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

N341745575

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| FACILITY: LYMTAL INTERNATIONAL, INC. | | SRN / ID: N3417 |
| LOCATION: 4150 S. LAPEER RD., LAKE ORION | | DISTRICT: Southeast Michigan |
| CITY: LAKE ORION | | COUNTY: OAKLAND |
| CONTACT: Mr. Imad Janineh Janineh , | | ACTIVITY DATE: 06/15/2018 |
| STAFF: Adam Bognar | COMPLIANCE STATUS: Compliance | SOURCE CLASS: SM OPT OUT |
| SUBJECT: Scheduled Inspection | | |
| RESOLVED COMPLAINTS: | | |

**On Friday, June 15, 2018, Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD) staff, I, Adam Bognar conducted an unannounced targeted inspection of Lymtal international Inc. ("LymTal" or the "facility"), located at 4150 South Lapeer Road, Lake Orion, Michigan. The purpose of this inspection was to determine the facility's compliance status with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) rules; and Permit to Install No. 1306-91D.**

I arrived at LymTal at around 9:45 am and met with Mr. Larry Luettke, Maintenance. Mr. Imad Jannineh, Technical Manager, who normally handles environmental concerns for LymTal, was not present during this inspection. I identified myself, provided credentials, and stated the purpose of the inspection.

LymTal manufactures polyurethane based products. Products include concrete coatings, sealants, asphalt-based roof coatings, and others. Many of their products consist of a two-part epoxy where one product (Part A) is mixed with a primer (Part B) to cause a curing reaction when applied to the substrate. LymTal employees around 14-15 people and operates Monday through Friday from 6:30 am to 3 pm.

There are twelve reactors on site used to produce the Part A product of the two-part epoxy. In general, the reactions at LymTal combine a base polymer, consisting of a variety of polyols, with either Toluene Diisocyanate (TDI), Isoprophorone Isocyanate (IPDI), or Methylene diphenyl diisocyanate (MDI). A variety of other components are also used in smaller volumes to produce their product. Asphalt is used to produce certain roof coatings.

Polyols must be dehydrated to approximately 400 ppm water or less before reaction with the isocyanates. If excessive water is present during the reaction, the isocyanates may begin to cure and become solid while inside the reactor. Cleaning a cured reaction mixture out of a reactor can take weeks. Dehydration of polyols is accomplished inside the reaction vessel by adding mineral spirits, heating, and drawing a vacuum (26 inches Hg) on the reaction vessel. The water is removed via azeotropic distillation with the mineral spirits (Aromatic 100).

Exhaust from the vacuum pump is vented to a dual stage carbon adsorption system. The evaporation of mineral spirits (VOC) during this dehydration process is the main source of potential air contaminant emissions from these reactors. A mobile exhaust system is present so that in a reaction emergency, ducting can be quickly attached to any one of the reactors to discharge dangerous fumes and liquids outside of the plant.

There are four mixing tanks used to produce the Part B product (primer/curing agent). No reaction is required to produce the Part B product. Part B ingredients are simply added to a mixing tank to create the end product. From the mixing tank, the product is poured into pails via tap directly from the tank.

PTI No. 1306-91D – FGREACTORS

This functional group consists of twelve stirred-tank reactors of various sizes for manufacturing

polyurethane-based products. All twelve reactors are vented to a dual stage carbon adsorption system. Reactants (TDI, IPDI, MDI, Polyols) are homogeneously mixed in the reactors at approximately 180 degrees Fahrenheit for 4-5 hours until the reaction is complete. The products are allowed to cool to approximately 100 degrees Fahrenheit before additives such as UV-protectors, bubble releasers, viscosity adjusters, ect. are added. Products are packaged directly from these reactors via taps located near the reactors.

Section II – S.C. 1: Limits Lymtal's annual dehydration solvent (Aromatic 100) usage to a total of 16,000 lbs between all reactors. Based on the records provided to MDEQ-AQD during the recent MAERS submittal (Attachment 1), and the records provided to me during this inspection (Attachment 2), this limit has not been exceeded. The highest reported usage based on a 12-month rolling average was in January 2017 at 5936 lbs of solvent used.

Section IV – S.C. 1 and 2: States that Lymtal shall not process TDI, MDI, IPDI, or polyurethane based products in any of the reactors unless the dual stage activated carbon adsorption system is properly operated, or the associated reactor is completely closed. Emissions from the reactors arises from the vacuum pumps during polyol dehydration. The common control system for all reactors is as follows:

"old-style" metal box carbon canister → Vacuum Pump → 55 gallon knockout drum → "new-style" Carbtrol G-2S activated carbon canister → 55 gallon "see through" knockout drum.

The "new-style" Carbtrol G-2S activated carbon canisters are equipped with steel internal piping to handle higher temperatures and flow rate. Mr. Jannineh stated that Lymtal will be replacing the "old-style" metal box carbon canister with another Carbtrol G-2S canister. Recently, two G-2S carbon canisters were purchased so that one can be installed before the vacuum pump and the other can be on stand-by incase of a VOC/HAP breakthrough.

Section V – S.C. 1: Requires that Lymtal test the dual stage carbon adsorption system for breakthrough of the first canister at least once per week. This test is to be done once the process reaches a steady state condition. If breakthrough is detected, Lymtal must change out the carbon material in the upstream (dirty) carbon canister and reverse the operating order of the two canisters (downstream → upstream). Based on the records I reviewed (Attachment 3), these tests are performed on a weekly basis.

Breakthrough testing is performed for VOC, TDI, IPDI, and MDI. The only substance that was detected to breakthrough was VOC. The highest reported solvent breakthrough occurred on June 14, 2018, at 4.65% of the feed concentration. The primary canister must be changed if solvent breakthrough exceeds 20% of the feed concentration. Larry informed me that he changes the carbon canisters approximately once per year, depending on production/usage.

Breakthrough testing is currently performed before and after the "old-style" metal box carbon canister using a single point chemical/VOC monitor. A quarter inch valve is tamped into the two-inch vacuum piping so that the monitor can be inserted. The chemical concentration before the carbon control is compared to the chemical concentration after the carbon control to determine breakthrough percentage.

Section VI – S.C. 1: Requires Lymtal to keep monthly and 12-month rolling records of the pounds of solvent used in FGREACTORS during the dehydration process. These records are maintained; however, the records that were maintained on-site needed to be modified to include additional emission units. Mr. Jannineh made these modifications to the records and provided me with record sheets from January 2017 – December 2017 via email on July 31, 2018 (Attachment 2). I reviewed these records and did not find any instance where the annual dehydration solvent usage exceeded the permit limit of 16,000 lbs based on a 12-month rolling time period.

**Still, the 12-month rolling dehydration solvent usage is not explicitly reported; however, this information can be extrapolated from the given data by adding these three items: "Total VOC/Solvent From the Last 11 Months" + "Total VOC/Solvent from**

**LOGS for the month" + "Total VOC/Solvent from SHAR Reactor #8"**

**Section VI – S.C. 2: Requires Lymtal to keep records of carbon breakthrough monitoring and carbon replacement for FGREACTORS. These records are maintained. Mr. Jannineh provided me with these records via email on June 19, 2018 (Attachment 3).**

PTI No. 1306-91D – FGFACILITY

This flexible group includes all process equipment source-wide, including grandfathered and exempt equipment. Equipment includes one 5,000-gallon TDI storage tank and one 3,000-gallon IPDI storage tank. Storage tank emissions are controlled using Carbtrol G-1S model activated carbon canisters.

Section VI. S.C. 1: Requires Lymtal to keep records of the VOC and HAP concentrations of the dehydration solvents used. Mr. Jannineh provided me with these records (Attachment 1). The only dehydration solvent used is mineral spirits (Aromatic 100) which is 100% VOC. Aromatic 100 also contains 4% HAPS: 3% Cumene and 1% Xylene.

Section VI. S.C. 2: States that Lymtal shall calculate the VOC and Total HAP emission rates from FGFACILITY on a monthly and 12-month rolling time period using an acceptable method. Mr. Jannineh provided me with copies of these monthly record sheets from January 1, 2017 to May 31, 2018. While reviewing these records I noticed a few issues with their contents. Annual VOC/HAP emissions appear to be under reported compared to what was reported in their FY2017 MAERS submittal.

For example, the highest reported emissions were during the 12-month rolling period ending in February 2017. During this period VOC emissions were reported at 2001.8 lbs and HAP emissions were reported at 80.072 lbs; however, during their FY2017 MAERS submittal their VOC emissions were reported at 7161 lbs and HAP emissions were reported at 260 lbs. I determined that additional emission sources that were included in the FY2017 MAERS submittal were not included in the 12 month rolling emission totals; including: SHAR reactor #8, mixers/mixing tanks fugitive emissions, and raw material fugitive emissions.

I discussed this issue with Mr. Jannineh and he agreed to modify his 12-month rolling VOC/HAP emission sheets to include these other emissions sources. This modified version is attached to this report (Attachment 2). The emissions reported on this updated version match closely with what was reported in MAERS.

Most of the emissions from the manufactured products at Lymtal are from the polyol dehydration process. Dehydration solvent emissions are likely over reported because they assume that no emissions are captured by the carbon adsorption system. Other sources of emissions are fugitive emissions that may arise from opening and closing tanks, transferring fluids, filling pails, ect..

Fugitive emissions are estimated by taking the inventory of raw materials that are received/stored in the tanks and subtracting the amount of raw materials used during production. The difference between these two values is roughly the amount of VOC/HAPS that escape. The fugitive emission estimations that Lymtal provided were discussed and found acceptable during previous AQD inspections.

Pilot Reactor

Lymtal operates one 50-gallon pilot reactor to test new products that are developed at a laboratory scale. This functions as an medium sized reactor between laboratory scale and full-scale production. The vacuum pump for this reactor is equipped with a carbon control system consisting of one knockout drum followed by an activated carbon drum. This unit appears to be exempt from Rule 201 requirements pursuant to Rule 283 (2)(a)(v).

Sandblaster

Lymtal operates one sandblasting station for use in product testing. Sometimes a material surface, such as concrete, needs to be sandblasted before a test coating can be properly applied on the surface. This unit is ventilated indoors and used infrequently. This sandblaster appears to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(vi)(B). Rule 285(l)(vi)(B) exempts sandblasting equipment from permitting if the unit is ventilated indoors.

Mixing Tanks

**There are four mixing tanks used to produce the Part B product, or primer/curing agent. These tanks are stored and filled inside the facility. There is no outside ventilation. Mixers are kept sealed at all times except during filling or cleaning operations. Mixers appear to be exempt from Rule 201 requirements pursuant to Rule 284 (2)(i). Rule 284(2)(i) exempts mixing of VOC's from permitting if the mixing vessel is less than 40,000 gallons and contains material with a true vapor pressure less than 1.5 psia.**

Storage Tanks

**Storage tank list and locations are attached to the FY2014 inspection report. The storage tanks at this facility appear to be exempt from Rule 201 requirements pursuant to Rule 284 (2)(i). Rule 284 (2)(i) exempts storage tanks from permitting so long as the vessel is less than 40,000 gallons and contains material with a true vapor pressure less than 1.5 psia.**

Pressure is generated during the filling of the raw material tanks from bulk shipment tanks. To prevent VOC/HAP emissions from releasing this pressure, all raw material tanks are ventilated to a Carbtrol G-1S model activated carbon canister.

The same vacuum pump that is used for dehydration is used to transfer TDI, IPDI, and mineral spirits (dehydration solvent) from the bulk storage tanks to the reactors. This makes these tanks essentially a closed loop system. The only way that VOC/HAP can escape is through one of the carbon canisters.

TDI and IPDI are stored in a separate and isolated room with a safety alarm to protect worker health and safety. The chemicals are stored at 100-120 degrees Fahrenheit to avoid crystallization. Both tanks are vented to their own individual carbon control system consisting of a knockout drum and a single carbon adsorption drum (55 gallon). The plant is also equipped with a low oxygen alarm system for worker safety. These tanks are part of permit 1306-91D.

Boiler

**One natural gas fired boiler is present with a heat input of 675,000 BTU/hr. This boiler does not appear to be subject to federal NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR, Part 60, Subpart Dc) because the boiler design capacity is less than 10 million BTU per hour. This boiler appears to be exempt from Rule 201 requirements pursuant to Rule 282 (2)(b)(i). Rule 282 (2)(b)(i) exempts boilers from permitting if they burn sweet natural gas and have a heat input less than 50,000,000 BTU per hour.**

Compliance Determination

**Lymtal appears to comply with the federal Clean Air Act, Part 55, Air Pollution Control of the Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) rules; and Permit to Install No. 1306-91D.**

NAME Adam Boger DATE 8/13/2018 SUPERVISOR SK