

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

B592955297

FACILITY: COMMERCIAL STEEL TREATING CORPORATION		SRN / ID: B5929
LOCATION: 31440 STEPHENSON HWY., MADISON HTS		DISTRICT: Warren
CITY: MADISON HTS		COUNTY: OAKLAND
CONTACT: Ajay Jain , Environmental Manager		ACTIVITY DATE: 06/23/2020
STAFF: Adam Bogнар	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Scheduled Inspection		
RESOLVED COMPLAINTS:		

On Tuesday, June 23, 2020, Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) employee Adam Bogнар conducted a scheduled inspection of Commercial Steel Treating (the "Facility" or "CST") located at 31440 Stephenson Highway, Madison Heights, 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 Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) rules; and Permit to Install No 160-15.

Due to the ongoing COVID-19 pandemic, an in-office record review was conducted rather than on-site. I requested records electronically from Mr. Ajay Jain, Environmental Manager on May 11, 2020. Mr. Jain provided me the requested records on May 20, 2020. I reviewed records from April 2019 through April 2020. These records can be accessed on the AQD shared drive at the following address: S:\Air Quality Division\STAFF\Bognar, Adam\Inspection Documents\Commercial Steel Treating June 2020 Records.

On June 23, 2020 I conducted an on-site inspection of Commercial Steel Treating. I arrived at around 10 am. I met with Mr. Dave Scott, Engineer. Mr. Ajay Jain, the usual environmental contact, was recently laid off. Because of this, Mr. Jain was not present during this inspection. I introduced myself, provided credentials, and explained the purpose of the inspection. Mr. Scott explained current operations and gave me a tour of the manufacturing plant.

CST performs heat treating on customer supplied steel parts. Metallurgical processes at this facility include hardening, tempering, nitriding, and carburizing. Most of the parts are automotive related. CST is currently operating 24/7 with a skeleton crew of workers. The majority of the operational staff have been laid off since the beginning of the COVID-19 pandemic.

The purpose of steel heat treating is to induce a change in the internal molecular structure (allotrope) of the steel workpiece. In hardening furnaces, steel workpieces are heated to a temperature at which the allotrope of iron changes from ferrite to austenite. The steel workpieces are maintained at this temperature for a period of time depending the desired end product qualities. The Austenite allotrope of iron can hold more carbon than the ferrite allotrope. As the workpiece sits in the austenite phase, carbon from the furnace atmosphere effuses into the iron. This carbon effusion into the workpiece is known as "carburizing".

Carbon is provided to the furnaces by several endothermic gas generators which provide a carbon rich and oxygen poor environment to the furnaces. These generators appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(I)(iv).

The workpiece is then quickly immersed in an oil bath to cool the workpieces rapidly. If the cooling is rapid enough, the carbon that effused into the steel will not have enough time to diffuse back into the atmosphere and will become trapped in the workpiece. This transforms the steel into a new allotrope, martensite, which is a very hard form of steel. If cooling occurs too slowly, then the steel will effuse its carbon and revert back to ferrite during cooling. After quenching, excess oil is washed off the part in an alkaline wash.

After hardening, most parts go through a tempering process. Hardening creates a very hard, but brittle steel. The purpose of tempering is to reduce the brittleness of the hardened workpiece. Tempering alters the size and distribution of carbon within the martensite by heating the workpiece to a temperature below the austenite phase for an extended period. Tempering improves toughness, or the ability to deform without fracturing, and reduces hardness. Tempering furnaces are also known as "draw" furnaces. It is important that any quench oil is cleaned off parts before tempering occurs, otherwise the quench oil will be burned off in the tempering furnace. After tempering, some parts receive an aqueous rust preventative coating.

CST is set up to perform nitriding in batch furnaces AB618, AB619, AB620, AB622, and AB623, as well as in continuous furnaces AC727, AC729, and AC730. Anhydrous ammonia is used to supply the furnace with

nitrogen. Ammonia is injected into the furnace atmosphere where it dissociates into nitrogen and hydrogen. The nitrogen in the furnace atmosphere effuses into the surface of the steel workpiece creating a nitride layer. The nitride layer creates a very hard surface with desirable mechanical properties. Not all parts receive nitriding.

CST has laid off around 200 staff since the beginning of the COVID-19 pandemic. They are currently operating at a reduced capacity with a skeleton crew of workers. CST had some amount of “essential” products that they had been producing during the stay at home order. The majority of the parts processed at CST are automotive related, and with the automotive plants shut down and automobile demand down, Mr. Scott does not expect their production volume to increase anytime soon.

Permit to Install No. 160-15

Permit to Install No. 160-15 was issued to commercial steel treating on November 20, 2015 for 10 steel hardening lines.

EU-AC727

EU-AC727 is a 8.14 million Btu/hour natural gas fired atmospheric continuous steel hardening furnace with oil quench tank, post-washer, and continuous draw (tempering) furnace.

AC727 is a continuous furnace line. Parts are automatically fed to the hardening furnace by a conveyor belt. Parts exit the hardening furnace into a below-grade oil quench tank. From the oil quench tank, parts are washed in an alkaline wash station before being conveyed into the tempering furnace. After the tempering furnace, parts are conveyed into an optional tank containing a rust preventative emulsion. Flash off from the oil quench tank goes to a flare before exiting through a stack.

Section I – SC 1,2: VOC emissions are limited to 2.35 lbs/hour and 10.3 tons per year. The hourly limit is based on a four-week period and the annual limit is based on 13 four-week periods. CST is in compliance with these emission limits based on the records I reviewed. VOC emissions are reported at 3.25 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 4.51 tons in the 13-four week-period ending in April 2019. The highest reported hourly emission rate is 2.25 lbs/hour for the 10th 4-week period in 2019.

Section VI – SC 1: Specifies recordkeeping requirements. CST must maintain records of VOC emissions in four-week periods and in 13 four-week (1 year) rolling time periods. These records are maintained.

EU-AC734

EU-AC734 is a 2.00 million Btu/hour natural gas fired atmospheric continuous rotary steel hardening furnace with oil quench tank, post-washer, and continuous draw (tempering) furnace. EU-AC734 was removed from the facility in 2019. I verified that the required records were kept prior to the removal date.

EU-AC737

EU-AC737 is a natural gas fired furnace line that includes a 4.165 MMBtu/hr continuous hardening furnace, oil quench, pre washer, post washer, and tempering furnace.

Section I – SC 1: VOC emissions are limited to 12 tons per year based on 13 consecutive 4-week time periods. CST is in compliance with these emission limits based on the records I reviewed. VOC emissions are reported at 4.52 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 6.9 tons in the 13-four week (annual) period ending in April 2019.

Section II – Quench oil use is limited to 3,384 gallons per year based on 13 consecutive 4-week time periods. CST is in compliance with the quench oil usage limit based on the records I reviewed. Quench oil usage in EU-AC737 is reported at 1252 gallons for all of 2019. The highest reported quench oil usage is 1919 gallons for the annual period ending in April 2019.

Section VI – SC 1,2,3,4: Specifies recordkeeping requirements for EU-AC737. The permittee must maintain a current listing from the manufacturer of the chemical composition of each quench oil. This composition data must be used along with the amount of quench oil used, the amount of quench oil recycled, the amount of quench oil disposed of, and the amount of quench oil spilled to calculate the VOC emission rates. Mr. Jain provided me with the safety data sheet (SDS) and technical data sheet (TDS) for the quench oil used at the facility. The quench oil, “Perchem 1510-CV” contains up to 95% petroleum distillates. The majority of the distillates are “solvent-dewaxed light paraffinic”. This data is used to calculate the VOC emission rates on an annual and 4-week basis. The quench oil is assumed to be 100% VOC in the calculations.

Section VIII – SC 1,2,3,4: Specifies stack parameters for EU-AC737. I did not verify stack dimensions during this inspection. Stacks appeared to be exhausted unobstructed vertically upwards to the ambient air.

EU-AMMONIA

EU-AMMONIA consists of one 10,000 gallon anhydrous ammonia storage tank.

Section III – SC 1: States that CST shall comply with and maintain a copy of “Part 78, Storage and Handling of Anhydrous Ammonia”. This is maintained on site. Mr. Scott sent me a picture of the binder containing these regulations.

Section III – SC 2: States that the permittee shall not operate EU-AMMONIA unless the inspection and maintenance program in Appendix A has been implemented and maintained. There is an appendix A in this permit to install; however, there is no mention of ammonia tank maintenance in this appendix. This condition has a footnote 1 indicating that the condition is state only enforceable and was established in a previous permit to install. Once I have access to the Commercial Steel Treating files I will see if I can find the original Appendix A from the Ammonia Tank permit to install.

Section III – SC 3: States that CST shall not operate the ammonia tank unless an emergency response plan is implemented and maintained. This must be updated each spring season. An emergency response plan is in place. Mr. Scott provided me with the plan after updating it to reflect the current staff situation. The emergency response plan covers several hazardous situations that could arise in this type of manufacturing environment such as fires, spills, natural gas leaks, and ammonia storage tank leaks. The plan states that in the event of an ammonia storage tank leak water should be used to control the release of vapors, and the emergency shutoff valve to the plant should be closed.

Section III – SC 4: States that the permittee shall not operate the ammonia tank unless all transfer operations are performed by a reliable person properly trained and made responsible for proper compliance with all applicable procedures. All transfer operations are performed by a contractor, Tanner, who are experts in operation of ammonia tanks and ammonia transfer operations.

Section III – SC 5: States that the ammonia storage tank shall be filled to greater than 20% water capacity. Mr. Scott stated that the tank is never filled above this level. There is a large sign on the ammonia tank stating “CAUTION: DO NOT FILL OVER 20 PERCENT”.

Section IV – SC 1: States that the ammonia storage tank shall be fitted with safety release valves that are replaced, retested, or recertified every 5 years. According to the annual inspection records I reviewed; these safety release valves were changed in May 2020.

Section IV – SC 2: States that the permittee shall not operate EU-AMMONIA unless a remotely operated internal or external positive shut-off valve is installed. There is both a remote and manual shut-off valve installed on this tank. The tank can be opened and closed remotely from a control room.

Section IV – SC 3: States that the permittee shall not operate the ammonia tank unless a bulkhead, anchorage, or equivalent system is used at each transfer area. The ammonia tank is equipped with an anchorage system.

Section IV – SC 4: States that the permittee shall not operate the ammonia tank unless all liquid lines are equipped with back pressure check valves. All vapor lines must be equipped with properly sized excess flow valves. Liquid lines are equipped with check valves.

Section IV – SC 5: States that any vapor or liquid line that requires venting after ammonia transfer shall be vented through a water trap of 55 gallons in size or larger. No vapor or liquid lines require purging in this system.

Section IV – SC 6: States that a sign shall be present at the facility entrance stating the emergency phone numbers for the owner, primary operator, local and state police, local fire department, and ambulance service. I observed that this sign is present at the facility entrance.

Records of ammonia tank maintenance are maintained. Mr. Jain provided me with weekly, monthly, and annual maintenance inspection records for EU-AMMONIA.

During the weekly inspection employees check for ammonia odors, ensure vapor & liquid lines are intact, ensure

clear access to tank, verify caution signs are in place, check for any tank damage, and check for frost on the lines outside. The monthly inspection has the same checklist, but also includes testing the sprinkler system over the ammonia tank. The annual tank inspection includes inspecting many individual parts for signs of wear. The annual inspection is when any soon to be expired parts are replaced. Two pressure relief valves were replaced in February 2020. These valves will expire on February 28, 2025.

Section VII – SC 1: States that the permittee shall notify the PEAS and/or the AQD district supervisor immediately of any abnormal release of anhydrous ammonia from this tank. Mr. Scott stated that there have not been any releases. There have been no ammonia releases reported to MACES.

FG-AB618/619

FG-AB618/619 consists of two natural gas fired atmospheric batch steel hardening furnaces, each with an oil quench tank.

Section I – SC 1: VOC emissions are limited to 2.4 tons per year based on 13 consecutive 4-week time periods. CST is in compliance with these emission limits based on the records I reviewed. VOC emissions are reported at 1.49 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 1.86 tons in the 13-four week (annual) period ending in March 2020.

Section VI – SC 1: Specifies recordkeeping requirements. CST must maintain records of VOC emissions from FG-AB618/619 in four-week periods and in 13 four-week (1 year) rolling time periods. These records are maintained.

FG-AB620/622/623

FG-AB620/622/623 consists of three natural gas fired atmospheric batch steel hardening furnaces, each with an oil quench tank.

Section I – SC 1,2: VOC emissions are limited to 0.8 lbs/hour and 3.5 tons per year. The hourly limit is based on a four-week period and the annual limit is based on 13 four-week periods. CST is in compliance with these emission limits based on the records I reviewed. VOC emissions are reported at 0.221 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 0.286 tons in the 13-four week-period ending in January 2020. The highest reported hourly emission rate is 0.59 lbs/hour during the 8th 4-week period in 2019.

Section VI – SC 1: Specifies recordkeeping requirements. CST must maintain records of VOC emissions from FG-AB620/622/623 in four-week periods and in 13 four-week (1 year) rolling time periods. These records are maintained.

FG-AC735/736

Section I – SC 1,2: VOC emissions from EU-AC735 and EU-AC736 are limited to 12 tons per year each (24 tons total from both units) based on rolling 13 four-week periods.

VOC emissions from EU-AC735 are reported at 5.34 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 5.71 tons during the 13-four week-period ending in February 2020. VOC emissions from EU-AC736 are reported at 4.82 tons for all of 2019. The highest reported annual emission rate for the period I evaluated was 5.4 tons during the 13-four week-period ending in April 2019.

AC735 & AC736 appear to be in compliance with VOC emission limits based on the records I reviewed.

Section II – SC 1,2: Quench oil usage from EU-AC735 and EU-AC736 is limited to 3,384 gallons per year each (6,768 gallons total from both units).

Quench oil use in EU-AC735 is reported at 1481 gallons for all of 2019. The highest reported quench oil usage was 1583 during the annual period ending in February 2020.

Quench oil use in EU-AC736 is reported at 1335 gallons for all of 2019. The highest reported quench oil usage was 1496 during the annual period ending in April 2019.

AC735 & AC736 appear to be in compliance with the quench oil usage limits based on the records I reviewed.

Section VI – SC 1: Specifies recordkeeping requirements. CST must maintain records of VOC emissions from FG-AC735/736 in four-week periods and in 13 four-week (1 year) rolling time periods. These records are

maintained.

Other Furnaces

There are several more furnaces that are not included in the permit to install. These furnaces either appear to be exempt from Rule 201 requirements pursuant to Rule 282 (2)(a)(i) or are grandfathered into a previous exemption rule. The company claims these furnaces

AC730 (currently operating) and AC 732 (currently shut down) are older continuous hardening and tempering lines which utilize oil quenching. AC731 was been offline since 2011.

AC729 (currently operating) is an older rotary hardening and tempering furnace line.

The company claims AC29, AC730, AC731, and AC732 are grandfathered under the previous exemption rule. Prior to April 17, 1992, "natural gas-fired, liquefied petroleum gas-fired or electrically heated furnaces for heat treating metals, the use of which does not involve molten materials" were exempt from permit to install requirements. These furnaces appear to be exempt from Rule 201 requirements even though they utilize oil quenching.

AC728 is an older offline tempering furnace only.

AB624 is a temper only furnace with a heat input of 500,000 Btu/hr

AB625 is a temper only furnace with a heat input of 500,000 Btu/hr

AC728, AB624, and AB625 appear to be exempt from Rule 201 requirements pursuant to Rule 282 (2)(a)(i).

AB626 is used as a wash tank only. Water soluble wash solution is used.

AB627 is used as a wash tank only. Water soluble wash solution is used.

AB628 is used as a wash tank only. Water soluble wash solution is used.

AB626, AB627, and AB628 appear to be exempt from Rule 201 requirements pursuant to Rule 281 (2)(k).

GN284 is a "bell" furnace. A large metal, bell shaped, lid is lowered on top of workpiece(s). This enclosed space creates an environment for heat treating. Electric heating elements are used. No quench oil is used.

CB751, CB752: CB751 & CB 752 are out of service and have been for some time. There is no plan to bring these back online.

CB753, and CB754: CB753 is a hardener and CB754 is a temper furnace. Material used in these furnaces utilize a quench after the hardener. This process includes a wash of the parts to remove oil residue prior to being processed in the tempering furnace. During this inspection, CB754 had a significant amount of black smoke coming out of it. I asked Mr. Scott why it was smoking, but he was not sure at the time. He could not locate staff that knew what the issue was. After the inspection, Mr. Scott informed me that quench oil had not been adequately cleaned off the part before the part was put into the tempering furnace. The quench oil was burning off while the part was in the tempering furnace.

These furnaces were installed in the late 60s or early 70s according to Mr. Scott. Another operator confirmed that he has been with the company for 46 years, and these two furnaces were already installed when he was hired. The install date on these furnaces appears to exempt them from Rule 201 requirements; however, ; however, this process is still subject to Rule 301 which requires that "a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than the most stringent of the following: (a) A 6-minute average of 20% opacity, except for 1 6-minute average per hour of not more than 27% opacity.". The majority of the black smoke coming out of the furnace was venting out a roof top fan to the ambient air. It is possible that the opacity may have exceeded 20%. I did not verify the opacity during this inspection. I am no longer a certified Method 9 reader because the Method 9 certification class was cancelled this year due to Covid-19 concerns. I informed Mr. Scott about my concerns about the possible opacity with these furnaces. Mr. Scott agreed to work with staff to do a better job cleaning the quench oil off the parts before tempering.

Endothermic Generators

There are four endothermic generators in this facility that provide a carbon rich (and oxygen poor) atmosphere to the heat treat furnaces. These endothermic generators appear to be exempt from Rule 201 requirements pursuant to Rule 285 (2)(I)(iv).

Shot Blasting

There is a shot blasting machine used to clean metal parts. A baghouse is installed to capture any emissions from the shot blasting. I observed that there were several holes in the shotblasting/baghouse setup. I observed material from the shot blasting machine coming out of these holes and being scattered on the floor. The shot blast machine is located directly next to a bay door, which was open during my inspection. There is a chance that shot blast/metal fragments are making it outside of the general in-plant environment.

The shot blast machine appears to be exempt from Rule 201 requirements pursuant to Rule 285(2)(I)(iv) since it is equipped with a baghouse; however, the unit must be repaired to meet this exemption rule. I informed Mr. Scott on August 13, 2020 that this is a violation of EGLE-AQD Rule 201. Commercial Steel Treating must repair the structural integrity of the shot blast/baghouse system so that shot blast material and metal particulate do not end up outside of the plant. I discussed this issue with AQD district supervisor Ms. Joyce Zhu. AQD will exercise enforcement discretion and not issue a violation notice at this time provided that Commercial Steel Treating repair this issue in a timely and satisfactory manner. Mr. Scott informed me that he has a work order scheduled to get it fixed by the end of October 2020. I asked Mr. Scott to send me the completed work order and pictures of the repair once it is finished.

FGFACILITY

Section I – SC 1: Facility-wide VOC emissions are limited to 82.4 tons per year based on rolling 13 four-week periods. The facility appears to be in compliance with VOC emission limits based on the records I reviewed. Facility-wide VOC emissions are reported at 19.67 tons for all of 2019. The annual period ending in April 2019 has the highest emissions for the period I evaluated at 22.73 tons.

Section II – SC 1: Facility-wide quench oil usage is limited to 22,000 gallons per year based on rolling 13 four-week periods. The facility appears to be in compliance with the quench oil usage limits based on the records I reviewed. Facility-wide quench oil use is reported at 7,724 gallons for all of 2019. The annual period ending in April 2019 has the highest emissions for the period I evaluated at 9,694 gallons.

Section VI – SC 1,2,3,4: Specifies recordkeeping requirements for FGFACILITY. The permittee must maintain a current listing from the manufacturer of the chemical composition of each quench oil. This composition data must be used along with the amount of quench oil used, the amount of quench oil recycled, the amount of quench oil disposed of, and the amount of quench oil spilled to calculate the 4-week and rolling 13 four-week VOC emission rates from quench oil facility-wide.

These records are kept. The quench oil usage is calculated from oil addition to furnaces and subtracting the oil that is reclaimed, disposed, or recycled.

Combustion emissions from the natural gas fired furnace must also be recorded. Combustion emissions are accounted for. 97,868,000 standard cubic feet of natural gas has been burned at the facility from January 1, 2020 through May 30, 2020. Facility uses AP-42 emission factors to calculate CO, VOC, PM, NOx, and SO2 emissions from combustion.

Compliance Determination

International Casting Corporation appears to be in compliance with the recordkeeping requirements of Permit to Install (PTI) No. 160-15.

Observations made during my inspection indicate that Commercial Steel Treating 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 Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) Administrative Rules.

As discussed in the report, Commercial Steel Treating must repair the shot blasting unit such that metal particulate and shot blast do not end up outside of the general in-plant environment. AQD will exercise enforcement discretion and not issue a violation notice at this time provided that Commercial Steel Treating repair this issue in a timely and satisfactory manner. AQD will follow up with Commercial Steel Treating before the end of October 2020 about this issue.

NAME Adam Bognar

DATE 9/25/2020

SUPERVISOR Sebastianykallemkal