

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

B237168198

FACILITY: PVS TECHNOLOGIES		SRN / ID: B2371
LOCATION: 10825 HARPER, DETROIT		DISTRICT: Detroit
CITY: DETROIT		COUNTY: WAYNE
CONTACT: Matthew Hehn , Capital Projects Engineer		ACTIVITY DATE: 07/17/2023
STAFF: Jonathan Lamb	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: FCE, FY 2023		
RESOLVED COMPLAINTS:		

INSPECTED BY: Jonathan Lamb, EGLE-AQD

PERSONNEL PRESENT: Matt Hehn - Capital Projects Engineer; Andy Weidemann – Plant Engineer; Nick Thelen – Maintenance Supervisor

FACILITY PHONE NUMBER: (313) 571-1100

CONTACT PHONE NUMBER: 313-348-9393 (Matt Hehn)

CONTACT EMAIL: mhehn@PVSCchemicals.com

FACILITY WEBSITE: www.pvschemicals.com

SAFETY REQUIREMENTS: long sleeves, hard hat, and safety goggles are required; emergency respirator provided.

FACILITY BACKGROUND:

PVS Technologies produces liquid ferric chloride, which is used as a flocculant in the drinking and wastewater treatment industries and as an etching agent in the production of circuit boards in the electronic and computer industries. The facility also repackages and redistributes anhydrous ferric chloride, though anhydrous ferric chloride is no longer produced on site. The facility moved into this location in 1991. The facility currently operates 24 hours per day (three 8-hour shifts), seven days per week, and has 18 employees on site.

PVS Technologies is a division of PVS Chemicals, Inc. PVS Chemicals, Inc. is headquartered across the street at 10900 Harper. PVS Chemicals was established in Detroit in 1945 as Pressure Vessel Services, Inc., and has been at the current address since 1991. The company has various divisions and facilities throughout North America and worldwide.

PVS Nolwood, another division of PVS Chemicals, leases a portion of the building for storage and distribution of chemicals in drums and totes. This site does not store any materials used or produced at PVS Technologies and does not perform any processing or consolidation of chemicals on site and does not appear to be subject to air permitting requirements.

The facility is located adjacent to PVS Transportation (11001 Harper, SRN B3427) and tanker trucks owned by PVS Transportation may be used to transport ferric chloride produced at PVS Technologies to customers off-site; however, there is no common control of the two facilities (separate ownership), they do not share the same SIC major group code, and the transport of chemicals produced at PVS Technologies is less than 50% of the business operations of PVS Transportation. Based on this information, the facilities are determined to be two separate stationary sources.

Note: The mailing address for PVS Technologies is at the corporate offices at 10900 Harper, but the facility operations are performed at 10825 Harper. Wayne County files/permits show an address of 6500 French Road for this facility – this is the same address as 10825 Harper but a different entrance which is no longer used.

COMPLAINT/COMPLIANCE HISTORY:

There has not been a history of complaints against this facility and the facility was determined to be in substantial compliance during the most recent inspection performed in August 2019.

PROCESS DESCRIPTION/EQUIPMENT:

The raw materials used in the production of ferric chloride are ferrous chloride, scrap steel and mill scale, and hydrochloric acid. Ferrous chloride and hydrochloric acid are delivered via either rail car or tanker and stored in outdoor tanks. Scrap steel and mill scale (iron oxide) are delivered via truck and stored in designated areas outside. Scrap steel is delivered one or two times a week and mill scale is delivered once every week or two.

The ferric chloride production process (FGFERRICCHLORIDE) is broken into two groups, the Reduction Group (FGREDUCTION) and the Chlorine Group (FGCHLORINE), both of which consist of various storage and reactor tanks. In the Reduction Group, ferrous chloride and/or hydrochloric acid (HCl) is reacted with iron oxide (either scrap steel or mill scale) to produce ferrous chloride with a higher iron/lower acid concentration. This ferrous chloride is then sent through a filter press to remove any solids and then sent to the Chloride Group, where chlorine is added to the ferrous chloride, which reacts to produce ferric chloride.

The following tanks in FGREDUCTION are controlled by a single-stage scrubber (EUK-127), rated at 3,000-3,300 acfm per manufacturer specifications, which uses water as the scrubbing solution to control HCl emissions. All tanks within the Reduction Group contain solutions with less than 25% hydrochloric acid, except for T-200, which has a 37% concentration of hydrochloric acid:

EUT-106A and EUT-106B: Two 10,000-gallon reaction tanks. Mill scale is added to ferrous chloride to produce a concentrated ferrous chloride solution.

EUT-107: 20,500-gallon reduction reactor tank. Scrap steel is added to ferrous chloride to produce a concentrated ferrous chloride solution.

EUT-107A: 15,000-gallon reduction reactor tank. Scrap steel is added to ferrous chloride to produce a concentrated ferrous chloride solution.

EUT-109: 3,000-gallon intermediate storage tank containing unfiltered ferric chloride.

EUT-114 and EUT-115: Two 150,000-gallon storage tanks for either ferrous chloride or hydrochloric acid.

EUT-116: 150,000-gallon storage tank for drinking water-grade ferric chloride or ferrous chloride solution. Currently used to store water-grade ferric chloride.

EUT-200: 4,700-gallon storage tank for hydrochloric acid (37%) used for fine-tuning concentrations.

EUT-201: 10,000-gallon reactor tank which reacts HCl with iron oxide to produce ferrous chloride.

The following tanks in FGCHLORINE are controlled by a 2-stage scrubber (EUK-501-502), rated at 2,000 acfm per manufacturer specifications, which currently uses a scrubbing solution of ferrous chloride in both stages to control chlorine emissions. The facility may also use ferrous chloride and sodium hydroxide as the scrubber solution in place of only ferrous chloride.

EUT-108A, T-108B, T-108C, and T-108D: Four 30,000-gallon reactor tanks which chlorinate ferrous chloride into ferric chloride.

EUT-103: 30,000-gallon chlorine scrubber feed tank containing ferrous chloride solution.

During the production each batch of ferric chloride, the temperature of the tanks increases as the ferrous chloride and chlorine react, though the temperature of the tanks is restricted to 165°F by a system interlock to protect the inner rubber linings of each tank.

The following tanks in FGFERRICCHLORIDE are used for storage of product and do not have emission control due to the low HCl concentration in the product:

EUT-50: 10,000-gallon storage tank for etchant or other specialty products.

EUT-101: 30,000-gallon intermediate process storage tank for liquid ferric chloride.

EUT-102: 30,000-gallon storage tank for ferric chloride (final product).

EUT-104: 30,000-gallon intermediate process storage tank for unfiltered ferrous chloride.

EUT-195: 10,566-gallon storage tank for etchant or other specialty products.

EUT-196: 21,672-gallon storage tank for etchant or other specialty products.

EUT-197: 16,561-gallon storage tank for etchant or other specialty products.

EUT-198: 21,672-gallon storage tank for etchant or other specialty products.

EUT-199: 8,478-gallon storage tank for etchant or other specialty products.

There are no storage tanks for chlorine. Chlorine is stored in the rail car in which it is delivered on tracks that run adjacent to the building. Each rail car contains approximately 90 tons of chlorine. Chlorine is pumped directly from the railcars to the processing tanks; the facility uses about one railcar of chlorine every 36 to 48 hours. There are chlorine monitors with alarms near these rail cars and throughout the facility to detect any chlorine leaks coming from the storage or processing of chlorine. Emissions from the transfer of chlorine from the rail car to the tanks are controlled by the two-stage packed tower scrubber (EUK-501-502).

EUT-202 and EUT-203: Two 8,000-gallon cationic polymer storage tanks. The tanks have been installed in place but have not been hooked up to the system and have yet to be filled with material.

There are two diesel tanks located outside by the EUK-501-502 scrubber which are used to fuel vehicles on site. The tanks are 200 and 250 gallons, respectively, and are exempt per Rule 284(2)(i).

APPLICABLE RULES/ PERMIT CONDITIONS:

PVS Technologies was issued PTI No. 152-15A on August 1, 2022. This permit was a modification of PTI No. 152-15 to install two tanks for storing polymer (FGPOLYMER) for potential blending into some of the formulations of the ferric chloride finished product. These tanks have been partially installed but have yet to be put into service due to lack of demand for the blended product. For the purpose of this inspection, records from January 2022 through July 2023 were reviewed to determine compliance.

PTI No. 152-15A, Special Conditions:

EUCIRailCar

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Malfunction Abatement Plan (MAP) was submitted for AQD approval on November 2, 2022, with an amended version submitted to AQD on June 23, 2023. The MAP is implemented and maintained.

VI. MONITORING/RECORDKEEPING

1. IN COMPLIANCE. MAP is maintained on site and all records demonstrating compliance with preventative maintenance records were provided for my review during the inspection.

XI. OTHER REQUIREMENTS

1. IN COMPLIANCE. All rail cars entering the facility operate in compliance with the conditions of EUCIRailCar.

EUYARD

I. EMISSION LIMITS

1. IN COMPLIANCE. Visible emissions from the material storage piles, including material loading/unloading and truck traffic, are maintained below 5% opacity. I did not observe any active loading or unloading of material during the inspection, but I did not observe any fugitive dust issues in the yard from truck traffic. The area where material is stored is paved.

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Nuisance Minimization/Fugitive Dust Plan was previously submitted for AQD approval on December 30, 2015. Since PTI 152-15A did not change the operations of EUYARD, AQD determined it was not necessary to resubmit the plan. The plan is implemented and maintained. No fugitive dust issues were observed during the inspection.

VI. MONITORING/RECORDKEEPING

1. IN COMPLIANCE. All records associated with the Nuisance Minimization/Fugitive Dust Plan are maintained on site and were reviewed during the inspection.

FGREDUCTION

I. EMISSION LIMITS

1. IN COMPLIANCE. Based on results of emission testing performed on April 19, 2016, the hydrogen chloride emission rate was below the detection limit of 0.0017 pph, which demonstrates compliance with the permit limit of 1.03 pph.

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Malfunction Abatement Plan (MAP) was submitted for AQD approval on November 2, 2022, with an amended version submitted to AQD on June 23, 2023. The MAP includes a complete preventative maintenance program, identification of the process and control equipment operational parameters, and a description of corrective actions to be taken in the event of a malfunction or failure to comply with applicable emission limits, and calibration schedule for all meters/monitors.

2. IN COMPLIANCE. Facility ceases production when the scrubber is not in operation for maintenance. During the compliance period, there were no malfunctions of the scrubber which forced production to cease.

3. IN COMPLIANCE. Facility uses water as the scrubbing solution, based on the operational parameters set during emissions testing on April 19, 2016. Based on a review of records, the conductance of the water in the scrubbing solution did not exceed 709,000 microsiemens/centimeter during the compliance period; conductance normally ranged from 7,000 to 139,000 microsiemens/centimeter. During the inspection, I noted the conductance at 8,000 microsiemens/centimeter [Note: Monitor reads in millisiemens/cm (mS/cm), not microsiemens/cm (μ S/cm), so the actual reading on the monitor showed 8.0 mS/cm].

4. IN COMPLIANCE. Based on a review of scrubber monitoring records performed during the inspection, the scrubber operates in compliance with the following operational parameters:

- Minimum liquid flow of 14 gallons per minute. A review of daily operational logs showed the liquid flow rates normally ranged from 58 to 60 gallons per minute.
- Maximum gas flow rate of 3600 scfm (~4,500 acfm). Based on manufacturer specifications, the scrubber fan is rated at 3000 to 3300 acfm, which maintains compliance with this condition.
- Maximum pressure drop of 3 inches water gauge. A review of operational logs shows pressure drop did not exceed 3 inches water gauge during the compliance period; most days showed a pressure drop of 0.0 inches water gauge.

IV. DESIGN/EQUIPMENT PARAMETERS

1. IN COMPLIANCE. Scrubber EUK-127 is installed, maintained, and operated at all times when equipment in FGREDUCTION is in operation.

2. IN COMPLIANCE. An alternate pump for the scrubber is kept in the maintenance room in case of malfunction of the operational pump.

3. IN COMPLIANCE. A device to monitor the conductivity of the scrubbing solution in EUK-127 on a continuous basis is installed, operated, and maintained. The conductivity meter was replaced in April 2023.

4. IN COMPLIANCE. A device to monitor the liquid flow rate of the scrubbing solution in EUK-127 on a continuous basis is installed, operated, and maintained.

5. IN COMPLIANCE. A device to monitor the pressure drop across EUK-127 on a continuous basis is installed, operated, and maintained.

VI. MONITORING/RECORDKEEPING

1. IN COMPLIANCE. All records are maintained in a format acceptable for AQD and were made available for review by AQD during the inspection.

2. IN COMPLIANCE. A log of all maintenance activities and downtime for EUK-127 is maintained electronically and was made available for review by AQD during the inspection.

3. IN COMPLIANCE. Facility maintains records of the operating hours of FGREDUCTION on a daily and monthly basis. These records were made available for review by AQD during the inspection. On each day FGREDUCTION is in operation, it is assumed to be operating for the full 24-hour period.
4. IN COMPLIANCE. Facility maintains information on the maximum capacity of the fan associated with EUK-127, as installed. This information shows the fan to be 3,000 to 3,300 acfm at 104°F to 134°F.
5. IN COMPLIANCE. Facility personnel manually record the conductance, liquid flow rate, and pressure drop at least once per shift (facility runs three 8-hour shifts per operating day). These records were made available for AQD review during the inspection.
6. IN COMPLIANCE. Results of testing performed on April 19, 2016, as required in FGREDUCTION, SC V.1, is maintained on site. These results were submitted to AQD on June 6, 2016.

VIII. STACK/VENT RESTRICTIONS

1. IN COMPLIANCE. Scrubber stack SVK-127 appears to meet the permit specifications of maximum diameter of 18 inches and minimum height of 49 feet above ground level.

FGCHLORINE

I. EMISSION LIMITS

1. IN COMPLIANCE. Based on results of emission testing performed on April 20, 2016, the chlorine emission rate was 0.09 ppmv, which demonstrates compliance with the permit limit of 1.0 ppmv.
2. IN COMPLIANCE. Based on results of emission testing performed on April 20, 2016, the chlorine emission rate was 0.000367 pph, which demonstrates compliance with the permit limit of 0.022 pph.

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Malfunction Abatement Plan (MAP) was submitted for AQD approval on November 2, 2022, with an amended version submitted to AQD on June 23, 2023. The MAP includes a complete preventative maintenance program, identification of the process and control equipment operational parameters, and a description of corrective actions to be taken in the event of a malfunction or failure to comply with applicable emission limits.
- 2 and 3. IN COMPLIANCE. Facility ceases production when the scrubber is not in operation for maintenance, malfunction, or if the monitored chlorine concentration in the exhaust gas meets or exceeds the limit in S.C. I.1 (1 ppm). If the monitored chlorine concentration reads 0.5 ppm, an alarm is activated; if the concentration hits 1.0 ppm, the chlorine feed from the railcar is automatically shut down. The feed from the rail car into the process does not start again until the chlorine concentration is less than 0.5 ppm and the alarm is cleared; this usually takes a few minutes for the chlorine level in the exhaust gas to drop to 0.5 ppm when these situations occur. According to Mr. Hehn, this situation occurs infrequently.
4. IN COMPLIANCE. Maximum gas flow rate is not to exceed 2,000 scfm (~2988 acfm at a maximum tank temperature of 165°F). Based on the manufacturer specifications, the scrubber fan is rated at 2,000 acfm, which maintains compliance with this condition.

IV. DESIGN/EQUIPMENT PARAMETERS

1. IN COMPLIANCE. Two-stage packed tower scrubber EUK-501-502 is installed, maintained, and operated at all times when equipment in FGCHLORINE is in operation.
2. IN COMPLIANCE. An alternate pump for the scrubber is kept in the maintenance room in case of malfunction of the operational pump.
3. IN COMPLIANCE. A device to monitor and record the chlorine concentration of the exhaust gas from EUK-501-502 on a continuous basis during operation of any equipment in FGCHLORINE is installed, operated, and maintained. Per the Malfunction Abatement Plan, calibration is performed every six months using a chlorine sensor bumper test on each sensor; records of the bump tests are maintained. The monitoring device is equipped with an alarm and interlocking shutdown system that would close the flow of chlorine from the railcar and cease operation of FGCHLORINE if the monitored chlorine concentration meets or exceeds the limit of 1 ppm, as specified in FGCHLORINE, SC I.1. Mr. Hehn indicated this occurs infrequently. In these situations, the flow of chlorine from the railcar is automatically shut off so no chlorine is added to the process

until the chlorine in the exhaust drops to 0.5 ppm, at which time they can continue feeding chlorine from the railcar into the process. Mr. Hehn stated that it usually takes a few minutes for the chlorine in the exhaust to drop to 0.5 ppm.

4. IN COMPLIANCE. Facility uses ferrous chloride as the scrubbing solution in both towers of EUK-501-502.

5. IN COMPLIANCE. A device to monitor the liquid flow rates of the scrubbing solutions in EUK-501-502 on a continuous basis is installed, operated, and maintained.

6. IN COMPLIANCE. A device to monitor the pressure drop across EUK-501-502 on a continuous basis is installed, operated, and maintained.

V. TESTING/SAMPLING

1. IN COMPLIANCE. Testing to determine chlorine emission rates from FGCHLORINE was performed on April 20, 2016.

VI. MONITORING/RECORDKEEPING

1. IN COMPLIANCE. All records are maintained in a format acceptable for AQD and were made available for review by AQD during the inspection.

2. IN COMPLIANCE. Facility maintains records of the chlorine concentration of the exhaust gas from SVK-501-502 on a continuous basis. Chlorine concentration is monitored and recorded every second, according to Mr. Hehn. These records were made available for review by AQD during the inspection.

3. IN COMPLIANCE. A log of all maintenance activities and downtime for EUK-501-502 is maintained and were made available for review by AQD during the inspection.

4. IN COMPLIANCE. Facility maintains records of the operating hours of FGCHLORINE on a daily and monthly basis. These records were made available for review by AQD during the inspection.

5. IN COMPLIANCE. Facility maintains information on the maximum capacity of the fan associated with EUK-501-502, as installed. Manufacturer's specification sheets show the fan to be 2,000 acfm.

6. IN COMPLIANCE. Results of testing performed on April 20, 2016, as required in FGCHLORINE, SC V.1, are maintained on site. These results were also submitted to AQD on June 6, 2016.

VIII. STACK/VENT RESTRICTIONS

1. IN COMPLIANCE. Scrubber stack SVK-501-502 appears to meet the permit specifications of maximum diameter of 18 inches and minimum height of 49 feet above ground level.

FGPOLYMER

Since FGPOLYMER has yet to be put into operation, these conditions were not evaluated during this inspection.

FGFERRICCHLORIDE

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. The facility maintains an Emergency Action Plan for the equipment in FGFERRICCHLORIDE, which describes the triggering event for implementation of the plan and the actions to be taken. A copy of this plan was submitted to AQD via email on December 1, 2015.

VI. MONITORING/RECORDKEEPING

1. IN COMPLIANCE. The facility maintains a copy of the Emergency Action Plan at the facility. Any events which would initiate actions under the Emergency Action Plan would be reported and recorded. Since the last inspection, there have been no incidents which would have initiated actions to be taken in accordance with the Emergency Action Plan.

VIII. STACK/VENT RESTRICTIONS

1. IN COMPLIANCE. Scrubber stack SVK-127 appears to meet the permit specifications of maximum diameter of 18 inches and minimum height of 49 feet above ground level.

