

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

N625158248

FACILITY: CABOT CORPORATION		SRN / ID: N6251
LOCATION: 3603 S SAGINAW ROAD, MIDLAND		DISTRICT: Bay City
CITY: MIDLAND		COUNTY: MIDLAND
CONTACT: Kevin Musser , Safety, Health, & Env Specialist		ACTIVITY DATE: 03/25/2021
STAFF: Benjamin Witkopp	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Facility Inspection		
RESOLVED COMPLAINTS:		

On March 25, 2021 Ben Witkopp of the Michigan Department of Environment, Great Lakes, and Energy - Air Quality Division (AQD) met with Kevin Musser. Kevin is the sites Safety, Health, and Environmental Manager.

The facility manufactures amorphous fumed silica for sale to the adjacent site of Dow Silicones Corporation (formerly Dow Corning Corporation) as its primary customer among others. Cabot is situated on the north end of the site. Cabot receives chlorosilanes from Dow Silicones via piping. Cabot's process consists of vaporizing and then using combustion air and hydrogen to produce amorphous silica. The hydrogen is supplied by Air Products which is considered a support facility and is located on the south east side of Cabot. Byproducts are HCl and chlorine. Natural gas and hydrogen are used in a "staged injection" at high temperatures. The result is a push of the chlorine to HCl. The hydrogen also helps in temperature control and also helps to lower the levels of carbon monoxide. HCl, CO<sub>2</sub>, CO, and chloromethanes are formed. A filter is used to collect the amorphous silica. Any HCl remaining on the surface of the silica is removed when the material is routed through a calciner. The silica is then cooled for storage and delivery. HCl is recovered from the entire process and sold. A caustic scrubber control system uses sodium hydroxide to remove small amounts of HCl and chlorine prior to atmospheric discharge. The scrubber is monitored by two continuous emissions monitors (CEM) to measure the amount of CO being discharged. One monitor basically operates as a backup. In the case of a monitor failure it could then be used to minimize downtime.

The entire source (both Cabot and Air Products) is covered by renewable operating permit MI-ROP-N6251-2020. The permit also contains opt-out limits for hazardous air pollutants (HAPs) though the source does not have the potential to be a major source of them. The limits are there only as a point of clarity. The permit has two sections, the first being for Cabot and the second for Air Products. An air permit for the use of a different feedstock was sought and subsequently issued as 29-18. Permit 29-18A was issued April 24, 2019 to correct some typographical errors. The permit was granted for using a new adiabatic tower. An increased capacity of the Air Products hydrogen plant was also felt to be needed though that does not require permitting action. Three skid mounted units were brought in, however, at this point, the additional capacity is not needed.

Kevin and I started out with a records review in his office.

Verification of CEM accuracy was last conducted on December 1, 2020. One CEM, the older of the two units, read within 1.60% relative accuracy while the other read within 2.93%. Both of the values are below the 10% specified in 40 CFR Part 60 Appendix B

CO has a ton per year (tpy) limit of 432 based on a 12 month rolling time period. The most recent high level was 122.28.

Total chloromethanes have a limit of 21 ppmv and testing showed 1.528. The chloromethanes also have a limit of 8.9 tpy based on a 12 month rolling time period. The highest recent level was 0.23. Particulate matter has a standard limit of 0.10 pounds per 1,000 pounds of stack gas and had a test requirement which was fulfilled in 2007. It also has a limit of 3.4 tpy on a 12 month rolling time period. The highest level recently achieved was 0.80. The 12 month rolling time period limits on HAPs are 8.9 tpy for individual ones and 22.4 tpy for aggregate. The highest amount of aggregated HAPs was 4.89 tons. The individual HAPs records on a 12 month rolling time period were also low. For example HCl is the largest HAP with 4.2 tons for the latest 12 months. Chlorine had 0.32 tons. Since

the level of aggregate HAPs was below that for even individual HAPs there clearly would not be an emissions limit problem.

HCL was tested from the TF 13 vent (SV2) and the caustic scrubber exhaust (SV7). TF 13 showed 0.334 pounds per hour while the scrubber had 0.0051. The results are below the respective limits of 0.95 and 0.61 pounds per hour.

We then went to the control room to check instantaneous values. The highest reading of CO was 2,200 ppmv. The highest recent historical production reading was 3,521 on June 10, 2020. The value is below the permit limit of 4,000 ppmv based on a 15 minute rolling time period. Per the malfunction abatement plan, the caustic scrubber CD-SCRUB is to operate with a minimum pH level of 7.8 and have a minimum recirculation flow rate of 50,000 Kg/hr. It was running at 78,800 to 84,800 Kg/hr. The pH was 8.4. Peak post reaction temperature was 759 C as a high and 736 for the low. These temperatures equate to 1,398 F and 1,357 F respectively. They are within the range of 1,300 to 1,600 F specified in the permit.

Maintenance records are kept concerning things like the caustic scrubber, filters, etc. Pressure drop gauges for filters are also checked and bags are checked and replaced on the filter vent (TF 13). We discussed the filter media for the filter vent and Kevin found the bag type had been switched. This resulted in an updated malfunction abatement plan being submitted.

The maintenance building is home to the emergency engine and the cold cleaner. The engine is subject to 40 CFR 63 ZZZZ. A preventative maintenance check on the engine is performed each month by Cabot and records were provided. Cummins performed annual maintenance on June 2, 2020. It included a full service check including the battery, coolant, oil change, load test etc. The engine run time is basically due to maintenance and checks. The cold cleaner is used only occasionally with operating instructions posted as required.

The change to a new feedstock and other customer requirements required the installation of a new "burner" to accommodate mixing the new feedstock with hydrogen. It is also equipped with an automatic ignitor at the point where air is added to the mix. However, the ignitor was not fully functional. Since the new burner was not mentioned in the most recent air permitting action I discussed its differences with the operators. The fuel type had not changed. Therefore, the concern centers around the use of combustion air. Air, not oxygen, is used to facilitate combustion. The resulting products of combustion would then be primarily NOx. Operators were questioned and stated the new burner system actually uses less air than the original burner. Since less air is used there is no concern about an increase in NOx emissions.

Section 2 of the ROP concerns Air Products Corporation. The company is considered a support facility to Cabot as it supplies hydrogen solely to the plant. It operates under permit to install exemption Rule 290. It is also subject to the overall source wide limits for HAPs. George Beris is the environmental contact for Air Products. Records required to demonstrate compliance with rule 290 and HAPs limits were requested and subsequently provided. The highest total HAP emissions were 0.0596 tons on a 12 month rolling time period basis. This is far less than the limit of 8.9 tons for individual HAPs let alone the 22.4 tons allowed for total HAPs. Carbon monoxide, methanol, ethanol, and ammonia are the emissions of concern under rule 290. The highest monthly total was less than 40 pounds in comparison to the 1,000 pounds allowed.

Based upon the records reviewed and equipment checked at the time, the facility is considered to be in compliance.

NAME

B. Withapp

DATE

6-30-21

SUPERVISOR

Chris Hare