DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N665036695

FACILITY: Specialty Steel Treating Inc		**SRN / ID:** N6650
LOCATION: 31610 W Eight Mile Rd, FARMINGTN HLS		**DISTRICT:** Southeast Michigan
CITY: FARMINGTN HLS		**COUNTY:** OAKLAND
CONTACT: Scott Verhelle , EVP		**ACTIVITY DATE:** 08/26/2016
STAFF: Francis Lim	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MINOR
SUBJECT:		
RESOLVED COMPLAINTS:		

On August 26, 2016, I conducted an inspection at Specialty Steel Treating located at 31610 Eight Mile Road, Farmington Hills. 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 (MDEQ-AQD) Administrative Rules; and Permit-to-Install No. 64-14A and General Permit 20-01. During the inspection, AQD staff was assisted by Andrew Master, Quality Analyst and Scott Verhelle, Executive Vice-President.

Specialty Steel heat treats metal parts for use in automotive and other applications, which includes bearings, metal connectors and plates. The purpose of heat treating is to change the structure of the steel to make it tougher but less brittle. The process starts with hardening by heating the steel alloys above the critical transformation temperature for the material (1500-1725 °F), then cooled rapidly, enough to cause the material to transform to a much harder, stronger structure. The alloys are cooled rapidly (quenched) by using oil, air, water, or other liquid, depending upon the amount of alloying elements in the material. Heating the alloys above the critical temperature causes carbon and other elements to go into a solid solution. Quenching "freezes" the microstructure. This makes the steel harder but brittle. The steel alloys are subsequently tempered to transform the microstructure to achieve the appropriate hardness and eliminate stresses on the material. Tempering is the process of reheating the steel at a relatively lower temperature (300-800 °F) resulting in a component with the appropriate combination of hardness, strength and toughness.

Specialty Steel conducts carburizing, and nitriding at this location. Carburizing and nitriding toughens the surface of the steel by altering the carbon and nitrogen content at the steel surface. An endothermic gas maintains the atmosphere in the furnace. 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. To increase the carbon content at the metal surface, natural gas is injected in the furnace. To increase the nitrogen content at the metal surface, anhydrous ammonia (ammonia dissociates to N and H gas) is injected to the furnace (NOTE: Atmospheric nitrogen is diatomic, so it cannot be used for nitriding). Furnace atmospheric gas is flared as it exits the furnace. This also acts as a curtain to prevent air in-leakage to the furnace, and thus avoiding a potential explosion hazard.

At this facility, oil quenching is used. Oil quench tanks are located below grade. Quench oil goes through a bag filter to remove contaminants. A flare burns off some of the smoke and emissions from the oil quench tanks. The flare emits inside the facility.

Metal parts are washed after oil quenching. All washer tanks are equipped with oil skimmers

to remove the accumulated oil in the washer tank. Skimmed oil is combined with other waste oil products. The wash water is heated to 150-170 °F, thus killing most bacteria, and lessening odor problems. Alkaline based soap and hot water is used for washing. Washing operations are part of the heat treating process.

Smoke and flames are released when the furnace chamber doors open for charging and release of heat treated parts.

Specialty Steel previously had the following permits for the heat treating furnaces: Permit 247-99 for the Integral Quench Furnace No. 93, 94, and 95; Permit 23-04 for the Integral Quench Furnace No. 101 and 102; Permit 162-04 for Integral Quench Furnace No. 103 and 104 and Pusher Furnace No. 86 and 88; Permit 263-07 for Integral Quench Furnace No. 92; and PTI 225-01 for Pusher Furnace No. 83. With the issuance of PTI-64-14, the previously issued permits have been voided.

A pusher furnace is an automated line consisting of a hardening, quenching, washing, tempering process. An integral quench furnace is a hardening furnace that contains a below grade quench oil dip tank within the furnace, and a washing tank. The metal parts are manually transferred to an annealing furnace for tempering.

The batch tempering furnaces used for the integral quench furnaces are numbered 96, 97, 98, 105, 106, 107, and 108. The tempering furnaces are exempt. Furnaces numbered in the 90's are grouped together and furnaces numbered in the 100's are grouped together. The tempering furnaces are not dedicated to any integral quench furnace.

The furnaces are numbered based on location.

As a result of a recordkeeping violation issued to the facility, a permit application was submitted to consolidate all these permits for ease of recordkeeping. All the hardening furnaces with oil quenching are covered by PTI No. 64-14A. This permit, issued June 13, 2016 includes a recently installed (but not yet operating) Pusher Furnace No 82.

PTI No. 64-14A has a VOC limit of 17.5 tons per year based on a rolling 12-month period and a quench oil usage rate of 4,800 gallons per year based on a rolling 12-month period.

Facility submitted a record of VOC emissions and quench oil usage rate for 2016. VOC emissions and usage showed negative numbers for some months, which seems impossible. That could be explained when additions of oil is less than the amount of oil recycled. I discussed the records with Keith Beavers, maintenance manager. He explained that the amount reclaimed is obtained from Wolverine Oil, their oil recycler. The amount recycled that is recorded comes from the manifest. I noticed that the amount recycled is sometimes identical from week to week. I believe Wolverine just estimates the amount recycled. From January to August 2016, facility reported a net usage of 90 gallons and VOC emissions of 0.33 tons. See attached records.

General Permit 20-01. This permit is for the anhydrous ammonia storage tank. Storage capacity is 8000 gallons, although never filled up near capacity. Facility keeps an updated copy of the emergency response plan in case of ammonia leak. There is a safety relief valve and remotely operated positive shutoff valve installed on the tank. The shutoff valve switch is located near the tank. A maintenance plan as identified in a checklist is implemented. Ammonia storage tank annual inspection is conducted.

The ammonia dissociator has been removed. Raw ammonia is directly injected to the furnace. Ammonia usage is small since this facility does not conduct much nitriding work.

On October 9, 11 & 16, November 16 & 30, December 13, 2012, and February 5, 2013, AQD inspector Iranna Konanahalli conducted a complaint investigation regarding throat irritating and burning type odor".

Iranna observed that the evaporation of quench oil (due to high temperature of hot metal parts immersed in oil) creates a blue haze in the plant. The blue haze is due to oil mist in the plant. Iranna also observed that the blue haze caused an odor that is irritating to the throat. The blue haze and odor emits through the roof ventilation. Since the fumes discharge by natural drafts with very little discharge velocity, the odor spreads through the neighborhood.

Iranna also observed black smoke at the roof level as a result of incomplete combustion of natural gas. Excess air is set manually – no automatic control.

I conducted an odor observation and visible emissions observation after the inspection. I did not notice any strong odor of visible emissions greater than 20% opacity. Specialty Steel does not regularly conduct burner tune-up of the furnaces.

NAME _____ DATE 09-21-16 SUPERVISOR Joyce