

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

N694426051

FACILITY: Michigan Foam & Fabrication, LLC.		SRN / ID: N6944
LOCATION: 2700 Wills Road, MARYSVILLE		DISTRICT: Southeast Michigan
CITY: MARYSVILLE		COUNTY: SAINT CLAIR
CONTACT: John Von Zellen, Supervisor/Maintenance/Environmental		ACTIVITY DATE: 07/23/2014
STAFF: Sebastian Kallumkal	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Onsite Inspection		
RESOLVED COMPLAINTS:		

On Wednesday, July 23, 2014, I conducted a targeted, annual inspection at the Michigan Foam & Fabrication, LLC. located at 2700 Wills Road, Marysville, Michigan. The purpose of the inspection was to verify facility's compliance with requirements of Article II, Air Pollution Control, Part 55 of Act 451 of 1994, with requirements of the Renewable Operating Permit No. MI-ROP-N6944-2011a and AQD Consent Order No. 21-2010.

The Consent Order AQD No. 21-2010 was finalized and was effective on January 18, 2011. The Consent Order AQD No. C-2006 is null and void after the new CO is issued.

I arrived at the facility about 11:00 am. I met Mr. Don Tate, President. He introduced me to Mr. John Van Zellen, Supervisor/Maintenance & Environmental and Mr. Michael Cuffia, Management Consultant. During pre-inspection meeting, we discussed the process, compliance, and the maintenance of the ionization tubes. The facility has VOC monitors in the grinding and extrusion areas. The light goes from yellow to red. The facility also has 14 isobutane monitors (sniffers) in the extrusion area.

The facility has five air makeup units with 8 ion producers in each and 5 bulbs in ion producers. Each month two of the ion producers are maintained (by Altech). The facility's Preventive Maintenance/Malfunction Abatement Plan (PMP/MAP) requires the bulbs be replaced as preventive maintenance on an annual basis.

#### PROCESS:

The facility manufactures polyethylene foam products. It has three extruders: one 600 lb/hr FG-90 (EUEXTRUDER1), and two 500 lb/hr FG-75 (EUEXTRUDER2 and EUEXTRUDER3). They use polyethylene beads as the primary polymer and liquid isobutane (blowing agent) as the raw material. A heated cross over is fixed in the end of the extruders so that the melted plastic can be fed to the either a profile or sheet die. Each extruder utilizes either of the two downstream handling/takeoff equipment that are used for foam sheet production and for profile parts production. Extruder 2 is run alone or Extruder 1 and Extruder 2 run combined with a single die. The Extruder 3 is always run separately.

The blowing agent, isobutane is injected in to the extruders with the melted plastic. The melt is then transported down the barrel under pressure to mix the blowing agent and plastic thoroughly and develop the correct pressure and temperature within the melt to produce the desired properties in the finished products. As the mix is pushed out of the die, the release of pressure allows the blowing agent to expand causing the formation of cells in the plastic, which produce the foam property.

In the profile manufacturing mode which is a straight shot out of the front of the extruders, the shape is set by the dye. It is cooled through a water spray bath and then cut to size.

In sheet production mode, heated adapters are used to move the melt from either extruder to the offset die so that one set of sheet takeoff equipment can be utilized for both extruders. In sheet production the melt is extruded through a circular die and it is then split and straightened to form a flat sheet. The sheet is transported over cooling cans and then wound into rolls for storage and shipment.

In the polyethylene scrap recycling process, the scrap foam is shredded in one of the two shredding machines. The shredded scrap material is conveyed by air to storage bags located adjacent to the Reclaim

**Extruder.** Shredded material is then conveyed from one of the two storage bags to the reclaim extruder using a vacuum transportation tube. Once conveyed to the Reclaim Extruder and melted, the melt is then extruded through a strand/palletizing die and immediately cut into beads. This extrusion and cutting occurs in a water bath so the beads are instantly cooled so they do not stick together and are then transported by the cooling water to a separator. After the water is removed, the beads are sent to a centrifugal bead dryer to remove any remaining moisture. The beads are boxed, stored, and eventually returned to the production line along with new feed stock and converted to foam.

The VOC (isobutane) emissions are controlled with an Air Code Ionization Control System (ICS). The ICS consists of three banks of ion generators (ionization tubes) which provide positive and negative charged ions to the air supply fans located at three different locations inside the extrusion production (extrusion hall) area.

Each ionization chamber contains a cluster of tubes. The tubes operate a medium voltage corona, minimizing the formation of ozone, and create an appropriate mixture of positive and negative ions. These ions free electrons from the oxygen molecules in the air and allow those molecules to break the pollutant molecular structures into less harmful chemicals. The ions react with the VOCs and supposedly reduce them into carbon dioxide and water.

The positive and negative ions are dispersed through ventilation supply ducts (Ecoducts) to all areas of the production floor and reclaim room. These rooms meet the requirements for a permanent total enclosure, accounting for 100% capture, and act as the "reaction chamber". The exhaust from this reaction chamber is through two axial fans. Each exhaust hood consists of two inlets and one outlet through the wall of the building about 15 feet from the floor. The facility adds humidity (spraying moisture) enhance the reaction.

Many ecoducts are arranged over the two extruders where most of the isobutane is emitted. They have installed particulate filters to protect the bulbs from dust. These filters are routinely inspected and replaced on a semi-annual basis.

#### **INSPECTION:**

After the pre-inspection meeting, they accompanied me for an inspection of the facility. I visited the storage, laminating, reclamation area, production area and CEMS area.

#### **Production Data at the time of inspection:**

At the time of the inspection EXTRUDER 1 and EXTRUDER 2 were operating in a combined mode. EXTRUDER 3 was also operating at the time of my inspection.

I observed that the ECODUCTs located near EXTRUDER 1 and EXTRUDER 2, storage area and the grinding area were damaged. I advised them to replace all the damaged ECODUCTs to get good air (ion) flow in required areas. ECODUCT was missing in the storage area. The facility has 3 levels of visual alarms (Green, Yellow [flash, solid] and Red) to indicate isobutane leaks in the building.

Next I inspected the scrap reclaim area. The facility has two grinders and a reclaim extruder. This area is equipped with ECODUCTS.

Next we inspected the CEMS. The monitor was reading 44.1 lb/r and 1125 PPM VOC at that time.

Fagerdala currently operates 24 hours per day and 7 days per week. Its current main production is foam for the Sealy Mattresses. They also manufacture swim noodles.

At the time of my inspection they had various finished products in the production room. Some of the products are kept in the production room for 24 hours while others are kept for 3-4 days for de-gassing prior to removing to other areas of the plant. I observed that the indicator lights for the control system units were lit indicating that the bulbs are operating.

During the inspection I collected copies Isobutane usage log for July, 2013-June 2014, smoke tests, CGA testing, annual PM checks. See attached for review.

## Compliance

### FGFACILITY

Special conditions I.1 and I.2 limits the facility's annual VOC emission rate to 220 tpy and daily emissions to 1670 ppd. The facility has not exceeded the annual emission limit. The 2013 4<sup>th</sup> quarterly emission report (1706 ppd on 11/17/13) and 2014 1<sup>st</sup> Quarterly emission report (1697 ppd on 2/25/2014) showed that the daily VOC emissions exceeded the facility's permit limit. The subsequent days showed compliance with the daily limits. The records show that the facility's annual (July 2013-June 2014) VOC emissions were 156.22 tons.

Special condition II-1 limits the isobutane usage to 1,670,400 pounds per 12-month rolling time period as determined at the end of each calendar month. The records show that the facility used 666,691 pounds of isobutane during July 2013-June 2014.

Special Condition III.1 requires the facility to submit a malfunction abatement plan/preventive maintenance plan (MAP/PMP). A QD received a revised, approvable plan on October 11, 2010.

Special Condition III.2 requires that the permittee maintain the east and west exhaust fan systems such that the individual exhaust fan flow rate is approximately the same as the flow rate measured during the most recent compliance test. Each exhaust fan (North Exhaust Fan and South Exhaust Fan) has two exhaust intakes (South side and North Side).

#### October 10, 2013 RATA Test

North Exhaust Fan #2, Total Flow = 6629 ACFM

South Exhaust Fan #1, Total Flow = 18094 ACFM

The combined flow was approximately 24,000 ACFM.

Next RATA test is scheduled for 4<sup>th</sup> Quarter 2015. The flow rate will be compared during that test to verify compliance.

Special Condition IV.1 requires the facility to install and properly maintain an ionization control system. The facility had installed the Air Code Ionization Control System (ICS) and performs routine preventive maintenance for the control equipment. The facility keeps a preventive maintenance log for this control system. See discussion above.

Special Condition IV-2 requires that the facility maintains the non-fugitive enclosure properly. The facility is performing smoke tests for each natural draft opening (NDO) every month. The smoke tests show that the air flows into the non-fugitive enclosure.

Special Condition VI.3 requires that the permittee to install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the VOC emissions from FGFACILITY on a continuous basis. The condition also requires the permittee to install and operate this Compliance Assurance Monitoring System (CAMS) system to meet the timelines, requirements and reporting detailed in Appendix 9 of the ROP and to use the CAMS data to assure compliance with the daily and annual VOC emission limits.

The facility has installed a continuous VOC monitor which collects air flow from both exhaust vents. The CAMS was installed, calibrated, maintained and operated in accordance with PS8 of Appendix B, 40 CFR Part 60. As specified in the Appendix 9, Requirement 3, the facility's RATA frequency is reduced to once in eight quarters along with Cylinder Gas Audit (CGA) in each of the 7 quarters of the 8 continuous quarter periods. The facility conducted last RATA test on October 10, 2013. The facility submits quarterly CGA reports with its quarterly excess emission reports.

The permittee is required to send reports for quality assurance and Excess Emission Report (EER) and summary report (Appendix 9-Requirement 4) to AQD within 30 days after the end of the quarter. The 2<sup>nd</sup> quarter report for 2014 was submitted on August 1 2014.

Special Condition V.1- The facility's emission rate test and RATA test to verify the accuracy of the monitor. The last RATA was conducted on October 10, 2013 and report was received on December 9, 2013. The report showed that the CAMS barely passed the RATA. The relative accuracy was 19% with the limit being 20%. AQD reminded the facility in a letter dated December 19, 2013, that the monitor may require adjustment, maintenance or repair to improve relative accuracy.

Facility had conducted a performance test during the 2011 RATA test due to the installation of the new process equipment, EXTRUDER3. The emission rate showed compliance with the VOC emission limit. Facility's initial performance test and emission rate test were done when the CAMS was installed. The CAMS provides VOC emissions in PPM and calculates the lb/hr emission rate using exhaust flow rate.

Special Condition V.2- Facility verifies that VOC monitor meets the requirements of Performance Specification 8. Facility submits the notifications and test reports as required.

Speciation Condition V.3- Facility is required to verify the direction of flow at least once every six months and to submit a notification of the test to AQD. The facility verifies direction of flow on a monthly basis.

Special Condition VI.1- Facility keeps daily records of the amount of blowing agent (isobutane) used in FGFACILITY.

Special Condition VI.2- The facility has installed a continuous VOC monitor and is continuously monitoring VOC emissions. The monitor is calibrated on a daily basis. Facility keeps the calibration records.

Special Condition VI.3- Facility keeps records of all verifications of the direction of air flow at the non-fugitive enclosure NDOs.

Special Condition VI.4: The facility keeps records of blowing agent (isobutane) usage on a daily basis and calculates VOC emissions in pounds per day. It also calculates the 12-month rolling VOC emission rate in tons per year.

**Conclusion:**

Based on the inspection and review of the submitted reports, the facility appears to be in compliance with the applicable air quality requirements. The facility shall install and maintain the Eco-ducts for ion dispersion where ever necessary, maintain the VOC monitor as mentioned above, and submit the compliance reports timely.

NAME S. Ballumkal

DATE 8/27/14

SUPERVISOR CTE