DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

A088471085

FACILITY: Billerud Escanaba LLC		**SRN / ID:** A0884
LOCATION: 7100 COUNTY 426 M.5 ROAD, ESCANABA		**DISTRICT:** Marquette
CITY: ESCANABA		**COUNTY:** DELTA
CONTACT: Amanda Freele , Environmental Engineer		**ACTIVITY DATE:** 01/30/2024
STAFF: Joe Scanlan	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Announced inspection to determine compliance with MI-ROP-A0884-2021b		
RESOLVED COMPLAINTS:		

REGULATORY AUTHORITY

Under the Authority of Section 5526 of Part 55 of NREPA, the Department of Environment, Great Lakes, and Energy may upon the presentation of their card, and stating the authority and purpose of the investigation, enter and inspect any property at reasonable times for the purpose of investigating either an actual or suspected source of air pollution or ascertaining compliance or noncompliance with NREPA, Rules promulgated thereunder, and the federal Clean Air Act.

FACILITY DESCRIPTION

Billerud Escanaba Mill is a pulp and paper mill owned by Billerud Americas Corporation and is located in Wells Township, Delta County, MI. The Escanaba Mill began operating in 1911 as a paper mill under Escanaba Pulp and Paper Company. The Escanaba Mill complex encompasses 2000 acres and is approximately 4.0 miles north of downtown Escanaba, surrounded by a mix of scattered residential developments, commercial businesses, farmland, and undeveloped forestland. Delta County is currently designated by the EPA as attainment/unclassified for all criteria pollutants.

The Escanaba Mill consists of a woodyard, several power boilers, kraft pulp mill, refiner mechanical pulp (RMP) mill, chemical recovery process, three paper machines, a pulp dryer, three off-machine blade coaters, six supercalenders, and six winders. The facility generates its own electricity using steam-driven turbines and operates a wastewater treatment plant. Using both hardwood and softwood logs, the mill manufactures graphic paper such as coated sheets, coated web, coated digital & Inkjet paper for commercial printing and marketing applications as well as specialty papers used in label applications. The facility has the capacity to produce approximately 730,000 tons of paper per year.

PROCESS DESCRIPTION

The Kraft pulping process uses chemicals to dissolve the lignin in wood fibers to create wood pulp. The pulp is washed and bleached and then processed on a paper machine or pulp dryer. The chemicals that are used to cook the wood are recovered through other Kraft processes. In the RMP mill, hardwood chips are treated with hot caustic and the soft chips are then macerated mechanically using refiners to produce unbleached pulp.

Billerud obtains wood chips from two sources to create pulp. Wood chips are generated from logs that are chipped on site and the mill also purchases wood chips, which are delivered via trucks to the mill. In the Kraft mill, wood chips are transferred from an open storage area to one of eight batch digesters where steam and white cooking liquor (sodium hydroxide – NaOH and sodium

sulfide – Na2S) are added to dissolve the wood lignin and produce pulp. This cooking process breaks the bonds that link the lignin (glue) and cellulose (fibers) in the wood. The digester pulp is washed, and the spent cooking liquor (black liquor) is recovered.

Subsequent process operations remove knots, clean, wash, screen, and bleach the pulp. After the knotters, brownstock washers clean the pulp by removing spent cooking chemicals and wood residue. Further cleaning, screening, and oxygen delignification (O2 delignification system) are performed prior to the pulp being sent to the bleach plant. At the bleach plant the pulp is whitened to various brightness levels. Chlorine dioxide and peroxide are used to whiten the pulp. After the pulp is bleached, it is sent to high density storage tanks where it can be drawn off to either the pulp dryer or paper machine. The white slush pulp is either dried in the pulp dryer and sold as market pulp or converted to paper on the paper machines and sold.

The pulp dryer and paper machines produce marketable pulp and paper products. The paper machines take pulp from the high-density storage tanks and mixes the manufactured pulp with purchased pulp, supplemental chemicals, and additives. At the front end of the Paper Machine, the pulp is formed on a thin, moving wire mesh. As the wire mesh moves through the paper machine, water is removed from the pulp via vacuum and dryer sections of the paper machine. Paper is formed as the water is removed. After the dryer section, the paper is coated on both sides and smoothed using calendars. The paper is then wound on reels that are cut into smaller rolls and then shipped offsite via truck or railcars.

Excess Kraft pulp is formed and dried on a pulp dryer for future use during pulp mill outages or for sale to external customers. The pulp dryer is utilized to dewater, press, and dry pulp from the high-density storage tanks. Other than pH adjustment of the pulp, there are no additives or coating utilized.

The spent cooking liquor (weak black liquor) from the digesters is pumped to evaporators where the black liquor is concentrated to heavy black liquor. The heavy black liquor is fired in the recovery furnace where the organic portion of the black liquor is readily combusted, and the inorganic portion accumulates as smelt in the bottom of the recovery furnace. The smelt is drained off to the smelt dissolving tank and mixed with weak wash to form green liquor. The green liquor is pumped to the causticizing area where it is first clarified. After the clarifier, the green liquor is pumped to the slaker where lime (CaO) is added to produce calcium hydroxide (CaOH, or slaked lime) slurry. The slaked lime slurry passes through a series of causticizers where the green liquor is converted to white liquor, and lime mud (calcium carbonate – CaCO3) is generated as a by-product. The lime mud is washed and screened and then eventually sent to the lime kiln. The lime kiln converts the lime mud back to lime. The reclaimed lime is used in the slaking process and the white liquor is sent to the digesters to cook wood chips.

In addition to the processing equipment at Verso, the mill creates its own power through steam driven turbines. Steam is produced by four boilers along with the Recovery Furnace. The Recovery Furnace produces a significant amount of steam that is used throughout the mill.

The wastewater treatment plant removes organic material and solids from the process wastewater generated by the mill. The treatment system includes a primary settling basin, a cooling tower, aeration basins, and secondary settling basins. Sludge from the wastewater treatment plant is reused as a soil amendment for farm fields and land reclamation or landfilled.

The mill also collects concentrated vent gases (CVG), low volume high concentration (LVHC) gases and high-volume low concentration (HVLC) gases, from several emissions units to control organic hazardous air pollutants (HAPs). The HVLC gases are burned in the recovery furnace and the LVHC gases are burned in the Thermal Oxidizer (EUOC33) or the Lime Kiln (EULK15) as a backup incineration device.

EMISSIONS REPORTING

Billerud Escanaba Mill is required to report its annual emissions through the Michigan Air Emissions Reporting System (MAERS). The following table lists stationary source emission information as reported to MAERS for the year 2022:

POLLUTANT	2022 EMISSIONS (Tons)
CO	1441.8
NOX	1598.9
PM10-PRI	11.4
PM10-FIL	138.3
PM25-PRI	11.0
PM25-FIL	104.1
SO2	590.6
VOC	157.8

2022 is the last year for reporting to MAERS. For 2023 and beyond, all facilities will be using the MiEnviro State and Local Emissions Inventory System (SLEIS) for annual emissions reporting.

COMPLIANCE HISTORY

The facility has not had any compliance issues since the previous Full Compliance Evaluation (FCE) in 2022. However, on March 7, 2024, Billerud submitted an amended Annual Compliance Report that identified missing monthly visible emissions inspections for certain emission units subject to Subpart S.

REGULATORY ANALYSIS

Billerud Escanaba Mill is considered a major stationary source for all criteria pollutants and hazardous air pollutants (HAPs). The Escanaba Mill currently operates under Renewable Operating Permit (ROP) No. MI-ROP-A0884-2021b and PTI No. 17-23. PTI No. 17-23 is a recently issued PTI that concerns the Chemical Recovery Furnace, Lime Kiln, and Smelt Dissolving Tank. PTI No. 17-23 will be incorporated into the ROP at the request of a Minor Modification, or during the next ROP renewal. The mill is also subject to NSPS and MACT federal regulations as outlined in the Staff Report for MI-ROP-A0884-2021b.

The most recent notable change to the ROP was a minor modification to incorporate PTI No. 184-16A into Section 1 of the ROP, which is for an air system upgrade (ASU) to the existing combustion air system on No.10 Recovery Furnace (Recovery Boiler). This was incorporated into the ROP on April 5, 2022.

INSPECTION

Due to the size of the Escanaba Mill, the FY24 full compliance evaluation will be split into multiple inspections. This initial inspection took place on January 30, 2024, and began with an introductory meeting between EGLE AQD staff Joseph Scanlan (myself) and Billerud environmental staff Amanda Freele and Charles Detiege. After the meeting, Amanda and mill staff escorted me on a tour of the Kraft Mill, including the LVHC and HVLC systems, and Thermal Oxidizer.

FGBBKRAFT – Kraft Mill Subpart BB System. This flexible group covers the applicable requirements from 40 CFR Part 60, Subpart BB – Standards of Performance for Kraft Pulp Mills. FGBBKRAFT includes the following:

EUBB22 Digester System consists of batch digesters, blow tanks, and a blow heat condensing system.

EUBB23 Brownstock System processes brown pulp from the digester blow tanks and includes the knotters, brownstock washers, and associated vacuum pumps and filtrate tanks. The Brownstock System is used for final treatment of Kraft pulping process condensates.

EUBB33 Steam Stripping System consists of a steam stripper column and reflux condenser used to strip total reduced sulfur (TRS) compounds from condensate streams from various processes in the Kraft pulp mill. The Steam Stripping System is also used to pre-treat kraft pulping process condensates.

EUBB05 Evaporator System consists of a multiple-effect evaporator and associated condensers and hotwell used to concentrate the spent cooking liquid that is separated from the pulp (black liquor).

Gases from the EUBB22 Digester System, the EUBB33 Steam Stripping System, and the EUBB05 Evaporator System are routed to the EULVHC closed vent gas collection system and burned in the Thermal Oxidizer (EUOC33) or the Lime Kiln (EULK15) as a backup. Gases from the EUBB23 Brownstock System and the EUBB22 Digester System digester domes and capping valves are routed to the EUHVLC closed vent gas collection system and burned in Chemical Recovery Furnace (EURF15).

Emission Limit

SC I.1 The Digester System, Brown Stock Washer System, Evaporator System, and Steam Stripping System are subject to a TRS limit of 5 ppm by volume on a dry gas basis, corrected to 10% oxygen based on a 12-hour average, unless the gases are combusted in either the Recovery Furnace or the Thermal Oxidizer and Lime Kiln with a minimum temperature of 1200 F for at least 0.5 seconds.

Process/Operational Restrictions

SC III.1 During the inspection the thermal oxidizer was in operation and showed a combustion temperature of 1340 Fahrenheit at 1:27 PM. The oxidizer was combusting gases from the Digestor System at 44.3 SCFM, Steam Stripping System at 2183 SCFM, and the Evaporator System at 390 SCFM. Gases from the Brownstock System and remaining Digester System gases are collected and combusted in the Recovery Furnace.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion. An amended semiannual report for 2022 was submitted to AQD March 6, 2024, for deviations related to gaps in monthly visible emissions readings.

FGLVHC – LVHC System

The LVHC System (FGLVHC) consists of a collection of equipment regulated by 40 CFR Part 63, Subpart S including the digesters, turpentine recovery, evaporator, steam stripping system, and associated equipment which vent to the LVHC gas collection system. Emission Units include:

EUBB05 Evaporator NSPS Devices

EUOT22 Digester Other Devices

EUBB22 Digester NSPS Devices

EUMT22 Miscellaneous Turpentine Handling Devices

EUBB33 Steam Stripping NSPS Devices

EUMC33 Miscellaneous Condensate Stripping System Devices

LVHC gases from FGLVHC are collected in a closed vent collection system and incinerated in the Thermal Oxidizer (EUOC33) or the Lime Kiln (EULK15) as a backup incineration device.

Process/Operational Restrictions

SC III.1-3 During the inspection, the thermal oxidizer was in operation and combusting LVHC gases. The thermal oxidizer showed a combustion temperature of 1340 Fahrenheit at 1:27 PM. The oxidizer was combusting gases from the Digestor System at 44.3 SCFM, Steam Stripping System at 2183 SCFM, and the Evaporator System at 390 SCFM. Gases from the Brownstock System and the Digester System are collected and combusted in the Recovery Furnace. The LVHC

gases are vented through a closed-vent system to the thermal oxidizer or the lime kiln as a backup device.

Monitoring/Recordkeeping

SC III.4, VI.1-2 An internal records review in early 2024 revealed that 5 months of records for monthly leak detection/visual inspections for emission units associated with FGLVHC were not available for 2022. Upon discovery, these monitoring and recordkeeping deviations were reported in a revised semiannual deviation report submitted to AQD on March 6, 2024. A similar deviation was also reported for December 2023. As indicated in the revised deviation report, proper training to staff has been given to follow a monthly schedule for these inspections.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the Annual certifications of compliance are submitted in a timely fashion. FGLVHC had two deviations reported for 2023. An amended Semiannual report for 2022 was submitted to AQD March 6, 2024, for recordkeeping deviations related to gaps in monthly leak detection readings.

FGHVLC – HVLC System

The HVLC System (FGHVLC) consists of a collection of equipment regulated by 40 CFR Part 63, Subpart S including the following: knotters, brownstock washers, brownstock filtrate tanks, digester fugitive gases, and black liquor storage and processing tanks. Emission Units include:

EUBB22 Digester Capping Valves

EUBB23 Brownstock NSPS Devices

EUME05 Miscellaneous Evaporator System Devices

HVLC gases from FGHVLC are collected in a closed vent system and destroyed in the Chemical Recovery Furnace (EURF15).

Process/Operational Restrictions

SC III.1-3 HVLC gases are routed through a closed-vent system to the Recovery Furnace to be combusted.

Monitoring/Recordkeeping

SC III.4, VI.1-2 An internal records review in early 2024 revealed that 5 months of records for monthly leak detection/visual inspections for the Brown Stock Washer Collection System were not available for 2022. Upon discovery, these monitoring and recordkeeping deviations were reported in an amended Semiannual deviation report submitted to AQD on March 6, 2024. A similar deviation was also reported for December 2023.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the Annual certifications of compliance are submitted in a timely fashion. FGLVHC had two deviations reported for 2023. An

amended Semiannual report for 2022 was submitted to AQD March 6, 2024, for recordkeeping deviations related to gaps in monthly leak detection readings.

FGTO33 – Thermal Oxidizer System

The Thermal Oxidizer System (FGTO33) includes two emission units: EUOC33 Thermal Oxidizer, a dedicated incineration device for gases from the FGLVHC System and EUSA33 Soda Ash Storage Tank.

Exhaust from the Thermal Oxidizer (EUOC33) is routed through a packed scrubber which utilizes a soda ash scrubbing solution to control sulfur dioxide emissions.

Emission Limits

The thermal oxidizer contains emission limits of PM, SO2, TRS, Total HAP measured as methanol, and visible emissions. Compliance is demonstrated through proper operation of the scrubber and performance testing.

Process/Operational Restrictions

SC III.1-3 The thermal oxidizer is required to maintain a minimum temperature of 1200 F based upon a 5-minute averaging time measured at the point of incineration and minimum retention time of 0.5 seconds. During the inspection, the thermal oxidizer was in operation and the combustion temperature was 1340 Fahrenheit at 1:27 PM. The oxidizer was combusting gases from the Digestor System at 44.3 SCFM, Steam Stripping System at 2183 SCFM, and the Evaporator System at 390 SCFM at a natural gas firing rate of 4.08 KSCFH. Performance testing on 10/22/20 has shown that total HAP concentrations (methanol surrogate) at the outlet of the Thermal Oxidizer are reduced to less than 20 ppm by volume, corrected to 10% O2 on a dry basis, showing compliance with SC III.2.

Design/Equipment Parameters

SC IV.1-2 The packed scrubber is equipped with a monitoring device for the liquid flow rate, pH of the scrubbing liquid, and the pressure drop across the scrubber. During the inspection, the last logged 3-hour average liquid flow rate for the first stage of the scrubber was 823 gpm and the second stage was 639 gpm. The first stage scrubber pH was 7.0 as the last logged 3-hour average and the second stage was 9.4 as the last logged 3-hour average. The pressure drop across the first stage of the scrubber was 0.8" WC and the second stage was 1.3" WC. The Thermal Oxidizer is equipped with a continuous temperature monitoring and recording system.

Testing/Sampling

SC V.1-3 The Thermal Oxidizer is required to be tested for total HAPs measured as methanol at least once every five years. Testing was last performed on 10/22/2020 and the average emission rate was 1.88 ppmvd at 10% O2. The average emission rate from the test is in compliance with SC I.5. Testing is next required by 10/22/2025.

Monitoring/Recordkeeping

SC VI.1-10 Pressure drop is continuously monitored and recorded at least every 15-minutes for a 3-hour average across each stage of the scrubber. The pressure drop across the first stage of the scrubber was 0.8" WC and the second stage was 1.3" WC during the inspection.

The scrubber liquid feed rates to the first and second stage are continuously monitored and recorded at least every 15-minutes for a 3-hour average. The first stage is required to maintain a minimum flow rate of 536 gpm and the second stage a minimum of 122 gpm. During the inspection, the last logged 3-hour average liquid flow rate for the first stage of the scrubber was 823 gpm and the second stage was 639 gpm.

The facility also continuously monitors and records the pH of the scrubber liquid in the first and second stage. The first stage is required to maintain a minimum of 6.3 and the second stage a minimum of 7.8 based on a 3-hour average. During the inspection, the first stage scrubber pH was 7.0 as the last logged 3-hour average and the second stage was 9.4 as the last logged 3-hour average.

The Thermal Oxidizer is a CAM subject emission unit with the packed scrubber being a CAM subject control device. Pressure drop, liquid flow rate, and pH are used as the indicators of performance. During the inspection, the packed scrubber appeared to be operating properly and no visible emissions were detected.

CAM report for the last half of 2023 show a minor 2-hour excursion on 8/02/23 related to plugged scrubber lines that resulted in reduced scrubber flow. During this excursion, gases were sent to the Lime Kiln and the Thermal Oxidizer was taken offline until the scrubber lines had been cleaned.

Reporting

SC VIII.1-5 CAM reports, Semiannual reporting of monitoring and deviations and the Annual certifications of compliance are submitted in a timely fashion. FGTO33 had one minor deviation reported for 2023.

CONCLUSION

Based on the inspection conducted and records reviewed, Billerud Escanaba Mill appears to be in compliance with the requirements in MI-ROP-A0884-2021b.

NAME  DATE 5-7-2024 SUPERVISOR