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MAWLA

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

B874736390

FACILITY: JOHNSON MATTHEY VEHICLE TESTING & Development, LLC		SRN / ID: B8747
LOCATION: 12600 UNIVERSAL DR, TAYLOR		DISTRICT: Detroit
CITY: TAYLOR		COUNTY: WAYNE
CONTACT: Evan Logan , EH&S and Quality Specialist		ACTIVITY DATE: 06/30/2016
STAFF: Stephen Weis	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Compliance inspection of the Johnson Matthey Vehicle Testing and Development, LLC facility in Taylor. The Johnson Matthey facility is scheduled for inspection in FY 2016.		
RESOLVED COMPLAINTS:		

Location:

Johnson Matthey Vehicle Testing and Development, LLC
(SRN B8747)
12600 Universal Drive
Taylor 48180

Date of Activity:

Thursday, June 30, 2016

Personnel Present:

Steve Weis, DEQ-AQD Detroit Office
Evan Logan, Johnson Matthey - EH&S and Quality Specialist
Dominic Margitan, Johnson Matthey

Purpose of Activity

A self-initiated inspection of the Johnson Matthey Vehicle Testing and Development, LLC facility (hereinafter "Johnson Matthey") was conducted on Thursday, June 30, 2016. The Johnson Matthey facility was on my list of sources targeted for an inspection during FY 2016. The purpose of this inspection was to determine compliance of operations at the Johnson Matthey facility with applicable rules, regulations and standards as promulgated by Public Act 451 of 1994 (NREPA, Part 55 Air Pollution Control), and with applicable Federal standards. The facility is also subject to the terms and conditions of Permit to Install Nos. 149-02M (addressing the operation of 12 engine test cells), 170-13 (for a fluorescent light bulb crusher) and 43-07 (for a diesel generator).

Facility Site Description

The Johnson Matthey facility is located in the Metro-Telegraph Industrial Park, a grouping of industrial and commercial properties located just west of Telegraph Road between Northline and Brest Roads in Taylor. Most of the properties in the vicinity of the Johnson Matthey facility are zoned commercial and industrial; there are residential areas south of Northline Road, and some residential properties along the west side of Telegraph Rd. and the north side of Northline Rd. The closest residences to Johnson Matthey are located about ¼ mile from the facility.

Johnson Matthey began operating at this facility in 1999. The facility was formerly owned and operated by Watson Engineering, Inc., who, like Johnson Matthey, performed engine testing at the facility.

Facility Operations

Johnson Matthey is a multi-national corporation that is headquartered in the United Kingdom, and has facilities in several countries around the world. According to the company website, Johnson Matthey provides products and technologies that are used in the environmental, automotive, chemical, pharmaceutical/medical, recycling, and oil and gas industries. Among the products listed as being developed and manufactured by the company are precious metal chemicals and catalysts, battery technologies, and emission control catalysts. The company is divided into five global divisions – Emission Control Technologies, Process Technologies, Precious Metal Products, Fine Chemicals and New Businesses. There are two Johnson Matthey facilities operating in Taylor

that are part of the Emission Control Technologies Division - the facility that is the subject of this report, and another facility located at 25201 Brest Road (having a SRN of N7755), which is located just under ½ mile from this facility. By virtue of having their own SRNs, the two Taylor facilities are considered by DEQ-AQD as being separate stationary sources at this time. These two facilities also operate under the banner of Johnson Matthey Testing.

Johnson Matthey Testing performs testing on automotive engine emission systems and engine components at this facility. During the site visit, I was told that this facility is capable of operating 24 hours per day, 7 days a week; the operating schedule is determined by the type of testing being performed. This facility has 12 test cells, which are essentially rooms in which automotive engines are operated while various parameters are tested and monitored. The facility tests a variety of engines in the test cells that are fueled by gasoline, diesel, natural gas, compressed natural gas, propane, and ethanol. Air emissions from the engines, and in turn the test cells, are controlled by a catalytic converter, as well as other control devices that may be appropriate based on the type of engine and fuel being used in a given test cell (for example, while a gasoline-fired engine is equipped with a catalytic converter, diesel engines are equipped with catalyst systems, as well as diesel particulate filters). The controlled emissions are vented to the ambient air via stacks; each test cell has their own dedicated stacks. The engines are placed on so-called test stands, on which the engine is installed and set-up for testing, eventually being connected to a fuel supply, an exhaust system (including emission controls), and analytical/diagnostic equipment. The facility has 18 test stands to set up engines for testing in one of the test cells. The test cells are designated in Permit to Install No. 149-02M as EU-TESTCELL1 through EU-TESTCELL12, and are grouped together for permitting purposes in the Flexible Group FG-TESTCELLS.

According to Johnson Matthey, 100 percent of the testing conducted at the facility involves engines fitted with catalysts and other engine-appropriate air pollution control devices. The company performs a variety of engine testing at the facility, which is typically either endurance/durability type testing, or engine emissions certification testing. I was told during my site visit that a lot of the test stands are used to run testing that is part of internal projects relating to catalyst aging and development; these tests try to simulate engine mileage and subsequent catalyst degradation to check if the catalyst is controlling air emissions effectively. The facility also performs some quality audit testing of customer's engines.

The fuel that is used for engine testing is stored in four underground storage tanks – a 5,000 gallon capacity tank that stores biodiesel; two 10,000 gallon capacity storage tanks that store gasoline; and a 20,000 gallon storage tank with two compartments – a 10,000 gallon compartment to store E10 ethanol, and a 10,000 gallon compartment to store ultra-low sulfur diesel.

The most recent MAERS report shows 70 persons employed at the facility. The staff works in catalyst sales, emissions testing, engineering, or data acquisition.

Inspection Narrative

I arrived at the facility at 9:50am. I was met by Evan Logan of Johnson Matthey. Prior to starting my site visit, I watched a company safety orientation video, and completed and signed a visitor/safety agreement. After this was completed, Evan and I proceeded to her office area where we discussed the purpose of the site visit, and I was provided with some background regarding the facility. We were joined by Dominic Margitan of Johnson Matthey. I was told that Johnson Matthey began operating at this facility in 1999, purchasing the building from Watson Engineering. We discussed the hours of operation at the facility, and the types of work that occur. I was told that the facility is capable of operating on a 24 hour per day, 7 days per week basis (aside from holidays), and that the work schedule is determined by the work that the facility is contracted to do at any given time. I was told that the engine testing at this facility is typically endurance/durability testing, through which engines and engine components are tested and monitored at various loads and run times to simulate usage and associated wear and tear under various operating conditions, and emissions certification testing. The facility also performs testing for internal company projects relating to catalyst aging and development. Johnson Matthey manufactures catalysts at a facility in Pennsylvania, and testing is performed at this facility on catalysts produced and/or developed by Johnson Matthey to measure the effectiveness of the catalysts as they age through usage as part of an engine-exhaust system.

We proceeded to review facility records to check compliance with permitting requirements. We went through the conditions in Permit to Install No. 149-02M, and we discussed how the facility demonstrates compliance with the permit conditions. This will be discussed in detail in the next section of this report. Evan and Dominic showed by the computer records that they use to track information related to testing. Each engine/engine platform that is tested at the facility has an emission rate before controls/without catalyst, in units of grams per brake

horsepower hours (g/bhp*hr), determined by Johnson Matthey. Based on the test results, Johnson Matthey is able to measure the percent reduction in air emissions, which is then used to calculate the emission rates for the pollutants, including those for which there are limits in the permit. The internal tracking system also tracks the hours that each test cell runs, and the amount of fuel used during each test. We also discussed the requirement to keep records of the sulfur content of the gasoline and diesel fuel used in the test cells. I was told that the fuel is supplied by Corrigan, and that all incoming loads have an accompanying fuel analysis that is performed by paragon Laboratories that includes the sulfur content. I was shown an example of one of these analyses.

I also had some questions regarding the 2015 MAERS submittal for the facility, which was submitted earlier this year. I presented my MAERS-related questions during the site visit, and there were some follow-up e-mails between myself and Johnson Matthey staff that satisfied my questions and allowed for revisions to be made to the MAERS submittal. I have attached copies of relevant e-mails and documents relating to the MAERS submittal to this report for reference.

After going over records, we walked around the facility. We first stopped to look at the light bulb crusher. The crusher unit, which is a 55 gallon drum-top unit, was permitted by DEQ-AQD; Permit to Install No. 170-13 was issued on December 11, 2013. Johnson Matthey installed this crusher to recycle spent fluorescent light bulbs from their facility. The crusher is used when the facility has accumulated enough bulbs to warrant operating the unit. One of the maintenance staff at the facility (Ralph) has been trained to operate the unit (with another staff person, Jeff, as his back-up). The bulb crushed is kept in a maintenance room adjacent to the testing area. The unit is mounted on wheels, and when it is used, it is moved next to a downdraft booth in the maintenance area. The downdraft booth is a 3' x 6' unit manufactured by Diversitech, and is typically used for canting and de-canting catalysts. The bulb crushing unit, itself, is equipped with a bag filter followed in series by a HEPA filter and an activated carbon filter to control air emissions from the unit. I was told that the unit is operated according to manufacturer's recommendations, and the filters are changed in accordance with the manufacturer's filter maintenance policy. I was told that the facility is switching to using LED lighting. This will presumably greatly reduce the use of the crusher, possibly eventually eliminating its use.

After viewing the bulb crusher, we toured some of the test cells. We observed Test Cell 4 (EU-TESTCELL4). This test cell is currently being used to test diesel engines. We spoke with some of the emissions testing staff about the operation of the test cell. They described the emission control equipment in use during testing; the diesel engine is equipped with a diesel oxidation catalyst, selective catalytic reduction (SCR) and an ammonia slip catalyst (ASC) to control NO_x emissions, and a diesel particulate filter. They presented some data showing that the pre-control NO_x emissions were measured at 145ppm, while post-control emissions were close to zero. The testing staff said that emission control efficiencies are typically around 98% for the diesel engines, and higher for gasoline engines.

After touring the testing area, we returned to the lobby area and discussed the site visit. I told Evan that I would send a document that details the questions that I have relating to the MAERS submittal.

I left the facility at 11:55am.

Permits/Regulations/Orders/Other

Permits

The Johnson Matthey facility currently has three DEQ-AQD Permits to Install (PTI). The following is a summary of the facility's compliance with each of these permits.

Permit to Install No. 149-02M

This permit addresses the operation of 12 engine test cells.

The following provides a description of Johnson Matthey's compliance with the Special Conditions put forth by Permit to Install No. 149-02M; all of the permit conditions are grouped under the Flexible Groups FG-TESTCELLS:

Conditions I.1 through I.23 (Emission Limits) – These conditions put forth emissions limits relating to the operation of the 12 test cells. There are emission limits for NO_x, CO, SO₂ and benzene. Some of these permit conditions – I.3, 5, 11, 16, 20 and 22 – put forth emission limits at times when catalytic control is not used. All of the testing at this facility utilizes catalytic control, so there is no need to check these conditions at this time. Facility staff (Evan and Dominic) showed me the internal data tracking system that is linked to the testing operations. They were able to demonstrate how the pound per gallon/million cubic feet emission rates are

continuously logged, and how the mass emission rates (pounds per hour, tons per year) are tabulated and used for the MAERS report. Johnson Matthey is **in compliance** with the requirements of these permit conditions.

Condition II.1 (Material Limits) – As previously mentioned in this report, all of the testing that occurs at this Johnson Matthey facility utilizes catalytic control. Thus, the limit put forth in this condition on the amount of fuel used during periods when the emissions from engines are not controlled does not apply at this time. The facility is **in compliance** with this condition.

Condition II.2 (Material Limits) – This permit condition limits the sulfur content of the gasoline and the diesel fuel used in the test cells. The fuel used at the facility is supplied by Corrigan Oil Company, and all incoming fuel shipments have an accompanying fuel analysis that includes an analysis of the sulfur content. The sulfur content of the fuels used at this facility is **in compliance** with this condition.

Condition IV.1 (Design/Equipment Parameters) – All twelve of the test cells in use at this facility are equipped with a catalytic control system, and they are installed and operating properly, in accordance with this permit condition. The facility is **in compliance** with this condition.

Condition VI.1 (Monitoring/Recordkeeping) – This condition requires that the inlet and outlet temperature of each catalyst control unit be monitored. During the site visit, I was told that the data acquisition control system used as part of the testing operations tracks these temperatures by the second. The facility is **in compliance** with this requirement.

Condition VI.2 (Monitoring/Recordkeeping) – The permit condition puts forth various recordkeeping requirements in SC 2a – 2l. For 2a, there are no periods of test cell operation without catalytic control to report. For 2b – 2f, the facility's internal tracking system tracks the number of hours that each test cell operates, and the amount of fuel used during each test. For 2g – 2j, facility staff demonstrated how they use the tracking system to calculate emissions from the operation of the test cells. As mentioned in the discussion for SC VI.1, the inlet and outlet temperature of the catalyst system is monitored and recorded, which satisfies the requirement for 2k. For 2l, as mentioned in the discussion for SC II.2, an analysis of the sulfur content of the fuel is kept for each delivery of fuel. Johnson Matthey is **in compliance** with the recordkeeping requirements of this condition.

Conditions VIII.1 (Stack/Vent Restrictions) – This special condition puts forth the parameters (minimum height above ground, maximum exhaust diameter) for the scrubber stack. The dimensions in the permit condition were provided during the permit review. I did not verify these dimensions with the facility; I am assuming that they are compliant with the dimensions in the permit conditions

Permit to Install No. 170-13

This permit addresses the operation of the fluorescent light bulb crusher. Johnson Matthey uses the crusher to dispose of spent light bulbs from their own facility. As such, the crusher is used when the facility has accumulated spent bulbs. The facility tracks the usage of the bulb crusher via an internal document titled "Bulb Crusher Processing Record". I was provided a copy of this form, which is attached to this report for reference. Since the first tracked use of the crusher on June 3, 2014, the unit has been used on 34 occasions. This form tracks the number of bulbs processed in the crusher, the date that the bulbs were crushed, the type and size of bulb crushed, and the temperature of the room in which the crusher is located during use.

During the site visit, we discussed the bulb crusher, and some of the literature that was provided to Johnson-Matthey when they were purchasing the unit. Evan e-mailed me electronic versions of a couple of documents, one titled "The Bulb Eater Model 55 VRS Mercury Emissions Sampling and Evaluation Report", the other titled "Bulb Eater FAQ". I have attached a copy of the FAQ document to this report; a copy of the Mercury Emissions Sampling and Evaluation Report has been placed in the facility file.

Condition II.1 and 2 (Material Limits) – The facility is limited to crushing 150 eight foot bulbs per calendar day, and 3,000 per year. Over the 34 times that the bulb crusher has been used, eight foot bulbs were only crushed on one occasion (3/17/2016), when 24 bulbs were crushed. The facility is **in compliance** with these conditions.

Condition III.1 through 6 (Process/Operational Restrictions) – The facility appears to be **in compliance** with these conditions. The crusher unit is operated and maintained according to manufacturer's recommendations; it is located inside of the building, properly set-back from property lines; the activated carbon replacements are performed in accordance with manufacturer's recommendations, and accumulated waste disposed of.

Condition IV.1 through 3 (Design/Equipment Parameters) – The facility appears to be **in compliance** with these

conditions. I was told that the filters on the crusher unit are properly installed and maintained according to manufacturer's recommendations; the drum is kept in good shape; and there was a cap on the feed chute of the unit. A picture of the bulb crusher that I took during the site visit is included with this report.

Condition V.1 (Testing/Sampling) – According to the Johnson Matthey staff, the activated carbon filter is changed according to manufacturer's recommendations. Thus, there should be no need to test the effectiveness of the activated carbon if it is regularly changed. The facility should be **in compliance** with this requirement.

Condition VI.1 through 4 (Monitoring/Recordkeeping) – Facility staff track the number of bulbs crushed in the unit; the room temperature when the unit is in use; records as to when filters on the unit are replaced; and disposal records for the material collected in the crusher. The facility is **in compliance** with this requirement.

Conditions VIII.1 (Stack/Vent Restrictions) – The bulb crusher is located inside of the building in a separate room, and it is not vented to the ambient air. The facility is **in compliance** with this requirement.

Permit to Install No. 43-07

This permit is a DEQ-AQD General Permit to Install for Diesel Fuel-Fired Engine Generator. Johnson Matthey applied for this permit on January 23, 2007 to address the permitting requirements associated with the installation of a diesel-fired engine generator at the facility. According to the application form submitted by Johnson Matthey:

- The engine generator is being installed to provide back-up power during a power outage.
- The unit is manufactured by Kohler, and is a model 10637305 unit.
- The engine has a maximum nameplate capacity of 330 hp, 0.2 MW.

Additional information from the facility provided that the engine in the unit was manufactured by Detroit Diesel, and has a serial number of 06A047382.

The facility appears to be **in compliance** with the conditions of this permit. Due to its intended purpose for emergency use, the engine is limited in terms of its operation. Johnson Matthey tracks the fuel usage of the engine on a weekly basis, and the information is recorded in an internal database. A copy of a summary sheet for the engines that was recently provided by Johnson Matthey shows that diesel fuel usage by the engine over the 12 month period from July 2015 through June 2016 was 332.7 gallons, well below the permitted limit of 136,000 gallons per 12 month rolling time period. The copy of the summary sheet is attached to this report.

The diesel fuel used in the engine is the same fuel used in the rest of the facility, so the sulfur content is analyzed and monitored. Facility staff told me that the engine is maintained by a contractor, W.W. Williams, who logs all maintenance checks and activity and makes any necessary repairs to the engine. Johnson Matthey spoke with Kohler, and was able to determine that the NOx emission factor for the engine is 100 lbs of NOx/gallon of diesel fuel fired. This is the emission factor that Johnson Matthey uses to calculate NOx emissions resulting from the use of the engine.

Regulations

Subpart ZZZZ (area source MACT) was found to not apply per 63.6585 which specifies that a source is not subject if a stationary reciprocating internal combustion engine (RICE) is being tested at a stationary RICE test stand. This facility operates such testing processes and is therefore not subject.

Subpart PPPPP does not apply per 63.9285 which specifies that the MACT applies only to engine test stands located at a major source of HAPs. This facility will remain a minor HAPs source per the emission estimates at maximum capacity.

Storage Tank Regulations

As referenced earlier in this report, this facility has four underground fuel storage tanks used to store the fuel that is fired in the engine test cells.

In terms of **Federal regulations**, 40 CFR Part 63, Subpart CCCCC (National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities) applies to the operation of

gasoline storage tanks, including those used at the Johnson Matthey facility. Johnson Matthey utilizes their gasoline storage tanks to dispense gasoline into motor vehicle engines, in their case test engines. Per the applicability provisions of this regulation, this type of use classifies the Johnson Matthey facility as a gasoline dispensing facility, or GDF. The Johnson Matthey facility has a relatively low annual fuel throughput, and Subpart CCCCCC puts forth limited requirements on GDF's with a monthly gasoline throughput of less than 10,000 gallons. Facilities with less than 10,000 gallons of monthly throughput do not need to submit an Initial Notification, nor a Notification of Compliance Status, to EPA relating to Subpart CCCCCC. Facilities with less than 10,000 gallons of monthly gasoline throughput are required to implement and maintain management practices, as put forth in 40 CFR 63.11116, that prevent handling gasoline in a manner that results in vapor releases to the atmosphere for extended periods of time. These facilities are also required to maintain records of gasoline throughput to demonstrate that their monthly throughput is less than 10,000 gallons. There are no Federal air quality regulations that apply to the non-gasoline fuel storage tanks at the facility. It should be noted that DEQ-AQD does not have delegated authority for Subpart CCCCCC.

In terms of **State regulations**, some of DEQ-AQD's Part 7 rules apply to certain gasoline storage tanks. Specifically, Rule 703 requires that storage tanks at gasoline distribution facilities that were installed after July 1, 1979 and have a storage capacity of greater than 2,000 gallons be equipped with a permanent submerged fill pipe, and such tanks that are located in the metropolitan Detroit area be equipped with a vapor balance system (or an equivalent control system that has been approved by DEQ). As with the Federal regulations, there is not an applicable State air quality regulation that is applicable to storage tanks for fuels other than gasoline.

Johnson-Matthey will be made aware of the regulatory requirements for their gasoline storage tanks.

Compliance Determination

Based upon the results of the June 30, 2016 site visit and subsequent review of facility records, the Johnson Matthey Vehicle Testing and Development facility in Taylor appears to be **in compliance** with the terms and conditions of Permit to Install Nos. 149-02M, 170-13 and 43-07.

Attachments to this report: E-mail and information exchanges relating to this year's MAERS report; a copy of the Bulb Crusher Processing Record form; a copy of the Bulb Eater FAQ document; a copy of the generator engine usage summary sheet.

NAME Steve Wes DATE 9/28/16 SUPERVISOR K