

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

A474458891

FACILITY: Emerald Steel Steel Processing LLC		SRN / ID: A4744
LOCATION: 31624 STEPHENSON HWY, MADISON HTS		DISTRICT: Warren
CITY: MADISON HTS		COUNTY: OAKLAND
CONTACT: Chris Collins , VP of Operations		ACTIVITY DATE: 05/21/2021
STAFF: Sebastian Kallumkal	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: Scheduled inspection to verify compliance applicable air quality regulations and PTI NO. 1316.90C		
RESOLVED COMPLAINTS:		

On May 21, 2021, I, Michigan Department of Environment, Great Lakes & Energy – Air Quality Division (EGLE-AQD) staff, Sebastian Kallumkal, requested information and records pursuant to PTI No. 1316-90C from Emerald Steel Processing, LLC. (SRN A4744) located at 31624 Stephenson Highway, Madison Heights, Michigan. Due to the Covid 19 pandemic protocols, the records are reviewed prior to conducting inspections to limit the time spent at the site. The malfunction abatement plan (MAP) and monitoring records were received on June 4th. During review deficiencies were found in the MAP and records and sent an email to the facility contact about these deficiencies. In response, a TEAMS meeting was conducted to explain the missing items.

Chris Collins, Joe Ankley, Mark Fuqua, and David Lieder (All Emerald Steel Processing) attended the meeting. Chris agreed to update the MAP to include indicators to be monitored and the normal ranges. The facility has two scrubbers and the PM list (PM-106A) for the second scrubber will be modified to document additional items as in the other scrubber (PM-106). The monitored parameter (pressure drop, scrubber liquid flow, pH) ranges and daily data are recorded in the “Daily Waste Water Inspection Log Sheet”.

Chris also mentioned that the facility is missing data for March-July 2020 due to facility shutdowns and layoffs during Covid 19 pandemic. The data is also missing for the month of April due to renovation activities at the facility. This are deviations of the requirements of the permit; however, AQD will use enforcement discretion with respect to the record requirements.

On Thursday, June 17th, 2021, I conducted an onsite inspection at Emerald Steel Processing, LLC. 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 (MEGLE-AQD) Administrative Rules; and Permit-to-Install No. 1316-90C.

At the facility, I met Mr. Chris Collins, VP Operations. I introduced myself, stated the purpose of the inspection and provided credentials. He took my temperature as part of facility’s Covid 19 pandemic protocol. Next, he accompanied me to a conference room. I met Mr. Mark Fuqua, Maintenance Manager, David Lieder, Manufacturing Plant Engineer, and Jim Heath, First Shift Supervisor.

Chris gave me a copy of the updated MAP, monthly PM list for both scrubbers, and “Daily Waste Water Inspection Log” Sheet. The parameters to be monitored and the ranges are included in the PM sheets.

During the pre-inspection meeting, we discussed facility’s operations and changes since last inspection. The facility currently has three batch annealing furnaces and one push tray annealing furnace. The third batch furnace was installed around August 2015. The facility is in the process of installing another batch furnace. The process has begun, and the installation could be completed by January 2022.

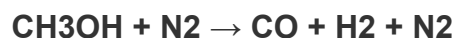
The facility has sixty-five employees, and operates 24 hours per day, and 7 days per week. Emerald Steel processes the steel coils used at the nearby Shannon Precision Fasteners, LLC as well as other automotive customers and fastener manufacturers.

Steel coils are heat treated (anneal) in gas fired furnaces. The coils then go through the cleaning line where the coils are rinsed, pickled with sulfuric acid and surface treated with zinc phosphate, lime, lube or polymer.

The steel coils are only annealed, but no hardening or oil quenching. The purpose of annealing is to increase the formability (less brittle) of the carbon steel. An endothermic gas or methanol/nitrogen mix is injected into the annealing furnaces. These gases are important in heat treating because the furnace atmosphere has to be controlled. At this facility, the endothermic gas or methanol/nitrogen mix maintains the carbon content of the steel, since carbon is lost during the heat-treating process. Furnace atmospheric gas is flared as it exits the push tray annealing furnace. This also acts as a curtain to prevent air in-leakage to the furnace, and thus avoiding a potential explosion hazard.

Facility operates an endothermic generator that produces the endothermic gas through the reaction of a rich gas (fuel) to air mixture passing over a catalyst (nickel) in a retort furnace maintained at around 1950 F. Endothermic gas produced is nitrogen, carbon monoxide, hydrogen and water vapor.

As an alternative to endothermic gas, methanol/nitrogen mixture is also used as atmospheric gas. Liquid methanol and gaseous nitrogen are metered into the furnace where the liquid nitrogen is atomized and sprayed. Methanol/nitrogen is primarily used in the push tray annealing furnace. Facility operates a 5,000-gallon capacity methanol storage tank. Usage is 5,000 gallons per month. Although methanol is a hazardous air pollutant (HAP), methanol itself is not released to the air since the following reaction typically takes place inside the furnace:



The three-batch natural gas-fired annealing furnaces are rated at 6.2 MM BTU/hr each. A typical batch annealing process lasts about 12-18 hours. Since this is an annealing process, no quenching (rapid cooling after heating) is done. Instead, the steel coils are cooled down by gradually decreasing the temperature inside the batch furnace and then air cooled. In the push tray annealing furnace, the steel coils are “pushed” inside the different heating zones of the furnace. In contrast to the batch furnaces, the push furnace has zone heaters where the temperature goes down as

the steel coils are pushed into the next zones where the steel coils undergo a 4-stage cooldown. The steel coils are subsequently air cooled.

After heat treating, the steel coils go to the cleaning line, where it goes through a series of tanks for rinsing, pickling (remove scale), zinc phosphating, lime, lube or polymer coating.

The pickling operation (with four sulfuric acid tanks and controlled by a MAPCO scrubber with mist eliminator) was covered by PTI 1316-90B. In 2012, facility added two more sulfuric acid tanks and a new scrubber with mist eliminator (Harrington) and was issued PTI No. 1316-90C. Current setup is that acid fumes from three sulfuric acid pickling tanks are controlled by the MAPCO scrubber and the acid fumes from the other three sulfuric acid pickling tanks are controlled by the Harrington scrubber. Acid concentration in the pickling tanks is about 10-12% at 160°F. PTI 1316-90B was voided after the issuance of PTI 1316-90C.

The following are the equipment used at the pickling operation: Six sulfuric acid tanks, three water rinse tanks (cold water, hot water), one zinc phosphate tank, phosphate rinse tank, basic neutralizer (water plus borax) tank, polymer lube tank, lime tank.

The facility has installed an in-line pH meter, a flowmeter and a magnehelic for the Harrington Scrubber. The MAPCO scrubber is equipped with pressure monitor and pH monitor. Its scrubber liquid flow is estimated using marked flow indicators in the scrubber liquid surge tank and by observing the flow of the scrubber return liquid into the surge tank. This tank has tubes with flow indicators which are marked at 125 GPM, according to Jim. The newer scrubber (Harrington) has automatic pH controls. The pH is electronically monitored and if the solution becomes acidic, a neutralizing solution is automatically added. The MAPCO scrubber is not equipped with automatic neutralizer addition. The neutralizer is added as needed and at the end of the week the scrubber liquid is emptied and filled with fresh water. Jim told me they check the packed bed once a week to verify proper flow.

Inspection:

After the pre-inspection meeting, they accompanied me for an inspection of the process area. It is located in another building. While walking to that building, I did not observe any visible emissions from the stacks. My observations are explained below.

PTI No. 1316-90C - FGTANKS

SC III.1- EUTANKS and EUTANKS2 (FGTANKS) are equipped with a packed bed scrubber system with mist eliminator and are installed, maintained and operated in a satisfactory manner.

SC III.2- A revised malfunction abatement plan (MAP) is attached to this report. Scrubber PM (PM-106A) and Scrubber PM (PM-106) are parts of the MAP.

SC IV.1- A magnehelic is installed and operating properly to monitor the pressure drop across each packed bed scrubber system.

Sc IV.2- Liquid flow monitors are installed for each scrubber and are working properly.

SC VI.1- The pressure drop across the packed bed scrubber is monitored daily and logged in the “Daily Waste Water Inspection Log Sheet”. The pH, Differential pressure and water flow to the scrubber are checked daily and included in this log sheet. The in-line pH meter of the MAPCO scrubber showed around 3.3. A neutralizing solution is not added automatically to the MAPCO scrubber water. Jim told me they add the neutralizing agent once a week and will replace the scrubber water with fresh water at the end of the week. According to the logsheet, when pH is below 4.5, the reservoir is drained and filled with fresh water. Jim told me that the tank will be filled the following day (Friday, June 18th).

On Monday, January 28th, I discussed the low pH issue with Jim Heath. He explained that after the inspection, they added buffer solution to the tank to raise the pH, but the installed pH meter was reading still reading about 4.0. So, they checked the pH with a handheld monitor which read about 7.0. They recalibrated the installed pH meter and it is reading properly now. Later he sent me a screenshot of the pH meter. It read 7.3 (attached).

With low pH of the liquid, the scrubber may not be able to control the acid fumes. The facility needs to add neutralizing agent more often to keep the pH of the scrubber liquid around 7 to enhance the neutralization of acid fumes. If the low pH of the scrubber liquid occurs more often, AQD may require the facility to install a pH recorder to record the pH of the scrubber liquid.

We also discussed the low liquid flow for the South scrubber. April records showed that the South scrubber flow was around 95 GPM. He told me that they had identified the issue and found that the flow float had sediments on them which resulted the low reading. They cleaned the floats and now the readings are above the indicator level. They added maintenance of the floats to their monthly preventive maintenance list.

The pH of the Harrington scrubber is electronically monitored and if the solution becomes acidic, a neutralizing solution is automatically added. I verified that the pH of the Harrington scrubber is more than 7.

Observations on June 18, 2021.

Scrubber	Diff. Press. “WC	pH	Liquid Flow
	<2.25 “WC	5-7	North >250 GPM South >120 GPM
MAPCO (North)	1.6	3.3 (see discussion above)	250
Harrington (South)	1.2	7.1	121

Scrubber preventive maintenance is conducted monthly and includes visual inspection of scrubber packing, visual inspection of mist eliminator blades for solids buildup and visual inspection of ductwork to the scrubber.

SC VI.2- Daily pressure drop reading across the scrubber is logged in the daily inspection logsheet. Records of inspections of packed bed scrubber are included in the monthly scrubber preventive maintenance.

SC VII.- Facility had sent a letter to the EGLE regarding notification of completion of installation of the project with an attachment of the Malfunction Abatement Plan (MAP).

SC VIII.1 &2- The scrubber stacks' dimensions were not verified but appear to be as specified in the permit.

The facility has two large sulfuric acid storage tanks (each 5000 gallons) in a containment area. The sulfuric acid concentration is 50%. These tanks exempt from permit to install requirements (R336.1201) pursuant to R336.1284(h)(i).

The facility has a 5000-gallon methanol storage tank. This storage tank is exempt from permit to install pursuant to R336.1284(n).

The requirement of R 336.1201(1) to obtain a permit to install does not apply to containers, reservoirs, or tanks used exclusively for any of the following:

(h) Storage and water dilution of aqueous solutions of inorganic salts, bases, and the following acids: (i) Sulfuric acid that is not more than 99% by weight

(n) Storage of methanol in a vessel that has a capacity of not more than 30,000 gallons.

The annealing furnaces at that facility are fueled by natural gas and are exempt from permit to install requirements pursuant to R336.1282(2)(a)(i).

R336.1282 (2)- The requirement of R 336.1201(1) to obtain a permit to install does not apply to any of the following:

(a) Any of the following processes or process equipment which are electrically heated or which fire sweet gas fuel or no. 1 or no. 2 fuel oil at a maximum total heat input rate of not more than 10,000,000 Btu per hour:

(i) Furnaces for heat treating or forging glass or metals, the use of that does not involve ammonia, molten materials, oil-coated parts, or oil quenching.

The atmosphere generator which uses natural gas and liquid nitrogen is exempt from permit to install requirements pursuant to R336.1285(l)(iv).

R 336.1285 Permit to install exemptions; miscellaneous.

Rule 285. (1) This rule does not apply if prohibited by R 336.1278 and unless the requirements of R 336.1278a have been met.

(2) The requirement of R 336.1201(1) to obtain a permit to install does not apply to any of the following:

(1) The following equipment and any exhaust system or collector exclusively serving the equipment:

(i) Equipment used exclusively for bending, forming, expanding, rolling, forging, pressing, drawing, stamping, spinning, or extruding either hot or cold metals.

(ii) Die casting machines.

(iii) Equipment for surface preparation of metals by use of aqueous solutions, except for acid solutions.

(iv) Atmosphere generators used in connection with metal heat treating processes.

Conclusion: The facility appears to be in compliance with applicable air quality regulations and the requirements of PTI No.1316.90C.

NAME Sebastianykallemkal

DATE 07/14/2021

SUPERVISOR Joyce