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

A088472157

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:** 06/06/2024
STAFF: Joe Scanlan	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Announced inspection to determine compliance with MI-ROP-A0884-2021b and PTI No. 17-23.		
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 a incorrect emission factor. This resulted in lower VOC emissions overall for 2023.	

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 5/17/2021 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.

On 8/06/2024, the facility requested in writing to terminate the Consent Order. The request contained supporting information as required by paragraph 20 of AQD No. 2021-11. Review of this request and supporting information indicates Billerud Escanaba, LLC, achieved compliance with the terms and requirements of the Consent Order. AQD No. 2021-11 was voided by EGLE AQD on 8/14/2024.

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. The company has addressed the oversight and is now in compliance with the requirements.

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 27 (Omya inspection was March 21, 2024) and have been summarized in compliance activity reports. This inspection (6/06/2024) 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: EURF15 – Chemical Recovery Furnace, EUST15 – Smelt Dissolving Tank, EUS29 – Recausticizing System, EUPB – Paint Spray Booth, FGSB14 – Chip Surge Bins,

FGRMP – RMP System, FGSTARCH – Starch Handling and Make Down, FG25 – Bleaching System, FGLK29 – Lime Kiln System, FGSIRICE – SI RICE Units, and FGCIRICE – CI RICE Units.

EURF15—The #10 Chemical Recovery Furnace burns black liquor, #6 fuel oil, and used oil and is equipped with natural gas burners for supplemental firing. The Recovery Furnace can also fire vent gases (containing TRS compounds) from pulping process. The unit receives and incinerates gases from enclosures and closed-vent systems and is used to incinerate High Volume Low Concentration (HVLC) non-condensable gases from the Digester System, Brownstock System, Evaporator System, and Chemical Recovery Furnace System. The air handling system has been modified.

The Recovery Furnace is primarily fueled by black liquor solids (BLS) from the evaporator system which are combusted, generating steam to support mill processes. Process chemicals are recovered in molten smelt and salt cake. The heavy black liquor is pumped through a direct steam heater to the Recovery Furnace. In the Recovery Furnace, the sulfur and sodium inorganic chemicals and organic content comprising the BLS are recovered and combusted respectively. The organic portion of the liquor burns releasing heat for steam generation. The inorganic portion of the liquor is recovered to be used to regenerate cooking liquor for the continuous digester. The inorganics accumulate on the furnace floor (char bed) and are drained off as a molten smelt into a dissolving tank where they are mixed with weak wash to form green liquor. The green liquor is then pumped to the recausticizing area. The combustion gases are pulled upwards through the Recovery Furnace by an induced draft (ID) fan. Heat is removed from the combustion gases in two superheaters, a generating section, and two economizers. The combustion gases then pass to an ESP where particulate matter is removed. From the ESP, the combustion gases flow to the stack.

Emission/Material Limits

SC I.1 The Recovery Furnace has emission limits of Arsenic, Cadmium, CO, Chromium, HAP Metals measured as PM, NOx, PM, Polychlorinated Biphenyls, SO2, TRS, and Visible Emissions. Compliance with these emission limits is demonstrated through performance tests, continuous opacity monitoring (COM), and continuous emission monitoring (CEM).

Material Limits

SC II.1 The Recovery Furnace also contains materials limits for used oil that shall not exceed the parameters outlined in SC II.1-2 and for the used oil not to exceed 15% of the total feed rate of fuel oil blend, as stated in SC II.3.

Used oil is no longer fired in the Recovery Furnace and sold off-site to a third party.

Process/Operational Restrictions

During the inspection, the Recovery Furnace was operating. At 11:31 AM, the BLS firing rate was 261.3 gpm @ 5.34% O2 , TRS @ 2.0 lb/hr, and opacity @ 4.31%. All fields of the ESP were active.

SC III.1 & 2 requires the operating load of the Recovery Furnace to be reduced to 77,600 pounds of BLS per hour if any two electric fields of the ESP are out of service. Billerud is aware of this requirement and reduces the BLS firing rate when there is an exceedance from the CEMS, COMS, or a malfunction with the ESP.

Testing/Sampling

In 2022, the facility submitted a PTI application to reduce the averaging time of the carbon monoxide (CO) limits of 800 ppmvd and 570 lb/hr from the current 8-hours in PTI No. 184-16a to 4-hours averaging time. As a result, PTI 184-16a was voided on 5/20/2022, and PTI No. 17-23 was issued 1/25/2023 to address these changes. Compliance continues to be demonstrated via stack testing with 4-hour test runs to match the averaging time.

SC V.1,2,4, & 6 Performance testing for SO2, NOx, and PM last occurred during the week of 3/21/2022. Testing was conducted to demonstrate compliance with PTI No. 184-16a and MI-ROP-A0884-2021b. Test results indicate the Recovery Furnace passed all respected emission limits for SO2, NOx, CO (hourly average), and PM.

Performance testing for CO compliance with PTI No. 17-23 was conducted on 7/26 and 7/27/2023; an average of the three runs showed CO emissions of 293.0 ppmvd and 267.8 lb/hr, well below the established limit.

SC V.3 The Recovery Furnace no longer burns fuel oil blended with used oil, thus no testing for TACs has occurred in the last five years.

Monitoring/Recordkeeping

The facility continuously monitors and records the oxygen content, opacity, and TRS emissions with CEMS and COMS. At 11:31 AM, during the inspection on 6/06/2024, the CEMS was reporting 1.88 ppmd @ 5.34% oxygen and 2.00 pph for the last logged 12-hour average TRS emission rates.

The Recovery Furnace uses a continuous opacity monitor (COM) system to measure opacity as an indicator of the proper operation of the ESP. The Recovery Furnace has a visible emission limit of 20% opacity except for one 6-minute average per hour of not more than 27%. Opacity is determined at the exhaust of the Recovery Furnace in the stack. During the inspection, the instantaneous opacity from the COMS was showing 4.31% opacity, the 6-minute average last recorded was 4.2% opacity, and the last logged 1-hour average was 4.78% opacity.

The facility continuously monitors and records the BLS feed rate and ESP voltage across each field. The amount of fuel flow into the Recovery Furnace is monitored and recorded continuously from the control system. Example records were provided for the dates 3/11/2023 and 5/27/2024 that note the voltage (KV) of each field in the ESP during each hour of operation.

Average ESP voltage between the East and West modules of the ESP had standard deviation of

Used oil is no longer fired in the Recovery Furnace and sold off-site to a third party.

Reporting

SC VII.1-7 Quarterly EER, Semi-annual, and annual compliance reports have been submitted in a timely manner. Downtime issues with CEMS and COMS was minor. TRS exceedances not related to startup/shutdown are addressed below.

For 2022, a single deviation for a 12-hour TRS exceedance has been reported that occurred on 10/13/2022. The company notified AQD district staff the following morning via email and followed up with a Rule 912 notification on 10/17/2022. The permit limit of 5 ppm and 5.6 pph TRS corrected to 8% O2 on a 12-hour average was exceeded, with average emissions reported at 5.50 ppm and 5.85 pph during the 12-hour averaging time. The cause was due to adjustments made to optimize the system, however it resulted in air/fuel issues that resulted in noncompliance. Changes were made to primary, secondary, and tertiary air flow, and production was reduced until TRS levels were within limit. To correct the issue, standard operating procedures have been modified to address furnace combustion when TRS levels exceed 3 ppm and 5 ppm.

For 2023, minor emissions deviations due to startup with detailed information were reported in 2023. For example, on 5/09/2023, there was an exceedance of the 5 ppm TRS limit on a 12-hour average due to startup of the furnace. TRS averaged 5.7 ppm over the 9-hour duration of the event. The operator inserted a liquor gun, increased the operating temperature, and changed air flows to reduce TRS emissions to below the limit.

For 2024, a single deviation for a 12-hour TRS exceedance has been reported that occurred on 5/27/2024. The company notified AQD district staff the following morning via email and followed up with a Rule 912 notification on 5/31/2024. The permit limit of 5 ppm and 5.6 pph TRS corrected to 8% O2 on a 12-hour average was exceeded, with average emissions reported at 6.46 ppm and 6.87 pph during the 12-hour averaging time. This was due to irregular burn conditions. Operators enacted the High TRS Emergency Operating Procedure (EOP) by incrementally reducing the production rate and increasing secondary and tertiary air flow until TRS was reduced. Black liquor temperature and black liquor gun angles were adjusted to stabilize burn conditions. Preventative measure includes reviewing the EOP protocol for promptly adjusting black liquor guns if a similar situation should arise in the future.

Stack/Vent Restrictions

SC VIII.1 A rangefinder was utilized for the 6/14/2022 inspection to measure the stack height of the Recovery Furnace. The stack measured 290 feet from eye level, which meets the minimum height of 284 feet.

Other Requirements

SC IX.1-2 The Recovery Furnace is maintained and operated in a satisfactory manner. There is an Inspection and Maintenance Program which documents records of inspections, problems found, repairs done, and/or corrective action taken. Additionally, the Recovery Furnace is addressed in the Utilities MAP to minimize pollutant emissions during periods of startup, shutdown, and malfunction.

EUST15 – Within the Smelt Dissolving Tank, inorganics from the chemical Recovery Furnace and precipitator are mixed with weak wash to form green liquor. The green liquor is then pumped to the causticizing area where it is first clarified before moving to the Slaker where lime is added to produce calcium hydroxide slurry.

Air pollution control equipment includes a wet scrubber and mist eliminator for PM control.

Emission Limits

SC I.1 The Smelt Dissolving Tank contains emission limits of HAP metals measured as PM, PM, and total reduced sulfur (TRS). Compliance with these emission limits is demonstrated through performance tests.

Testing/Sampling

SC V.1-4 The Smelt Dissolving Tank is required to test for PM and TRS emission rates every five years. In 2023, the facility submitted a PTI application to reduce the averaging time for the existing Total Reduced Sulfur (TRS) limit of 0.084 gr/kg black liquor solids for the Smelt Dissolving Tank from a 12-hour average to a 1-hour average. PTI No. 17-23 was issued 1/25/2023 to address these changes.

Testing for PM and TRS limits last occurred on 5/17/2023. The test results indicate all emission rates were below the emission limits. The average TRS emissions from the test were 0.0082 g/kg BLS. The average PM emission rates from the testing were 0.091 lb/1000 lbs exhaust gases and 0.083 lb/ton BLS with a minimum scrubber flow rate of 73 gpm on a 3-hr block average.

Monitoring/Recordkeeping

SC VI. 1 The facility has installed, calibrated, maintains, and operates a continuous monitoring system to measure fan run status and the scrubbing liquid flow rate at least once every successive 15-minute period.

SC VI.2 The minimum scrubber flow rate indicator of 73 gpm based on a 3-hour block average was determined by the MACT PM performance test conducted in 2023.

SC VI.3 - 5 Based on an observation of the instantaneous flow rate of 126.3 gpm and a 3-hour average flow rate of 123.8 during the inspection, along with a review of records and reports submitted, the scrubber is being operated within established operating parameters.

Reporting

SC VII.1-3 Semiannual reporting of monitoring and deviations and the annual certifications of compliance are submitted in a timely fashion. Downtime issues with CMS for flow rate was minor.

SC VII.5 EE reports are timely; no major deviations/excursions reported.

Stack/Vent Restrictions

SC VIII.1 A rangefinder was utilized during the 6/14/2022 inspection to measure the stack height of the Smelt Dissolving Tank. The stack measured approximately 287 feet from eye level, which meets the minimum height requirement of 288 feet.

Other Requirements

SC IX.1-2 The Smelt Dissolving Tank is maintained and operated in a satisfactory manner. There is an Inspection and Maintenance Program which documents records of inspections, problems found, repairs done, and/or corrective action taken. Additionally, the Smelt Dissolving Tank is addressed in the Utilities MAP to minimize pollutant emissions during periods of startup, shutdown, and malfunction.

EUS29—The Recausticizing System consists of the Lime Slaker (EUS29) and is subject to CAM. In the slaker, calcium oxide from the Lime Kiln System (FGLK29) reacts with green liquor from the Smelt Dissolving Tank (EUST15) to produce white liquor and lime mud. The reaction is carried out in the slaker and causticizers. The mixture is separated in two white liquor clarifiers. White liquor is used in the digesters as a cooking chemical. Lime mud is washed, dewatered and oxidized in the Lime Kiln System to regenerate calcium oxide for the slaking process. This emission unit is CAM-subject.

PM emissions are controlled by the scrubber using green liquor as the scrubbing medium.

Emission Limits

SC I.1 The Recausticizing System has a PM emission limit of 0.10 lb/1000 lbs of exhaust gas measured at normal operating conditions. Compliance is demonstrated through testing every five years.

Design/Equipment Parameters

SC IV.1b The slaker scrubber is equipped with a continuous monitoring system for scrubber liquid flow rate. The monitor is located at the scrubber liquid inlet pipe.

Testing/Sampling

SC V.1-3 The wet scrubber was last tested on 10/22/2020 for PM emissions. The average PM emission rate from the scrubber was 0.0452 lb/1000 lb of exhaust gas, which shows compliance with the 0.10 lb/1000 lb of exhaust gas limit. Testing is required every 5 years.

Monitoring/Recordkeeping

SC VI.1-7 The scrubber liquid flow rate is continuously monitored and recorded. During the inspection, at 11:38 AM on 6/06/2024, the instantaneous flow rate was 159 gpm and the last logged 3-hour average was 159 gpm.

The minimum flow indicator range for proper scrubber operation is 150 gpm, based on a 3-hour averaging time. This flow is based on a 2011 compliance stack test which demonstrated compliance with the emission limit. The emission rate was 0.0796 lbs/1000 lbs. exhaust at operating conditions versus a limit of 0.10 lbs/1000 lbs

exhaust. The indicator range is also based on good engineering judgment. Per the CAM Plan, corrective actions shall be initiated following any excursion from this indicator.

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 Reported monitor downtowns for flow rate monitoring are minor occurrences.

SC VII.6 EE reports are timely. No exceedances/excursions reported for 2022. In 2023, one excursion was reported for scrubber flow rate on 1/25/2023 when the flow rate fell below the minimum limit of 150 gpm. No exceedances/excursions reported for 2024 at this time.

Other Requirements

SC IX.1-3 The Lime Slaker and scrubber are maintained and operated in a satisfactory manner. The emission unit has a satisfactory CAM plan and there is an Inspection and Maintenance Program which documents records of inspections, problems found, repairs done, and/or corrective action taken. Vent piping is inspected during the weekly scrubber exhaust fan inspections, and the flow meter is inspected annually. Indicators are calibrated and maintained according to manufacturer's specifications and/or good engineering practice.

EUPB – The Paint Spray Booth is a spray booth for maintenance purposes. Dry exhaust filters are utilized to control particulates. At the time of the inspection, the paint booth was not in operation.

Material Limits

SC II.1 The Paint Spray booth contains a material limit of 200 gallons of coating as applied, minus water, per month. Compliance is demonstrated through keeping monthly records of the amount of coating used.

Process/Operational Restriction

SC III.1 At the time of inspection the booth was not in operation; however, the dry filters were installed and in good shape.

Monitoring/Recordkeeping

SC VI.1 Records were provided for 2022 and 2023 of coating usage. For 2022, the facility used 8 gallons and for 2023, 12 gallons.

FGSB14 – The Chip Surge Bin System has two emission units:

EU1SB14 #1 Chip Surge Bin

EU2SB14 #2 Chip Surge Bin

These emission units each utilize a cyclone for pneumatic transfer of chips.

Emissions Limits

SC I.1 The Chip Surge Bins have a PM emission limit of 0.10 lb / 1000 lbs of exhaust gases, measured at operating conditions. Compliance is demonstrated through visible emission checks of the cyclone exhausts.

Monitoring/Recordkeeping

SC VI.1 Billerud is required to inspect and record observations of emissions from the cyclone exhausts while the process is operating. The inspections are to occur on a weekly basis. Example records were provided for 3/11/2023 and 5/27/2024. No visible emissions were noted on the inspection records. During the inspection, the chip surge bins were operating, and no visible emissions were observed from the cyclone exhaust.

Reporting

SC VII.1-3 A review of the 2022 and 2023 annual compliance reports show major deviations were reported for the Chip Surge Bins.

FGRMP – This flexible group is the Refiner Mechanical Pulping (RMP) System, which has three emission units:

EUCS61 Chip Silo

EUSB61 Chip Surge Bin

EURMP61 Refiner Mechanical Pulping

The Chip Silo and Chip Surge Bin are controlled by cyclones.

Emissions Limits

SC I.1 The RMP System has a PM emission limit of 0.10 lb / 1000 lbs of exhaust gases, measured at operating conditions. Compliance is demonstrated through visible emission checks of the cyclone exhausts.

Process/Operational Restrictions

SC III.1 EURMP61 is restricted to not process more than 113,150 tons of RMP per year as determined on a 12-month rolling time period basis. At the time of the inspection on 3/27/2024, the RMP system was processing 127 air dried tons per day. No visible emissions were observed from the RMP System.

Monitoring/Recordkeeping

SC VI.1 Verso is required to inspect and record observations of emissions from the cyclone exhausts while the process is operating. The inspections are to occur on a

weekly basis. Example records were provided for 3/11/2023 and 5/27/2024. No visible emissions were noted on the inspection records.

SC VI.2 The facility is also required to monitor and record the amount of RMP produced monthly and on a 12-month rolling basis. Verso provided a spreadsheet that notes the total tons produced for each month and the 12-month rolling sum. As of December 2023, the 12-month rolling was 30,023 tons. A review of 2022 shows 53,675 tons produced.

FGSTARCH – Starch Handling and Make Down includes the following equipment for the handling and make-down of starch for the paper machines and coaters:

EUSS43 The #1 Coater Dry Starch System equipment includes #1 and #2 Starch Silo, #1 and #2 Starch Day Bins, and #1 and #2 Starch Wet Out Tanks

EU1SS08 and EU1M08 The #3 Paper Machine Dry Starch System equipment includes EU1SS08 #1 Starch Silo, and EU1M08 #1 Starch Make Down Tank

EU2SS08, EU3SS08, and EU2M08 The #3 Coater Dry Starch System includes EU2SS08 #2 Starch Silo, EU3SS08 #3 Starch Silo, and EU2M08 #2 Starch Make Down Tank.

EUSS66 The #4 Coater System includes Starch Storage consisting of #1 and #2 Starch Silos.

For the #1 Coater Dry Starch System, individual baghouse dust collectors are utilized on the #1 and #2 Starch Silos, a common baghouse is used for the #1 and #2 Starch Day Bins, and a common baghouse is used for the #1 and #2 Starch Wet Out Tanks. For the #3 Paper Machine, baghouse dust collectors serve the #1 Starch Silo and #1 Starch Make down Tank. For the #3 Coater Dry Starch System, baghouse dust collectors serve the #2 Starch Silo, #3 Starch Silo, and #2 Starch Make down Tank. For the #4 Coater System, individual baghouse dust collectors serve the #1 and#2 Starch Silos.

Emission Limits

SC I.1 The Starch Handling and Make Down equipment contains a PM emission limit of 0.10 lb / 1000 lbs of exhaust gas calculated on a dry gas basis for each baghouse of FGSTARCH. Compliance is demonstrated through performing visible emission checks on a weekly basis.

Process/Operational Restrictions

SC III.1 Billerud operates the Starch Handling equipment with the required baghouses.

Monitoring/Recordkeeping

SC VI.1 Example records were provided for the dates 3/11/2023 and 5/27/2024 The records note the equipment name, purpose of inspection, date/time, operator ID, and inspection result. From the records reviewed, the facility is conducting visible emission observations of the baghouses during operation.

FGB25 – The Bleaching System (FGB25) has four emission units:

EUS25 Bleaching Stage Equipment which includes the bleaching stage equipment where chlorine dioxide is applied and removed

EUB25 Chlorine Dioxide Plant

EUED25 Extraction Devices

EUM25 Methanol Storage

The Bleaching System is used to whiten Brownstock pulp for papermaking. Bleaching is accomplished through the use of chemicals, bleaching towers, extraction towers, and washers. Chlorine dioxide is used for bleaching and is manufactured on site. Gases from the pulp bleaching stages are routed in a closed vent collection system to the Bleach Plant Scrubber System which consists of two packed scrubbers in series. Off-gases from the chlorine dioxide generator and storage tanks are scrubbed with chilled water in a tail gas scrubber prior to being scrubbed in the Bleach Plant Scrubber system.

This emission unit was inspected on 1/30/2024 and 6/06/2024. Operating data was collected on 1/30/2024.

Emission Limits

SC I.1 The Bleaching System contains emission limits for chlorine, chlorine dioxide, and chlorinated HAPs. Compliance is demonstrated through proper operation of the scrubbers and performance testing.

Process/Operational Restrictions

SC III.1-2 At the time of the inspections, the combined scrubbers and chilled water tail gas scrubber appeared to be operating properly. On 1/30/2024 The scrubber flow 3 hr average on #1 was 430.4 gpm and the flowrate on #2 was 352.6 gpm.

SC III.3-6 All exhaust gases are routed through a closed vent system to the chilled water gas scrubber and two packed scrubbers.

Testing/Sampling

SC V.1-3 Performance testing on the Bleaching system last occurred on 10/21/2020.

Monitoring/Recordkeeping

SC VI.1-3 The oxidation-reduction potential (ORP) is continuously monitored and recorded for the scrubbers in series. At the time of the inspection on 1/30/2024, the ORP for #1 was 342.5 and for #2 was 450.1.

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 Review of Subpart S reports showed no excess emissions or monitor downtime for 2022 or 2023.

FGLK29 – The Lime Kiln System includes:

EULK29 Lime Kiln

EULKI29 two Lime Storage Bins, one for hot lime storage, one for purchased lime storage.

The Lime Kiln System processes lime mud from the Recausticizing System to regenerate calcium oxide. Evaporator condensate is used for lime mud washing. Filtrate from lime mud washing, known as weak wash, is used in the Bleaching System and the Chemical Recovery Furnace System as an air scrubbing medium. Lime mud is mixed, washed, and fed to the Lime Kiln where it is converted to calcium oxide. Calcium oxide is conveyed by bucket elevator to the lime storage bin. From the storage bins, calcium oxide is utilized in the Recausticizing Process. The Lime Kiln is fired with natural gas and/or fuel oil. The Lime Kiln acts as a backup incineration device for the Thermal Oxidizer System.

A scrubber and mist eliminator are used to control PM emissions from the Lime Kiln. A baghouse dust collector is used to control PM emissions from the Lime Storage Bins. FGLK29 is subject to CAM requirements.

The Lime Kiln was inspected on 1/30/2024 and 6/06/24.

Emission Limits

SC I.1 The Lime Kiln has emission limits of HAP Metals measured as PM, PM, SO2, and TRS emission limits. Compliance is demonstrated through stack testing, proper operation of the control equipment, and CEMS.

Process/Operational Restrictions

SC III.1 During the inspection, the venturi scrubber and mist eliminator were operating properly with no visible emissions observed from the stack.

Testing/Sampling

SC V.1-3 The Lime Kiln was last tested for compliance with SC I.1 on 10/1/2020. The average emission rate was 0.063 gr/dscf @ 10% O2, which is in compliance with SC I.1. Results were not reported out in lb/1000 lbs of exhaust gases to show compliance with SC I.2 because at the time of the test, the 2016 ROP was effective and did not require testing to show compliance with this emission limit. Future PM tests on the Lime Kiln will require emission rates to be reported in lb/1000 lbs exhaust gas in addition to gr/dscf @ 10% O2.

PTI No. 17-23 added a stack testing requirement for SO2 for the lime kiln as the compliance demonstration for the existing SO2 limit in the permit. Testing has not been conducted yet for this limit.

Monitoring/Recordkeeping

SC VI.1 Using CEMS, Billerud continuously monitors and records the TRS concentration from EULK29. At 1:29 PM during the inspection on 1/30/2024, the TRS emissions were 4.29 ppmvd @ 8% O2 and the last logged 12-hour average was 4.75 ppmvd @ 8% O2. At 11:37 AM on 6/30/2024, TRS emissions were 3.39 ppmvd @ 8% O2 and the last 12-hour average was 3.59 ppmvd @ 8% O2.

SC VI.2 The scrubber pressure drop and liquid flow are also continuously monitored and recorded for EULK29. On 01/30/2024, the pressure drop 3 hr average across the scrubber was showing 13.9" WC and the liquid flow rate was 600.7 gpm.

SC VI.8-9 The pressure drop across the Lime Storage Bins baghouse is also continuously monitored and recorded. During the inspection, the baghouse pressure drop was reading 1.7" WC. Average baghouse pressure drop for the month of January equaled 1.6" WC. All operating parameters of control equipment were within the required ranges.

Reporting

SC VII.1 Reports for compliance, emission exceedances, and monitor downtimes are reported semiannually and annually in a timely manner. For 2023, the Lime Kiln scrubber differential pressure dropped below 13.6" WC for 3 hours. Dates, reasons, and corrective actions for Lime Kiln excursions were documented in the semiannual MACT II reports.

Other Requirements

SC IX.1-2 The Lime Kiln is maintained and operated in a satisfactory manner. There is an Inspection and Maintenance Program which documents records of inspections, problems found, repairs done, and/or corrective action taken. Additionally, the Lime Kiln is addressed in the MAP to minimize pollutant emissions during periods of startup, shutdown, and malfunction.

FGSIRICE – The Spark Ignition Emergency Engine Group (FGSIRICE) consists of 2 spark ignition engines:

EULKSIRICE is the Lime Kiln Emergency Drive Engine

EUEOCSIRICE is the EOC Back-up Generator

The engines are used to provide mechanical work or power a generator in emergency situations. Both engines are 4 stroke lean burn less than 250 HP.

Process/Operational Restrictions

SC III.1 Annual hourly operating limits do not apply for standard emergency status. Annual compliance records show the engines are not exceeding hourly limits for non -emergency, maintenance, and other various operating conditions.

Design/Equipment Parameters

SC IV.1 Both engines are equipped with non-resettable hour meters. The facility tracks the number of hours of operation, purpose, total running hours, and maintenance performed.

For 2023, EULKSIRICE operated a total of 5.2 hrs/yr, and EUEOCSIRICE operated a total of 32.9 hr/yr. These hours are well below any operational limits for both engines.

Monitoring/Recordkeeping

SC VI.1-2 The facility tracks the number of hours of operation, purpose, total running hours, and maintenance performed.

Reporting

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

Other Requirements

SC IX.1-4 Based on the records reviewed, the facility is operating and maintaining the emergency engines according to 40 CFR Part 63, Subpart ZZZZ.

FGCIRICE – The Compression Ignition Emergency Engine Group (FGCIRICE) consists of 4 compression ignition engines:

EUE1CIRICE E1 Emergency Lift Pump

EUFW1CIRICE Water Treatment Building Emergency Fire Water Pump

EUFW2CIRICE Administrative Building Emergency Fire Water Pump

EUTTGCIRICE Turbine Turning Gear Back-up Generator

The engines are used to provide mechanical work and to power pumps (e.g., fire water pump).in emergency situations. All engines are 4 stroke lean burn less than 250 HP.

Process/Operational Restrictions

SC III.1 Annual hourly operating limits do not apply for standard emergency status. Annual compliance records show the engines are not exceeding hourly limits for non -emergency, maintenance, and other various operating conditions.

Design/Equipment Parameters

SC IV.1 Both engines are equipped with non-resettable hour meters. The facility tracks the number of hours of operation, purpose, total running hours, and maintenance performed.

For 2023, EUE1CIRICE operated a total of 52.8 hrs/yr, EUFW1CIRICE operated a total of 42.6 hr/yr, EUFW2CIRICE operated a total of 35.75 hrs/yr, and EUTTGCIRICE operated a total of 4.51 hrs/yr. These hours are well below any operational limits for the four engines.

Monitoring/Recordkeeping

SC VI.1-2 The facility tracks the number of hours of operation, purpose, total running hours, and maintenance performed.

Reporting

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

Other Requirements

SC IX.1-4 Based on the records reviewed, the facility is operating and maintaining the emergency engines according to 40 CFR Part 63, Subpart ZZZZ.

CONCLUSION

Based on the inspection conducted and records reviewed, these emission units at the Billerud Escanaba Mill appear to be in compliance with the requirements in MI-ROP-A0884-2021b and PTI No. 17-23.

NAME _____ DATE 9-6-2024 SUPERVISOR _____