

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

A649749031

FACILITY: Meridian Brick		SRN / ID: A6497
LOCATION: 3820 E. Serr Rd., CORUNNA		DISTRICT: Lansing
CITY: CORUNNA		COUNTY: SHIAWASSEE
CONTACT: Jerry Greger, Supervisor		ACTIVITY DATE: 06/03/2019
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Unannounced, scheduled inspection to determine compliance with PTI 170-18 and MI-ROP-A6497-2015.		
RESOLVED COMPLAINTS:		

Inspected by: Michelle Luplow (author) and Janelle Trowhil (AQD Permits Section)
Personnel Present: Jerry Greger (jerry.greger@meridianbrick.com), Supervisor
Bill Stevens, Kiln Operator (bill.stevens@meridianbrick.com), Kiln fireman

Other personnel:
Robert Clements, Plant Manager

Purpose: Conduct an unannounced, scheduled, partial compliance evaluation (PCE) inspection by determining compliance with Meridian Brick's ROP, MI-ROP-A6497-2015 and recently issued PTI 170-18 (by permit engineer Janelle Trowhill) for the replacement of the whirl wet particulate control device and issuance of HAPs opt-out conditions. This activity was done as part of a full compliance evaluation (FCE).

Safety PPE: High visibility vests, hard hats, steel-toed boots and hearing protection (near the whirl-wet) are required to be worn.

Facility Background/Regulatory Overview: Meridian Brick, according to J. Greger, is the only brick manufacturer in Michigan and is a supplier of brick primarily for residential construction and primarily purchased by Detroit distributors. Meridian Brick was formerly Forterra Brick up until May 2017, and prior to that, Hanson Brick. Bricks are manufactured from shale mined from Meridian's shale mining operations, located adjacent to the Meridian Brick crushing and kiln plant 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.

Meridian Brick is a major source of SO₂ and PM₁₀. Sulfur from the shale is released as SO₂ upon firing the brick in the kilns. The exhaust stream from the kilns is injected with dry hydrated lime to neutralize the SO₂ (as sulfuric acid), in addition to neutralizing HF prior to being exhausted through a baghouse to control the particulate.

Meridian Brick applied for an opt-out permit for HAPs (PTI 170-18) which was issued in April 2019. In 2010, per request by the EPA, Meridian 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, Meridian's Regional Environmental Manager, provided me with the stack test results during a previous inspection which demonstrated that Meridian Brick was a major source of the HAP, hydrofluoric acid (a potential to emit greater than 10 tons per year), and thus resulted in Meridian Brick being 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 (Cl₂), hydrofluoric acid (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. The MACT Subpart JJJJJ required testing to be conducted on EUKILN02 by December 26, 2018 or obtain an opt-out permit before June 25, 2019. By obtaining the opt-out permit for HAPs, Meridian Brick is no longer subject to the MACT Subpart JJJJJ; however, they do so at their own risk of enforcement action, as the MACT "Once in, always in" policy rescission is being challenged in court.

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

There are currently no plans to fix EUKILN02's roof because there is not enough demand to justify the need to operate EUKILN02. During the 2017 inspection there was enough production to operate both kilns; EUKILN02 was operating during the 2017 inspection, and EUKILN01 had been brought back into production in February 2017 after its roof had been caved in.

An administratively complete ROP renewal application is due between April 29, 2019 and April 29, 2020. A tentative pre-application meeting is scheduled for August 2019. I reminded J. Greger of this appointment and the renewal due date.

Inspection: At approximately 9:30 a.m. on June 3, 2019, Janelle Trowhill and I met with J. Greger and B. Stevens. J. Greger stated that Robert Clements, Plant Manager, is retiring and therefore there will likely be a new plant manager, supervisor, and kiln foreman at the next inspection.

J. Greger and B. Stevens provided us with a tour of the facility. J. Greger explained that many of the historic buildings that are no longer being used for production will be torn down, or reutilized as storage space within the coming months.

J. Greger showed us the current shale mining pit that is used for production (regulated under EGLE’s Water Resources Division for water discharge) and explained that there is approximately a year’s worth of shale left at this location. Plans for a new shale pit on the opposite side of Serr Road are in place (with a life expectancy of 20 years), in addition to rerouting plant traffic to Wren Road, which is east of the facility entrance. Serr Road will be closed just east of the residences and just east of Wren Road, and Tile Plant Road (to the north of the plant) will be closed just south of M-21/Corunna Road. See attached map for reference. Plan are to have all proposed roads closed by December 2019. Mining is conducted 5 days per week, stockpiling as much as possible in the summer months in an effort to avoid mining and hauling shale during the winter months. Winter month mining can result in ice within the shale which causes processing issues.

EUCRUSHING

EUCRUSHING operations were not being conducted during the inspection. This emission unit is comprised of the NSPS Subpart OOO-subject process equipment; it 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, including enclosures within a building and drop chutes for fugitive dust mitigation. See Table 1 for a list of equipment, control devices, opacity limits, and visible emissions noted during the inspection.

J. Greger said that they generally crush the mined shale 5 hours per day (6 a.m. – 11 a.m.), 5 days per week, all year long in order to provide the materials necessary to produce brick. He said as long as the kilns are operating they will need to produce and process shale. He said there have been no new installations to EUCRUSHING and there have also been no modifications or changes to the existing equipment.

We did not enter the crushing plant building. J. Greger said that respirable silica dust is a hazard within this building and Meridian Brick employees are required to be fit-tested for respirators per MIOSHA. Although the crushing operations were not occurring, there was visible dust in the air and it was my professional judgment that J. Trowhill and I not be exposed to that environment during the inspection.

The primary crusher is located underground and the grinding plant feed belt is an enclosed conveyor located on the outside of the 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.

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 emanating from the crushing plant building). Meridian 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 1, I saw no signs of opacity from the crushing plant building, the grinding plant feed belt, nor the primary crusher – these units were not in operation during the inspection.

J. Greger provided me with April 2018 – March 2019 monthly VE records for these pieces of equipment. All records were provided and reviewed; records indicate that there were no visible emissions seen from the primary crusher, grinding plant feed belt, or the grinding plant building. See attached for a snapshot of these records (quarterly).

Material Limits & Monitoring/Recordkeeping

Meridian Brick has a material limit of 225,000 tons of material throughput in EUCRUSHING per 12-month rolling time period. I requested 12-month rolling records from April 2018 – March 2019. J. Greger provided me with 12-month rolling records from 2013 – 2019. The total tons processed during April 2018 – March 2019 12-month rolling period was 87,910.27 tons (see attached records). All other 12-month rolling process rates (2013 – 2019) were also reviewed and all were less than the 225,000-ton limit.

Table 1. EUCRUSHING equipment (Appendix 9 of ROP)

Equipment Description	ID Number	Opacity Limit (Percent)	Control Device	Visible Emissions during
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				inspection
Primary Crusher	462-76	15	N/A - None	None
Grinding Plant Feed Belt	No. 1	10	Equipment enclosure	None
Stedman Impact grinder	SGR-1	0	Enclosed in Building	None
Steadman Grinder exit belt	No. 7	0	Enclosed in Building	None
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
Simplicity Screen #5	Screen 5	0	Enclosed in Building	None
Simplicity Screen #6	Screen 6	0	Enclosed in Building	None

Design/Equipment Parameters

Meridian 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

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

Site Roadways/Plant Yard

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.

J. Greger said an old fire truck, with a capacity of 3,000 gallons of water, is used to control dust on the unpaved quarry haul road that runs from the mining pit, through the back of Meridian Brick's property, and to the storage piles. He provided me with records for water suppressant application for the 2018 calendar year, which shows water is applied every 3 – 7 days. Watering began in May 2018 and ended in September 2018. Of particular importance is that the 2019 spring and early summer seasons have been particularly rainy and as a result, Meridian Brick's records for water application may indicate a sparse water application schedule. During the inspection the quarry haul road was well-saturated with water and J. Trowhill and I did not observe any dust being generated while J. Greger drove us down the haul road. J. Greger said that during dry conditions the quarry haul road is usually watered in the morning and in the afternoon. Although not required by the fugitive dust control plan, 10 mph speed limits signs are posted.

During the 2018 kiln stack test I noted that the unpaved plant roads and plant yard were very dusty and requested that they use other means to control these areas since water application alone did not appear to be working. In 2018, Robert Clements informed me that they would begin to use calcium chloride on the unpaved plant road entrance and on the unpaved plant yard, starting in 2018. Upon arriving at Meridian for this inspection, I noted that calcium chloride had been applied to the unpaved plant road entrance and unpaved plant yard. J. Greger said this calcium chloride was applied May 28, 2019.

Depending on the rain patterns for the upcoming months, J. Greger said an additional calcium chloride application will occur in July or August 2019.

The plan also requires that all paved roadways and paved plant yard be swept between dust control applications, as needed, and any spillage on roads shall be cleaned up immediately. During past inspections I noted many piles of finely crushed shale pushed off to the sides of the plant yard near the buildings and other process equipment. Since that time, J. Greger has ensured that all piles were removed and the paved portions of the plant yard were swept. During this inspection, we noted that Meridian Brick has kept the paved portions of their roads and yards well maintained: there were no piles of material and the paved portions of the site were well-swept. As of December 2018, J. Greger said they've also bought 3 vacuum sweeper trucks to continue to maintain these paved portions of their facility. He showed me two of the units onsite. J. Greger said they sweep once per week maximum and once per every couple of weeks minimum and that no sweeping is done when the pavement is wet.

Plant

Drop distances between transfer points must be kept at a minimum to reduce fugitive dust from transfer operations. We observed only one instance of transfer operations: the transfer of mined shale from the loader bucket to the primary crusher. We did not see any signs of opacity from the dumping of the shale into the crusher, indicating that the drop distance was satisfactory.

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 inspection and therefore could not determine compliance with the requirement to conduct stockpiling with a minimum drop distance; however, the storage piles appeared to be well-saturated with water and I saw no signs of fugitive dust from these piles during the inspection.

Storage piles must generate no more than 5% opacity. I saw no opacity generated from the storage piles during the inspection. J. Greger said that they've never had to water the storage piles because there is enough water in the material to keep the piles from releasing fugitive dust. I observed while onsite that the piles do appear to retain moisture, and fugitive dust is not released.

Truck Traffic

Vehicles are required to be loaded to prevent their contents from dropping, leaking, blowing or otherwise escaping. We observed no truck loading from the mining pit during the inspection. All truck loadouts from the facility contain brick only and therefore no spillage, blowing, or leaking would be present.

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

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. 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 "Monthly Truck Traffic Visible Emissions" readings, and provided me with these records for April 2018 – March 2019 (see attached). These records include the required VE readings from the Pit Road, Plant road/yard, and storage piles. All monthly recorded readings were 0% opacity. Attached is a snapshot of the monthly records (1/quarter).

During the inspection I saw no signs of opacity from any of the processes covered under EUTRUCKTRAFFIC.

Process/Operational Restrictions

The fugitive dust plan in Appendix 10 is required to be implemented in maintained in order to operate EUTRUCKTRAFFIC. Evaluation that Meridian 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 "Monthly Truck Traffic Visible Emissions" readings, and provided me with these records for April 2018 – March 2019 (see attached). These records include the required VE readings from the storage piles. All monthly recorded readings were 0% opacity. Attached is a snapshot of the monthly records (1/quarter).

During the inspection I saw no signs of opacity from any of the storage piles; they appeared very wet.

Process/Operational Restrictions

The fugitive dust plan in Appendix 10 is required to be implemented in maintained in order to operate EUSTORAGE. Evaluation that Meridian Brick is meeting this requirement is found under the EUCRUSHING discussion. Meridian 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 a downward sloping gooseneck. 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/1,000 lbs exhaust gases limit is not being met, as well as the baghouse not being operated properly.

I requested monthly records from April 2018 – March 2019, attached is one record per quarter as examples. All records indicate that there were no visible emissions seen during any of the months. While onsite, I also did not see any visible emissions from the exhaust stack of the baghouse.

Semi-annual records of repairs and maintenance on the EUPUG-90 baghouse collector are required based on the Preventative Maintenance Plan (PMP) December 2014 version. Although the ROP for EUPUG-90 does not require that records of the inspections of the baghouse itself be kept, only maintenance and repairs, J. Greger showed me that they do document their semi-annual maintenance inspections on EUPUG-90's baghouse. I requested the 2018 semi-annual inspections, maintenance and repairs log, as specified in Meridian's PMP. The semi-annual inspections were conducted in January 2018 and July 2018. Both records (attached) indicate that the baghouse was in proper operating order. The only repairs/maintenance that were conducted on the baghouse was replacing the bags on 10/13/13, as reported in a previous inspection report.

Meridian Brick is in compliance with all conditions for EUPUG-90 at this time.

FGKILNS (KILN01, KILN02): MI-ROP-A6497-2015 and PTI 170-18

FGKILNS is composed of two parallel natural gas-fired tunnel kilns. Kiln 1 was operating during the inspection. Kiln 1 was brought back into production in February 2017. Prior to this, only Kiln 2 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 its ceiling has caved in. There are currently no plans to repair Kiln #2's ceiling as production demand does not warrant an additional kiln to be operating at this time.

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) and dry hydrated 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 tunnel was open halfway, which allows ambient area 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 greater than halfway at any time, as this would allow more air to flow through the stack and change emission rates. Maximum routine operations would therefore include keeping the door a maximum of halfway open. During the inspection the door was 7/8 closed and therefore would be considered part of maximum routine conditions.

Sulfur Dioxide Emission Limits, Process/Operational Restrictions, Testing/Sampling & Monitoring/Recordkeeping*SO₂ Emissions/Calculations*

To calculate SO₂ emissions, Meridian 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 (Appendix 5). 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 SO₂ emission calculations.

Meridian Brick keeps an electronic spreadsheet that is used to perform all calculations outlined in Appendix 7. D. McKeown said that Meridian Brick produces standard-sized bricks and larger. Because of the variance in brick size, Meridian 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 SO₂ emissions formula. The standard brick equivalents (SBE) are noted in the spreadsheet as such (see attached).

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; and the % sulfur from each dry and burnt brick tested into the spreadsheet. From there the spreadsheet calculates the SO₂ emissions on an hourly and calendar year basis and the appropriate lime feed rates for a particular month. The lime feed rate will also depend on the number of cars sent through the kiln per day (the push rate).

J. Greger provided me with August 2018 – February 2019 monthly brick sulfur content test results (tests conducted by Harrop Industries), records attached, and I verified that the brick weights and % sulfur for both the dry and fired bricks were the values entered into the electronic spreadsheets.

Permitted SO₂ emission limits from both kilns combined is 241 lb/hr (averaged over a calendar month) and 650 tons/calendar year. SO₂ emissions are required to be determined by the methods and calculations outlined in Appendix 5 and Appendix 7 of the ROP (which Meridian Brick does, as described above), respectively, in addition to stack testing within 5 years of the previous stack test.

Hourly SO₂ emissions and ton/calendar SO₂ emissions records were obtained and reviewed for calendar years 2017, 2018 and 2019 (through May 2019). The highest hourly SO₂ emissions from both kilns combined was 242 lb/hr in July 2017, with the second highest at 150 lb/hr in April 2018. Although the July 2017 data suggests Meridian Brick is out of compliance with the 241 lb/hr limit, the June 2018 stack test hourly data shows compliance with this limit. The calculations used to determine the lb/hr emissions is largely based upon averages over a monthly time period. The June 2018 stack test provides more accurate data and therefore a violation notice will not be sent for this one hourly exceedance. See *June 2018 Stack Testing* discussion below. I will remind J. Greger that any exceedances of permit limits must be reported as deviations in the annual and semi-annual reports.

Annual SO₂ emissions from both kilns combined were reviewed for calendar years 2017, 2018 and 2019 to determine compliance with the 650 tons per calendar year limit. The 2017, 2018, and 2019 (through May 2019) calendar year limits are as follows, respectively: 456 tons, 311 tons, and 115 tons. Meridian Brick appears to be in compliance with their calendar year SO₂ limits at this time.

June 2018 Stack Testing

The most recent stack testing was conducted in June 2018. Stack Test results showed that Kiln 1 produced an SO₂ emission rate of 92.9 lb/hr. Extrapolating this data to 2 kilns, total SO₂ hourly emission rate would be 185.8 lbs/hr, demonstrating compliance with the 241 lb/hr emission limit.

Additionally, PM emission rates were also tested. 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 SO₂ emissions. Dry hydrated injection rates are determined using Appendix 7 calculations, and the lime feed rate is required to be monitored and recorded on a continuous basis. Meridian Brick is required to use hydrated lime feed rates that are calculated Appendix 7. The spreadsheets calculate lime feed rate on a monthly basis. The lime feed rate calculated in a particular month is the lime feed rate that is used for the following month's lime feed control. For example, the calculated March 2018 hydrated lime feed rate is 193.95 lbs/hr. This rate is used for April 2018 operations for controlling SO₂. J. Greger provided me with hydrated lime feed rate records for the last 2 weeks of April 2018 (see attached for a few of these), which document a lime feed rate of 193 lb/hr. I will inform J. Greger and B. Stevens that the calculated lime feed rate shall be rounded up, rather than down, as a safety factor to ensure enough hydrated lime is injected.

In the past, J. Greger said that whatever they determine the lime feed rate to be they will incorporate an additional 10% of lime to feed into the baghouse as a safety factor, but based on review of the lime feed rate records, this is no longer practiced at Meridian Brick. During previous inspections, B. Stevens had said that for every cart of bricks that is sent through the kiln, the kilnmen check the lime feed rate to ensure that the feed rate is accurate. B. Stevens said that for 30 seconds they will catch the lime in a bag, weigh the bag and then extrapolate the lbs per 30 seconds to lbs/hour. They then correlate this to the dial on the lime feed rate monitoring system. For example, "40" on the lime feed rate monitor during the inspection would equate to 66 lb/hr, according to B. Stevens. The feed rate is monitored continuously. During this inspection, I verified that the lime feed rate determinations are still conducted in a similar manner; however, B. Stevens said that the kilnmen only verify and record the lime feed is maintained at the appropriate rate three times per week. This practice does not meet the requirement to record the lime feed rate on a continuous basis. I mentioned to B. Stevens during the inspection that he revert back to the practice of verifying and recording the lime feed rate for every charge they get, as checking the lime feed rate every 15 minutes (defined as "continuous") would be overly cumbersome. B. Stevens agreed to verifying feed rates for every charge, and I expect this to be the case moving forward and at future inspections.

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. Meridian Brick's Preventative Maintenance Plan was originally drafted May 1, 2003. During the 2015 ROP renewal, Meridian Brick included an updated version of their PMP in the ROP renewal application. The new PMP is dated December 15, 2014. I requested that Meridian Brick revise the plan so that it is clear which emission unit each maintenance plan is for.

J. Greger said that the cooling tower is still being used, but it doesn't use water to cool the air anymore, because the Goretex bags can withstand a higher heat. He said that Meridian 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.

The PMP generally 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).

J. Greger said that the Daily Inspection logsheet containing a checklist for the storage silo, bin activator, baghouse, piping leaks and insulation integrity is filled out daily by the kiln operator. I asked for 2-week's worth of daily records, which he provided (4/16/18 – 4/30/18). I reviewed these records (several are attached as an example) and found the records to indicate that all inspection checks were OK.

He also showed me the "Weekly Inspection" logsheets for the weeks of 4/23/18 and 4/30/18 on the blower filter, lime feed at duct insertion point of the conveying system, the blower filter and exhaust fan bearings for the baghouse, and the floor buildup for the cooling tower. All items were noted as "ok" condition, except for floor buildup during the week of 4/23/18 (noted as "slight"). Floor buildup was taken care of, as 4/30/18 records indicate "OK" for this line item.

I requested 2018 and 2019 "Quarterly Inspection" logsheets, which I reviewed. The logsheets were filled out in January, April and July, and October of 2018; and in January and April of 2019 (see attached for a sample of these records). Each weekly inspection targets the bin activator, volumetric feeder and baghouse housing hopper leaks and pulse jet cleaning mechanism. All items listed in the quarterly logsheets were marked "ok."

I requested "Semi-Annual Inspection" logsheets for the bin, feeder, baghouse and controls of the kiln for 2018 and 2019. Semi-annual inspections, according to the records, were conducted in January and July 2018 and January 2019. Items inspected include the baghouse electronic controls, cooling tower, and bin activator/volumetric feeder. All items were inspected and checked as being "ok" in condition, and are attached for reference.

The maintenance checks on the EUPUG-90 mill baghouse collector are required to be conducted semi-annually. J. Greger provided me with 2018 records (January and July 2018). The condition of the bags, hangers, wall integrity and ductwork are among the items monitored during this inspection. All items were marked "OK" in the inspection logsheets, attached.

"Bi-annual inspection" logsheets for the baghouse cleanliness and cooling tower are conducted every other year. J. Greger provided me with records from the 2015, 2017 and 2018 bi-annual inspections. Items to be inspected include bag condition, compartment cleanliness and condition, and couplings tightness. All items were marked as "ok" in condition. The 2017 and 2018 records are attached. I am requesting that Meridian Brick update their PMP to convert the baghouse bi-annual inspections to semi-annual to ensure that the baghouse is being maintained and functioning properly. Considering that Meridian Brick operates 24 hours per day, 7 days a week, semi-annual inspections, rather than every other year, is prudent.

Baghouse Temperature and Pressure Drop

Kilns must also 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 kept at or below 485°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 450 °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 475°F, the alarm sounds, and the kiln exhaust and kiln shut down automatically, thus Meridian 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.

The kilns must not be operated if the pressure drop across the kiln fabric filter is less than 2 inches H₂O or greater than 6 inches H₂O and the pressure drop should be continuously monitored and recorded. A digital display (Meridian Brick refers to it as the "Pollution Control Device") continuously digitally monitors the pressure drop across the fabric filter, with the acceptable operating range (2-6 inches H₂O) labeled (per request by B. Culham, previous AQD inspector). An alarm should sound if the pressure drop exceeds 6 inches H₂O. B. Stevens explained that the pressure drop only exceeds 6 inches H₂O when the fan speed is increased to keep smoke out of the plant and that an alarm does sound when this occurs.

Table 2 contains monitored parameters during the inspection. All parameters during the inspection were within the permitted operating ranges. B. Stevens provided me with a truncated sampling of temperature and pressure data. He said that a data point is collected every second but pulled 30-minute data for the sake of brevity (see attached). The data was reviewed to ensure pressure drops and temperatures in May 2019 were within the permitted ranges. There are 2 data points demonstrating the pressure was outside the 2-6" H₂O pressure drop range: 0.24 " H₂O on 5/5/19 and 6.32" H₂O on 5/6/19. These will be brought to the attention of Meridian Brick staff and I will remind them that these are excursion and will need to be reported as both a deviation and an excursion (CAM), and include the corrective actions, etc in their semi-annual reports. I will remind them that all data needs to be reviewed to ensure that excursion and deviations are properly identified.

Table 2. Operating parameter values during inspection

	2-6" H ₂ O ΔP	Temperature (° F)	Lime feed rate	Cooling Tower Temp (°F)	Bag Degradation Temp (°F)
Kiln 1	5.17	418	123 lb/hr	442	475 (alarm), 500 (bag deg temp)
Kiln 2	NA	NA	NA	NA	475 (alarm), 500 (bag deg temp)

Based on the limit of 0.10 lb/1000 lbs exhaust gas PM limit, there should be no signs of opacity from FGKILNS operations. 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 "Monthly Kiln Stacks Visible Emissions" readings, and provided me with these records for April 2018 – March 2019 (see attached). All monthly recorded readings were 0% opacity.

During the inspection I saw no signs of opacity from FGKILNS, there was, however, steam being emitted at <5%.

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

The FGPLANT1 collectively 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). All 4 units are vented via local ventilation to the same control device. PTI 170-18 was issued to allow for the installation of a Donaldson Torit dust collector with dry filter to replace the "whirl wet" wet cyclone separator, which controls particulate from these 4 emission units. At this time the new dust collector has not been installed, but J. Greger said that he expects to have the new unit installed within the next 1 – 1.5 months. Meridian Brick ran into an issue where the baghouse was dimensionally larger than expected and will need to remove part of the roof to install it. They plan to install it closer to the middle of the plant, which will also allow for greater vacuum on each of the emission units, thus greater capture efficiency. I reminded J. Greger that this unit needs to be installed within 18 months of permit issuance in order to avoid an automatic void of PTI 170-18 and causing Meridian Brick to apply to install the unit again.

EUPUG-30 and EUSMALLDRYER were not operating during the inspection. EUSMALLDRYER is not operational because the natural gas line to the unit has been dismantled as the result of construction projects throughout the facility. J. Greger explained it will take a month or two to reinstall the natural gas line.

EUSMALLMIXER is used to mix sand and chemicals, including brick colorant, to be used in the EUPUG-30 and EUPUG50 lines.

J. Greger said this process does not operate all the time; it was not operating during the time of inspection. Meridian Brick is required to do Method 9 readings once per month. J. Greger provided me with copies of VE readings done on 5/27/15 and 6/30/15 – there was a 0% average opacity for the 6-minute interval (see attachment). I did not see any signs of opacity during the inspection. Meridian Brick is in compliance with this condition.

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

Emission Limits

Meridian Brick is limited to 0.05 lbs/1000 lbs exhaust gas for the whirl wet, which is equivalent to 0% opacity. If opacity is seen, this is an indicator that the emission limit is not being met. The whirl wet was operating during the inspection, but I saw no signs of opacity from the whirl wet's exhaust vents.

Process/Operational Restrictions & Monitoring/Recordkeeping

The whirl wet is required to be maintained at a pressure drop between 7 – 9" H₂O and Meridian Brick is required to monitor and record the pressure drop across the collector on a weekly basis. Additionally, Meridian Brick is required to conduct monthly uncertified visible emission readings from the whirl wet. At any time that visible emissions are observed, certified Method 9 readings are required to be taken. J. Greger keeps records of "Monthly Whirl Wet Visible Emissions" readings and provided me with these records for April 2018 – March 2019 (see attached). All monthly recorded readings were 0% opacity. Within these sheets, J. Greger keeps weekly pressure drop readings, which were reviewed and determined that all recorded pressure drop readings were within the permitted pressure drop range. The 7 – 9" H₂O pressure drop requirement, in addition to the certified visible emission readings will no longer apply when Meridian Brick installs their new dust collector under PTI 170-18.

Meridian Brick is also required to record pressure drops across the wet dust collector/cyclone on a weekly basis. Also provided on the VE observation form are J. Greger's weekly pressure drop records. Pressure drop must be maintained between 7 and 9 in H₂O. None of the readings done by J. Greger were outside of these bounds.

FGFACILITY (PTI 170-18)

FGFACILITY was added to the permitted requirements under PTI 170-18 and is used to put legally enforceable restrictions on individual and aggregate HAPs, facility-wide (HAPs opt-out). The PTI was issued in April 2019 and therefore there has not been a full 12-months of data to determine compliance with the 12-month rolling limits; however, Meridian Brick has January – May 2019 data.

There are currently no Material Limits, Process/Operational Restrictions, Design/Equipment Parameters, or Reporting requirements for FGFACILITY.

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. Meridian 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.

David McKeown provided me with excel spreadsheets containing these calculations (attached). HAPs evaluated during the June 2018 stack test were included in the individual and aggregate data was used for all HAPs that were tested for. Individual HAPs on a 12-month rolling basis are determined by choosing the individual HAP with the highest emission for that month to establish that all other HAPs, including the highest-emitting one, are below the ton/12-month rolling limit of 8.9 tons. Highest individual HAP emissions from January – May 2019 was 0.6 tons. Total aggregate HAPs from January – May 2019 was 0.8 tons. Meridian Brick is meeting their HAP opt-out limits at this time.

Testing/Sampling

Meridian 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. Another test is therefore required to be conducted before June 19, 2023

FGPARTSWASHER

There are 3 cold cleaners (never heated) parts washers located onsite at Meridian Brick that J. Greger said are rented from Vesco Oil. Each of them holds approximately 25 – 30 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.

Mineral spirits is still the cleaning solvent used in all 3 parts washers; according to the MSDS submitted to me by J. Greger, the only halogenated compound present is trace amounts (<0.1%) of tetrachloroethylene (perchloroethylene) (see attachment). According to the ROP, the cleaning solvents must not exceed 5% by weight of this compound. Meridian Brick is therefore in compliance with the material limits condition of the ROP for this emission unit.

J. Greger said that Vesco is the company who maintains the parts washers. The parts washers are also swapped out with other parts washers. The maintenance on the units is also performed by Vesco.

Each of the cold cleaners has an air/vapor interface of approximately 3.75 ft² (1.5 ft x 2.5 ft) and therefore meets the design requirement of not exceeding 10 ft² of air/vapor interface.

All 3 cold cleaners were equipped with lids. During the inspection all lids were closed on the units.

Condition 3 of Monitoring/Recordkeeping in the ROP says that written operating procedures must be posted in an accessible, conspicuous location near each cold cleaner. During the inspection I verified that the Vesco Oil Cold Cleaner Operating Procedures were still in place for each of the units. Meridian Brick is in compliance with the operating procedure requirement.

Conditions 4 & 5 of the FGPARSWASHER design/equipment parameters requires certain conditions be met depending on the Reid vapor pressure of the cleaning solvents. The Reid vapor pressures for trimethylbenzene and mineral spirits are 0.095 psia and 0.13 psia, respectively, according to Cameo Chemicals MSDS. Condition 4 requires mechanical assistance of the cover if the Reid vapor pressures are more than 0.3 psia. Meridian Brick is not required to have mechanical assistance based on the psia's.

Condition 5 requires certain conditions be met if the Reid vapor pressures are greater than 0.6 psia; the Reid vapor pressures are not, and therefore the conditions are not applicable.

Compliance Statement: Meridian Brick is currently in compliance with MI-ROP-A6497-2015 and PTI 170-18 at this time.

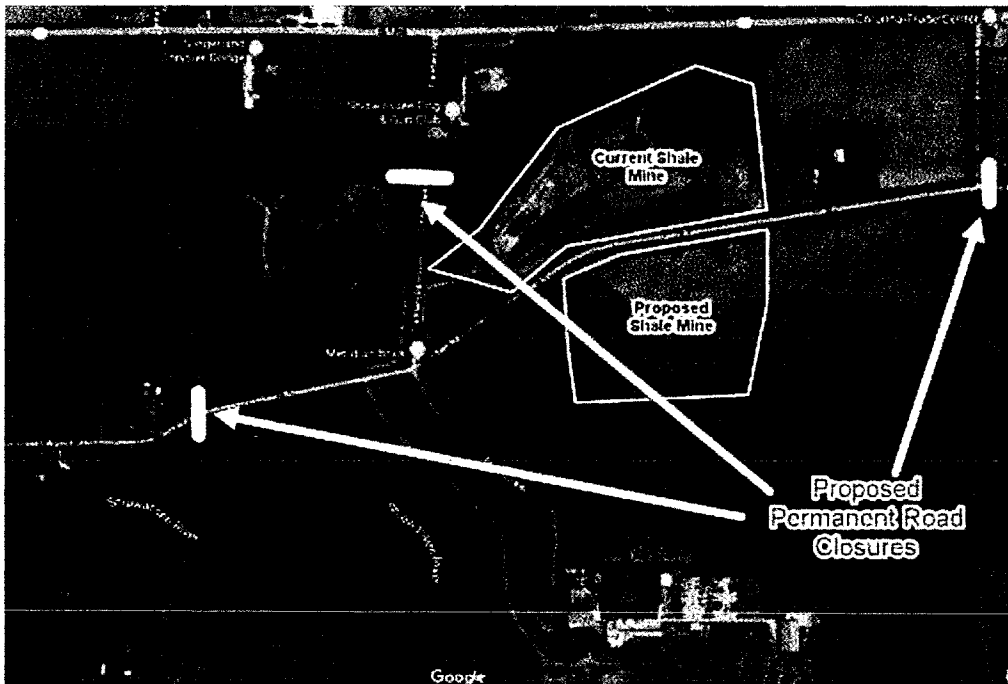


Image 1(New Site Map) : Map showing proposed permanent road closures to the plant in addition to proposed new shale mining area and current mining area. Proposed new plant road to enter facility would be Wren Rd, exclusively

NAME M. Greger DATE 7/5/19 SUPERVISOR B. P.