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

N672645190

FACILITY: Heat Treating Services Corp - Plant 3		**SRN / ID:** N6726
LOCATION: 915 Oakland Ave, PONTIAC		**DISTRICT:** Southeast Michigan
CITY: PONTIAC		**COUNTY:** OAKLAND
CONTACT: Ken Rogghe , Corporate Engineering Manager		**ACTIVITY DATE:** 06/26/2018
STAFF: Adam Bognar	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** MINOR
SUBJECT: Self Initiated Inspection		
RESOLVED COMPLAINTS:		

On Tuesday, June 26, 2018, Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD) staff, I, Adam Bognar, conducted an unannounced self-initiated inspection of Heat Treating Services Corporation of America – Plant 3, located at 915 Cesar E Chavez Avenue, Pontiac, 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 Environmental Quality, Air Quality Division (MDEQ-AQD) rules; and Permit to Install No. 169-01.

I arrived at Heat Treating Services Corporation of America – Plant 3 ("HTS" or "the facility") at around 10 am and met with Mr. Kenneth Rogghe, Corporate Engineering Manager. I identified myself, provided credentials, and stated the purpose of the inspection.

During the pre-inspection meeting we discussed PTI No 169-01 and general information about the facility. I explained that I will need to review records, inspect the processes at the facility, and verify compliance with the conditions of PTI 169-01. Mr. Rogghe obtained the required records from his consultant, Lynn Jankowski, of Civil & Environmental Consultants Inc. (CEC). It appears that CEC handles most of the environmental concerns for HTS.

Mr. Rogghe informed me that an additional heat treating furnace named "R5" was installed several years ago. Permit to Install No. 161-01 was issued on August 30th, 2001 and does not include furnace R5. Furnace R5 is identical and adjacent to the HR-2 furnace, but was installed at a later date. Both are 10.9MM BTU/hr capacity belt model natural gas fired furnaces. Since the furnace is larger than 10MM BTU/hr furnace R5 is not exempt from Rule 201 requirements pursuant to Rule 282 (2)(a)(i). Operation of metal heat-treating furnace R5 without obtaining a permit to install is a violation of MDEQ-AQD Rule 201.

After the facility tour, I explained this issue to Mr. Rogghe. I informed him that I will need to speak with my supervisor to determine if a violation notice needs to be sent in response to this issue. After speaking with my supervisor, I informed Mr. Rogghe that he will be receiving a violation notice from our office. I also explained that to resolve this violation he will need to submit an appropriate response to our violation notice and submit an air permit to install application for furnace R5 in a timely manner. A violation notice is scheduled to be delivered to Heat Treating Services Corporation of America on July 18, 2018 seeking compliance with Rule 201 requirements.

After the pre-inspection meeting Mr. Rogghe gave me a tour of the facility.

HTS performs heat treating on ferrous metal parts. Nearly all parts treated here are used in the automotive industry. In metal heat treating, a controlled application of heat is used to alter the physical and chemical properties of the metal. Hardness, strength, toughness, ductility, and elasticity of a metal/alloy can all be manipulated depending on the desired application of the treated part. The driving force behind these changes is a heat induced phase transformation of the internal lattice structure of the ferrous part. This is also known as a change in the allotrope of iron. This change is somewhat analogous to a change between different types of carbon allotropes such graphite, diamond, and charcoal.

This facility operates continuously nearly 24 hours a day and 365 days per year unless some type of maintenance is required.. It is in their best interest to run continuously for two main reasons: (1) shutting down a

furnace is time consuming as it can take as long as eight hours for a cold furnace to heat up again, and (2) this cooling and heating causes wear and tear on the furnace due to stresses arising from thermal expansion and contraction.

The main types of heat treating that occur at this facility are hardening, tempering, annealing, and normalization. In all of these processes, time, temperature, and atmospheric composition within the furnace are precisely controlled to achieve the desired properties in the end product. Ferrous metal products will all react differently to heat treating depending on their size, shape, and alloy composition. At this facility, most heat treating occurs in a "carbon neutral" environment, meaning the atmospheric concentration of carbon in the furnace is adjusted to match the carbon concentration within the part.

Hardening furnaces are also called austenitizing furnaces. To harden iron, it must be heated to its austenic crystal phase and then quickly cooled, or "quenched", usually by oil, water, or air. The rapid cooling causes a portion of the austenite to transform into martensite, a hard and brittle allotrope of iron. Martensite is formed because carbon atoms within the austenite phase do not have sufficient time to diffuse out of the crystalline structure in large enough quantities to form pearlite. Pearlite is a ductile iron allotrope consisting of alternating layers of cementite and ferrite.

Hardened martensitic iron/steel is generally too brittle for most applications. To reduce brittleness and increase ductility, parts generally undergo tempering after hardening. In tempering, the metal is heated to a lower temperature than in hardening (around 200-700 °C) for a set amount of time. This lower heat application causes a change in the size and distribution of carbon within the martensitic steel. Heating above this lower temperature is avoided so that the part does not reach the austenic crystal phase where the hard martensite would be affected.

Annealing is a process where the metal is heated above the recrystallization temperature (where austenite begins to form) and then slowly cooled to increase ductility and reduce hardness, making a part more workable. This prepares the part for further work such as shaping, stamping, and forming. Cooling is carried out slowly so that any austenite created does not transform into the hard martensite, but instead transforms into the more ductile/workable pearlite.

Normalization is an annealing process where the metal is cooled in air after heating to relieve stress. When a metal part undergoes physical work, i.e. bending, forming, stamping, welding, it hardens during this process. Normalization helps to return the metal to it's original, more ductile, state.

HTS Plant 3 has four heat treating lines: HR-1, HP3, HR2, and R5. All heat treating lines other than R5 are included in PTI 169-01.

HTS operates one hardening/tempering line, HR-1 (EUHR-1H, EUQUENCH, EUHR-1D). HR-1 is a 15 MM BTU/hr natural gas fired hardening furnace equipped with a 3000-gallon oil quench tank and a 3 MM BTU/hr natural gas fired draw (tempering) furnace.

Parts exit the hardening furnace and are immediately lowered into the adjacent agitated oil quench tank. Parts remain in the oil tank for several minutes before being raised out onto a drip tray to allow oil to flow off parts. The area between the furnace and quench tank is nitrogen blanketed to prevent excessive oxidation of the parts. When parts descend into the quench tank a portion of the oil is vaporized. I observed the vaporized portion become captured by the fume hood above the quench tank. The fume hood is vented to a Flat-Bed HEAF dry filter particulate control system. After quenching, parts are conveyed to the draw furnace for tempering. Parts are not washed before entering the draw furnace, so some amount of oil may be combusted/emitted during tempering.

HP-3 is a 45 MM BTU/hr natural gas fired pusher furnace. This furnace is used for annealing and normalizing. No quench oil is used.

HR-2 and R5 are identical 10.9 MM BTU/hr belt model natural gas fired furnaces. They are located right next to each other. No quench oil is used.

PTI No. 169-01 – EUQUENCH

Special Conditon 1: States that HTS shall not use more than 1700 gallons of quench oil per month. Based on the records I reviewed this limit has not been exceeded. The record sheets are somewhat misleading because during certain months more than 1700 gallons are purchased; however, if the purchased amount is totaled over a 12-month period the average monthly purchased amount is always less than 1700 gallons. This is because the oil is stored in on-site storage tanks before being added to the quench tank. Mr. Rogghe stated that their equipment and production is very consistent and would not allow them to exceed 1700 gallons per month at maximum capacity.

Special Condition 2: States that HTS shall not operate EUQUENCH unless the dry filter particulate control system and mist eliminator is installed and operating properly. I did not climb to the roof to observe the filter system. There is a computerized preventative maintenance system that notifies Mr. Rogghe when filters need to be changed. Filter changes occur once per month or whenever the furnace is down. Before entering the facility, I noticed a small amount of visible emissions (black smoke) coming out of a stack. Mr. Rogghe explained that these emissions arise from the oil quench process and are only intermittent. I observed during the inspection that the black smoke had stopped. I did not perform a method 9 visible emission reading.

Special Condition 3: States that by the 10th day of each calendar month, HTS shall calculate the quench oil usage for the previous month using a material balance. Records of these calculations are to be kept for at least five years. These records were made available to me during my inspection. Attached to this report are copies of these records from January 2017 to May 2018.

Stack restrictions: I did not climb to the roof or measure the stacks. Stacks are all located above the 30 ft roof. The stacks appear to meet permit requirements.

Emission limit for EU-HP3: The 45MM BTU/hr pusher annealing furnace, HP3, has a nitrogen oxide emission limit of 4.5 lbs/hour or 19.71 tons/year. These limits are based on 24 hours per day, 365 days per year operation so it is unlikely that this limit will ever be exceeded. MDEQ-AQD is not requesting that a stack test be performed at this time.

Endothermic gas generators

There are several endothermic gas generators on-site that provide a controlled, carbon neutral, atmosphere to the furnaces. These units appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(iv). No ammonia associated with nitriding is used at this facility.

Shot Blasting

There are four shot blasting machines used to clean/polish metal on a production basis. Emissions from these machines are controlled by a fabric filter and ventilated to the in-plant environment. These units appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(l)(vi).

Compliance Determination

Observations made during my inspection and record review indicate that Heat Treating Services Corporation – Plant 3 is not 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); and Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD) Administrative Rules. A

violation notice is scheduled to be delivered to Heat Treating Services Corporation of America on July 18, 2018 seeking compliance with Rule 201 requirements.

NAME Adam Borgson DATE 7/16/18 SUPERVISOR SK