

**DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: Scheduled Inspection**

B287546848

FACILITY: Michigan Sugar Company, Caro Factory		SRN / ID: B2875
LOCATION: 819 Peninsular St., CARO		DISTRICT: Saginaw Bay
CITY: CARO		COUNTY: TUSCOLA
CONTACT: Steven Smock , Environmental Manager		ACTIVITY DATE: 10/03/2018
STAFF: Meg Sheehan	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled site inspection for FY19		
RESOLVED COMPLAINTS:		

**On Wednesday, October 3, 2018, a scheduled site inspection was conducted by AQD District staff at Michigan Sugar Company's (MSC) Caro Factory in Caro, Tuscola County. MSC representatives Steve Smock (Environmental Manager) and Jeff Hebert (Factory Chemist) provided a tour of the facility. The facility was in operation upon our arrival. Site inspection activities were conducted with the intent of confirming compliance with Renewable Operating Permit No. MI-ROP-B2875-2013a.**

MI-ROP-B2875-2013 was issued on October 15, 2013. Permit to Install (PTI) No. 44-14 for a natural gas fired boiler (EUBOILER4) was issued on June 12, 2014 and incorporated as a minor modification into the ROP on January 9, 2015. This boiler replaced two coal fired boilers (EUWICKESBOILERWE and EUWICKESBOILEREA). MI-ROP-B2875-2013a expired on October 15, 2018, and the renewal application is currently in-house, having been received on March 15, 2018. For the purposes of this inspection, compliance has been evaluated based on the conditions of MI-ROP-B2875-2013a.

#### **FACILITY & PROCESS DESCRIPTION**

The Michigan Sugar Company Caro factory is a sugar processing plant, reported to have begun operation at its current location in 1899. The principal products produced by the facility are reported to be liquid sucrose and granulated sugar from sugar beets. Other products include molasses and beet pulp, both of which are used in animal feed, as well as spent sugar beet lime which is used as a soil supplement.

The sugar beet processing operations are comprised of several steps, including cleaning, washing, slicing, diffusion, juice purification using milk of lime, evaporation, crystallization, pulp drying and liquefaction of granulated sugars into liquid sucrose. Lime (CaO), among other process additives, is used to adjust the pH in the various process stages to achieve the desired product.

Operations at the facility are seasonal, with sugar beet processing conducted during "campaigns." Campaigns are reported historically to run from mid-late September through February or March. More recently, due to larger harvests, slice operations have been from late August through March. It is during this period that the raw sugar beets and any resulting pressed or dried pulp are processed. Operations during a campaign are reported to be 24/7 until both onsite and off-site store sugar beets have been processed.

Granulated sugar and liquid sucrose production and packaging operations are conducted independent of the beet processing and may be conducted throughout the year. No powdered or brown sugars are produced and no molasses desugarization activities are conducted at this facility. Maintenance and tune-ups on process equipment is conducted during "inter-campaign" times, when beets are not being processed (April through August).

#### **EXEMPT EQUIPMENT**

Most of the sugar manufacturing equipment is either exempt from permitting under R 336.1285(2)(dd) or is not considered to be a potential source of air pollution. Exempt emission units identified for this facility include:

- 5 MMBtu/Hr natural gas fired boiler used for supplemental heat during inter-campaign/summer (EUSUMBOILER1 – reported to be exempt under R 336.1282(2)(b)(i))
- Natural-gas fired heaters for space heating (EUNATGASUNITHTRS – reported to be exempt under R 336.1282(2)(b)(i))
- 4,000-gallon hydrochloric acid storage tank used for evaporator cleanups (EUHCLTANK – reported to be exempt under R 336.1284(2)(i))
- Sugar cooler with dust collector (EUCOOLERDUST)
- Dust collector for the granulator (EUGRANDUSTCOLLECTOR)
- No. 6 fuel oil storage tank (EUNO6FUELTANK)



- Vacuum drum filters for lime rinsing (EUVACUUMFILTERS)
- Vacuum pumps for lime (EUVACUUMPUMPS)
- Storage silo and associated transfer conveyors (EUWEIBULLSILO)

## COMPLIANCE HISTORY

No odor complaints have been received since May 27, 2014. Odor sources at the facility include the general process odors associated with sugar production, wastewater receiving/treatment ponds, flume ponds, and the lime pile. Quarterly, semi-annual and annual reports are submitted in a timely manner. A violation notice was issued as a result of the last site inspection, conducted on 10/13/16 for Special Condition III.2. under FG-PULP; the pulp drier was operated 80 hours over the 4,000-hour permit limit. The violation was resolved on January 24, 2017, and the facility reported that based on stack testing the exceedance in operation time did not result in an exceedance of emission limits for the process.

## COMPLIANCE EVALUATION

MSC Staff reported that no major changes had occurred at the facility since the last site inspection that would affect any of the permitted or exempt equipment onsite.

### EU-PACKAGEBOILER3

Fuel oil or natural gas fired boiler used for steam production for the processing of sugar beets with a rated capacity of 75,000 pounds of steam per hour (approximately 90 MMBtu/Hr). It was installed in 1974 and is equipped with a continuous oxygen trim system. The boiler was operating at 60% capacity (45,000 lbs. of steam/hour) during the inspection. MSC staff report that once a campaign is initiated, the boilers are operated 24/7 with varying production rates until the end of the campaign to achieve the most efficient output. This year's campaign started the last week of August.

- V.1 and VI.2) MSC staff reported that EU-PACKAGEBOILER3 has only fired natural gas for at least the last nine years, except for a HAPs engineering study in the fall of 2012, as well as a limited period of operation in the spring of 2014. Staff also reported no new shipments of fuel oil have been received since 2007. The sulfur content of the existing fuel oil was verified as part of a previous inspection and was found to be in compliance at that time.
- VI.1) Visible emission surveys were not being conducted or recorded for the boiler and its associated stack (SVPACKAGEBOILER3). A violation notice is being sent because of this. At the time of the inspection, no visible emissions were observed.

### EUBOILER4

Natural gas fired boiler used for steam production for the processing of sugar beets, and heat for the facility. It was relocated from the MSC Bay City facility under PTI no. 44-14 and replaced two coal-fired boilers in 2014. EUBOILER4 is rated at 146.5 MMBtu/Hr for 120,000 pounds of steam production per hour and equipped with low NOx burners, a continuous oxygen trim system and a continuous emission monitoring system (CEMS). It is subject to 40 CFR Part 60, Subpart Db: Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. At the time of the inspection the boiler was operating at 60% capacity (87.9 MMBtu/Hr or 72,000 lbs. steam/hour). All requirements pertaining to the initial installation of the boiler and CEMS have been met and will not be discussed in this report (Special Conditions VI.2 and VII.4).

- II.1) MSC staff reported that the boiler has only ever fired natural gas.
- III.1) An updated malfunction abatement plan (MAP) was submitted as part of the ROP renewal on July 31, 2018.
- IV.1) Per MSC staff, 146.5 MMBtu/Hr reflects 100% operational load for the boiler, which it has not reached. A review of the one-time energy audit indicates that the boiler is limited to operations of 60% because of a severe vibration that occurs at 60-65% operational load.
- IV.3) The facility collects the total gas usage from a meter daily and inputs the data into the central computer system.
- IV.4 and VI.2) The CEMS continuously monitors and records the NOx emissions and oxygen content of the exhaust gas per the permit conditions. The digital read-out displays NO, NO2, NOx and CO in ppm. The data may be accessed through the central computer system. Quarterly CGAs and annual RATAs have been submitted in a timely manner since installation of EUBOILER4. Data reported has shown the instruments have been operating in compliance with requirements.
- Special conditions VI.3 through VI.7 require the following records, all of which were provided and appear to meet permit limits for 2016 and 2017:
  - o VI.3) Natural gas usage



than 0.8% by weight (per the fuel sampling plan in Appendix 7 of the ROP). This sampling event (10/13/16) was a split sample that occurred during the previous Air Quality inspection. The results of the AQD sampling indicated the sulfur content was within the permit limit. A split sample was also taken during this inspection, and the results were within the permit limit.

Sample ID	Date	Campaign	Heat Value (Btu/lb)	Reported (% S by weight)	Adjusted (% S limit by weight)
Caro DEQ Split	10/13/16	2016-2017	12,551	1.23	1.07
B2875 Grab 1	10/13/16		11,000	0.49	0.98
Cavo 2017/18	4/6/18	2017-2018	12,837	0.53	1.09
MSC Caro B2875	10/3/18		11,057	0.416	0.94

#### FG-PULP (EUPULPDRYER, EUPELLETMILLDUST and EUPELLETCOOLER)

Rotary dryer for drying beet pulp fired on fuel oil or natural gas, installed pre-1967. The pulp pellet mills system made pellets from the dried pulp and the pellet cooler cooled beet pulp pellets coming off the pellet mills before they were stored in bins. MSC staff report that all equipment associated with the pellet mills, including EUPELLETMILLDUST and EUPELLETCOOLER have been removed from the facility. The removal of these emission units from the ROP will be addressed during the renewal process. EUPULPDRYER is subject to 40 CFR Part 64 – Compliance Assurance Monitoring (CAM) because the emissions are controlled by a Multiclone collector (without fly ash re-injection and flue gas recirculation (FGR)).

- III.2 and VI.4) A log of hours of operation for the pulp drier is maintained and was available for review. The pulp drier operated within its permit limit (4,000 hours per year) for 2016 and 2017.
- III.3) Based on records that were reviewed during the inspection, it does not appear that the differential pressure of the Multiclone exceeded its normal operating parameters set forth by the MAP and CAM plan. In addition, none of the visible emission records that were reviewed indicated abnormal emissions.
- III.4) MSC staff reported that the auxiliary fan had previously been replaced by a cyclone in the ductwork, which reduces the pulp and the wear and tear on the primary recirculation fan blades. As one of the two fans has been removed, it is impossible for the facility to be out of compliance with this condition.
- IV.1, VI.2 and VI.3) The multiclone is equipped with a continuous monitor to measure the pressure drop across the multiclone. It is monitored by MSC staff, and the pressure drop is recorded once per hour of every shift (for a total of eight hours per shift) on appropriate log sheets which were available for review. Special Condition V.3 requires the pressure drop to be monitored at least three times per shift with at least one hour between readings. The FGR is also equipped with a continuous monitor, and the air flow is recorded at the same time as the pressure drop on the same log.
- V.1 and VI.5) MSC staff reported that except for an engineering study for HAPs conducted in the fall of 2012, no fuel oil has been used since before the 2009-2010 campaign. Staff also reported no new shipments of fuel oil have been received since 2007. The sulfur content of the existing fuel oil was verified as part of a previous inspection and was found to be in compliance at that time.
- V.2) Stack testing for PM was conducted on December 5, 2017. FG-PULP was found to be in compliance with its PM emission limits at this time. Stack testing will be required again on or before six months of the ROP's expiration date in 2023.
- VI.1) Visible emission surveys are conducted during each shift. Records were reviewed onsite and appear to comply with the ROP conditions.
- VII.4 and VII.5) Semiannual reports submitted by the company include CAM excursions, exceedances and downtime, which satisfy the requirements of these Special Conditions.

#### **COMPLIANCE DETERMINATION**

At this time, the Michigan Sugar Company – Caro Factory is non-compliant due to the violation of Special Condition VI.1 for EU-PACKAGEBOILER3. Except for this violation, the rest of the facility appears to be in general compliance with the conditions of MI-ROP-B2875-2013a.

NAME Meg Sheehan

DATE 11/5/18

SUPERVISOR C. Hore



- o VI.4) Annual capacity factor for natural gas
- o VI.5) NOx emissions (96.3 tpy limit)
- o VI.6) CO emissions (147.6 tpy limit)
- o VI.7) CO2e emissions (75,138 tpy limit)

#### FG63-5D-EXGAS1BOILER

EUBOILER 4 is subject to 40 CFR Part 63, Subpart DDDDD – National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters. The applicable requirements are contained in this flexible group.

- III.2) The permittee is required to meet work practice standards in Table 3 of 40 CFR Part 63, Subpart DDDDD that applies to EUBOILER4. The facility is required to complete the following:
  - o Initial tune-up (completed on September 16, 2014 by American Instrumentation, Inc. This also satisfies Special Condition V.1. of this flexible group.)
  - o Conduct a one-time energy audit (completed December 16, 2015 by Armstrong Service, Inc. This also satisfies Special Conditions V.2. and V.3. of this flexible group.)
  - o Conduct a 5-year performance tune-up (due in 2019). Note that the company reports that for insurance purposes, an inspection is conducted every year that meets almost all the requirements for the 5-year tune-up. It is the facility's intent to add those additional requirements to the normal inspection when required. This also satisfies special condition V.4. of this flexible group.
- VI.3) Records of the date, time, occurrence and duration of each start-up and shutdown for 2018 are maintained by the company and were available for review. Records for 2016 and 2017 were temporarily unavailable due to an unexpected computer error. The AQD inspector has requested these records once the issue is resolved, and the file will be updated. A violation notice will not be sent at this time.
- VI.4) Natural gas is the only fuel used in the boiler.
- VI.5 through VI.7) The requested records were supplied by the company in a timely manner, satisfying the requirements of Special Condition VI.5. The facility reports the necessary records are accessible from onsite via the company's computer system, and records are maintained for at least five years if not more.
- VII.4 and VII.7) All applicable notification requirements in 40 CFR 63.7545 have been met prior to this inspection.
- VII.9 through VII.13) The documentation submitted as part of the quarterly, semi-annual and annual reporting for excess emissions and CEMS downtime appears to meet the reporting requirements listed in Table 9 of 40 CFR Part 63 Subpart DDDDD.

#### FG-2KILNS (EU-LIMEKILN1 and EU-LIMEKILN2)

Two vertical kilns (both installed in 1911) fired with coke or anthracite coal to produce carbon dioxide and calcium oxide (lime) for purification of sugar juice. Gases generated from the kilns are transported by separate lines using fans to a main pressure header prior to going to carbonization tanks. Should gas production exceed flow required to the carbonization tanks, the remaining gas is released through the pressure header relief valve. The lime is introduced into the sugar making process as milk of lime at the carbonation tanks. The carbon dioxide is used for pH adjustment in the carbonation tanks. Both kilns share a stack and are run in unison. The units are reported to start up approximately four days prior to the start of a campaign to get up to operational ranges.

- III.1) MSC Staff report that the only time the carbonation system is not operating and receiving the lime kiln combustion gases is during start-up or shut-down, per the requirements of the ROP.
- V.1) The company maintains records of the sulfur content analysis supplied by the vendor upon delivery of coke or anthracite coal. A review of these records indicates the sulfur content of the coke/anthracite coal was below the permit limit of 0.8% sulfur by weight.
- VI.1) Visible emission surveys are conducted during each shift. Records were reviewed onsite and appear to comply with the ROP conditions.
- VI.2) Records were provided for the monthly amounts of anthracite coal and coked fired in the lime kilns. The facility was below the permit limit of 5,000 tpy for 2016 and 2017. Staff report that weight belts are used to report daily material usage for the kilns, which is used to generate monthly totals. These totals are compared with onsite stockpiles and inventory records to confirm usage.
- VI.3) MSC tests the sulfur content of the coke/anthracite coal once per campaign, as the ROP requires. Records provided by the company indicate that for the 2017-2018 campaign, the sulfur content was within permit limits. Records for the 2016-2017 campaign showed an adjusted sulfur content greater