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

B286634583

FACILITY: MAHLE ENGINE COMPONENTS USA, INC.		**SRN / ID:** B2866
LOCATION: 916 W. State St., SAINT JOHNS		**DISTRICT:** Lansing
CITY: SAINT JOHNS		**COUNTY:** CLINTON
CONTACT: Kurt Ray , EHS Coordinator		**ACTIVITY DATE:** 04/19/2016
STAFF: Julie Brunner	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MINOR
SUBJECT: Scheduled compliance inspection of Mahle		
RESOLVED COMPLAINTS:		

On April 17, 2016, I conducted an unannounced, scheduled inspection of Mahle Engine Components USA, Inc. (MEC) in St. Johns. The last compliance inspections of the facility were on January 30, 2014 and August 12, 2014.

Contacts:
Kurt Ray, EHS Coordinator, 989-224-5439, bryon.taylor@us.mahle.com
Susan Palmer, MEC Corporate, 248-596-8916, susan.palmer@us.mahle.com
Bryon Taylor, MEC Manager of Facilities Management, 989-224-5441, bryon.taylor@us.mahle.com

Facility Description:
MEC manufactures metal piston rings for all forms of combustion engines. The company was founded in 1946 and is celebrating their 70 year anniversary this year. The main market is automotive. MEC makes piston rings for the domestic market: Ford, Chrysler, and GM. A joint venture company, Allied Ring Components (ARC) shares operations to produce piston rings for the foreign market. MEC is responsible for environmental compliance of both companies. The facility has a number of metal machining activities including milling, stamping, threading, drilling, cutting, grinding, welding, phosphating, miscellaneous metal coating, and chrome plating. Metal surface treatment includes heat treatment, hardening, and liquid coating of parts. The facility also includes business offices and a warehouse.

The facility is located on west side of the City of St. Johns. The surrounding area is mixed use with residential and commercial/industrial properties.

Regulatory Overview:
MEC and ARC are considered a true minor source of any regulated air contaminants including hazardous air pollutants (HAPs), and is not subject to the Title V Renewable Operating Permit (ROP) program. There are eight (8) active Permits to Install (PTIs) 351-83, 110-93, 394-94, 14-95, 384-08, 2-08A, 100-12, and 166-12 for the facility.

PTI 351-83 – Chromium stripping tank with wet fume scrubber
PTI 110-93 – Manganese phosphate/zinc phosphate coating process
PTI 394-94 – Zinc phosphate coating process
PTI 14-95 – Manganese phosphate coating process
PTI 384-08 – Two (2) high velocity oxygen fuel (HVOF) processes with the following emission units:

EUHVOF1	**High Velocity Oxygen Fuel (HVOF) metal deposition operation to put a ceramic-metal coating on the running face of piston rings. Emissions are controlled by a dust collector.**
EUHVOF2	**High Velocity Oxygen Fuel (HVOF) metal deposition operation to put a ceramic-metal coating on the running face of piston rings. Emissions are controlled by a dust collector.**

PTI 2-08A – Five (5) hard chrome electroplating tank lines (FGCHROME1 & FGCHROME2) with the following

emission units:

FGCHROME1	**EUCHROME1**	**Hard chrome electroplating tank with individual two stage composite mesh pad scrubber vented to a common HEPA filter (with pre-filter).**
FGCHROME1	**EUCHROME2**	**Hard chrome electroplating tank with individual two stage composite mesh pad scrubber vented to a common HEPA filter (with pre-filter).**
FGCHROME1	**EUCHROME3**	**Hard chrome electroplating tank with individual two stage composite mesh pad scrubber vented to a common HEPA filter (with pre-filter).**
FGCHROME1	**EUCHROME4**	**Hard chrome electroplating tank with individual two stage composite mesh pad scrubber vented to a common HEPA filter (with pre-filter).**
FGCHROME2	**EUCHROME5**	**Hard chrome electroplating tank with a two stage composite mesh pad mist eliminator system for control along with in-line mist eliminators. EUCHROME5 and EUCHROME6 vent to a common HEPA filter control device and stack.**
FGCHROME2	~~**EUCHROME6**~~ **This line has been removed.**	~~**Hard chrome electroplating tank with a two stage composite mesh pad mist eliminator system for control along with in-line mist eliminators. EUCHROME5 and EUCHROME6 vent to a common HEPA filter control device and stack.**~~

PTIs 100-12 and 166-12 – Two (2) general permits for anhydrous ammonia tanks. PTI 100-12 was for an existing 1,000 gallon tank. PTI 166-12 was for a new anhydrous ammonia tank located at the back of the plant. The following emission unit is defined on the general permit:

EU-AMMONIA	**A single anhydrous ammonia storage tank and any associated handling process, nurse tanks or applicator tanks. The nominal tank storage capacity shall not exceed 30,000 gallons. For multiple storage tanks at a source: Each tank shall be covered by a separate general permit and shall have an identification number assigned from the application (identified on the Process Information form).**

The facility also has a large number of exempt processes. The list is attached to the file copy of the inspection report.

The five (5) hard chrome electroplating tank lines (FGCHROME1 & FGCHROME2) are subject to 40 CFR 63, Subpart N, "National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks" as an area source. The affected source to which the provisions of this subpart apply is each chromium electroplating or chromium anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.

MAERS:
The facility reports to MAERS as a fee Category III. The MAERS was audited for 2015 and adjustments were

made. The following emissions were reported for 2015:

Emission Unit Name	Pollutant	Pollutant Emissions (lbs)
EU-ARC-LINE	Nitric Acid	628.8
EU-CHROME-STRIP	Chromium	1.4
EU-HVOF-KEROSENE	CO	89.9
	NOx	844.6
	PM10	223.0
	SO2	2821.4
EU-LACQUER	VOC	189.0
EU-MAINT-PAINT	VOC	729.2
EU-MN-COAT	Nitric Acid	539.6
	Phos Acid	0.84
EU-SANDBLAST	PM10	22.39
	PM25	2.24
EU-ZINC-COAT	Nitric Acid	46.86
RG-CHROME1	Chromium	0.060
RG-CHROME2	Chromium	0.066
RG-FINAL-CLEAN	VOC	2230.6
RG-FINAL-PAINT	VOC	279.3
RG-FINISHTURN	PM10	13.71
RG-PLASMA	PM10	124.4
	Nickel	14.7
	Molybdenum	43.5
	Chromium	26.0

Inspection:
I arrived at 9:25 AM. The weather conditions were 43°F, overcast, wind northeast at 11 MPH, and UV index was low. No visible emissions or odors were identified upon arrival.

I met with Mr. Kurt Ray. (Mr. Ray is leaving and in the interim Susan Palmer will be the contact/support out of Farmington Hills until another EHS Manager is hired.) I provided Kurt with a copy of the Environmental Inspections brochure. We discussed the purpose of my inspection, the last inspection conducted, and then we toured facility operations. The facility officially operates five (5) days per week in three (3) 8-hour shifts. They can operate up to seven (7) days per week, and are currently running six (6) days per week. The facility produces 300,000 piston rings per day. MEC employs 358 temporary and full time staff including salaried and labor. The facility was operating during the inspection.

PTI 351-83 – Chromium stripping tank with wet fume scrubber

PTI 351-83 is for a cleaning process to strip chrome from the arbor collars (parts holders for the chrome plating operations). The stripping tank has a solution of sodium hydroxide. An electric charge is applied with the collars acting as the cathodes and the negatively charged anodes to convert the chrome to a solution consisting of water, sodium hydroxide, and sodium chromate. The emissions from the stripping tank are controlled by a wet scrubber. Pressure drop readings are recorded daily on a clip board located by the cleaning process. If the pressure drop exceeds the operating parameters, the system is shut down and maintenance is called to identify the problem per the O & M Plan. The ventilation system and scrubber were clean, competent, and showed no evidence of leaks or corrosion. There were no visible emissions from the process. The wet scrubber was installed and appeared to be operating properly. The permitted chromium emission limit of 0.03 milligrams per cubic meter is assumed not to be exceeded with a properly operating control system, but a stack test would be required to verify this emission limit. MEC is in compliance with the conditions of PTI 351-83.

MEC is going to move the wet scrubber for easier maintenance, and may also upgrade or replace it. The scrubber sits on a platform above the stripping tank. Exemption Rules 285(a), (c), or (d) may be used depending on if the scrubber is upgraded or replaced. The project will not change the effectiveness of the scrubber in order to be compliant with the conditions of PTI 351-83.

Located in the same area of the cleaning process is a small paint station, "Stop-off lacquer coating". A lacquer thinner is applied by brush to parts. The small "booth" is vented externally. The process is exempt per Rule 287 (c).

An aqueous washer (water & RP) Tank #974 is used for the application of Rustproof® 4200 (SDS #254) to metal arbors. The tank is vented externally. The process is exempt per Rule 285(l)(iii) for surface preparation of metals by aqueous solutions, except acid solutions.

A caustic cleaner (RoPrepp & RP) Tank #975 is used for the application of REPREPP R SPECIAL (SDS #1862) to metal arbors. The tank is vented externally. The process is exempt per Rule 285(l)(iii) for surface preparation of metals by aqueous solutions, except acid solutions.

A Vapor Blast system (Rule 281(c)) uses a water grit (quartz) slurry to blast clean parts on arbor collar trees is followed by Electroclean (Rule 281(e)) Tank #208 (SDS #1864, #1855) which are rinse tanks with water, acid tank #210 (SDS #1276), and last a raise. The parts are ready for chrome plating after cleaning.

PTI 2-08A – Five (5) hard chrome electroplating tank lines (FGCHROME1 & FGCHROME2)
The permit is for six (6) hard chrome electroplating lines but EUCHROME6 was removed in November of 2012 according to MAERS. Each line has multiple above the tank in-line mist eliminators (mesh pad) that draw vapors from across the top of the tank, condense the vapors and drain back into the plating tanks. At the end of each line is a condensate tank that pulls out water. After each condensate tank the emissions are vented to a mesh scrubber located on the other side of a wall, and then the emissions from the chrome plating lines are combined to vent to two (2) HEPA filter control devices. Three (3) lines go to one HEPA filter, and two (2) lines go to the other HEPA filter. The ventilation systems, ductwork, and scrubbers were clean, competent, and showed no evidence of leaks or corrosion. The plating tanks contain Chromium VI, and acids which are very corrosive. The tanks are plastic and well maintained.

Pressure drop gauges are at the end of each line, between each mist collector, and on the HEPA filters. Daily pressure drop readings are taken, and at startup and shutdown of the system. The paper logs for the pressure drop readings are located by the pressure gauges in each line. The daily readings are entered into an electronic database and kept on file for 5-years. Spare parts are kept on-site per the O & M Plan. The O & M Plan has had no changes since 2009.

The lines are operated for 12-hours at night due to the cost of electricity. During the inspection, the operator was cleaning and prepping for the evening plating operations.

The process appears to be meeting all the requirements of PTI 2-08A which has emission limits, O & M plans, and work practice standards per 40 CFR 63, Subpart N.

PTI 384-08 – Two (2) high velocity oxygen fuel (HVOF) processes
There are two (2) plasma spray coating stations (flame chamber furnace) each controlled by a Donaldson Tort cartridge dust collector. The plasma coating process uses kerosene, oxygen, nitrogen and metal powder (chromium, nickel, molybdenum) that is applied in a flame chamber furnace to create a hard surface coating on the piston rings.

The area to prep the piston rings before the HVOF process includes sand blasting the parts for porosity. The sand blasting is controlled by a dust collector. A wet grinder with mist collector and no external vents is also used to prep parts. After prep, the parts go to the flame chamber furnace for plasma coating. The metal powder is loaded into canisters with a preset amount of powder and the volume of powder used is recorded daily. The permit has a limit of 284,746 lb/year of ceramic coating. This is tracked based on the amount of metal powders used in the process to produce the ceramic-metal hard coating on the rings. For the 2015 MAERS, MEC reported 119,980 lb of metal powder used in the process which is below the permitted limit.

The performance of the fabric filter dust collector is monitored continuously with a pressure gauge as required by the permit. Daily pressure drop readings are recorded on a paper log and entered into an electronic database. The paper log is located near the dust collector and displays the operational limit for the gauge as between 0.1" to 4" and the compliant limit for the gauge as between 0.05" to 5". The ranges listed are based on manufacturer's recommendations for the equipment. If the pressure drop measured by the gauge is outside of the operational limit, the process is shutdown, and maintenance is contacted per the facility O & M Plan. The process appears to be meeting all the requirements of PTI 384-08 which has emission limits for nickel and particulate, material limits, and requires proper operation of the dust collector.

Other Plasma Coating

In addition to the two (2) permitted plasma spray coating processes, MEC has five (5) more plasma coating stations. Three (3) are conventional plasma coating stations that apply the metal coating using oxygen (O_2) and hydrogen (H). Two (2) HDAP plasma coating stations use O_2, H, and argon to apply the metal coating. The plasma coating applies chromium, nickel, and molybdenum powders to harden the parts. The grinding and plasma coating are controlled by a baghouse. On the west side of the facility beside a disconnected ammonia tank is the dust collector (blue jewel) that controls the plasma units (HDAP Plasma 1, Conventional Plasma #1 & #4). Conventional and HDAP plasma coating is exempt per Rule 285(i) and the baghouses are exempt per Rule 285(l)(vi)(C).

PTI 394-94 – Zinc Phosphate Coating Line

The zinc phosphate coating operation is an automated dip line with traveling racks consisting of nine (9) tanks. The parts don't go through every tank.

The tank configuration is as follows:
Tank #1 – Soap and water (SDS #2185)
Tank #2, #3, #4 – Raise water tanks
Tank #5 – Large rectangle tank with a mix of acids (SDS #2181, 2182)
Tank #6, #7, #8 – Raise water tanks
Tank #9 – Rust inhibitor
Dryer – open oven tank operated at 300°F

System is vented to a central exhaust out the roof. MEC appears to be compliance with the conditions of PTI 394-94 which contains emission limits for nitric and phosphoric acids, 0.0% opacity, and stack/vent restrictions.

PTI 14-95 – Manganese Phosphate Coating Line

The manganese phosphate coating operation is an automated dip line with traveling racks consisting of fifteen (15) tanks. The tanks are in an oval configuration. The 15th tank is an open oven. Tank #819 is a caustic rust strip. The parts don't go through every tank. MEC appears to be compliance with the conditions of PTI 14-95 which contains emission limits for nitric and phosphoric acids, 0% opacity, and stack/vent restrictions.

New Phosphate Coating Line

The phosphating lines on PTIs 394-94 and 14-95 are being replaced with a new phosphating line. The new line will be capable of both zinc and manganese phosphating. It is fully enclosed and automated. The coating line has programmable dip sequences for cleaning, phosphating, rust inhibitors and washing tanks. It has a total of nineteen (19) tanks with a drying oven tank. A central ventilation system with mist collector and drain goes to a vent stack that is vertical out the roof. The new line is still in start-up. Before installation of the new line, exemption Rule 290 was discussed with AQD staff. Once the line is fully operational, the records for Rule 290 will need to be kept. PTIs 394-94 and 14-95 for the old phosphating lines can be voided when they are removed from service.

Washers and Cleaning Processes

MEC has an aqueous washer exempt per Rule 285(l)(iii). It has six (6) tanks - one (1) caustic, three (3) wash, one (1) rust proofing, a recirculation tank and tank dryer. There is no external exhaust. This system is to be replaced with a new washer.

There is a PVD sand blast with Torit filter with external exhaust vent #386 exempt per Rule 285(l)(vi)(C). A PVD aqueous cleaner is exempt per Rule 285(l)(iii).

Machining
B & K banks A, B, C, & D is a metal grinding operation with 24 machines (6 grinders per line). Each line is equipped with a Carter Day Dust collector. Two (2) dust collectors are then connected to a Hoffman blower for vacuum which is then exhausted outside to one of two (2) Hoffman Blowers. The stack is 13 feet tall. The blower is powered by a 100 HP, 3600 RPM, 3 phase/60 hertz/460 volts, T.E.F.C. AC Motor capable of handling 2,000 SCFM of influent air exhausts uncaptured particulates through a 10" stack at an exit point approximately 13 feet above the finish floor. The "STJ Air Permit Exemptions Inventory" lists this process as exempt under Rule 290. This process could probably be exempt under Rule 285(l)(vi)(C).

Gas Nitriding System (GNS)
The MEC gas nitrating system process has been removed and the ammonia tank associated with it has been disconnected. The tank is permitted and could be voided. (I believe the ammonia tank was permitted on PTI, 100-12.)

A new GNS started production about 1 ½ years ago. An electric nitriding tank furnace is used to treat (harden) metal parts. Ammonia and N_2 gas is injected under vacuum into the furnace. The furnace operates at approximately 400°F and is held for 9 hours. Then the gas is purged and unreacted ammonia is treated in a 0.079 MMBtu/hr natural gas-fired afterburner which operates at 1350°C. Emissions from the afterburner are vented externally to the roof. The process is exempt per Rule 282(a)(i).

Beside the GNS is an electric tempering furnace for stress relief of metal parts. N_2 gas is injected into the furnace at atmospheric conditions and heated. The process is exempt per Rule 282(a)(i).

PTI 166-12 – 500-gallon Anhydrous Ammonia Tank
The anhydrous ammonia tank which services the GNS is located in a fenced area. Tanner is the owner that maintains the tank and provides the ammonia. The facility has an emergency response plan and emergency contacts are posted. The tank is located with the proper set back distance, has remote shut-off, and sensors / gauges as required by the general permit are located inside the facility. The tank appears properly maintained and in compliance with PTI 166-12.

PTI 110-93 – Zinc and Manganese Phosphate Coating Line
ARC has an automated dip line with traveling racks which uses the same chemicals and processes as the MEC phosphating. The tanks are in a slightly different configuration than the MEC lines. ARC appears to be compliance with the conditions of PTI 110-93 which contains emission limits for nitric, sulfuric and phosphoric acids, 0.0% opacity, and stack/vent restrictions.

There is also an aqueous washer in the area exempt per Rule 285(l)(iii).

ARC Tough RIK
ARC operates two (2) systems that put a "Teflon" coating on metal parts. (Moly Dry 465, SDS #80867 and 80840). The systems consist of an enclosed sprayer, heater, two (2) water wash followed by bag filters for particulate control, and a cooling area. The Tough RIK systems are exempt per Rule 287(c).

ARC Heat Treating Furnaces
ARC has three (3) CAM heat treating furnaces #512, #513, and #514 along a wall, two (2) heat treating furnaces beside Tough RIK, and a FORM electric furnace for treatment of metal parts. Treatment is done under atmospheric conditions and there is no oil quenching. All furnaces are vented externally and are exempt per Rule 282(a)(i).

ARC Machining
There is various types of metal machining processes operated by ARC. These processes are exempt per Rule 285(l)(vi)(B).

Final Paint Operation
MEC paint application (located beside warehousing) for marking a strip on finished rings is done in an automated dry filter spray booth. There is also a small manual coater with dry filter and a small dip tank vented externally in the area. The coating is a lacquer thinner (SDS #0143). MEC uses about 20 to 30 gallons per year of coating which is tracked daily. The process is exempt per Rule 287(c).

ARC also has final paint operations similar to MEC. There are three (3) manual spray areas with external exhaust vents. These are reported as a group and are operated as exempt per Rule 287(c).

Facility Dust Collectors
A diagram showing the stack locations of the processes and all external dust collectors is attached. This includes the three (3) blue dust collectors on the north side of the facility and the blue jewel on the west side. Information on the dust collectors is attached. The blue dust collectors (#907, #908, #909, and #918) are Carter Day and control various plasma operations. Information on the dust collectors for the Tough RIK, sandblast, and B & K grinding machines is also included. Dust collector #908 has a short exhaust stack with a china cap. Dust collector #909 has a short exhaust stack. A new (installed summer of 2015) dust collector (#918?) has a short exhaust stack (below the roof line) and cap. The new dust collector sits beside an abandoned dust collector. No emissions were observed from any of the dust collector stacks.

An estimation of potential to emit (PTE) particulate (PM) from the dust collectors using Rule 331(1)(a) limits of 0.1 lb PM / 1000 lb of exhaust gas was done by AQD staff. At worse-case, PM PTE is less than 70 tons per year (tpy) from the facility.

Maintenance Shop
There is grinding, manual saws, cutters, routers, drill presses, and lathes in the maintenance areas. These processes are not vented to the ambient air and qualify for exemption per Rule 285(l)(vi)(B). Manual welding with ventilation is in one room and is exempt per Rule 285(i).

A three (3) sided, walk-in, manual spray paint booth is located beside the maintenance shop. Approximately 2 to 3 gallons per month is used to paint equipment in-house. The maintenance paint booth is operated as exempt per Rule 287(c).

Process Heat
High pressure steam for facility processes is provided by two (2) natural gas-fired boilers located in a separate room on the south side of the building. Boiler #1 is a Cleaver-Brook, horizontal tube, 5.23 MMBtu/hr with a manufacture date of 1965. This boiler is grandfathered. Boiler #2 is a Cleaver-Brook, horizontal tube, 8.375 MMBtu/hr with a manufacture date of 1988 which is exempt per Rule 282(b)(i). The boilers exhaust out the roof, straight up. The boilers are not subject to any New Source Performance Standards (NSPS) or Boiler MACT (40 CFR 63, Subpart JJJJJJ).

At the time of inspection, both Boiler No. 1 and Boiler No. 2 were operating.

There are no emergency generators on-site.

Roof Stacks
All process stacks on the roof are approximately 33 feet. The building is approximately 18 feet tall, and the stacks are about 6 feet above the roof.

Departure:
After the facility tour, Mr. Ray and I discussed the inspection and the records request.

I departed the facility at approximately 4:30 PM.

Records Review:
The following records were requested:
1. Safety Data Sheets for materials used at:
   - o Zinc Phosphate Coating
   - o Tough RIK Coating
   - o Plasma Operations (Conventional, HDAP, HVOF)
   - o Final Paint
2. Process Diagrams for Zinc Phosphate Coating (MAHLE & Allied Ring)

3. Facility Diagram detailing the process connections to all external dust collectors. This includes the 3 – blue dust collectors on the north side of the facility and the blue jewel on the west side. We were thinking that the plasma coating was controlled by the blue jewel. B&K grinding operations may be vented separately, but we were not completely sure that they were not going to one of the northern dust collectors.
4. Operational records for the last 6 weeks (March and April) for:
   - o Tough RIK Coating
   - o Plasma Operations (Conventional, HDAP, HVOF) Powder usage and pressure drop readings
   - o Chrome pressure drop readings (daily)
   - o MEC and ARC Final Paint
   - o Zinc Phosphate Coating
   - o Maintenance Paint (and any paint coating using Rule 287(c))
5. Operational information for the dust collectors including the 4 – blue dust collectors, the B& K grinders dust collectors, and ARC Tough RiK:
   - o Stack Heights (and if there is a stack cap)
   - o Volume in cubic foot per minute (CFM) for exhaust gas
   - o Emissions control efficiency rating
   - o Filter Type
   - o Particulate Output performance guarantee typically listed in grains per dry standard cubic foot (gr/dscf)

Records obtained for the inspection are attached.

Reporting:
Semi-annual ongoing Compliance Reports are required for PTI 2-08A and the Chrome NESHAP (40 CFR 63, Subpart N). No excess emissions were reported for the most recent report period of July 1, 2015 through December 31, 2015.

Summary:
The facility appeared to be in compliance with the applicable rules and regulations, and PTIs 351-83, 110-93, 394-94, 14-95, 384-08, 2-08A, 100-12, and 166-12.

PTIs 394-94 and 14-95 for the old phosphating lines can be voided when they are removed from service. I also recommend voiding PTI 100-12 for the anhydrous ammonia tank that has been taken out of service.

The facility should probably update / cleanup the listing of exempt equipment.

I also recommend that the facility review the MAERS information to update and clean up the emission units and emission factors for the next MAERS reporting.

NAME Nate P. Bruno DATE 6/28/16 SUPERVISOR