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

A404358920

FACILITY: Dow Silicones Corporation		**SRN / ID:** A4043
LOCATION: 3901 S Saginaw Rd, MIDLAND		**DISTRICT:** Bay City
CITY: MIDLAND		**COUNTY:** MIDLAND
CONTACT: Amanda Karapas , Air Specialist		**ACTIVITY DATE:** 07/14/2021
STAFF: Gina McCann	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MEGASITE
SUBJECT: FGTHROX		
RESOLVED COMPLAINTS:		

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

- Gina McCann (EGLE-AQD, Senior Environmental Quality Analyst)
- Amanda Karpas (DOW-Air Specialist)
- Becky Meyerholt (Environmental Specialist)
- Lyndsey McComb (FGTHROX Run-Plant Engineer)

Records reviewed as part of the inspection were:

- ROP Annual report for 2020

FGTHROX is the site-wide thermal oxidizer system with heat recovery (THROX) unit. FGTHROX consists of a burner, quencher, absorber, 2 stage ionizing wet scrubbers (IWS) in series, and stack. This device is a CAM subject unit for VOCs and PM10.

The THROX removes VOC, HAPs, PM10, HCl, and other toxic air contaminants from the FGSITEBLOWER consolidated vents system prior to discharge to atmosphere. At the time of the inspection the plant was in compliance with the ROP MI-ROP-A4043-2019.

Special condition (SC) I.1 limits NOx to 36 ton per year (tpy) based on a 12-month rolling time period as determined at the end of each calendar month. During the inspection we discussed the tracking of this records. The NOx emissions are generated using the records maintained from SC VI.2 and SC VI.10, which require proper operation of the NOx Continuous Emissions Monitor (CEMS). For the 12-month rolling time period ending May 2021, NOx emissions were 7.96 tpy.

SC I.2 limits CO to 90 tpy based on a 12-month rolling time period. SC VI.11. is the associated monitoring and recordkeeping requirement to keep records necessary to demonstrate that CO is in compliance with the emission limit listed in SC I.2. For the 12-month rolling time period ending May 2021, CO emissions were 0.71 tpy.

SC I.3 restricts PM10 emissions to 13.4 tpy based on a 12-month rolling time period. SC VI.12 is the associated monitoring and recordkeeping requirement to keep records necessary to demonstrate compliance with the PM10 limits in SC I.3, I.4, and I.6. PM10 emissions for the 12-month rolling time period ending May 2021 were 4.89 tpy. This emissions calculation does not speciate PM emissions and actually is a total particulate emissions from FGTHROX.

SC I.5 restricts PM10 emissions vented through EUTHROX to 3.5 pounds per hour (pph) based on a 720 hour rolling average. SC VI.12.f. is the associated monitoring and recordkeeping requirement to monitor and record the 720 hour average PM10 emission rate in pounds per hour, based on data from emission testing or the online gas chromatographs, calculated at the end of each hour from the PM10 emitted during the preceding 720 hours and the hours that EUTHROX was combusting vent gas containing silicon during the preceding 720 hours. This calculation shall be completed by the last day of the calendar month, for the pervious calendar month, for each hour in the previous month. For the 720 hour rolling average ending May 31, 2021, PM10 emissions were 1.05 pph.

SC I.6 restricts PM10 emissions to 100 lbs./month resulting from EU2703-06, EU2703-07, EU2703-08, EU2703-09, and EU2703-13. These emission units vent directly to the THROX so the silicon is not measured by the on-line GCs. SC VI.12e. is the associated monitoring and recordkeeping that requires the PM10 emission rate in lb/month due to EU2703-06, EU2703-07, EU2703-08, EU2703-09, and EU2703-13 shall be calculated. This calculation shall be completed by the last day of the calendar month for the pervious calendar month. For the 12-month rolling time period ending May 2021 PM10 emission from the specified emission units was 8.33 lbs.

The plant maintains a malfunction abatement plan (MAP) for FGTHROX. The MAP was updated and approved July 2, 2021. There are 2 alarms on three GCs. The first alarm is for total composition. This alarm checks that the constituents making up the fee stream when added equal approximately 100% or 1, 000,000 parts per million by volume. This ensures the GCs are analyzing a "new" gas stream and that the stream has not stalled for some reason. The second alarm makes sure that the GCs are continuously updating by looking for periods when constituent compositions do not change. Essentially this will catch software glitches.

SC VI.4 requires satisfactory operation of online gas chromatographs (GCs) to monitor and to continuously record the concentrations of compounds containing the silicon atom in the wet and dry vent headers to EUTHROX. For the purposes of this condition, "continuously" is defined as one measurement every 60 minutes. The GCs can be down for a maximum of 5 hours per day and 72 hours per 12-month rolling time period, as determined at the end of each calendar month. SC VI.12.c is the associated monitoring and recordkeeping requirement to record the dates and times that the silicon loading to the IWS was not measured. During the inspection we discussed how the downtime applies to the GCs, meaning if it was an individual limit or an aggregate limit for the GCs. I spoke with the permit engineer and reviewed the permit evaluation and determined that each of the GCs is allowed downtime of 5 hours per day and 72 hours per 12 -month rolling time period. I reviewed the 12-month rolling time period ending May 2021. The downtime associated with this 12-month rolling period was 13.2 hours for the dry vent, 53.9 hours for the wet vent and 66.6 hours for the MeCl vent. Daily downtime hours varied from 0.1 hours on the wet vent in March of 2021 to 4.99 hours on the MeCl vent in January 2021.

Satisfactory operation, referenced in SC VI.4, is defined in the MAP, which includes monthly calibration/verification, weekly maintenance of flows, pressures, and gas cylinder, monthly preventative maintenance of filters, ports, rotors, and vac pump and semi-annually the valves, septa, and seals are serviced. I reviewed maintenance records from January 2020 through June 2021. It appears the plant is maintaining the GCs according to the MAP.

SC VI.5 requires the plant to record the gas flow rates in the wet and dry vent headers to EUTHROX on a continuous basis, i.e. one instantaneous data point every 15 minutes. At the time of the inspection gas flow from the wet vent was 270 pounds per hour (pph) and the dry vent was contributing 2303 pph. The ROP does not have a requirement to record flow from the Methylene Chloride (2703/601) line.

SC VI.6 requires the plant to install, calibrate, maintain, and operate in a satisfactory manner a device to monitor and record the gas flow rate from EUTHROX on a continuous basis. The plant has a continuous emissions monitor (CEMs) installed for NOx, O2, Total Hydrocarbons (THC) and Carbon Dioxide (CO2). This requirement helps the CEMs to function properly. At the time of the inspection, I recorded the following readouts from the CEMs trailer.

Analyzer	1-minute block average
NOx	31.1 ppm
O2	10.6 %
THC	0.1 ppm
CO2	5.0 %

SC VI.8 requires the daily, monthly and 12-month rolling time period average fuel used for EUTHROX. For the 12-month rolling time period ending May 2021, the average fuel used for EUTHROX was 8,307,631 pounds of natural gas and NOx emissions was 7.96 tpy.

SC VI.9 requires the plant to keep, in a satisfactory manner, continuous records of EUTHROX combustion chamber temperature. SC IV.1 is the associated design/equipment parameter condition, which requires a minimum THROX combustion chamber temperature of 1800F and maintaining a residence time in the combustion chamber of greater than 1.0 second at any time when process vents are routed to EUTHROX. I reviewed combustion chamber temperature from May 1, 2020 through May 31, 2021. Two periods of time stuck out for temperatures below the permitted 1800F. The first was May 20, 2021, which is associated with the Sanford Dam failure. I confirmed this period of time was identified as a deviation on the annual deviation report. As a proactive measure, in preparation for the pending Sanford dam failure and subsequent flooding of the site, the entire site was shut down in a safe and orderly manner. This included a shutdown of the site THROX. Once the flood waters receded, the site initiated a safe and orderly return to normal operation.

SC IV.1. restricts operation unless the EUTHROX combustion chamber temperature is 1800°F and a residence time in the combustion chamber of greater than 1.0 second is maintained at any time when process vents are routed to EUTHROX. Satisfactory operation of the IWS includes maintaining the following parameters in the table below at or above the specified minimum

values over the specified averaging period. Readouts were observed during the inspection and are recorded below.

Parameter	Value Observed during last test	Value Observed at 12:02	Limit from MI -ROP-A4043-2019
1st stage IWS secondary voltage	24.0 KV	23.7 KV	≥ 10 kV (one hr. avg. period)
2nd stage IWS secondary voltage	21.4 KV	21.8 KV	≥ 15 kV (one hr. avg. period)
2nd stage IWS secondary current	224 mA	226 mA	≥ 50 mA (one hr. avg. period)
THROX combustion chamber temperature	1986F	1972 F	≥ 1800 degrees F (15 minute avg. period)
HCl absorber pH (east probe – scrubber recycle line)	6.24	7.58	> 5 (24 hour avg. period)
HCl absorber pH (west probe – overflow to sump)	6.27	7.81	> 5 (24 hour avg. period)
Gas Flow to THROX- Wet vent	553 pph	270 pph	NA

Gas Flow to THROX- dry vent	**313.5 pph**	**2303 pph**	**NA**
Gas Flow to THROX- MeCl vent	**75.5 scfm**	**267 pph**	**NA**
Total Heat Input (natural gas + dry and wet vents+ MeCl vent)	**28.5 MMBTU**	**28.1 MMBtu**	**NA**

At the time of the inspection the plant was in compliance with the ROP MI-ROP-A4043-2019.

NAME  DATE 8/3/2021 SUPERVISOR