DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Self Initiated Inspection

N555149481

FACILITY: DETROIT STEEL TREATING CO		**SRN / ID:** N5551
LOCATION: 1631 HIGHWOOD EAST, PONTIAC		**DISTRICT:** Southeast Michigan
CITY: PONTIAC		**COUNTY:** OAKLAND
CONTACT: Raymond Fox , President		**ACTIVITY DATE:** 07/02/2019
STAFF: Adam Bognar	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MINOR
SUBJECT: Self-Initiated Inspection		
RESOLVED COMPLAINTS:		

On Tuesday July 2nd, 2019, Michigan Department of Environment, Great Lakes, and Energy, Air Quality Division (EGLE-AQD) staff, I, Adam Bognar, conducted a self-initiated inspection of Detroit Steel Treating Company located at 1631 East Highwood, Pontiac, Michigan. The purpose of the inspection was to determine the facility's compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) Administrative Rules; and PTI Nos. 219-96 and 46-18.

I arrived at Detroit Steel Treating Company at around 10 am and met with Mr. Raymond R. Fox (Bob), President. I introduced myself, provided identification, and stated the purpose of the inspection. Mr. Fox gave me a tour and explained the processes at the facility.

Detroit Steel Treating Company performs contract heat treating on steel parts for various industries including automotive, aerospace, defense, agriculture, and others. There are around 8 employees that ideally operate 24 hours a day; however, Mr. Fox stated that the facility is only operating one shift (day) since the night shift employee recently retired.

Steel heat treating at this facility basically consists of two processing steps – hardening and tempering. First the steel parts are heated to high temperature for a specific duration and then cooled rapidly; this is known as hardening. This produces a harder steel, but also a more brittle steel. Secondly, the steel parts are heated to a lower relative temperature to soften the steel and reduce brittleness; this is known as tempering. The furnace temperature, duration of heating, and the atmospheric composition within the furnace all play important roles in the final properties of the treated steel.

There are three batch furnaces used for hardening. Two of them were in operation during the inspection while one of them is being repaired. These are the largest furnaces on-site, with a maximum natural gas input of 1000 CF/hr. Using a heating value of 1020 BTU/CF, this corresponds to a maximum heat input of 1,020,000 BTU/hr. Mr. Fox estimated the current temperature of one of the furnaces to be around 1550 °F. After the parts sit at high temperature for the appropriate amount of time, they are cooled (quenched) by lowering the parts into an oil bath located integrally within the furnace unit. A portion of the quench oil is vaporized and emitted to the atmosphere during this quenching process.

The atmospheric composition within the hardening furnaces is precisely controlled using endothermic gas generators. These "endo" gas generators are natural gas fired. The endo gas serves multiple purposes. The gas creates and oxygen poor environment within the furnaces, which inhibits or reverses oxidation and reduces the potential for explosions. Controlling the amount and composition of endo gas allows the furnace operator to precisely control the atmospheric carbon concentration. Atmospheric carbon concentration is an important variable that must be adjusted depending on the desired quality of the heat treated part. The generators can provide 750 cubic feet per hour of endo gas to each hardening furnace. These generators appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(iv).

For certain parts, a high nitrogen environment is desired during the heat treatment process. This process, known as nitriding, results in a relatively hard outer surface on the part while allowing the inner part to remain relatively soft. At this facility, the nitrogen is supplied to the hardening furnaces by piping in gaseous anhydrous ammonia at a rate of approximately 20-25 cubic feet per hour. The anhydrous ammonia is stored in a 1000-gallon tank adjacent to the facility.

The facility has an anhydrous ammonia tank with a 1000-gallon capacity. This tank was installed prior to December 20, 2016; before the current exemption was promulgated. The previous exemption did not include a

size restriction on anhydrous ammonia tanks. The new exemption, EGLE-AQD Rule 284 (2)(j), promulgated on December 20, 2016, requires that a permit to install be obtained for pressurized anhydrous ammonia tanks larger than 500 gallons. The facility can operate this 1000-gallon anhydrous ammonia tank under the previous exemption rule; however, if any changes are made to the equipment then a permit to install may be required. These changes include reconstruction, replacement, relocation, or modification of the anhydrous ammonia tank.

After hardening, steel parts are tempered in tempering furnaces. There are six tempering furnaces at this facility. Compared to the hardening furnaces, these tempering furnaces are smaller and run at lower temperatures. No oil quenching or ammonia is used in the tempering process. These furnaces appear to be exempt from Rule 201 requirements pursuant to Rule 282 (2)(a)(i).

The facility operates a "rust prevention" line consisting of a series of tanks: Black oxide conversion→ water rinse 1 → water rinse 2 → oil coat → hot water cleaning tank. All tanks are exhausted to the general in-plant environment. These tanks appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(r).

Three sand blasting stations are used for certain parts. I observed that these stations are exhausted to a fabric filtration system located inside the building, and into the general in-plant environment. These stations appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(vi).

Violation Notice

During the last AQD inspection on February 15, 2018, I informed Mr. Fox that a permit to install is required to operate the three heat-treating furnaces (hardening furnaces) that utilize both oil quench and ammonia. Operation of these three heat-treating furnaces without obtaining a permit to install is a violation of EGLE-AQD Rule 201. The EGLE-AQD rule that would allow these furnaces to operate without a permit to install (Rule 282 (2)(a)(i)) only applies to heat treating furnaces that do not involve ammonia, molten materials, oil-coated parts, or oil quenching. The three heat treating furnaces at this facility utilize both ammonia and oil quenching. A violation notice was sent to Detroit Steel Treating Company on March 2, 2018.

Detroit Steel Treating Company responded to this violation in a timely manner by applying for and obtaining Permit to Install No. 46-18 on July 18, 2018. Permit to Install No. 46-18 permits three 1.0 MMBTU/hr natural-gas fired integral quench heat treating furnaces that can be used for ammonia nitriding. Detroit Steel Treating Company appears to comply with the new permit. The violation may be resolved.

Permit to Install No. 46-18 – FGQUENCH

Section I & 2: Establishes a VOC emission limit of 5.5 tons per year and a quench oil usage limit of 1,500 gallons per year. Based on the records I reviewed, Detroit Steel Treating Company complies with these limits. The highest reported 12-month rolling emission rate and quench oil usage was in November 2018 at 6125 lbs VOC emitted and 875 gallons of quench oil used.

Section IV – SC 1: States that the facility shall not operate the quench oil tanks unless its respective flame curtain is installed, maintained, and operated in a satisfactory manner. I observed that the flame curtain was operating on all three furnaces. Flames were observed coming out of the door cracks on each furnace.

Section VI – SC 1,2,3: Requires Detroit Steel Treating Company to keep records of the amount of quench oil used to replenish the vaporized quench oil in each furnace. The amount of quench oil used must be used to calculate the VOC mass emission rate and quench oil usage rate on a monthly and 12-month rolling time period. Additionally, the facility must maintain up to date manufacturers data detailing the chemical composition of the quench oil.

Detroit Steel Treating Company maintains these records. Mr. Fox showed me the Safety Data Sheets for the two quench oils used (Q100 and Q600) and the gallons of both quench oils used since PTI No. 46-18 was issued. I used this data to create a spreadsheet that calculates the quench oil usage and VOC emission rate on a 12-month rolling and monthly basis. I sent Mr. Fox this spreadsheet with instructions on how to use it. I explained that filling out the gallons of quench oil used in this spreadsheet will satisfy the recordkeeping requirements of PTI No. 46-18. See attached spreadsheet.

Section VIII – SC 1,2,3: Establishes stack parameters. I did not verify stack dimensions during this inspection. Stacks appeared to be discharged vertically unobstructed to the ambient air.

PTI No. 219-96 was issued to this facility in 1996 for two molten salt baths and an open oil quench tank. This equipment has not been used in several years, but it is still on-site. The only special condition of the permit is a 20% opacity limit.

Compliance Determination

Detroit Steel Treating Company appears to be operating in compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) Administrative Rules; and Permit to Install Nos. 219-96 and 46-18.

NAME Adam Bogner DATE 7/11/2019 SUPERVISOR SK