

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

A404350616

FACILITY: Dow Silicones Corporation		SRN / ID: A4043
LOCATION: 3901 S Saginaw Rd, MIDLAND		DISTRICT: Saginaw Bay
CITY: MIDLAND		COUNTY: MIDLAND
CONTACT: Jennifer Kraut , Air Specialist		ACTIVITY DATE: 09/26/2019
STAFF: Gina McCann	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MEGASITE
SUBJECT: EU508-01 and FG304VENTRECOVERY		
RESOLVED COMPLAINTS:		

Inspection Date: 9/26/2019

Inspection Started: 8:30

Inspection Ended: 12:00

DOW Silicones/MDEQ-AQD staff present during the inspection:

- Gina McCann (EGLE-AQD, Senior Environmental Quality Analyst)
- Jennifer Kraut (Air Specialist, DOW Silicones)
- Matt Weber (Production Engineer for 515 Building, DOW Silicones)
- Maria Allen (Production Engineer for 515 Building, DOW Silicones)
- DJ Droste (Environmental Specialist, DOW/DOW Silicones)

Records reviewed as part of the inspection were:

- ROP Annual report for 2018
- 40 CFR Part 64 CAM excursion/exceedance report for 2018
- 40 CFR Part 63 Subpart FFFF, MON MACT periodic report for 2018

EU508-01

This emission unit consists of the Phenyltrichlorosilane and diphenyldichlorosilane recovery process, including reactors, columns, condensers, tanks, and related equipment. Included in this emission unit is the phenylchlorosilane distillation process which is defined in the conditions for this emission unit. This permit covers all PINTO vents associated with these processes. EU508-01 includes a 60,000 gallon benzene storage tank (i.e. tank T-60). This emission unit is subject to the requirements of 40 CFR Part 60, Subparts A and Kb, 40 CFR Part 61, Subparts A, J, and V, and 40 CFR Part 63, Subparts A, EEEE, and FFFF. The most recent PTI for this emission unit is PTI No. 84-08B.

Emissions for this unit are controlled by:

- Benzene absorber
- FG304VENTRECOVERY - 304 vent recovery system comprised of two interchangers (HX1 2040 and HX2 2040) and 2 condensers (HX1 2044 and HX2 2044) followed by one of the following:
 - FGTHROX - Thermal oxidizer with heat recovery (THROX) unit consisting of a burner, quencher, absorber, and two two-stage ionizing wet scrubbers (IWS) in series; or
 - FG337SCRUBBER - 337 wet scrubber (9950, 9960 – scrubbers typically alternate in operation, but can operate in-parallel and vent to SV337-001/002, respectively); or

- o **FGSITESCUBBERS** - Site wide water scrubber system that removes HCl and chlorosilanes from the FGSITEBLOWER consolidated vent system prior to discharge to atmosphere when the site wide thermal oxidizer system is not operating properly.
- o Service water condenser HX-10642, for the phenylchlorosilane distillation process only, in limited circumstances.

Special condition (SC) III.1. restricts operation of EU508-01, except as allowed under SC IV.5 and IV.6, unless the exit gas temperature from the benzene absorber is below 10°C. SC VI.2.a. is the associated monitoring and recordkeeping requirement to monitor and record, on a continuous basis, the exit gas temperature of the benzene absorber. During the inspection we observed the benzene absorber. The absorber had an exit gas temperature of -12°C with a LO secure process alarm (SPA) set at -55 and a HI SPA set at 22.50. I reviewed records of the exit gas temperature for the time period January 1, 2018 through September 19, 2019. There were five times when the exit gas temperature was above 10°C. During each of these events emissions were vented to FGTHROX, with the exception of the event on September 17, 2018. FGTHROX was not operating during this time period, however neither was the process.

SC III.2. requires the liquid flow rate of condenser HX-10642 to maintain a flow at or above 5 gallons per minute (gpm). Flow below 5 gpm requires the plant to implement corrective action. SC VI.2.b. is the associated monitoring and recordkeeping requirement to monitor and record, on a continuous basis, the coolant flow rate of condenser HX-10642. During the inspection we observed the service water condenser. The condenser had a liquid flow rate of 43.2 gpm with a LO SPA set at 10.00 gpm. I reviewed records of the exit gas temperature for the time period January 1, 2018 through September 19, 2019. There were two periods of time when the liquid flow rate was below the required 5 gpm, which coincided with times of calibration.

SC IV. 1. restricts operation of EU508-01, except as allowed by SC IV.5 and SC IV.6., unless the benzene absorber is installed, maintained, and operated in a satisfactory manner. Calibration for the benzene absorber last occurred on September 27, 2017. During an upgrade in the software used to track maintenance activities, the work order to calibrate by October 15, 2018 was lost and therefore the unit not calibrated. The glitch has since been fixed. The results of the calibration due on October 10, 2019 was requested and the results indicated the device passed.

SC IV.2. restricts operation of EU508-01, except as allowed by SC IV.5 and IV.6, unless FG304VENTRECOVERY is installed, maintained and operated in satisfactory manner. Calibration for condensers HX1 2044 and HX2 2044 last occurred on June 20, 2017. During an upgrade in the software used to track maintenance activities, the work order to calibrate HX1 2044 and HX2 2044 by October 15, 2018 and June 15, 2018, respectively, was lost and therefore the units were not calibrated. The glitch has since been fixed. HX1 2044 was calibrated on June 15, 2019 and no adjustments were made to the accuracy of the equipment.

SC IV.3. restricts operation of EU508-01, except as allowed by SC IV.4 and SC IV.5., unless emissions are routed to FGTHROX and FGTHROX is installed, maintained, and operated in a satisfactory manner. FGTHROX was not reviewed during this inspection. The last inspection on November 8, 2017 indicates FGTHROX was in compliance with its

permit conditions, indicating that it was installed, maintained and operated in a satisfactory manner.

SC IV.4. allows EU508-01 to operate up to a total of 1,500 hours per 12-month rolling time period, as determined at the end of each calendar month, when FGTHROX is not operating in a satisfactory manner as long as the following conditions are true: FG304VENTRECOVERY and the benzene absorber are operating in a satisfactory manner; the FG304VENTRECOVERY exhaust is routed to FG337SCRUBBER or FGSITESCRUBBERS and the control device (FG337SCRUBBER or FGSITESCRUBBERS) is installed, maintained, and operated in a satisfactory manner. SC VI.4. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record monthly and 12-month rolling time period, as determined at the end of each calendar month, hours that EU508-01 operated while the FG304VENTRECOVERY exhaust was not routed to FGTHROX. Hours EU508-01 operated when emissions were not routed to FGTHROX, for the 12-month rolling time period ending July 2019, were 685.99 hours.

SC IV.5 allows the phenylchlorosilane distillation process to operate for up to 800 hours in any 12-month rolling time period, while the benzene absorber and FG304VENTRECOVERY are not installed, maintained, and operated in a satisfactory manner, hereinafter "with 10642 control only." SC VI.4. is the associated monitoring and recordkeeping requirements that requires the plant to monitor and record for the phenylchlorosilane distillation process, for each calendar month, the number of hours of operation with 10642 control only and for the 12-month rolling time period, as determined at the end of each calendar month, the total number of hours of operation with 10642 control only. The plant does not utilize this flexibility but does maintain the appropriate recordkeeping. During the inspection we viewed the valve that would need to be opened for 10642 to be the only control. We also viewed the position of the valve for the time period January 1, 2018 through September 19, 2019 and the valve remained closed.

SC IV.6. allows for operation of EU508-01 when the benzene absorber is not operating in a satisfactory manner, as long as emissions are routed to FGTHROX and FGTHROX is installed, maintained, and operated in a satisfactory manner. During periods of time when the benzene absorber operated outside of its permitted operating parameters emissions were routed to FGTHROX. FGTHROX was not reviewed during this inspection. The last inspection on November 8, 2017 indicates FGTHROX was in compliance with its permit conditions, indicating that it was installed, maintained and operated in a satisfactory manner.

Compliance Reporting

The ROP Annual report for 2018, 40 CFR Part 64 CAM excursion/exceedance report for 2018 and 40 CFR Part 63 Subpart FFFF, MON MACT periodic report for 2018 were all reviewed as part of the pre-inspection process. No deviations were reported during this time period.

FG304VENTRECOVERY

304 Vent Recovery System comprised of two interchangers (HX1 2040 and HX2 2040) and two condensers (HX1 2044 and HX2 2044) which operate in series to remove air contaminants from process exhaust. The 304 vent recovery system receives process

exhaust from several emission units on-site. FG304VENTRECOVERY is a CAM subject emission unit subject to the requirements of 40 CFR Part 64. The condensers are CAM subject devices for VOC. The most recent PTI for this emission unit is PTI No. 84-08b.

- FGTHROX: Thermal oxidizer with heat recovery (THROX) unit consisting of a burner, quencher, absorber, and two two-stage ionizing wet scrubbers (IWS) in series; or
- FG337SCRUBBER: 337 wet scrubber (9950, 9960-scrubbers typically alternate in operation, but can operate in parallel and vent to SV337-001/002, respectively); or
- FGSITESCRRUBBERS: Site wide water scrubber system that removes HCl and chlorosilanes from the FGSITEBLOWER consolidated vent system prior to discharge to atmosphere when the site wide thermal oxidizer system is not operating properly.
- Condensers HX1 2044 and HX2 2044

SC III.1. restricts operation of any emission unit vented to the 304 vent recovery system, except as allowed by SC IV.1.a of FGSITEBLOWER, unless the exit gas temperatures of the refrigerated vent condensers (HX1 2044 and HX2 2044) are below -76°C. If the exit gas temperatures exceed -76°C this is considered an excursion per CAM and requires corrective action. SC VI.1. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a continuous basis, the exit gas temperature of the refrigerated vent condensers (HX1 2044 and HX2 2044). I reviewed records for the time period November 11, 2017 through September 25, 2019. During this time period there were three periods of time when either HX1 2044 or HX2 2044 exceeded the permitted -76°C requirement. However, emissions were routed to FGTHROX during these periods of time.

SC III.2. requires the plant to install and calibrate a temperature indicator for condensers HX1 2044 and HX2 2044. Calibration for condensers HX1 2044 and HX2 2044 last occurred on June 20, 2017. During an upgrade in the software used to track maintenance activities, the work order to calibrate HX1 2044 and HX2 2044 by October 15, 2018 and June 15, 2018, respectively, was lost and therefore the units were not calibrated. The glitch has since been fixed. HX1 2044 was calibrated on June 15, 2019 and no adjustments were made to the accuracy of the equipment.

SC V.1. requires within 240 days of ROP reissuance, the plant shall verify VOC and benzene emission rates from FG304VENTRECOVERY. Testing was scheduled for October 16, 2019, however the plant emailed on October 15, 2019 that the unit had a pump failure on one of the processes venting to it and the test would need to be rescheduled. Additional testing requirements were added to the ROP during the last renewal, which requires the plant to test FG304VENTRECOVERY, at a minimum, of every 5 years. The emission limit table, SC I.2., limits VOCs to 22.5 ton per year (tpy), based on a 12-month rolling time period as determined at the end of each calendar month. The permit does not have associated monitoring and recordkeeping requirements to show compliance with this limit. They will be added at the time of the next ROP renewal.

After the inspection I had asked the plant to verify that they were able to meet the 22.5 tpy limit. The plant last tested FG304VENTRECOVERY in 2013. At that time, the VOC emission rate was 14.52 pounds per hour. During conversations with DOW Silicones staff it appears FG304VENTRECOVERY operates continuously. Therefore, VOC emissions exceed the permitted 22.5 ton per year limit. A violation notice was sent on October 16, 2019.

The table below shows the monitoring parameters observed during the inspection.

Pollution Control	Process/ Operational Restrictions	Instantaneous Reading	Secure Process Alarm (SPA)	Time
HX1 2044	Exit gas temperature - 76 C	-101°C	-76°C	11:18
HX1 2044	Exit gas temperature - 76 C	-101°C	-76°C	11:18

Compliance Reporting

The ROP Annual report for 2018, 40 CFR Part 64 CAM excursion/exceedance report for 2018 and 40 CFR Part 63 Subpart FFFF, MON MACT periodic report for 2018 were all reviewed as part of the pre-inspection process. No deviations were reported during this time period.

NAME Gina L. McCann DATE 10/16/19 SUPERVISOR C. Hae