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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-1761I
Plant ID No.:	007-00016
Applicant:	Weyerhaeuser NR Company
Facility Name:	Sutton OSB Mill
Location:	Heaters, Braxton County
SIC/NAICS Codes:	2493/321219
Application Type:	Modification
Received Date:	April 4, 2016
Engineer Assigned:	Joe Kessler
Fee Amount:	$3,500
Date Received:	April 6, 2016
Complete Date:	May 5, 2016
Due Date:	August 2, 2016
Applicant's Ad Date:	April 12, 2016
Newspaper:	*The Braxton Citizens News*
UTM's:	529.939 km Easting • 4,290.213 km Northing • Zone 17
Latitude/Longitude:	38.76245/-80.65324
Description:	Replacement of the Regenerative Catalytic Oxidizers (RCOs) with a biological oxidation scrubber (biofilter). Additionally, potential emissions from various emission units at the facility have been recalculated using updated emission factors and assumptions.

On October 24, 1994, Weyerhaeuser was issued Permit No. R13-1761 for the construction of a 450,000 TPY oriented strand board (OSB) facility. Since that date, multiple revisions to the permit have been made as follows:

- Permit No. R13-1761R was issued on June 5, 1997 to reflect "as built" design changes to the facility's environmental controls for press emissions;
- Permit No. R13-1761A was issued on June 17, 1998 allowing increased resin usage;
- Permit No. R13-1761B was issued on December 2, 1999 allowing an increase in formaldehyde emissions;

- Permit No. R13-1761C was issued to allow the removal of the RCOs, which were operating on the wood flake dryers at the facility. It was argued by Weyerhaeuser that the operation of the RCOs should not be required to control volatile organic compound (VOC) emissions from the wood flake dryers because the facility's uncontrolled emissions (without the operation of the RCOs) were considered minor (less than 250 tons/year of VOC); as defined by the Prevention of Significant Deterioration (PSD) regulations;

- Permit Application No. R13-1761D was withdrawn on February 16, 2006;

- Permit No. R13-1761E was issued on June 22, 2007 primarily allowing for an increase in permitted emission limits based on stack testing;

- Permit No. R13-1761F was issued on July 23, 2008 to install two Regenerative Thermal/Catalytic Oxidizers (RTO/RCOs) to comply with the Plywood and Composite Wood Products (PCWP) MACT (40 CFR 63, Subpart DDDD). Weyerhaeuser also proposed to use a powdered resin (in replacement of an equivalent amount of liquid resin) and requested to remove the pine wood processing limit;

- Permit No. R13-1761G was issued on March 12, 2009 as a Class II Administrative Update (A/U) to (1) add language concerning the Routine Control Device Maintenance Exemption (RCDME) pursuant to 40 CFR 63, Subpart DDDD and (2) requested authorization to add an additional operating scenario to the permit; during idle run conditions (times when the dryers are not drying material), venting the exhaust gases of the energy cells through the dryers and wet ESPs and out Emission Point 21. This operating scenario was called "Energy Cell Only Mode"; and

- Permit No. R13-1761H was withdrawn on October 11, 2012.

DESCRIPTION OF PROCESS/MODIFICATION

Existing Facility

Weyerhaeuser's Sutton OSB Mill is an OSB production facility with the potential to make a maximum of 80,250 ft^2 of 3/8 inch board per hour. The OSB is produced primarily from hardwood and is made with methylene diphenyl diisocyante (MDI) resin, phenol-formaldehyde (PF) resin, wood strands, wax, and other additives to form the surface and core layers of the composite board. Major processing areas at the facility are: Log Intake and Storage, Flaking and Screening, Strand Drying, Mat Preparation, Pressing, Board Finishing, and Shipping.

Cut logs are unloaded and stored at the site. During the winter months, the logs are conditioned and thawed. The logs are debarked, cut to length and flaked into thin strands approximately 0.025 inches thick, 0.75 inches wide, and 3.0 inches long. The removed bark material is used in the hog feed system to fire two energy cells.

The wood strands are stored in a bin, and during production are fed into one of four rotary dryers. The 175 mmBtu/hour wood-waste fired energy cells (with natural gas backup primarily used during start-up and designed at a heat input of 29 mmBtu/hour) provide the heat to the dryers in the

form of direct contact with the flue gases. In the dryers, the moisture in the flakes is reduced from a range of 40 to 60 percent to 2 to 4 percent. The dryers, during normal operation, exhaust through two Wet Electrostatic Precipitators (WESPs) and two RCOs for control of particulate matter and hydrocarbons prior to exhaust into the air. The facility is currently permitted to run in several other operating modes:

- "Idle run mode" - defined as those times when the Energy Cells are operating, no material is being dried in the dryers, gases are vented through the operating Multi-clones, and emitted from Emission Points 10 and 11;

- "Energy Cell Only Mode" - defined as those times when the Energy Cells are operating, no material is being dried in the dryers, gases are vented through the operating WESPs, and emitted from Emission Point 21; and

- "RCDME" - defined as those times when the Energy Cells are operating, material is being dried in the dryers, gases are vented through the operating WESPs, *not* controlled by the RTOs, and emitted from Emission Point 21.

The dried wood strands are screened into three classifications: surface, core, and fines or fuel. Larger strands are used for the surface layers of the OSB, while the core layers contain the intermediate sizes. The fines contain very small flakes or dust that cannot be used in the OSB. The larger flakes are blended with resins and wax and formed into mats that contain two surface layers and two core layers. These mats are trimmed and loaded into a sixteen-slotted press. In the press, mats are heated up to 4,050 degrees Fahrenheit under a pressure of 750 pounds per square inch. This process cures the thermosetting resin and forms the sheets of Structurwood.

The press discharges the sheets onto a sawline conveyor system. The fumes from the press and the handling operations are routed to the energy cells as part of the feed air for combustion. This arrangement takes advantage of the preheated press vent exhaust (which facilitates efficient combustion), and it acts to oxidize the volatile organic compounds, carbon monoxide, and hazardous air pollutants (formaldehyde and benzene) in the press vent exhaust.

Each of the four separate dryers is designed to process up to 28,000 lb/hr of dried wood flakes, for a total facility process rate of 111,000 lb/hr of dried flakes. When combined with resins and wax, which will average approximately 7.3 percent of total weight of the product, the press will handle up to 120,800 lb/hr and 450,000 tons/year of commercial Structurwood.

Proposed Modifications

Weyerhaeuser has now submitted a permit application to make the following substantive modifications:

- Increase the maximum production of the facility from 80,250 ft^2 of 3/8 inch board per hour to 94,000 ft^2 of 3/8 inch board per hour (with an annual average of 86,000);

- Replacement of the RCOs with a biological oxidation scrubber - commonly referred to as a biofilter - to control hydrocarbon emissions (in compliance with 40 CFR 63, Subpart DDDD) from the Energy Cells. The RCOs will continue to be used during biofilter construction;

- Revision of the Press Bypass Mode emissions to account for small changes in emission factors and calculation methodology; and

- Removal of the Wax/Resin Tank Heater (Emission Point Number 39) from the permit.

Biofilter Description

Weyerhaeuser has proposed to replace the existing RCOs with a biological oxidation scrubber - commonly referred to as a biofilter - to control hydrocarbon emissions (in compliance with 40 CFR 63, Subpart DDDD) from the Energy Cells. A biofilter is basically a very large scrubber which has three packed bed sections. The scrubbing liquid is water with live bacteria that have been designed to digest water soluble hydrocarbons. Biofilters are especially efficient at controlling methanol as it is very water soluble.

When the Energy Cells are operating in normal mode, contaminated gas is drawn from the process ducting (at nearly atmospheric pressure) using a centrifugal fan and is pushed into the biofilter to be distributed through the gas absorption section. In this section soluble contaminants are transferred to the liquid phase. Less soluble compounds are treated after passing through the absorption section in the gas phase bio-oxidation section. A mist eliminator removes entrained water droplets from the gas before emitting through the stack to atmosphere. Contaminated liquid from both the absorption section and the gas bio-oxidation section drain by gravity to the liquid phase bio-oxidation section. Aeration and mixing in the liquid bio-oxidation section facilitate degradation of the absorbed contaminants.

Liquid required for sump mixing and spray in the absorbing and gas bio-oxidation sections is circulated using two (2) centrifugal pumps. A portion of flow is directed to an aerator located in the sump using the Aerator Pump. Another fraction of liquid is pumped using the Spray Pump to an automatic backwash filter system where large solids that may clog the spray nozzles are removed. Backwash is returned to the sump or directed to process water system as blowdown according to conductivity and Total Suspended Solids (TSS) measurements. Liquid from the filter is split to the absorbing and gas bio-media sections.

Nutrients are added in the gas bio-oxidation spray line for distribution over the gas bio-media bed. Nutrients trickle through the gas media sections and reach the sump for liquid biomass uptake. Nutrients added to the nutrient tank are supplied in the form of a powder packaged in one pound water-soluble bags. A specified number of bags are added monthly into the nutrient tank which is filled with non-potable water. A slow mechanical agitator mixes the nutrients in water. A heater and embedded thermostat regulate the nutrient tank temperature.

The top section of the packing is for the gas phase biological reaction so it has a relatively small spray mist of water that keeps the packing wetted with activated microbes where it can come into contact with any hydrocarbons that may have escaped the middle absorption packing section. The middle section consists of structured packing and will have a large amount of water trickling

through the media to absorb as much of the water soluble pollutants into the aqueous phase as possible. Although the exact flow rates that will be needed have not yet been established, this middle section has the capacity to deliver 6,500 gallons of water a minute. The bottom section of the scrubber has a random packing material made from High Density Polyethylene (HDPE) which is submerged in the liquid phase. This allows additional residence time for the microbes to reduce the hydrocarbon concentrations.

SITE INSPECTION

Due to the nature of the modification, the writer did not conduct a site inspection for this permitting action. According to information in the DAQ database, the last on-site inspection occurred on November 16, 2015 by Mr. Richard Ray of the Compliance/Enforcement Section. Based on that inspection, the facility was determined to be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Weyerhaeuser included in Attachment N of the permit application a recalculated estimate of the potential emissions produced by the energy cells/dryers and based on the use of the biofilter instead of the RCOs. Emissions were based on site-specific stack test data, revised throughputs as noted above, and a biofilter methanol control efficiency of 90%. Emission limits for operation during "normal mode" and "Energy Cell Mode" from both Emission Point 21 and 23 given under Table 4.1.2. are now aggregated to allow Weyerhaeuser flexibility to operate both the RCOs and the biofilter during construction and shakedown. Due to the complexity of the calculations, refer to Attachment N for a detailed understanding of the calculations.

Emissions Summary

Based on the estimation methodology as submitted in Attachment N of the permit application, the post-modification facility-wide PTE of the Sutton OSB Mill is given in Attachment B. The change in annual facility-wide PTE as a result of the modifications evaluated herein is given in the following table:

Table 1: Change In Facility-Wide Annual PTE

Pollutant	R13-1761G[(1)]	R13-1761I	Change
	tons/year	tons/year	tons/year
CO	230.46	227.91	-2.55
NO_X	228.46	247.47	19.01
$PM_{2.5}/PM_{10}/PM$	96.16	99.60	3.44
SO_2	17.17	18.06	0.89
VOCs	90.77	149.96	59.19
HAPs	32.62	42.70	10.08

(1) Emissions estimated from Permit Number R13-1761G.

REGULATORY APPLICABILITY

The following will discuss only the regulatory applicability of general rules and specific rules to the emission units that have been proposed to be modified as part of this permitting action.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed modification of the Sutton OSB Mill has a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY (see Table 1) and, therefore, pursuant to §45-13-2.17, the proposed changes are defined as a "modification" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the . . . modification . . . and operation of any stationary source to be commenced without . . . obtaining a permit to . . . modify." Therefore, Weyerhaeuser is required to obtain a permit under 45CSR13 for the proposed changes.

As required under §45-13-8.3 ("Notice Level A"), Weyerhaeuser placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on April 12, 2016 in *The Braxton Citizens News* and the affidavit of publication for this legal advertisement was submitted on April 22, 2016.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Sutton OSB Mill is located in Braxton County, WV. Braxton County is classified as "in attainment" with all National Ambient Air Quality Standards (NAAQS). Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY. As given in Table 1, the facility-wide PTE of the modified Sutton OSB Mill remains less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 45CSR14 and the rule does not apply.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The Sutton OSB Mill, defined under Title V as a "major source," was last issued a Title V renewal permit on April 22, 2013 (R30-00700016-2013). Proposed changes evaluated herein must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

40 CFR 63 Subpart DDDD: National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products

40 CFR 63, Subpart DDDD, sets standards for plywood and composite wood product (PCWP) manufacturers located at major sources of HAPs. Pursuant to §63.2231(a), a PCWP is defined as a facility "that manufactures plywood and/or composite wood products by bonding wood

material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product." The Sutton OSB Mill meets this definition and is therefore, as a major source of HAPs (pursuant to §63.2231(b)), subject to the applicable requirements of Subpart DDDD.

Subpart DDDD allows sources to choose from a variety of compliance options to reduce emissions of HAPs: production-based compliance options (§63.2240(a)), compliance options for add-on control systems (§63.2240(b)), and an emissions averaging compliance option (§63.2240(c)). Weyerhaeuser had previously chosen to meet Subpart DDDD by using a compliance option for an add-on control systems - in there case installation of RCOs. Currently, Weyerhaeuser is showing compliance by reducing Total Hydrocarbons (THC) to 20 ppm_{vd} as specified under Table 1B of the rule. Now Weyerhaeuser is proposing to replace the RCOs with one (1) biofilter (as allowed under §63.2240(b)). Due to the uncertainty in final operation, Weyerhaeuser is proposing to show compliance with the rule through one of the following proscribed demonstrations under Table 1b:

- Limit emissions of total HAP, measured as THC (as carbon)a, to 20 ppmvd; or
- Reduce methanol emissions by 90 percent; or
- Reduce formaldehyde emissions by 90 percent.

Additionally, Weyerhaeuser will have to meet one of the operating requirements proscribed for use of a biofilter under Table 2 of Subpart DDDD:

- Maintain the 24-hour block biofilter bed temperature within the range established according to §63.2262(m); or
- Maintain the 24-hour block average THC concentration (methane may be subtracted) in the biofilter exhaust below the maximum concentration established during the performance test.

Additionally, to demonstrate initial compliance with the compliance options and operating requirements, Weyerhaeuser must conduct performance tests and establish each site-specific operating requirement in Table 2 of Subpart DDDD according to the requirements in §63.2262 and Table 4.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the existing Sutton OSB Mill and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)) that is identified in the permit application as having a PTE as emitted through the biofilter greater than 0.05 TPY (100 pounds/year):

Table 2: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Acetaldehyde	VOC	Yes	B2 - Probable Human Carcinogen
Acrolein	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Carbon Disulfide	VOC	No	No Assessment Available
Chlorine	VOC	No	No Assessment Available
Chlorobenzene	VOC	No	D - Not classifiable as to human carcinogenicity
Chloroform	VOC	Yes	B2 - Probable Human Carcinogen
Cumene	VOC	No	D - Not classifiable as to human carcinogenicity
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
n-Hexane	VOC	No	Inadequate Data
Hydrogen Chloride	VOC	No	No Assessment Available
Manganese	PM	No	D - Not classifiable as to human carcinogenicity
Mercury (elemental)	PM	No	D - Not classifiable as to human carcinogenicity
Methanol	VOC	No	No Assessment Available
Methyl Chloride	VOC	No	D - Not classifiable as to human carcinogenicity
Methyl Isobutyl Ketone	VOC	No	Inadequate Data
Dichloromethane	VOC	Yes	Likely to be carcinogenic to humans
Propionaldehyde	VOC	No	Inadequate Data
Tetrachloroethylene	VOC	Yes	Likely to be carcinogenic to humans
Toluene	VOC	No	Inadequate Data
Xylene	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological

conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum increase in emissions are less than applicability thresholds that would define the proposed modification as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the modification, an air quality impacts modeling analysis was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The only substantive change to the monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR) in the draft permit is the following as added under 4.2.4.:

- For the purpose of determining compliance with the production limit set forth in Section 4.1.9(d) of this permit, the permittee shall monitor and record the monthly and rolling twelve month total of OSB (as adjusted to 3/8 inch) produced at the facility. Compliance with the hourly production limit shall be based on the average hourly production rate as calculated for each month.

PERFORMANCE TESTING OF OPERATIONS

Due to the replacement of the RCOs with the biofilter, the following new performance testing is required under 4.3.1. of the draft permit:

- At the same time as the initial performance test required under 40 CFR 63, Subpart DDDD, the permittee shall conduct, or have conducted, a performance test during "normal mode" as defined under 4.1.3(a)(2) to determine compliance at Emission Point 23 with the hourly emission limits of VOCs and the HAPs targeted by 40 CFR 63, Subpart DDDD.

CHANGES TO PERMIT R13-1761G

The substantive changes made changes to R13-1761G were limited to:

- Emission Units Table 1.0 of the draft permit was updated with the proposed use of the biofilter;

- Emission Point 23 was added to Table 4.1.2. of the draft permit with the now aggregated emission limits for both Emission Points 21 and 23 during "normal mode" and "Energy Cell Mode";

- Additional footnotes were added to Table 4.1.2. of the draft permit;

- An additional operating scenario was defined under 4.1.3(a)(2);

- Requirements for submitting a new RCDME for use of the biofilter were added under 4.1.6(f);

- New OSB Production limits were added under 4.1.9(d);

- 40 CFR 63, Subpart DDDD language specific to the biofilter was added under 4.1.19. and 4.1.20.;

- New production throughput monitoring was added under 4.2.4.;

- New performance testing was added under 4.3.1; and

- The Wax/Resin Tank Heater was removed from the Emissions Unit Table.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-1761I to Weyerhaeuser NR Company for the proposed modification of the Sutton OSB Mill located in Heaters, Braxton County, WV.

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Joe Kessler, PE
Engineer

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Date