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

A088471348

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:** 03/27/2024
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

Beginning in 2024, Billerud Escanaba Mill is required to report its annual emissions through the MiEnviro State and Local Emissions Inventory System (SLEIS). The following table lists stationary source emission information as reported to SLEIS for the year 2023:

POLLUTANT	2023 EMISSIONS (Tons)
CO	1496.9
NOX	1336.8
PM10-PRI	163.7
PM10-FIL	123.9
PM25-PRI	132.3
PM25-FIL	93.7
SO2	115.2
VOC	177.4*
*2023 VOC emissions for the #4 Paper Machine were corrected in SLEIS August 2024 due to an incorrect emission factor. This resulted in lower VOC emissions overall for 2023 than previously reported.	

The mill was idled for several weeks during 2023 due to illness and market conditions, resulting in lower emissions than would be reported in a normal operating year.

COMPLIANCE HISTORY

Administrative Consent Order AQD No. 2021-11 was issued to the company on 5/18/2021 for MACT DDDDD (Boiler No. 11 & No. 8) and Subpart S (Thermal Oxidizer & Bleach Plant Scrubbers)

violations. At the time of this inspection, the facility has successfully met all testing and compliance requirements set forth in AQD No. 2021-11.

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. Previous inspections took place on January 30 and March 21, 2024, and have been summarized in compliance activity reports. This inspection included AQD District Staff Drew Yesmunt 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 Charles escorted us on a tour of the mill to observe additional emission units not covered in previous inspections. The following emission units/flexible groups were inspected during this site visit: EU7817 – Boiler 7, EU8B13 – Boiler 8, FGBMACTB07B08 – Boiler 7 and Boiler 8 Subpart DDDDD requirements, FG9B03 – Boiler 9 System, FG11BFA – Boiler 11 System, FGBMACTB09B11 – Boiler 9 and Boiler 11 Subpart DDDDD requirements, EUCS14 – Chip Thickness Screening, EU2PD40 – The Pulp Dryer System, EUCOND – Condensate Collection and Treatment, FGPAPER – Paper Machine Systems, FGCOATER – and Paper Machine Coaters.

EU7B17 – Boiler 7 is a Riley boiler rated for 150,000 pounds of steam per hour (22 MMBtu/hr heat input) that provides steam for mill processes. Boiler 7 burns natural gas and fuel oil. No add-on air pollution control equipment is utilized. Boiler 7 was not operating at the time of the inspection. This boiler is currently in idled status and primarily fires natural gas when operating.

Material Limits

SC II.2 The determination of the sulfur content is carried using ASTM D4292. For example, two shipments of fuel oil were received on 1/26/2024 from HTP Energy. A delivery of 20,352 gallons with a percent sulfur as received of 0.0898, with a calculated Btu/lb of 18,549. This well below the sulfur content limit of 1.5%.

Monitoring/Recordkeeping

SC VI.1 Example fuel oil records were provided that note the date received, fuel oil grade, source of fuel oil and supplier, and gallons received, along with the fuel oil sulfur and BTU content.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

EU8B13 – Boiler 8 is a Combustion Engineering boiler rated for 450,000 pounds of steam per hour (594 MMBtu/hr heat input) that provides steam for mill processes and steam turbine-generator sets for producing electricity. A flue gas recirculation system is installed on Boiler 8. The Boiler 8 burns natural gas and fuel oil. At the time of the inspection, Boiler 8 was operating at 209.79 KPPH.

Emission Limits

SC I.1-3 This emission unit contains NOx emission limits that are averaged over the ozone control season. Compliance is demonstrated using CEMS.

Material Limits

SC II.1 The determination of the sulfur content is carried using ASTM D4292. For example, two shipments of fuel oil were received on 1/26/2024 from HTP Energy. A delivery of 20,352 gallons with a percent sulfur as received of 0.0898, with a calculated Btu/lb of 18,549. This well below the sulfur content limit of 1.0%.

Monitoring/Recordkeeping

SC VI.1 Example fuel oil records were provided that note the date received, fuel oil grade, source of fuel oil and supplier, and gallons received, along with the fuel oil sulfur and BTU content.

SC VI.2-6 Per R336.1801, Boiler 8 is required to report NOx emissions because it combusts >50% fossil fuel by mass during the Ozone Control Period, therefore it meets the definition of a fossil fuel-fired boiler.

During the Ozone Control Period of 2023 from 5/1/2023 through 9/30/2023, Boiler 8 only burned natural gas and had a total heat input of 318,085 MMBtu/hr. The actual emission rate for the ozone season was 0.163 lbs/MMBtu of NOx, which is under the 0.20 lbs/MMBtu limit.

For the 2022 Ozone Control Period of 5/1/2022 through 9/30/2022, Boiler 8 only burned natural gas and had a total heat input of 776,967 MMBtu/hr. The actual emission rate for the ozone season was 0.180 lbs/MMBtu of NOx, which is under the 0.20 lb/MMBtu limit.

Per the Quality Assurance procedures in Appendix F of 40 CFR Part 60, the last RATA for the NOx CEMS on Boiler 8 was successfully completed on April 17, 2024.

The facility keeps records of CEMS data, stack test results, fuel usage, heat input, quality assurance activities, and major maintenance activities for Boiler 8.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

FGBMACTB07B08 – Boiler 7 and Boiler 8 are subject to requirements for existing boilers and process heaters that are designed to burn gas 1 subcategory fuel with a heat input capacity of 10 MMBTU/hr or greater at major sources of HAP emissions per 40 CFR Part 63, Subpart DDDDD (Boiler MACT). Units designed to burn gas 1 subcategory fuels include boilers or process heaters that burn only natural gas, refinery gas, and/or Other Gas 1 fuels (units that burn liquid fuel for testing or maintenance purposes for less than a total of 48-hours per year, or that burn liquid fuel during periods of curtailment or supply interruptions are included in this definition).

Process/Operational Restrictions

SC III.1-4 Boiler 7 last had a tune-up on June 3, 2016. Currently, boiler 7 is not in operation and will be required to have a tune-up performed within 30 days of start-up. Boiler 8 last had a tune-up performed on June 3, 2020, along with a burner and oxygen trim system inspection. The facility appears to be operating Boiler 8 in a manner consistent with good air pollution control practices for minimizing emissions.

Monitoring/Recordkeeping

SC VI. 1-6 Notifications and reports for compliance with MACT DDDDD are kept on file. Boiler 8 only burns natural gas and does not burn any solid fuels. Boiler 7 only burns natural gas but is not currently in operation. A copy of the 2020 boiler tune-up report was provided that notes the burner inspection with the concentrations of CO in the effluent stream in parts per million volume and the oxygen in volume percent. No changes were made to the burner air-to-fuel ratio control system at the time of the burner tune-up. Boiler 8 burned natural gas during the previous 12- months to the boiler tune-up. The semiannual Boiler MACT reports submitted contain all the information required in SC VII.4, SC VII.5, and SC VII.6.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

SC VII.5-7 Boiler tune-up compliance reports are submitted in a timely fashion to AQD and CEDRI.

FG9B03 – The Boiler 9 System has two emission units:

EUSB03 – Wood Residue Surge Bin. The Wood Residue Surge Bin is controlled by a cyclone dust collector.

EU9B03 – Boiler 9 is a Babcock & Wilcox boiler rated for 250,000 pounds of steam per hour (approximately 360 million BTU per hour heat input) that provides steam for mill processes and steam turbine-generators for producing electricity. Boiler 9 burns primarily wood residue, but may also burn natural gas, and paper cores. Control equipment for Boiler 9 includes multiclones and two wet scrubbers (North and South) for PM control.

Boiler 9 and the Wood Residue Surge Bin were not in operation at the time of inspection.

Emission Limits

SC I.1-5 Boiler 9 contains emission limits of NOx and PM with compliance demonstrated through stack testing and the monitoring of control equipment operating parameters.

Process/Operational Restrictions

SC III.1 Boiler 9 is required to be operated with the multiclone and wet scrubbers. During the inspection, Boiler 9 was not in operation; however, typical normal operation necessitates the use of the multicyclone and wet scrubbers.

Design/Equipment Parameters

SC IV.1 Boiler 9 is equipped with monitoring devices for the pressure drop and liquid flow rate on each scrubber.

Testing/Sampling

SC V.1-4 Testing on Boiler 9 last occurred August 18th and 19th of 2022. The test was performed to show compliance with the state PM limits and the MACT DDDDD limits. The average measured PM emission rate was 0.185 lb/MMBtu, and the CO emission rate was 1,729 ppmv @ 3% O2. The emission rates passed the respective limits of 0.44 lb PM/MMBtu and 3500 ppmv CO @3% O2.

Monitoring/Recordkeeping

Billerud records the quantities and respective BTU content of natural gas, wood residue, and paper cores burned in Boiler 9. The scrubber liquid flow rate and pressure drop are continuously monitored and recorded. The facility keeps records of monitoring data, monitor performance, and corrective actions taken. Stack test results, daily records of fuel usage, heat input, and data used to determine heat content are maintained.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

SC VII.4-5 A review of the 2023 annual compliance report shows no deviations were reported for Boiler 9.

Stack/Vent Restriction(s)

Stack height measurements were taken during the 2022 inspection with a rangefinder. Both north and south stacks of Boiler 9 measured 288 ft from eye level with the rangefinder.

FG11BFA – BOILER 11 SYSTEM

The Boiler 11 system flexible group (FG11BFA) has eight emission units that are part of Boiler 11 (EU11B68) and the Boiler 11 Fuel and Ash Handling systems (multiple emission units). Boiler 11 was installed 1981 and modified 1986. It is an ABB Combustion Engineering combination fuel boiler rated for 750,000 pounds of steam per hour (approximately 1040 million BTU per hour heat input) that provides steam for mill processes and steam turbine-generators for producing electricity.

Boiler 11 burns natural gas and solid fuels, which include pulverized coal, wood residue, wastewater treatment plant residuals (WWTPR), TDF, and Non-Hazardous Secondary Materials (NHSM) pellets.

The Boiler 11 Fuel and Ash Handling System includes the following emission units and control devices:

EUCH68 – Coal Handling

EUFH68 – Fuel Handling (wood residue, WWTPR, NHSM pellets, and TDF)

EU1S68 – #1 Coal Silo

EU2S68 – #2 Coal Silo

EU3S68 – #3 Coal Silo

EU1AS68 – #1 Ash Silo

EU2AS68 – #2 Ash Silo

Boiler 11 is equipped with an over-fired air system (OFA), multicyclone, and ESP. Individual baghouses are used on the three coal silos, baghouse on the #2 ash silo, and pugmills for wetting ash from #1 and #2 ash silos prior to loading into trucks for disposal.

Due to Billerud corporate sustainability initiatives, the Escanaba Mill has discontinued the usage of TDF and NHSM pellets as fuel for Boiler 11. The facility last used TDF as fuel on December 24, 2022, and last used NHSM pellets on February 2, 2015. Additionally, going forward into 2024, the facility will discontinue the use of pulverized coal as fuel for Boiler 11. Coal silos and associated baghouses will continue to be maintained via the Inspection and Maintenance Plan, as the facility would like to retain the ability to utilize coal as a fuel if necessary. The facility will continue to fuel Boiler 11 on wood waste, WWTPR, and natural gas.

Emissions Limits

SC I.1-9 Boiler 11 has emission limits for CO, NOx, PM, SO2, mercury, and opacity. Compliance with these limits is demonstrated through stack testing, CEMS, and COMS.

PM and opacity limits are also established for the fuel and ash handling equipment. Compliance with these limits is demonstrated through visible emission checks along with proper operation and maintenance.

Material Limits

SC II.1-7 Boiler 11 contains material limits on the coal sulfur content, TDF amounts, NHSM pellets amount, NHSM chlorine content, and amount of wood in percent weight of total solid fuels. Compliance is demonstrated through recordkeeping and fuel analysis.

Process/Operational Restrictions

SC III.1 At 12:40 PM during the inspection, Boiler 11 was in operation and was firing both wood and natural gas. The unit fires only natural gas upon startup.

SC III.2-4 The ESP and multiclone were in operation and appeared to be operating properly with no opacity detected. The ash silo for Boiler 11 was observed with no visible emissions detected.

SC III.5 The three coal silos are totally enclosed and were observed with baghouses installed. At the time of the inspection, coal was not being fired in Boiler 11, so no coal handling was taking place.

Testing/Sampling

A satisfactory compliance test on Boiler 11 for CO and PM last occurred September of 2022. The average PM emission rate was 0.0035 lb/MMBtu, and the average CO emission rate was 209.8 ppmv @ 3% O2. The emission rates passed the respective limits of 0.44 lb PM/MMBtu and 3500 ppmv CO @3% O2.

Verification of the supplier certificate of analysis for the engineered non-waste fuel pellets was not requested. Engineered NHSM fuel pellets have not been burned in Boiler 11 since February 2, 2015.

Monitoring/Recordkeeping

SC VI.1 Billerud monitors and records the opacity and oxygen content from Boiler 11 on a continuous basis with COMS. During the inspection, the instantaneous opacity from the COMS was reading 0.52% with the last recorded 6-minute average was at 0.36%. O2 was reading 5.90%.

SC VI.2,3,9 NOx emissions are monitored and recorded with CEMS. At the time of inspection, the CEMS was reporting 0.203 lb/MMBtu.

SC VI.4-5 The facility keeps records of the amount of natural gas and solid fuels burned in Boiler 11. Fuel use records were analyzed for the period 1/1/2023 through 12/31/2023. The records note the type, amount, heat input, and 10-day average weight percent of wood waste, coal, and WWTPR of total solid fuel used for each day Boiler 11 operated. For example, on 7/04/2023, the total heat input was 12,865 MMBtu; 4912 MMBtu was bark, 7789 MMBtu was gas, 164 MMBtu was WWTPR, and 0 MMBtu from coal.

No coal or sludge was being fired in Boiler 11 on the date of inspection. The steam load was at 422.1 kpph, wood waste throughput was 36 tph, and the natural gas flow rate was 253 kcfh. The

primary fuel fired in Boiler 11 is wood waste from pulp production; however, Boiler 11 also fires WWTPR with typical fuel consumption rate of 27 tons/day.

A review of the daily records shows the 10-day average weight percent of wood and sludge of total solid fuel used is above the minimum 45% requirement.

The facility tracks the date received, source, shipper, and tons received of coal. The most recent laboratory analysis of coal was conducted in February of 2024. The analysis provides the ash, sulfur, and BTU content for coal. Analyses show the coal samples having a sulfur content of 0.53% by weight, less than the 1.0% by weight limit. NHSM fuel pellets were last burned in Boiler 11 on February 2, 2015, and last used TDF as fuel on December 24, 2022, therefore no fuel analysis for these fuels has been necessary.

Boiler 11 is CAM subject with the ESP being a CAM subject control device and opacity as an indicator of performance using COMS. The facility provides CAM Excursion/Exceedance and Monitor Downtime reports on a semiannual basis. During the inspection, the COMS appeared to be operating properly and no visible emissions were detected. A review of the semiannual CAM reports shows the facility had some monitor downtime, but no major deviations. The facility appears to be complying with the operating, recordkeeping, and reporting requirements of CAM for Boiler 11.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

FGBMACTB09B11 – Boiler 9 and Boiler 11 utilize hybrid suspension grate burners designed to burn wet biomass/bio-based solid fuel requirements for existing boilers and process heaters rated at 10 MMBTU/hr or greater at major sources of Hazardous Air Pollutants per 40 CFR Part 63, Subpart DDDDD. These existing boilers or process heaters burn at least 10 percent biomass or bio-based solids on an annual heat input basis in combination with solid fossil fuels, liquid fuels, or gaseous fuels.

Boiler 11 is controlled by a multiclone and ESP. Boiler 9 is controlled by a multiclone and two wet scrubbers.

Emission Limits

SC I.1-4 MACT DDDDD contains emission limits for HCl, mercury, filterable PM, and CO. Compliance is demonstrated through performance testing, fuel analysis, and CEMS/COMS.

Process/Operational Restrictions

SC III.1 Billerud operates Boiler 9 and 11 within the emission limits, work practice standards, and operating limits of MACT DDDDD.

The last five-year tune-up on Boiler 9 occurred on 7/29/2020. Boiler 9 utilizes an O2 trim system with a setpoint established through performance testing. The last five-year tune-up on Boiler 11

occurred on 8/17/2020. Boiler 11 also utilizes an O2 trim system with a setpoint established through performance testing. Details on items inspected and corrective actions are provided in the Boiler MACT Tune-up Procedure and Documentation Form that is submitted semiannually.

Design/Equipment Parameters

Both Boiler 9 and 11 are equipped with an oxygen trim system. The oxygen trim setpoint is no lower than the lowest hourly average oxygen concentration measured during the most recent CO performance test. Boiler 9 was last tested for CO in August of 2022 and passed the CO limit with a minimum O2 trim of2.0%. Boiler 11 was last tested for CO in September of 2022 and passed the CO limit with a minimum O2 trim of 2%.

Boiler 11 is equipped with COMS. At the time of the inspection, the last logged 6-minute average was 0%. Boiler 9 is equipped with a scrubber flow meter and differential pressure transducer on both the north and south scrubbers.

Testing/Sampling

SC V.1-5 Boiler 9 was last tested for CO and PM in August of 2022 and the average emission rates were less than 75% of the limits. Boiler 11 was last tested for CO and PM in September of 2022 and the average emission rates were less than 75% of the limits. Boiler 11 was last tested for mercury and HCl on 8/17/2021 and the average emission rates were less than 75% of the limits.

SC V.6-7 Under 40 CFR Part 63 Subpart DDDDD, Billerud Escanaba is electing to use performance testing for demonstrating compliance with the mercury and hydrogen chloride emission limits applicable to Boiler No. 9 and Boiler No. 11. These boilers are required to test at representative operating load conditions while burning a fuel mixture having the highest content of chlorine and mercury, as required under 40 CFR 63.7520(c), and establish maximum chlorine and mercury input levels, as required under 40 CFR 63.7540(a)(2)(ii), to demonstrate continuous compliance with the mercury and HCl emission limits. These maximum pollutant input levels are established during performance tests in accordance with Equation 7 and 8 in 40 CFR 63.7530(b)(1) and (2). The performance tests are also used to establish the operating limits for the minimum O2 trim setpoint and the maximum steam flow rate (operating load).

In May of 2024, EGLE AQD approved an alternative monitoring request from the facility to demonstrate compliance with applicable emission limits, establish maximum mercury and chlorine input levels, and establish operating limits per 40 CFR Part 63 Subpart DDDDD. Billerud is proposing to conduct one test on Boiler No. 9 and Boiler No. 11 to show compliance with the HCl, mercury, PM, and CO emission limits while also establishing operating limits. In addition, Billerud is proposing to only burn wood residue and wastewater treatment plant residuals (WWTPR) in Boiler No. 11 as the only permitted solid fuels. To both establish the maximum operating loads of the boilers and test at representative operating loads while burning the fuel mixture with the highest content of chlorine and mercury, Billerud shall burn wood residue and WWTPR at a rate estimated to be a worst-case scenario with the supplemental addition of natural gas to achieve a targeted steam load. The maximum chlorine and mercury input levels would be calculated only from the solid fuels burned during the test and would not include the heat content of natural gas in Equations 7 and 8 of 40 CFR Part 63 Subpart DDDDD. Natural gas is exempt from a fuel analysis for chlorine and mercury concentrations under 40 CFR 63.7510(a). Following the performance

test, this method would also be used to demonstrate ongoing compliance with the maximum pollutant input levels established.

SC V.8 Boiler 9 has used fuel analysis to comply with the HCl and mercury emission limits. A review of the 2023 semiannual boiler MACT report shows the monthly fuel analysis for mercury and HCl to be below the weighted lb/MMBtu limits.

Monitoring/Recordkeeping

SC V.1 The facility has a site-specific monitoring plan for each CMS system. The Boiler MACT Site-Specific Monitoring Plan (Rev. July 2020) includes all the requirements of SC VI.1.

Billerud operates all CMS and control monitoring devices during all times the boilers are operating. A review of the first semiannual report for 2023 shows 5 startup/shutdown events for Boiler 9 and 2 for Boiler 11. Both boilers were firing natural gas during the startup/shutdown events.

SC VI.7 The facility keeps all notifications, reports, performance tests, fuel analysis and other compliance demonstration records.

SC VI.8 The semiannual Boiler MACT Subpart DDDDD reports submitted contain all the information required in SC VI.8

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

SC VII.4-6 The semiannual Boiler MACT Subpart DDDDD reports submitted contain all the information required in SC VII.4-6.

EUCS14 – Chip Thickness Screening includes #1 Chip Reclaim Surge Bin, #2 Chip Reclaim Surge Bin, Air Density Separator #1A, Air Density Separator #1B, Air Density Separator #2A, Air Density Separator #2B.

Emissions

SC I.1-4 Chip Thickness Screening equipment have hourly PM and PM-10 emission limits that are verified by testing.

Operating Parameters & Monitoring/Recordkeeping

SC III.1 & VI.1 A review of 2023 inspection records show the cyclone dust collectors for the Chip Thickness Screening equipment undergo routine inspection and maintenance in order to operate properly.

Testing/Sampling

SC V.1-2 The most recent performance test for the Chip Thickness Screening equipment was conducted 6/07/22. Test results show the emission unit is in compliance with the PM and PM-10 emission limits.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

EU2PD40 – The Pulp Dryer System is comprised of a pulp make down system and a pulp dryer.

SC VI.1 At the time of the inspection, the pulp dryer was not in operation. A review of the 2022 MAERS and 2023 SLEIS reporting show the pulp dryer did not operate; the unit has not operated since 2019. Billerud is currently not selling any pulp and is using all pulp produced to create paper.

EUCOND – Condensate Collection and Treatment is a grouping of equipment used to collect and treat kraft pulping process condensates, and which are subject to the Standards for Kraft Pulping Process Condensates 40 CFR 63.446. The regulated equipment systems are identified in 40 CFR 63.446(b).

SC III.1-4 Foul condensates are collected at the stripper column feed tank. Foul condensate treatment consists of pre-treatment through a steam stripper and final treatment at the brownstock washers. The Condensate Collection and Treatment System is a closed collection system.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

SC VII.4 A review of the 2023 Subpart S semi-annual compliance reports shows there were no deviations reported from Condensate Collection and Treatment system.

Other Requirements

SC IX.1-2 Review of inspection records from 2023 show the facility is in compliance with the inspection requirements of Subpart S.

FGPAPER – The Paper Machine Systems includes the following emissions units:

EU1PM32 – #1 Paper Machine and associated stock preparation equipment

EU3PM07 – #3 Paper Machine and associated stock preparation equipment

EU4PM64 – #4 Paper Machine and associated preparation equipment

Emissions are vented through vertical stacks uncontrolled.

Emission Limits

The Paper Machine Systems contain VOC emission limits based on a 12-month rolling time period for #3 Paper Machine and #4 Paper Machine. Compliance is demonstrated through emission calculations and recordkeeping.

Material Limits

The #4 Paper Machine contains a paper production limit of 286,650 tpy based on a 12-month rolling time period. Compliance is demonstrated through record keeping.

Process/Operational Restrictions

The facility only uses mill supply water, non-direct contact condensates, well water, or white water as sources for #3 Paper Machine.

Monitoring/Recordkeeping

SC VI.1 Annual VOC emissions for #1 Paper Machine (EU1PM32) for 2023 were 5.26 tons.

SC VI.2 & 5 Billerud tracks the monthly and 12-month rolling VOC emissions from the #3 and #4 Paper Machines using an emission factor of 0.20 lbs VOC per ton of paper produced. A review of records for the #3 Paper Machine show the December 2023 12-month rolling VOC emission rate to be 12.3 tpy, well below the 27.51 tpy limit.

December 2023 12-month rolling VOC emissions for the #4 Paper Machine were reported as 44.3 tpy, which is well over the 26.9 tpy limit. After a review of calculations, it was determined that the facility used an incorrect emission factor of 0.53 pounds of VOC per ton of paper when calculating emissions for the #4 Paper Machine, instead of 0.20 pounds of VOC per ton of paper. Using the correct emission factor of 0.20, the December 2023 12-month rolling VOC emission rate is 16.7 tpy, which is below the 26.9 tpy limit. The facility has corrected the error in their record-keeping.

SC VI.4 The facility tracks the monthly and 12-month rolling paper production for the #4 Paper Machine. Monthly and 12-month rolling records were evaluated for the period January 2023 through December 2023. The 12-month rolling paper production for #4 Paper Machine for December 2023 was 167,133 tons; well below the 286,650 tpy limit.

SC VI.3 & 6 The facility maintains the SDS for each material and chemical additive used in the #3 and #4 Paper Machines.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion.

FGCOATER – Paper Machine Coaters includes 3 emission units:

EU1C36 - #1 Coater

EU3C27 - #3 Coater

EU4C65 - #4 Coater

These coaters are subject to 40 CFR Part 63, Subpart JJJJ.

Emission Limits

The #1 Coater contains VOC emission limits of 7.8 pph and 0.00037 lb/lb of coating solids applied based on a monthly average. The #3 Coater contains VOC emission limits of 28.0 tpy based on a 12-month rolling time period and 0.00027 lb/lb of coating solids applied based on a monthly average. The #4 coater contains VOC emission limits of 31.5 tpy based on a 12-month rolling time period and 0.00021 lb/lb of coating solids applied based on a monthly average. Compliance is demonstrated through recordkeeping and emission calculations.

All three coaters are also subject to the MACT JJJJ limit of no more than 20% organic HAP of the mass of coating solids applied based on a monthly average (40 CFR 63.3370). Compliance is demonstrated through following the requirements of 40 CFR 63.3320(b)(3). Billerud has chosen to demonstrate compliance with the limitation of no more than 0.20 kg organic HAP per kg of coating solids, as applied, as a monthly average for all coating materials applied, using VOC as a surrogate for the organic HAP content of coatings. Since the state limits for lb of VOC per lb of coating solids applied is less than 20% based on a monthly average, compliance with these limits demonstrates compliance with the MACT JJJJ limit.

Monitoring/Recordkeeping

SC VI.1 The facility maintains monthly records of all coating usage amounts, VOC contents, and hours of

operation for the #1 Coater. Records were provided for 2023 that note the month, VOC content, dry coat weight applied, coater operating hours, average coat application rate in dry lbs/hr, lbs VOC per dry lbs coating applied, and VOC emission rate in lbs VOC per coater operation hour.

SC I.1 & VI.2 The maximum monthly VOC emission reported for #1 Coater in 2023 (EU1C36) was 3.25 lb/hr (July 2023), well below the 7.8 lb/hr limit.

SC VI.3 Billerud tracks the raw material usage rate and VOC content of raw material used in the #3 Coater and #4 Coater. 2023 monthly emission records were reviewed for both the #3 and #4 Coaters.

For 2023, the highest application rate of raw material in a month for the #3 Coater was in March at 12,918 lb/hr; the lowest being in April at 8,220 lb/hr.

For 2023, the highest application rate of raw material in a month for the #4 Coater was in June at 30,613 lb/hr; the lowest being in November at 26,626 lb.hr.

SC VI.4 The facility calculates monthly and 12-month rolling VOC emissions from #3 Coater (limit 28 tpy) and #4 Coater (limit 31.5 tpy). 2023 emissions reporting show 3.1 tpy for #3 Coater, and

4.2 tpy for #4 Coater, through December 2023. These are emissions are well below permitted limits.

SC VI.5 The facility tracks the monthly average VOC content in lbs VOC/lbs of coating solids applied for all coaters.

For 2023, the #1 Coater (limit 0.00037 lbs VOC/lbs coating) the highest monthly average was 0.000213 lbs VOC/lbs coating. Total VOC emissions for 2023 was 3.03 tons.

For 2023, the #3 Coater (limit 0.00027 lbs VOC/lbs coating) the highest monthly average was 0.00023 lbs of VOC/lbs of coating applied. Total VOC emissions for 2023 was 2.61 tons

For 2023, the #4 Coater (limit 0.00021 lbs VOC/lbs coating), the highest monthly average was 0.00006 lbs VOC/ lbs of coating solids applied. Total VOC emissions for 2023 was 2.20 tons.

SC VI.6 The facility keeps a copy of each SDS for all raw materials used in the three coaters. Billerud is in compliance with the 0.20 lbs organic HAPs per lbs of coating solids as applied based on the records reviewed. No visible emissions were detected from the coating applicators and the associated dryers.

SC VI.7 Records to demonstrate compliance with Subpart JJJJ are maintained. It should be noted that Subpart JJJJ sets emissions standards for HAPs (VOCs) from surface coating operations; however, VOC emission limits in MI-ROP-A0883-2021b are more restrictive VOC emission limits than the Subpart JJJJ requirements. No deviations were reported for 2023.

Reporting

SC VIII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion, including semi-annual reporting for Subpart JJJJ compliance.

CONCLUSION

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

NAME _____ DATE 9-6-2024 SUPERVISOR _____