

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

B287372597

FACILITY: Michigan Sugar Company - Sebewaing Factory		SRN / ID: B2873
LOCATION: 763 N Beck St, SEBEWAING		DISTRICT: Bay City
CITY: SEBEWAING		COUNTY: HURON
CONTACT: Meaghan Martuch , Air Compliance Manager		ACTIVITY DATE: 04/10/2024
STAFF: Benjamin Witkopp	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Facility Inspection		
RESOLVED COMPLAINTS:		

On April 10, 2024, Ben Witkopp of the Michigan Department of Environment, Great Lakes, and Energy - Air Quality Division (AQD) went to Michigan Sugar Company's (MSC) factory located in Sebewaing Michigan. Factory Manager Kevin Romzek, Factory Chemist Jeanette Smith, and MSC Air Compliance Manager Meaghan Martuch were present for MSC. The facility is covered by renewable operating permit (ROP) MI-ROP-B2873-2019. The facility extracts sugar produced by sugar beets. Molasses and beet pulp are additional co-products. The beet pulp is sold as pressed or in pelletized form. Spent lime from the process is sold as a soil enhancement.

MSC operations are seasonal as the processing is conducted during "campaigns" which typically run from mid August through mid March. The final step is the "juice campaign" after the slicing and beet processing is done. The unprocessed juice which remains is processed into sugar. The sugar itself can be handled, packaged, etc. at any point during the year. A large beet harvest during the past growing season has caused the slicing campaign to be completed in mid April.

LIME KILN

The kiln uses coke or anthracite coal for fuel to heat limestone rock. Coke was the fuel in use. Carbon dioxide and calcium oxide are produced by the kiln to be used in beet processing.

There is a fuel sulfur limit of 0.7% by weight. A usage limit is also present in the ROP. It is 5,000 tons per 12 month rolling time period and not an average nor per campaign basis. The highest sulfur content was found to be 0.67 % as received and 0.68% on a dry basis as determined by Mineral Labs, Inc. of Sayersville Kentucky. The sample was taken at the factory location by MSC staff. The highest 12 month rolling time period for usage occurred in February 2023 at 3,086 tons.

Visible emissions readings (non-certified) are to be taken when the kiln is directly venting to the atmosphere. Logs also indicate east or west stack and the operational state. The highest reading found was 13.5% in comparison to the 20% allowed under AQD Part 3 rule 301.

PULP DRYERS

The factory has three pulp dryers. Pulp dryer one and two are contained in a flexible group. Dryer three has its own separate conditions. The use of the dryers is purely

demand driven. If area cattle operations can utilize wet pulp for feed then the demand for dried and pelletized pulp is lessened.

Pulp dryer three has a hourly limit per campaign year, not calendar year. The campaign year restriction is 6,240 hours. Records through February were checked since the campaign was ending. The campaign had 2,578 hours of operation logged. The dryer also has a limit of 1,032 hours during ozone season which is defined as May 1 through September 30. Only 116 hours of operation were logged during ozone season. There are limits on volatile organic compound (VOC) and carbon monoxide (CO) emissions. The limits are 245 and 442 tons per year (tpy) respectively based on a 12 month rolling time period. The records from 2023 to date were requested and provided later. The values were checked and found to be 37.4 and 145.47 tons for VOC and CO respectively which both occurred in January 2023. The values are well below permitted levels.

The dryer also has a particulate (PM) limit in terms of pounds per thousand pounds of stack gas. Compliance is sought through proper operation of control devices and periodic stack testing. A multicyclonic collector is used to control particulate emissions. The pressure drop across the collector is to be maintained between one to nine inches of water per the Malfunction Abatement Plan (MAP) and the Compliance Assurance Monitoring (CAM) plan. Pulp dryer three is also equipped with a flue gas recirculation system which is to be maintained between 5,000 and 19,000 cubic feet per minute per the plans. The pressure drop was typically between 4 and 6 inches while the flue gas recirculation rate was 11,000 and 12,000 cfm. Lastly, dryer three has a sulfur dioxide (SO₂) limit. However, the SO₂ would result when / if the unit is burning fuel oil. Fuel oil is not being used.

Dryers one and two are contained in a separate flexible group in the ROP. There is a particulate limit in terms of pounds per thousand pounds of stack gas. They also have a SO₂ limit that only applies when burning fuel oil. Fuel oil is not being used. Compliance is sought through proper operation of control devices and periodic stack testing. Like dryer three, each unit is equipped with a multicyclonic collector to control particulate emissions. The pressure drop across the collector is to be maintained between one to nine inches of water per the MAP and CAM plan. The dryers are also equipped with a flue gas recirculation system which is to be maintained between 5,000 and 19,000 cubic feet per minute per the plans. The pressure drop was typically between 6 and 8 inches while the flue gas recirculation rate for the units was usually 6,000 cfm.

The time period stated in the ROP for the SO₂ limits for all of the dryers is not found in AQD rule 402 and would require a means of verification to occur hourly. There is also a requirement to calculate the acceptable sulfur content as a means of demonstrating compliance. The requirement in the permit states the basis is to be on a pounds per million btu heat input basis and appendix 7 is referenced for the calculation. However, appendix 7 then presents the calculation resulting in the sulfur as % sulfur. Records were not requested given the existence of the conflict and due to oil not being used as a fuel. The various conflicts between what is stated within the ROP itself indicates a close review of the ROP in its upcoming renewal is needed.

FGBOILERS

The flexible group consists of the east (2) and west (3) Wickes boilers. The boilers are coal fired spreader stoker units. Emissions from each boiler are controlled by multiclones. Each boiler has two sets of multiclones. Subsequent to the multiclones the exhaust is combined and controlled by a high efficiency venturi scrubber and a wet electrostatic precipitator (WESP). The venturi and WESP were installed to meet the requirements of the Boiler National Emission Standards for Hazardous Air Pollutants (NESHAP) Maximum Achievable Control Technology (MACT) regulations found in 40 CFR part 63 subpart DDDDD, hereinafter Boiler MACT.

The boilers have two emission limits on them as a result of having obtained an air use permit that is contained in the ROP. Compliance with the PM limit is sought by monitoring proper operation of control equipment. Compliance with the sulfur dioxide (SO₂) limit is based upon fuel sampling.

Readings of various control device parameters have been included in the boiler operational logs. The acceptable pressure drop range across the multiclone units is specified as one to six inches of water column in the ROP. Review of records found pressure drops within range. The values were also checked in the boiler control area. The live reading for boiler two east multiclones was 3.5 inches. Boiler two's west units were 3.6 inches. The live readings for east and west units of boiler three were 3.2 and 3.5 inches respectively.

The boilers have emission limits of 0.45 pounds of particulate per 1,000 pounds of stack gas and 2.50 pounds of sulfur dioxide (SO₂) per million btu's heat input (based on a 24-hour period). The 24-hour time period is questionable as it would necessitate hourly sampling, calculations, etc. The current ROP requirement to collect a representative coal sample once per campaign for independent analysis was being met. There is a requirement to calculate the acceptable sulfur content. The requirement in the permit states the basis is to be on a pounds per million btu heat input basis and appendix 7 is referenced for the calculation. However, appendix 7 then presents the calculation resulting in the sulfur as % sulfur. Records were not requested given the existence of the conflict. The various conflicts between what is stated within the ROP itself indicates a close review of the ROP in its upcoming renewal is needed. The situation is similar to that found for the pulp dryers. The typical sulfur content on a dry basis was between 0.6 and 0.68 %. BTU content per pound ranged between 13,000 and 13,900. Table 41 in the AQD part 4 rules would have a limit of 1.5%. The SO₂ limit stated in the permit is 2.5 pounds per million BTU's heat input and it lines up with the 1.5% in the AQD table 41. Given the sulfur content of the coal being less than 0.7 and the heat values nearing 14,000 btu's per pound, a simple proportion check indicates no problems with SO₂ emissions.

FGSTOKERBLRS-5D

Control devices were added to the existing multiclones to meet the Boiler MACT requirements for coal fired boilers two and three. The Boiler MACT is found in 40 CFR Part 63 subpart DDDDD. A venturi scrubber and WESP were installed in series after the multiclones exhaust was combined. The multiclone performance was previously discussed under FGBOILERS. A significant amount of time was spent reviewing the federal requirements in relation to MSC practices.

FGSTOKERBLRS-5D (operational limits / parameters / continuous compliance)

Live data was checked in the operating area. Pressure drop across the venturi scrubber was 26 inches of water. Water flow in the center was 406 gallons per minute (gpm). The WESP instantaneous total power ranged in the mid 20s kilowatts (KW). Combined steam flow was approximately 115,000 pounds per hour. These values are above the lowest of those found in the most recent performance testing for PM, e.g. 22.1 inches of water for scrubber pressure drop, 437.5 gpm for scrubber flow, and 5.1 KW for total secondary power. Maximum steam flow limit was calculated to be 159,104 pounds per hour, however, that could not be verified at this point as discussed below.

For reference purposes, the Boiler MACT Appendix Table 4 presents operating limits while Table 7 specifies how to establish them. Boiler MACT Appendix Table 8 then directs the means to demonstrate continuous compliance.

The company states that performance testing (a.k.a. stack testing) is the means used to demonstrate compliance with the Boiler MACT emission limits. Keep in mind the stack testing occurs in a single stack since the emissions from the boilers are combined and routed through a series of control equipment. If the emissions limits are met, then Table 7 of the Boiler MACT provides the means for establishing an operating limit resulting from the testing. Operating limits are intended to provide one of the means of ongoing compliance between tests. One must determine the operations highest hourly average of the three run averages during the stack test multiply it by 1.1 (110 percent) as the operating limit for the combined boiler loads. It is felt the steam load operating limit should be on a combined basis as the direct result of the pollutant measurement being taken at a point after which the boiler exhausts have been combined. The boilers have boiler MACT limits for filterable PM, carbon monoxide (CO), hydrogen chloride (HCl), and mercury (Hg).

Therefore, to ensure compliance with all of the pollutants, it seems the boilers should not operate at a steam load greater than the smallest operating limit.

Individual operating parameters for PM, CO, HCl, and Hg will now be discussed. When using a wet scrubber for PM and Hg control, Table 4, item 1, requires maintaining the 30-day rolling average pressure drop and the 30-day rolling average liquid flow rate at or above the lowest one-hour average pressure drop and the lowest one-hour average liquid flow rate, respectively, measured during the performance test demonstrating compliance with the PM and Hg emission limitation according to 40 CFR 63.7530(b) and Table 7 of the subpart. Because wet electrostatic precipitator technology is employed after the venturi scrubber, Table 4, item 4 b, requires maintaining the 30-day rolling average total secondary electric power input of the electrostatic precipitator at or above the operating limits established during performance testing according to 40 CFR 63.7530(b) and Table 7 of the subpart. The levels recorded on boiler operator logs appeared to be above minimums.

Though the boilers have an HCl limit, the scrubber is not considered a wet acid gas scrubber, by definition as stated in a footnote for Table 4 of the subpart, because no alkaline slurry or solution is used. Therefore, pH measurement and monitoring is irrelevant. The scrubber parameters established for PM and Hg as stated above would also be those that apply to HCl.

The boilers do not have a control device for CO emissions, therefore, control requirements are not listed in Table 4 of the subpart. Rather it discusses oxygen

analyzer systems. Table 4 does discuss units equipped with oxygen trim and refers to 40 CFR 63.7525(a). Since MSC has chosen to equip the boilers with an oxygen trim system rather than install a continuous emission monitoring system, 63.7525(a) becomes relevant. 40 CR 63.7525(a) (7) requires the oxygen trim system be operated with the oxygen level set no lower than the lowest hourly average oxygen concentration measured during the most recent CO performance test as the operating limit for oxygen according to Table 7. The presence of oxygen in the flue gases from boilers 2 and 3 was being tracked during CO testing. Checks of live data showed the % oxygen in boiler two's east and west exits from the multiclones was 13.2% and 13.8% respectively. The corresponding values for boiler three were 13.6% for the east and 13% for the west. The values are nearly double that of the 7.3% stated as being established during the most recent stack testing conducted in December 2023.

It could not be established that 30 day-day rolling averages were employed for either the scrubber or the WESP operating properties. In boiler MACT reports, the company listed the parameters as 24-hour averages rather than 30 day rolling averages as stated in the regulation. It may be a mistake. It should be noted the 24-hour average would be more restrictive. This must be clarified.

Lastly, it should be noted the operational limits / parameters are subject to change based on the results and operational parameters achieved during periodic performance testing.

FGSTOKERBLRS-5D (tune-ups)

For boilers having a heat input capacity greater than 10 MMBTU/hr, the Boiler MACT 40 CFR 63.7540 (a) (10) also requires an annual tune-up (13 months) while burning the type of fuel that routinely provided the majority of the heat input over the 12 months prior to the tune-up. The tune-ups were indeed performed with the boiler burning coal. They were performed September 23, 2023.

FGSTOKERBLRS-5D (stack testing)

MSC has chosen to use stack / performance testing of its coal fired boilers as its means to demonstrate compliance with the Boiler MACT. Stack testing under the boiler MACT allows a variation in time frames depending upon the results of prior testing. If testing is performed and is below limits, but is above 75 % of the limit, then testing must occur again within one year. However, if test results are below 75% of limits, for two consecutive years of testing, then additional testing can be postponed up to 37 months from the date of the last test.

MSC had testing conducted for PM, CO, and Hg on December 20, 2023. HCl was tested the following day. All parameters passed. It should be noted that screened stoker coal was used during the test. Therefore that is the grade and size of coal that should be used in the boiler in the future. However, legacy coal remains on site. This was pointed out as being problematic in the future to Kevin and Meaghan.

FGSTOKERBLRS-5D (reporting)

Specific compliance reports must be submitted on a schedule. The items to be reported are specified per 40 CFR 63.7550. Meaghan and I previously discussed the

reports that had been submitted in the past by MSC. She was instructed to go by the the actual Boiler MACT requirements as ultimately that is what is required by the Federal regulations.

The reports now contain operating parameter limitations, instances of startup or shutdown, etc.

MSC has met the requirements to provide notification of compliance status reports within 60 days after the completion of a relevant compliance demonstration activity. Examples include completion of performance tests.

FG-NATGASBOILERS-5D

Two natural gas fired boilers are contained in the ROP flexible group for Boiler MACT requirements. The CE package boiler is a 100 MMBTU/hr unit while the summer boiler is only a 7 MMBTU/hr unit. The Boiler MACT is found in 40 CFR Part 63 subpart DDDDD.

The basic requirements for gas fired boilers consist of conducting periodic tune-ups. Boilers greater than 5 and less than 10 MMBTU/hr are to have a tune-up every two years (25 months). An annual tune-up (13 months) is required for boilers greater than 10 MMBTU/hr. The summer boiler was last tuned on March 17, 2020 and is not used. The CE boiler (boiler 4) was tuned September 15, 2023.

OTHER PROCESSES

In the pellet production area, the dried pulp is transferred to pellet mills. The dry pulp is then pressed into pellets with some water added via a slight amount of steam. This results in the formation of a slightly shiny hard exterior to the pellets to minimize breakage. Pellets are routed to a pellet cooler which draws air across the pellets. Once cooled, the pellets are transferred to bins on site.

MSC is using rule 290 (a)(iii) for the pellet cooler as well as the pulp pellets handling system. The rule allows particulate sources controlled by fabric filter collectors handling less than 30,000 cubic feet per minute of exhaust.

Rule 285 (DD) MSC has several processes which were deemed to be exempt by Rule 285 (dd) prior to the start of ROPs. The equipment associated with suger production and packaging activities. Meaghan is not comfortable with that exemption and feels 290 (a)(iii) better represents the situation. She previously made the same observation for similar operations at the Croswell factory. MSC checks pressure drop on control equipment to ensure proper operation and records the findings on a log.

The equipment associated with sugar production and packaging activities are the granulator, powder mill, sugar dust collector, and sugar cooler.

The sugar cooler used to use air as a means to cool. A Solex sugar cooler has been installed and air is not the cooling agent. The Solex uses plate to fluid technology to cool, much like a radiator in an automobile. Therefore, emissions are not created by the new unit. However, the old unit was not removed, but by-passed, when the new one was installed. There is no plan to remove the old unit. Kevin stated roughly 90% of the sugar cooled is run through the Solex with the remaining 10% run through the traditional style cooler. The sugar is then blended.

The facility does have a fugitive dust plan in place which was being followed.

CONCERNS

The MSC Sebawaing factory is considered in compliance based only on the information found at the time of the inspection.

The facility is currently in negotiations with AQD enforcement. The major difficulties revolve around the coal fired boilers and the boiler MACT. The factory is beholden to its coal supplier for coal availability in entirety to say nothing of the coal quality and size. Screened stoker coal was used during the most recent stack testing which was supposed to use representative coal, therefore it should be the coal in use. However, legacy coal remained on site. MSC has chosen to use stack testing as a means to demonstrate compliance. However, testing was completely missed in the past and test results, particularly for CO, are highly dependent on the size and quality of the coal. The fuel is also subject to cold and wet storage conditions with are not conducive to proper combustion. The company spent much time and effort with boiler consultants in an attempt to improve operations since the most recent failed CO test. However, one must realize the boilers date to the start of World War II. The ability to maintain proper operation is problematic. These problems in combination with apparently not understanding and stating operating parameters as 24 hours averages rather than 30 day rolling averages are a concern for the ability to demonstrate ongoing compliance. Even the maximum boiler load operating calculation needs attention as stated in this report.

Meaghan Martuch left the company without the issues being explored. Dillon King is MSC's recently hired new Air Compliance Manager. The concerns with establishing operating limits etc for the coal fired boilers may benefit from his background in stack sampling utility boilers.

NAME

B. King

DATE

9-30-24

SUPERVISOR

Lia R. King