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

B719259518

FACILITY: VERSO QUINNESEC, LLC		**SRN / ID:** B7192
LOCATION: W-6791 US HIGHWAY 2, QUINNESEC		**DISTRICT:** Marquette
CITY: QUINNESEC		**COUNTY:** DICKINSON
CONTACT: PAULA LAFLEUR , ENVIRONMENTAL ENGINEER (12/2017)		**ACTIVITY DATE:** 05/25/2021
STAFF: Michael Conklin	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Targeted inspection for FY 21.		
RESOLVED COMPLAINTS:		

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

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

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

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

The Verso Corporation Quinnesec Mill (Verso 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. Verso 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.

The Quinnesec mill was built in 1981 by Champion International Corporation. Champion International was purchased by International Paper Company (IP) in 1999. Verso Paper subsequently purchased the Mill from IP in 2006. The Mill initially underwent PSD permitting in 1981 and has undergone other PSD modifications since that date. The 1981 PSD permitting project established the minor source baseline date for SO2 and PM10. The Mill's Recovery Furnace was constructed in 1985 by Babcock and Wilcox. A 1989 PSD modification, which was permitted in 1993, to the Recovery Furnace established the minor source baseline date for nitrogen dioxide (NO2). During the past 10 years, the Mill has been issued Permit-to-Install (PTI) permits for minor NSR permitting projects at the Mill.

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.

Verso 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 Verso 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. Verso 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 CVG are equivalent to low volume high concentration (LVHC) gases and the DVG are equivalent to high volume low concentration (HVLC) gases. A closed vent system is used to collect CVG 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 DVG from the brownstock washer and the O2 delignification system as well as several process storage tanks.

Emissions Reporting

Verso 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 2020.

Pollutant	Amount (lbs)
CO	1421695.72
NOx	2201202.84
PM10, Filterable	268786.91
PM10, Primary	8615.71
PM2.5, Filterable	156237.48
PM2.5, Primary	6182.10
SO2	433043.60
VOC	137051.05

Compliance History

There have been no violations at the facility since the last inspection that occurred in 2018.

Regulatory Analysis

Verso 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). In addition, Verso Quinnesec is also 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. The Verso Mill currently operates under Renewable Operating Permit (ROP) No. MI-ROP-B7192-2020.

Verso Quinnesec is also subject to NSPS and MACT federal regulations.

Inspection

An on-site inspection was performed on 05/25/2021 to verify compliance with MI-ROP-B7192-2020 and monitor RATA testing for the chemical recovery furnace, waste fuel boiler, package

boiler, and lime kiln. The facility representative was Paula LaFleur, Environmental Engineer for Verso Quinnesec. The inspection began by collecting operational data on the emission units undergoing RATA testing at the time. While on-site, RATA(s) were being performed on the recovery furnace (EU815-1) and lime kiln (EU0917-1). The recovery furnace was showing a steam production rate of 556 KPPH and the lime kiln production was reading 676 tons/day. Matt Karl (EGLE) was also on-site to monitor RATA testing. From operations observed, testing was conducted in accordance with all protocols and preliminary results were showing a relative accuracy for all measured pollutants within 20% of the reference method.

RATA testing was not able to be completed for the day on the lime kiln, however, due to an unexpected failure on the lime conveyor. This issue caused a bottleneck in the lime recovery process forcing the lime kiln to shutdown and be emptied. The emptying of the kiln caused a temporary fugitive dust issue due to the contractor performing the work not following proper procedures for the removal process and the material being conveyed out too quickly, according to Verso. The incident lasted for 1-hour before a supervisor noticed the fugitive dust issue. Corrective actions included having internal meetings with the contractor and putting together SOPs to reduce the chance of re-occurrence. A request was made to update the fugitive dust plan for the facility with the new SOPs and if there will be any additional controls added during the process of emptying the lime kiln in the future. An updated fugitive dust plan was provided on 6/4/2021 and was determined to be acceptable.

Next, a tour of the targeted emission units for inspection occurred. Emission units reviewed for compliance as part of this inspection includes the following: Chip Bin (EU0203-1), Digester System (EU0204-1), Digester Blow Tank (EU0205-1), Brown stock Washers (EU0368-1), White Liquor Oxidation System (EU0407-1), O2 Delignification System (EU0460-1), Bleach Plant Process (EU0508-1), Bleach Plant Process Extraction Tower (EU0513-1), Bleach Plant Process Extraction Washer and Filtrate Storage (EU0514-1), Methanol Storage Tank (EU0611-1), Evaporator System (EU0765-1), Hotwell (EU0766-1), Condensate Stripper (EU0767-1), Chemical Recovery Furnace (EU0815-1), Smelt Dissolving Tank (EU0816-1), Lime Kiln (EU0917-1), Slaker (EU1019-1), and Pulp Dryer. Following the inspection, a records request for records required to be maintained in the ROP was sent on 6/1/2021 and all records were provided by 6/10/2021.

EU0407-1 White Liquor Oxidation System

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 the period 01/01/2021 through 05/1/2021. The records provided show proper operation of the demister by having no visible emissions observed from the oxidizer stack.

EU0611-1 Methanol Storage Tank

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

SC I.1-2, II.1, III.1, VI.1

The methanol emission limits are practically enforceable through the monitoring and recording of the amount of methanol transferred into the storage tank. The facility has a limit of 600,000 gallons per 12-month rolling time period. Records were provided showing quantities of methanol that are transferred into the tank. Each transfer appears to be 43,100 lbs. Records were also provided of the fill rate. The records show a fill rate for each day spot checked of under 100 gal/min.

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.

Emission/Material Limits

The recovery furnace has emission limits of HCl, H2SO4, TRS based on H2S, TCDD Toxic Equivalent (2,3,7,8-tetra-chlorodibenzo-p-dioxin), PM2.5, PM10, PM, SO2, NOx, CO, VOC, Lead, and TGNMO measured as total methane. 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 4.44 million pounds per operating day and 755,000 tons per year based on a 12-month rolling time period. Compliance with these material limits is demonstrated through recordkeeping.

Process/Operational Restrictions

During startup and shutdown of the recovery furnace, CO emissions shall not exceed 1000 ppmv on a dry gas basis at 8% O2, based on a 12-hour average. Compliance with this limit is determined using the CEMS for CO. At the time of the inspection, the CEMS monitor for the recovery furnace showed a last logged average of 36.5 ppmv during startup and 169 ppmv during shutdown. The smelt dissolving tank scrubber and mist eliminator were operating while the recovery furnace was in operation. During the inspection, the recovery furnace and ESP appeared to be operating properly.

Testing/Sampling

Performance testing for SO2, NOx, CO, HCl, Sulfuric Acid, TRS, TCDD, and TGNMO on the recovery furnace has not occurred for this ROP renewal period. Verso is currently in the process of obtaining a PTI for a proposed project to increase pulp production and BLS firing. Verso is targeting to complete most of the project in Spring of 2022. Performance testing for these emission limits will likely occur following project completion.

Performance testing for the PM 0.44 gr/dscf at 8% oxygen limit was performed on 9/15/2020. The average emission rate during the performance test was 0.016 gr/dscf at 8% oxygen. Testing for the PM emission limit is next required by 9/15/2025.

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 of opacity defining proper operation of the ESP 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. Opacity is determined at the exhaust of the recovery furnace to the main stack.

A review of the 2020 fourth quarter and 2021 first quarter excess emission reports show a total of ten 6-minute average opacity events greater than 35% during the 2020 fourth quarter and a total of five 6-minute average opacity events greater than 35% during the 2021 first quarter. These events were due to the precipitator transformer rectifier (TR) issues and trips. Corrective actions involved reducing liquor flow to the Recovery Boiler and restoring power to the tripped TRs.

Verso will be undergoing precipitator improvement projects during the Verso's outages in 2021 and 2022.

The Recovery Furnace also contains a continuous emission monitoring system (CEMS) for the TRS concentration emission limits. A review of the 2020 fourth quarter and 2021 first quarter excess emission reports show no excess emissions reported over the emission limits.

Records were provided of the recovery furnace opacity and TRS emissions for 04/01/2021 and 04/02/2021. Compliance with the PM concentration emission limits if demonstrated through opacity monitoring. For 04/01/2021 and 04/02/2021, the daily average opacity measurements were 17% and 17.8%. Records were also provided of CEMS data for the 24-hour, 12-hour, and 2-hour TRS concentration emissions for these dates.

Compliance with the concentration limits (ppmv) of SO2, NOx, CO, and TRS is demonstrated with the CEMS. The CEMS data for these pollutants is also used to calculate 12-month rolling emission rates. For the period January 2020 through April 2021, the 12-month rolling emission rates for NOx, CO, TRS, and SO2 stay below the 12-month rolling limits. During the inspection, the CEMS for the recovery furnace was showing emission rates of 1.4 ppm TRS/O2, 0.0 ppm SO2/O2, 94.2 ppm NOx/O2, and 6.0 ppm CO/O2.

The facility is also required to maintain 12-month rolling emission rates for H2SO4, H2S, PM2.5, PM10, PM, VOC, and lead. CEMS are not used for these pollutants and the facility uses stack test emission factors for pollutants that are tested. Verso supplied records of calculating 12-month rolling emission rates for these pollutants by taking an average of the most recent stack test emission factors. For 2019 through August 2020, the filterable PM emission factor (lb/ton) was an average of the 2011 and 2017 tests. From September 2020 and forward, the emission factor is an average of the 2017 and 2020 tests.

In reviewing 12-month rolling emission rates for pollutants where source specific stack test emission factors are available, the AQD believes using the most recent stack test emission factor, from the month the test occurred and going forward, is most representative of the source's current operations, condition of equipment, and control efficiency. A review of the 2020 compliance and deviation reports, show there being many deviations reported relating to the Recovery Furnace ESP that caused opacity (indicator of PM emissions) exceedances throughout 2020. Many of these issues had to do with TR trips, along with precipitator ash buildup and airlock feeder malfunctions. It was noted there were new procedures put in place for precipitator shell heater operation to prevent future trips and new TR sets upgraded. Also noted in the reports were improvements made to optimize exhaust flow through the precipitators during the mill's May 2020 maintenance outage. Based on a review of these reports and the increased PM

emissions results comparing historic tests, the most recent (September 2020) PM stack test emission factor is believed to be most representative of the current operations and condition of the equipment. Averaging emission factors from prior test results, and there being changes in the overall efficiency and condition of the equipment, is not a fair representation of emissions from current operations.

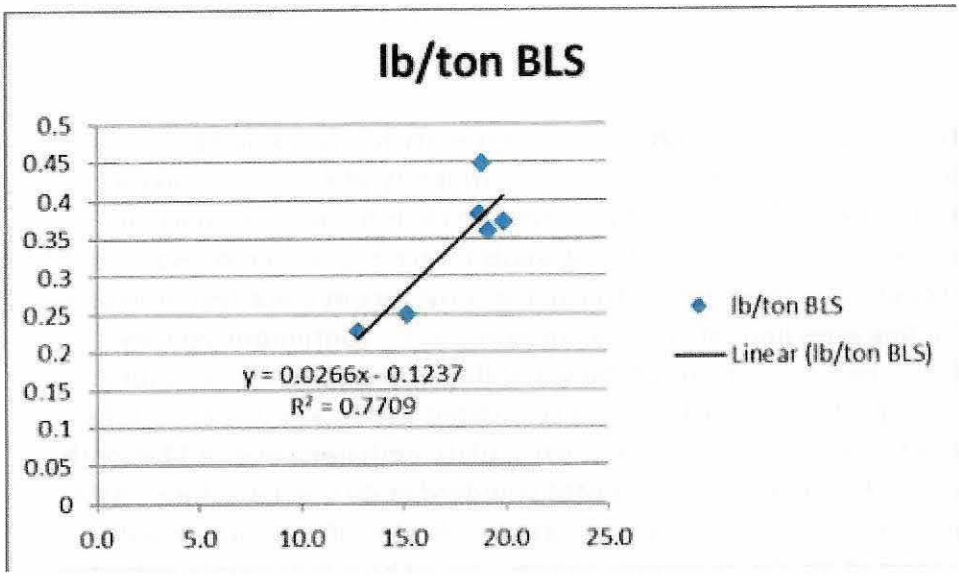
After reviewing the original 12-month rolling emissions spreadsheet Verso provided, a request was made to provide updated records for 12-month rolling emission rates using emission factors starting from the month of the most recent stack test and going forward until a new test occurs. Verso provided an updated spreadsheet using emission factors from the most recent stack test to the month of a new test occurred. In doing so, Verso begins exceeding the 12-month rolling PM emission limit in April 2021.

Verso responded with stating that using the 09/15/2020 stack test emission factor is not representative of normal operations and does not consider the variability of emissions over a specific time period. Verso stated the 2020 MACT II PM emission factor is higher than normal operations due to ESP issues and testing at higher operating loads than normal. Verso also stated they were never aware of, nor required in their permit to use the most recent stack test emission factor in calculating 12-month rolling emission rates. Verso believes using continuous opacity monitoring data from the CEMS is a better indicator of the variability of particulate over a long period of time as compared to a single test. Opacity can be correlated with stack test emissions data and a slope can be developed to accurately represent particulate emissions over a 12-month period at various levels of opacity. The NESHAP Subpart MM standard at 40 CFR 63 Subpart MM requires continuous monitoring of recovery furnace opacity as an indicator of compliance with the particulate limit of 0.044 gr/dscf @ 8% O2, therefore opacity should be a reasonable indicator of particulate emissions.

Verso provided a third version of the recovery furnace 12-month rolling emission rate spreadsheet that uses COMS data and stack test results to create a monthly emission factor based on the monthly average stack opacity from the COMS. The spreadsheet provides a correlation between PM stack test emission rates and stack opacity at the time of testing. Six stack test data points were used in creating the linear plot of PM (lb/ton) emission factor and stack opacity. The plot provides a linear equation of $y = 0.0266x - 0.1237$ with an R^2 value of 0.7709. The plot data is outlined below.

Date	opacity	gr/dscf @ 8%	lb/ton BLS	tons/hr BLS
3/24/2011	12.8	0.0093	0.228	87.0

8/24/2017	15.2	0.0097	0.250	83.5
8/6/2019	19.9	0.0129	0.372	89.5
8/6/2019	19.1	0.0125	0.359	87.5
8/6/2019	18.7	0.0126	0.382	85.1
9/15/2020	18.8	0.0159	0.449	85.1



This equation is then used to calculate the monthly PM emission rate (y) by using the monthly average stack opacity (x) from the COMS. Using this approach to calculate the monthly PM emission rates and the 12-month rolling emission rates, the spreadsheet shows the 12-month rolling PM emission rates increase from 2019, and as of July 2021, the 12-month rolling total is 122.15 tpy. Verso believes this method of calculating monthly PM emission rates is more accurate than having to use a single stack test emission factor over a 12-month period.

The AQD finds this method of calculating the monthly PM emission rates from the recovery furnace acceptable. The facility is using opacity as an indicator of PM emissions with MACT MM. Verso has provided a correlation between stack test emission results and opacity to produce monthly emission factors in calculating monthly PM emission rates. The facility also does not have recordkeeping language currently in the permit to require using the most recent stack test emission factor in calculating 12-month rolling emission rates.

Filterable PM10:PM and filterable PM2.5:PM ratios from NCASI are used in calculating PM10 and PM2.5 emission factors. For the period January 2020 through April 2021, the 12-month rolling emission rates for PM, PM10, PM2.5, H2SO4, VOC, and lead stay below the 12-month rolling limits.

Verso is required to also monitor and record the amount of fuel combusted daily and the black liquor solid (BLS) usage rate on a daily basis. In addition, the facility is required to maintain 12-month rolling records of the amount of natural gas, BLS, salt cake and ESP hopper materials fired in the recovery furnace. During the inspection, the control system for the recovery furnace was showing a BLS flow rate of 168.29 kpph. The amount of fuel flow into the recovery furnace is monitored and recorded continuously from the control system. From records reviewed, the total 12-month rolling tons of BLS, including saltcake and ESP hopper solids, remains under the 755,000 tons. The natural gas usage in the recovery furnace is under the 793.55 MMCF per year limit.

Reporting

A review of the 2020 annual compliance and deviation reports show a total of 13 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. New procedures have been put in place for the precipitator shell heater operation to prevent future trips due to excessive shell heater power consumption. Also, several precipitator TR sets were upgraded in the first quarter of 2020 to improve reliability and collection efficiency. There were also improvements made to optimize exhaust flow through the precipitators during the facility's May 2020 maintenance outage.

Stack/Vent Restrictions

SV08-ST-004-001 appeared to be at least 299 feet above ground and have a maximum diameter of no more than 168 feet.

Other Requirements

Verso is required to maintain records of startup and shutdown that includes dates, starting time, ending time, and CO emission rates during this time period. A recovery furnace downtime report was provided for the dates 01/01/2020 through 05/31/2021. During this reporting period there were a total of 12 incidents where the recovery furnace was shutdown and then restarted. CO emission rate records were provided for the 05/01/2021 through 05/11/2021 shutdown and startup. During the shutdown process, the highest hourly CO emission rate was 320 ppm. On 05/11/2021, during recovery furnace startup, the highest hourly CO emission rate was 181 ppm.

As noted above, the facility maintains records of fuel rates and hourly steam load. Verso is also required to maintain records of voltage and amperage supplied to all the fields and chambers of EU0815-1's ESP, along with time periods of one chamber operation of the ESP. Records of the hourly firing rate in the recovery furnace along with the volts and amps in each TR set of the ESP were provided for the dates 09/30/2021 and 01/31/2021 as examples.

EU0816-1 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 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 183 gpm and the scrubber differential pressure was 3.38 in WC. The fan for the scrubber was reading 95% of full load amps. The bypass was closed, and exhaust was being routed through the scrubber.

Testing/Sampling

Testing for H2S, TRS, PM, PM10, SO2, and TGNMO emission rates has not yet occurred for this ROP renewal period. Testing for these pollutant emission rates from the smelt dissolving tank last occurred in 2017.

Testing for PM against the 0.107 lb/ton BLS (dry) and 8.5 pph limits last occurred in September 2020. The smelt dissolving tank passed these emission limits with an average emission rate of 0.087 lb/ton BLS and 7.7 pph.

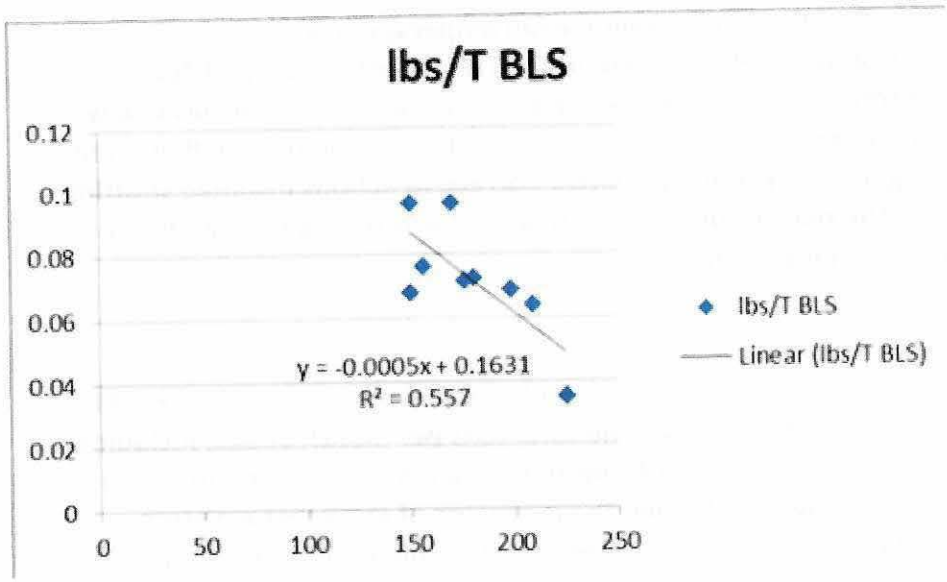
Monitoring/Recordkeeping

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. A review of the second 2020 semiannual (7/1 – 12/31) shows a total of 3 hours where the scrubber fan amperage was below 60 amps and 9 hours where the scrubber flow was below 150 gpm. The reason for low flow to the scrubber was nozzles became plugged during a pump switch. Corrective actions included shutting down the scrubber briefly to clear. The reason for low fan amperage was during the period the scrubber was shutdown to address the plugged nozzle.

Verso 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. Similar to the recovery furnace, the records first provided showed the averaging of stack test emission factors for calculating 12-month rolling emission rates. A request was made to Verso to update the spreadsheet with 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. Verso provided the data below in plotting the lb/ton BLS stack test emission factors and the scrubber liquid flow rate (gpm).

Date	Flow (gpm)	lbs/T BLS
8/6/2004	150	0.068
3/29/2011	225	0.035
8/29/2017	180	0.072
8/7/2019	156	0.076
8/7/2019	176	0.071
8/7/2019	209	0.064
9/16/2020	198	0.069
9/17/2020	150	0.096
9/18/2020	170	0.096



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 as of August 1, 2021, the 12-month rolling PM emissions from the smelt dissolving tank are 23.85 tons. Filterable PM10:PM and filterable PM2.5:PM ratios from NCASI are used in calculating PM10 and PM2.5 emission factors. For the period January 2020 through April 2021, the 12-month rolling emission rates for PM, PM10, PM2.5, H2SO4, VOC, and lead stay below the 12-month rolling limits.

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 2020 CAM Excursion Summary and Monitor downtime reports note the smelt dissolving had nine 3-hour rolling average periods where the scrubber flow was less than 150 gpm. On 10/25/20, for a period of 6 hours and 15 minutes the scrubber flow was less than the MACT II established compliance limit of 150 gallons/minute. The cause was plugged scrubber liquid nozzles from debris cleaned from scrubber recirculation line during a maintenance outage. Corrective actions included taking the scrubber out of service and opening the bypass intermittently. On 10/30/20, the smelt dissolving tank scrubber fan tripped during startup and was bypassed for 10 minutes. There was low flow of liquor to the recovery furnace during this period. The fan was reset and restarted without further issue.

<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 methanol, TRS based on H2S, CO, NOx, PM, 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 676.1 tpd and the natural gas flow rate was 1719.9 scfm. The CEMs was providing a real time TRS/O2 ppm @ 10% O2 average of 3.6 ppm 1-hour, 4.9 ppm 12-hour, and 4.6 ppm 24-hour.

Testing/Sampling

Performance testing for methanol, TRS, CO, NOx, PM, SO2, and TGNMO last occurred in 2017. The lime kiln passed for all emission limits tested against.

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

Verso 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. An example daily record was provided for March 10, 2021. The record notes the 3-hour rolling average

scrubber flow rate throughout the day was over 390 gpm and the scrubber differential pressure was over 33 in. H20.

Verso monitors and records the lime production from the kiln. As of April 2021, the 12-month rolling lime production from the kiln is 111,439 tons.

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

Reporting

A review of the 2020 annual compliance and deviation report show one deviation reported for the lime kiln. On 6/13/20, the lime kiln scrubber flow was less than the MACT II lower established limit of 400 gallons/minute. This was due to a combination of low pump speed and low level in the scrubber slurry tank. The duration of the deviation was three 3-hour rolling average periods of scrubber flow rate. Corrective actions included increasing the scrubber flow to correct the problem.

Verso also submits semiannual MACT II Excess Emissions & CMS Performance and Malfunction reports for the lime kiln. A review of the first semiannual 2021 report shows no MACT II violations.

<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 lime) slurry. The slaked lime curry 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

Verso 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. Example records were provided for the dates 09/30/2020 and 01/31/2021 that show the flow rate being recorded every hour of operation. The average flow rate on 09/30/2020 was 16.8 gpm and on 01/31/2021 it was 20.7 gpm.

Reporting

A review of the 2020 annual and 2021 first semiannual compliance reports show no deviations reported for the slaker.

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.

Monitoring/Recordkeeping

Verso 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. Example records were provided for the dates 09/30/2020 and 01/31/2021. The records show the white liquor caustic flow rate and white liquor caustic concentration every hour. The average flow rate for both days was 30 gpm and the average white liquor caustic concentration is between 96 g/l and 98 g/l.

Reporting

A review of the first 2020 semiannual compliance and deviation report notes several deviation occurrences between the dates 1/1/20 to 6/30/20 where LVHC gases were vented to the atmosphere due to equipment issues. The total venting time was 0.38% of the semi-annual operating time, which is within the 1% of semi-annual operating time allowance specified in MACT I. The second 2020 semiannual compliance and deviation report notes the total LVHC venting time to be 0.16% of the semi-annual operating time.

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 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 1725 tons per day and 572,959 tpy. Compliance with this material limit is demonstrated through keeping daily and 12-month rolling time period basis records of the tons of pulp produced.

Monitoring/Recordkeeping

Verso 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 572,959 ton limit. Also, the daily pulp production appears to be staying below the 1725 ton per day limit.

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

Examples records were provided that show the scrubber liquid inlet flow rate and scrubber effluent pH in the bleach plant process group being monitored with a CMS. The records review show the D stage scrubbers to be operating properly.

Compliance

Based on the inspection performed and records reviewed, Verso Quinnesec appears to be in compliance with MI-ROP-B7192-2020 and all other applicable state and federal air quality regulations.

NAME Michael Cobb DATE 8-26-2021 SUPERVISOR EJL