

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

A474466443

<b>FACILITY:</b> Emerald Steel Processing, LLC		<b>SRN / ID:</b> A4744
<b>LOCATION:</b> 31624 STEPHENSON HWY, MADISON HTS		<b>DISTRICT:</b> Warren
<b>CITY:</b> MADISON HTS		<b>COUNTY:</b> OAKLAND
<b>CONTACT:</b> Chris Collins , VP of Operations		<b>ACTIVITY DATE:</b> 11/29/2022
<b>STAFF:</b> Iranna Konanahalli	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> MINOR
<b>SUBJECT:</b> FY 2023 schedule inspection of Emerald Steel Processing, LLC ("Emerald") located 31624 Stephenson Hwy., Madison Heights, Michigan 48071-1642. PTI No. 1316-90D (APP-2022-0115) dated May 10, 2022.		
<b>RESOLVED COMPLAINTS:</b>		

### FY 2023 schedule inspection

**Emerald Steel Processing, LLC (A4744)**  
**31624 Stephenson Hwy.**  
**Madison Heights, MI 48071-1642**

**NAICS Code: 332000 - Fabricated Metal Product Manufacturing**

#### Contacts:

1. Mr. Chris Collins, VP Operations (E-mail: cCollins@emeraldsp.com; Phone: 248-720-0573; Fax: 248-720-0575; Cell: 734-223-5432)
2. David Lieder, Manufacturing Engineer (E-mail: dLieder@emeraldsp.com ; Phone: NA; Fax: 248-720-0575; Cell: 248-807-2289)
3. Joe Ankley, President (E-mail: jAnkley@emeraldsp.com ; Phone: 248-616-3195; Fax: 248-720-0575; Cell: NA). Ankley did NOT participate during the inspection.

**Active PTI: PTI No. 1316-90D (APP-2022-0115) dated May 10, 2022.** AQD revised the existing permit (1316-90C → 1316-90D). The purpose of the revision was to replace the existing HARRINGTON scrubber (40,000 cfm) with a higher flow rate SCRUBAIR SSQV scrubber (50,000 cfm). All emissions from the acid tanks are controlled by two acid scrubbers using water as a scrubber liquor (no caustic addition). Only pollutant emitted is sulfuric acid. No criteria pollutant. See below that sulfuric acid exists only as mist.

### Sulfuric acid

Sulfuric acid exists in the sulfuric acid pickling process gas stream as aerosol droplets (only as acid liquid particles and not in vapor phase) because the acid has very low vapor pressure and its partial pressure is very low for 10 percent aqueous solution ( $0.353 \times 10^{-13}$

bar at 100 degrees Celsius). See Perry's Chemical Engineers Handbook (pages 3-68 thru 3-69). Hence, sulfuric acid practically does not exist in vapor phase in the gas stream.

On November 29, 2022, I conducted a level-2 Minor **Source FY 2023 schedule inspection** of Emerald Steel Processing, LLC ("Emerald") located 31624 Stephenson Hwy., Madison Heights, Michigan 48071-1642. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994, PA 451; Michigan Department of Environment, Great Lakes and Energy, Air Quality Division (EGLE-AQD) administrative rules; and PTI No. 1316-90D.

During the inspection, Mr. Chris Collins, VP Operations, and David Lieder, Manufacturing Engineer, assisted me.

Joe Ankley, President, was not present during the inspection.

Founded in 2001 by Chuck O'Brien, Emerald Steel Processing, L.L.C. of Madison Heights, Michigan, operates as a metal coil processing company. Emerald offers coil coatings, annealing, heading, and storage services. Emerald serves customers in the State of Michigan. Emerald performs Coil Annealing (Lamellar Pearlitic (LPA), Stress Relieve and Spheroidization), Coil Coating (Lime, Phos & Lime, Phos & Lube (Reactive Lube) and Phos & Polymer), Coil Drawing (Direct Draw, Drawn from Spheroidize Annealed Rod (DFSAR), Spheroidize Anneal in Process (SAIP) and Spheroidize Anneal Final Size (SAFS)), Coil Storage, etc. services.

The following are the equipment used at the pickling operation: Six (6) sulfuric acid ( $\approx 10\%$   $H_2SO_4$ ) tanks, three (3) water rinse tanks (cold water, hot water, spray rinse), two (2) zinc phosphate tanks, one (1) phosphate rinse tank, one (1) basic neutralizer (water plus borax) tank, one (1) polymer lube tank, one (1) lime tank.

The business is conducted using three Emerald owned buildings. However, only one building contains the steel coil manufacturing processes.

#### **PTI No. 1316-90D, EMISSION UNITS (EUs)**

#### **PTI No. 1316-90D, FGTANKS**

**FGTANKS (EUTANKS, EUTANKS2):** Four (4) sulfuric acid tanks controlled by an acid scrubber (MAPCO) and two (2) sulfuric acid tanks controlled by a separate scrubber (SCRUBAIR SSQV).

#### **PTI No. 1316-90D, FLEXIBLE GROUP (FG)**

#### **PTI No. 1316-90D, FGTANKS, III**

Push-pull ventilation systems and two scrubbers are operating properly. A malfunction abatement plan (MAP) is implemented. (PTI No. 1316-90D, FGTANKS, III.1-2)

#### **PTI No. 1316-90D, FGTANKS, IV**

Magneheilic pressure drop instruments are present, liquid flow is noted, pH is monitored and fresh water is added to replace acidic water to adjust pH (no caustic). Data is logged twice per shift and 6 times per day. . (PTI No. 1316-90D, FGTANKS, IV.1-3: pressure drop across the packed bed scrubber, the liquid flow rate, pH)

### **PTI No. 1316-90D, FGTANKS, VI**

Pressure drop, water flow rate (gpm), pH are noted six times per day or twice per shift. Equipment inspection and repairs logs are kept. (PTI No. 1316-90D, FGTANKS, VI.1-2)

Five 14.7 MM BTU per hour continuous push furnaces are present. Four (two large 10.6 MM BTU per hour, two small 6.4 MM BTU per hour) batch furnaces are present for annealing. Only pipeline quality sweet natural gas is used in all furnaces.

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. Carbon neural annealing is performed using endothermic gas or methanol/nitrogen mix. The endothermic gas or methanol/nitrogen mix maintains the carbon content of the steel, since some carbon is lost during the heat-treating process.

Emerald operates an endothermic generator that produces the endothermic gas through the reaction of a rich gas (fuel- natural gas) to air mixture passing over a catalyst (nickel) in a retort furnace maintained at around 1900<1950 F. Endothermic gas produced is nitrogen, carbon monoxide, hydrogen and water vapor.

Emerald operates a 5,000-gallon capacity methanol storage tank. The CH<sub>3</sub>OH 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:

Furnaces using natural gas or electrical energy for heat treating are exempt from Rule 336.1201 (Permit-to-Install) pursuant to R336.1282(2)(a)(i). An atmosphere generator which uses natural gas and liquid nitrogen is exempt from permit to install requirements pursuant to R336.1285(2)(l)(iv).

### **Conclusion**

Emerald is in compliance with PTI No.1316.90D.

NAME *D. S. Marshall*

DATE February 27, 2023

SUPERVISOR *Joyce*