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

B622030993

FACILITY: SELFRIDGE PLATING INC		**SRN / ID:** B6220
LOCATION: 42081 IRWIN RD, HARRISON TWP		**DISTRICT:** Southeast Michigan
CITY: HARRISON TWP		**COUNTY:** MACOMB
CONTACT: Lawrence Raymond , Environmental Compliance Officer		**ACTIVITY DATE:** 08/12/2015
STAFF: Francis Lim	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT:		
RESOLVED COMPLAINTS:		

On August 12, 2015, AQD staff conducted an inspection at Selfridge Plating, Inc. located at 42081 Irwin in Harrison Twp., Michigan. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) rules; PTI numbers 208-84A and 208-84B, NESHAP Subpart N for chromium emissions from chrome plating and anodizing processes, Area Source Plating NESHAP 40 CFR 63 Subpart WWWWWW, and NESHAP Subpart T for emissions from halogenated cold cleaners. Joe Raymond, Environmental Compliance Officer (586-469-3141) assisted AQD staff during the inspection.

Selfridge Plating, Inc. plates and strips various steel and aluminum parts used for predominantly military aircraft. The facility performs hard chrome plating, aluminum anodizing, black oxide plating, manganese and zinc phosphating, copper cyanide stripping, zinc plating, cadmium plating, nickel sealing, copper cyanide plating and chrome stripping. All of these processes are covered under PTI number 208-84A. The chromium plating and aluminum anodizing processes are subject to NESHAP Subpart N. To comply with the NESHAP, the hard chrome plating line installed a 3-stage mesh pad dry scrubber to control chromium emissions. For aluminum anodizing, facility uses a chemical fume suppressant agent (foam blanket) to control chromium emissions.

Electroplating is an electrochemical process of surface treatment. The workpiece is immersed in an electrolyte solution containing the metal to be plated.

For hard chrome plating, the workpiece is attached to the cathode and direct electrical current is applied to the anode. Both the cathode and anode are immersed in an electrolyte solution which contains an ion of the metal being plated and other ions to allow the flow of electricity. As direct current is applied to the anode, the negative electrons migrate toward the cathode. The positively charged metal ion to be plated, then deposits on the negatively charged workpiece. Chrome ions come from the chromic acid electroplating bath. Electric current determines the electroplating rate. A catalyst is not used because the client does not want it. NOTE: Chromic acid contains chromium in an oxidation state of +6 (hexavalent chrome). Chromic acid is produced by mixing sulfuric acid with dichromate.

In aluminum anodizing, the surface of the aluminum is oxidized forming a layer of aluminum oxide that protects the aluminum beneath it. The process involves passing an electrical charge in a chromic acid electrolyte bath where the aluminum is immersed. In this process, the aluminum to be anodized is the anode. As electric current is applied to the anode, the negatively charged electrons migrate to the cathode. As electrons move out of the anode, the negatively charged anions move in to the anode, which results in anodizing or oxidizing the aluminum. This process also produces hexavalent chrome.

Black oxide coating produces a black oxide finish on the metal surface. Black oxide is not a plating process since black oxide is not deposited on the metal surface. This is a conversion process where

black oxide is produced by chemical reaction between the surface of the metal and oxidizing salts (which forms magnetite, a black oxide of iron). Workpiece is immersed in a 300 °F caustic solution. Black oxide coating is just for appearance purpose – no hardening and no buildup of materials. Electric current is not used.

Manganese and zinc phosphating is a surface treatment where the workpiece is immersed in a solution of manganese and zinc phosphate. Manganese and zinc phosphate provide abrasion and corrosion resistance. Electric current is not used.

Copper cyanide stripping uses cyanide salts to strip the metal of copper. This is called immersion stripping. Initially, copper is applied to section of the workpiece so that the copper plated section will not harden during heat treating. After heat treating, the unwanted copper is then stripped off. Electric current is not used.

Chrome stripping uses hydroxide salts to strip the chrome from the workpiece. This is usually done to strip the chrome if the chrome was plated improperly. Basically this is an electroplating in reverse. Instead of depositing chrome, the chrome from the workpiece is stripped in an electrolyte bath.

Zinc and cadmium plating is also an electroplating process utilizing an electrolyte bath. Major difference is the zinc and cadmium to be plated is the anode itself. Cadmium and zinc ball anodes are used for plating into the workpiece. An electrolyte composed of sodium cyanide is used as the plating bath. The zinc and cadmium in the anode dissolves and goes into the electrolyte solution and deposits in the workpiece.

Copper cyanide plating is a similar electroplating process that uses cyanide salts as electrolytes. Workpiece is placed in the cathode uses a copper slab anode for plating. The copper in the anode is dissolved and goes into the electrolyte solution and deposits in the workpiece.

NOTE: Cyanide salts plus acid will produce hydrogen cyanide gas.

Nickel sealing process uses a nickel acetate bath. The nickel fills up the pores in the surface for better corrosion control. Electric current is not used.

The copper barrel line has been removed.

Based on MAERS reports, emissions from the above electroplating process and immersion process are small.

Main contaminants in electroplating come from the vapor, mist and gases. In general, chrome plating produces bubbles more rapidly resulting in heavier mist.

The facility operates six trichloroethylene (TCE) batch cold cleaners permitted under PTI number 208-84B and are subject to NESHAP Subpart T. Two 22' diameter TCE cold cleaners and four 8-gallon TCE cold cleaners are used for wax removal. Wax is used as a masking agent. Methyl ethyl ketone (MEK) cold cleaners consisting of five gallon buckets are also used by the facility for parts cleaning. This facility no longer use toluene. Limits for toluene (no longer used) and MEK emissions from these cold cleaners have been set by PTI number 208-84B. Usage for MEK and TCE has gone down since facility recycles them. Facility operates two distillation units to recover TCE and MEK.

Facility pretreats wastewater before it goes to the sewer. Water goes to a clarifying tank, solids are precipitated out. The collected solids go to a belt press for solids reduction. Solids are disposed as hazardous waste.

Permit Number 208-84A for the plating operations:

Special Condition No. 13: This condition requires chromium emissions from the 12 hard chromium electroplating tanks vented to a 3-stage mesh pad dry scrubber to be less than 0.03 milligrams per dry standard cubic meter. Stack testing on the Duall Model No. HMF-90 dry bed scrubber performed on October 23, 1996, and October 24, 1996, indicated that chromium emissions were 0.00023 milligrams per dry standard cubic meter. To ensure limit is met, facility conducts quarterly inspection of the following: inlet and outlet transition zones, spray nozzles, packed bed section, mesh pads, drain lines, fan motor and fan vibration. Attached is maintenance records for March 1, 2015 and June 1, 2015.

Staff did not conduct rooftop inspection of the 3-stage mesh pad scrubber.

NOTE: On September 19, 2012, the EPA reduced chromium emission rate limit from 0.030 mg/dscm to 0.015 mg/dscm 40 CFR 63.342(c)(1)(ii)

Special Condition No. 14: This condition requires chromium emissions from the aluminum anodizing process tanks, using a chemical fume suppressant agent, to be less than 0.01 milligram per dry standard cubic meter. Clayton Environmental performed an impinger/bubbler analysis on November 1, 1996, using EPA Method 306 on the chromium emissions from the aluminum anodizing tanks and found that emissions were below this level. Complying with Special Condition No. 26 would also indicate that the facility is complying with this condition.

Special Condition No. 15: This condition requires that no visible emissions be produced from any of the vented stacks at the facility. No visible emissions from the stacks were observed during the inspection.

Special Condition No. 16: This condition requires that the hard chromium tanks not be operating unless the dry scrubber is installed and operating in accordance with NESHAP Subparts A and N. The scrubber is installed and proper maintenance is conducted on the scrubber. Attached is the Operation and Maintenance Plan for the chromium tanks.

Special Condition No. 17: This condition requires that the pressure drop across the 3-stage scrubber be measured with a pressure drop indicator. A magnehelic is used to continually measure the pressure drop across the scrubber. The pressure drop must range between 2.3 to 4.3 inches of water to be in compliance. A pressure drop log is maintained daily by the facility. Staff conducted random inspection of the pressure drop historical logs, and did not notice any out of range pressure drop readings Mesh pad should be changed if pressure drop exceeds 4.3 inches of water. Attached is a copy of readings from May 1, 2015 to May 28, 2015.

Special Condition No. 18: This condition requires that the exhaust gases from the chromium tanks be discharged unobstructed vertically upwards to the ambient air from a stack with a maximum diameter of 38 inches and at least 26 feet above the ground. Stack dimensions appear to be as specified in permit condition.

Special Condition No. 19: This condition requires that the exhaust gases from the cadmium and zinc lines be discharged unobstructed vertically upwards to the ambient air from stacks with the following dimensions respectively: An 18" diameter stack 21 feet above the ground for the cadmium line and a 16.4" diameter stack 22 feet above the ground for the zinc line. Stack dimensions appear to be as specified in permit condition.

Special Condition No. 20: This condition required the facility to prepare and submit an Operation and Maintenance plan including a start-up, shutdown, and malfunction plan by January 25, 1997. According to previous inspection, the facility submitted this plan on January 13, 1997. AQD staff requested a duplicate copy of the Operation and Maintenance Plan and is attached to this report.

The scrubber manufacturer Duall inspected the equipment 2 years ago. Duall concluded that the mesh pad is still in good since they do a good job of rinsing it. I verified that rinse water is flowing to reservoir and that the washer fluid is clear (indicating that the mesh pad is operating properly). Upon Duall's recommendation, the facility bought a spare motor for the scrubber.

Special Condition No. 21: This condition required the facility to perform chromium emission stack testing within 40 days of the issuance of this permit, but not later than July 24, 1997. Stack testing was performed on October 23, 1996, and October 24, 1996.

Special Condition No. 22: This condition states that the facility may be required to conduct stack testing at the request of the AQD. The AQD is not requesting stack testing to be performed at this time.

Special Condition No. 23a: This condition requires the facility to inspect the mesh pad and packed beds of the dry scrubber on a quarterly basis. See Special Condition No. 17. In addition, Duall Corporation performs comprehensive maintenance on the scrubber system every 2-3 years.

Special Condition No. 23b: This condition requires the facility to wash down the mesh pad and packed beds per manufacturer's recommendations. The pads and packed beds are automatically washed down with acid every hour.

Special Condition No. 23c: This condition stipulates that any pressure drop variation greater than 1" outside the operating range of the scrubber (3.3 +/- 1 inch water, or 2.3 to 4.3 inches of water) shall be documented; the operation and maintenance plan shall be reviewed; and the corrective action shall be noted. The Ongoing Compliance Status Report for the hard chrome plating tanks for the 2012, 2013, and 2014 calendar years is on file and signed by Craig Studaker, President of the facility. A copy of 2015 Ongoing Compliance Status Report is attached. During those times, there were no instances in which the pressure drop across the scrubber was outside the accepted operational range. An area source is required to complete the report annually and retain on site. Mr. Studebaker certified that work practice standards are being followed.

Special Condition No. 24: This condition requires the applicant to periodically visually inspect the scrubber to check for proper drainage and to ensure that no chromic acid build-up is occurring on the mesh pad and packed beds. Mr. Raymond conducts rooftop visual checks of the mesh pad system of the scrubber to verify that no chromic acid build-up had occurred. He also verifies that the scrubber is properly draining to a 55-gallon drum inside the facility.

Special Condition No. 25: This condition requires the facility to maintain records of inspections required to comply with applicable Work Practice Standards of 40 CFR 63.342(f). These records were shown to AQD staff during the inspection. Mr. Studebaker also certified that work practice standards are being followed. This is included in the Ongoing Compliance Status Report.

Special Condition No. 26: This condition requires that the surface tension of the aluminum anodizing tank be maintained at or below 45 dynes per centimeter as measured by a staglometer. Surface tension is maintained by adding a chrome mist eliminator (foam blanket) to the anodizing tank. Staff conducted random inspection of 2015 historical logs of surface tension and did not notice any exceedance. Attached is a copy of surface tension monitoring data from July 14, 2015 until August 11, 2015. Surface tension must be initially taken every 4 hours (after replacement of the anodizing tank contents). After 40 hours of measurement without any exceedances, measurement can be reduced every 8 hours until another 40 hours is met (without any exceedance). Afterwards, measurement is reduced every 40 hours until the bath is replaced and then measurement cycle is started all over again.

Special Condition No. 27: This condition requires that surface tension of the aluminum anodizing tanks be monitored in accordance with 40 CFR 63 Subpart A and N. Surface tension is measured in accordance with the schedule discussed in Special Condition No. 26. Each run is one hour long – 40 runs equals 40 hours.

Special Condition No. 28: This condition requires that rectifier current in the hard chromium tanks be less than or equal to 60 million amp-hr/year based on a 12-month rolling average. Records from June 2013 until June 2015 is attached. Highest monthly total is well below 60 million amp-hr/year. NOTE: As discussed above regarding chrome electroplating, current is directly related to the plating rate.

Special Condition No. 29: This condition requires that monitoring, recordkeeping, and operation and maintenance information necessary to comply with NESHAP Subparts A and N be kept on file for five years and be made available to the AQD upon request. The facility provided the required records for staff review.

Permit Number 208-84B for the cold cleaners:

Special Condition No. 14: This condition sets an 8.9 ton per 12-month rolling time period emission limit on an individual HAP. As of June 2015, 12-month rolling emissions for all HAPs are 0.97 tons per year. I reviewed 12-month rolling emissions for 2014 and 2015. No exceedance was noted. Records are attached.

Special Condition No. 15: This condition sets a toluene emission limit of 1.0 ton per 12-month rolling time period and requires the facility to record the amount of toluene used in gallons. Toluene has not been used during the previous 12-month reporting period.

Special Condition No. 16: This condition sets a methyl ethyl ketone (MEK) emission limit of 3.0 tons per 12-month rolling time period and requires the facility to record the amount of MEK used in gallons. As of June 2015, 12-month rolling MEK emissions are 1.65 tons per year. I reviewed 12-month rolling emissions for 2014 and 2015. No exceedance was noted. The amount of MEK used in gallons was also recorded. Records are attached. NOTE: MEK has been delisted from the HAPs list

Special Condition No. 17: This condition sets an aggregate HAP emission limit of 22.5 tons per 12-month rolling time period. As of June 2015, 12-month rolling emissions for all HAPs are 0.97 tons per year. I reviewed 12-month rolling emissions for 2014 and 2015. No exceedance was noted. Records are attached.

Special Condition No. 18: This condition requires no visible emissions from the cold cleaners. No visible emissions were observed during the inspection.

Special Condition No. 19: This condition requires that the disposal of the used solvents be performed in a manner which minimizes their introduction into the outer air. Most of the TCE is reclaimed and reused (the facility has a TCE vapor recovery and recycling system).

Special Condition No. 20: This condition requires that the following records be kept for each cold cleaner:

a. The cleaner and its constituents shall be identified. This was verified during the inspection.
b. The VOC content of each solvent in pounds per gallon. This was verified during the inspection.
c. The pounds per gallon of each HAP for each cleaner. The solvents used are TCE and MEK.
d. The amount of each cleaner used. These records are attached to this report.
e. Monthly calculations of each HAP emission rate in tons per month. These records are attached to this report.

f. Monthly calculations of HAPs to determine and 12-month rolling time period emission rate. These records are attached to this report.

Special Condition No. 21: This condition requires the facility to operate the cold cleaners in a manner which minimizes fugitive emissions. During the inspection, AQD staff verified that the lids of all cold cleaners were closed and usage instructions were posted above each cleaner.

Special Condition No. 22: This condition requires the cold cleaners to be operated per the provisions of MDEQ Rule 336.707. The cold cleaners are operating in accordance with this rule.

Special Condition No. 23: This condition requires that the cold cleaners be operated in compliance with 40 CFR 63 Subpart T (NESHAP Subpart T). The facility was required to send a compliance report to the AQD to satisfy NESHAP Subpart T. Clayton Environmental sent the AQD a compliance report for batch cold cleaners on February 26, 1998. Facility is complying with the NESHAP by installing a cover, maintaining a freeboard ratio of at least 0.75 and following work practice standards.

NOTE: Solvent usage records are based on purchase records per drum of solvent. Mr. Lawrence said because of low solvent usage, it is very difficult and cumbersome to track down actual monthly usage.

Selfridge Plating is also subject to the Area Source Plating NESHAP, 40 CFR 63 Subpart WWWWWW. This facility maintains a compliance summary for the NESHAP, including compliance with the work practice standard. The annual report is signed by Mr. Studaker and maintained on site. A copy of the 2014 report is attached.

Facility still has an active Consent order, AQD No. 11-1997 for alleged violations involving the operations of the electroplating lines and cold solvent cleaners located at the site.

NAME [signature] DATE 05-03-15 SUPERVISOR CTE