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

B622049552

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:** 07/09/2019
STAFF: Adam Bognar	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: Scheduled Inspection		
RESOLVED COMPLAINTS:		

On Tuesday, July 09, 2019, AQD staff Adam Bognar conducted a targeted scheduled inspection of Selfridge Plating, Inc. (the "facility" or "Selfridge") located at 48021 Irwin Road, Mount Clemens, MI. The purpose of this inspection was to determine the facility's compliance status 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 Environment, Great Lakes, and Energy, Air Quality Division (EGLE-AQD) rules; Permit to Install Nos. 208-84A, 208-84B, and 4-18; 40 CFR Part 63 Subpart N – National Emissions Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks (Chrome NESHAP); and 40 CFR Part 63 Subpart T – National Emission Standards for Halogenated Solvent Cleaning.

I arrived at Selfridge Plating at around 9 am. I met with Mr. Lawrence (Joe) Raymond, Environmental Compliance Officer. I identified myself, provided credentials, and stated the purpose of the inspection.

During the pre-inspection meeting, we discussed current operations and PTI's Nos. 208-84A, 208-84B, and 4-18. I reviewed and collected records at this time. After the meeting, Mr. Raymond gave me a tour of the facility.

Selfridge Plating Inc. plates, coats, and strips steel and aluminum parts used in military aircraft. Selfridge Plating operates the following processes at this location: hard chrome plating, electroless nickel plating, black oxide conversion coating, copper cyanide stripping, tin plating, silver plating, cadmium plating, copper cyanide plating, and chrome stripping. The electroless nickel plating line is covered in PTI No. 4-18 issued on February 7, 2018. All other plating lines are covered under PTI No. 208-84A or are operating as exempt from Rule 201 requirements. Additionally, there are six trichloroethylene (TCE) and four methylethylketone (MEK) batch cold cleaners covered by permit number 208-84B.

All aluminum anodizing processes have recently been removed from the facility.

Operations

In *Hard Chromium electroplating*, the workpiece to be plated is attached to the cathode and DC electrical current is applied to the anode. Both the cathode and anode are immersed in an electrolyte solution with contains chromic acid (Cr^{+6}) along with other ions that increase the conductivity of the solution. As electric current is applied to the anode, the negative electrons migrate towards the cathode (workpiece). The negative electrons supplied to the workpiece reduce the chromic acid (Cr^{+6}) in the solution to form metallic chromium. This reduction takes place on the surface of the workpiece. The metallic chromium deposits onto the workpiece causing the desired plating action.

Cr+6 (Hexavalent chrome) emissions from the above process are primarily due to the oxygen and hydrogen gas bubbles liberated during electrolysis. The electrolytic process causes water to liberate oxygen at the anode and hydrogen at the cathode. As these liberated gas molecules coalesce and form bubbles, they rise to the surface of the tank and burst at the surface. This bursting action splashes the bath solution into the air above the liquid surface causing a mist to form. This mist contains quantities of chromic acid as well as other bath components.

At Selfridge, mist from the hard chrome electroplating tanks appeared to be adequately collected by inlet ducts located near the tank surface. The ducts are vented to a 3-stage mesh pad scrubber.

Electroless Nickel Plating produces an even layer of nickel-phosphorous on the surface of a workpiece. The nickel-phosphorous coating provides corrosion and wear resistance. In contrast to electroplating, plating thickness does not depend on the geometry of the workpiece. Parts are immersed in a nickel phosphorous bath. The quality of the plating can be varied by changing the concentration of phosphorous in the bath. Selfridge Plating operates a larger "medium" phosphate bath where most of the electroless nickel plating occurs. There is a smaller "high" phosphate bath that is only used occasionally. Nickel (a HAP) emissions are

controlled by a composite mesh pad scrubber.

Black oxide conversion coating produces a black magnetite finish on a metal surface. The workpiece is immersed in a 300°F caustic solution. It is not a plating process since black oxide is not deposited on the surface, but instead is the result of a chemical reaction between the metal surface and oxidizing salts present in the solution. Electric current is not used.

In *copper cyanide stripping* the metal piece is immersed in a bath containing cyanide salts that strip the metal of copper. Initially, the copper is applied to section off the workpiece so that the copper plated section will not harden during heat treating. After heat treating, the undesired copper is stripped off in this process. Electric current is not used.

Chromium stripping uses a bath of hydroxide salts to strip the chromium from the workpiece. This is usually done to strip chrome from parts that were plated unsatisfactorily. This process is basically the reverse of chromium electroplating. In this case, the workpiece is the anode instead of the cathode. As the metallic chrome loses electrons it is oxidized into a state that is soluble in the electrolyte bath.

Cadmium, tin, and silver electroplating are similar processes to hard chrome plating, except the anode is composed of the metal that will be plated on the workpiece. The workpiece is the cathode. As electrolysis proceeds, the metallic anode dissolves into the electrolyte solution and deposits onto the workpiece.

Copper cyanide electroplating is analogous to zinc and cadmium plating. The anode is a copper slab while the cathode is the workpiece. As electrolysis proceeds, the copper anode dissolves into the cyanide salt electrolyte solution and deposits onto the workpiece.

Permit Number 208-84A: Plating Operations
Special Condition 13: This condition limits the chromium emissions from the 12 chromium tanks vented to the 3-stage mesh pad scrubber to 0.03 mg per dry standard cubic meter. A stack test was performed on the Duall Model No. HMF-90 mesh pad scrubber on October 23 & 24, 1996. The test indicated that the total chromium emissions were 0.0023 mg per dry standard cubic meter. To ensure that this performance is maintained, Selfridge conducts quarterly inspections of the inlet and outlet transition zones, spray nozzles, packed bed section, mesh pads, drain lines, fan motor, and fan vibration. Records of quarterly inspections are kept.

EPA reduced emission rate to 0.015 mg / dry standard cubic meter on September 19, 2012. This new limit is established in the Chromium Electroplating NESHAP 40 CFR 63.342 (c)(1)(ii). Based on the records I reviewed the mesh pad scrubber should achieve this emission limit.

Special Condition 14: This condition states that the chromium emissions from the aluminum anodizing process tanks, using a chemical fume suppressant containing a wetting agent, shall not exceed 0.01 mg per dry standard cubic meter, corrected to 70°F and 29.92 inches of mercury. The aluminum anodizing process has been removed from the facility. Before the process was removed, compliance with this condition was demonstrated by maintaining the bath surface tension below 40 dynes/cm^2 when measured with a stalagmometer.

Special Condition 15: This condition requires that emissions from all vented process tanks are not to exceed 0% opacity. I did not observe any visible emissions.

Special Condition 16: This condition states that the hard chrome tanks shall not be operated unless the 3-stage mesh pad dry scrubber is installed and operating properly. I observed that mesh pad washdown water is collected in a drum near the pressure gauge. A three-stage pressure gauge was present which showed that each mesh pad had a pressure drop reading. I verified that an appropriate operation and maintenance manual is maintained on-site. A responsible official has signed an ongoing compliance report stating that the equipment has been operated in accordance with the operation and maintenance manual.

Special Condition 17: This condition stipulates that Selfridge shall equip and maintain the 3-stage mesh pad scrubber with a pressure drop indicator. A Magnahelic three-gauge pressure drop indicator was present that indicated the individual pressure drop across each pad of the three-part scrubber. During the inspection three pressures totaled to approximately 3.15 inches of water. An average pressure drop of 3.3 inches of water was indicated during the initial performance test. The established range is between 2.3 and 4.3 inches of water.

Special Condition 18, 19, and 20: These conditions specifies stack requirements for the hard chromium tanks, cadmium and zinc tanks, and all other vented process tanks. The stacks appeared to meet permit

requirements. AQD staff did not perform a rooftop inspection to verify stack dimensions.

Special Condition 21: This condition states that Selfridge shall prepare and submit an operation and maintenance plan including the start-up, shutdown, and malfunction plan to the District Supervisor by January 25, 1997. I verified that this plan is maintained onsite.

Special Condition 22: This condition states that within 40 days of the issuance of this permit, but not later than July 24, 1997, that Selfridge verify chromium emission rates from the hard chrome tanks via testing. A stack test was performed on the Duall Model No. HMF-90 mesh pad scrubber on October 23 & 24, 1996.

Special condition 23: This condition suggests that verification of chromium emission rates may be required for the aluminum anodizing tanks. The aluminum anodizing process has been removed from the facility.

Special Condition 24: A) This condition requires the facility to inspect the mesh pad and packed beds on a quarterly basis. Quarterly inspections are performed and documented. See Special Condition 13.

B) This condition requires the facility to wash down the mesh pads and packed beds per manufacturer's recommendations. The packed pads and beds are washed down daily with approximately 100 gallons of HCl. The waste water generated is stored in large on-site cisterns and eventually transported to a hazardous waste facility.

C) This condition stipulates that if the pressure drop across the air pollution control device varies by more than plus or minus 1 inch of water column, from the pressure drop determined during initial testing, that the variation be documented, and corrective actions taken. The records I reviewed did not show any exceedance of this standard.

Special Condition 25: This condition requires Selfridge to visually inspect the control device for proper drainage and to make sure there is no chromic acid buildup on the mesh pad and packed beds. Quarterly inspections are performed and documented.

Special Condition 26: This condition states that Selfridge shall maintain records of inspections required to comply with applicable work practice standards of 40 CFR 63.342 (f). I verified that the facility maintains satisfactory records that document the required workplace standards.

Special Condition 27: This condition establishes an upper limit for bath surface tension in the aluminum anodizing tanks. The aluminum anodizing process has been removed from the facility.

Special Condition 28: This condition requires Selfridge to monitor surface tension in the aluminum anodizing tanks. The aluminum anodizing process has been removed from the facility.

Special Condition 29: This condition restricts the rectifier current input to the chromium tanks to 60 million amp-hr/yr based on a 12-month rolling time period. So long as the 60 million amp-hr/yr limit is not exceeded, Selfridge is considered an Area Source. Mr. Raymond provided me with 12 month rolling records for rectifier current. The records show that Selfridge is well below the 60 million amp-hr/yr limit. In 2019, the highest 12-month rolling total was reported at 17.5 million amp-hrs.

Special Condition 30: This condition requires that Selfridge keep monitoring, recordkeeping, operation and maintenance information necessary to comply with the Chromium Electroplating NESHAP. Selfridge appears to be maintaining the proper information on-site.

PTI No. 4-18: Electroless Nickel Plating Line

PTI No. 4-18 was issued on February 7, 2018 for an electroless nickel plating line with two electroless nickel tanks. These tanks are controlled by a dedicated composite mesh pad (CMP) scrubber that was installed at the same time as this line.

Section III – SC 1: Requires the facility to implement and maintain a malfunction abatement plan (MAP) for the composite mesh pad system. This plan is maintained on-site and appears to address the MAP specifications outlined in the permit. The plan is also in the AQD file for the facility.

Section IV – SC 1: States that the facility shall not operate the electroless nickel tank(s) unless the CMP scrubber is installed, maintained, and operated in a satisfactory manner. The CMP scrubber appeared to be

installed and functioning correctly. Pressure drop was at 0.4 inches of water during the inspection. The operation and maintenance plan states that the pressure drop must be maintained between 0.2 and 2.2 inches of water. Based on the records I reviewed, the pressure drop tends to fluctuate between 0.3 and 0.5 inches of water.

Section IV – SC 2: States that the CMP shall have a device to monitor pressure drop on a continuous basis. This CMP scrubber is equipped with a Magnahelic pressure drop monitoring device.

Section VI – SC 1: States that the facility shall perform inspections of the CMP system. These inspections include daily pressure drop readings and quarterly inspections of all related ductwork to ensure there are no leaks. Records at the facility indicate that these inspections are performed and documented. The facility provided me with records of daily pressure drop readings from the nickel CMP scrubber (see attached).

Section VIII – SC 1: Specifies stack dimensions. I did not verify stack dimensions during this inspection. Stacks appeared to be exhausted vertically unobstructed to the ambient air.

Section IX – SC 1: States that the facility shall comply with all provisions of the National Emission Standards for Hazardous Air Pollutants for Plating and Polishing Operations as specified in 40 CFR Part 63 Subparts A and WWWWWW as they apply to the electroless nickel line. The AQD has not taken delegation of this standard therefore compliance was not verified. Selfridge maintains a NESHAP WWWWWW compliance summary on-site.

PTI No. 208-84B: Cold Cleaners

Special Condition 14-17 +20: These conditions set emission limits for HAPs, methylethylketone (MEK), and Toluene based on a 12-month rolling time period. Special Condition 20 requires certain records to be kept for each cold cleaner. Mr. Raymond maintains a spreadsheet that calculates the HAP emissions from the cold cleaners based on usage over a 12-month rolling time period. The spreadsheet includes information about each cold cleaner including the amount and type of solvent used, and concentrations of HAPs/VOC within the solution. Based on the spreadsheet data, the facility is well below the HAP emission limits. Trichloroethylene (TCE) is the only HAP based solvent currently used. 12-month rolling TCE emissions were reported at 2.26 tons in May 2019. The emission rate of MEK is well below permit limits although it is no longer considered a HAP as of December 13, 2006. Toluene is no longer used.

Special Condition 18: This condition stipulates that there shall be no visible emissions from the cold cleaners. No visible emissions were observed during the inspection.

Special Condition 19: This condition requires that the disposal of collected air contaminants be performed in a manner which minimizes the introduction of air contaminants to the outer air. Most of the TCE is reclaimed and reused using a vapor recovery distillation device. Mr. Raymond stated that he is not able to recover MEK with this device because the quality of the MEK is compromised after distillation.

Special Condition 21: This condition requires that all processes at the facility are operated in a manner which minimizes fugitive HAP emissions. Cold cleaners appeared to be operating in accordance with this rule. All lids were closed during the inspection.

Special Condition 22 and 23: These conditions state that all cold cleaners will be operated according to MDEQ Rule 336.707 and the National Emission Standards for Halogenated Solvents as specified in 40 CFR, Part 63, Subpart T. Selfridge appears to be adhering to these regulations. The facility complies with this NESHAP by installing a cover, maintaining a freeboard ratio of at least 0.75, and following work practice standards.

Sand Blasting

The facility operates several aluminum oxide sand blast units that exhaust outside after passing through an appropriately designed and operated fabric filter. These units appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(vi).

Painting

Selfridge operates a small painting area used to apply coating to parts. The coating is used to prevent plating on certain areas of a part. Areas that receive the coating are not plated. The paint is applied by hand with small paint brushes. There is no external vent for the painting process. Records show that the facility uses less than 200 gallons of coating per month. Usage is around 200 gallons per year. The booth appears to be exempt from Rule 201 requirements pursuant to Rule 287(2)(c).

Boilers
Selfridge operates two natural gas fired boilers. One has a 1.2MM BTU/hr heat input and the other (recently installed) has a 800,000 BTU/hr heat input. These are used as process heaters. These units appear to be exempt from Rule 201 requirements pursuant to Rule 282(2)(i).

Wastewater Evaporator
The facility operates one wastewater evaporator to reduce the volume of waste plating bath water. This unit is located in the same room as the 800,000 BTU/hr boiler. Mr. Raymond stated that he never puts acid solutions into the evaporator as the acid would likely evaporate. Only aqueous solutions that contain solids are put into this unit. This wastewater evaporator appears to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(m).

Emergency Generator
The facility operates one natural gas fired emergency generator. The generator has a maximum energy output of 130 kW or 444,000 BTU/hr. The owner's manual for the emergency generator indicates that the maximum input of natural gas to the unit is 1618 standard cubic feet per hour. Assuming a heating value for natural gas of 1,000 BTU/SCF, the generator has a maximum heat input of approximately 1.6MM BTU. The facility provided me with documentation showing that this generator is EPA certified for conformity with the Clean Air Act and 40 CFR Part 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

This unit appears to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(g).

Other Plating Operations
Selfridge operates various other plating lines that are subject to the National Emission Standards for Hazardous Air Pollutants Part 63 Subpart WWWWWW (6W), Area Source Standards for Plating and Polishing Operations. The AQD has not taken delegation of this standard therefore compliance was not verified. Selfridge maintains a NESHAP compliance summary as well as records of the number of Nickel Strike Bath loads.
I left the facility around 10:30 am.

Compliance Determination
Selfridge Plating appears to be in 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 Environment, Great Lakes, and Energy, Air Quality Division (EGLE-AQD) rules; Permit to Install Nos. 208-84A and 208-84B; 40 CFR Part 63 Subpart N – National Emissions Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks (Chrome NESHAP); and 40 CFR Part 63 Subpart T – NESHAP for Halogenated Solvent Cleaning.

NAME Adam Bogner DATE 7/15/2019 SUPERVISOR SK