COSTS		
Operating Labor[2]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[2]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.82/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[3]		
Electricity ($ 0.073 per kWh)		$143,058
TOTAL DIRECT COSTS (DC)	**DC =**	**$169,783**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$418,488**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[4] = 0.1424		**$1,489,582**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$1,924,106**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$2,093,889**
Annual Control Cost ($)		**$2,093,889**
Pollutant to be Removed [VOC] (tpy) [5]		**250**
CONTROL COST EFFECTIVENESS ($/ton)		**$8,367**

1. Control cost factors are obtained from the OAQPS CCM Section 3.2, Chapter 2, Table 2.10, "Annual Costs for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.
2. The hourly labor rate is based on the current Huber pay schedule.
3. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
4. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
5. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-3. Direct Capital Costs for RTO to Control VOC - Stranding, Debarking, and Green Bins

Direct Capital Cost Summary		**Capital Cost**
DIRECT COSTS		
RTO Purchased Equipment and Direct Installation Costs		
RTO Equipment[1]	$	2,763,100.00
Instrumentation (Included with the RTO equipment and installation cost) [1]		$0
Ductwork (1% of PEC)		$27,631
Sales Tax (7% in Georgia)		$193,417
Freight (Included with the RTO installation cost) [1]		$0
RTO Direct Cost (DC)	**PEC =**	$2,984,148
TOTAL DIRECT COST (DC)	**DC =**	**$2,984,148**

1. Cost data provided per MEGTEC quote dated September 27, 2005.

Table D-4. Indirect Capital Costs for RTO to Control VOC - Stranding, Debarking, and Green Bins

Indirect Capital Cost Summary		
RTO INDIRECT COSTS[2]		
Engineering (10% of RTO PEC)		$298,415
Construction and field expenses (5% of RTO PEC)		$149,207
Contractor fees (10% of RTO PEC)		$298,415
Start-up (2% of RTO PEC) [1]		$59,683
Performance test (1% of RTO PEC)		$37,048
Contingencies (3% of RTO PEC)		$89,524
RTO Total Indirect Cost (IC)	**RTO IC =**	**$932,293**
TOTAL INDIRECT COST (IC)	**IC =**	**$932,293**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$3,916,441**

1. Cost data provided per MEGTEC quote dated September 27, 2005.

2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators."

Table D-5. RTO Cost Analysis to Control VOC - Stranding, Debarking, and Green Bins

Annual Cost Summary[1]		Annual Cost
DIRECT ANNUAL COSTS		
RTO Operating Labor[2]		
Operator (0.5 hour/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[2]		
Labor (1 hour/day, 365 days/year @ $13.82/man-hr)		$5,042
RTO Material (100% of maintenance labor)		$5,042
Utilities[3]		
Electricity ($ 0.073 per kWh)		$476,860
RTO Auxiliary Fuel (MMBtu/hr, $11.6/Mscf)		$1,492,167
TOTAL DIRECT COSTS (DC)	**DC =**	**$1,990,710**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$13,010**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$156,658**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[4] = 0.1424		**$557,613**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$727,280**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$2,717,991**
Annual Control Cost ($)		**$2,717,991**
Pollutant to be Removed [VOC] (tpy) [5]		**322**
CONTROL COST EFFECTIVENESS ($/ton)		**$8,448**

1. Control cost factors are obtained from the OAQPS CCM Section 3.2, Chapter 2, Table 2.10, "Annual Costs for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.
2. The hourly labor rate is based on the current Huber pay schedule.
3. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
   The prices of natural gas, $11.60 per thousand cubic foot (Mscf), was calculated based on the usage and cost data from January 2009 at the Huber site.
4. Based on a 10 year equipment lifetime. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the OAQPS CCM Sixth Edition.
5. A capture efficiency of 100% and an RTO control efficiency of 90% are considered in the calculation.

Table D-6. RTO Auxiliary Fuel Cost to Control VOC - Stranding, Debarking, and Green Bins

Auxiliary Fuel Cost Summary		
Standard Temperature	68	°F
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	90	°F
Minimum RTO Temp	1500	°F
Heat Input	24.11	Btu/acf
Exhaust Gas Flow Rate	207,100	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$1,492,167.38**	**dollars/yr**

1. Utility rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).

Table D-7. DESP Cost Analysis to Control PM Emissions - Furnace and Dryers

Capital Cost Summary			Capital Cost
DIRECT COSTS			
ESP PURCHASE COST[1]			
ESP + auxiliary equipment		**$**	**2,054,048**
Instrumentation (10%)			$205,405
Sales Tax (3%)			$61,621
Freight (5%)			$102,702
TOTAL DRY ESP PURCHASE COST (PEC)[1]	**PEC =**	**$**	**2,423,777**
ESP Direct Installation Costs			
Foundations & supports (4% of PEC)			$96,951
Handling & erection (50% of PEC)			$1,211,888
Electrical (8% of PEC)			$193,902
Piping (1% of PEC)			$24,238
Insulation for ductwork (2% of PEC)			$48,476
Painting (2% of PEC)			$48,476
TOTAL DRY ESP DIRECT COST (DC)[1]	**DC=**	**$**	**4,047,707**
INDIRECT COSTS[2]			
Engineering (20%)			$484,755
Construction and field expenses (20%)			$484,755
Contractor Fees (10%)			$242,378
Start-up (1%)			$24,238
Performance test (1%)			$24,238
Contingencies (3%)			$72,713
TOTAL INDIRECT COST (IC)	**IC =**		**$1,333,077**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**		**$5,380,784**

1. Calculated from 2008 vendor quote, using the six tenths power law to scale to size. Direct Cost estimated using EPA OAQPS Control Cost Manual.

2. Indirect capital cost factors taken from Section 6, Particulate Matter Controls of the OAQPS Control Cost Manual (CCM), Sixth Edition, January 2002.

Table D-8. DESP Cost Analysis to Control PM Emissions - Furnace and Dryers

Annual Cost Summary[1]			**Annual Cost**
DIRECT ANNUAL COSTS			
Maintenance & Operating Labor[1]			$48,926
Utilities[4]			
Electricity			$42,718
TOTAL DESP DIRECT COSTS (DC)		**DC =**	**$91,644**
INDIRECT OPERATING COSTS			
Overhead (60% of Operating Labor and Maintenance)			**$29,356**
Administrative Charges (2% of TCI)			**$107,616**
Property Taxes (1% of TCI)			**$53,808**
Insurance (1% of TCI)			**$53,808**
Capital Recovery (CRF x TCI)			
10 years @ 7.00% interest	CRF[5] = 0.1424		**$766,103**
TOTAL DESP INDIRECT COSTS (IC)		**IC =**	**$1,010,689**
TOTAL ANNUALIZED DESP COST (TAC = DC + IC)		**TAC=**	**$1,102,333**
Cost Effectiveness Summary			
Annual Control Cost ($)			**$1,102,333**
Pollutant to be Removed (tpy)[6]			**360**
CONTROL COST EFFECTIVENESS ($/ton)			**$3,059**

1. Annual cost factors taken from OAQPS CCM, Section 6, Chapter 3, Table 3.21, "Electrostatic Precipitators," Sixth Edition, January 2002.
2. Direct Annual Costs are based on quote received from PCC Industries.
3. Utilities calculated as follows:
   Scaled kW/hr from quote to 192 kW/hr for 8,760 hr/yr at $0.073 per kWhr.
4. Interest rate conservatively set at 7.00%, based on EPA's seven percent social rate used in the OAQPS CCM.
5. Assumes an 95% control efficiency for DESP.

Table D-9. Incremental Cost Comparison of 3 WESPs @ 75% Efficiency and 3 DESPs @ 95% Efficiency

Control Device	3 WESPs @ 75% [1]	3 DESPs @ 95%	Incremental Difference
Annualized Capital Cost ($)	$0	$766,103	$766,103
Annual Electricity Cost ($)	$115,106	$42,718	-$72,388
Annual Water & Chemical Cost ($)	$100,000	$0	-$100,000
Controlled Emissions (tpy)	284	360	76
Incremental Cost ($/ton)	--	--	$7,826

[1] Assumes no capital cost is required since this equipment is currently installed at the facility.

Table D-10. RTO Energy Cost to Control VOC - Trim and Grade Baghouse (SC09)

Auxiliary Fuel Cost Summary		
Standard Temperature	68	°F
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	°F
Minimum RTO Temp	1500	°F
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate	40,300	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$304,020.34**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	224	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$143,058.07**	
Total VOC Emissions Removed [2]	27.86	tpy
Total Cost	**$16,050.02**	dollars/ton VOC removed

1. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
2. Assumes 90% control efficiency.

Table D-11. RTO Energy Cost to Control VOC - Screening and Blending Baghouse (SC08)

Auxiliary Fuel Cost Summary		
Standard Temperature	68	^oF
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	^oF
Minimum RTO Temp	1500	^oF
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate	50,000	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$377,196.45**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	224	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$143,058.07**	
Total VOC Emissions Removed [2]	50.87	tpy
Total Cost	**$10,227.90**	dollars/ton VOC removed

1. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
2. Assumes 90 percent control efficiency.

Table D-12. RTO Energy Cost to Control VOC - Forming Baghouse (SC45)

Auxiliary Fuel Cost Summary		
Standard Temperature	68	^oF
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	^oF
Minimum RTO Temp	1500	^oF
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate	54,200	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$408,880.95**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	261.63	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$167,303.96**	
Total VOC Emissions Removed [2]	27.05	tpy
Total Cost	**$21,302.38**	dollars/ton VOC removed

1. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
2. Assumes 90 percent control efficiency.

Table D-13. RTO Energy Cost to Control VOC - Sanding and Tongue & Groove (SC67)

Auxiliary Fuel Cost Summary		
Standard Temperature	68	°F
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	°F
Minimum RTO Temp	1500	°F
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate	71,600	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$540,145.32**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	261.625	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$167,303.96**	
Total VOC Emissions Removed [2]	41.34	tpy
Total Cost	**$17,113.40**	dollars/ton VOC removed

1. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
2. Assumes 90 percent control efficiency.

Table D-14. RTO Energy Cost to Control VOC - Edge Coating

Auxiliary Fuel Cost Summary		
Standard Temperature	68	°F
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	°F
Minimum RTO Temp	1500	°F
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate	10,000	acfm
Natural Gas Cost [1]	$11.37	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$75,439.29**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	224.25	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$143,403.39**	
Total VOC Emissions Removed [2]	11.27	tpy
Total Cost	**$19,426.34**	dollars/ton VOC removed

1. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
2. Assumes 90 percent control efficiency.

Table D-15. Direct Capital Costs for Biofilter to Control VOC - SC09

Capital Cost Summary			**Capital Cost**
DIRECT COSTS			
Purchased Equipment and Direct Installation Costs			
Biofilter Equipment and installation [1]		$	2,790,250.45
Instrumentation (Included with the biofilter equipment and installation cost) [1]			$0
Sales Tax (7% in Georgia)			$195,318
Freight (Included with the biofilter equipment and installation cost)[1]			$0
Biofilter Direct Cost (DC)	**PEC =**		$2,985,568
TOTAL DIRECT COST (DC)	**DC =**		**$2,985,568**
INDIRECT COSTS[2]			
Engineering (10% of PEC)			$298,557
Construction and field expenses (5% of PEC)			$149,278
Contractor fees (10% of PEC)			$298,557
Start-up (2% of PEC)			$59,711
Performance test (1% of PEC)			$37,066
Contingencies (3% of PEC)			$89,567
TOTAL INDIRECT COST (IC)	**IC =**		**$932,736**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**		**$3,918,304**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-16. Biofilter Cost Analysis to Control VOC - SC09

Annual Cost Summary		**Annual Cost**
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$47,686
TOTAL DIRECT COSTS (DC)	**DC =**	**$74,411**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$156,732**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$557,878**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$730,646**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$805,057**
Annual Control Cost ($)		**$805,057**
Pollutant to be Removed [VOC] (tpy) [4]		**22**
CONTROL COST EFFECTIVENESS ($/ton)		**$37,159**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-17. Direct Capital Costs for Biofilter to Control VOC - SC08

Capital Cost Summary		**Capital Cost**
DIRECT COSTS		
Purchased Equipment and Direct Installation Costs		
Biofilter Equipment and installation [1]		$ 3,175,719.68
Instrumentation (Included with the biofilter equipment and installation cost) [1]		$0
Sales Tax (7% in Georgia)		$222,300
Freight (Included with the biofilter equipment and installation cost)[1]		$0
Biofilter Direct Cost (DC)	**PEC =**	$3,398,020
TOTAL DIRECT COST (DC)	**DC =**	**$3,398,020**
INDIRECT COSTS[2]		
Engineering (10% of PEC)		$339,802
Construction and field expenses (5% of PEC)		$169,901
Contractor fees (10% of PEC)		$339,802
Start-up (2% of PEC)		$67,960
Performance test (1% of PEC)		$42,186
Contingencies (3% of PEC)		$101,941
TOTAL INDIRECT COST (IC)	**IC =**	**$1,061,592**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$4,459,613**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-18. Biofilter Cost Analysis to Control VOC - SC08

Annual Cost Summary		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$47,686
TOTAL DIRECT COSTS (DC)	**DC =**	**$74,411**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$178,385**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$634,948**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$829,368**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$903,779**
Annual Control Cost ($)		**$903,779**
Pollutant to be Removed [VOC] (tpy) [4]		**40**
CONTROL COST EFFECTIVENESS ($/ton)		**$22,844**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and a biofilter control efficiency of 70% are considered in the calculation.

Table D-19. Direct Capital Costs for Biofilter to Control VOC - SC45

Capital Cost Summary			Capital Cost
DIRECT COSTS			
Purchased Equipment and Direct Installation Costs			
Biofilter Equipment and installation [1]		$	3,333,187.39
Instrumentation (Included with the biofilter equipment and installation cost) [1]			$0
Sales Tax (7% in Georgia)			$233,323
Freight (Included with the biofilter equipment and installation cost)[1]			$0
Biofilter Direct Cost (DC)	**PEC =**		$3,566,511
TOTAL DIRECT COST (DC)	**DC =**		**$3,566,511**
INDIRECT COSTS[2]			
Engineering (10% of PEC)			$356,651
Construction and field expenses (5% of PEC)			$178,326
Contractor fees (10% of PEC)			$356,651
Start-up (2% of PEC)			$71,330
Performance test (1% of PEC)			$44,278
Contingencies (3% of PEC)			$106,995
TOTAL INDIRECT COST (IC)	**IC =**		**$1,114,231**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**		**$4,680,742**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-20. Biofilter Cost Analysis to Control VOC - SC45

Annual Cost Summary		**Annual Cost**
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$47,686
TOTAL DIRECT COSTS (DC)	**DC =**	**$74,411**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$187,230**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$666,432**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$869,697**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$944,108**
Annual Control Cost ($)		**$944,108**
Pollutant to be Removed [VOC] (tpy) [4]		**21**
CONTROL COST EFFECTIVENESS ($/ton)		**$44,878**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-21. Direct Capital Costs for Biofilter to Control VOC - SC67

Capital Cost Summary		**Capital Cost**
DIRECT COSTS		
Purchased Equipment and Direct Installation Costs		
Biofilter Equipment and installation [1]	$	3,939,199.46
Instrumentation (Included with the biofilter equipment and installation cost) [1]		$0
Sales Tax (7% in Georgia)		$275,744
Freight (Included with the biofilter equipment and installation cost)[1]		$0
Biofilter Direct Cost (DC)	**PEC =**	$4,214,943
TOTAL DIRECT COST (DC)	**DC =**	**$4,214,943**
INDIRECT COSTS[2]		
Engineering (10% of PEC)		$421,494
Construction and field expenses (5% of PEC)		$210,747
Contractor fees (10% of PEC)		$421,494
Start-up (2% of PEC)		$84,299
Performance test (1% of PEC)		$52,329
Contingencies (3% of PEC)		$126,448
TOTAL INDIRECT COST (IC)	**IC =**	**$1,316,812**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$5,531,755**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-22. Biofilter Cost Analysis to Control VOC - SC67

Annual Cost Summary		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$47,686
TOTAL DIRECT COSTS (DC)	**DC =**	**$74,411**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$221,270**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$787,597**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$1,024,903**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$1,099,314**
Annual Control Cost ($)		**$1,099,314**
Pollutant to be Removed [VOC] (tpy) [4]		**32**
CONTROL COST EFFECTIVENESS ($/ton)		**$34,191**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-23. Direct Capital Costs for Biofilter to Control VOC - All Baghouses

Capital Cost Summary			Capital Cost
DIRECT COSTS			
Purchased Equipment and Direct Installation Costs			
Biofilter Equipment and installation [1]		$	7,642,809.21
Instrumentation (Included with the biofilter equipment and installation cost) [1]			$0
Sales Tax (7% in Georgia)			$534,997
Freight (Included with the biofilter equipment and installation cost)[1]			$0
Biofilter Direct Cost (DC)	**PEC =**		$8,177,806
TOTAL DIRECT COST (DC)	**DC =**		**$8,177,806**
INDIRECT COSTS[2]			
Engineering (10% of PEC)			$817,781
Construction and field expenses (5% of PEC)			$408,890
Contractor fees (10% of PEC)			$817,781
Start-up (2% of PEC)			$163,556
Performance test (1% of PEC)			$101,527
Contingencies (3% of PEC)			$245,334
TOTAL INDIRECT COST (IC)	**IC =**		**$2,554,869**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**		**$10,732,675**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-24. Biofilter Cost Analysis to Control VOC - All Baghouses

Annual Cost Summary		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$143,058
TOTAL DIRECT COSTS (DC)	**DC =**	**$169,783**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$429,307**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$1,528,091**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$1,973,434**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$2,143,217**
Annual Control Cost ($)		**$2,143,217**
Pollutant to be Removed [VOC] (tpy) [4]		**114**
CONTROL COST EFFECTIVENESS ($/ton)		**$18,732**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-25. RTO Direct Capital Cost to Control VOC from DRYR/WBNR - 4 RTOs

Capital Cost Summary		Capital Cost
DIRECT COSTS		
Purchased Equipment Costs		
RTO Equipment[1]		$ 7,130,729.63
Instrumentation (Included with the RTO equipment cost) [1]		$0
Sales Tax (7% in Georgia)		$499,151
Freight (5% of RTO Equipment)		$356,536
Purchased Equipment Cost (PEC)	**PEC =**	**$7,986,417**
Direct Installation Costs		
Foundation and supports (8% of PEC)		$638,913
Handling and erection (14% of PEC)		$1,118,098
Electrical (4% of PEC)		$319,457
Piping (2% of PEC)		$159,728
Insulation for ductwork (1% of PEC)		$79,864
Painting (1% of PEC)		$79,864
Direct Installation Cost (DIC)	**DIC =**	**$2,395,925**
TOTAL DIRECT COST (DC)	**DC =**	**$10,382,342**
INDIRECT COSTS[2]		
Engineering (10% of PEC)		$798,642
Construction and field expenses (5% of PEC)		$399,321
Contractor fees (10% of PEC)		$798,642
Start-up (included in MEGTEC quote) [1]		$ -
Performance test (1% of PEC)		$99,151
Contingencies (3% of PEC)		$239,593
TOTAL INDIRECT COST (IC)	**IC =**	**$2,335,348**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$12,717,691**

1. Cost data provided per MEGTEC quote dated September 27, 2005.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8,

Table D-26. RTO Cost Analysis to Control VOC from DRYR/WBNR - 4 RTOs

Annual Cost Summary[1]		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[2]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr, per RTO)		$30,255
Supervision (15% of Operator)		$4,538
Maintenance[2]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr, per RTO)		$22,691
Material (100% of maintenance labor)		$22,691
Utilities[3]		
Electricity ($ 0.0485 per kWh)		$1,907,441
Auxiliary Fuel (MMBtu/hr, $11.60/Mscf)		$2,612,323
TOTAL DIRECT COSTS (DC)	**DC =**	**$4,599,940**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$48,105**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$508,708**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[4] = 0.1424		**$1,810,713**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$2,367,526**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$6,967,465**
Annual Control Cost ($)		**$6,967,465**
Pollutant to be Removed [VOC] (tpy)[5]		**3,992**
CONTROL COST EFFECTIVENESS ($/ton)		**$1,746**

1. Control cost factors are obtained from the OAQPS CCM Section 3.2, Chapter 2, Table 2.10, "Annual Costs for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.
2. The hourly labor rate is based on the current Huber pay schedule.
3. Utility costs are based on the following rates:
An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
The prices of natural gas, $11.60 per thousand cubic foot (Mscf), was calculated based on the usage and cost data from January 2009 at the Huber site.
4. Based on 10 year equipment lifetime. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the OAQPS CCM Sixth Edition.
5. Per the vendor quote, a capture efficiency of 100% and an RTO control efficiency of 95% are considered in the calculation.

Table D-27. RTO Direct Capital Costs to Control VOC from DRYR/WBNR- 3 RTOs

Capital Cost Summary		**Capital Cost**
DIRECT COSTS		
Purchased Equipment Costs		
RTO Equipment[1]		$ 4,000,179.40
Instrumentation (Included with the RTO equipment cost) [1]		$0
Sales Tax (7% in Georgia)		$280,013
Freight (5% of RTO Equipment)		$200,009
Purchased Equipment Cost (PEC)	**PEC =**	**$4,480,201**
Direct Installation Costs		
Foundation and supports (8% of PEC)		$358,416
Handling and erection (14% of PEC)		$627,228
Electrical (4% of PEC)		$179,208
Piping (2% of PEC)		$89,604
Insulation for ductwork (1% of PEC)		$44,802
Painting (1% of PEC)		$44,802
Direct Installation Cost (DIC)	**DIC =**	**$1,344,060**
TOTAL DIRECT COST (DC)	**DC =**	**$5,824,261**
INDIRECT COSTS[2]		
Engineering (10% of PEC)		$448,020
Construction and field expenses (5% of PEC)		$224,010
Contractor fees (10% of PEC)		$448,020
Start-up (obtained from MEGTEC quote) [1]		$15,800
Performance test (1% of PEC)		$55,622
Contingencies (3% of PEC)		$134,406
TOTAL INDIRECT COST (IC)	**IC =**	**$1,325,878**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$7,150,139**

1. Cost data provided per MEGTEC quote dated September 27, 2005.

2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-28. RTO Cost Analysis to Control VOC from DRYR/WBNR - 3 RTOs

Annual Cost Summary[1]		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[2]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[2]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[3]		
Electricity ($ 0.073 per kWh)		$1,430,581
Auxiliary Fuel (MMBtu/hr, $11.37/Mscf)		$1,488,709
TOTAL DIRECT COSTS (DC)	**DC =**	**$2,946,015**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$286,006**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[4] = 0.1424		**$1,018,019**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$1,320,060**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$4,266,074**
Annual Control Cost ($)		**$4,266,074**
Pollutant to be Removed [VOC] (tpy)[5]		**3,781**
CONTROL COST EFFECTIVENESS ($/ton)		**$1,128**

1. Control cost factors are obtained from the OAQPS CCM Section 3.2, Chapter 2, Table 2.10, "Annual Costs for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.
2. The hourly labor rate is based on the current Huber pay schedule.
3. Utility costs assume continuous operation of 2 RTOs and B26are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
   The prices of natural gas, $11.60 per thousand cubic foot (Mscf), was calculated based on the usage and cost data from January 2009 at the Huber site.
4. Based on 10 year equipment lifetime. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the OAQPS CCM Sixth Edition.
5. Per the vendor quote, a capture efficiency of 100% and an RTO control efficiency of 90% are considered in the calculation.

Table D-29. Incremental Fuel Cost Comparison of 3 RTOs @ 95% Efficiency and 2 RTOs @ 90% Efficiency

Control Device	2 RTOs @ 90%	3 RTOs @ 95%	Incremental Difference
Annual Fuel Cost ($)	$1,488,709	$2,612,323	$1,123,614
Annual Electricity Cost ($)	$1,430,581	$1,907,441	$476,860
Controlled Emissions (tpy)	3,781	3,992	210
Incremental Cost ($/ton)	--	--	$7,618

Table D-30. WESP Cost Analysis to Control PM Emissions - Press

Capital Cost Summary		Capital Cost
DIRECT COSTS		
TOTAL WESP DIRECT COST (DC)[1]	**DC = $**	**2,993,243**
INDIRECT COSTS[2]		
Engineering (20% of PEC)		$507,329
Construction and field expenses (20% of PEC)		$507,329
Contractor fees (10% of PEC)		$253,665
Start-up (1% of PEC)		$25,366
Performance test (1% of PEC)		$25,366
Contingencies (3% of PEC)		$76,099
TOTAL INDIRECT COST (IC)	**IC =**	**$1,395,156**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$4,388,399**

1. Calculated from 2005 vendor quote, using the six tenths power law to scale to size.
2. Indirect capital cost factors taken from Section 6, Particulate Matter Controls of the OAQPS Control Cost Manual (CCM), Sixth Edition, January 2002.

Table D-31. WESP Cost Analysis to Control PM Emissions - Press

Annual Cost Summary[1]		Annual Cost
DIRECT ANNUAL COSTS[2]		
Operating & Maintenance Labor[3]		$100,000
Utilities[4]		
Electricity		$74,488
Water and Chemical Usage		
Water Usage		$50,000
Chemical Usage		$50,000
TOTAL WESP DIRECT COSTS (DC)	**DC =**	**$274,488**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$60,000**
Administrative Charges (2% of TCI)		**$87,768**
Property Taxes (1% of TCI)		**$43,884**
Insurance (1% of TCI)		**$43,884**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest	CRF[5] = 0.1424	**$624,809**
TOTAL WESP INDIRECT COSTS (IC)	**IC =**	**$860,345**
TOTAL ANNUALIZED WESP COST (TAC = DC + IC)	**TAC=**	**$1,134,833**
Cost Effectiveness Summary		
Annual Control Cost ($)		**$1,134,833**
Pollutant to be Removed (tpy)[6]		**42**
CONTROL COST EFFECTIVENESS ($/ton)		**$26,900**

1. Annual cost factors taken from OAQPS CCM, Section 6, Chapter 3, Table 3.21, "Electrostatic Precipitators," Sixth Edition, January 2002.
2. Direct Annual Costs are based on quote received from Turbo Sonic/PEI.
3. Operating and Maintenance costs include sludge and waste water removal.
4. Utilities calculated as follows:
   Scaled kW/hr from quote to 116 kW/hr for 8,760 hr/yr at $0.073 per kWhr.
5. Interest rate conservatively set at 7.00%, based on EPA's seven percent social rate used in the OAQPS CCM.
6. Assumes an 95% control efficiency for WESP.

Table D-32. RTO Energy Cost to Control VOC - Ink Branding and Stamping

Auxiliary Fuel Cost Summary		
Standard Temperature	68	^{o}F
Density of Air	0.0026	lb-mole/scf
Specific Heat of Air	6.85	Btu/lb-mole F
Exhaust Gas Temperature	72	^{o}F
Minimum RTO Temp	1500	^{o}F
Heat Input	25.24	Btu/acf
Exhaust Gas Flow Rate[1]	71,600	acfm
Natural Gas Cost [2]	$18.42	dollars/MMBtu
Heat Loss Rate	5.00%	
Total Natural Gas Cost	**$874,867.79**	**dollars/yr**
Electricity Cost Summary		
Cost of Electricity	$0.0730	$/kWh
Electricity Required	224	kW/h
Hours of Operation	8,760	h/yr
Total Electricity Cost	**$143,058.07**	
Total VOC Emissions Removed [3]	42.41	tpy
Total Cost	**$24,003.53**	dollars/ton VOC removed

1. Exhaust gas flow rate was set equal to the flow rate of air from the sanding and tongue and groove baghouse as a conservative estimate. Ink branding and stamping are fugitive sources located inside the warehouse building, which has an outlet air flow of 71,600 acfm.
2. Natural gas rates are based on January 2009 utility bills resulting in $11.60 per thousand cubic foot (Mscf).
3. Assumes 90% control efficiency.

Table D-33. Direct Capital Costs for Biofilter to Control VOC - Ink Branding and Stamping

Capital Cost Summary		Capital Cost
DIRECT COSTS		
Purchased Equipment and Direct Installation Costs		
Biofilter Equipment and installation [1]		$ 3,939,199.46
Instrumentation (Included with the biofilter equipment and installation cost) [1]		$0
Sales Tax (7% in Georgia)		$275,744
Freight (Included with the biofilter equipment and installation cost)[1]		$0
Biofilter Direct Cost (DC)	**PEC =**	$4,214,943
TOTAL DIRECT COST (DC)	**DC =**	**$4,214,943**
INDIRECT COSTS[2]		
Engineering (10% of PEC)		$421,494
Construction and field expenses (5% of PEC)		$210,747
Contractor fees (10% of PEC)		$421,494
Start-up (2% of PEC)		$84,299
Performance test (1% of PEC)		$52,329
Contingencies (3% of PEC)		$126,448
TOTAL INDIRECT COST (IC)	**IC =**	**$1,316,812**
TOTAL CAPITAL INVESTMENT (TCI = DC + IC)	**TCI =**	**$5,531,755**

1. Cost data per October 25, 2005 BioReaction Industries quote provided for a 130,000 scfm unit. Cost data adjusted using the sixth-tenths power law and an assumed air flow of 71,600 acfm from the ink branding and stamping operations.
2. Indirect capital cost factors taken from the OAQPS Control Cost Manual (CCM), Section 3.2, Chapter 2, Table 2.8, "Capital Cost Factors for Thermal and Catalytic Incinerators," Sixth Edition, January 2002.

Table D-34. Biofilter Cost Analysis to Control VOC - Ink Branding and Stamping

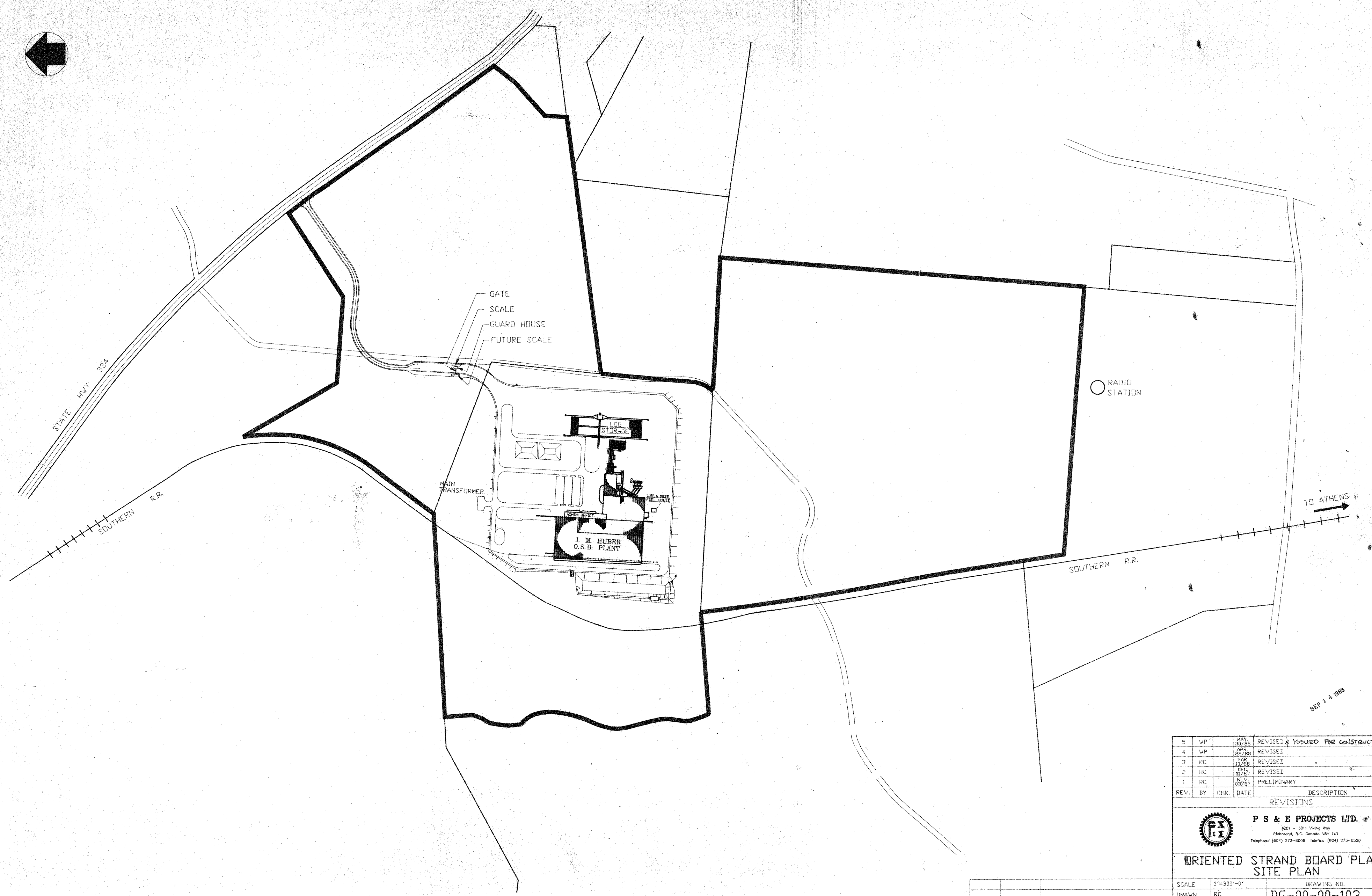
Annual Cost Summary		Annual Cost
DIRECT ANNUAL COSTS		
Operating Labor[1]		
Operator (0.5 hr/shift, 3 shifts/day, 365 days/year @ $18.42/man-hr)		$10,085
Supervision (15% of Operator)		$1,513
Maintenance[1]		
Labor (0.5 hr/shift, 3 shifts/day, 365 days/year @ $13.815/man-hr)		$7,564
Material (100% of maintenance labor)		$7,564
Utilities[2]		
Electricity ($ 0.073 per kWh)		$143,058
TOTAL DIRECT COSTS (DC)	**DC =**	**$169,783**
INDIRECT OPERATING COSTS		
Overhead (60% of Operating Labor and Maintenance)		**$16,035**
Administrative, Property Tax, and Insurance Charges (4% of TCI)		**$221,270**
Capital Recovery (CRF x TCI)		
10 years @ 7.00% interest CRF[3] = 0.1424		**$787,597**
TOTAL INDIRECT COSTS (IC)	**IC =**	**$1,024,903**
TOTAL ANNUALIZED COST (TAC = DC + IC)	**TAC=**	**$1,194,686**
Annual Control Cost ($)		**$1,194,686**
Pollutant to be Removed [VOC] (tpy) [4]		**31**
CONTROL COST EFFECTIVENESS ($/ton)		**$38,233**

1. The hourly labor rate is based on the current Huber pay schedule.
2. Utility costs are based on the following rates:
   An electricity rate of $0.073/kWh, which is the current rate for January 2009, charged to Huber.
3. Interest rate conservatively set at 7.00%, based on EPA's seven percent social interest rate from the *OAQPS CCM Sixth Edition* .
4. A capture efficiency of 100% and an biofilter control efficiency of 70% are considered in the calculation.

Table D-35. Proposed Pound per Hour Limits

	Pollutant							
	PM_{10}		CO		NO_X		VOC	
Emission Point	**Limit**	**Units**	**Limit**	**Units**	**Limit**	**Units**	**Limit**	**Units**
Dryers & Furnace	21.65	lb/hr	64.30	lb/hr	142.55	lb/hr	42.89	lb/hr
Press	0.132	lb/MSF	0.12	lb/MSF	0.28	lb/MSF	0.13	lb/MSF
SC45	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	1.68E-01	lb/MSF
SC08	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	8.91E-02	lb/MSF
SC09	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	9.18E-02	lb/MSF
SC67	3.80E-03	gr/scf	N/A	N/A	N/A	N/A	1.36E-01	lb/MSF

APPENDIX E – PLOT PLAN & FLOW DIAGRAMS



ITEM	REQ'D	DESCRIPTION	DRAWING NO.	WEIGHT

SEP 1 4 1988

REV.	BY	CHK.	DATE	DESCRIPTION
5	WP		MAY. 30/88	REVISED & ISSUED FOR CONSTRUCTION
4	WP		APR. 22/88	REVISED
3	RC		MAR. 10/88	REVISED
2	RC		DEC. 01/87	REVISED
1	RC		NOV. 03/87	PRELIMINARY

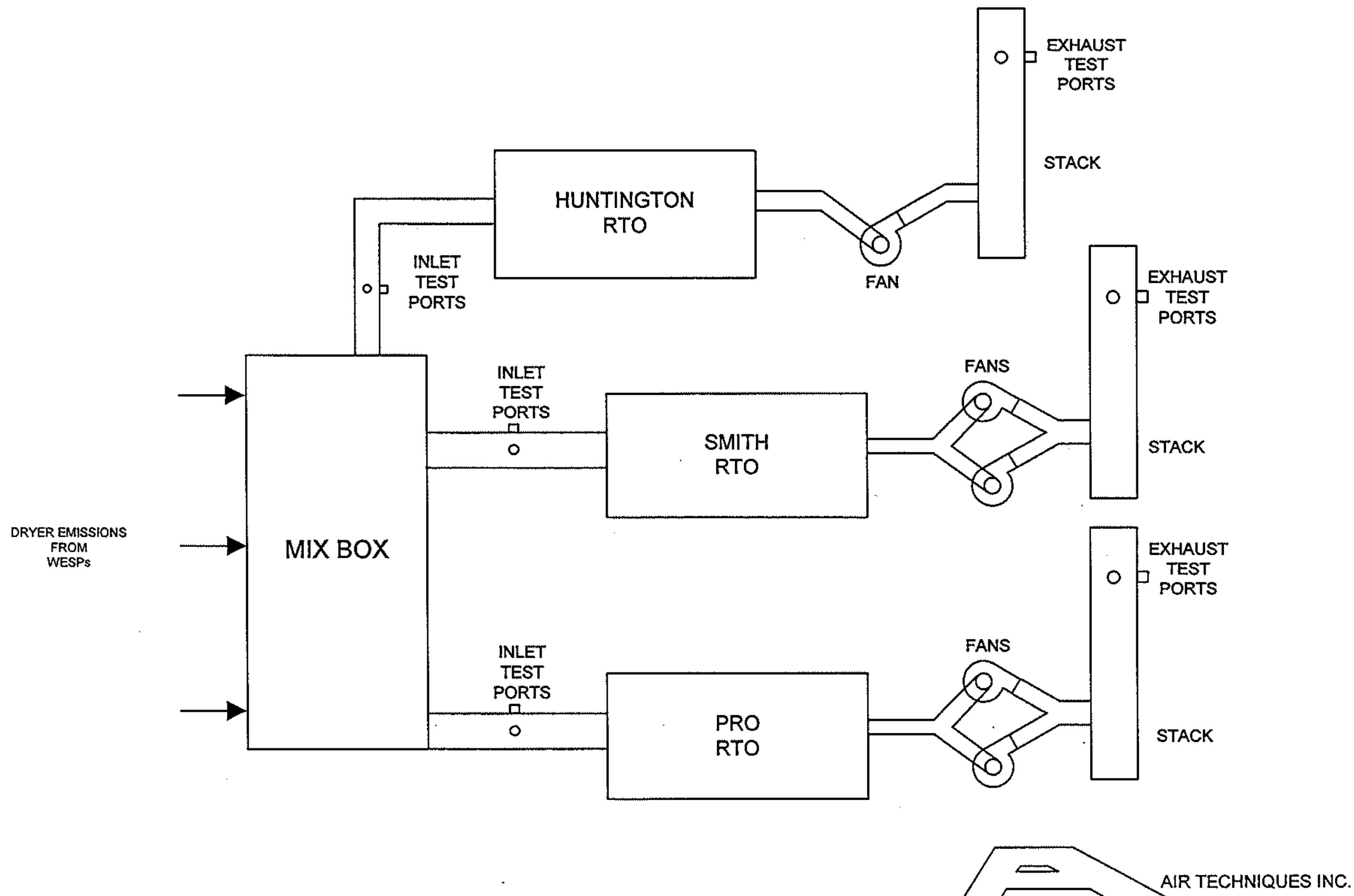
REVISIONS

P S & E PROJECTS LTD.
#201 – 3011 Viking Way
Richmond, B.C. Canada V6V 1W1
Telephone (604) 273-8008 Telefax: (604) 273-0520

ORIENTED STRAND BOARD PLANT SITE PLAN

DATE	PROJECT NO.	CUSTOMER
03NOV87	S87-026	J.M. HUBER CO.

SCALE	1"=300'-0"	DRAWING NO.	REV.
DRAWN	RC	DG-00-00-103	5
DATE	NOV. 87	D-106-477	
APPROVED			

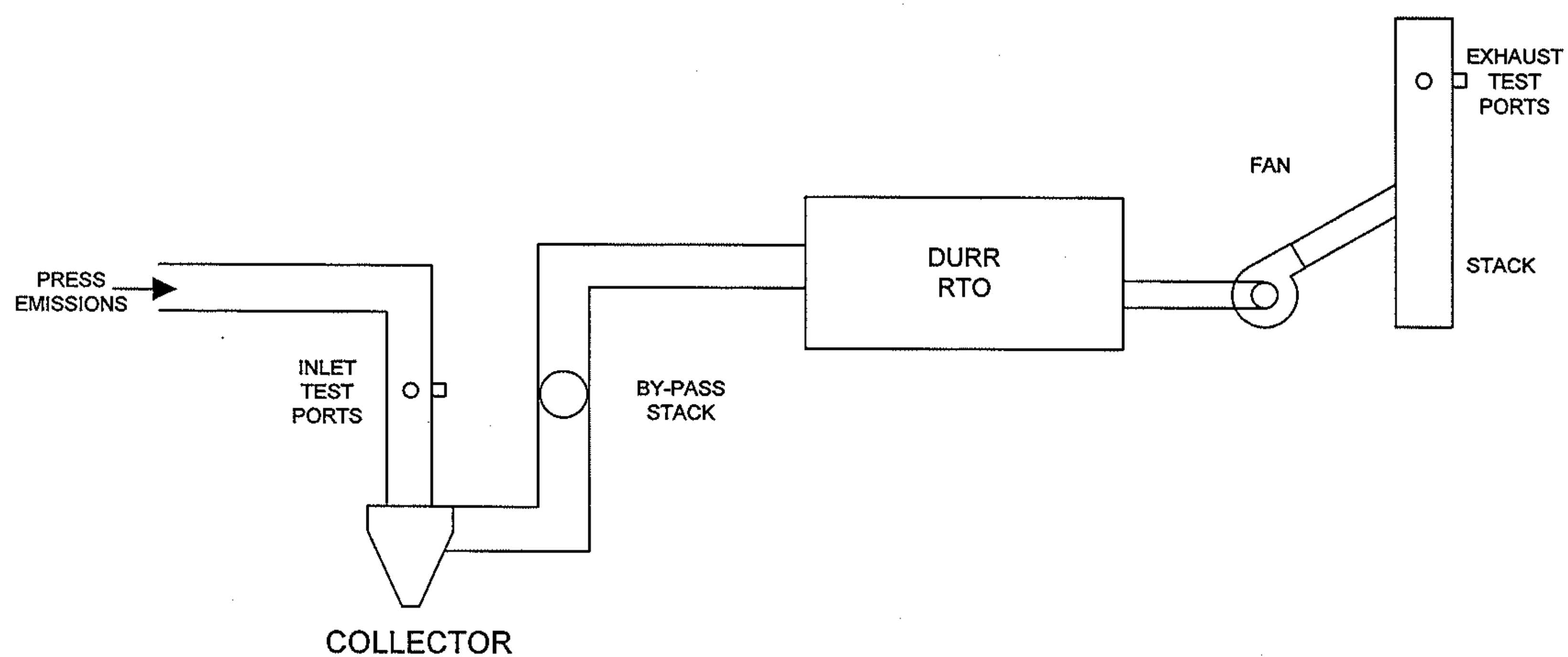


AIR TECHNIQUES INC.

HUBER ENGINEERED WOODS

COMMERCE, GA

PROCESS SCHEMATIC



AIR TECHNIQUES INC.

HUBER ENGINEERED WOODS

COMMERCE, GA

PROCESS SCHEMATIC

APPENDIX F – TITLE V DATABASE AND CERTIFICATION PAGE

4244 International Parkway
Suite 120
Atlanta, Georgia 30354-3906
404-363-7000

Certifications and Signatures

Facility Name: **Huber Engineered Woods, LLC**

Project Name: **July 2009, Title V Modification**

AIRS Number: **131570014**

Submittal File Name: **131570014_20090707.mdb**

COMPUTER DISK VIRUS EXAMINATION CERTIFICATION:
I certify that, to the best of my knowledge, the completed electronic application disk has been inspected and found free of any known viruses.

Signature:____ Date:________________

Name (print):____

Offical Title:____

SOFTWARE USAGE CERTIFICATION:
I certify that the software used to complete the Georgia Title V application was used as provided by the Georgia Environmental Protection Division, Air Protection Branch and was unaltered in any way. I understand that the submission of a Title V (Part 70) application completed using any altered version of the provided software constitutes the submission of an incomplete application and that such action may be subject to enforcement by the Georgia Air Protection Branch and/or the US EPA.

CERTIFICATION OF COMPLIANCE:
Except as stated on the Compliance Plan For a Non-Compliant Emission Unit or Group form of this application, I hereby certify that this facility is in compliance with all applicable requirements effective as of the date of this certification and will continue to comply with such requirements. For applicable requirements promulgated as of the date of this certification, that will become effective during the permit term, I further certify that, except as stated on the Compliance Plan For a Non-Compliant Emission Unit or Group form of this application, this facility will comply with such requirements and will continue to comply with such requirements.

I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this application and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Unless otherwise required by the Director, compliance certifications will be submitted to the Director at least annually.

SIGNATURE OF RESPONSIBLE OFFICIAL:

Signature:____ Date:____________________

Name (print):____

Offical Title:____

Address:____

Notary Public Certification of Responsible Official's Signature:

Signature of Notary Public:____

As part of this permit application, Huber is requesting that the PSD synthetic minor emission limits be removed from the current Title V operating permit, No. 2493-157-0014-V-02-0. In order to assist the EPD in modifying the permit, Huber has provided a summary of the required permit condition changes.

Permit Condition 3.2.1 – The Permittee shall not discharge, or cause the discharge into the atmosphere, from Equipment Group BDFN, Equipment Group DRYR, Ink Applicator IA, and Green End Paint Applicator GEP, during any twelve month period, emissions of: [391-3-1-.03(2)(c); PSD Avoidance – 40 CFR 52.21]

- ***a. NO_x in excess of 233 tons***
- ***b. CO in excess of 237 tons***
- ***c. VOC in excess of 242 tons***
- ***d. PM in excess of 218 tons***

Huber requests that this condition be removed from the operating permit, as the purpose of this application is to remove all PSD synthetic minor emission limits.

Permit Condition 3.2.4 – The VOC destruction efficiency of RTO's SRTO, HRTO, and PRTO shall be as follows: [PSD Avoidance – 40 CFR 52.21; 391-3-1-.03(2)]

- ***a. At least 90 percent while processing wood containing 80 percent or greater pine by weight; and***
- ***b. At least 80 percent while processing wood containing less than 80 percent pine by weight.***

Huber requests that this condition be removed from the permit. In accordance with 40 CFR 52.21, Huber has proposed BACT emission limits for the RTO's at the Commerce Mill, which include a 90% control efficiency on all RTOs at the facility.

Permit Condition 3.2.5 – The combustion temperature of the oxidizer retention chamber in RTO's: SRTO, HRTO, DRTO, and PRTO, shall be at least 1500 ^{o}F, or the temperature established in accordance with Condition 4.2.4 during the operation of Equipment Groups DRYR and BDFN, whichever is applicable. [PSD Avoidance – 40 CFR 52.21; 391-3-1-.03(2)]

Huber requests that the PSD Avoidance regulatory citation be removed from this condition.

Permit Condition 3.2.8 – The Permittee shall not operate the Thermal Oil Pre-heaters TOP1 and TOP2 more than 1,000 hours each during any twelve consecutive month period. [391-3-1-.03(2)(c); PSD Avoidance – 40 CFR 52.21]

Huber requests that this condition be removed from the permit. Although the TOP have not been installed, there is no longer a need for a PSD Avoidance operating limit if Huber chooses to install and operate these units.

Permit Conditions 4.2.1 and 4.2.2 – Emission Factors

Huber proposes that the BACT emission limits provided in Section 4 of this application be used in lieu of the emission limits provided in this section.

Permit Conditions 6.2.6, 6.2.7, 6.2.8, 6.2.9, 6.2.10, 6.2.11 – Rolling Emissions Tracking

The purpose of these recordkeeping conditions is to track compliance with PSD avoidance limits. Since Huber is requesting to remove all PSD avoidance limits, Huber requests that these 12-month rolling emissions tracking conditions be removed from the permit.

Permit Condition 6.2.12 – The Permittee shall notify the Division within 30 days after it begins use of MUPF and/or LPF resins to produce saleable product. [PSD Avoidance per 40 CFR 52.21]

This notification has already taken place. Therefore, Huber requests that this condition be removed from the Title V permit.

Proposed Permit Condition – Operational Flexibility

Huber requests that EPD add permit language to allow for operational flexibility to change resins, catalysts, and inks to other resins, catalysts and inks that have an emissions profile that is equal to or less than the current resins and catalysts.