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

A649767069

FACILITY: General Shale Brick, Inc. - DBA Michigan Brick		**SRN / ID:** A6497
LOCATION: 3820 E. Serr Rd., CORUNNA		**DISTRICT:** Lansing
CITY: CORUNNA		**COUNTY:** SHIAWASSEE
CONTACT: Jerry Greger , Plant Manager		**ACTIVITY DATE:** 04/13/2023
STAFF: Michelle Luplow	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Onsite compliance inspection to determine compliance with MI-ROP-A6497-2015 and MI-ROP-A6497-2022a.		
RESOLVED COMPLAINTS:		

Inspected by: Michelle Luplow

Personnel Present: Jerry Greger (jerry.greger@michiganbrick.com), Plant Manager

Bill Stevens, Kiln Operator (bill.stevens@michiganbrick.com), Supervisor

Purpose

Conduct an unannounced, onsite partial compliance evaluation (PCE) inspection by determining compliance with Michigan Brick's ROPs, MI-ROP-A6497-2015 and MI-ROP-A6497-2022a. This activity was conducted as part of a full compliance evaluation (FCE).

Safety/PPE

Onsite visits require high visibility vests, protective eyewear, hard hats, and steel-toed boots. Michigan Brick employees wear respirators when working in the crushing building.

Facility Background/Regulatory Overview

Michigan Brick's official name is General Shale Brick, Inc (Plant 66), dba Michigan Brick. Michigan Brick was formerly Michigan Brick until November 2022 when General Shale Brick purchased the facility and a transfer of ownership occurred. Michigan Brick was also formerly known as Forterra Brick up until May 2017, and prior to that, Hanson Brick.

Michigan Brick, according to J. Greger, is the only brick manufacturer in Michigan and is a supplier of exterior house/face brick primarily for residential construction and primarily purchased by Detroit distributors. This facility does not produce refractory brick. Bricks are manufactured from shale mined from Michigan Brick's shale mining pit, located adjacent and northeast of their brick manufacturing operations. A primary crusher crushes the raw shale into an acceptable size at the grinding plant. The size is then further reduced by grinding the material down to an acceptable mesh size for the pug mixers and brick extruders. Extruded bricks are placed into a drying oven to remove moisture prior to being fired in the natural gas-fired kilns.

Michigan Brick is a major source of SO_2 and PM_{10} and an opt-out source of HAPs. Sulfur from the shale is released as SO_2 upon firing the brick in the kilns. The exhaust stream from the kilns is injected with hydrated lime to neutralize sulfuric acid, in addition to neutralizing hydrofluoric acid (HF) prior to being exhausted through a baghouse to control the lime particulate.

Michigan Brick applied for an opt-out permit for HAPs (PTI 170-18) which was issued in April 2019 and rolled into MI-ROP-A6497-2022. In 2010, per request by the EPA, Michigan Brick conducted stack testing to determine HF emissions as part of the input process for developing the MACT Subpart JJJJJ for Brick and Structural Clay Products Manufacturing (BSCP), published on October 25, 2015 (prior to this date, the subpart was vacated). D. McKeown, Michigan Brick's Regional Environmental Manager, provided me with the 2010 stack test results

during a previous inspection which demonstrated that Michigan Brick was a major source of the HAP, HF (a potential to emit greater than 10 tons per year), and thus resulted in Michigan Brick becoming subject to the MACT Subpart JJJJJ. In June 2018, a stack test was conducted on EUKILN01 (EUKILN02 was not able to be tested due to the roof collapsing) to determine compliance with the MACT Subpart JJJJJ, in addition to gathering data that would demonstrate that HAP potential emissions are below major source thresholds. Results contained emissions of the following elements and compounds: hydrochloric acid (HCl), chlorine (Cl_2), HF, mercury (Hg), antimony (Sb), arsenic (As), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), manganese (Mn), nickel (Ni), and selenium (Se). The data showed that neither the individual HAPs, nor aggregate HAPs, potential to emit exceeded the 10 tpy and 25 tpy major source thresholds, if operating at maximum routine conditions. Due to the "once in, always in" MACT policy being challenged in court, Michigan Brick chose to opt-out of the MACT by obtaining PTI 170-18. With issuance of the opt-out permit for HAPs before June 25, 2019 (required test date for EUKILN02), Michigan Brick was no longer subject to the MACT Subpart JJJJJ because they took restrictions to limit their HAP potential to emit.

In addition to obtaining the HAPs opt-out, PTI 170-18 also allowed for the replacement of the whirlwet particulate control device with a fabric filter baghouse, which is associated with FGPLANT1.

EUCRUSHING processes are subject to the NSPS Subpart OOO for nonmetallic mineral crushing.

MI-ROP-A6497-2022a (simple administrative amendment) was issued January 25, 2023 to change the owner/facility name on the ROP from "Meridian Brick" to "General Shale Brick, Inc. (Plant 66) dba Michigan Brick."

J. Greger said that EUKILN02's roof has spots that need to be replaced. There are currently no plans to fix EUKILN02's roof because there is not enough demand to justify the need to operate EUKILN02. A reconstruction analysis will need to be submitted to demonstrate that rebuilding EUKILN02's roof is exempt when and if Michigan Brick decides to do so.

Inspection

On April 13, 2023, I arrived at Michigan Brick at approximately 9:45 a.m. and met with Bill Stevens and Jerry Greger. Upon entry into the facility I noticed slight track-out onto Serr Road, but not enough where, in my professional judgment, there would be enough trackout to cause fugitive dust issues from Serr Road traffic. The unpaved plant entry road was well-maintained: driving on this unpaved surface did not cause any fugitive dust to be generated.

The shale mines that Michigan Brick uses for brick production are regulated under EGLE's Water Resources Division for water discharge. Michigan Brick is currently mining their "older" shale pit which is located north of the facility (the corner of Serr Road and Vitrified Highway), and, as of January 2023, they have opened a second shale mine located south of Serr Road (see attached maps), which they are also mining. The new, southernmost pit has a life expectancy of 20 years. Shale mining is conducted by Great Lakes Fusion, who also owns and operates nonmetallic mineral crushers.

B. Stevens said shale mining is conducted by Great Lakes Fusion between October and April, annually, 5 days per week, to build up their shale stockpiles. During this inspection, Great Lakes Fusion was actively mining shale from the southernmost shale pit. B. Stevens said he expects shale mining to cease prior to the start of summer. Crushing of the shale occurs year-round (minus weekends and holidays). The shale stockpiles currently being used for brick manufacturing are from the "old" shale mine.

Michigan Brick currently operates 3 shifts: The kilns operate 24 hours per day, 7 days per week; kiln operators are present all 3 shifts; and production operations occur on first and second shifts.

Table 1 lists all equipment currently onsite.

Table 1. Michigan Brick equipment list.

Emission Unit	Description	Control Device
EUCRUSHING	See Table 2 for a list of EUCRUSHING equipment.	Primary crushing is conducted underground, all other grinding equipment is enclosed within a building.
EUTRUCKTRAFFIC	Facility-wide truck traffic	Dust suppressant methods as necessary
EUSTORAGE	Shale stock piles	Dust suppressant methods as necessary
EUPUG-90	Mixer and extruder to add color and texture to brick	Pulse-jet baghouse collector
EUKILN01	Natural gas-fired brick tunnel kiln. Operational.	Baghouse with lime injection
EUKILN02	Not Operational. Natural gas-fired brick tunnel kiln	Baghouse with lime injection
EUPUG-30	Small extruder	Controlled by Donaldson Torit dust collector (DFO3-12). Shares this control with EUPUG-50, EUSMALLDRYER, EUSMALLMIXER.
EUPUG-50	Mixer with extruder	Controlled by Donaldson Torit dust collector (DFO3-12). Shares this control with EUPUG-30, EUSMALLDRYER, EUSMALLMIXER.
EUSMALLDRYER	Sand dryer	Controlled by Donaldson Torit dust collector (DFO3-12). Shares this control with EUPUG-30, EUPUG-50, EUSMALLMIXER.
EUSMALLMIXER	Paddle mixer	Controlled by Donaldson Torit dust collector (DFO3-12). Shares this control with EUPUG-30, EUPUG-50, EUSMALLDRYER.
Parts Washers	2 Parts Washers using a 0.42 lb/gal VOC degreaser	Rule 281(2)(h) and contained within the ROP under FGPARTSWASHER

EUCRUSHING

EUCRUSHING equipment and grinding plant feed belt were operating during the inspection. B. Stevens said crushing occurs during the first shift only, although, they may change crushing operations to third shift (10 p.m. – 6 a.m.). As long as the kilns are operating they will need to process shale. B. Stevens confirmed there have

been no new installations to EUCRUSHING and no modifications or changes to the existing equipment, except for the addition of Belt C in 2019.

This emission unit is comprised of NSPS Subpart OOO-subject process equipment and includes crushing equipment used to decrease the size of the mined shale; the equipment used to handle and transport the crushed material; and control methods.

The primary crusher is located underground, and the grinding plant feed belt is an enclosed conveyor located on the outside of the crushing building. The secondary crusher located within the grinding plant building is equipped with a baghouse which exhausts to the in-plant environment. All equipment except for the primary crusher and grinding plant feed belt are enclosed within the grinding plant building.

See Table 2 for a list of equipment, control devices, opacity limits, and visible emissions noted during the inspection. Visible emission observations for all equipment located within the grinding plant building were determined by viewing the outside of the grinding plant from all angles to ensure that opacity was not emitting from any portion of the building.

J. Greger said that respirable silica dust is a hazard within the grinding building and Michigan Brick employees are required to be fit-tested for respirators per MIOSHA. J. Greger said they've also installed a drop curtain, as well as water spray bars on the crushing equipment to further minimize exposure to Michigan Brick's employees.

There are currently no Testing/Sampling or Stack/Vent Restriction requirements for EUCRUSHING.

Emission Limits & Monitoring/Recordkeeping

Opacity is limited to 15% for the primary crusher and 10% for the grinding plant feed belt. The remaining equipment is located within the crushing plant building and has an opacity limit of 0% from the building (i.e. there should be no visible emissions (VEs) emanating from the crushing plant building). Belt C is the exception, with a 7% opacity limit. Michigan Brick is required to perform and record the results of a visible emission observation during routine operating conditions at least once per calendar month on the primary crusher, grinding plant feed belt and the grinding plant building. During the inspection, as noted in Table 2, I saw no signs of opacity from the crushing plant building, the grinding plant feed belt, nor the primary crusher.

As I requested, J. Greger provided me with calendar year 2022 monthly VE records for these pieces of equipment. All records were provided and reviewed; records indicate that there were no VE's seen from the primary crusher, grinding plant feed belt, or the grinding plant building on the days that the VE observations were taken. J. Greger clarified that "Reading 1," designated at the bottom of the VE forms, is for the grinding plant feed belt, while readings 2 and 3 are for the grinding plant building. See attached for a snapshot from the provided records.

Table 2. EUCRUSHING equipment (Appendix 9 of ROP)

Equipment Description	ID Number	Opacity Limit (Percent)	Control Device	Visible Emissions during inspection
Primary Crusher	462-76	15	N/A - Located underground	None
Grinding Plant Feed Belt	No. 1	10	Equipment enclosure	None
Stedman Impact grinder	SGR-1	0	Enclosed in Building	None
Stedman Grinder exit belt	No. 7	0	Enclosed in Building	None

Equipment Description	ID Number	Opacity Limit (Percent)	Control Device	Visible Emissions during inspection
Elevator belt to screens	No. 8	0	Enclosed in Building	None
Screen feed/plow belt	No. 9	0	Enclosed in Building	None
Finished belt under screens	No. 10	0	Enclosed in Building	None
Finished short cross conveyor	No. 11	0	Enclosed in Building	None
First finished elevator conveyor	No. 12	0	Enclosed in Building	None
Second finished elevator conveyor	No. 13	0	Enclosed in Building	None
Finished shuttle car conveyor	No. 14	0	Enclosed in Building	None
Coarse return belt	No. 4	0	Enclosed in Building	None
Coarse return elevator belt	No. 5	0	Enclosed in Building	None
Coarse return short feed belt	No. 6	0	Enclosed in Building	None
Reclaimer system	REC-1	0	Enclosed in Building	None
Reclaimer conveyor belt	Belt A	0	Enclosed in Building	None
Belt to splitting tower	Belt B	0	Enclosed in Building	None
Leahy screen #1	Screen 1	0	Enclosed in Building	None
Leahy screen #2	Screen 2	0	Enclosed in Building	None
Leahy screen #3	Screen 3	0	Enclosed in Building	None
Leahy screen #4	Screen 4	0	Enclosed in Building	None

Equipment Description	ID Number	Opacity Limit (Percent)	Control Device	Visible Emissions during inspection
Simplicity Screen #5	Screen 5	0	Enclosed in Building	None
Simplicity Screen #6	Screen 6	0	Enclosed in Building	None
2019 Belt	Belt C	7	Enclosed in Building	None

Material Limits & Monitoring/Recordkeeping

Michigan Brick has a material limit of 225,000 tons of material throughput in EUCRUSHING per 12-month rolling time period. As requested, J. Greger provided me with 12-month rolling records for January 2020 – February 2023. The 12-month rolling period with the highest total tons processed during January 2020 – February 2023 was 93,200 tons (see attached records) during the period of February 2019 - January 2020. Michigan Brick appears to be meeting EUCRUSHING material limits at this time.

Design/Equipment Parameters

Michigan Brick is required to label all equipment using company ID numbers according to the ID numbers in Appendix 9 in the ROP and within Table 1. The equipment was verified that it was ID'ed during a previous inspection, the ID's are located on the belt guards.

Process/Operational Restrictions

Michigan Brick must not operate EUCRUSHING, EUSTORAGE, or EUTRUCKTRAFFIC unless the Fugitive Dust Control Plan in Appendix 10 is implemented and maintained:

Fugitive Dust Control Plan:

Site Roadways/Plant Yard/Truck Traffic

Dust on the site roadways and the plant yard are required to be controlled by water, calcium chloride, or other acceptable and approved fugitive dust control compounds. Records of all dust suppression activities are required to be kept.

I observed 30+ commercial and personal vehicles onsite during the inspection; none of this traffic resulted in fugitive dust emissions from the unpaved portions of the plant yard (i.e. near process equipment, office, and site entryway); however, I did note fugitive dust in excess of the 5% opacity standard for truck traffic throughout the westernmost area of the plant yard where shale is stockpiled. See attached photo for dry haul road conditions. B. Stevens said this road is used strictly by Great Lakes Fusion who mines and stockpiles the shale and that he would ask Great Lakes Fusion to apply water to control the dust. I explained to B. Stevens that Michigan Brick has a responsibility to maintain the unpaved roads, regardless of who is using the roads. On April 19, 2023, J. Greger sent a photo of the watered haul road. Based on the photo, the unpaved haul road appears to have been maintained by water.

J. Greger said that they plan to apply calcium chloride to their unpaved plant yard in May and September 2023. He said they typically apply calcium chloride to the unpaved areas twice per year (during the summer operating season).

The Fugitive Dust Control Plan also requires that all paved roadways and paved areas of the plant yard be swept between dust control applications, as needed, and any spillage on roads shall be cleaned up immediately. During this inspection I noted piles of spillage pushed off to the sides of the paved plant yard near the buildings and other process equipment. I pointed this out to B. Stevens onsite, and to J. Greger during a followup call on May 19, 2023. I noted that it is required by the Fugitive Dust Plan that all piles be routinely cleaned up. J. Greger acknowledged this issue and stated it would be taken care of.

J. Greger said they installed scrapers on the outside conveyor belts. He explained that the material being conveyed is wet and likes to stick to the belt, so the scrapers ensure that the wet material is removed to reduce the amount of material that falls off the conveyors to the ground.

J. Greger said they have 3 vacuum sweeper trucks to continue to maintain these paved portions of their facility. He showed me one of the units onsite. The vacuum sweepers are used once per week on paved portions of the plant yard and paved plant roads, depending on the weather. J. Greger said they will not use the vacuum sweeper when it's raining.

During the non-winter months J. Greger said Michigan Brick uses calcium chloride on the unpaved roads and unpaved plant yard twice per year at a minimum, and that it is working so well they don't need to use their 3,000-gallon water truck to keep the dust down in these areas (although they still maintain this truck onsite).

Although not required by the fugitive dust control plan, 10 mph speed limits signs are posted.

Plant

Drop distances between transfer points must be kept at a minimum to reduce fugitive dust from transfer operations. There were not transfer operations being conducted during the site visit to verify drop distances were being minimized.

Storage Piles (includes verification of compliance with EUSTORAGE conditions for open area storage piles)

Stockpiling of all shale is to be performed to minimize drop distance and control potential dust problems and the storage piles shall be watered as needed to meet the opacity limit of 5%. Stockpiling of the nonmetallic minerals occurs behind the facility. I did not witness the process of stockpiling during the site visit and therefore could not determine compliance with the requirement to conduct stockpiling with a minimum drop distance; however, I saw no signs of fugitive dust from any of the storage piles during the inspection.

J. Greger said that they've never had to water the storage piles because there is enough naturally-occurring water in the material to keep the piles from releasing fugitive dust.

Truck Traffic

Vehicles are required to be loaded to prevent their contents from dropping, leaking, blowing or otherwise escaping. We observed no truck loading during the inspection.

Based on the condition of the unpaved roads and yard during the inspection, it appears that Michigan Brick is maintaining most of these areas according to their Fugitive Dust Control Plan, with the exception of the haul road from the quarry to the storage piles. J. Greger noted they would work to maintain this dust as well as clean up with material piles around the paved areas of the plant to ensure compliance with the Fugitive Dust Control Plan. It is my professional judgment that a review of their dust suppressant application records was not necessary at this time; however, failure to address the fugitive dust from the haul roads and material spillage clean up may result in a violation notice in the future.

EUTRUCKTRAFFIC

This emission unit addresses all truck traffic related to delivery of material products to customers, traffic from the quarry pit to the processing area, loader traffic, storage pile handling and loading delivery trucks.

There are currently no Material Limits, Design/Equipment Parameters, Testing/Sampling, or Stack/Vent Restrictions for EUTRUCKTRAFFIC.

Emission Limits & Monitoring/Recordkeeping

Opacity from EUTRUCKTRAFFIC operations is limited to 5% opacity, based on a 6-minute average. As previously stated in this report, it was observed that the opacity from the truck traffic on the haul road from the shale quarry to the storage pile was greater than 5%. A Method 9 was not conducted, but rather I requested that dust control be applied as soon as possible to address the exceedance. B. Stevens agreed to this, and the issue was corrected, as demonstrated by the photo sent by J. Greger on 4/19/23.

Records of monthly uncertified visible emission readings are required to be kept. J. Greger keeps records of "Monthly Truck Traffic Visible Emissions" readings and provided me with these records for January - December 2022 (see snapshot attached), as requested. These records include the required VE readings from the Pit Road, Plant road/yard, and storage piles. All monthly recorded readings were 0% opacity.

Process/Operational Restrictions

The fugitive dust plan in Appendix 10 is required to be implemented in maintained in order to operate EUTRUCKTRAFFIC. Evaluation that Michigan Brick is meeting this requirement is found under the EUCRUSHING discussion.

EUSTORAGE

This emission unit covers open area storage piles of various material sizes and product types.

There are currently no Material Limits, Design/Equipment Parameters, Testing/Sampling, or Stack/Vent Restrictions for EUSTORAGE.

Emission Limits & Monitoring/Recordkeeping

Opacity from EUSTORAGE operations is limited to 5% opacity, based on a 6-minute average. Records of monthly uncertified visible emission readings are required to be kept. At any time that visible emissions are observed, certified Method 9 readings are required to be taken. J. Greger keeps records of EUSTORAGE opacity on the "Monthly Truck Traffic Visible Emissions" document. He provided me with these records for January – December 2022 (see attached), as requested. All monthly recorded readings were 0% opacity.

During the inspection I saw no signs of opacity from any of the storage piles.

Process/Operational Restrictions

The fugitive dust plan in Appendix 10 is required to be implemented in maintained in order to operate EUSTORAGE. Evaluation that Michigan Brick is meeting this requirement is found under the EUCRUSHING discussion.

Michigan Brick is in compliance with all conditions under EUCRUSHING, EUTRUCKTRAFFIC and EUSTORAGE at this time.

EUPUG-90

The EUPUG-90 is equipment used for brick extrusion and to add color and texture to the brick. A pulse-jet baghouse is equipped to the mixer/extruder: 4 baghouse compartments with 4 collection bins. The exhaust stack from the dust collector is downward sloping, exhausting approximately 10' above ground level (see attached photos). J. Greger pointed out that they have welded down the tops of the canisters collecting the EUPUG-90 particulate.

This unit was operating during the inspection.

There are currently no Material Limits, Design/Equipment Parameters, Testing/Sampling, or Stack/Vent Restrictions for EUPUG-90.

Emission Limits, Process/Operational Restrictions & Monitoring/Recordkeeping

Particulate matter is limited to 0.10 lbs/1,000 lbs exhaust gases from the baghouse. There are no visible emission limits, but there is a requirement to perform 6-minute uncertified visible emission observations at least once per calendar month and to record these observations. If visible emissions are seen, certified visible emission readings are required to be taken. If there are visible emissions present, this is an indication that the 0.10 lbs/1,0000 lbs exhaust gases limit is not being met, as well as the baghouse not being operated properly.

J. Greger showed me the dust collector for EUPUG-90. I did not observe any VE's emitting from the exhaust stack during the inspection.

I requested monthly records for January – December 2022 (see attached). All records indicate that there were no visible emissions seen during any of the months during this period.

Semi-annual records of inspections, repairs and maintenance on the EUPUG-90 baghouse collector are required based on Michigan Brick's Preventative Maintenance Plan (PMP) (version 4-10-20). I requested these semi-annual records be provided for the 2021 and 2022 calendar years, which J. Greger provided (see attached). Table 3 contains the dates the semi-annual inspections were conducted and the results of those inspections, as documented by Michigan Brick staff. No issues were found during these inspections.

Table 3. EUPUG-90 Semi-Annual Inspection Summary

Semi-Annual Inspection Date	Findings/Comments	Repair/Maintenance Needed?
January 13, 2022	Good	NA
July 18, 2022	Good	NA
July 5, 2021	Good	NA
February 9, 2021	Good	NA

Michigan Brick appears to be in compliance with all conditions for EUPUG-90 at this time.

FGKILNS (KILN01, KILN02)

FGKILNS is comprised of two parallel natural gas-fired tunnel kilns. Kiln 1 (EUKILN01) was operating during the inspection. Kiln 1 was brought back into production in February 2017. Prior to this, only Kiln 2 (EUKILN02) had been operating because Kiln 1 had to be repaired (its ceiling had caved in) and after repairs there wasn't enough demand to operate the second kiln. Kiln 2 is currently not operational, as described in the Facility Background section of this report.

Bricks are first sent through a 610°F dryer to remove moisture, which prevents the bricks from exploding in the kiln. After being dried, they are called "dry bricks," while bricks post-kiln are called "fired bricks" (as referenced in Appendices 5 and 7 of the ROP).

Each kiln is equipped with a baghouse (Goretex bags, rated at 500F) and dry lime injection. The lime injection neutralizes the acids from the process before it is collected in the baghouse. The gases are diverted from the kilns to a tower where the hydrated lime is injected into the gas stream, from here it is sent to a cooling tower where the gas is cooled via air infiltration to 450F, a temperature at which the Goretex bags can withstand.

During the June 2018 stack test, Tom Gasloli (TPU) and I observed that the small door on the side of the cooling tower was open halfway, which allows ambient air to flow through the cooling tower, into the baghouse, and out the stack. T. Gasloli and I discussed that this door should never be open/closed more than halfway at any time, as this would change emission rates. Maximum routine operations would therefore include keeping the door halfway open. During the inspection the door was cracked open slightly to maintain an appropriate temperature in the baghouse, and therefore would be considered part of maximum routine conditions.

An additional stack test will be conducted in May, and at that time the cooling tower door opening will be reevaluated.

J. Greger said that the cooling tower used to use water to cool the gas stream, but not any longer, because the Goretex bags can withstand a higher heat. He said that Michigan Brick only has to bleed ambient air into the tower to cool down the process air to an acceptable temperature before it enters the baghouse. J. Greger said that the cooling water would erode the inside of the tower, which then required more inspections and maintenance to be done. Without the water there is less of a need for quarterly inspections of the tower. It is AQD's position, therefore, that semi-annual inspections of the cooling tower are acceptable.

<u>Emission Limits, Process/Operational Restrictions, Testing/Sampling & Monitoring/Recordkeeping</u>

SO_2 Emissions & Calculations

To calculate SO_2 emissions, Michigan Brick is required to sample one dry brick and one fired brick on a monthly basis and send to a lab to be analyzed for sulfur content per the test procedures in Appendix 5 of the ROP. The difference in the sulfur content from the dry brick and the fired brick is used to determine the percent sulfur released. The percent sulfur released is then used in the calculations contained in Appendix 7 for monthly SO_2 emission calculations.

Michigan Brick keeps an electronic spreadsheet that is used to perform all calculations outlined in Appendix 7. D. McKeown said that Michigan Brick produces standard-sized bricks and larger. Because of the variance in brick size, Michigan Brick uses "brick equivalents" to calculate the brick tonnage using the brick weight determined during the monthly brick sulfur content test, which is then used in the Appendix 7 SO_2 emissions formula.

J. Greger enters the number of days per month the kilns were run; the average number of cars sent through the kiln; the monthly brick equivalents sent through the kiln; the weight of each dry and burnt brick that is tested on a monthly basis; and the % sulfur from each dry and burnt brick tested into the spreadsheet. From there the

spreadsheet calculates the SO_2 emissions on an hourly and calendar year basis and the appropriate lime feed rates necessary for control according to Appendix 7.

The lime feed rate necessary for proper control will depend on the number of cars sent through the kiln per day (the push rate). A "safety factor" of 1.1 (10%) is included in the Appendix 7 lime feed rate calculations. In addition to this, J. Greger said that Michigan Brick adds an additional 11% to the lime feed rate, as an additional safety factor.

Permitted SO_2 emission limits from both kilns combined is 241 lb/hr (averaged over a calendar month) and 650 tons/calendar year. SO_2 emissions are required to be determined by the methods and calculations outlined in Appendix 5 and Appendix 7 of the ROP (which Michigan Brick does, as described above), in addition to stack testing within 5 years of the previous stack test.

Average hourly SO_2 emissions and ton/calendar year SO2 emissions records were obtained and reviewed for calendar years 2021 and 2022 (see attached) to determine compliance with the 241 lb/hr limit. The highest hourly SO2 emissions from both kilns combined between calendar years 2021 and 2022 was 51 lb/hr in August 2022, with the second highest at 46 lb/hr in July 2022.

Annual SO_2 emissions from both kilns combined were obtained and reviewed for calendar years 2021 and 2022 to determine compliance with the 650 tons per calendar year limit. The 2021 and 2022 calendar year SO2 emissions was 109 tons and 151 tons, respectively.

A stack test was conducted on June 21, 2018. Stack Test results from the 2018 test showed that Kiln 1 produced an SO_2 emission rate of 92.9 lb/hr. Extrapolating this data to 2 kilns, total SO_2 hourly emission rate would be 185.8 lbs/hr, demonstrating compliance with the 241 lb/hr emission limit. Michigan Brick stack tested Kiln 1 again on May 9, 2023, in accordance with the 5-year testing requirement outlined in the ROP. Results are pending.

PM emission rates were also tested on June 21, 2018. Each kiln is limited to 0.10 lbs PM/1,000 lbs exhaust gas. Stack test results show an emission rate of 0.0038 lbs PM/1,000 lbs exhaust gas, demonstrating compliance with the limit.

Dry hydrated lime feed rate calculations

The dry hydrated lime is used to control an assumed 11% of SO_2 emissions, according to the calculations outlined in Appendix 7 of the ROP. Michigan Brick's spreadsheets calculate lime feed rate on a monthly basis. The lime feed rate calculated for a particular month is the lime feed rate that is used for the following month's lime feed control. For example, the calculated December 2022 hydrated lime feed rate at a 9.0 car push rate is 64.30 lbs/hr. This rate will be used for the January 2023 operations for controlling SO_2.

Additionally, Michigan Brick operates at various car push rates that generally range from 6 – 12 cars. The lime feed rate depends on the car push rate, or what the Appendix 7.4 equation refers to as the "number of brick cars expected through the kiln." Michigan Brick uses their calculation spreadsheet by changing the car push rate, which in turn changes the necessary lime feed rate to control 11% of SO2 emissions. Michigan Brick's calculaton spreadsheet does not track actual car push rates (car push rates can vary day-to-day) and actual car push rates are not required to be recorded, only an "expected" rate. Michigan Brick therefore conducts more accurate lime feed rate calculations by basing their lime feed rates on actual cars pushed through the kiln.

During the inspection, B. Stevens showed me Michigan Brick's process for determining the lime feed rate: B. Stevens zeros out a tray on a scale, then uses the tray to capture lime for 30 seconds. The tray is then placed back on the scale to gather a grams per 30-second rate, that is extrapolated to 60 minutes/1 hour. During the inspection a total of 289 g lime was collected in 30 seconds. This number is multiplied by 2 (to get an amount for 1 minute) and then by 60 (to get an amount for one hour) and then divided by 453.6 (to convert from grams to pounds). The lime feed rate that Michigan Brick was running at during the inspection was 76.5 lbs/hour, which is more than the required 75 lb/hr Michigan Brick was aiming for.

According to MI-ROP-A6497-2022a, the lime feed rate is required to be monitored and recorded once every 2 hours to ensure proper operation of the lime injection control system. Although not required, B. Stevens provided me with the daily car push rates from August 2022 – February 2023, as requested, to assist with review of the lime feed rate records. Based the daily car push rates that B. Stevens provided and Michigan Brick's calculation spreadsheet, a determination was made regarding what the appropriate lime feed rate control would be on a daily basis, and compared these values to the lime feed rate values Michigan Brick is required to record every 2 hours from August 2022 – February 2023. There were multiple instances where the lime feed rate was either not recorded, or was lower than the lime feed rate required to control 11% of the SO2. Table 4 contains this lime feed rate data.

As tabulated in Table 4, there were 90 recorded instances between August 2022 and February 2023 where the lime feed rate was lower than the required lime feed rate. Because Michigan Brick is required to use a lime feed rate that is 2.5 times the stoichiometric ratio, as calculated according to Appendix 7, these 90 recorded instances are a deviations from the ROP. Additionally, these 90 recorded instances are also CAM excursions, as defined in MI-ROP-A6497-2022a SC VI.4.

Michigan Brick is required to report CAM excursions and ROP deviations annually and semi-annually. The Annual and Semi-annual reports covering July 2022 – December 2022 are due by March 15, 2023. Michigan Brick submitted these reports on time; however, the CAM excursions and the ROP deviations for the lime feed rates were not reported.

A violation notice will be issued for the following:

- FGKILNS SC VI.3 for failure to maintain a lime feed rate that is 2.5 times that of the stoichiometric ratio, as calculated in Appendix 7, for those 90 instances.
- FGKILNS SC VII.2 and SC VII.3 for failure to report these lime feed rate deviations for August 2022 – December 2022 (annual and semi-annual reports).
- FGKILNS SC VII.4 for failure to report semi-annual CAM excursions for the 82 lime feed rate excursions that occurred between August 2022 and December 2022.

Additionally, Michigan Brick is required to record the lime feed rate once every 2 hours as an indicator of proper operation of the dry lime injection control. For the records review between August 2022 and February 2023, there were 7 instances in October 2022 and one instance in November 2022 where the lime feed rate was not recorded, for a total of 8 instances. This is considered a deviation from the ROP requirements. For the semi-annual reporting period of July 2022 – December 2022, Michigan Brick submitted their report by March 15, 2023; however, they did not report the 8 instances where the lime feed rate was not recorded.

A violation notice will be issued for the following:

- MI-ROP-A6497-2022a FGKILNS SC VI.3 for failure to record the lime feed rate every 2 hours for the October and November 2022 instances.
- MI-ROP-A6497-2022a FGKILNS SC VII.2 and SC VII.3 for failure to report the lime feed rate missing records as deviations for October and November 2022.

Michigan Brick is required to report the January and February 2023 lime feed rate CAM excursions and ROP deviations for the semi-annual period of January – June 2023 by September 15, 2023.

Table 4. Lime Feed Rate Deficiencies, August 2022 – February 2023.

Date of Lime Feed Rate Excursion(s)	Required Lime Feed Rate (lb/hr) at the specified car push rate (cpr)	Documented Lime Feed Rate (lb/hr) Less Than Required Lime Feed Rate	Lime Feed Rate Records Missing
8/3/22	94.95 (at 10.9 cpr)	94.4 at 7 p.m.	NA
8/5/22	94.95 (at 10.9 cpr)	94.7 at 1 p.m.	NA
8/11/22	100.17 at 11.5 cpr	97.8 at 1:00 a.m. 96.4 at 3:00 a.m. 98.1 at 5:00 a.m. 99.7 at 7:00 a.m. 98.4 at 11 p.m.	NA
8/12/22	100.17 at 11.5 cpr	99.8 at 3:00 a.m. 98.94 at 5:00 a.m. 97.3 at 7:00 a.m.	NA
8/13/22	100.17 at 11.5 cpr	98.1 at 5:00 a.m. 99.4 at 9:00 a.m. 99.9 at 11:00 a.m.	NA
8/14/22	100.17 at 11.5 cpr	98.6 at 9:00 a.m. 99.1 at 11:00 a.m. 99.0 at 1:00 p.m. 99.2 at 3:00 p.m. 100.1 at 5:00 p.m. 99.4 at 7:00 p.m.	NA

8/15/22	100.17 at 11.5 cpr	98.1 at 1:00 p.m. 98.9 at 3:00 p.m. 9.7 at 7:00 p.m.	NA
8/16/22	100.17 at 11.5 cpr	98.67 at 1:00 a.m. 99.73 at 3:00 a.m. 98.8 at 7:00 a.m. 99.4 at 9:00 a.m. 99.47 at 11:00 p.m.	NA
9/1/22	97.86 at 10.9 cpr	90.4 at 7:00 p.m.	NA
9/2/22	97.86 at 10.9 cpr	89.6 at 7:00 p.m.	NA
9/3/22	97.86 at 10.9 cpr	94.7 at 9:00 p.m. 96.5 at 11:00 p.m.	NA
9/6/22	97.86 at 10.9 cpr	94.1 at 7:00 a.m.	NA
9/14/22	93.37 at 10.4 cpr	75.66 at 11:00 p.m.	NA
9/15/22	93.37 at 10.4 cpr	88.35 at 11:00 p.m.	NA
9/16/22	97.86 at 10.9 cpr	94.50 at 5:00 a.m. 88.3 at 9:00 p.m.	NA
9/17/22	97.86 at 10.9 cpr	92.59 at 7:00 a.m. 90.7 at 3:00 p.m.	NA
9/18/22	97.86 at 10.9 cpr	89.68 at 7:00 a.m. 82.53 at 11:00 p.m.	NA
9/19/22	97.86 at 10.9 cpr	61.9 at 7:00 a.m. 80.2 at 9:00 a.m. 84.6 at 11:00 p.m.	NA

9/20/22	**97.86 at 10.9 cpr**	**75.1 a 1:00 a.m.** **75.3 at 7:00 a.m.** **93.1 at 11:00 a.m.** **93.65 at 11:00 p.m.**	**NA**
9/21/22	**97.86 at 10.9 cpr**	**94.97 at 11:00 p.m.**	**NA**
9/22/22	**97.86 at 10.9 cpr**	**97.2 at 11:00 p.m.**	**NA**
9/23/22	**97.86 at 10.9 cpr**	**88.8 at 9:00 a.m.** **97.3 at 11:00 a.m.**	**NA**
9/26/22	**97.86 at 10.9 cpr**	**96.82 at 5:00 a.m.**	**NA**
10/5/22	**90.12 at 10.9 cpr**	**NA**	**1:00 a.m.** **3:00 a.m.** **5:00 a.m.** **11:00 p.m.**
10/25/22	**87.64 at 10.6 cpr**	**NA**	**1:00 a.m.** **3:00 a.m.** **5:00 a.m.**
11/2/22	**77.88 at 10.4 cpr**	**77.5 at 7:00 a.m.** **73.1 at 11:00 p.m.**	**NA**
11/3/22	**79.38 at 10.6 cpr**	**78.5 at 5:00 a.m.** **78.6 at 11:00 p.m.**	**NA**
11/8/22	**81.63 at 10.9 cpr**	**76.19 at 1:00 a.m.** **77.7 at 3:00 a.m.** **74.43 at 11:00 p.m.**	**NA**
11/13/22	**74.89 at 10 cpr**	**NA**	**11:00 p.m.**

11/21/22	74.89 at 10 cpr	70.41 at 11:00 p.m.	NA
11/28/22	68.9 at 9.2 cpr	68.5 at 7:00 a.m. 68.2 at 11:00 a.m.	NA
12/2/22	70.9 at 9.2 cpr	70.4 at 1:00 a.m. 70.3 at 9:00 a.m. 68.2 at 11:00 p.m.	NA
12/5/22	70.9 at 9.2 cpr	68.2 at 11:00 p.m.	NA
12/6/22	72.44 at 9.4 cpr	71.4 at 11:00 a.m.	NA
12/11/22	72.44 at 9.4 cpr	69.5 at 3:00 p.m. 71.9 at 5:00 p.m. 68.5 at 7:00 p.m. 70.1 at 9:00 p.m.	NA
12/12/22	72.44 at 9.4 cpr	71.9 at 1:00 p.m. 72.1 at 3:00 p.m. 72.3 at 9:00 p.m.	NA
12/16/22	72.44 at 9.4 cpr	68.7 at 11:00 a.m.	NA
12/22/22	61.65 at 8 cpr	60.4 at 9:00 a.m.	NA
12/24/22	61.65 at 8 cpr	60.31 at 5:00 a.m. 60.84 at 7:00 a.m. 61.37 at 9:00 a.m.	NA
12/25/22	61.65 at 8 cpr	60.5 at 11:00 a.m. 58.7 at 1:00 p.m.	NA
12/28/22	61.65 at 8 cpr	53.7 at 11:00 p.m.	NA
1/18/23	64.3 at 9 cpr	63.9 at 7:00 a.m. 63.3 at 9:00 a.m.	NA

1/19/23	64.3 at 9 cpr	62.6 at 1:00 a.m. 63.2 at 3:00 a.m. 62.4 at 5:00 a.m. 60.3 at 11:00 p.m.	NA
2/22/23	65.4 at 9 cpr	64.5 at 3:00 p.m.	NA
2/27/23	65.4 at 9 cpr	60.8 at 11:00 p.m.	NA

Waste Lime

During the inspection, I noted that Michigan Brick had set up a new system to collect the waste lime used in the baghouse. Prior to the summer of 2022, Michigan Brick had the waste lime disposed of by utilizing a landfill's waste hauling truck to pneumatically pull the waste lime from the silo and into the truck. In the summer of 2022, Michigan Brick no longer had access to this waste hauling truck and therefore dropped a 12" pipe into waste bin, which then gets picked up by a local landfill company. The waste bin is lined with a plastic-type liner. The 12" pipe is inserted into the liner and waste lime can then be loaded from the silo into the waste bin. This process was not operating during the inspection; however, I did not that residual lime was coating the outside of this 12" pipe, an indicator that when lime is being transferred, lime dust is escaping the process.

Michigan Brick is looking into addressing this apparent fugitive dust issue: They discussed the possibility of hooking vacuum on the line to pull back into the baghouse to ensure the disposal system is under negative pressure, thus minimizing fugitive dust and/or slowly the flow of lime into the waste bin to prevent dust from escaping the waste liner.

Process/Operational Restrictions & Monitoring/Recordkeeping

Preventative Maintenance Plan

The kilns can only be operated if a Preventative Maintenance Program (PMP) has been implemented and is maintained. Michigan Brick's Preventative Maintenance Plan was originally drafted May 1, 2003. Within the 2020 ROP renewal application, Michigan Brick included an updated version of their PMP in the most recent ROP renewal application. The new PMP is dated April 10, 2020. I will be reviewing this plan and have follow-up conversations with Michigan Brick regarding the clarity and content of the PMP/MAP as there are deficiencies that need to be addressed including temperature, pressure drop, and baghouse inspection deficiencies (as described below "Baghouse and Temperature Drop" and "SVKILN01 Visible Emission Observations."). Revisions to the PMP will be necessary to address those deficiencies.

The PMP contains items to be monitored, corrective actions that can be taken in the event of abnormal operation, and what should be inspected and how often it should be inspected (daily, weekly, quarterly, semi-annually and bi-annually).

Baghouse Temperature and Pressure Drop

Kilns must not be operated unless the temperature in each fabric filter collector is maintained 15°F below the bag degradation temperature, and an alarm must sound if the temperature in the baghouse gets within 25°F of the bag degradation temperature, or the set point if it is lower than this range. Baghouse temperature is required to be continuously monitored and recorded. The Goretex bag degradation temperature is 500°F, therefore the temperature must be maintained below 485°F, and an alarm must sound if the temperature reaches 475°F. B.

Stevens said the exhaust from the kiln is sent through the gas cooling tower to drop the temperature of the gas before the gas enters the fabric filters. He said the cooling tower alarm is set at 475°F and that if the cooling tower temperature reaches 475°F the kiln operator has 30 minutes to bring the temperature down before the baghouse alarm sounds. B. Stevens said that if the temperature in the fabric filter collectors reaches 450°F, another alarm sounds, and the kiln exhaust and kiln shut down automatically, thus Michigan Brick is operating the kilns more than 15°F below the bag degradation temperature and is in compliance with this condition.

Temperature is continuously monitored and recorded digitally. Table 4 contains the temperature data recorded during the inspection, indicating operation within the appropriate operating range.

The kilns must not be operated if the pressure drop across the kiln fabric filter is less than 2 inches H_2O or greater than 6 inches H_2O and the pressure drop should be continuously monitored and recorded. A digital display (Michigan Brick refers to it as the "Pollution Control Device" or "PCD") continuously digitally monitors the pressure drop across the fabric filter, with the acceptable operating range labeled. B. Stevens said an alarm should sound if the pressure drop exceeds 6 inches H_2O. Table 4 contains the pressure drop data recorded during the inspection, indicating operation within the appropriate operating range.

Table 5. **Operating parameter values recorded during 4/13/23 inspection.**

	2-6" H2O ?P	Baghouse Temperature (°F) (required to be maintained below 485°F)	Lime feed rate	Cooling Tower Temp (°F)
Kiln 1	4.99	371.5	76.45 lb/hr (controller speed at 7.56)	405.25
Kiln 2	NA	NA	NA	NA

March 2022 and April 2023 Temperature and Pressure Monitoring Downtime & Data Loss Incidents

Michigan Brick is required to continuously monitor and record the kiln's baghouse temperature and pressure drop. During the inspection, I was informed that two incidents occurred (March 2022 and April 2023) which caused Michigan Brick to lose recorded data and/or resulted in monitoring system downtime:

March 2022

An electrical storm caused temperature and pressure data loss from February 16, 2022 – March 3, 2022. The PMP repair log indicates there was a "short in the TC wiring" which I confirmed with J. Greger and B. Stevens is the event that triggered the data loss. Baghouse temperature and pressure drop data were not continuously recorded during this time; however, monitoring of the temperature and pressure drop on the PCD system was still able to be conducted. The system was upgraded on March 3, 2022 to allow for recording of data to ensue.

Although temperature and pressure drop data was not *continuously* monitored or recorded from February 16, 2022 – March 3, 2022, Michigan Brick does keep a daily record of the baghouse temperature and pressure drop on their "Daily Inspection Logsheet" as a component of the Preventative Maintenance

Program. I reviewed these records from February 16 – March 3, 2022 and the temperature and pressure drop recorded once per day during this period were within the appropriate ranges.

April 2023

In the early morning, April 6, 2023, a lightning storm incident impacted the temperature and pressure monitoring system. Both the data logger and on-screen PCD monitoring were destroyed with the lightning strike: the record logging and on-screen monitoring were no longer functional. All temperature and pressure records were destroyed, except for data from October 3, 2020 – May 27, 2021. This includes all data pre-October 3, 2020 and all data post-May 27, 2021. A refurbished monitoring system was installed on April 12, 2023. Michigan Brick continued to operate from April 6, 2023 – April 12, 2023 while the pressure drop and temperature monitoring and recordkeeping systems were non-functional.

I requested continuous temperature and pressure drop records for January 2021 – December 2022. As a result of the April 6, 2023 data loss, Michigan Brick was only able to provide me with October 2020 – May 29, 2021 continuous records for these two operating parameters (see attached). These records indicate that the temperature of the baghouse was within the appropriate operating range; however, from May 20 – May 27, 2021 the pressure drop exceeded the 6" w.c. upper limit of the operating range. B. Stevens explained during a follow-up call on June 7, 2023 that the pressure drop exceeded the 6" w.c. limit because they increased the flow through the baghouse in an attempt to "clean" the bags of particulate prior to installing new bags. He said that this is common practice prior to installing new bags. Neither a CAM excursion report nor a deviation report was filed with AQD for the 2021 annual and semi-annual reporting.

Daily pressure drop and temperature readings are recorded on the "Daily Inspection Logsheet." Michigan Brick indicated they have all daily logs (with daily recorded temperature and pressure readings) for pre-October 2020 and post-May 27, 2021 except for April 6 – 12, 2023, when neither of these parameters could be monitored from the PCD screen.

Temperature and pressure drop data was requested for January 2021 – December 2022. Michigan Brick only had data for October 3, 2020 – May 27, 2021. A violation notice will be issued for the following, based on the above information regarding temperature and pressure drop data:

1. Michigan Brick shall not operate a kiln if the pressure drop across the kiln fabric filter is greater than 6" w.c.. The pressure drop records from October 3, 2020 – May 27, 2021 indicate that from May 20 – May 27, 2021 the EUKILN01 baghouse was operated at a pressure drop that exceeded the baghouse's 6" w.c. upper limit. This is a violation of FGKILNS SC III.2 of MI-ROP-A6497-2015. Operating the baghouse at a pressure drop greater than the upper limit is also a violation of FGKILNS SC IV of MI-ROP-A6497-2015 and Rule 910 for failure to operate the air-cleaning device (baghouse) in a satisfactory manner.
2. Michigan Brick is required to restore operation of FGKILNS to its normal or usual manner of operation as expeditiously as practicable upon detecting an excursion in accordance with good air pollution control practices for minimizing emissions and includes taking any necessary corrective actions to restore normal operation and to prevent the likely reoccurrence of the cause of the excursion. Because Michigan Brick stated that the pressure drop excursions that occurred from May 20 – May 27, 2021 is common practice (see "April 2023 discussion," above) AQD believes no necessary corrective actions are in place to prevent a reoccurrence of this excursion. AQD also believes the excursion of operating the baghouse at greater than 6" w.c. for 8 days in a row from May 20 – May 27, 2021 is not considered expeditious and is therefore a violation of MI-ROP-A6497-2015 FGKILNS SC VI.8.
3. An excursion of the baghouse pressure drop range of 2 – 6 " w.c. occurred from May 20 – May 27, 2021 when the pressure drop exceeded 6" w.c.. Excursions are required to be reported semi-annually. Michigan Brick did not report this excursion for the January – June 2021 semi-annual reporting period. Failure to identify and report the pressure drop excursion for the semi-annual period of January – June 2021 is a violation of FGKILNS SC VII.4 of MI-ROP-A6497-2015.

4. Michigan Brick is required to report all deviations annually and semi-annually. The annual report (January – December 2021) and semi-annual report (January – June 2021) did not include deviation reports for the May 20 – May 27, 2021 pressure drop exceedances. The failure to report the May 20 – May 27, 2021 pressure drop exceedances as deviations is a violation of FGKILNS SC VII.1, VII.2 and VII.3 of MI-ROP-A6497-2015.
5. Michigan Brick is required to continuously monitor and record the pressure drop as an indicator of proper operation of the fabric filter. Michigan Brick was unable to provide continuous records demonstrating that the pressure drop was continuously monitored and recorded from May 28, 2021 – April 12, 2023. This includes the pressure drop data not continuously recorded from February 16 – March 3, 2022 and April 6 – April 12, 2023. This is a violation of MI-ROP-A6497-2015 FGKILNS SC VI.2 (May 28, 2021 – August 2, 2022) and MI-ROP-A6497-2022a FGKILNS SC VI.2 (August 3, 2022 – April 12, 2023).
6. Michigan Brick is required to report all deviations annually and semi-annually. The annual report (January – December 2022) and semi-annual report (January – June 2022) did not include deviation reports for the February 16 – March 3, 2022 period where pressure drop was not being recorded continuously. The failure to report this instance as a deviation is a violation of FGKILNS SC VII.1, VII.2 and VII.3 of MI-ROP-A6497-2015.
7. Michigan Brick shall not operate the kilns unless the gauge to measure pressure drop across the fabric filter collector is installed and operating properly. Michigan Brick operated EUKILN01 from April 6 – April 12, 2023 when the pressure drop gauge was non-functional (pressure drop was unable to be monitored or recorded due to the monitoring system failure), and therefore not operating properly. This is a violation of MI-ROP-A6497-2022a FGKILNS SC IV.4.
8. Michigan Brick shall monitor and record the temperature entering each fabric filter for each kiln on a continuous basis. Michigan Brick was unable to provide me with the requested continuous temperature records for May 28, 2021 – December 2022. Additionally, temperature records were also not available for January – April 12, 2023. The missing data from May 28, 2021 – August 2, 2022 is a violation of FGKILNS VI.1 (MI-ROP-A6497-2015). The missing data from August 3, 2022 – April 12, 2023 is a violation of FGKILNS SC IV.2. and SC VI.1 (MI-ROP-A6497-2022a).
9. Michigan Brick is required to continuously monitor and record temperature data during operation of the kilns. Michigan Brick operated EUKILN01 from April 6 – April 12, 2023 when the baghouse temperature monitoring gauge was non-functional (temperature was unable to be monitored or recorded due to the monitoring system failure), and therefore not operating properly. This is a violation of MI-ROP-A6497-2022a FGKILNS SC IV.3. and SC VI.9.
10. Michigan Brick is required to submit semi-annual reports that include the summary information on the number, duration, and cause for CAM monitor downtime incidents. The semi-annual report submitted July 20, 2022 for the semi-annual period of January – June 2022, did not include reporting of the February 16 – March 3, 2022 temperature and pressure drop monitoring downtime. This is a violation of MI-ROP-A6497-2015, FGKILNS SC VII.4

SVKILN01 Visible Emission Observations

MI-ROP-A6497-2015 requires kiln stack visible emission (VE) readings be taken once per month. Upon renewal of the ROP August 3, 2022, under MI-ROP-A6497-2022, the requirement to determine visible emissions (VE) from the kiln stack was changed from monthly to daily. I requested monthly VE records for January – July 2022 and daily VE records from August 3, 2022 – April 2023. J. Greger informed me that he only had monthly VE observation records for August 3, 2022 – April 2023, noting that Michigan Brick had overlooked the requirement to switch from monthly to daily kiln VE observations. He stated that they began conducting daily VE readings on the kiln stack as of May 1, 2023. All monthly visible emission readings, from January – April 2023 indicated there were no visible emissions. The April 2023 reading was conducted on April 28, where Michigan Brick indicated there was no opacity observed.

- A violation notice will be issued for failure to conduct daily visible emission observations from August 3, 2022 – April 30, 2023.
- A violation notice will also be issued for failure to identify and report the deviations associated with not conducting the daily visible emission observations for the semi-annual reporting period of July – December 2022, as well as failure to identify these deviations in the annual report covering January – December 2022.

I was informed during the inspection by B. Stevens that the day prior, April 12, EUKILN01's baghouse had a malfunction. This was during the period where pressure drop on the baghouse was not being monitored or recorded. B. Stevens said at approximately 4 p.m. on April 12, 2023 Michigan Brick staff witnessed excessive amounts of opacity exhausting from EUKILN01's baghouse. J. Greger said they shut down the kiln immediately and stopped production upon observing the opacity. J. Greger stated that they are able to shut the kilns down without ruining the batch of bricks in the kiln. He said they can go for at least 24 hours without heat without impacting the quality of the brick batch; however, he acknowledged several days without heat has the potential to impact the brick batch.

B. Stevens stated that the clip came off one of the baghouse bags, which rubbed on the ring which resulted in the ring cutting through the bag and detaching the bag from the baghouse structure. Particulate was released from the stack as the result of the missing bag. The new bag was installed at approximately 9 a.m. on the day of the inspection, April 13, 2023 (I arrived onsite at 9:45 a.m.). The kiln resumed firing bricks at 10:30/11:00 on April 13. I observed some opacity from the stack after the bag was replaced; however, I attributed the opacity to possibly the need for the bag to build a dust cake to control the dust properly.

Building a proper dust cake on the new bag was likely not the reason why opacity was seen exhausting from the stack on April 13, 2023, because on May 9, 2023, during the stack test on EUKILN01, I again noted opacity from the kiln stack. During the stack test, B. Stevens, J. Greger and I discussed the opacity concern. B. Stevens said that during the April 12 opacity event, they ran UV tracer through the baghouse to determine the issue, while they noted one of the bags missing, B. Stevens also noted, based on the UV light test, that there were places where the bags connect to the baghouse floor that particulate was escaping through (at the seals) and said that the bags are bolted down as tight as they can be, but particulate is still escaping through the gaps between the floor and bag. J. Greger sent me a photo of UV light at one of these gaps (see attached).

Michigan Brick continued to operate the kiln and its baghouse with the leaks at the seals, between the bags and baghouse floor from the date they noted the leaks (April 12) through Wednesday, May 17, 2023. On May 17, 2023, J. Greger informed me that a special, high-heat resistant caulk, endorsed by the Gortex bags representative, was used to seal the leaking spots in the baghouse seals on May 17. He noted that they did find some of the tighteners at the top that clamp down the bags were also loose.

Rule 910

Operating the baghouse while leaks in the seals and loose clamps were present from April 12, when the issue was noticed through May 17, 2023 when the caulk was applied is a violation of Rule 910: an air-cleaning device shall be installed, maintained and operated in a satisfactory manner. The baghouse was not being maintained and operated in a satisfactory manner from April 12 – May 17, 2023.

- A violation notice for Rule 910 will be issued for failure to maintain and operate the baghouse in a satisfactory manner from April 12 – May 17, 2023.

Rule 912

Because there was no pressure drop data for April 6 – April 12, 2023 nor any daily kiln visible emission readings during this time, there is therefore no data suggesting that that baghouse was properly operating from April 6, 2022, up until Michigan Brick stated that the excess opacity was seen on April 12, 2022. The AQD considers this an abnormal condition under Rule 912 with indicators that the 0% opacity visible emission standard was exceeded from April 6 – April 12, 2023.

Additionally, the leaks in the seals and loose clamps also created a situation where opacity was emitted at a threshold higher than the allowed emission standard of no visible emissions (indicator is 0% opacity) from April 12 – May 17, 2023.

Rule 912 requires that Michigan Brick notify AQD of the abnormal condition or malfunction resulting in air emissions in excess of a standard that continues for more than 2 hours. The notice is required no later than 2 business days after the discovery of the malfunction. The malfunction was discovered on April 12, 2023 and AQD was not notified until the day of the stack test, May 9, 2023. This is a violation of Rule 912(4) as the notice was provided 27 days after the malfunction was discovered. Additionally, a written report is required to be submitted within 10 days after the malfunction has been corrected or within 30 days of discovery of the malfunction, whichever occurs first. AQD was notified on May 17, 2023 that the malfunction was corrected. This is a violation of Rule 912(5) for failure to provide a written report to AQD within 30 days of the discovery of the malfunction (30 days from date of discovery of the malfunction would have been May 12, 2023). AQD believes the abnormal condition occurred from April 6, 2023 – May 17, 2023. May 17, 2023 is when Michigan Brick informed AQD that the malfunction had been fixed.

- A violation notice will be issued for Rule 912(4) & (5) to address the missed notification and reporting instances.

Michigan Brick has been notified that these kiln stack opacity excursions that were noted on April 12 through May 16 must be reported as excursions per CAM requirements and as deviations in their annual and first semi-annual reporting for 2023.

FGPLANT1 (EUPUG-30, EUPUG-50, EUSMALLDRYER, EUSMALLMIXER)

The FGPLANT1 is a plant used to make "thin" bricks and consists of EUPUG-30 (an extruder that creates straight bricks), EUPUG-50 (an extruder that makes corner bricks), EUSMALLMIXER (a paddle mixer), and EUSMALLDRYER (a sand dryer system). EUSMALLMIXER is used to mix sand and chemicals, including brick colorant, to be used in the EUPUG-30 and EUPUG-50 lines.

All 4 units are vented via local ventilation ductwork to the same control device, a Donaldson Torit dust collector with dry filter, permitted under PTI 170-18, to replace the "whirl wet" wet cyclone separator, which controls particulate from these 4 emission units. A notification of installation for the new dust collector was received on September 4, 2020, informing AQD that the new baghouse was installed on August 10, 2020.

Emission Limits, Process/Operational Restrictions, & Monitoring/Recordkeeping

The new dust collector is installed in the center of FGPLANT1 and is vented to the in-plant environment, which is the way that this unit was permitted. The permit requires that Michigan Brick maintain PM emission rates at 0.05 lb/1000 lb exhaust gases by maintaining the dust collector according to the manufacturer's specifications, and to monitor and record the pressure drop across the dust collector on a weekly basis. Additionally, Michigan Brick is required to operate the dust collector within a pressure drop range as established by the manufacturer.

The pressure drop is required to be maintained at 2 – 7 "w.c.. During the inspection, The equipment permitted under FGPLANT1 was not operating during the inspection, including the dust collector; however, to demonstrate that the dust collector was operating properly, B. Stevens had the line operator turn on and run material through EUPUG-30 and the Torit dust collector. The pressure drop reading was 4.1" w.c. while operating EUPUG-30 and the dust collector, demonstrating compliance with the pressure drop range.

Michigan Brick is required to conduct and record weekly pressure drop monitoring on the dust collector. I requested records for January 2021 – December 2022; however, recordkeeping for this collector did not begin until April 2021, at which time Michigan Brick provided information to AQD that they would begin recording weekly pressure drops on the unit in response to a violation notice sent in March 2021 for failure to record the weekly pressure drop. I reviewed records from April 2021 – December 2022. It appears Michigan Brick is keeping weekly records, as required, and all noted pressure drops were within the 3 – 7" w.c. operating range.

There are no Material Limits, Design/Equipment Parameters, Testing/Sampling, Reporting, or Stack/Vent Restrictions for FGPLANT1 at this time.

SOURCE-WIDE CONDITIONS: HAP Limitations

Source-wide conditions were added to the ROP upon renewal, based on the FGFACILITY permitted requirements under PTI 170-18 and is used to put legally enforceable restrictions on individual and aggregate HAPs, a facility-wide (HAPs opt-out) as a means for Michigan Brick to opt out of the MACT Subpart JJJJJJ.

There are currently no Material Limits, Process/Operational Restrictions, Design/Equipment Parameters, or Reporting requirements under the Source-wide requirements.

Emission Limits & Monitoring/Recordkeeping

Each individual HAP is limited to 8.9 tpy on a 12-month rolling period and aggregate HAPs are limited to 22.4 tpy per 12-month rolling period. Michigan Brick is required to calculate the quantity of HAP materials used, the HAP emission factor of each HAP-containing material used or emitted (emission factors are required to be based on testing at the facility); and individual and aggregate monthly and 12-month rolling emission rates are required to be calculated.

J. Greger provided me with an excel spreadsheet containing individual and aggregate HAPs calculations (attached) on a monthly and 12-month rolling basis for January 2021 – February 2023, as requested. All emission factors are included in the HAPS calculations spreadsheet and are based on the June 2018 stack test results and AP-42 for those compounds which emissions testing is not required. D. McKeown explained that all non-mercury metal HAP lb/ton-product-fired emission rates were calculated based on the emission rate provided in the stack test report (lb/hr), divided by 8.04 tons of fired product per hour (the production rate during the test). Upon review of the records, I noted that monthly individual and aggregate HAP emissions were missing for July 2022 – February 2023. This missing data impacted the 12-month rolling records. I notified J. Greger on 6/28/23 of this missing data. D. McKeown responded on 6/29/23 stating that he planned to have a revised copy of the calculation spreadsheet to me the week of July 10 at the latest to allow their consultants, Trinity Consultants, to correct the record. D. McKeown provided the revised HAPs calculation spreadsheet on 7/13/23.

The highest individual HAP 12-month rolling emissions was 4.0 tons for the period of March 2022 – February 2023 and for the period of May 2022 – April 2023. The highest total aggregate HAPs 12-month rolling emissions was 5.6 tons for the same two 12-month rolling periods as the highest individual HAP 12-month rolling periods. Based on the data submitted, HCl is the largest contributor of aggregate HAPS emissions, and the highest emitted individual HAP. Michigan Brick is meeting their HAP opt-out limits at this time.

Testing/Sampling

Michigan Brick is required to verify HAP emission rates from either Kiln 1 or Kiln 2 to determine compliance with individual and aggregate HAP limits, and includes the testing for HCl, HF, chlorine, Hg and non-Hg metal HAPs. The most recent test was conducted on May 9, 2023, as required by the ROP. Results are pending. Michigan Brick will be required to use the 2023 stack test results from May 9 onward to calculate HAPs emissions.

FGPARTSWASHER

There are 2 (never heated) parts washers located in their garage and in the new maintenance building. J. Greger said Michigan Brick owns these units now (previously they were renting the units from Vesco Oil), but Vesco Oil still services and maintains these units. Each of them holds approximately 40 gallons. Each parts washer tub is attached to a drum where the solvent is stored through a drain at the bottom of the wash tub (no chemicals are stored in the washer itself), which meets the design requirement of equipping the washer with a draining device.

Cleaning solvents must not be comprised of halogenated compounds, methylene chloride, perchloroethylene, trichlorethylene, 1,1,1,-trichloroethane, carbon tetrachloride or chloroform in excess of 5% by weight. Mineral spirits was the cleaning solvent used in the parts washers; however, B. Stevens said that they now use "Oil Eater

Cleaner/Degreaser; according to the SDS submitted to me by J. Greger, there are no halogenated compound present in this material (see attachment). Michigan Brick is therefore in compliance with the material limits condition of the ROP for this emission unit.

The dimensions of the parts washers both appear to have an air/vapor interface of less than 10 ft^2) and therefore meets the design requirement of not exceeding 10 ft^2 of air/vapor interface.

Both parts washers are equipped with lids. During the inspection, I verified that the lids were closed on both units.

Michigan Brick appears to be in compliance with Rule 281(2)(h) at this time.

Compliance Statement: Michigan Brick is currently in noncompliance with MI-ROP-A6497-2015 and MI-ROP-A6497-2022a. A violation notice will be sent to address the noted deficiencies.

Image 1(Facility Aerial) : Yellow outlines indicate new (southernmost) and old (northernmost) shale mining pits.

Image 2(Lime) : Lime noted on ground near baghouse. This is the result of baghouse changeout.

Image 3(Lime Cleanup) : Photo was taken and sent to AQD on 4/19/23 indicating that lime has been swept up, post-baghouse change. Onsite in May, AQD confirmed residual white appearance from lime cannot be re-entrained into air. Appears to be bound to the concrete's surface.

Image 4(Waste Lime Bin) : System implemented to collect waste lime from storage silo.

Image 5(Dry haul road) : Dry haul road resulted in fugitive dust from truck traffic during inspection.

Image 6(Haul controlled) : Photo taken by Michigan Brick on 4/19/23. Photo used to demonstrate water was applied to the haul road to minimize fugitive dust from truck traffic.

Image 7(Trace Baghouse) : UV Trace Light indicates leaks around the seal of a bag contained within KILN01's baghouse.

Image 8(Unsealed bags) : Photo credit: Michigan Brick. Photo before sealer was applied to bag seals.

Image 9(Caulked Bag) : Photo Credit: Michigan Brick. Photo shows caulk has been applied at seal of bag cage.

Image 10(Facility) : Note opacity present above lime storage tower (white cylinder) from EUKILN01's stack (right side of photo).

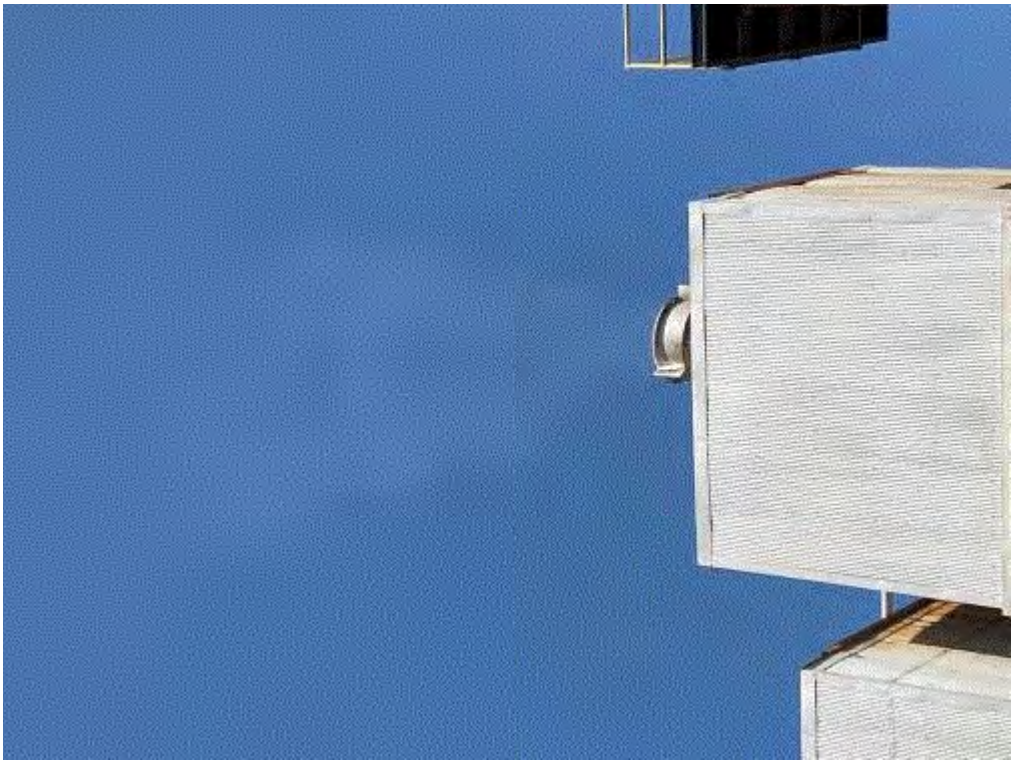

Image 11(Opacity) : Opacity seen from EUKILN01's stack on 5/9/23 during stack test.

NAME Mary Lynn DATE 7/18/23 SUPERVISOR RB