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

A404362814

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:** 05/04/2022
STAFF: Gina McCann	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MEGASITE
SUBJECT: EU322-03, EU322-06, and EU322-11		
RESOLVED COMPLAINTS:		

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

- Gina McCann (EGLE-AQD, Environmental Specialist)
- Nathanael Gentle (EGLE-AQD, Environmental Quality Analyst)
- Jim Alger (Environmental Specialist, Dow MiOps)
- Amy Chang (Environmental Specialist, Dow MiOps)
- Conner Kneip (Production Engineer, 322 Building, Dow Silicones)
- Matt Ludwick (Production Engineer, 322 Building, Dow Silicones)

EU322-06

This emission unit is the silizane manufacturing process. This emission unit is subject to the requirements of 40 CFR Part 63, Subpart FFFF. The most recent PTI for this emission unit is PTI No. 296-07. Emissions are controlled by condensers 6391, 6392, 7604, 7605, and 7623.

This emission unit was most recently permitted in 2007. Special condition (SC) I.2. restricts VOC emissions to 0.8 ton per year (tpy) based on a 12-month rolling time period as determined at the end of each calendar month. SC VI.3. is the associated monitoring and recordkeeping requirement that requires the plant to keep records as required to demonstrate compliance with the emission limits. For the 12-month rolling time period ending March 2022 were 0.21 tpy.

SC I.4. restricts hexane emissions to 0.1 tpy based on a 12-month rolling time period as determined at the end of each calendar month. SC VI.3. is the associated monitoring and recordkeeping requirement that requires the plant to keep records as required to demonstrate compliance with the emission limits. For the 12-month rolling time period ending March 2022 were 0.00 tpy. The last time the plant produced a product using hexane was in March 2020. In October 2021 the plant performed trial batches without hexane and are able to remove hexane from their emission stream.

SC I.6. restricts ammonia emissions to 179.3 tpy based on a 12-month rolling time period as determined at the end of each calendar month. SC VI.3. is the associated monitoring and recordkeeping requirement that requires the plant to keep records as required to demonstrate compliance with the emission limits. For the 12-month rolling time period ending March 2022 were 3.98 tpy.

Emissions are controlled by several condensers. To ensure emissions are efficiently captured each of the condensers has a specific operating range it shall operate within. SC III.1. requires condensers 6391 and 6392 to operate with the coolant outlet temperature below 30°F. SC III.2. requires condenser 7623 to operate with the

process gas outlet temperature below 30°F. SC VI.1. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a continuous basis, the outlet temperature for condensers 6391 and 6392 and, the process gas outlet temperature from condenser 7623 with instrumentation acceptable to the AQD. I reviewed records of operating parameters for the time period starting January 1, 2021 through May 1, 2022. There were three distinct time periods when the condensers operated out of the specified ranges within the permit. Further review of these time periods showed no chlorosilane feeding to the process and the reactor kettle temperatures were low, which meant the process was not in operation during these time periods.

SC III.3. operation of the process unless the coolant exit temperature for the condensers (7604, 7605) are 40°F or below. SC VI.2. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a continuous basis, the exit temperature for condensers 7604 and 7605 with instrumentation acceptable to the AQD. For the purpose of this condition, "on a continuous basis" is an instantaneous data point recorded at least once every 15 minutes. I reviewed records of operating parameters for the time period starting January 1, 2021 through May 1, 2022. The condensers generally operate with the exit temperature below -10°C. During the time period June 8, 2021 through July 1, 2021 the process was shutdown for maintenance. The remainder of the time, the condensers operated within the required parameters.

The process is restricted from operating unless the condensers (6391, 6392, and 7623) are installed and operating properly. One way to determine proper operation is by operating within the specified ranges in the permit. During the inspection we viewed the condensers. Table 1 shows the operating parameters observed.

Table 1

EU/FG	Pollution Control Device	Process/Operational Restriction	Observed Value	SPA
EU322-03	Condenser 6391 (TT 1302)	coolant outlet temperature shall not exceed 30°F (-1.11C)	-37.2°C	-9.00°C
EU322-03	Condenser 6392 (TT 1286)	coolant outlet temperature shall not exceed 30°F (-1.11C)	-37.7°C	-9.00°C
EU322-03	Condenser 7604 (TT 1248)	coolant exit temperature shall not exceed 40°F (4.44C)	-16.4°C	-4.00°C

EU322-03	Condenser 7605 (TT 282)	coolant exit temperature shall not exceed 40°F (4.44C)	-16.3°C	-4.00°C
EU322-03*	Condenser 7623 (TT 1238)	process gas outlet temperature shall not exceed 30°F (-1.11C)	-17.7°C	-9.00°C
EU322-06*	Condenser 4507 (TT 2150)	coolant exit temperature 50°F (10C) or less	3.7 °F	40 °F
EU322-11	Condenser 6384 (TT 1174)	coolant exit temperature -15°C (-26.11F) or less	-27.2°C	-17.00°C
EU322-11	Scrubber 22452 (FT 16833/ 16832)	liquid flow rate 10 gallons per minute or more	20.7 gpm	12.00 gpm

*Process that exhausts to this device was not in operation at the time of the inspection.

Additionally, the plant is required to equip and maintain the condensers (6391, 6392) associated with vent stack numbers SV322-011 and SV322-014 with a temperature instrument to monitor the coolant's outlet temperature, per SC IV.3. SC IV.4. requires the plant to equip and maintain the condenser (7623) associated with vent stack number SV322-013 with a temperature instrument to monitor the process gas outlet temperature and SC IV.5. requires the plant to equip and maintain the condensers (7604, 7605) with a coolant exit temperature instrument. During the inspection we viewed each of the devices. The temperature transmitters (TT) id tags associated with each device could be found at the associated stack vent. Table 1 identifies the TTs associated with the pollution control device.

Along with confirming the equipment is installed and operating in a satisfactory manner, emission control efficiency is determined by properly maintaining the equipment. Table 2 identifies the dates associated with calibrations on the transmitters. Routine calibrations are being performed.

Table 2		

Unit	Equipment	Date
HX-6391	TT-1302	6/29/2017
		4/15/2021
HX-6392	TT-1286	6/29/2017
		4/15/2021
HX-7623	TT-1238	6/29/2017
		3/18/2021
HX-7604	TT-1248	6/29/2013
		5/15/2018
HX-4507	TT-2150	12/29/2017
		8/22/2020
HX-6384	TT-1174	3/29/2016
		3/28/2020
Scrubber 22452	FT-16832	2/8/2010
		9/17/2021
Scrubber 22452	FT-16833	3/29/2018
HX-7605	TT-282	6/29/2012
		6/29/2017
		9/17/2021

EU322-06

This emission unit was recently re-permitted under PTI 308-94B and the ROP modification received September 13, 2021. Dow Silicones Corporation (DSC) entered into a Consent Decree (19-11880) with U.S. EPA on January 24, 2020. The Consent Decree required DSC to update affected air permits at the site to ensure full compliance with the 40 CFR Part 63 Subpart FFFF (MON MACT) requirements including the consideration of trace chemicals discovered in certain raw materials.

This emission units general process is completed by reacting octomethylcyclotetrasiloxane with potassium hydroxide in the presence of cyclohexane. An atmospheric strip removes the solvent from the product after the reaction. The vent is sent through a glycol condenser, 4507, then to the atmosphere. The recovered solvent is reused in the next batch. The facility operates 356 days per year, 25 hours per day.

SC I.1. restricts VOC emissions to 4.0 tpy based on a 12-month rolling time period as determined at the end of each calendar month. SC VI.3. is the associated monitoring and recordkeeping requirement that requires the plant to calculate and keep, in a satisfactory manner, records of monthly and 12-month rolling time period VOC emissions for EU322 06 using production records, operating records, and/or other data acceptable to the AQD District Supervisor. The permittee shall keep all records on file at the facility and make them available to the Department upon request. For the 12-month rolling time period ending March 2022, VOC emissions were 0.71 tpy.

Emissions are controlled by condenser 4507. To ensure emissions are efficiently captured condenser 4507 shall operate the coolant exit temperature at 50ºF or less, per SC III.1. SC VI.2. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a per shift basis, the coolant exit temperature for condenser 4507 with instrumentation acceptable to the AQD District Supervisor. For the purpose of this condition, "on a per shift basis" is defined as an instantaneous data point recorded at least once every eight hours. The plant may record block average values for eight hour or shorter periods calculated from all measured data values during each period. The plant shall keep all records on file at the facility and make them available to the Department upon request. During the inspection we viewed this condenser. Table 1 shows the operating parameter observed compared to the permit requirement. I reviewed records of operating parameters for the time period starting January 1, 2021 through May 1, 2022. The condenser generally operates with the coolant exit temperature below 20°F. During the time period May 31, 2021 through July 1, 2021 the process was shutdown for maintenance. The remainder of the time, the condenser operated within the required parameters.

Additionally, the plant is required to equip and maintain the condenser with a coolant exit temperature indicator, per SC IV.2. During the inspection we viewed condenser 4507. The TT id tag associated with each device could be found at the condenser. Table 1 identifies the TT associated with the pollution control device.

Along with confirming the equipment is installed and operating in a satisfactory manner, emission control efficiency is determined by properly maintaining the equipment. Table 2 identifies the dates associated with calibrations on the transmitters. Routine calibrations are being performed.

EU322-11

This emission unit was recently re-permitted under PTI 146-20 and the ROP modification received August 27, 2021. Dow Silicones Corporation (DSC) entered into a Consent Decree (19-11880) with U.S. EPA on January 24, 2020. The Consent Decree required DSC to update affected air permits at the site to ensure full compliance with the 40 CFR Part 63 Subpart FFFF (MON MACT) requirements including the consideration of trace chemicals discovered in certain raw materials.

The process covered under this permit is used to distill crude methylvinyldichlorosilane. The crude material is collected into a feed tank until enough is available for a batch. It is then transferred to the batch distillation process where it is distilled. Product is taken overhead and sent to a storage tank. The pot residue is sent to a scrap tank. DV1631E waste tank is managed as a separate emission unit under R291 exemption.

Emissions from the process equipment are routed through a chilled vent condenser, 6384, and water scrubber, 22452. Condensate from the condenser drains into the crude feed tank. The facility operates 365 days per year, 24 hours per day.

SC I.2. restricts VOC emissions to 13.4 tpy based on a 12-month rolling time period as determined at the end of each calendar month. SC VI.5. is the associated monitoring and recordkeeping requirement that requires the plant to keep records as required to demonstrate compliance with the emission limits specified in this table. A monthly summary of these emissions shall be made available to the AQD upon request. Within 30 days following the end of each calendar month, the plant shall calculate and record emissions from EU322-11 for the previous calendar month to demonstrate compliance with the 12-month rolling time period emission totals specified in this table. The plant shall keep all records on file and make them available to the Department upon request. For the 12-month rolling time period ending March 2022, VOC emissions were 1.12 tpy.

Emissions are controlled by condenser 6384 and scrubber 22452. To ensure emissions are efficiently captured condenser 6384 shall not operate EU322-11 unless the coolant exit temperature of condenser 6384 is -15°C or less, per SC III.1. SC VI.2. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a continuous basis, the coolant exit temperature of condenser 6384 with instrumentation acceptable to the AQD. For the purposes of this condition, "on a continuous basis" is defined as an instantaneous data point recorded at least once every 15 minutes. The plant may record block average values for 15 minute or shorter periods calculated from all measured data values during each period. SC III.2. restricts the plant from operating EU322-11 unless the liquid flow rate through scrubber 22452 is 10 gallons per minute (gpm) or more. SC VI.3. is the associated monitoring and recordkeeping requirement that requires the plant to monitor and record, on a continuous basis, the liquid flow rate of scrubber 22452 with instrumentation acceptable to the AQD. For the purposes of this condition, "on a continuous basis" is defined as an instantaneous data point recorded at least once every 15 minutes.

During the inspection we viewed the condenser and scrubber. Table 1 shows the operating parameters observed compared to the permit requirement. I reviewed records of operating parameters for the time period starting January 1, 2021 through May 1, 2022. The condenser generally operates with the coolant exit temperature below -20°C and the liquid flow rate of scrubber 22452 is greater than 15 gpm. The

condenser operated within the required parameters for the time period reviewed. During the time period reviewed, two peaks were identified when the scrubber operated below the required 10 gpm. Further review of the production records showed the process was not in operation during these time periods.

Additionally, the plant is required to equip and maintain the condenser with a coolant exit temperature indicator, per SC IV.2. During the inspection we viewed condenser 6384. The TT id tag associated with each device could be found at the condenser. Table 1 identifies the TT associated with the pollution control device. Also, SC IV.3. requires the scrubber 22452 be equipped with a liquid flow indicator. During the inspection we viewed scrubber 22452. The flow transmitter (FT) id tag associated with each device could be found at the condenser. Table 1 identifies the FT associated with the pollution control device.

Along with confirming the equipment is installed and operating in a satisfactory manner, emission control efficiency is determined by properly maintaining the equipment. Table 2 identifies the dates associated with calibrations on the transmitters. Routine calibrations are being performed.

Compliance Reporting

The annual ROP deviation report for 2021 was reviewed as part of this inspection process. One deviation was identified for EU322-11. The process vents were vented through stack SV322-004 instead of the permitted vent SV322-005. During an AQD inspection it was discovered the plant believed this change could be made under exemption R285(2)(d) since the scrubber is a more efficient air pollution control device but did not consider the operating requirements in the existing permit. A revised permit was issued and became effective on 9/1/2022 which allows EU322-11 to vent through SV322-004. This deviation is considered resolved.

NAME  DATE 5/19/2022 SUPERVISOR