

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

N179463110

FACILITY: Atlas EPS, a Division of Atlas Roofing Corp.		SRN / ID: N1794
LOCATION: 8240 Byron Center Rd., BYRON CENTER		DISTRICT: Grand Rapids
CITY: BYRON CENTER		COUNTY: KENT
CONTACT: Tim Van Hoeven , Plant Manager		ACTIVITY DATE: 04/28/2022
STAFF: April Lazzaro	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: Unannounced, scheduled inspection.		
RESOLVED COMPLAINTS:		

Staff, April Lazzaro arrived at the facility to conduct an unannounced, scheduled inspection. There were no significant odors, and no visible emissions noted at that time. I phoned Tim Van Hoeven, Plant Manager from the vestibule and informed him of my intent to conduct an inspection, and he escorted me to a conference room for the opening discussion. During that discussion, we talked about recordkeeping expectations for submittal to the AQD for a compliance determination.

FACILITY DESCRIPTION

Atlas EPS, A Division of Atlas Roofing Corporation (Atlas) is a manufacturer of expandable polystyrene (EPS) and is the largest source of volatile organic compounds (VOC) in the Grand Rapids District with 200 tons of VOC emissions. The facility operates pursuant to Renewable Operating Permit (ROP) No. MI-ROP-N1794-2017a, which is currently undergoing the renewal process and Permit to Install 82-21A. Atlas is located in downtown Byron Center, with a school directly to the north, a residential neighborhood directly to the east and shopping centers directly to the west and south. The facility consists of two buildings that are connected via a corridor. Atlas uses the EPS beads to make polystyrene foam products generally used in the construction industry. The raw material consists of tiny, (the size of a grain of salt) hollow polystyrene beads that are impregnated with the blowing agent pentane. A blowing agent is a substance which changes the cellular structure via a foaming process. When steam is applied, the pentane is released from the bead, causing it to expand in size (30x) and harden. As such, the primary pollutant emitted at Atlas is pentane, which is VOC. Pentane is not identified as a hazardous air pollutant (HAP) according to the EPA yet is identified as a toxic air contaminant according to State of Michigan Air Quality Division (AQD) air toxics rules with an Initial Threshold Screening Level (ITSL) of 17,700 $\mu\text{g}/\text{m}^3$ over an 8-hour average which is the equivalent of 17.7 ppm. A Safety Data Sheet found online states that the odor is "gasoline-like" and has an odor threshold of 2.2 ppm. Pentane is highly flammable and heavier than air. The raw material also contains smaller amounts of ethylbenzene and styrene which are individually limited in the permit.

The first stage of the process is called pre-expansion and the tiny bead is exposed to heat and steam which causes it to expand. Atlas uses two boilers to provide steam for the polystyrene foam process. Atlas has two batch expansion machines, (EUEXPANDER5 and EUEXPANDER6) and the emissions of pentane generated during the expansion process are ducted through moisture knock-out pots, and then to a thermal oxidizer for emissions reduction. Approximately 13.2% of the pentane in the beads is released during pre-expansion based on new data provided by the company during the permitting process for PTI No. 18-21A. After pre-expansion, the beads are stored (EUBEADAGING) to allow for further off-gassing of the pentane.

The pentane emissions from the bead storage is released to the atmosphere through the in-plant ventilation and remain there anywhere from four hours to three days. The next stage is molding, and Atlas currently has four molding machines (EUMOLD5-8). Steam is used again at the molding machines to press and form large rectangular blocks out of the expanded beads. The mold machines each have multiple stacks that duct emissions of pentane and steam to the outside air. After molding, the blocks are held in storage for a prescribed amount of time to allow them to age to get to the right moisture content. They may be put in one of several "hot" rooms which are heated up to 140°F. After the correct moisture content has been achieved, the foam blocks are cut to the desired length and thickness at one of four cutting lines (EUCUTTING). Some foam may also be embossed on the one embossing line (EUEMBOSSING). Embossing is the creation of an impression in the foam, which can create a pattern and changes the density. Atlas also recycles scrap foam in-house which is shredded and re-condensed. Some of the recycled foam is reused at the facility, but most is externally sold.

Atlas has made several changes to equipment at the facility recently and in the past five (5) years, which have been permitted through the Permit to Install process. The first change included replacing an older expander and moving the existing expander closer to the regenerative thermal oxidizer (RTO). This change was subsequently incorporated into the Renewable Operating Permit as a modification. As a part of that project, Atlas removed two older boilers and installed one new boiler. An existing smaller boiler was moved into the boiler room. The new boiler at 12,563 mmBtu/hr was identified in the permit to install (PTI) application as being subject to the New Source Performance Standard Dc, which is found in 40 CFR Part 60 Subpart Dc. This boiler is fueled by natural gas and as such the only requirement is to record fuel usage. This information was requested, and fuel use information was provided for the facility. Per AQD guidance, the facility may prorate or predict natural gas usage, with the prior approval of the AQD District Supervisor. Atlas EPS utilizes this alternate method.

Most recently, 2 additional PTI modifications have been issued. One was to replace the existing thermal oxidizer with a new regenerative thermal oxidizer pursuant to PTI No. 18-21, which was required due to a reduction in stack height. The second modification pursuant to PTI No. 82-21A was to replace EUMOLD4 with EUMOLD8, which is larger and has a faster production capacity. During the permitting process, Atlas reevaluated the emissions profile for the facility operations. This means that they changed the distribution of emissions that are generated at each phase of the operation. This was done to avoid Prevention of Significant Deterioration (PSD) review, and to keep the project emissions below the 40 ton level.

In December 2019, the AQD began to receive odor complaints from a resident of the neighborhood directly to the east. Odors have been confirmed by AQD staff, but not at the intensity required to be considered a violation of Rule 901(b). The most recent odor complaint that can be positively attributed to the Atlas facility was received in April 2020.

COMPLIANCE EVALUATION

FGEPS

This flexible group contains 8 emission units that include the two expanders, four molds, bead ageing and the RTO. The emission limits include emissions from all operations combined, which are proportioned based on the data provided in the application for PTI No. 82-21A as described above. The company is required to utilize a specific method of calculation as described in the permit to demonstrate compliance with the emission limits. There are 14 stacks listed as being associated with these emission units.

Emission Limit(s)

Emissions of VOC's are limited to 272.4 lb/hr based on the daily hours of operation and 374.5 tons per year based on a 12-month rolling time period as determined at the end of each calendar month. Since the last inspection, Atlas EPS has begun to conduct the required lab testing of the finished product. That value is used to determine the VOC retention factor of the products tested which is necessary to conduct the calculation specified in the permit. This number varies and is product specific. The VOC retention factor is the number that should be used in the calculation for the P_w value. This value is a production-weighted average based on the product produced and the pentane content in the as shipped product based on the lab testing. This number is not expected to be the same every month, assuming there is a different ratio of products manufactured, with different pentane contents. Atlas EPS is not using a production weighted average as required in the calculation, but rather a straight average of VOC retention across all beads tested. Atlas EPS is not calculating emissions as required by the permit, and as such this is a violation of FGEPS, Special Condition II.3.

Additionally, the company updated the VOC retention expected from the bead expansion portion of the process during the permitting process for 82-21A. The number of expected VOC (pentane) loss from expansion was previously estimated at 17% but is now estimated at 13.2%. This reduces the amount of VOC destroyed by the oxidizer, and as such uncontrolled emissions increase. By changing the input in the company's spreadsheet from 17% to 13.2%, emissions increase by 21.5 tons over a 12-month rolling time period. Based on these incorrect parameters, the company is not properly calculating emissions. The current VOC emissions reported by Atlas EPS for the 12-month rolling time period ending in April 2022 are 195.25 tons, however that number is expected to change when the recordkeeping is corrected as noted above.

The records that were submitted also showed 18 days where the daily limit of 272.4 lbs/hr VOC was exceeded. Each day where the records show emissions over 272.4 lbs/hr is a violation of the FGEPS, Special Condition I.1. This will be further discussed below.

Based on the new EUMOLD8 installation, the permit now includes styrene emission limits and a VOC limit specifically from that mold. The styrene emissions are limited to 80 lb/month and VOC are limited to 23.9 tons per 12-month rolling time period. The company calculates styrene and VOC emissions based on the styrene content of each product and assumed losses based on beads molded in EUMOLD8. Since the permit is new, there are not 12-months of data for the full time period, however reported VOC and styrene emissions for the month of March were 1,308 lbs and 24.26 lbs respectively.

There is also a limit for VOC loss from EUMOLD8 of 4.87% which is based on stack testing. That stack testing is upcoming.

A Violation Notice will be issued citing the deficiencies identified above.

Material Limit(s)

Material limits consist of 16,600 lb/yr for ethylbenzene processed and 84,400 lb/yr for styrene processed, both based on a 12-month rolling time period as determined at the end of each calendar month. The reported ethylbenzene and styrene processed for the 12-month rolling time period ending in April 2022 were 1.60 lbs and 3,731.68 lbs respectively

The material limit(s) section also provides a specific calculation that is to be used to determine emissions from the EPS bead expansion process. Atlas EPS is not using a production weighted average as required in the calculation, but rather a straight average of all beads tested, as such the company is not properly utilizing this calculation. This is a violation of Special Condition FGEPS.II.3. As indicated above, a Violation Notice will be issued citing this deficiency.

Process/Operational Restriction(s)

The permit requires that the feed to the expanders shall cease immediately, upon initiation of the thermal oxidizer bypass. I discussed whether or not there is a bypass with facility staff and was informed that there is no thermal oxidizer bypass on the unit.

The permit states that the permittee shall not operate more than 4 block mold machines at any given time. The permittee currently only has 4 operational block mold machines.

FGEPS and the associated thermal oxidizer has Compliance Assurance Monitoring (CAM) requirements. The permit requires that the permittee shall not operate the thermal oxidizer unless it is operating under a negative pressure. This is measured in the plant at the expanders. If the expanders are not under negative pressure, a blue light will flash and the units will shut down. The system is currently monitoring and recording negative pressure from the gauge nearest the RTO.

Since the last inspection, a ROP renewal application has been submitted. The monitoring provisions for the RTO related to CAM has also been updated along with this permitting action. Atlas EPS is monitoring and recording pressure drop of the system, which is equipped with an interlock if pressure parameters are out of range.

Design/Equipment Parameter(s)

The permittee has equipped the thermal oxidizer with a continuous temperature indicator and recorder. Temperature records were requested, reviewed and were found to be acceptable.

The permittee shall not input feed into any expander unless it is vented to the thermal oxidizer that is installed and operated in a satisfactory manner. Satisfactory manner includes maintaining a minimum VOC destruction efficiency in the thermal oxidizer of 95% by weight a minimum combustion temperature of 1,500°F and retention time of 0.25 seconds. The system is equipped with a series of interlocks to

prevent the expanders from operating if the RTO or pressures are not within programmed parameters.

During the inspection, the RTO was operating at 1,622°F. The pressure drop reading for the process capture system which measures closest to the RTO was at -1.3" H₂O, and the filter pressure drop was 0.009" H₂O.

Testing/Sampling

The permittee is required to verify VOC emission rates for the thermal oxidizer and establish parameters to ensure the capture system is operating under negative pressure by testing once every five years. The last test was on March 22, 2022. The permit requires that a complete test report of the test results be submitted to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. The test report has not been received, and as such this is a violation of FGEPS, Special Condition V.1. This deficiency will be included in the Violation Notice.

The permittee is required to determine the VOC content as received and as shipped of product from FGEPS. Since the last inspection, Atlas EPS has begun and continues annual bead sampling to determine the VOC content of product as shipped.

Monitoring/Recordkeeping

The permittee is required to record the daily hours for the EPS process. The same production hours are entered into the spreadsheet for each day except for Saturday, which is based on employee timecard information. As a result of this method, a Violation Notice was issued during the 2018 inspection for exceeding the lb/hr VOC emission limit on several Saturday's. At the time of the 2019 inspection, I specifically asked if this issue was addressed and was told that they check for that to ensure accuracy. During the inspection and records review conducted in in December 2019 however the spreadsheet again showed that there were hourly emissions exceedances on Saturday's. The records that were requested as part of this inspection shows 18 Saturday's since January 2021 where the daily emission limit was exceeded. Additionally, these exceedances in the recordkeeping were not reported to AQD as a deviation or a Rule 912 notification nor was the spreadsheet corrected. As noted in the 2019 inspection report, this raises the question as to whether or not the Responsible Official is properly reviewing compliance data prior to certifying to the accuracy of it. This continues to be an issue and as identified above the violations of the daily VOC limit in FGEPS, Special Condition I.1 will be included in a Violation Notice.

The permittee appears to be accurately recording the monthly throughput at pre-expansion for each lot of EPS beads. The permittee records monthly pounds of regrind under a heading of "recycle" in the spreadsheet.

The permittee records the pounds of VOC per 100 pounds of EPS beads as received, for each lot of EPS beads used. This mathematical expression is just another way of writing the pentane content as an equivalent to weight percent, which is the value available on the Certificate of Analysis.

The permittee is required to record the total VOC emissions emitted at pre-expansion and the VOC destruction efficiency of the thermal oxidizer. The VOC destruction efficiency for the new RTO can be updated upon receipt of satisfactory stack test results.

The permittee is required to calculate and keep a record of the total VOC emissions from FGEPS, using the method detailed in Appendix 3. The permittee is not properly calculating the production-weighted average fraction of VOC retained in product based on annual sampling. As previously noted, a Violation Notice will be issued citing this deficiency.

The permittee appears to be maintaining the ethylbenzene and styrene containing material calculations correctly.

The permittee is continuously monitoring the thermal oxidizer temperature, and no apparent monitoring malfunctions or data exclusions were identified. The permittee indicated they are performing all weekly inspections of the thermal oxidizer and capture system and provided the most recent annual inspection information conducted by an outside contractor.

Atlas EPS is also required to maintain recordkeeping in accordance with the calculations in the permit to demonstrate compliance with Rule 336.2818. Compliance with that annual calculation will be determined during the next inspection.

Reporting

Annual and semi-annual reports have been received timely. However, as indicated above, while the company has a detailed method for reviewing permit conditions, they did not report, or address any errors in the emissions spreadsheet related to the daily VOC limit exceedances. This will need to be monitored going forward.

Stack/Vent Restriction(s)

Atlas EPS has indicated that all the stacks are sized as permitted. During the most recent permitting process, AQD required updated stack information from the company to ensure accuracy.

Other Requirement(s)

The other requirements are associated with the CAM Plan, which has been updated since the last inspection.

FGRULE290

The Rule 290 flexible group is used for the one embossing and various cutting processes at the facility. As previously described, embossing is where the foam is pressed into a specific shape, or a design is pressed into the cut piece. Emissions generated from embossing are pentane and non-carcinogenic particulate matter. The permittee is keeping records of emissions from embossing which were provided. However, the company was unable to provide emissions from the various cutting lines. Atlas EPS asked for an extension to May 20, 2022, to submit these records, however the records have not been received. As such, this is considered a

violation of Rule 201 for failure to obtain a PTI for the cutting lines. This deficiency will be included in the Violation Notice.

2022 Michigan Air Emissions Reporting System (MAERS Report)

The original MAERS report was received timely, however when I compared emissions data from the report to the data submitted as a part of the compliance inspection, I found that the data did not match. I pointed this out to Atlas EPS, who responded that the data in MAERS was incorrect, and they would revise and resubmit the report by May 13, 2022. The MAERS report has not been resubmitted. This deficiency will be included in the Violation Notice.

During the extensive records review as part of this inspection, the previous MAERS data was compared to data that Atlas EPS used in the permitting process to avoid PSD. The production data in the company's Past Actual project accounting for the highest 2-year average (2017) indicates that 2.12 million more beads were processed that year than what was reported in MAERS for the same year. It is unclear which dataset is correct, however if the Past Actual project accounting data is correct, it would appear emissions were underreported. If MAERS is correct, then the data used for the PSD permit was overinflated.

COMPLIANCE SUMMARY

Atlas was in non-compliance at the time of the inspection.

NAME 

DATE 4/6/22

SUPERVISOR 