

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

B287537777

FACILITY: Michigan Sugar Company, Caro Factory		SRN / ID: B2875
LOCATION: 819 Peninsular St., CARO		DISTRICT: Saginaw Bay
CITY: CARO		COUNTY: TUSCOLA
CONTACT:		ACTIVITY DATE: 10/13/2016
STAFF: Sharon LeBlanc	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: FCE scheduled site inspection for 2017 fiscal year. Company has been electronically notified at the time of report preparation that 2015 annual emissions reported exceedance of 80 hours above the allowed 4000 hours of operation for FG-PULP.		
RESOLVED COMPLAINTS:		

Tuesday, October 13, 2016, AQD District Staff conducted a scheduled site inspection at The Michigan Sugar Company Facility (MSC) (SRN B2875) 819 Peninsular Street, Caro, Michigan. One Renewable Operating Permit (ROP) (MI-ROP-B2875-2013a) is associated with the referenced facility. MI-ROP-B2875-2013 was issued on October 13, 2013. Permit to Install (PTI) No. 44-14 was issued on June 12, 2014, and incorporated as a minor modification into the ROP on January 9, 2015. Inspection activities were conducted to determine if the facility was operating in compliance with the referenced permits.

The facility was operating upon arrival though it had an unexpected shut down towards the end of the inspection. AQD staff conducted site inspection activities with Jeff Hebert (Factory Chemist) and Steve Smock (Environmental Engineer). Portions of the facility visited included boiler room, sugar production and fuel storage areas.

FACILITY DESCRIPTION

The MSC facility is an approximately 300 acre sugar processing plant located in a mixed commercial, agricultural and residential area in Caro, Tuscola County, Michigan. Located on Peninsular Street, the MSC facility extends across the Cass River to M24, and extends to South Colling Road to the southwest and Peninsular Street and Columbia Street to the north. Located to the immediate west-northwest of the facility are the fairgrounds.

The referenced facility is reported to have begun operation at that location in 1899 and is reported to be the oldest continuously operating sugar beet factory in the United States. Comments made by MSC staff indicated that the Cass River Dam located south of the facility was at one time property of the sugar company, and that in the not too distant past the Dam and some nearby MSC land had been sold to a private party.

The principal products for the facility are reported to be liquid sucrose and granulated sugar from sugar beets. Other MSC process products include molasses, which is used as a cattle feed supplement; beet pulp which is sold in bulk as cattle feed; pelletized dry beet pulp (bulk) and pressed pulp (bulk), which is used for animal feed; and spent sugar beet lime sold/used as a soil enhancement/supplement.

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

Granulated sugar and liquid sucrose production and packaging operations are conducted independent of the beet processing and can/may be conducted throughout the year. Packaging of granulated sugar is reported to be limited to 1000-lb totes at this facility. Processed sugars at this facility are limited to granulated sugars, some of which as previously indicated are liquefied into liquid sucrose. Granulated sugar is liquefied and sold as liquid sucrose year around. No powdered or brown sugars are produced and no molasses desugarization activities are conducted at this facility.

Processing Activities and Equipment - The sugar beet processing operations are comprised of several steps, including cleaning, washing, slicing, diffusion, juice purification using milk of lime, evaporation, crystallization, dried-pulp pelletization, and liquefaction of granulated sugars into liquid sucrose. Lime (CaO) and SO₂ among other process additives are used to adjust pH in the various process stages to achieve the desired product.

The majority of the sugar manufacturing equipment is either exempt from permitting under R. 285(dd) or is not considered to be a potential source of air pollution. Emission units identified for this facility include:

- One natural gas or No. 6 fuel oil-fired boiler (EUPACKAGEBOIL3).
- An exempt natural gas-fired boiler (EUSUMBOILER)
- One natural gas or fuel-oil fired rotary pulp dryer (FGPULP, EUPULPDRYER).
- Two vertical, lime kilns (FG2KILNS, EULIMEKILN1 and EULIMEKILN2)
- One sugar cooler with dust collector (EUCOOLERDUST)
- The dust collector for the granulator (EUGRANDUSTCOLLECTOR)
- One Hydrochloric Acid Storage Tank (EUHCLACIDTANK) used for evaporator cleanups
- One No. 6 fuel oil tank (EUNO6FUELTANK)
- Three natural gas space heaters (EUNATGASUNITHTRS)
- Vacuum drum filters for lime rinsing (EUVACUUMFILTERS3)
- Vacuum pumps for lime (EUVACUUMPUMPS), and
- Storage silo and associated transfer conveyors (EUWEIBULLSILO)

Facility Changes -

At the time of the previous inspection (October 14, 2014) the facility had recently removed two coal-fired Wickes boiler previously operated onsite (FG-1BOILERS, AKA EUWICKESBOILEREA and EUWICKESBOILERWE) and installed a natural gas boiler (EUBOILER4 AKA FG63-5D-EXGAS1BOILER) that was formerly located at the MSC Bay City Facility (referred to as Boiler #5 at that facility) (PTI 44-14). The referenced boiler has low NO_x burners, a continuous Oxygen Trim System and Continuous Emission Monitors (CEMS) and had been started up on September 12, 2014. Compliance to Federal Requirements under Subpart DDDDD for the emission unit was not required until January 31, 2016.

In addition, the pellet mills and coolers had been previously reported to have been disconnected. At the time of the October 13, 2016, inspection facility staff confirmed that no pellets had been made at the facility for over 5 years, and that the dies had been removed from the mills and were transferred for use at another MSC facility. EUPULPDYER, EUPELLETCOOLER AND EUPELLETMILLDUST were determined to be subject to Compliance Assurance Monitoring (CAM) at the time of the ROP Renewal. Based on the above information, only EUPULPDYER would be subject due to its operating status.

MSC staff reported that with the exception of piping and other minor changes to cut down on energy/fuel use no changes in process equipment had been made since the previous inspection.

Odor Sources –

In addition to the general process odors associated with sugar production, additional odor sources have previously been identified for the site. These include the waste water receiving/treatment ponds, flume ponds and the lime pile.

Based on discussions with MSC staff as part of the waste water treatment program MSC adds a microbial suspension to the ponds to create/maintain the required microbe population, in addition the plant utilizes supplemental treatments to further control odors. These are added on an “as needed basis”.

Lime Pile- Lime slurry is piped intermittently to the top of the lime pile, and the liquid allowed to percolate down the pile. Any run-off is captured by the storm water controls and is carried to the waste water treatment ponds.

Compliance History –

As indicated above the MSC facility at the time of inspection was operating under MI-ROP-B2875-2013. A request for a permit modification to incorporate PTI-44-14 was received electronically on October 13, 2014.

No odor complaints have been received or VNs issued for the facility since May 27, 2014 and October 17, 2014, respectively. Quarterly, semi-annual and annual reporting are submitted in a timely manner.

COMPLIANCE EVALUATION

Operational Status – During the onsite inspection, the facility was in operation upon arrival, but shut down towards the end of the visit. As noted previously the pellet production areas are not operational. The pulp dryer was noted to be operating at the time of the inspection.

Facility personnel reported that beet slicing for this year’s campaign started on August 26, 2016, with the limekiln started up on August 23, 2016, to achieve operating temperature. Once a campaign is initiated, MSC staff report that boilers are operated 24/7 with varying production rates until the end of the campaign to achieve the most efficient output. The present campaign is anticipated to end in March 2017.

Based on file records, campaigns were reported to last approximately 150 days or less, however, MSC Staff has indicated that more recently campaigns of up to 210-days plus or minus 5-days are possible. In addition, the facility beet slice/production was reported to have been up to 4,400 tons per day, and up to 795,000 tons per year. Average processing for the facility over the campaign is reported to be approximately 3,800 tons/day. The following figures have been estimated to reflect approximate operational ranges.

Campaign	Tons Beets Processed per Campaign	Campaign Length (days)
2009-2010	600,000	159
2010-2011	645,000	174
2011-2012	650,000	174
2012-2013	795,000	213
2013-2014	679,000	184
2014-2015	686,000	200
2015-2016	736,000	223

Steam and heat for the facility are provided by one of three boilers onsite. These include;

- One natural gas or No.6 Fuel Oil fired package boiler (installed in 1974) (EU-PACKAGEBOILER3) and
- One Natural Gas (“Gas 1 Fuel”) fired boiler, relocated and installed at the facility in 2014 (EUBOILER4 AKA FG63-5D-EXGAS1BOILER).
- One natural gas fired summer boiler (exempt). The exempt summer boiler uses natural gas and is reported to only operate during the summer at which time the liquid sugar processing occurs.

At the time of the inspection, both the package boiler and EUBOILER4 were in operation. MSC staff reported that the package boiler was operating on natural gas. No approval for an alternative fuel has been issued, and the facility reports that no alternative fuel has been used. The emission unit has not operated on fuel oil for over two years no deliveries have occurred since 2007 onsite.

Two vertical lime kilns, both installed in 1911 presently exist onsite. MSC staff report that they share a stack and are ran in unison. Gases generated from the two EUS are transported by separate lines using fans to a main pressure header prior to going to carbonization tanks. The two lime kilns are located at the northeast end of the plant one being totally enclosed in a building, and the other only partially enclosed with approximately 1/3 of the kiln exposed to the elements. The emission units are permitted for firing of anthracite coal or coke. The units are reported to be started up approximately 4 days prior to the start of a campaign to get up to operational ranges. Pebble lime is brought in intermittently to augment the lime produced in the facility’s lime kilns to meet process demands.

The MSC Caro Facility has one natural gas or fuel-oil fired pulp dryer (EUPULPDRYER) (installed pre-1967) equipped with multiclone collector (without fly ash re-injection) and flue gas recirculation. MSC staff reported that with the exception of an engineering study for HAPs conducted in late October-Early November 2012 no fuel oil has been used since before the 2009-2010 campaign. Operation of the emission unit is based on product demand.

Material Usage Rates – A wide variety of materials are associated with MSC facility operation and production processes. A review of the ROP identified the following material limits:

FG-2KILNS have historically reported a combined use of approximately 135-150 tons of limestone and 12-14 tons of coke per day. Per the ROP, coke is limited to 0.8% sulfur by weight, and a total use of 5000 tons per 12-month rolling time period. A review of monthly totals and 12-month rolling totals indicates that the facility reported total is well below the limit, and in compliance with the 12-month rolling fuel use limits.

Staff report that weight belts are used to report daily material usage for the lime kilns totals, which is used to generate monthly totals. These totals are compared with onsite stockpiles and inventory records to confirm usage.

Operational Parameters –

With the exception of the emission units addressed below, operational limits presented in the existing ROP for the facility are limited to installation, maintenance and operation of appropriate pollution control devices.

FG2KILNS- Operational restrictions associated with this flexible group include operation of the lime kilns, except during startup, shutdown, or malfunction, only when the carbonation system is operating and receiving combustion gases from the lime kilns. MSC staff reported that the flexible group is operating in compliance with the ROP in that the only time the carbonation system is not operating and receiving the lime kiln combustion gases is during start up and shut down.

FGPULP- Operation of the beet pulp dryer is limited by the ROP to no more than 4,000 hours per year. Continuous operation of the beet pulp dryer for 4000 hours would equate to 166.67 campaign days. Based on previously presented information, the facility has not been below 166.67 days of operation for the campaign since 2010.

Period	Operation Period	Source
2010	2538 hrs	MAERS
2011	3000 hrs	MAERS
2012	2265 hrs	MSC
2013	2431 hrs	MAERS
2014	2431 hrs	MAERS
2015	4080 hrs	MAERS

The ROP also restricts the operation of the primary and auxiliary flue gas recirculation fans for EUPULPDRYER simultaneously. 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, the ROP facility is not able to be out of compliance for this condition (FG-PULP, III.4). Removal of the condition will be addressed in the next ROP Renewal.

EU-PACKAGEBOILER3 –Has a rated capacity of 75,000 lbs steam/Hr. At the time of the inspection it was operating at approximately 25,500 lbs steam/Hr. No operational restrictions with the exception of fuels combusted is associated with this EU.

EUBOILER4 (AKA FG63-5D-EXGAS1BOILER)- has rated capacities of 146.5 MMBTU/Hr and 120,000 lbs steam/hour. Per MSC Staff this value reflects 100% operational load for the unit, which the unit has not reached. At the time of the inspection, the boiler was reported to be at 39 MMBTU/Hr and approximately 30,000 lb of steam/hr (28% capacity). 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.

For the referenced emission unit the Facility is required to install, maintain and operate in a satisfactory manner low NOx burners and a device to monitor and record the calendar daily natural gas usage rate on a continuous basis. The facility reported that at the time of installation EUBOILER4 was equipped with low NOx burners and a continuous oxygen trim system (installed by burner supplier) and that the facility was collecting the total gas usage from a meter on a daily basis and inputting the data.

EUBOILER4 is also required by permit to install calibrate, maintain and operate in a satisfactory manner a device to monitor and record the NOx emissions and O2 content of the exhaust gas on a continuous basis. A Continuous Emissions Monitoring System (CEMS) installed by the company for the two parameters of interest meets this requirement.

The approved Malfunction Abatement Plan (MAP) required by permit for EUBOILER#4 was submitted on January 9, 2015. A prior version had been submitted and met the submittal due date requirements outlined in the ROP, but the District reviewer, requested revisions to the document before it could be approved.

The permittee is required to meet work practice standards in Table 3 of 40 CFR Part 63, Subpart DDDDD that applies to EUBOILER4. A review of the referenced table indicates that the facility is required to complete the following:

- Initial tuneup (completed on September 16, 2014, Documentation in American Instrumentation, Inc. correspondence dated 12/18/2016),
- Conduct a one-time energy audit, (completed on December 16, 2015 by Armstrong Service, Inc) and
- 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 almost meets all of the requirements under the referenced subpart for the 5-year performance tune-up. It is the facilities intent to add those additional requirements to the normal insurance inspection when required.

Emission Points –

FG-2KILNS – One stack is shared by the two lime kilns, and the kilns are reported to operate in unison, and continuously during the initial sugar/beet campaign. Emission limits associated with this flexible group include PM (based on test method) and SO2 (based on material limits of 0.8% sulfur by weight for fuel and fuel use limits). It should be noted that like the Bay City MSC facility, the gases from the limekiln to a pressure header, and should gas production exceed flow required to the carbonization tanks, the remaining gas is released thru the pressure header relief valve.

FGPULP – This flexible group is composed of EUPULPDRYER, EUPELLETMILLDUST and EUPELLETCOOLER. One stack (SVDRYERSTACK) is of record for the FG, and the emission limits are limited to particulate and SO2. The permit requires that the multiclone is equipped

with a continuous monitor to measure the pressure drop across the multiclone. The required instrumentation has been installed, and is monitored and recorded on appropriate log sheets.

At the time of the inspection only EUPULPDRYER was in operation. MSC Staff report that EUPELLETMILLDUST and EUPELLETCOOLER have been disconnected. Pulp is sold by the facility as either wet/pressed pulp in bulk, or as dried pulp. Demand for the wet/pressed pulp as animal feed by local farmers has been high.

EUPACKAGEBOILER3 - Is a fuel oil or natural gas fired boiler used for steam production in the facility. One stack (SVPACKAGEBOILER3) is associated with the emission unit. Emissions are based on sulfur content of the fuel oil, and are limited to 1.67 pounds per Million BTUs of heat input.

At the time of the inspection the emission unit was reported, with the exception of the HAPs Engineering Study conducted in late October-early November 2012, and a limited period of operation in spring 2014, has not been run on fuel oil since December 29, 2009. No visible emissions were noted against the skies at the time of the inspection.

EUBOILER4 – Emissions from the referenced unit are routed thru the former Wickes Boiler stack and has been renamed SVBOILER4.

Monitoring and Testing –

FG-2KILNS, EUPACKAGEBOILER3 and FG1BOILERS all require minimum confirmatory sampling and analysis of applicable fuels by the permittee to verify compliance. Sample collection is required to be conducted at least once per sugar campaign. Upon request the facility submitted copies of the analytical results for verification samples for the 2014-2015 and 2015-2016 campaigns.

Analyticals for confirmatory samples collected in conjunction with the October 13, 2016, site visit as well as by the company for the 2014-2015 and 2015-2016 campaigns reported heat values above the 9,400 BTU/lb used in part to define compliant coke or coal for FG-KILNS. Based on the difference in heating values for the fuel samples, a determination of the maximum allowable sulfur content for the samples was made per Appendix 7 of the ROP. The adjusted values are reflected below:

Sample ID	Campaign	Heat Value (BTU/lb)	Reported (% Sulfur by weight)	Adjusted % Sulfur Limit by weight
Caro Coke	2014-2015	12,889	0.65	1.1
Caro Ant Coal	2014-2015	13,662	0.75	1.2
Cavo Ant.Coal	2015-2016	12,893	0.55	1.09
B2875 Grab 1	October 13, 2016	11,000	0.49	0.9

Based on the above analytical data and adjusted sulfur contents, it appears that the coal/coke used for the past two campaigns at this facility for FG-2KILNS are in compliance with permit limits.

With respect to EUPACKAGEBOILER3, as previously noted, the unit has been operating on Natural Gas with the exception for two different periods, the most recent being a period in Spring 2014. At that time it was operating using fuel oil stored onsite, and received in 2007. The fuel oil was determined to be in compliance as part of a previous inspection. Testing requirements associated with this and other fuel oil burning EUs onsite require monitoring of testing of sulfur content with each received shipment.

Continuous Emission Monitoring (CEMS) for NOx (ppm) and O2 (%) have been installed and are operational for EUBOILER4. 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.

In addition, the facility is required to conduct verification testing at their own expense for emissions. The most recent stack testing requirements are summarized below:

Emission Unit	Parameters	Date Tested	In Compliance	Deadline for Next Testing
FG-PULP	PM	12/13/2012	Yes	4/18/2018
EUBOILER4	CO	12/11/2014	Yes	NA

CO Emission Testing and Relative Accuracy Testing (RAT) for Gas Fired Boiler #4 was conducted on December 11, 2014. Testing was conducted at 58.4% capacity based on steam flow capacity and 62.5% based on natural gas flow. Results reported confirmed compliance with respect to the RATA and CO permit limits. Should the facility increase the operating load of the referenced boiler in the future, retesting may be required to confirm compliance with emission limits.

Record Keeping and Reporting –

A review of records was conducted as part of the October 13, 2016, site inspection. Under the existing ROP, the facility is required to promptly report any deviations, as well as to report quarterly CEMS downtime and excess emission and annually/semiannually any monitoring and deviations. Annual emissions reporting as well as certifications of compliance are also completed and submitted by the facility in a timely manner.

Records maintained in the form of handwritten logs are kept for a period of 5 years in 3-ring binders for review. A general review of the binders was made to confirm that 5 years of records were being maintained, and that required documentation is being recorded in compliance with the permit conditions. No compliance issues were noted during the log review. Supplemental records were requested electronically and reviewed to complete the compliance evaluation.

A review of permit conditions includes the following record keeping and reporting requirements.

Visible Emission Survey- In addition to the record keeping and reporting requirements listed above the facility is required to conduct visible emission surveys for EUPACKAGEBOILER, FG-1BOILERS, FG-2KILNS and FG-PULP during daylight hours, and record the date, time, results and initials of the person making the observations. A review of logs maintained by the facility

indicated that survey was being conducted when the units were in operation, and from a general review of the records it appeared that the records were complete and that no deviations had occurred.

FG-2KILNS – in addition to the VE Surveys previously identified, recordkeeping requirements for this emission unit are limited to monthly totals of coke and/or anthracite coal being used as well as monitoring of the sulfur content by weight according to the ROP Fuel Sampling Plan. A review of records indicated that the fuel usage is recorded on logs. Sulfur monitoring records are kept on file and consist of laboratory analytical records for materials as provided by vendors, or as confirmatory sampling by the facility. All of which are in general compliance with permit conditions.

FG-PULP - In addition to VE Surveys, the facility is required by permit to continuously monitor the air flow through the flue gas recirculation and the pressure drop across the multiclone with proper instrumentation. Written records of hours of operation for the emission unit are also required under the permit. The referenced records were found to be maintained in compliance with the permit conditions.

EUBOILER4 (AKA FG63-5D-EXGAS1BOILER) - As previously indicated this EU started up on September 12, 2014. Submittals by the facility to meet 40 CFR Subpart DDDDDD requirements include:

- A one-time energy assessment conducted by Armstrong Service Inc. on February 26, 2016.
- The initial notification of applicability for subpart DDDDD was received electronically by the District on May 29, 2013, and followed by a hardcopy submittal.
- Initial notification of installation for EUBOILER4 received on October 3, 2014.
- Notification of compliance status (copy for District Files requested)
- Notification of Startup received on October 3, 2014.

Record keeping requirements associated with this emission unit also include the following Monthly and 12 month rolling totals:

- NG usage
- Annual Capacity Factor (NG)
- NOx Emissions
- CO Emissions, and
- CO2e Emissions

In addition, the facility is required to maintain records of all information necessary for all notifications and reports, including but not limited to:

- Compliance tests and any testing required by permit
- Monitoring Data,
- Verification of heat input capacity required to show compliance
- Daily records identifying type and amounts of fuel combusted in emission unit, and

- All calculations required to show compliance with the permit limits

Records provided appear to be complete and emission totals reported were well below 12-month rolling limits for EUBOILER4. It should be noted that CEMs monitoring data is collected by the CEMS data acquisition system, and is downloaded quarterly. The above records were available from the Bay City Corporate Office electronically. In order to meet 40 CFR requirements that the records be accessible from onsite for at least 2 years, the company reports that they are available via a company network.

FG63-5D-EXGAS1BOILER recordkeeping requirements for start-up and shutdown (calendar date and time, occurrence and duration) and type and amount of fuels used during each start-up and shut down for the facility are no longer required under 40 CFR 63.7555 (i) and (j), respectively.

The documentation submitted as part of the Quarterly, Semi-annual and Annual reporting for excess emissions and CEMS downtime appears to meet reporting requirements listed in Table 9 of 40 CFR Part 63 Subpart DDDDDD required under the ROP.

Other Requirements -- In addition to the requirements previously specified the ROP required FG-PULP to have a Malfunction Abatement Plan (MAP) for the emission units to address malfunctions of pollution control equipment associated with the emission units. Copies of the documents are found within the Appendices of the ROP, and proper operating ranges for continuous monitoring devices are found on the log sheets to further clarify to operators when events may be developing that require attention.

SUMMARY

Tuesday, October 13, 2016, AQD District Staff conducted a scheduled site inspection at The Michigan Sugar Company Facility (MSC) (SRN B2875) 819 Peninsular Street, Caro, Michigan. One Renewable Operating Permit (ROP) (MI-ROP-B2875-2013a) is associated with the referenced facility. MI-ROP-B2875-2013 was issued on October 13, 2013. Permit to Install (PTI) No. 44-14 was issued on June 12, 2014, and incorporated as a minor modification into the ROP on January 9, 2015. Inspection activities were conducted to determine if the facility was operating in compliance with the referenced permit.

With the exception of an exceedance in FG-PULP operation hour limit it appears that the facility has been operating in compliance with the conditions of their ROP. The operational limit for FG -PULP is 4000 hours per year. The company in their MAERS submittal for 2015 operations reported 4080 hours of operation. At the time of report preparation, the company has been notified of the exceedance, and is reviewing data associated with the operations to determine if an error has occurred in reporting. A VN for the exceedance will be issued should the error not be found within a reasonable time.

In addition, the facility has been requested to provide a copy of the Notification of compliance status submitted

NAME Sharon Weblane

DATE 12/28/16

SUPERVISOR C. Gore