

DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: Self Initiated Inspection

*FY2016 Insp*

N341735902

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: 07/26/2016
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: FY 2016 SM CMS level-2 annual inspection of Lymtal International, Inc.		
RESOLVED COMPLAINTS:		

*N3417 - SAR - 2016 07 26*

**Lymtal International, Inc. (N3417)**  
4150 S. Lapeer Road  
(Formerly known as 4150 Cross @ S Lapeer Road, near exit 81 off I75)  
Lake Orion, Michigan 48359-1865

**NAIC: 325510 Polyurethane Coating Manufacturing. Concrete surface and expansion joint sealants for airports, bridges, parking structures, etc.**

**SRN reassign (ownership and name change): Harry S. Peterson Company (N3417) until May 1994) → Lymtal International, Inc. (N3417). About 1994, LymTal purchased Harry S. Peterson, which built the plant in 1929.**

**Phone: 248-373-8100; Fax: 248-373-3480**

**Synthetic Minor (ROP & MACT) PTI No. 1306-91D dated August 25, 2015. Rule 702 BACT carbon canisters (primary [older canister] and secondary [newer canister] by switching during canister replacement for break-through) control. Limiting HAP is cumene.**

**VOIDS: PTI Nos. 1306-91 (6/26/02), 1306-91A (5/20/04), 1306-91B (10/05/10) & 1306-91C (08/25/2015)**

**PTI Mods: PTI No. 1306-91 → PTI No. 1306-91A (ROP-opt-out for failing 208a registration) → PTI No. 1306-91B (increase hours of operation to 3,000 hrs./yr. from 2,000) → PTI No. 1306-91C (add 3 reactors [Reactor Nos. 8, 9, 10] and increase hours of operation to 5,000 hrs./yr. from 3,000) → PTI No. 1306-91D (add two reactors [TR1 & TR2], LymTal requested to increase hours of operation from 5,000 hrs./yr. to 6,000 hrs./yr., instead AQD [Permit Engineer Michelle Rogers] removed annual hours of operation limit [PTI No. 1306-91C, FGFACILITY III.1: 5,000 hours per year] but introduced materials usage limit [PTI No. 1306-91D, FG-REACTORS, II.1: 16,000 pounds per year of solvents to reactors]). Solvents, assisted by application of vacuum, are used to drive off moisture from reactors materials.**

**Not Subject to: NESHAP for Area Sources (Page 38864 / Federal Register / Vol. 72, No. 135 / Monday, July 16, 2007 / Rules and Regulations / Final Rule) because LymTal is in Polyurethane Coatings and Sealants Industry and not in Polyurethane Foam Production Industry. Both use Polyols (resins).**

**Not Subject to: Boiler NSPS Dc, New Source Performance Standards (NSPS), 40 CFR, Part 60, Subpart Dc.**

On July 10 & 26, 2016, I conducted a self-initiated **SM CMS** level-2 annual inspection of Lyntal International, Inc. ("LymTal") located at 4150 South Lapeer Road, Lake Orion, Michigan. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994, PA 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) administrative rules; and ROP & MACT Synthetic Minor PTI No. 1306-91D.

During the inspection, Mr. Imad Janineh (Phone: 248-373-8100; Fax: 248-373-3480; E-mail: imad@LymTal.com), Technical Manager, assisted me. Mr. Francis Lymburner, President and Owner, was present but did not participate. Mr. Magdy Talaat (Phone: 248-373-8100; Fax: 248-373-3480; E-mail: magdy@LymTal.com), Vice President and Owner of LymTal, also assisted.

In 1994, Mr. Magdy Talaat and Mr. Francis Lymburner bought Harry S. Peterson Company with an assistance of low interest loan from Oakland County. They named new company after themselves as LymTal. Harry S. Peterson built the plant in 1929. Sandez and Master Builder purchased the plant in 1988. Using one dozen reactors, LymTal, produces polymer-based concrete surface and gaps (expansion joints) sealing products known as Iso-Flex products. Iso-Flex products are used in the areas of traffic concrete coatings, roof coatings, sealants, penetrating sealers, expansion joints, etc.

In 2004, US EPA assessed an administrative penalty of \$53,000.00 for failure to comply with federal regulations for architectural coatings. However, LymTal settled for \$47,000.00

### Emission Units

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Flexible Group ID
EUREACTOR1	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR2	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR3	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR4	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR5	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR6	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR7	Reactor for manufacturing polyurethane-based products. Activated carbon control.	FGREACTORS
EUREACTOR8	Reactor for manufacturing polyurethane-based products. Activated carbon control. (300 gallon Avon)	FGREACTORS
EUREACTOR9	Reactor for manufacturing polyurethane-	FGREACTORS

	based products. Activated carbon control. (500 gallon Scholds)	
EUREACTOR10	Reactor for manufacturing polyurethane-based products. Activated carbon control. (175 gallon Stainless)	FGREACTORS
EUREACTORTR1	Reactor for manufacturing polyurethane-based products. Activated carbon control. (2,000 gallon)	FGREACTORS
EUREACTORTR2	Reactor for manufacturing polyurethane-based products. Activated carbon control. (2,000 gallon)	FGREACTORS
EUTDITANK	5,000 gallon TDI storage tank.	NA
EUIPDITANK	3,000 gallon IPDI storage tank.	NA
Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1290.		

### Flexible Groups

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGREACTORS	Reactors for manufacturing polyurethane-based products. Emissions are controlled by a dual-stage carbon adsorption system consisting of two (2) activated carbon canisters operating in series.	EUREACTOR1, EUREACTOR2, EUREACTOR3, EUREACTOR4, EUREACTOR5, EUREACTOR6, EUREACTOR7, EUREACTOR8, EUREACTOR9, EUREACTOR10, EUREACTORTR1, EUREACTORTR2
FGFACILITY	All process equipment source-wide including equipment covered by other permits, grand-fathered equipment and exempt equipment.	
<p>VOC emissions control system consists of a 55-gallon knock-out drum (which is not required by the permit) that knocks out moisture and significant amount of VOC (knock-out drum materials consist of 60 percent liquid high molecular weight VOC and 40 percent water) and saves carbon, a primary 55-gallon carbon canister (dirty) and secondary 55-gallon carbon canister (polishing). The carbon canisters are made by Carbtrol Corporation of Bridgeport, CT; Phone: 800-242-1150. The canisters contain activated carbon (CAS # 7440-44-0, 100% carbon). Most recently, on July 23, 2014, LymTal changed the secondary canister and previous secondary canister is now primary.</p>		

Twelve (12) reactors (Reactor Nos. 1 thru 10 and TR1 & TR2) 5,000-gallon TDI and 3,000-gallon IPDI storage tanks are part of the permit. The emissions from all reactors are controlled by a knock-out drum (55-gallon) and a couple of 55-gallon carbon canisters (activated carbon adsorption units) arranged in series. The knock-out drum take out easily condensable high molecular weight compounds such as mineral spirits so that longevity of carbon canisters can be increased by reducing hydrocarbons load on them.

LymTal International, Inc. ("LymTal") manufactures polyurethane-based products, concrete coatings and sealants; and some adhesives and sealers as well. The major part of manufacturing at this time is coatings and sealants for water proofing concrete floors. In general, the company uses a base polymer (variety of Polyols, about 11), either Toluene Diisocyanate (TDI) or Isoprophorone isocyanate (IPDI) and reacts a proprietary mixture of these materials in a batch reactor vessel with other components to produce the finished product. TDI (aromatic) and IPDI (aliphatic) are stored at 100-120 degrees Fahrenheit to prevent crystallization. TDI and IPDI are stored in a separate and isolated room with safety alarm system to protect worker health and safety. The plant, in addition, is equipped with low oxygen alarm (audible and visible) system for worker safety. Before chemical reaction, Polyols are dehydrated. The dehydration (moisture removal) is accomplished by adding mineral sprits to Polyols, heating and drawing vacuum (26 inches Hg) on Polyol tank / reactor. The company uses Polyols as raw materials. Other raw materials used are solvents, fillers, catalysts, surfactants, and plasticizers, additives. During the last several years MEK consumption has been gradually reduced to nil; LymTal has accomplished its goal of eliminating MEK altogether in the products so as to minimize fire, safety and environmental hazard. In addition, MEK is hygroscopic and, as a result, there were product problems. Mineral spirits completely replaced MEK. Dehydration solvents include Hi-Sol 10 and TS-100 and 100 Solvent.

Consumption of mineral spirits, methyl ethyl ketone (MEK), methyl acetate has consistently reduced since 2005. The solvents are used to reduce viscosity of the products.

Elimination of methyl ethyl ketone (CAS# 78-93-3, MEK, Butanone  $C_4H_8O$ , density  $\rho = 0.805$  g/mL, Flash Point FP = 16 °F, Boiling Point BP = 175 °F, Vapor Pressure = 78 mm Hg at 20 °C, Flammability Range FR = 1.4%v [LEL] – 11.4%v [UEL], Viscosity  $\mu = 0.43$  centipoise), an explosive material due to low flash point (FP = 16 °F) and wide flammability range, reduced the plant insurance rates. About December 13, 2005, US EPA removed (de-list) MEK from CAA Sec. 112 HAP list although it is VOC.

Products, both one-component and two-component, are a result of chemical reactions and blending between polymers, fillers (pigments, calcium carbonate, etc.), solvents (NMP, DPMA, DPM, TS100 or aromatic solvents, NPA, N-Butanol, etc.) and additives (UV protectors, antioxidants, wetting agents, dispersion agents, etc.)

There are twelve (12) reactors (Reactor Nos. 1 thru 10 and TR1 & TR2) and three mixers. Reactor Nos. 7, 8 and 9 were added with PTI No. 1306-91B → PTI No. 1306-91C modification (October 5, 2010). TR1 and TR2 were added with PTI No. 1306-91C → PTI No. 1306-91D modification (August 2015). During the inspection, I noticed that the reactors and mixers did not have permanent exhaust stacks attached to each one. There is a flexible detachable duct that is connected to an exhaust stack that the company utilizes as standby duct for any emergency cases when the company may need to exhaust any emissions

directly to the outside air. There were no visible emissions observed during the plant tour. Mr. Janineh and Mr. Talat confirmed that reactions occur in a closed vessel so that the only possible source of emissions is fugitive emissions. Since there were no stacks attached directly to the vessels, Janineh indicated that any potential emissions are discharged in the general in-plant environment. All reactors have vacuum applied to them through a vacuum pump for use during dehydration stage. Between the batches, reactors are cleaned using mineral spirits (TS100, aka aromatic solvents); and MEK use has been terminated since CY2007 due its explosive nature. The vacuum (dehydration) process emissions are controlled by carbon canisters (in series 55-gallon drums: knock-out drum for moisture & high molecular weight compounds, dirty primary canister and polishing secondary canister). Isocyanates are used in the manufacturing process. However, being hygroscopic, Isocyanates react readily with water and it assumed that all isocyanates have reacted and that no emissions to ambient air occur. Hence, dehydration step is used to remove water. Several solvents (TS-100, Hi-Sol10, 100 Solvent) together with an application of vacuum and heat to the reactors are used to assist dehydration.

Due to new Dow Automotives Project, LymTal added one more reactor (eighth) and one more mixer (fourth); PTI was NOT be amended. However, eighth reactor and fourth mixer are idled because Dow project got cancelled due to the 2008 economic crisis in the automotive industry. On July 20, 2010, I asked Mr. Talat to modify PTI No. 1306-91B to include new equipment and to increase hours of operation. Lymtal modified the permit (PTI No. 1306-91B → PTI No. 1306-91C (add 3 Reactor Nos. 8, 9, 10 and increase hours of operation to 5,000 hrs./yr. from 3,000)) in October 2010.

Reactants (Polyols, TDI, IPDI) are mixed to homogeneous mixture in twelve (12) stirred tank reactors at 180 degrees Fahrenheit for 4-5 hours when the reaction is complete. Then the products are allowed to cool to 100 degrees Fahrenheit and the additives such as UV-protectors, bubble releasers, viscosity adjusters, etc. are added. The products are packaged at 80-90 degrees Fahrenheit

### **Pilot Plant**

LymTal also has one 55-gallon pilot reactor to test new products developed on a test-tube scale before going to production scale. The pilot reactor operates 2-3 times per month. One 2-gallon reactor is added.

One more 175-gallon pilot reactor is bought but idled and never used.

### **Storage tanks (21)**

See the attached storage tank list and locations to the FY2014 inspection report.

The LymTal has one 5,000-gallon storage tank for TDI, one 3,000-gallon storage tank for IPDI upstairs in a locked room. TDI and IPDI are extremely hazardous and are continuously monitored using an ambient air leak detection alarm system. These TDI and IPDI tanks are part of the permit.

There are four storage tanks for Polyols in the production area (one 2,000-gallon, two 3,000-gallon and one 5,000-gallon tanks). There is no MDI tank anymore because MDI is bought in 55-gallon drums. Two 2,500-gallon tanks for caster oil are installed in the production area.

At the backyard, one 2000-gallon and one 1100-gallon tanks store mineral spirits. One 2000-

gallon MEK storage tank is currently empty. One 5000-gallon tank stores caster oil. In all, there are three caster oil tanks including two in production area. Caster oil is imported from India.

About July 2010, I asked Mr. Janineh to revise PTI No. 1306-91B to increase the hours of operation limit. This amendment may as well include addition of new reactors and one new mixer. By October 2010, the reactors (8, 9, & 10) were added to the permit (PTI No. 1306-91B → PTI No. 1306-91C). During August 2015 PTI Mod (PTI No. 1306-91C → PTI No. 1306-91D), two reactors known as TR1 and TR2 are added as well.

After 12-reactor and 4-mixer process, 25-gallon carbon canister, vacuum pump, two knockout drums (to remove liquids, if any) and 55-gallon carbon canisters (two activated carbon canisters first 55-gallon canister and second 55-gallon canister) are connected in series to control emission of volatile organic compounds (VOC) (PTI No. 1306-91D, FG-REACTORS, SC IV.1 & 2 SC V.2). 55-gallon canister is brought down from the roof for easy of maintenance. A portable instrument (single point monitor made by MDA Scientific with various keys for each chemical such as MDI, IPDI, TDI, etc) is used to monitor breakthrough for both canisters (PTI No. 1306-91D, FG-REACTORS SC V.2). A hose is connected to a sample tap on the 55-gallon canister. Few years ago (Feb 2010), 55-gallon canister moved from the roof to a location near small 25-gallon canister, which is located near the vacuum pump. Obviously, Tedlar bags are not used. Instead, the portable instrument is directly connected. Breakthrough is determined separately for MDI, TDI and IPDI. The records of breakthrough monitoring are maintained (PTI No. 1306-91D, FG-REACTORS, SC VI.2). MDI, IPDI, TDI breakthrough is monitored once a week.

While 55-gallon secondary carbon canister was always located near the vacuum pump, 55-gallon primary carbon canister was relocated from the roof to near the other canister. The secondary 55-gallon canister was replaced as follows: **February 2010, March 22, 2012, and July 23, 2014**. Prior secondary canister always becomes primary canister upon replacement: canister swap, i.e. most recent secondary canister is swapped as a primary and primary canister that is saturated (attained break-through) is sent out for regeneration.

VOC control equipment arranged series:

55-gallon knock-out drum → 55-gallon primary carbon canister (new carbon placed in service **July 23, 2014**) → 55-gallon knock-out drum → Vacuum pump → 55-gallon secondary carbon canister for polishing operation.

#### **PTI No. 1306-91D**

Monthly hours of operation, VOC and HAP, the required calculations, carbon canister break-through monitoring records are kept. As I asked Mr. Janineh in CY 2004 to calculate emissions at the end of each calendar month based on 12-month rolling period, this is now done (PTI No. 1306-91D, FG-REACTORS, SC VI.1 [solvent usage] & 2 [carbon canister break-through]). AQD (Permit Engineer Michelle Rogers) removed hours of operation limit (PTI No. 1306-91C, FGFACILITY, SC III.1: 5,000 hours / year) instead added solvent usage limit (PTI No. 1306-91D, FG-REACTORS SC II.1: 16,000 pounds of solvents per year). LymTal used 2,333.5 pounds (1.167 tons) of VOC / solvents per year for CY 2015 (PTI No. 1306-91D, FG-REACTORS SC II.1 limit: 16,000 pounds of solvents per year). Not taking into account 96% control efficiency of combined two 55-gallon carbon canister system (dirty primary 80% and polishing secondary 80%, in addition knock-out drum), LymTal emitted 1.167 tons of VOC per year and 0.0467 HAPs per year (PTI No. 1306-91D, FG-FACILITY SC

I.1 [VOC] & I.2 [HAP] limits: 5 tpy VOC and 3 tpy Aggregate HAPs); i.e. all solvents used are considered emitted in spite of two 55-gallon carbon canister control plus knock-out drum prior to carbon canisters, for the purpose of calculations and compliance. LymTal keeps VOC and HAP records (PTI No. 1306-91D, FG-FACILITY SC VI.1 [VOC and HAP info] and 2 [VOC and HAP emissions])

### **Boilers**

One steam boiler of capacity 0.5 million BTU per hour and one hot water boiler of capacity 1 million BTU per hour are present. These boilers are **not** subject to federal NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR, Part 60, Subpart Dc) because boiler design capacity is less than 10 million BTU per hour. In addition, pursuant to Rule 336.1282(b), the boilers burning sweet natural gas (up to 50 million BTU per hour) are exempt from Rule 336.1201 (Permit-to-Install).

### **Dow Automotive Contract Manufacturing Business**

Dow Project got cancelled due to economic crisis and General Motors bankruptcy.

### **PTI Modifications**

As of April 3, 2002, LymTal was not in compliance with 208a registration requirements. AQD issued the letter of violation (LOV) dated April 3, 2002. In response to the letter of violation (LOV) dated April 3, 2002, LymTal obtained the ROP Opt-out Permit No. 1306-91A dated June 26, 2002 (revised PTI No. 1306-91 → PTI No. 1306-91A). Previously issued PTI No. 1306-91A was amended as PTI No. 1306-91B dated May 20, 2004, to increase hours of operation from 2,000 hours per year to 3,000 (revised PTI No. 1306-91A → PTI No. 1306-91B). In October 2010, PTI No. 1306-91B is revised to include Nos. 8, 9 & 10 reactors and to increase hours of operation from 3,000 to 5,000 hours per year (PTI No. 1306-91B → PTI No. 1306-91C). In August 2015 during the PTI revision (PTI No. 1306-91C → PTI No. 1306-91D), AQD (Ms. Rogers) removed hours of operation limit (PTI No. 1306-91C, SC III.1, VI.2: 5,000 hours / year) instead added solvent usage limit (PTI No. 1306-91D, FG-REACTORS SC II.1: 16,000 pounds of solvents per year)

### **Conclusion**

LymTal is in compliance with the permit (ROP opt-out PTI No. 1306-91D). 55-gallon carbon canisters (primary and secondary) in series are operating properly. The carbon adsorption system controls VOC emissions from solvents-assisted reactors dehydration process emissions.

NAME



DATE



SUPERVISOR



