

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

B237144305

FACILITY: PVS TECHNOLOGIES		SRN / ID: B2371
LOCATION: 10825 HARPER, DETROIT		DISTRICT: Detroit
CITY: DETROIT		COUNTY: WAYNE
CONTACT: Matthew Hehn , Chemical Engineer		ACTIVITY DATE: 05/04/2018
STAFF: Jonathan Lamb	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MINOR
SUBJECT: Targeted inspection, FY 2018		
RESOLVED COMPLAINTS:		

INSPECTED BY: Jonathan Lamb, MDEQ-AQD
PERSONNEL PRESENT: Peter Onyskiw, Environmental Manager; Matt Hehn, Chemical Engineer
FACILITY PHONE NUMBER: (313) 571-1100
CONTACT PHONE NUMBER: (313) 921-1200, ext. 5174 (Mr. Onyskiw)
CONTACT EMAIL: ponyskiw@PVSChemicals.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 flocculent 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; however, 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), Monday through Friday, and has 15 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.

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 considered 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:

The facility was issued a Violation Notice on October 15, 2015, based on violations noted during the inspection performed on August 26, 2015. These violations included exceeding ferric chloride production limits and not operating the two-stage scrubber in accordance with permit specifications. These violations were resolved with the issuance of Permit to Install No. 152-15 on November 20, 2015.

There have been no complaints lodged against this facility in the past 10 years.

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 dump truck and stored in designated areas outside.

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 Chlorine 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-106 and EUT-107: 20,000-gallon reactor tanks. Mill scale is added to ferrous chloride to produce a concentrated ferrous chloride solution.
- EUT-107A: 15,000-gallon reactor tanks. 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: 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.
- 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 (note: the facility may also use ferrous chloride and sodium hydroxide as the scrubber solution in place of only ferrous chloride):

- EUT-108A, T-108B, and T-108C: 30,000-gallon reactor tanks which chlorinate ferrous chloride into ferric chloride.
- EUT-105B: 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 and EUT-103: 30,000-gallon storage tanks 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 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).

The facility had contacted AQD in early 2016 regarding the possibility of adding a vanadium chloride production process at the facility using existing equipment; AQD Permit staff determined that a PTI modification would likely be required to allow vanadium chloride production. At the time of inspection, the facility had put these plans on hold due to lack of demand for the product but may revisit the idea in the future if it becomes economically viable.

APPLICABLE RULES/ PERMIT CONDITIONS:

PVS Technologies was issued PTI No. 152-15 on November 20, 2015; Wayne County Permit Nos. C-9040 through C-9055, C-10082, C-10083, and C-10084 were voided on December 23, 2015, since the equipment was now covered by PTI No. 152-15:

PTI No. 152-15, Special Conditions:

EUCIRailCar

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Malfunction Abatement Plan (MAP) was submitted for AQD approval on December 30, 2015, within 45 days of permit issuance. 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. Fugitive dust records were reviewed during the inspection. 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. The materials stored in piles on site are metal fines, which form a crust on the outer layers of the pile when exposed to moisture, reducing the potential for fugitive emissions blowing off the piles during windy conditions.

III. PROCESS/OPERATIONAL RESTRICTIONS

1. IN COMPLIANCE. A Nuisance Minimization/Fugitive Dust Plan was submitted for AQD approval on December 30, 2015, within 45 days of permit issuance. The plan is implemented and maintained.

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 December 30, 2015. 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 160,000 to 550,000 microsiemens/centimeter. During the inspection, I noted the conductance at 272,000 microsiemens/centimeter [Note: Monitor reads in millisiemens/cm ($\mu\text{S}/\text{cm}$), not microsiemens/cm (mS/cm), so actual reading on the monitor showed 27.2 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. Records show the liquid flow rate was kept above 14 gallons per minute during the compliance period. Liquid flow rates normally ranged from 37 to 42 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. [Note: During testing performed on April 19, 2016, the pressure drop was recorded as 1.5" wg. Since there has not been any calibration of the pressure gauge since the date of testing, it is recommended that the facility perform calibration of the gauge on a regular basis to verify that pressure drop is being properly measured and recorded.]

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. NOT IN COMPLIANCE. A device to monitor the conductivity of the scrubbing solution in EUK-127 on a continuous basis is installed, operated, and maintained. However, the facility has not performed calibration on the monitor since installation. Calibration frequency is not addressed in the Malfunction Abatement Plan.

4. NOT 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. However, the facility has not performed calibration on the monitor since installation. Calibration frequency is not addressed in the Malfunction Abatement Plan.

5. NOT IN COMPLIANCE. A device to monitor the pressure drop across EUK-127 on a continuous basis is installed, operated, and maintained. However, the facility has not performed calibration on the monitor since installation. Calibration frequency is not addressed in the Malfunction Abatement Plan.

V. TESTING/SAMPLING

1. IN COMPLIANCE. Testing to determine hydrogen chloride emission rates from FGREDUCTION was performed on April 19, 2016, within 180 days of issuance of PTI No. 152-15.

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 and were 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.
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 records the conductance, liquid flow rate, and pressure drop at least once per shift (facility runs three 8-hours 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 S.C. V.1, is kept on site. These results were also submitted to AQD on June 6, 2016.

VII. REPORTING

1. NOT IN COMPLIANCE. Facility did not notify AQD, in writing, that the scrubbing solution was switched to water within 30 days of completion of the activity, as required.
2. NOT IN COMPLIANCE. Facility did not notify AQD, in writing, that the conductivity meter, pressure drop gauge, and flow meter within 30 days of installation, as required.

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.

IX. OTHER REQUIREMENTS

1. NOT DETERMINED. Facility was unable to provide documentation that the conductivity meter, pressure drop gauge, and flow meter were installed prior to February 18, 2016. These meters were verified by AQD staff as being installed and operational during testing performed on April 19 and 20, 2016.

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 December 30, 2015. 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 1 ppm, an alarm is activated and the chlorine feed from the railcar is automatically shut down. The feed from the railcar into the process does not start again until the alarm has cleared and the chlorine concentration is less than 0.5 ppm; 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 once or twice per month.

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 on a monthly basis during the chlorine sensor bumper test; records 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 in S.C. I.1 (1 ppm). Mr. Hehn indicated this occurs once or twice a month. 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. NOT 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; however, the facility has no records of calibration being performed on the monitor. Calibration frequency is not addressed in the Malfunction Abatement Plan.

6. NOT IN COMPLIANCE. A device to monitor the pressure drop across EUK-501-502 on a continuous basis is installed, operated, and maintained; however, the facility has no records of calibration being performed on the monitor. According to the Malfunction Abatement Plan, calibration is to be performed on an annual basis.

V. TESTING/SAMPLING

1. IN COMPLIANCE. Testing to determine chlorine emission rates from FGCHLORINE was performed on April 20, 2016, within 180 days of issuance of PTI No. 152-15.

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 S.C. V.1, are maintained on site. These results were also submitted to AQD on June 6, 2016.

VII. REPORTING

1. NOT IN COMPLIANCE. Facility did not notify AQD, in writing, that an ORP meter was installed within 90 days of switching to ferrous chloride as the scrubber solution, as required per S.C. IV.4. The flow meter and pressure drop gauge, as required in S.C. IV. 5 and S.C. IV.6 were already installed on the scrubber prior to issuance of PTI No. 152-15.

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.

IX. OTHER REQUIREMENTS

1. NOT DETERMINED. Facility was unable to provide documentation or date of installation of the ORP meter. The ORP meter was verified by AQD staff as being installed and operational during testing performed on April 19 and 20, 2016, as required per S.C. IV.4. The flow meter and pressure drop gauge were already installed on the scrubber prior to issuance of PTI No. 152-15.

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.
- 2. 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.

FINAL COMPLIANCE DETERMINATION:

Based on this inspection, PVS Technologies is determined to be in noncompliance with the conditions of PTI No. 152-15 and applicable State and federal regulations. Specifically, PVS Technologies is out of compliance with the following conditions of PTI No. 152-15:

- FGREDUCTION, S.C. IV. 3, IV.4, and IV.5: Failure to perform calibration on the conductivity meter, flow meter, and pressure drop gauge of scrubber EUK-127.
- FGREDUCTION, S.C. VII.1: Failure to notify AQD, in writing, within 30 days of switching the scrubbing solution to water.
- FGREDUCTION, S.C. VII.2: Failure to notify AQD, in writing, within 30 days of installing the conductivity meter, flow meter, and pressure drop gauge.
- FGCHLORINE, S.C. IV. 5 and IV.6: Failure to perform calibration on the flow meter and pressure drop gauge of scrubber EUK-501-502.
- FGCHLORINE, S.C. VII.1: Failure to notify AQD, in writing, within 30 days of installing the ORP meter.

NAME 

DATE 1-8-19

SUPERVISOR 