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

B622074160

FACILITY: SELFRIDGE PLATING INC		**SRN / ID:** B6220
LOCATION: 42081 IRWIN RD, HARRISON TWP		**DISTRICT:** Warren
CITY: HARRISON TWP		**COUNTY:** MACOMB
CONTACT: Joe Raymond , Regulatory Compliance Manager		**ACTIVITY DATE:** 10/02/2024
STAFF: Adam Bognar	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: Scheduled Inspection		
RESOLVED COMPLAINTS:		

On Wednesday, October 2, 2024, 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 12 pm. I met with Joe Raymond, Environmental Compliance Officer and Mark Woolsey, Environmental Compliance Officer (in training). I identified myself, provided credentials, and stated the purpose of the inspection.
Joe informed me that he will be retiring soon and passing on his position to Mark Woolsey (mwoolsey@selfrdigeplating.com).

Joe and Mark walked me around the facility and showed me the operations. After the facility inspection, we sat down in Joe's office and discussed operations and PTI's Nos. 208-84A, 208-84C, and 4-18. I reviewed and collected records at this time.

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, 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.

The aluminum anodizing process that is covered by PTI 208-84A was removed from the facility prior to 2019. Additionally, since my 2019 inspection the tin plating line has been removed.

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, this mist is 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 was a smaller “high” phosphate bath that has been removed from the facility. 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 copper from the metal. Initially, the copper is applied to section off the workpiece so that the copper plated section will not be hardened 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 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: Chrome Plating Operations

Special Condition 13: This condition limits the chromium emissions from the 12 (currently 6) 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 Midwest Air Products Co. composite mesh pad scrubber on May 11, 2021, shortly after this control was installed to replace their previous Duall unit. The test indicated that the total chromium emissions were 0.0025 mg per dry standard cubic meter.

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 results of the May 2021 stack test, 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.

Joe stated that after PFAS was identified at the facility (due to fume suppressant usage), all anodizing tanks were removed, much of the flooring at the facility was replaced, the entire roof was replaced, and much of the walls were refinished. Joe stated that he determined through sampling that some of the PFAS identified at Selfridge Plating was coming down through rainwater. Joe stated that recent samples have shown that PFAS concentrations from the sampling locations on-site have come down substantially since this work was completed.

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. Joe stated that this is washed down periodically depending on the pressure drop but at least once a week. A magnahelic pressure gauge was present which showed a pressure drop of 1” of water. I verified that an appropriate operation and maintenance manual is maintained on-site.

A responsible official has signed an ongoing compliance status report (NESHAP N requirement) stating that the equipment has been operated correctly for the time period I reviewed (2023 and 2024). Joe showed me that the facility has a training manual to train new employees on the requirements of the chrome NESHAP.

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 pressure drop indicator was present that indicated the pressure drop across the three-part scrubber. During the inspection this pressure was 1” of water. An average pressure drop of 0.6” inches of water was indicated during the initial performance test. The operation and maintenance plan indicates an acceptable pressure drop range of between 0.2 and 1.6 inches of water. The chrome NESHAP allows for + or - 2 inches of water from the value determined during the stack test; however, a value of 0 for pressure drop would not indicate compliance.

Special Condition 18, 19, and 20: These conditions specify stack requirements for the hard chromium tanks, cadmium and zinc tanks, and all other vented process tanks. The stacks appeared to meet permit requirements. I 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. This plan was submitted for the previous Duall scrubber. I had the facility update the plan for the Midwest Air Products scrubber. The main difference in the new plan is that the acceptable pressure drop has changed to 0.2" to 1.6" of water. The records I reviewed show that the scrubber is being operated within this range.

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. A stack test on the new Midwest Air Products scrubber was conducted on May 11, 2021.

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. I verified that records of these quarterly inspections were maintained. These records show that 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. I did not notice any visible issues with this equipment during my inspection. I did not climb to the roof to inspect the mesh pads.

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 HCl. The waste water generated is stored in on-site cisterns and eventually transported to a hazardous waste processing 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. Joe stated that no deviations have occurred.

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. I checked the last three quarterly inspections dated 3/4/2024, 6/5/2024, and 9/2/2024. The inspector checks the inlet and outlet transition zones, spray nozzles, mesh pads, drain lines, fan motor, fan vibration, whether pressure lines are connected, and that pressure drop monitors are calibrated. All items were marked "OK" in the inspection records I reviewed.

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. These inspections include the quarterly inspections required by Special Condition 25.

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. Joe 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. The 12-month period in August 2024 showed 3.6 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. The facility maintains the proper information on-site based on my inspection and record review.

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. This scrubber is also manufactured by Midwest Air Products (same brand as chrome scrubber). Only one of the two tanks is currently in operation. The 2nd tank has been removed from the facility.

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 addresses 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 is installed and functioning correctly based on my inspection and record review. Pressure drop was at 0.5 inches of water during the inspection. The operation and maintenance plan states that the pressure drop must be maintained between 0.2 and 2.4 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. These records show pressure drops ranging from 0.2” of water to 0.5” of water.

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.

PTI No. 208-84C: Cold Cleaners

Special Conditions I.1, I.2, & I.3: These conditions set opt out emission limits for individual HAPs, total HAPs, and Toluene based on a 12-month rolling time period. Special Condition 20 requires certain records to be kept for each cold cleaner. The facility maintains a spreadsheet that calculates the HAP emissions from the cold cleaners based on usage over a 12-month rolling time period. Based on the records I reviewed, the facility is below the HAP emission limits. Trichloroethylene (TCE) and Toluene are the only HAP based solvents currently used. TCE is exclusively used in the cold cleaners and Toluene is exclusively used in the paint room.

TCE emissions were reported highest during the 12-month period ending in December 2023 at 2.88 tons.

Toluene emissions were reported highest during the 12-month period ending in December 2023 at 0.98 tons.

Total HAP emissions were reported highest during the 12-month period ending in December 2023 at 3.86 tons.

Special Condition I.4: This condition stipulates that there shall be no visible emissions from the cold cleaners. No visible emissions were observed during the inspection.

Special Conditions II.1: Limits the total amount of HAP containing cleaner in the cold cleaners to 1466.2 gallons per year. The records I reviewed show that usage was highest in December 2023 at 495 gallons.

Special Condition II.2: Limits the total amount of Toluene used in the cold cleaners to 275 gallons per year. Toluene is no longer used in the cold cleaners; however, toluene is used in the painting operations. Total toluene used in the painting operations was reported highest during the 12-month period ending in December 2023 at 270 gallons.

Special Condition III.1: 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. Joe stated that any waste solvent is put into a waste drum and taken away. Most of the TCE is reclaimed and reused using a vapor recovery distillation device. The boiler in the vapor recovery device is 10 gallons. Based on my observations during this inspection, this vapor recovery device is exempt from Rule 201 requirements per Rule 285(2)(u) since it is less than 55-gallons in size. MEK is not recovered with this device all waste MEK is sent out in drums as waste solvent. The facility does not account for any disposed solvent in their emission calculations.

Special Condition III.2: This condition requires that all processes at the facility are operated in a manner which minimizes fugitive HAP emissions. The cold cleaners are operating in accordance

with this rule based on my observations during this inspection. All lids were closed during the inspection. The cleaners are equipped with a hanger to allow parts to drain prior to removal from the cleaner.

Special Condition III.3: 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. The facility is adhering to these regulations based on my inspection, with one exception noted below. All cold cleaners were equipped with a cover, had a freeboard ratio of at least 0.75, and were equipped with a device for draining parts based on my observations.

Operating instructions were clearly posted on the TCE cold cleaners during my inspection. The MEK cold cleaners did not have operating instructions posted. Although MEK is not considered a HAP, these MEK cold cleaners are still subject to EGLE Rule 707 (4) which requires operating instructions be posted near the unit. I asked Joe to post operating instructions near the MEK cold cleaners. Joe sent me a picture after the inspection showing that operating instructions are posted near the MEK cold cleaners. At AQD discretion, no violation will be issued for failing to post operating instructions near this cold cleaner.

Special Conditions VI.1, VI.2, and VI.3: Specifies recordkeeping requirements for the cold cleaners. The facility maintains records of the identity of each cold cleaner, the VOC content of the cold cleaners, the content in lbs/gallon of each HAP contained in the cold cleaners, the amount in gallons of each cleaning solvent used, and monthly & 12-month rolling records of usage & emissions of each HAP containing solvent. Currently, TCE is the only HAP containing solvent used in the cold cleaners. The facility also maintains records of toluene used in the paint room.

Sand Blasting
The facility operates several aluminum oxide sand blast units that exhaust outside after passing through an appropriately designed and operated fabric filter. Based on my observations during this inspection, these units are exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(vi).

Painting
Selfridge operates a hand 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. The paint used is comprised of 50% toluene according to the datasheet I reviewed (40%-50% range according to SDS). The facility assumes it is 50% toluene for emissions reporting purposes. Records show that the facility uses less than 200 gallons of coating per month. Usage is around 440 gallons per year (8 drums). Two 55-gallon drums are purchased approximately every quarter based on the purchase records I reviewed. This is the source of all Toluene emissions from the facility. Based on my inspection and record review, the painting operation is 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. Based on my observations during this inspection, these units are 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. Joe 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. Based on my observations during this inspection, this unit is 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.

Based on my observations and record review, this unit is 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.

I left the facility at around 1:30 pm.

Compliance Determination
Selfridge Plating failed to maintain & install a sticker stating proper operating instructions on the MEK cold cleaners. This is a violation of EGLE Rule 707 (4). At AQD discretion, no violation will be issued for this non-compliance.

Based on my inspection and record review, Selfridge Plating is operating in compliance with all other parts of 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 Bognar DATE 10/28/2024 SUPERVISOR Joyce