

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

B149337778

FACILITY: Michigan Sugar Company - Bay City		SRN / ID: B1493
LOCATION: 2600 S Euclid Ave, BAY CITY		DISTRICT: Saginaw Bay
CITY: BAY CITY		COUNTY: BAY
CONTACT: Steven Smock , Environmental Engineer		ACTIVITY DATE: 10/14/2016
STAFF: Sharon LeBlanc	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: FCE scheduled inspection for the 2017 fiscal year. Supplemental information was requested on November 9, 2016, to complete the compliance evaluation for the facility. Based on the amount of time allowed for the records submittal (received December 9, 2016), the incomplete nature of the submittal, and unknown errors District Staff has determined that the a reasonable amount of time was allowed for records retrieval, and that records are not readily available. Based on general condition 5 and 17, and special conditions EUBOILER8 VI.4 and FGBOILERS VI.7 the facility is determined to be in noncompliance at the time of report preparation. Any supplemental information will be reviewed following receipt. sgl		
RESOLVED COMPLAINTS:		

On Friday, October 14, 2016, AQD District Staff conducted a scheduled site inspection at The Michigan Sugar Company Facility (MSC) (SRN B1493) 2600 South Euclid Ave, Bay City, Michigan. One Renewable Operating Permit (ROP) (MI-ROP-B1493-2016) is associated with the referenced facility and was issued on August 2, 2016, and will expire on August 2, 2021.

The facility was operating upon arrival, and AQD staff conducted site inspection activities with Arnel Negranza (Environmental and Desugarization Engineer) Gary Witzgall (Factory Manager) and Steve Smock (Environmental Engineer). The purpose of the inspection was to determine compliance with the referenced renewable operating permit.

A written request for supplemental data/records was requested electronically by District Staff on November 9, 2016. Data submitted electronically by the company for this facility as well as their Caro, Michigan Plant was received on December 19, 2016; at that time they indicated that the data for the Bay City Plant was not complete. Further electronic communications received on December 22, 2016, indicated that there were errors in a portion of the submittal. Based on the amount of time allowed for the records submittal, the incomplete nature of the submittal, and unknown errors it appears that the required records are not readily available. The facility is determined to be in compliance at the time of report preparation. Any supplemental information will be evaluated when received.

Temperatures well above freezing were noted at the time of the site inspection. No visible staining, dust, or distressed vegetation was noted in the immediate vicinity of the facility. In addition to process odors (desugarization and fugitive odors from the diffuser and other processing equipment), odors noted included the pressed pulp (slightly sweet), and raw beets (musty/earthy) that were being unloaded.

FACILITY DESCRIPTION

The MSC facility is comprised of over 175 acres located in a mixed commercial, agricultural and residential area in Monitor Township and the City of Bay City, Bay County Michigan. Located on South Euclid Avenue the MSC facility extends as far south as Hotchkiss and west as Westside Saginaw Roads. The referenced facility is reported to have begun operation at that location in 1901 and has operated previously as Monitor Sugar Company. Information available from Bay County Property Facility Staff reported that the facility was rebuilt in the 1980's which is partially reflected in the 1984 installation dates for pieces of equipment such as the Lime Kiln and pellet production area.

The principal product for the facility is granulated table sugars from sugar beets. Other MSC process products include powdered and brown sugar; betaine (a nitrogenous compound found in

molasses) that is used as a poultry and livestock feed; concentrated molasses solids (sucrose and nonsucrose solids), which are used as a cattle feed supplement; pressed beet pulp which is sold in bulk as cattle feed; pelletized dry beet pulp (bagged or 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” which normally start and end with beet slicing activities, run from early September through February-March. Operations during a campaign are reported to be 24/7 until both onsite and off-site stored sugar beets have been processed. Historical files indicate that the campaign was normally approximately 150 days. More recently due to increased harvests the sugar campaigns have lasted up to 200 days- plus in duration. Following the end of slice, the facility will operate apx. one additional month to complete processing of the juice.

Sugar production and packaging operations as well as molasses desugarization activities can be conducted independent of the beet processing campaign and can/may be conducted throughout the year.

Compliance History –

As indicated above the MSC facility is presently operating under an active ROP (MI-ROP-B1493 -2016).

A file review illustrates that the Facility has had a history of nuisance odor and pond management problems which have resulted, in part, in two Consent Judgments (CJ) (1987 and 2002) with the DEQ and the Facility’s predecessor, Monitor Sugar Company, operating at the same location as the current Facility. The two companies merged in 2004. The CJs were satisfied on June 14, 1996, and October 17, 2006, respectively.

Since 2006, a total of over 1675 odor complaints have been received regarding the Michigan Sugar Plant located in Bay City. The Air Quality Division District Staff have conducted 259 odor surveys resulting in the issuance of 32 Violation Notices for nuisance odors emanating from the facility. The following table presents a further breakdown of the odor complaints, odor surveys and violation notices associated with odor violations since 2006 by calendar year.

Year	Total No. of Complaints	Total No. of Odor Surveys	Total No. of Odor Verifications	Total No. of 901 Violations
2006	79	22	19	4
2007	40	18	3	2
2008	14	3	0	0
2009 – 2010	9	1	1	2
2011	6	0	0	0
2012	28	4	3	2
2013	61	15	8	2
2014	96	48	28	3
2015	777	88	21	10
2016	568	60	12	7

to date				
Total	1678	259	96	32

On June 9, 2014, as a result of odor complaints received during the 2013 calendar year, and ongoing NPDES violations cited, a joint enforcement notice was issued to the facility by DEQ Water Resources and AQD staff. The joint enforcement case was referred to the Attorney General’s Office on July 27, 2015. All three parties are presently involved in negotiations to address issues believed required to correct ongoing/reoccurring issues/violations associated with the waste water treatment ponds.

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 pelletizing, and sugar recovery from molasses. The following process description was determined in part from PTI applications and reports available in District Files as well as discussions with facility staff. Lime (CaO) and SO2 among other process additives are used to adjust pH in the various process stages to achieve the desired product.

Primary process steam is provided by three natural gas fired boilers. Heat and/or air conditioning are provided by the boilers and numerous exempt gas heaters.

Emission Unit	Heat Input -- lbs steam/hr	Comments
EUBOILER#6	180 million BTU/hr-- 150,000 lb steam/hr	On-site staff reported that boiler has oxygen trim.
EUBOILER#7	180 million BTU/hr-- 150,000 lb steam/hr	On-site staff reported that boiler has oxygen trim.
EUBOILER#8	243 million BTU/hr—200,000 lb steam/hr	Installed 2012
Summer Boiler	Exempt NG/oil-fired	Stand by for heating during non-campaign cool weather

Cleaning & Slicing –

Sugar beets received by MSC are staged both on and off-site for processing during the campaign. At the time of processing sugar beets are unloaded into one of two sugar beet receiving pits, loaded into the dry screener, and dropped into the beet flume. The beet flume is the wash system that is used to transport the beets into the plant and remove rocks, dirt and vegetation from the beets, and has been identified as a potential odor source.

From the beet flume, the beets move onto the beet pump, which transports the beets up to the 4th floor and an additional wash system. From here the beets and water are separated, the beets go into the slicer(s), and the water associated with both the flume and washer goes to the clarifier whose underflow is sent to the mud setting ponds.

The clarifier effluent and the clarified mud pond water are reused in the process. Excess flume water overflows from the mud ponds to the MSC Waste Water Treatment Plant (WWTP) which is composed of various settling/pretreatment ponds and anaerobic digester (ANAMET) System

with flare, clarifier, and several aeration ponds. Residual vegetation and other organics are land applied.

Diffusion –

Sliced beets (cosettes) cross a weigh belt and are conveyed to the diffusers (aka diffusion towers). The existing diffuser system is reported to consist of counter-current diffusers, with a capacity of approximately 49,000 tons per day. Cosettes are mixed with hot juice and pumped to the bottom of the tower. As the mixture travels up the diffuser hot water is added to the top, and the liquid/ raw juice travels down leaching sugars as well as other non-sugar compounds from the cosettes. Liquid/raw juice leaving the diffuser is sent to the pre-limer and main limers for further processing.

Beet solids (aka beet pulp or wet pulp) from the diffuser is sent to pulp press. Liquids generated during the press activities are sent to the diffuser, and the pressed pulp is either sold as pressed pulp or is sent to the pulp dryer. The pressed pulp is used by local farmers as animal feed, sales directly impacts the volume of pulp sent on to be dried, and pellet production.

Dried Pulp Pelletizing-

Pressed pulp is sent to EUSTEAMDRYER where it is heated by non-contact steam. Steam generated during the drying of the pressed pulp is captured and sent to the first evaporator. The moisture content of the pressed pulp is reported to be approximately 70-75%. The moisture content of the dried pulp reported to be typically between 8-12%. Dried pulp can be either sold as shreds or pellets.

In the pellet production area (EUPELLETPRODUCTN), dried pulp is transferred to pellet mills, where the semi-dry pulp is pressed into pellets and cooled in one of two pellet coolers (one vertical and one horizontal). Pellets exiting the mills are reported to be at approximately 75 degrees C and are cooled to approximately 30 degrees C in a pellet cooler. The cooler uses a fan to draw ambient air through the moving bed of pellets. The two pellet coolers have the capacity to cool up to 850 tons of beet pulp pellets per day. Cooled pellets are transferred by conveyors for storage into an approximately 5,000 ton silo onsite.

Juice Purification using Milk of Lime –

The lime kiln (EULIMEKILN) burns coke or anthracite coal to heat limestone rock producing calcium oxide (CaO) and carbon dioxide gas (referred to as calcining). The carbon dioxide gas is cooled and purified in the gas washer, and the gas is used for purification/processing of the raw juices. Heated CaO is mixed with sweet water in the lime slaking drum to produce calcium hydroxide [Ca(OH)₂] or “milk of lime” that is used for the purification/processing raw juice.

The raw juice from the cosette mixer and diffusion towers go into the pre-carbonation tank(s) and the pH is increased by the addition of limed juice from the intermediate liming tank and then reduced again using carbon dioxide gas from the lime kiln.

The alkaline juice is pumped to the intermediate liming tank and approximately 35% of the milk of lime used in the processing is added to the juice. Part of the limed juice is pumped back to the pre-carbonation tank(s) and the balance is heated and fed into the main liming tank(s) where the remaining 65% of the milk of lime is added. After reacting with the milk of lime the juice is pumped to the first carbonation tank(s) where it is again treated with carbon dioxide gas. The milk of lime and carbon dioxide cause the formation of a precipitate which captures the impurities found in the beet juice. The beet juice from this stage is known as “first carb” juice.

First carb juice is pumped through another heater and is sent to a clarifier where the mud is allowed to settle, leaving a clear juice. The mud is further pressed and the filtrate known as “sweet water” is sent to the lime slaker where it is added to CAO to produce milk of lime. The filter cake which consists of calcium carbonate, beet non-sugar impurities and insoluble materials such as filter aid and sand is sent to the spent lime storage area and sold.

Clarified juice is heated and pumped into the second carbonation tank(s) for further purification with carbon dioxide. The carbonated juice is sent thru pressure leaf filters to remove precipitate. The resulting filtered juice is light yellow in color and is referred to as “thin” juice. The precipitate cake is recycled in the carb juice processing cycle, with the resulting sweet water re-entering the lime slaker and the filter cake being sent to the spent lime storage area.

The thin juice produced in the second carbonation tank(s) is treated with SO₂ (sulfitation process) from 900 pound tanks to control juice color.

Evaporization –

After the sulfitation process the juice is heated and concentrated in the steam heated evaporator creating “thick” juice. During evaporation the dry substance content of the juice increases from approximately 16% to 70% and becomes a dark yellow to light brown in color.

From this point the thick juice passes through a three step crystallization process to separate sugar, liquids and impurities. Producing three grades of sugar product (white sugar, high raw and low raw) which are graded by purity of the sugars.

Crystallization –

High raw and low raw sugars are melted into the thick juice to produce “standard liquor”. The standard liquor is boiled in a vacuum pan to produce the white sugar crystals. The crystals are separated from the liquid by centrifuge processing, then dried (aka granulated), cooled, and stored for a short while to condition the crystals for later packaging or processing into powdered and brown sugar products.

The separated liquid is sent to another vacuum pan for the second crystallization. The crystals produced are separated during centrifugal processing from the liquids, with the remaining liquids crystallized during further vacuum pan and centrifugal processing to produce the low raw sugar and molasses (apx. 60% sugar). The molasses can be either sold as product or further processed to recover additional sugars.

Sugar Recovery –

The molasses desugarization process (EUMOLASSEDESUG/FGRULE290) utilizes chromatographic separation to further extract sugar and other products from the molasses. During the molasses desugarization process the molasses is diluted, filtered and degasified. The pretreated molasses is fed into a system of separation columns operating as a continuous loop. Water is added while a dilute sugar rich fractionation “extract” is removed. The system operates continuously with an inflow of diluted molasses and water and a simultaneous outflow of sugar enriched extract and non-sucrose by products.

The dilute sugar enriched extract and non-sugar molasses fraction are processed in an evaporation station where steam heat is used to evaporate some of the water concentrating the sugar enriched extract.

The condensate water produced is cooled in the cooling tower (EU-COOLINGTOWER). The condensate waters contain ammonia, which is extracted along with sugar from the beets during the sugar making process. Cooled waters from the tower are recycled in the process, reducing the quantities of additional fresh water drawn from the Saginaw River, and reducing the volume of process waters going into the waste water treatment system for the facility.

The concentrated sugar enriched extract is sent to storage tanks to be processed some of which occurs after the sugar beet campaign is completed. The concentrated non-sugar molasses by products (concentrated molasses solids) are sold for use as liquid cattle feed, as a de-icing product, dust control materials and as a binder for briquetting and/or pelleting dry materials.

Rule 285(DD) Exempt Equipment -- In addition to the above process equipment, the facility has a number of pieces of pollution control equipment that had been permitted under previous PTIs for the facility and which were included in the ROP for the facility prior to the May 13, 2009, amendment. These pieces include the following:

- DVPOWDERSUGFILTR – pulse jet baghouse for collecting PM from powdered sugar milling and packing.
- DVROTOCLONE-CLR – rotoclone cyclone for collecting particulate from sugar cooler.
- DVROTOCLOME-DRY – rotoclone cyclone for collecting particulate from sugar dryers.
- DVSUGARPKGFILTER – shaker type baghouse (manually operate)
- DVPOWDERSUGARCYLON – single cyclone for collecting PM from vacuum system when sugar is spilled in packing room, warehouse and sugar silo#1 processes.
- DVFABFILTER#1 -- pulse jet baghouse for collecting particulate from sugar silo#1 processes,
- DVVACFABFILTER – manual shaker type baghouse for collecting particulate from vacuum process to recover sugar from silo floors and sugar silo#2 processes.

Sugar packaging activities are reported to be conducted year around at the MSC Bay City Facility.

Facility Changes - In the past few years a number of projects/changes have been made at the facility. These include:

- Installation of three centrifuges on the front end of the mud ponds to reduce sediment loading to the ponds,
- Installation of a hydrogen Peroxide system to control odors from the outer ponds, and
- Installation of an additional loop for the Odor Management Inc. odor neutralization system around the clarifier on the front end of the mud ponds.

Operational Issues - No operational issues were reported for the facility for the 2014 -2015 or 2015-2016 campaigns.

COMPLIANCE EVALUATION

Source Wide Conditions – Under MI-ROP-B1493-2016 the Facility is responsible for complying with Rule 371 and Rule 372 which apply to fugitive dust emissions. The facilities fugitive dust control program is incorporated into the referenced ROP in Appendix 9. The permittee is also required to provide upon request copies of dust complaint logs, daily logs of dust suppressant applications and paved area sweeping and other records showing compliance.

The facility applies multiple actions to control fugitive dust issues. Main areas of concern are lime pile activities, unpaved roadways and beet piling grounds as well as onsite traffic. Copies of purchase orders for liquid calcium chloride for dust control purchased, as well as weekly dust control logs for September through mid-November of the present campaign. The logs indicate that the company is making use of dust suppressants, water tanks and brush sweepers (and in some cases street vacs) to control fugitive dust and track out on roadways where it becomes an issue. More recently sweeper and street vac activities have been subcontracted out and increased to twice a day to better address track out. When notified by AQD Staff of fugitive dust issues, the facility has taken additional actions to help control dust. Historically fugitive dust and track are issues during the beet harvest portion of the campaign, when fugitive dust and track out seems to be worse. Should additional actions be required, the company will be requested by the district to update their fugitive dust plan for the facility.

In addition to fugitive dust, source-wide conditions include semi-annual and annual reporting requirements. Which the facility is in general compliance with, submitting semi-annual and annual reports in a timely basis with the required certifications

Operational Status – During the onsite inspection, the facility (with the exception of the pellet production area) was operating. Facility personnel reported that the limekiln starts up a couple days earlier than the rest of the facility to achieve operating temperatures for campaign. Once a campaign is initiated, MSC staff report that with the exception of the steam pulp dryer and the pellet production equipment that the facility operates 24/7 with varying production rates until the end of the campaign to achieve the most efficient output.

Campaign	Total Days of Slice	Days for Juice Run	Volume of Beets processed	Avg. Slice Rate
2008-2009	182	36	1.46 million tons	362 tons/hr
2009-2010	159	24	1.4 million tons	355 tons/hr
2010-2011	186	24	1.6 million tons	362 tons/hr
2011-2012	175	27	1.5 million tons	294 tons/hr
2012-2013	208	22	1.8 million tons	360 tons/hr
2013-2014	186	21	1.5 million tons	336 tons/hr
2014-2015	203	30	1.6 million tons	343 tons/hr
2015-2016	226	14	1.8 million tons	333 tons/hr

At the time of the inspection a slice rate of apx. 400 tons per hour was reported. It is important to note that slice rate will slow down as the beets being processed become frozen, and as beet quality decreases as the campaign progresses.

As previously indicated, the facility operates three natural gas fired boilers during the campaign. All of the referenced boilers were installed with low NOx burners and flue gas recirculation.

Recent discussions with onsite staff indicate that boilers 6 & 7 have O2 Trim. In addition, all three also have been installed or modified with ductwork to pull in heated air generated in the sugar processing portions of the facility minimizing the degree the input air into the boilers needed to be heated and minimizing the natural gas consumption by the boilers.

At the time of inspection the MSC Bay City Facility had one steam dryer (EUSTEAMDRYER). This unit was installed in 2006 to replace three direct-fired, natural gas pulp dryers onsite that had been decommissioned as part of a prior terminated consent decree with EPA.

At the time of the inspection the pellet milling operations, basement silo conveyor and the associated wall vent were not in operation. Hours of operation for the pellet production area vary with production/demand. Some changes had occurred to the work/processing area as a result of international requirements regarding processing of pet foods and their ingredients. Based on the inoperative status of EUPELLETPRDCTN compliance with many of the ROP conditions could not be determined at the time of the inspection.

The facilities WWTP was in operation, including EUANEROBIC DIGESTER. No operational problems were reported at the time of the inspection with reference to the emission unit or it's associated flare.

Material Usage Rates – A wide variety of materials are associated with MSC facility operation and production processes. Most notable are natural gas used to run the three steam generating boilers, the raw sugar beets processed onsite, as well as the coke or anthracite coal and limestone associated with the lime kiln. Note that the facility requested approval to allow use of anthracite coal instead of coke as a fuel for the lime kiln in February 2013.

EUBOILER8 and FGBOILERS (EUBOILER#6 and #7) are boilers used to provide process steam and heat to the facility. By permit the referenced emission units are limited to Natural Gas fuel. EUBOILER8 is limited to pipeline quality Natural Gas as fuel.

Additional limits for the boilers exist with respect to Heat Input. EUBOILER8 is limited to a Heat Input Capacity of 243 MMBTU/hr, which is the maximum capacity of the referenced boiler.

FGBOILERS conditions limit the ratio of actual heat input for 12 consecutive calendar months to the maximum potential heat input based on an operation of 8,760 hours to a maximum ratio of 0.50. Information provided by the facility as part of their December 19, 2016 submittal did not appear to include the requested backup documentation to make compliance determination.

Previously reported material use rates associated with EULIMEKILN consist of approximately 25 tons of coke per day. Coke shipments are received on almost a daily basis. Permit conditions require record keeping and limit fuel use for the referenced emission unit to either anthracite coal or coke. No material use limits exist for the referenced emission unit.

No sulfur concentration limits for the fuel associated with EULIMEKILN were incorporated into the ROP. An evaluation of sulfur concentrations for verification samples collected and analyzed by the facility for the 2014-2015 and 2015-2016 campaigns are below maximum concentrations allowable under Rule 402. Fuel verification samples collected by AQD staff for analysis as part of the October 14, 2016, site inspection also reported sulfur concentrations below the maximum allowable concentrations under Rule 402.

Operational Parameters –

With the exception of the emission units addressed, no operational limits are presented in the existing ROP for the facility. It should be noted that the facility electronically tracks all maintenance activities onsite, including backup documentation making compliance with equipment maintenance records easily accessible.

EUBOILER8

Per ROP requirements, the Facility operates EUBOILER8 in general compliance with the CO Minimization Plan and Start-up/Shut down Plan for the EU. CEMS monitoring of NO_x and O₂, as well as appropriate EU inspection and maintenance activities are conducted to maintain the EU and assure appropriate operations. The most recent versions of the referenced plans for EUBOILER8 were received electronically by the District office on August 19, 2015.

EULIMEKILN

Process restrictions/conditions for the referenced emission unit are limited to installation, maintenance and operation of the wet scrubber (aka gas washer/quencher) which is to be operating satisfactorily. At the time of the inspection, all process equipment was reported to be operating properly and in general compliance with the ROP for the facility.

It should be noted however, that the requirement for the installation and operation of the gas washer (III.1) had been requested to be removed by MSC in the 2011 and 2016 ROP Renewals. The facility reports that the gas washer/quencher is not pollution control equipment but is part of the process equipment associated with the carbonization process. However, the gas washer/quencher acts like a bubbler, gases generated by the limekiln bubbling thru the control both cooling and removing PM from the gas. No gauges or other monitoring components are reported to be present for the gas washer/quencher.

EUPELLETPRDCTN

EUPELLETPRDCTN is a Compliance Assurance Monitoring (CAM) EU, emissions of which are controlled by cyclones and a wet scrubber. The pollution control devices have been installed with instrumentation to measure the pressure drop across and the water flow over the wet scrubber. In addition, there is an audible alarm that sounds when water flow stops. The facility staff report this is tested at least once a year when the pellet production area is shut down at the end of campaign.

Process restrictions associated with EUPELLETPRDCTN require the presence of plant personnel in the basement conveyor area for operation of the basement conveyor wall vent. MSC personnel have historically reported that the wall vent had been installed for the purpose of employee comfort and safety, during operation of the conveyor and is only operated when staff are present in the basement. The referenced conveyor loads out pellets from the silo bottom to the hoppers. The pellet production area was not operative at the time of the inspection, and the vent was not in operation. It should be noted that the vent at the time of the original PTI application vented directly outside. The permit was modified to reflect the connection of the vent to the dust collection equipment associated with the EU.

Conditions associated with EUPELLETPRDCTN also specify that all vehicles transporting pellets off the plant site will be covered or otherwise enclosed. In addition, the ROP requires that the pellet silo unloading elevator will be equipped with an extendable chute to minimize the pellet drop height to a maximum of 6-inches above the side of the vehicle bed (the ROP has a typo that indicates the conditions are for when the vehicle is being "unloaded"). No vehicles were being

loaded or leaving the site at the time of inspection to confirm compliance for these two conditions.

EUSTEAMDRYER

Operational limits/conditions associated with EUSTEAMDRYER were identified in the existing ROP. Records of dried pulp production are maintained as part of standard business practices, and include daily, weekly and monthly totals, as well as “to date” totals of production. No limits are associated with this emission unit.

EUANAEROBIC DIGESTER

The referenced emission unit is part to the MSC WWTP and includes an anaerobic digesting system (“ANAMET” tank) equipped with a flare which acts as a pollution control device. Conditions in the ROP for the facility require that the anamet system will not be operated unless a spark-ignited flare pilot at the flare is installed and operated in a satisfactory manner. It also requires that flow of biogas to the flare shall stop if the flare fails to ignite. At the time of the site inspection, the flare was operating, and MSC staff reported that no malfunctions had occurred since the 2009 AQD inspection.

As design/equipment parameter conditions, no detectable emission from the pressure-relief device on the process is allowed, except during malfunction. The permittee is required to conduct an inspection of the pressure relief device within 2 working days of a pressure release and at least once annually. Documentation provided indicates that the emission unit has been inspected at minimum annually for the past 5 years. The two most recent inspections being February 4, 2015 and December 16, 2016.

Per MSC staff, the pressure relief valve is under 2-3 lbs of pressure and activates at approximately 12 psi of pressure. The pressure release device prevents damage to the anamet tank. The referenced valves were reported to have last been serviced on September 6, 2011.

Emission Points –

EUBOILER#8 and FGBOILERS (EUBOILER#6 and #7)

The referenced emission units are natural gas fired boilers used to provide process steam and heat to the facility. Emission limits associated with the emission units are NO_x and CO. The EU is equipped with CEMs for monitoring NO_x and O₂. Required data is submitted quarterly and semi-annually in compliance with the ROP.

It should be noted that during the December 2016 RATA activities it was noted that CO CEMS were also installed for FGBOILERS. Facility staff reported that the units were not installed to meet permit conditions, but that they have been used by the facility to better monitor boiler operation and tuning.

The facility in response to the November 9, 2016, request provided the following emissions data for review (December 19, 2016):

- EUBOILER#8
 - Daily Gas usage in MCF (January 2015 and December 1, 2015 through February 29, 2016)
 - NO_x Emissions (lb/MMBTU)(daily) (January 2015 and December 1, 2015 through February 29, 2016)

- NOx Emissions (30-day rolling average, lb/MMBTU) (daily) (January 1, 2015 through September 30, 2016)
- FGBOILERS
 - Daily Gas usage in MCF (January 2015 and December 1, 2015 through February 29, 2016)
 - NOx Emissions (lb/MMBTU)(daily average) (January 2015 and December 1, 2015 through February 29, 2016)

In addition to the above information, the following information was not provided as part of the December 19, 2016 submittal by the facility:

- EUBOILERS-
 - NOx Tons/yr (12-month rolling total)(monthly)
 - Maximum daily heat input capacity (appears that facility provided data as percent of capacity per month)
 - Summary of dates and times in which EUBOILERS8 operated in startup or shutdown conditions.
- FGBOILERS
 - NOx Tons/yr (12-month rolling total)(monthly)
 - Maximum daily heat input capacity (appears that facility provided data as percent of capacity per month)
 - Summary of dates and times in which EUBOILERS8 operated in startup or shutdown conditions

Note that 8 hour average CO emissions for FGBOILERS were not requested as part of the supplemental data request).

A review of data the above referenced data has not been completed at the time of report preparation, based on electronic correspondence dated December 22, 2016 which indicates that errors have been found in the data previously submitted, but did not indicate what components of the submittal needed to be corrected.

EULIMEKILN

The role of the lime kiln is the production of CO2 gas and CaO from limestone and coke/anthracite coal for purification and filtration of liquid sugars. Emission limits associated with this EU include SO2 and PM from two stacks (approximately 185 feet high) associated with the lime kiln. Emission limits associated with this EU include SO2 and PM from two stacks (approximately 185 feet high) associated with the lime kiln and a pressure relief valve associated with the carbonation tanks. CO2 is reported to be completely used in the carbonation tanks.

Changes to testing requirements, addition of the pressure relief as a stack (SVLIMEKILNPRESSRELF) and updated VE requirements were made as part of a ROP MOD in 2015, and are incorporated into the renewed ROP.

The results of the January 22, 2015, stack test results are presented below:

Parameter	Limits	Results
PM	0.2 lb/1000 lb	0.0707 lb/1000 lb
SO2	8 lb/hr	0.0190 lb/hr

SO2	35 ton/yr @ 8760 hr/yr	0.0832 ton/yr @ 8760 hr/yr
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The company has indicated that it will be using the above test data for future annual emissions reporting (MAERS).

Daily visible emission surveys are required for opacity from SVLIMESTACK1 & 2 and SVLIMEKILNPRESSRELF. The latter of the three emission points is reported by the company to be frequently obscured by other vents and their steam plumes. Compliance with respect to VEs is considered met as long as the company documents an attempt to verify VEs from SVLIMEKILNPRESSRELF. Records reviewed as part of the October 14, 2016, inspection verified general compliance with the permit condition.

SO2 emissions have historically been determined based on sulfur content of the coke used in the equipment. Sulfur content is determined by laboratory analytical records of which are submitted to MSC by the vendor. In addition, the facility conducts verification sampling and analysis once per campaign in compliance with permit conditions. Laboratory analyticals provided for both anthracite coal and coke samples collected by the facility for the 2014-2015 and 2015-2016 campaigns, reported sulfur concentrations of 0.70% and 0.72% percent sulfur (dry basis) content in the coke samples, respectively.

More recently the Facility has began estimating total SO2 emissions for this EU based on stack test data, which has resulted in a decrease in reported SO2 emissions. The facility has reported that it has not at this time updated it's spreadsheet to reflect the newer emission calculation method, and the 12-month rolling SO2 emissions. They report that since 2015 SO2 emissions for the EU were approximately 122 lbs, that the 12-month rolling totals for 2015 and 2016 will not exceed the 35 ton per year limit.

EUPELLETPRODUCTN

This emission unit is associated with the pellet production area and consists of two pellet coolers, conveyors and associated storage silo. Particulates are the identified air contaminant associated with this process area. The control devices for the pellet production area consist of one cyclone for each of the two pellet coolers, and an additional cyclone for the material handling and conveyor area. All three cyclones are in parallel and connected to a wet scrubber to control PM. Material collected as a result of the three cyclones is returned to the pellet press for processing. Note that the files indicate that prior to 1987-1988 the wall vent in the silo basement vented directly to the outside. The original PTI for the equipment was modified to connect the wall vent with the existing pollution control equipment, with the material being drawn in by the fans associated with the existing control devices.

The ROP requires MSC to equip and maintain the wet scrubber with instrumentation to continuously measure the pressure drop, instrumentation to measure the flow in the scrubber and an audible alarm which will sound when flow stops. At the time of the inspection, EUPELLETPRODUCTN was not in operation, however written logs were inspected, and AQD staff verified that MSC staff are monitoring the pressure drop across the wet scrubber using a manometer, and that an audible alarm was installed.

As no pellet loading or transport activities were being conducted at the time of the site inspection, confirmation of compliance conditions associated with those activities could not be made.

EUANEROBICDIGESTER

Emissions associated with EUANEROBICDIGESTER include SO₂, which are controlled by the flare associated with the anamet tank. Biogas generated in the tank is burned off at the flare, or is released from a pressure relief device for the anamet tank.

At the time of the PTI application for this emission unit the anticipated composition of the biogas was CH₄ (65%), CO₂ (29%), H₂O (5%), H₂S (0.5%) and N₂/H₂ (trace). SO₂ emission limits were determined based on conversion factor of 64 lbs SO₂ per 34 lbs of H₂S. This resulted in emission limits of 20.14 pph and 36.10 ton/year, respectively for SO₂. Based on laboratory analysis of gas samples collected from the facility during the 2011-2012 and 2012-2013 campaigns, it was determined that the actual emission rates were significantly lower than factors used during permitting and that the average emission factor of 0.0210% by volume would be used for future determinations of emissions. The proposed emission factor was approved by District Staff in February 2014.

Records of gas flow are kept on a daily basis. Monthly reports are submitted by the facility to the District indicating the daily average biogas flow (cubic feet/day), the daily average SO₂ emissions (lb/hr), daily maximum SO₂ emissions (lb/hr), monthly total SO₂ emissions (tons) and 12 month rolling total SO₂ emissions (tons). Emissions are reported on a monthly basis and are in compliance with permit limits.

Under the present permit the facility is required to conduct an inspection within two days of a pressure relief valve release or once a year to determine if there are detectable emissions. "No detectable emissions" is defined in the ROP as an instrument reading of less than 500 ppm above back ground by EPA Method 21 (VOCs) or equivalent. No pressure releases were reported since the last inspection. The Facility reported the most recent inspection was conducted February 4, 2015 and December 16, 2016, using a MSA Altair, to read combustibles, methane and CO₂ concentrations. Concentrations were reported in percent (%) rather than in ppm as indicated by permit.

EU COOLING TOWER

Initially approved under a PTI in July 2001, MSC installed a three cell, water cooling tower to cool process waters from the condensers. The tower allows for use of recycled/cooled water in the process, reducing the quantities of additional fresh water drawn from the Saginaw River, and reducing the volume of process waters going into the waste water treatment system for the facility. The EU is reported to be down for maintenance for anywhere from a week to a month during the interim campaign.

Emissions associated with the process are the result of ammonia in the condensate waters. The ammonia is extracted along with sugar from the beets during the sugar making process, but remains in the water unlike the sugars which are removed in the process. Under their ROP the facility is recorded to record the water pump discharge pressure and concentration of ammonia in the water three times a week. Based on pump discharge pressure and pump curves, the facility can determine the volumetric flow rate of water entering the EU. Emission limits for the referenced emission unit are listed as 920 pph based on a 24-hour average. A review of requested data for one month each in 2015 and 2016 indicated that the EU was in general compliance with the permit conditions.

EUSTEAM DRYER

Emissions for EUSTEAM DRYER are limited to uncombined water vapor. The EU is a fluidized bed steam pulp dryer, which utilizes steam generated from the natural gas boilers onsite. The EU is not vented, and drying takes place in a closed and pressurized vessel.

FGRULE290

The molasses desugarization process (EUMOLASSEDESUG/FGRULE290) utilizes chromatographic separation to further extract sugar and other products from the molasses. During the molasses desugarization process the molasses is diluted, filtered and degasified. Equipment associated with molasses desugarization process include extract and molasses scales, dilute and heavy molasses tanks, extract storage and supply tanks, molasses bodyfeed tank, molasses precoat tank, sluice tank, upgrade supply tank, raffinade (concentrated molasses solids) supply and betaine supply tanks. Emissions of water vapor and VOCs are anticipated to be present as a result of the process activities, with both the steam and VOCs going into condensate.

Emission testing conducted in June 2004 on emissions based on filling and breathing losses from the raffinade supply tank and addressed citrate, malate, lactate, formate and acetate compounds identified in molasses and emitted as acids (citrate as citric acid, etc.). Based on throughput volumes reported during the time of testing, PTE VOC emissions of approximately 12 lbs per month were reported, well below the 1,000 lbs of VOC per month allowed under Rule 290. No visual emissions were noted in the molasses desugarization process area.

Monitoring and Testing –

EUBOILER8 and FGBOILERS (EUBOILER#6 and #7)

The referenced emission units are natural gas fired boilers used to provide process steam and heat to the facility. FGBOILERS (EUBOILER#6 and #7) are equipped with Low NOx Burners, Oxygen trim and Flue Gas Recirculation. Each boiler has one stack. Emission limits associated with FGBOILERS include NOx and CO. Emission limits for EUBOILER8 include NOx, CO and PM 2.5.

CEMS - The EUs are equipped with CEMs for monitoring NOx and O2. The referenced CEMs are calibrated automatically on a daily basis with appropriate standards. The CEMs are reported to automatically alarm when the instrument calibration drifts outside of acceptable ranges. Documentation of CEMs emission readings and calibration data is maintained electronically at the facility, and is obtainable by facility staff upon request. CEMS calibration data is requested and reviewed independent of site inspection activities. The most recent review found records in general compliance with the ROP. A supplemental request shall be made early in the calendar year 2017 for the previous calendar year.

Cylinder Gas Audits (CGAs) are conducted quarterly for each CEMs unit, with annual Relative Accuracy Test Audit (RATA) activities have historically been conducted in December and the most recent tests are summarized below.

RATA DATE	Emission Unit	Parameters	Pass or Fail
12/12 & 13/2016	Boilers 6,7,8	NOx & O2	Pass
12/15 & 16/2016	Boilers 6,7,8	NOx & O2	Pass
12/8 & 9/2014	Boilers 6,7,8	NOx & O2	Pass
12/17 & 18/2013	Boilers 6,7,8	NOx & O2	Pass

12/18 & 19/2012	Boilers 6,7,	NOx & O2	Pass
11/20/2012	Boiler 8	NOx & O2	Pass
12/7 & 8/2011	Boilers 5,6,7	NOx & O2	Pass
12/8 & 9/2010	Boilers 5,6,7	NOx & O2	Pass

CEMS events/issues reported by the company verbally or in quarterly, semi-annual and/or annual reporting for 2015-2016 and included:

EUBOILER8

- VN issued June 3, 2016, for CEMS failures totaling 14.7% monitor downtime for the 4th quarter of 2015 and 23% of 1st quarter of 2016 for EUBOILER8. Between the 2 quarters 35 successive days of failed monitors were reported.

The company in its response (June 22, 2016) indicated that the failure was due to issues with the zirconium cell which are not kept onsite, and that they used alternative monitoring activities to ensure that no NOx exceedances occurred during the time period, and that monitor repairs were conducted promptly and the units were returned to service.

- Shutdown of EUBOILER8 prior to CGA testing for 2nd quarter 2016 could be completed. CGA testing was conducted on August 29, 2016, prior to initiation of 2016-2017 campaign.

FGBOILERS

- January 22, 2015, verbal notification of the district office of new O2 monitor for EUBOILER7. RATA testing for new monitor was conducted January 27, 2015.
- 35.81% monitor downtime reported for O2 monitor for EUBOILER#7 for the 2nd quarter of 2015. Review of data indicated that the downtime was unusually high due to only 77 hours of operation for EU. No VN was issued.
- On December 12, 2016, District Staff was notified verbally of replacement NOx CEMS for EUBOILER#7 and EUBOILER#6 and O2 monitor for EUBOILER#6. AQD TPU Staff requested that 7 day drift data for the new units be submitted with the results of the December 2016 RATA report.

Boiler Operational and Emissions – A request for operational and emissions data monitored and recorded by the facility was sent electronically on November 9, 2016. As previously indicated in the “Emission Points” portion of the report the Facility’s December 19, 2016 electronic response was incomplete, and in electronic correspondence dated December 22, 2016, it was indicated that errors in the submittal had been found. No supplemental information was provided prior to completion of this document. A review of operational and emissions data submitted has not been completed at the time of report preparation.

Required reporting data is submitted quarterly, semi-annually and annually by the facility, (copies of which are on file at the District Office).

Per the ROP, emissions testing are required for EUBOILER8 for PM 2.5, NOx, and CO exhaust gases. The required testing was conducted on November 20, 2012, in compliance with the permit. Testing results reported indicated that emissions were below appropriate permit limits.

EULIMEKILN

Under the present ROP the permittee is required to keep monthly records of the amount of coke/anthracite coal used in the lime kiln, as well as to monitor and keep records of the sulfur content of the coke/anthracite charged to the lime kiln on an intermittent basis. The records are to include the percent sulfur content and the heat input in BTUs per pound of fuel.

In addition the permittee is required to maintain a record of the coke analysis of all shipments, and conduct an independent verification sampling at least once per sugar campaign. MSC staff maintain copies of the required records as part of normal business operations. Verification testing is conducted a minimum of once per year. Copies of the verification analysis were provided as requested. Analyticals for verification testing and AQD inspector grab sampling indicated that sulfur analysis was consistent with requirements.

In addition, as a condition of the present ROP, the facility is required to test both stacks of EULIMEKILN for SO2 and PM emissions. SO2 and PM testing for EULIMEKILN thru SVLIMEKILNPRESSRELF was conducted on January 22, 2015.

Copies daily Visible Emission (VE) surveys for daylight hour opacity from SVLIMEKILNPRESSRELF, SVLIMEKILNWESTSTACK and SVLIMEKILNEASTSTACK were reviewed as part of the October 14, 2016 compliance evaluation. All records appeared to be in general compliance with the ROP. Time periods in which one or more stacks were obscured by other steam plumes were documented as attempted and met the intent of the permit condition as agreed upon by District Staff.

EUPELLETPRDCTN

Monitoring activities associated with EUPELLETPRDCTN included monitoring of the differential pressure drop across the wet scrubber and three cyclones associated with the production area. The referenced readings are recorded manually once per shift, meeting the once per calendar day required under the facilities ROP.

In addition to the audible alarm installed to go off if flow was stopped to the wet scrubber MSC staff has installed a visual alarm in the form of a light which shuts off under alarm conditions. MSC staff indicated that the audible alarm is tested whenever the flow has to be shut off for the wet scrubber. The logs kept for EUPELLETPRDCTN also included documentation as to whether flow was present for the wet scrubber. Copies of handwritten logs reviewed and copies provided appear to be sufficient to meet compliance requirements. Differential pressure readings and water flow rates were recorded as required under the ROP and appeared to be in compliance with acceptable ranges identified for proper operation.

EUANEROBICDIGESTER

Monitoring activities associated with EUANEROBICDIGESTER include monitoring and recording on a daily basis the mass flow rate of methane gas and hydrogen sulfide gas going to the flare. In addition the permittee is required to keep a record of each pressure release and each pressure-relief device inspection. Records were found to be in general compliance with permit conditions.

EUCOOLINGTOWER

Emissions associated with the process are the result of ammonia in the condensate waters. The ammonia is extracted along with sugar from the beets during the sugar making process. ROP requirements include monitoring and recording of the ammonia concentrations and water pump discharge pressure for the tower a minimum of three times per week. A review of data requested for the months of January 2015 and April 2016 indicated that the facility was operating in general compliance of the permit.

Record Keeping and Reporting –

A request for operational and emissions data monitored and recorded by the facility was sent electronically on November 9, 2016. As previously indicated in the “Emission Points” portion of the report the Facility’s December 19, 2016 electronic response was incomplete, and in electronic correspondence dated December 22, 2016, it was indicated that errors in the submittal had been found. No supplemental information was provided prior to completion of this document. A review of operational and emissions data referenced above has not been completed at the time of report preparation.

A review of reports received to date appear to indicate that the required reporting under the ROP is being conducted in a timely basis. This reporting includes monthly reporting of emissions associated with EUANEROBIC DIGESTER, quarterly testing of the CEMS associated with EUBOILER#6 through #8, as well as semi-annual and annual operation and deviation reports for the facility.

It should be noted that the facility electronically tracks all maintenance activities onsite, including backup documentation making compliance with equipment maintenance records easily accessible.

In addition to data discussed previously, the Facility was required to provide written notification of the date of construction commencement and actual start-up of EUBOILER#8. Notification was received by the district office in correspondence dated September 10, 2012.

EUPELLETPRODUCTN

As previously indicated, monitoring activities associated with EUPELLETPRDCTN included monitoring of the differential pressures for the three cyclones as well as the differential pressure drop and flow across the wet scrubber. As previously indicated the differential pressures and flow data is recorded once per shift, meeting the once per calendar day required under the facilities ROP. No CAM deviations have been reported for this EU. No supplemental reporting is required for this emission unit.

EUANEROBICDIGESTER

A review of District files indicates that monthly reports of biogas associated with the ANAMET tank have been submitted in a timely manner. Records of gas flow are kept on a daily basis. Monthly reports are submitted by the facility to the District indicating the daily average biogas flow (cubic feet/day), the daily average SO₂ emissions (lb/hr), daily maximum SO₂ emissions (lb/hr), monthly total SO₂ emissions (tons) and 12 month rolling total SO₂ emissions (tons). Emissions reported have been in compliance with permit conditions.

SUMMARY

On Friday, October 14, 2016, AQD District Staff conducted a scheduled site inspection at The Michigan Sugar Company Facility (MSC) (SRN B1493) 2600 South Euclid Ave, Bay City,

Michigan. One Renewable Operating Permit (ROP) (MI-ROP-B1493-2016) is associated with the referenced facility and was issued on August 2, 2016, and will expire on August 2, 2021.

The facility was operating upon arrival, and AQD staff conducted site inspection activities with Arnel Negranza (Environmental and Desugarization Engineer), Gary Witzgall (Factory Manager) and Steve Smock (Environmental Engineer). The purpose of the inspection was to determine compliance with the referenced renewable operating permit. The last scheduled inspection for the facility was conducted on December 8, 2014.

A written request for supplemental data/records was requested electronically by District Staff on November 9, 2016. An electronic reminder was sent to the Facility on December 1, 2016. Data submitted electronically by the company for this facility as well as their Caro, Michigan Plant was received on December 19, 2016; at that time it was indicated that the data for the Bay City Plant was not complete. Further electronic communications received on December 22, 2016, indicated that there were errors in a portion of the submittal, and that the preparer may not complete the review/corrections prior to the December 29, 2016 report due date.

Based on the amount of time allowed for the records submittal, the incomplete nature of the submittal, and unknown errors District Staff has determined that the a reasonable amount of time was allowed for records retrieval, and that records are not readily available. Based on general condition 5 and 17, and special conditions EUBOILER8 VI.4 and FGBOILERS VI.7 the facility is determined to be in noncompliance at the time of report preparation. Any supplemental information will be reviewed following receipt. sgl

NAME Sharon Coble

DATE 12/29/16

SUPERVISOR C. Hare