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

B719268612

FACILITY: Billerud Quinnesec LLC		**SRN / ID:** B7192
LOCATION: W-6791 US HIGHWAY 2, QUINNESEC		**DISTRICT:** Marquette
CITY: QUINNESEC		**COUNTY:** DICKINSON
CONTACT: PAULA LAFLEUR , ENVIRONMENTAL ENGINEER		**ACTIVITY DATE:** 07/31/2023
STAFF: Michael Conklin	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Targeted inspection for FY 23.		
RESOLVED COMPLAINTS:		

Facility: Billerud Quinnesec, LLC – Quinnesec Mill (B7192)

Location: W-6791 US Highway 2, Quinnesec, Dickinson County, Michigan 49876

Contact: Paula LaFleur, Environmental Engineer, 906-779-3494

Facility Description

The Billerud Quinnesec Mill (Billerud Quinnesec) is a bleached Kraft pulp and paper mill located in Quinnesec, Dickinson County, MI. The mill is approximately 2.6 kilometers south and east of Quinnesec, MI, with the surrounding area being rural and consisting of rolling terrain. Dickinson County is currently designated by the EPA as attainment/unclassified for all criteria pollutants. Billerud Quinnesec produces hardwood pulp and graphic papers from hardwood logs through a variety of process operations. Existing operations include a woodyard, Kraft pulping process, chemical recovery process, a biomass (hog fuel) boiler, a natural gas (package) boiler, a pulp dryer, a coated paper machine, and a wastewater treatment plant.

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.

Billerud Quinnesec 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. The wood chips are transferred from an open storage area to a continuous digester system 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 (the "glue") and cellulose (the "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, and screen the pulp. There are two stages of knotters that remove knots from the pulp stream. 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 machine and sold.

The pulp dryer and paper machine produce marketable pulp and paper products. The paper machine takes 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 calenders. The paper is then wound on reels that are cut into smaller rolls and then shipped offsite via truck or railcars.

The pulp dryer is utilized to dewater, press, and dry pulp from the high-density storage tanks. After the pulp dryer, the pulp is cut into sheets and baled for shipment. Other than pH adjustment of the pulp, there are no additives or coating utilized. The chemicals that are used to cook the pulp (white liquor) are recovered in a series of processes involving different emissions units.

The spent cooking liquor from the digester, which is referred to as weak black liquor, 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 digester to cook wood chips.

In addition to the processing equipment at Billerud Quinnesec, the mill creates its own power and steam which are produced by the recovery furnace and two boilers. The recovery furnace produces a significant amount of steam that is used throughout the mill. Billerud Quinnesec also

operates a waste fuel boiler and a package boiler that also supply power and steam. The waste fuel boiler fires wood waste (i.e., hogged fuel), coal, and natural gas. The package boiler fires natural gas.

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 collects concentrated vent gases (CVG) and dilute vent gases (DVG) from several emissions units to control organic hazardous air pollutants (HAPs). The CVGs are equivalent to low volume high concentration (LVHC) gases and the DVGs are equivalent to high volume low concentration (HVLC) gases. A closed vent system is used to collect CVGs from the chip bin and other components of the digester system as well as from the evaporator and hotwell system and the condensate stripper. A closed vent system is also used to collect the DVGs from the brownstock washer and the O2 delignification system as well as several process storage tanks.

Emissions Reporting

Billerud Quinnesec 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	Amount (lbs)
CO	1265689.87
NOx	2170816.00
PM10, Filterable	235690.79
PM10, Primary	37541.51
PM2.5, Filterable	140700.07
PM2.5, Primary	5312.05

SO2	**311611.58**
VOC	**97804.41**

Compliance History

There have been no violations at the facility since the last inspection that occurred in 2021.

Regulatory Analysis

Billerud Quinnesec is a major stationary source as defined by the federal operating permit program (40 CFR Part 70) and the federal new source review (NSR) program (40 CFR Part 52). Billerud Quinnesec is subject to the Michigan Title V Renewable Operating Permit (ROP) regulations, Permit-to-Install/New Source Review (PTI/NSR) regulations, and Prevention of Significant Deterioration (PSD) Michigan Air Pollution Control Rules. Billerud currently operates under ROP No. MI-ROP-B7192-2020b and PTI No. 99-20B.

Billerud Quinnesec is also subject to the following NSPS and MACT federal regulations:

- 40 CFR Part 60, Subpart Db – NSPS for Fossil-Fuel-Fired Steam Generators;
- 40 CFR Part 60, Subpart BB – NSPS for Kraft Pulp Mills;
- 40 CFR Part 60, Subpart JJJJ – NSPS for Stationary Spark Ignition Internal Combustion Engines;
- 40 CFR Part 63, Subpart S – MACT for Pulp and Paper Industry;
- 40 CFR Part 63, Subpart MM – MACT for Chemical Recovery Combustion Sources at kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills;
- 40 CFR Part 63, Subpart DDDDD – MACT for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters;
- 40 CFR Part 63, Subpart ZZZZ – MACT for Stationary Reciprocating Internal Combustion Engines;
- 40 CFR Part 63, Subpart RR – MACT for Individual Drain System.

Inspection

An on-site inspection was performed on 07/31/2023 to verify compliance with MI-ROP-B7192-2020b and PTI No. 99-20B. The facility representative was Paula LaFleur, Environmental Engineer for Billerud Quinnesec.

<u>EU0101-1 Chip Screening Operations</u>

This emission unit includes the chip screening operations. Chips are screened to remove fines and overs (chips too large for pulping). Overs are conveyed to the chipper for re-processing. Emissions are controlled by baghouse #221.

Emission/Material Limits

The chip screening operations have PM emission limits and a visible emissions (VE) limit of 0%. Compliance with these limits is demonstrated through performing weekly non-certified visual opacity observations and continuously monitoring the pressure drop of the baghouse. The pressure drop indicator range is 0.1 to 4.0 inches water column.

Process/Operational Restrictions

During the inspection, the baghouse for chip screening was operating and no visible emissions from the stack were observed.

Design/Equipment Parameters

A differential pressure monitoring device is installed for the baghouse on EU0101-1.

Monitoring/Recordkeeping

Billerud is required to track monthly throughput of the wood yard. A spreadsheet was provided that notes the dry tons chipped, wet tons chipped, 12-month rolling dry chipped tons, the tons to the digester, purchased hog fuel monthly, and 12-month rolling purchased hog fuel. For example, records provided show 120,528 wet tons were chipped in July 2023.

Records were also provided that show the differential pressure being recorded once per shift. The records show the baghouse differential pressure recorded was within the indicator range of proper operation.

Reporting

A review of the first semiannual compliance and CAM report for 2023 notes there were 16 days where the baghouse differential pressure was outside of the range of 0.1 – 4" WC. There were no leaks or any visible emissions during these time periods. Corrective actions included changing the purge air fan, diaphragm, and bags.

<u>EU0102-1 Chip Production Operations</u>

This emission unit is part of the chip production operations. Roundwood is chipped in a rotary disc system and conveyed to screening operations or chip pile. Emissions are controlled by baghouse #212.

Emission/Material Limits

The chip production operations have PM emission limits and visible emissions (VE) limit of 5% opacity. Compliance with these limits is demonstrated through performing weekly non-certified visual opacity observations and continuously monitoring the pressure drop of the baghouse. The indicator range is 0.5 to 10 inches water column.

Process/Operational Restrictions

During the inspection, the baghouse for chip production was operating and no visible emissions from the stack were observed. The baghouse differential pressure gauge was reading 0.6" WC. Proper indicator of performance for the baghouse is 0.5 to 10 in WC.

Design/Equipment Parameters

A gauge for the baghouse differential pressure was observed in place and appeared to be operating correctly.

Monitoring/Recordkeeping

Billerud is required to track monthly throughput of the wood yard. A spreadsheet was provided that notes the dry tons chipped, wet tons chipped, 12-month rolling dry chipped tons, the tons to the digester, purchased hog fuel monthly, and 12-month rolling purchased hog fuel.

Records were also provided that show the differential pressure being recorded once per shift. The records show the baghouse differential pressure recorded was within the indicator range of proper operation.

Reporting

A review of the first semiannual compliance and CAM report for 2023 notes there were no deviations reported.

<u>EU0106-1 Air Density Separator</u>

The air density separator process separates wood chips used in the process from reject materials and conveys the chips to the storage pile or screening system. Emissions are controlled by a cyclone.

Emission/Material Limits

The Air Density Separator has PM emission limits and a visible emission (VE) limit of 0% opacity. Compliance with these limits is demonstrated through performing weekly non-certified visual opacity observations.

Monitoring/Recordkeeping

Records were provided that note visible emission checks from the cyclone for 2022. From the records reviewed, no visible emissions were noted.

Reporting

A review of the first semiannual compliance report for 2023 notes there were no deviations reported from the Air Density Separator.

<u>EU0407-1 White Liquor Oxidation System</u>

A caustic solution is combined with air, steam, and spent liquor solution which coverts the sodium sulfide to sodium thiosulfate. The oxidized white liquor is used to further treat wood pulp. Pollution control equipment includes a demister.

SC I.1-3, III.1, VI.1

This emission unit contains PM and VE limits which are enforced through the proper operation of the demister. Records were provided of daily visible opacity observations for 2022. The records provided show proper operation of the demister.

<u>EU0610-1 ClO2 Generating Plant</u>

This emission unit composes of operations and equipment used to make chlorine dioxide (ClO2). Three

chlorine dioxide storage tanks, with chilled water scrubbers, chlorine dioxide adsorption tower, salt cake slurry tank, generator dump tank, barometric condenser, salt cake filter, seal tank, sample chamber sewer, hereinafter "chlorine dioxide generator". Emissions are controlled by scrubbers.

Emission/Material Limits

The ClO2 Generating Plant contains emission limits of chlorine and chlorine dioxide. Compliance with these emission limits is demonstrated through monitoring and recording of scrubber liquid flow rate.

Process/Operational Restrictions

The white liquor scrubber and chilled water scrubbers were operational during the inspection and appeared to be operating properly. No leaks in the inlet pipes were detected. Verso can continuously monitor the white liquor scrubber operational parameters. At the time of the inspection, the scrubber pH was 13 and the flow was 75 gpm.

Reporting

A review of the first semiannual compliance report for 2023 notes there were no deviations reported from the ClO2 Generating Plant.

EU0611-1 Methanol Storage Tank

This emission unit is a methanol storage tank that vents externally.

The methanol emission limit is practically enforceable through the monitoring and recording of the amount of methanol transferred into the storage tank. The facility has a limit of 650,000 gallons per 12-month rolling time period. Records were provided showing quantities of methanol that are transferred into the tank on a monthly and 12-month rolling basis. For July 2023, the 12-month rolling transfer amount was 333,760 gallons and methanol emissions were 0.15 tons based on an emission factor of 8.97E-4 lb VOC per gallon methanol.

EU0815-1 Chemical Recovery Furnace

Black liquor solids (BLS) from the evaporator system are combusted in the chemical recovery furnace where steam is generated to support mill processes and 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 recovery furnace is a non-direct contact design. 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. Combustion air is supplied at four levels in the recovery furnace using forced draft (FD) fans. 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. The recovery furnace is equipped with natural gas burners for supplemental firing and can also fires vent gases (containing TRS compounds) from pulping process.

This emission unit was modified with PTI No. 99-20B to increase the BLS firing rate and pulping capacity.

Emission/Material Limits

The recovery furnace has emission limits of H2SO4, TRS based on H2S, PM2.5, PM10, PM, SO2, NOx, CO, VOC, Lead, TGNMO measured as total methane, and GHG as CO2e. Compliance with these emission limits is demonstrated through performance tests, continuous opacity monitoring (COM), continuous emission monitoring (CEM), and emission calculations.

The recovery furnace also contains limits of being only allowed to fire natural gas, virgin black liquor solids, salt cake or ESP hopper materials. The natural gas fuel usage is restricted to 793.55 million cubic feet per year and the virgin black liquor solids, salt cake or ESP hopper materials are restricted to 4.68 million pounds per operating day and 823,440 tons per year based on a 12-month rolling time period. Compliance with these material limits is demonstrated through recordkeeping. Records were provided showing the monthly and 12-month rolling fuel data. Though July 2023, the 12-month rolling BLS, salt cake, and hopper materials fired in the Recovery Furnace was 615,168 tons and 121 million cubic feet of natural gas.

Process/Operational Restrictions and Design/Equipment Parameters

At the time of the inspection, the smelt dissolving tank scrubber and mist eliminator were operating properly while the Recovery Furnace was in operation. The Smelt Dissolving Tank scrubber fan was operating at 89% of full load and the liquid flow rate was 224 gpm, as recorded at 11:16 AM. The Recovery Furnace was showing a BLS firing rate of 102 kpph and a steam flow of 341 kpph, as recorded at 11:07 AM. DVGs were being fired in the Waste Fuel Boiler. During the inspection, the Recovery Furnace and ESP appeared to be operating properly. TR #1 and TR #13 were down, however, the COMS showed an instantaneous opacity of 1.3% and a last logged 1-hour average of 2.0%. Billerud has added 12 new TRs to the precipitator making up a total of 24 TRs in the ESP. The upgrades to the ESP have since shown a lower monthly average opacity and a

lower filterable PM emission rate during stack testing of 26.6 lb/hr in 2022 compared to 39.5 lb/hr in 2020. No visible emissions were observed from the Main Stack.

Testing/Sampling

Performance testing for SO2, NOx, CO, HCl, Sulfuric Acid, TRS, and TCDD were removed with PTI No. 99-20B. The Recovery Furnace is equipped with a CEMS for measuring emission rates of NOx, CO, SO2, and TRS. Billerud is now required to test only for FPM, PM10, PM2.5, and TGNMO every five years. The last test for these pollutants was conducted in November 2022. The results from this test are summarized below.

Pollutant	Emission Rate
PM	26.6 lb/hr
PM10	25.8 lb/hr
PM2.5	24.1 lb/hr
TGNMO	2.2 lb/hr

The last MACT II test for compliance with the PM emission limit was conducted on 9/15/2020. The results were 0.016 gr/dscf @ 8% O2.

Monitoring/Recordkeeping

The recovery furnace uses a continuous opacity monitor (COM) system to measure opacity as an indicator of the proper operation of the ESP. The indicator range defining proper operation is 20% at the exit of the main stack. The recovery furnace also has a visible emission limit of 35% except for 2% of the time in any quarter and periods of SSM from MACT II. Opacity is determined at the exhaust of the recovery furnace to the main stack. During the inspection, the COMS was displaying an instantaneous opacity of 1.3% and a last logged 6-minute average of 1.8%. Quarterly reports are provided of monitoring data, monitor performance data, and corrective actions taken.

Compliance with the concentration limits (ppmv) of SO2, NOx, CO, and TRS is demonstrated with the CEMS. During the inspection, the CEMS for the recovery furnace was showing emission rates of 1.4 ppm TRS/O2 on a 12-hour average, 0.7 ppm SO2/O2 on a 24-hour average, 74.8 ppm NOx/O2 on a 24-hour average, and 0.0 CO/O2 on both a 3-hour and 8-hour average. In a follow-up email to Paula LaFleur to clarify the CO emission rates from the CEMS, the CO emissions were essentially zero because of the low firing rate. There isn't much CO emissions when the Recovery Furnace is running at reduced rates. A chart showing the CO emissions and firing rate over the period of 7/31 – 8/2 was provided showing the CO emissions increase at higher firing rates. The CEMS data for these pollutants is also used to calculate 12-month rolling emission rates. For the period January 2022 through July 2023, the 12-month rolling emission rates for NOx, CO, TRS, and SO2 stay below the 12-month rolling limits.

A linear equation is used to calculate a monthly average lb/ton PM emission factor from plotting the average stack opacity from the COMS and lb/ton PM emission rates during PM stack tests. Using the monthly average opacity from the COMS, a monthly average lb/ton PM emission factor is calculated from the linear equation. Filterable PM10:PM and filterable PM2.5:PM ratios from NCASI are also used in calculating PM10 and PM2.5 emission factors. From reviewing records provided for the period January 2022 through July 2023, the 12-month rolling emission rates for PM, PM10, PM2.5, H2SO4, VOC, and lead stay below the 12-month rolling limits. With the issuance of PTI No. 99-20B, emission limits were added for greenhouse gases as CO2e at 210 lbs/MMBtu based on a 12-month rolling average and 972,722 tpy based on a 12-month rolling sum. Through July 2023, records provided show the 12-month rolling sum of CO2e to be 703,268 tons and 204.54 lb/MMBtu.

A spreadsheet was provided of the calculated CO lb/hr 3-hr average, CO lb/hr 8-hr average, NOx lb/hr 24-hr average, and SO2 lb/hr 24-hr average emission rates based on the last performance test conducted in November 2022. The emission rates are calculated from the CEMS concentration data of the pollutants and the stack flow for PM or TFNMO measured during stack testing. During the testing period of 11/10/22 – 11/11/22, the highest CO 3-hr average was 162.6 1b/hr, CO 8-hr average was 105 lb/hr, NOx 24-hr average was 190 lb/hr, and SO2 24-hr average was 0 lb/hr.

Billerud is required to monitor and record all fuel combusted on an hourly, daily and monthly basis. Records of this data was requested for 3/4/2022, 8/10/2022, and 2/7/2023. The Recovery Furnace was down on 8/10/2022 as part of an extended mill outage, so there is no production or operational data for this day. Records provided show the hourly steam load, natural gas fired, BLS fired, along with voltage and current for each of the 12 TRs for the ESP. Also, records were provided of the total daily amount of BLS fired in the Recovery Furnace. For example, on 3/4/2022, 4.39 MMlbs of BLS was fired. The records reviewed for 2023 show the daily total BLS fired remains under 4.68 MMlbs. The hourly data reviewed for 3/4/2022 and 2/7/2023 show proper operation of the ESP during operation of the Recovery Furnace.

Billerud also keeps records of time periods when only one chamber of the ESP is in operation. For example, on 1/25/2023 and 5/4/2023, there were a few hours when only one chamber of the ESP was operational. During these time periods, the BLS firing rate was reduced to less than 80 kpph.

In addition, the facility is required to maintain monthly and 12-month rolling records of the amount of natural gas, BLS, salt cake and ESP hopper materials fired in the recovery furnace. From records reviewed, the total 12-month rolling tons of BLS, including saltcake and ESP hopper solids, remains under the 823,440 tons and the 12-month rolling natural gas usage in the recovery furnace is under the 793.55 MMCF per year limit.

Billerud also maintains records of startup and shutdown of the Recovery Furnace with dates, start time, and end time. From January 2022 through July 2023, there were a total of 18 startup/shutdown events. None of these events exceeded a 12-hour period.

Reporting

A review of the 2023 first quarter excess emissions report show there were 3 periods of the 6-minute average opacity being greater than 20%. These 3 occurrences were due to precipitator malfunctions. Corrective actions included reducing liquor flow while addressing the ESP malfunction. The COMS was unavailable for a total of 276 minutes in the first quarter or 0.22% of the operating time. The Recovery Furnace is equipped with a CEMS for CO, NOx, SO2, and TRS. Quarterly excess emissions, downtime reports, and cylinder gas audits are also being submitted. For example, a review of the first quarter 2023 show no excess emissions reported over the emission limits. The last CEMS RATA was performed during the period of 5/9/23 – 5/11/23. All relative accuracies were less than 20% of the reference method value.

Billerud also certifies compliance with the requirements for the Recovery Furnace and notes when deviations occur. A review of the 2022 annual compliance and deviation reports show a total of 6 dates with deviations from the recovery furnace. Many of the deviations reported involved the transformer rectifiers (TR) in the ESP tripping causing an exceedance in the 60-minute rolling average opacity limit of 20%. During these events, liquor flow to the recovery furnace was reduced until power was restored throughout the whole ESP.

Billerud also submits semiannual compliance reports for the Recovery Furnace with 40 CFR Part 63, Subpart MM.

<u>EU0816-1 Smelt Dissolving Tank</u>

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 for PM control.

Emission/Material Limits

The smelt dissolving tank contains emission limits of H2S, TRS, PM, PM10, PM2.5, SO2, VOC, CO, NOx, and TGNMO measured as methane. Compliance with these emission limits is demonstrated through performance tests, continuous monitoring system (CMS), and emission calculations.

Process/Operational Restrictions

At the time of the inspection, the scrubber liquid flow rate was reading 224 gpm and the fan for the scrubber was reading 89% of full load amps. The bypass was closed, and exhaust was being routed through the scrubber.

Testing/Sampling

Testing for TRS, PM, PM10, SO2, and TGNMO emission rates last occurred on November 8th, 9th, and December 14th of 2022. The test results are summarized below.

TEST RESULTS				
Test Location	**Test Date**	**Test Parameter**	**Emission Limit**	**Emission Rate**
Smelt Dissolving Tank	11/8/2022	TPM (PM_{10})	0.107 lb/TBLS 8.5 lb/hr	0.057 TBLS and 5.197 lb/hr
	11/8/2022	Filterable Particulate Matter	0.107 lb/TBLS 8.5 lb/hr	0.050 TBLS and 4.556 lb/hr
	11/9/2022	VOC	As CH_4 200 ppmvd 6.5 lb/hr	18.1 ppmvd CH_4 and 1.07 lb/hr
	11/8/2022 & 11/9/2022	TRS	As H_2S 0.033 lb/TBLS 0.0168 lb/TBLS	0.0050 lb/TBLS
	12/14/2022	SO_2	0.016 lb/TBLS 1.27 lb/hr	0.0019 lb/TBLS and 0.17 lb/hr

Monitoring/Recordkeeping

The CMS operating parameters for the scrubber are a flow rate of at least 150 gpm and 39% of full load amps for the fan. During the September 2020 test, the lowest average flow rate during the three tests was 150 gpm and fan amperage (% full load) was 75%. The 3-hour average scrubber flow parameter is 150 gpm and the 3-hour average fan amperage is 60.0 Amps. The facility records and submits reports of parameter exceedances in the semiannual MACT II reports.

Billerud maintains 12-month rolling emission rates from the smelt dissolving tank for H2S, TRS, PM, PM10, PM2.5, SO2, VOC, CO and NOx. The facility uses the total tons per month of BLS, including saltcake and ESP hopper material, in calculating the 12-month rolling emission rates. Billerud calculates a monthly emission factor for PM by correlating the scrubber flow rate during stack testing with the PM emission results. Subpart MM requires the establishing of scrubber operating ranges for fan amperage and scrubbing liquid flow rate. The minimum scrubbing liquid flow is the rate established during the most recent performance test for PM. The scrubbing liquid flow rate is used as a CPMS for PM emissions. The linear equation gathered from the correlated data is used to create a monthly, PM lb/ton BLS (y) emission factor based on the average monthly scrubber flow rate (x). Using this method, the records show through July 2023, the 12-month rolling PM emissions from the smelt dissolving tank are 15.76 tons. Filterable PM10:PM and filterable PM2.5:PM ratios from NCASI are used in calculating PM10 and PM2.5 emission factors. Through July 2023, the 12-month rolling emission rates for PM, PM10, PM2.5, H2SO4, VOC, and lead stay below the 12-month rolling limits. A discussion was had regarding no emissions reported for NOx. Since the Smelt Dissolving Tank is not a combustion source, it is believed there are very little to no emissions of NOx.

Records were requested when the bypass was opened and closed for 2022 through July 2023. During 2022, there were 5 occurrences where the bypass was used due to the scrubber cone being plugged. These incidents were all less than 15 minutes.

The facility also tracks and reports monitor downtimes for the fan amps and scrubber flow. The reports note the issues, duration, cause, and corrective actions.

Reporting

A review of the 2023 first semiannual ROP compliance and MACT II reports show no deviations from the Smelt Dissolving Tank or periods where the scrubber was in operation outside of the established limits.

<u>EU0917-1 Lime Kiln</u>

Lime mud from causticizing is converted to lime in the Lime Kiln. The lime mud is dried and heated to a high temperature in the Lime Kiln, which converts the lime mud to lime. The lime mud is heated directly with natural gas. CVGs and foul methanol are also incinerated in the Lime Kiln. The Lime Kiln is equipped with a venturi scrubber to remove particulate matter. The flue gas can be routed through a carbon dioxide extraction plant located onsite and owned by Specialty Minerals, Inc.

Emission/Material Limits

The lime kiln contains emission limits of TRS based on H2S, CO, NOx, PM, PM10, PM2.5, SO2, and TGNMO measured as methane. Compliance with these emission limits is demonstrated through performance tests, continuous emissions monitoring system (CEMS), and parametric monitoring.

Process/Operational Limits

At the time of the inspection, the mud flow to the kiln was 414 tpd and the natural gas flow rate was 1000.1 scfm. The CEMs was providing a real time TRS/O2 ppm @ 10% O2 average of 0.3 ppm 1-hour, 0.5 ppm 12-hour, and 0.3 ppm 24-hour.

The Lime Kiln wet scrubber was operating at 389 gpm and 32" WC during the inspection. The CPMS showed the last logged 3-hour average was 34" WC and 460 gpm. The current MACT II limits for the scrubber are 29" WC and 277 gpm.

Testing/Sampling

Performance testing for CO, NOx, PM, PM10, PM2.5, and TGNMO last occurred on December 13, 2022. The lime kiln passed for all emission limits tested against in PTI No. 99-20B.

Pollutant	Emission Limit	Units	Underlying Applicable Requirement	Emission Rate	% of Limit
CO (Method 10)	0.64	lb/MMBtu	R 336.2804, 40 CFR 52.21(d)	0.03	4.7
NOx (Method 7E)	0.30	lb/MMBtu	R 336.2803, R 336.2804, 40 CFR 52.21(c) & (d)	0.19	63.3
	29	Lb/hr		20	69.0
FPM (Method 5)	16.9	lb/hr	40 CFR 52.21(j)(3)	5.0	29.6
	9.4	lb/hr	R 336.2803, R 336.2804	5.0	53.2
PM10 and PM2.5 as TPM (Method 5 + 202)	9.7	lb/hr		5.4	25.8
TGNMO as Methane (Method 25A)	68	ppmdv@10% O_2	R 336.1702(a)	45	66.2
	5.0	lb/hr		4.2	84.0

There has been no fuel oil burned in the lime kiln since 2014.

Testing for the MACT II PM emission limit last occurred in June 2021. The purpose of the test was to demonstrate compliance with the emission limit specified in 40 CFR 63.862(a)(i)(C) and to revise the scrubber operating limits that are set forth through the CPMS. The results of the test showed an emission rate of 0.012 gr/dscf @ 10% O2 and 3.4 lb/hr for PM, while establishing a minimum scrubber flow rate of 277 gpm and minimum scrubber differential pressure of 29 inches H20 over a 3-hour rolling averaging period.

Monitoring/Recordkeeping

Billerud uses a CEMS to monitor TRS emissions and also uses a performance parameter monitoring system to monitor and record pressure drop across the scrubber and liquid flow rate. The last CEMS RATA for Lime Kiln occurred on May 9-10, 2023. The relative accuracy for TRS and O2 were 9.70% and 12.93% of the mean reference method value, respectively.

Billerud also monitors and records the lime production from the kiln. Through July 2023, the 12-month rolling lime production from the kiln was 113,497 tons. No fuel oil has been purchased during the period of January 2022 through Jul 2023.

Lime kiln operating parameter deviations and monitor downtimes are recorded in the semiannual MACT II Excess Emissions & CMS Performance reports.

Billerud is required to keep monthly and 12-month rolling PM2.5, PM10, and PM emission calculations. Emission factors from the 2022 stack test are used to calculate monthly emissions based on the total lime production. A review of records for 2022 through July 2023 show the Lime Kiln is in compliance with the emission limits in PTI No. 99-20B.

Reporting

A review of the 2022 annual compliance and deviation report show no deviations reported for the Lime Kiln. Billerud also submits semiannual MACT II Excess Emissions & CMS Performance and Malfunction reports for the lime kiln. A review of the first semiannual 2023 report shows no MACT II deviations from the established operating parameters.

<u>EU1019-1 Slaker</u>

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 li- e) slurry. The slaked lime slurry passes through a series of cauticizers where

the green liquor is converted to white liquor, and the lime mud is generated as a by-product. The slaker uses a wet scrubber to control PM emissions.

Emission/Material

The Slaker contains a PM emission limit that is practically enforceable through the monitoring and recording of the flow rate to the scrubber.

Monitoring/Recordkeeping

Billerud is required to monitor and record the flow rate to the scrubber. The flow rate to the scrubber is continuously monitored and recorded every hour. During the inspection, the CPMS showed the scrubber operating at a flowrate of 27.4 gpm.

Reporting

A review of the 2022 compliance reports show no deviations reported for the slaker.

EU1121-1 Waste Fuel Boiler

The Babcock & Wilcox waste fuel boiler has a nominal rated heat input capacity of 660 MMBtu/hr and was installed in 1981. It is a combination fuel boiler capable of burning wood refuse, coal, and natural gas to produce steam which is used to supply the steam turbines at the mill. The Waste Fuel Boiler is also an incineration device for DVGs and/or CVGs. Particulate emissions are controlled by a multicyclone collector and electrostatic precipitator (ESP), while gaseous pollutants are controlled by over-fired air (OFA).

Boiler MACT: Existing source; designed to burn solid fuel; stokers/sloped grate/others designed to burn wet biomass fuel.

Emission/Material Limits

The Waste Fuel Boiler contains emission limits for CO, PM, NOx, SO2, TGNMO measured as total methane, Mercury, HCl, and Visible Emissions. Compliance with these emission limits is demonstrated through performance testing, continuous emission monitoring (CEMS), continuous opacity monitoring (COMS), recordkeeping, and reporting.

The waste fuel boiler contains material limits of maximum sulfur content of the coal shall not exceed one percent sulfur by weight, calculated on 12,000 BTUs per pound and based on a 10-day rolling average. Also, the waste fuel boiler is only allowed to burn fuels as allowed in the unit designated to burn biomass/bio-based solid subcategory definition in 40 CFR 63.7575.

Process/Operational Restrictions

At the time of the inspection, the waste fuel boiler was in operation. The boiler operating parameters are continuously monitored from the boiler control room at the facility. At 11:27 AM CST, the operating system was showing a steam flow rate of 330 KPPH and the O2 trim was at 3.3% on the north and 3.37% at the south. The O2 trim setpoint was at 4%. The boiler was firing only waste wood material at the time of the inspection. The bark feed rate was at 52 tph. DVGs were being fired in the waste fuel boiler. The flow rate from the DVGs booster fan was showing 9.4 KSCFM. Natural gas and coal were not being fired in the boiler. The most recent MACT DDDDD performance test, on 05/02/2023, established the maximum 30-day rolling average steam flow rate of 412 KPPH and the minimum hourly O2 trim setpoint of 4%.

The waste fuel boiler is required to have a 5-year performance tune-up according to 40 CFR 63.7540(a)(12), since it's an existing boiler with an oxygen trim system. The 5-year tune-up must be conducted no more than 61 months after the previous tune-up. The purpose of the tune-ups are to optimize the flame pattern, optimize total CO emissions, and inspect the system controlling the air-to-fuel ratio to ensure calibration and proper function. The most recent inspection was performed on 10/5/2020 – 10/8/2020, with optimization on 4/22/2020. The prior inspection was performed on 10/6/2015 – 10/7/2015. The CO emissions measured before optimization on 4/22/2020 were 297.5 lb/hr and after were 210.5 lb/hr. The boiler steam rates during before and after tune-up were 378.8 KPPH and 381.9 KPPH. The fuel being fired was 90% wood and 10% coal at the time of CO measurements. The tune-up verified the boiler is capable of meeting emissions at 4.0% trim O2 set-point.

Design/Equipment Parameters

The waste fuel boiler contains a device to monitor the coal feed rate. There are five coal slingers that are measured in percent load. At the time of the inspection, no coal was being fired.

Testing/Sampling

Billerud keeps records of each coal shipment received. The records include the date received, source of the coal and shipper, and tons received. The most recent shipment of coal was received on 1/6/2023 and included 222 tons from East Kentucky Stoker (60%) and West Elk Blend (40%). An independent analysis of the 2023 shipment was performed on 9/11/23 and 9/13/23 for the coal ash content, sulfur content, and BTU content. Billerud uses the ASTM 3177 for determining

the sulfur content. Two samples were analyzed, and the average percent sulfur content corrected to 12000 BTU was 0.66%. The average ash content analyzed between two samples was 6.423%.

The AQD has not requested verification of CO, PM, and TGNMO emission rates to compare against the state promulgated emission limits for these pollutants. However, the last performance test in May 2023 showed emission rates of 195.11 lb/hr for CO and 0.0033 lb/MMBtu for PM.

Records were provided that show Billerud analyzes and records the monthly heating value, in Btu per pound, of the wet wood refuse on a calendar month basis. For example, through the month of July 2023, the total hog fuel heat input was 259011.2 MMBtu and the total fuel heat input was 266183.4 MMBtu.

Billerud has chosen to demonstrate compliance with each applicable heat input-based emission limit in Table 2 of MACT DDDDD through performance testing. If the performance tests for a given pollutant for at least 2 consecutive years show the emissions are at or below 75 percent of the emission limit for the pollutant, and if there are no changes in the operation of the Waste Fuel Boiler or air pollution control equipment that could increase emissions, Billerud may choose to conduct performance tests every third year. Each such performance test must be conducted no more than 37 months after the previous performance test. Initial performance testing for the MACT DDDDD heat input-based emission limits was conducted in 2016 with subsequent testing in 2017. Following the 2017 test, and the emission rates from testing being less than 75% of the limits, the next test was performed in 2020. The 2020 test results are summarized in the table below.

Parameter	Emission Rate	Emission Limit	% of Emission Limit
FPM lb/MMBtu	5.80E-03	3.70E-02	16%
HCl lb/MMBtu	5.10E-03	2.20E-02	23%
Hg lb/MMBtu	9.70E-7	5.70E-06	17%
CO ppmv @ 3% O2	314	1500	21%

The most recent performance test occurred in May 2023. The test results are summarized below. Testing is next required by June 2, 2026.

Parameter	Emission Rate	Emission Limit	% of Emission Limit
FPM lb/MMBtu	0.0033	3.70E-02	10%
HCl lb/MMBtu	0.0020	2.20E-02	10%
Hg lb/MMBtu	0.0000008	5.70E-06	15%
CO ppmv @ 3% O2	393.48	1500	26%
CO lb/hr	195.11	360	54%

The operating parameters established through the most recent performance test (2023) are a maximum 30-day rolling average steam flow rate of 412 KPPH and minimum hourly O2 trim setpoint of 4%. During the performance test, the pollutant loading fuel split was 92% hog fuel and 8% coal of the total heat input.

Monitoring/Recordkeeping

Compliance with the NOx and SO2 emission rates is verified using a CEMS located downstream of the ESP. The following table outlines the data from the CEMS observed during the inspection. No coal or CVGs were being fired in the boiler at the time of the inspection.

Pollutant	Last Logged Ave
NOx lb/MMBtu 1-hr	0.15
NOx lb/MMBtu 3-hour	0.15
SO2 lb/MMBtu 1-hour	0.0

SO2 lb/MMBtu Coal in 3-hour	**0.0**
NOx lb/hr 1-hour	**51.5**
SO2 lb/hr No CVGs 1-hour	**0.2**
SO2 lb/hr with CVGs 1-hr	**0.0**

The three continuous performance monitoring system (CPMS) parameters monitored include operating load (steam flow), O2 content (O2 trim set), and opacity (COMS). The waste fuel boiler contains a continuous opacity monitoring system (COMS) to measure opacity. Continuous compliance is demonstrated by maintaining the daily block average opacity at or below 10%. During the inspection, the COMS data showed the 24-hour average opacity from the waste fuel boiler to be 0.7%.

Billerud monitors and records the amount of wet wood refuse used in the waste fuel boiler on a monthly basis. A spreadsheet was provided that notes the amount of purchased hog fuel, self-generated hog fuel, and total hog fuel used in the waste fuel boiler. For example, 30,945 tons of hog fuel was used in the boiler during July 2023. The coal feeder conveyor system rate is continuously monitored and recorded in the mill's PI Process Book system.

Billerud has a site-specific monitoring plan (Rev. November 2015) that outlines the installation, performance, operation and maintenance, quality control, and recordkeeping and reporting procedures related to the waste fuel boiler CMS.

The facility is required to keep records of all monitoring data and calculated averages for applicable operating limits, such as opacity and operating load, to show compliance with each emission limit that applies. Billerud keeps track of the types of fuel and amounts used in the waste fuel boiler on a monthly basis. A spreadsheet was provided that shows the days of operation for each month, fuel usage, fuel heat input, chlorine and mercury fuel input, steam produced, O2 trim percent, and average monthly pound per hour NOx from the CEMS.

Reporting

A review of the first semiannual compliance and deviation report for 2023 shows one deviation reported for EU1121 from the MACT DDDDD operating limits. The Waste Fuel Boiler precipitator ash hoppers plugged resulting in ash carry over, precipitator TR trips, and high opacity resulted.

To resolve the high opacity, hogged fuel to the boiler was reduced, air flow was redistributed, hoppers were cleaned, and precipitator TR power was restored.

In addition to ROP compliance/deviation, Billerud submits MACT DDDDD semiannual compliance reports for the Waste Fuel Boiler. The MACT DDDDD compliance report provides the total fuel use, performance test summary, recordkeeping for startup/shutdown fuels, along with a deviation and malfunction report. For the period 01/01/2023 through 06/30/2023, the boiler burned 188,706 tons of wood, 102 tons of coal, and 83,543 KSCF of natural gas. Testing for the CO, PM, HCl, Hg heat input limits last occurred on 05/02/2023 and all emission rates were less than 75% of the emission limits.

EU1122-1 Package Boiler

The package boiler was installed in 1989 and has a nominal rated heat input capacity of 419 MMBtu/hr. The package boiler is designed to combust natural gas and is equipped with an oxygen trim system to maintain excess air at the desired level in the boiler. The package boiler operates at minimum load conditions except during outages of other boilers. The boiler is an existing source with respect to MACT DDDDD and it meets the criteria of the unit designed to burn gas I subcategory. As such, the package boiler is not subject to emission limits or operating limits under MACT DDDDD.

Emission/Material Limits

The package boiler contains emission limits for CO, NOx, and VOC. Compliance with these emission limits is demonstrated through CEMS, COMS, and emission rate calculations. Only pipeline quality natural gas is fired in the package boiler.

Process/Operational Restrictions

At the time of the inspection, the package boiler was not in operation.

The package boiler is required to have a 5-year performance tune-up according to 40 CFR 63.7540 (a)(12), since it's an existing boiler with an oxygen trim system. The 5-year tune-up must be conducted no more than 61 months after the previous tune-up. The purpose of the tune-ups are to optimize the flame pattern, optimize total CO emissions, and inspect the system controlling the air-to-fuel ratio to ensure calibration and proper function. The O2 trim setpoint is established during the tune-up for the package boiler, whereas for the waste fuel boiler, its established through performance testing. The most recent inspection was performed on 4/5/2020 – 4/14/2020, with optimization on 4/24/2020. The prior inspection was performed on 8/17/2015 – 8/18/2015. The CO emissions measured before optimization 0 lb/hr and after were 0 lb/hr. There

were essentially zero CO emissions from the package boiler during the before and after tuning measurements. This is typical for the package boiler as it usually operates under low load and steam flow according to Ms. LaFleur. The boiler steam rates during before and after tune-up were 49.97 KPPH and 49.07 KPPH. The fuel being fired was 100% natural gas at the time of CO measurements. The tune-up verified the boiler is capable of meeting emissions at 8.06% O2 trim.

Monitoring/Recordkeeping

NOx and CO emission rates are continuously monitored using a CEMS. The data from the CEMS was not able to be gathered during the inspection since the package boiler was not operating.

Reporting

A review of the first semiannual compliance report for 2023 notes there were no deviations reported from the Package Boiler.

<u>EU1128-1 Purchased Fuel Hogging Operations</u>

Delivery systems for purchased hog fuel (wood refuse), which is screened and transferred to the hog fuel storage pile, then to the waste fuel boiler (EU1121-1). The delivery system has three (3) open air drop points that include the truck dumper, screen operation bypass, and transfer building bypass. PM emissions are controlled by baghouse #162.

Emission/Material Limits

The purchased fuel hogging operations contains emission limits of PM, PM10, PM2.5, and VE. Compliance with these emission limits is demonstrated through weekly non-certified visible emission checks and monitoring pressure drop across the baghouse. This emission unit also contains a material throughput limit of 512,000 tpy of purchased wet wood refuse. Compliance with this material limit is demonstrated through monthly and 12-month rolling recordkeeping of the wet wood refuse processed.

Process/Operational Restrictions

At the time of the inspection, the baghouse for the purchased fuel hogging operations was in operation. No visible emissions were observed and the differential pressure was reading 0.25 in WC.

Design/Equipment Parameters

The baghouse has a Magnehelic gauge installed to monitor the differential pressure.

Monitoring/Recordkeeping

Billerud is required to record weekly non-certified visual opacity observations as an indicator of proper operation for the baghouse. The facility is also required to monitor and record the pressure drop across the baghouse. Records were provided for April and July 2023 that notes the pressure drop recorded for each day of operation and if visible emissions were observed. The records reviewed show the baghouse differential pressure stays within 0 – 10 in WC and no visible emissions detected.

Billerud also maintains monthly and 12-month rolling records of the amount of purchased hog fuel. For example, during July 2023, the facility purchased 10,305 tons and the 12-month rolling as of July 2023 was 154,972 tons.

Reporting

A review of the first semiannual compliance and CAM reports for 2023 notes there were no deviations reported from EU1128-1.

<u>EUCOOLTWR-1 Cooling Tower</u>

Mechanical induced draft cooling tower equipped with high efficiency drift eliminators.

Monitoring/Recordkeeping

The total PM emissions from the cooling tower for 2022 were 104.24 lb.

<u>EU1882-1 Q40 Pulp Dryer</u>

Pulp is dried before being cut into bales for transport and sale. This emission unit was added in PTI No. 99-20B.

Emission/Material Limits

The Pulp Dryer contains emission limits for VOCs and PM based on a 12-month rolling time period. Compliance with the emission limits is demonstrated through emission calculations and white-water sampling for methanol concentrations.

Testing/Sampling

Billerud is required to sample the white-water in the Pulp Dryer on a weekly basis during weeks the Pulp Dryer is in operation to determine the methanol concentration. Weekly white-water sample methanol results are averaged and used to calculate a monthly VOC emission factor. Records were provided of the white-water methanol sample results conducted each week and month in 2023. A monthly average VOC lb/ton emission factor is calculated based on the weekly sample results for each calendar month. For July 2023, the VOC emission factor was 0.035 lb/ton ADT market pulp.

Monitoring/Recordkeeping

Billerud is required to monitor and record the daily and monthly tons of pulp dried, along with monthly and 12-month rolling emission calculations for PM and VOC. A spreadsheet was provided showing the monthly and 12-month rolling pulp dried, PM, and VOC emissions. For July 2023, 15,369 tons of pulp was dried and the 12-month rolling dried was 224,524 tons. The VOC emission factor for July 2023 was 0.035 lb/ton pulp based on white-water sampling and VOC emission rates were 0.27 tons and the 12-month rolling were 4.65 tons. The monthly PM emission for July 2023 were 0.15 tons and 12-month rolling emissions were 2.25 tpy.

<u>EU1227-1 Q41 Paper Machine</u>

This emission unit includes the Q41 Paper Machine where pulp is combined with supplemental chemicals and additives to make various grades of paper.

Emission/Material Limits

The Q41 Paper Machine contains VOC, PM, PM10, and PM2.5 emission limits. Compliance with this emission limit is demonstrated through the monitoring and recording of the daily paper machine production rate, white-water sampling for methanol concentrations, and emission calculations. The Q41 Paper Machine also contains a material limit of 1,800 air dried tons of finished paper (ADTFP) per day. Compliance is demonstrated through monitoring and recordkeeping of production.

Process/Operational Restrictions

PTI No. 99-20B requires the facility to keep a plan on how emissions from the Q41 Paper Machine will be minimized at all times. The plan, Paper Machine Good Operating Practices for the Minimization of Particulate Emissions, was submitted to the AQD on 2/2/2023. It includes operating practices for the "wet end" and the "dry end" to minimize PM emissions along with periodic inspection and maintenance activities.

Testing/Sampling

Billerud is required to sample the white-water in the Paper Machine on a weekly basis during weeks the Paper Machine is in operation to determine the methanol concentration. Weekly white-water sample methanol results are averaged and used to calculate a monthly VOC emission factor. Records were provided of the white-water methanol sample results conducted each week and month in 2023. A monthly average VOC lb/ton emission factor is calculated based on the weekly sample results for each calendar month. For July 2023, the VOC emission factor was 0.037 lb/ton ADT market pulp.

Monitoring/Recordkeeping

The facility tracks paper production from the paper machine in tons per day. Billerud also tracks the daily coating application rate for the paper machine. The production rates are totaled for each calendar month and summed for a 12-month rolling total. For July 2023, the total produced was 24,050 tons and the 12-month rolling total was 338,404 tons.

Billerud is also required to track the monthly and 12-month rolling emission rates for VOCs, PM, PM10, and PM2.5. The PM emission factor being used is 0.04 lb/ton paper, the PM10 factor being used is 0.07 lb/ton paper, and the PM2.5 factor being sued is 0.06 lb/ton paper. These emission factors were also used as part of the projected emissions for PTI No. 99-20B. Based on the records reviewed, Billerud is in compliance with the 12-month rolling ton per year limits.

<u>EU1228-1 Finished Paper Trimming</u>

Paper rolls on the calendars and rereelers are trimmed to meet customer specifications. PM emissions are controlled by two cyclones and two baghouses.

Emission/Material Limits

EU1228-1 contains PM-10 and VE limits. Compliance with these limits is demonstrated through performing and recording weekly non-certified opacity observations.

Monitoring/Recordkeeping

Billerud is required to record weekly non-certified visible opacity observations as an indicator of proper operations for the baghouses. The facility performs weekly checks at a minimum and sometimes daily.

EU2336-1 Condensate Source Group

Condensed steam that has been used in the cooking and liquor evaporation processes is collected and sent to a foul condensate collection tank. Foul condensates include: HVLC system foul condensate, LVHC system foul condensate, digester system foul condensate, and evaporator foul condensate. Collected foul condensates are sent to a steam stripper system. Stripped condensate is removed from the steam stripper and sent to the pulp washing system for treatment. The steam stripper off gases are condensed to a liquid (foul methanol) and sent to the lime kiln for incineration.

Process/Operational

Billerud collects condensates from mill processes and routes them through a closed collection system to the condensate collection tank. The condensate collection tank is equipped with a vent at the top of the roof. Records are maintained of periods when venting occurs and documented in the semiannual MACT S compliance reports. A review of the first semiannual report for 2023 show there no periods of excess emissions greater than 5% of the total process operating time.

Monitoring/Recordkeeping

Billerud maintains a site-specific inspection plan for the closed collection system. This plan is covered under the LDAR-04 Inspection & Repair Procedures (Rev. 3/14/2023). Records were provided of monthly inspections performed and the outcomes for 2023 to-date.

FG2334-1 CVG (LVHC) System

The concentrated vent gas (CVG) system collects low volume high concentration (LVHC) off gases from the Chip Bin, Digester System, Digester Blow Tank, Evaporator System, Hotwell, and Condensate Stripper. The collected gases are combusted in the Lime Kiln, Waste Fuel Boiler, or Recovery Furnace and/or treated in the CVG scrubber. CVG System gases from the Digester System, Evaporator System, Hotwell, and Condensate Stripper are collected in a closed vent collection system and routed to the Lime Kiln (primary), Waste Fuel Boiler (primary backup), or CVG scrubber (secondary backup) for incineration and/or treatment. Concentrated Vent Gas (CVG) System gases from the Chip Bin and Digester Blow Tank are collected in a closed vent collection system and routed to the Waste Fuel Boiler (primary) or Chemical Recovery Furnace (secondary) for incineration.

Process/Operational

At the time of the inspection, the Lime Kiln was incinerating CVGs. The CVG source group emissions are routed to the Lime Kiln, Waste Fuel Boiler, or the Recovery Furnace in a closed-vent

system. Records are kept of excess emissions and reported in the MACT S semiannual compliance reports.

Monitoring/Recordkeeping

Billerud is required to monitor and record the white liquor flow rate during operation of the CVG scrubber on a continuous basis and the sodium hydroxide concentration from the white liquor tank on an intermittent basis. An inspection plan for the LVHC system is maintained. This plan is covered under the LDAR-04 Inspection & Repair Procedures (Rev. 3/14/2023).

Reporting

A review of the first 2023 semiannual MACT S compliance and deviation report notes several deviation occurrences between the dates 1/1/23 to 6/30/23 where LVHC gases were vented to the atmosphere due to equipment issues. The total venting time was 0.46% of the semi-annual operating time, which is within the 1% of semi-annual operating time allowance specified in MACT S.

<u>FG2335-1 DVG (HVLC) System</u>

Pulping process HVLC vent gases are collected from the brown stock system, oxygen delignification system, and digester system. The HVLC gases are routed to the Waste Fuel Boiler (primary) or Recovery Furnace (Secondary) for incineration.

Process/Operational

At the time of the inspection, the Waste Fuel Boiler was incinerating DVGs. The DVG source group emissions are routed to the Waste Fuel Boiler and Recovery Furnace in a closed-vent system. Records are kept of excess emissions and reported in the MACT S semiannual compliance reports.

Monitoring/Recordkeeping

An inspection plan for the HVLC system is maintained. This plan is covered under the LDAR-04 Inspection & Repair Procedures (Rev. 3/14/2023). Records were provided of monthly inspections performed on the DVG system for 2023 to-date.

Reporting

A review of the first 2023 semiannual MACT S compliance and deviation report notes several deviation occurrences between the dates 1/1/23 to 6/30/23 where HVLC gases were vented to

the atmosphere due to equipment issues. The total venting time was 0.11% of the semi-annual operating time, which is within the 1% of semi-annual operating time allowance specified in MACT S.

FGBBKRAFT-1 Kraft Mill Subpart BB Systems

Kraft mill Subpart BB systems flexible group regulated under 40 CFR Part 60, Subpart BB, applicable to the following associated emission units: Chip Bin, Digester System, Digester Blow Tank, Brown Stock Washers, Evaporator System, Hotwell, and Condensate Stripper. Vent gasses from EU0204-1, EU0765-1, EU0766-1 and EU0767-1 are collected in the CVG System (FG2334-1) and incinerated in the Lime Kiln or Waste Fuel Boiler. Vent gasses from the EU0203-1, EU0205-1 and EU0368-1 are collected in the DVG System (FG2335-1) and incinerated in the Waste Fuel Boiler or Recovery Furnace.

Emission/Material Limits

NSPS Subpart BB contains a TRS emission limit for the associated emission units and compliance is demonstrated through inspections of the closed vent system, The emission limit is only applicable when the gases are not being combusted in either the Lime Kiln, Waste Fuel Boiler, or Recovery Furnace.

The flexible group also contains a material limit for pulp of 1786 tons per day and 638,970 tpy. Compliance with these material limits is demonstrated through keeping daily and 12-month rolling time period basis records of the tons of pulp produced.

Process/Operational Restrictions

All exhaust gases from the Condensate Stripper, the Digester System, Digester Blow Tank, and Evaporator System are routed to either the Lime Kiln, Waste Fuel Boiler, or Recovery Furnace for incineration.

Monitoring/Recordkeeping

Billerud maintains records of the amount of pulp produced on a daily, monthly, and 12-month rolling time period basis. The records reviewed show the 12-month rolling pulp production staying below the 638,970 ton per year limit. Through July 2023, the 12-month rolling digester tons was 451,779 tons of pulp.

FGBLEACH-1 Bleach and Extraction Stages

The units in FGBLEACH-1 are used to whiten brownstock pulp. Bleached and washed pulp is stored in hardwood pulp storage chests prior to being used on the paper machine or converted to dried pulp. Emission units included in this flexible group include EU0508-1 (Bleach Plant Process), EU0513-1 (Extraction Stage Tower), EU0514-1 (Extraction Stage Washer and Filtrate Storage). Emissions are treated in the D stage scrubbers.

Emission/Material Limits

The emission units in this flexible group are subject to TGNMO emission limits. Compliance with these emission limits is demonstrated through monitoring scrubber liquid inlet flow rate and gas scrubber effluent pH. Fan operation is measured and recorded as an indicator of gas scrubber vent gas inlet flow rate.

Testing/Sampling

Testing of EU0508-1 against the outlet concentration of 10 ppmv or less of total chlorinated HAP lasted occurred in July 2020. The results showed an outlet concentration of 0.0 ppm.

Monitoring/Recordkeeping

Billerud has a CMS for monitoring and recording the gas scrubber liquid inlet flow rate and effluent pH in the bleach plant process group. An inspection plan for the bleach plant system is maintained. This plan is covered under the LDAR-04 Inspection & Repair Procedures (Rev. 3/14/2023).

Reporting

A review of the first 2023 semiannual MACT S compliance and deviation report notes there no excess emission occurrences between the dates 1/1/23 to 6/30/23.

<u>FGSOLIDFUEL-1 Solid Fuel Processing and Transfer</u>

This flexible group addresses coal and hogged fuel processing and transfer. The emission units include EU1125-1 Coal Crusher/Unloading and Handling, EU1127-1 Fuel Hogging Operations, and EU1137-1 Hogged Fuel/Coal Transfer.

Emission/Material Limits

Each emission unit in the flexible group is subject to PM and VE emission limits. Compliance with these emission limits is demonstrated through non-certified visible emission checks and the monitoring and recording of the differential pressure of the baghouses.

Process/Operational Restrictions

It was observed during the inspection that EU1125-1, EU1127-1, and EU1137-1 were all equipped with a baghouse. Only EU1127-1 was in operation at the time of the inspection. No visible emissions were observed.

Design/Equipment Parameters

Each baghouse is equipped with a device to monitor the differential pressure.

Monitoring/Recordkeeping

Records were provided for March and June 2023 showing the differential pressure for each baghouse in FGSOLIDFUEL-1 being recorded on a daily basis and visible emission checks being performed weekly.

Reporting

A review of the first semiannual compliance and CAM reports for 2023 notes there were no deviations reported for FGSOLIDFUEL.

<u>FGQ41STARCH-1 Starch Handling</u>

Starch is unloaded, stored and transferred for use on the paper machine. Three baghouses are used to control emissions.

Emission/Material Limits

FGQ41STARCH-1 contains PM and VE emission limits for each of the baghouses. Compliance with these emission limits is demonstrated through performing weekly non-certified visible opacity observations as indicator of proper operations.

Monitoring/Recordkeeping

The facility maintains records of weekly non-certified opacity observations when the baghouses are in operation. Records were reviewed for the months April and July of 2023.

Reporting

A review of the first semiannual compliance and CAM reports for 2023 notes there were no deviations reported for FGQ41StARCH-1.

FGCIRICEMACT-1

40 CFR Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE), located at a major source of HAP emissions, existing emergency, compression ignition (CI) RICE less than 500 brake HP. This flexible group includes EU22CI001-1 (fire pump engine).

Monitoring/Recordkeeping

Billerud is required to keep records of the maintenance conducted on the fire pump engine and the total number of operating hours. A spreadsheet was provided that notes each time the fire pump engine was operated for the period 01/01/2022 through 12/31/2022. The reason for operation is also provided. For 2022, the fire pump engine operated a total of 42.2 hours for maintenance and readiness testing. At the end of 2022, the fire pump engine had a total of 392.9 hours.

A maintenance checklist was provided for 2022 that notes major service and inspections performed on the fire pump engine. The 2022 maintenance record is dated for 9/22/22. The maintenance record provides a checklist for the inspection and maintenance performed on the fuel system, cooling system, intake and exhaust system, lubrication system, and overall operational status. The 2022 record notes the engine oil and filter were changed.

FGSIRICEMACT-1

40 CFR Part 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE), located at a major source of HAP emissions, existing spark ignition RICE less than or equal to 100 brake HP. This flexible group includes EU09SI001-1 (Lime Mud Storage Tank Auxiliary Gas Engine), EU09SI002-1 (Lime Kiln Auxiliary Gas Engine), EU23SI001-1 (Admin Computer Room Backup Generator).

Monitoring/Recordkeeping

Billerud is required to keep records of the maintenance conducted on EU09SI001-1, EU09SI002-1, and EU23SI001-1, along with the total number of operating hours. A spreadsheet was provided that notes each time the engines were operated during 2022. The reason for operation is also provided.

EU09SI001-1 operated for a total of 1.7, EU09SI002-1 operated for a total of 80.2 hours, and EU23SI001-1 operated for a total of 17.2 hours during 2022. Preventative maintenance worksheets were provided for 2022. The worksheets note the lubrication system, hydraulic systems, and general operation were inspected and parts replaced as needed, including checking engine oil and filter.

FGNSPSSSIICE-1

This flexible group contains requirements of the New Source Performance Standards (NSPS) for Stationary Spark Ignition Internal Combustion Engines (SI-ICE), 40 CFR Part 60, Subpart JJJJ, emergency SI ICE greater than 25 HP manufactured on or after 1/1/2009. EU12SSl001-1 (41 Computer Room Backup Generator) — USEPA certified to 40 CFR 1048, natural gas emergency engine 176 HP; engine manufacture date: 4/15/2010; installation date: 12/15/2011.

Monitoring/Recordkeeping

EU12SSI001 is an EPA certified engine (Certificate Number GNX-LSI-10-03). A spreadsheet was provided that notes the date, reason for operation, hour meter reading, and hours of operation on each date. For 2022, the engine operated a total of 45.3 hours. Reasons for operation were noted. Billerud performs annual oil changes on the engine. An oil change was completed on 12/28/22 for the engine. Preventative maintenance records were provided for 2022. The maintenance worksheets show the engine is being properly inspected and maintained.

FGPULPINGMOD-1

Emission units affected by the NSR reform rules for using baseline actual emissions and future projected actual emissions to provide a determination of project-related emissions increases for the modified and affected emission units. The modified and affected emission units from PTI No. 99-20B include: EU0815-1 Chemical Recovery Furnace, EU0816-1 Smelt Dissolving Tank, EU0917-1 Lime Kiln, EU1121-1 Waste Fuel Boiler, EU1227-1 Paper Machine, EU1227-1 Paper Machine Coater Dryers, EU1882-1 Pulp Dryer, EU0407-1 White Liquor Oxidation System, FGBLEACH-1 Bleach and Extraction Stages, EU0610-1 ClO2 Generating Plant, EU0611-1 Methanol Storage Tank, and EU0819-1 Slaker.

Monitoring/Recordkeeping

A spreadsheet was provided that shows the monthly and 12-month rolling SO2 and VOC emissions from the modified and affected emission units in PTI No. 99-20B. A review of the 12-month rolling SO2 and VOC emissions for 2022 through July 2023 show the emissions remaining under the baseline actual from the "Actual to Projected Actual" applicability test in PTI No. 99-20B.

Compliance

Based on the inspection performed and records reviewed, Billerud Quinnesec appears to be in compliance with MI-ROP-B7192-2020b, PTI No. 99-20b, and all other applicable state and federal air quality regulations.

NAME _____ DATE 9/18/2023 SUPERVISOR _____