N6327

MANUAL

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

N632751802

FACILITY: FEDERAL-MOGUL POWERTRAIN, LLC		**SRN / ID:** N6327
LOCATION: 47001 PORT ST, PLYMOUTH		**DISTRICT:** Detroit
CITY: PLYMOUTH		**COUNTY:** WAYNE
CONTACT: Troy Kantola , Technical Services Manager		**ACTIVITY DATE:** 11/14/2019
STAFF: C. Nazaret Sandoval	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FY 2020 - Scheduled Inspection		
RESOLVED COMPLAINTS:		

Source: SRN N6327 – Federal-Mogul (PTC)

Location: 47001 Port Street, Plymouth, MI 48170

Inspection Dates: 11/14/2019 and 01/22/2020

Reason for Inspection: Targeted Inspection

Inspector: Nazaret Sandoval, AQD

Main Contact Person: Troy Kantola, Technical Services Manager

Facility Phone Number: (734) 254-8350

FACILITY BACKGROUND

Federal-Mogul Corporation was founded in Detroit in 1899. The corporation operated with two business divisions: Federal-Mogul Powertrain and Federal-Mogul Motorparts. Federal-Mogul Powertrain focuses on original equipment powertrain products for automotive, heavy-duty and industrial applications. Federal-Mogul Motorparts sells and distributes a broad portfolio of products in the global vehicle aftermarket, while also serving original equipment manufacturers with vehicle products including brake friction, chassis, wipers and other components.

Federal-Mogul Corporation at Plymouth (Technical Center PT R&D), is part of the Powertrain Division. The facility is located in a light industrial area near M-14 and Beck Road. The business organization and the ownership at this location have changed over the years to become what it is today. In1997, T&N Industries built the T&N Technical Center in Plymouth. In 1998, two engine testing facilities (McCord Payen and AE Goetze) moved their operations into the T&N Technical Center. Federal-Mogul bought out T&N Industries and took over all facility operations. In 2010, Federal-Mogul Ignition Products (under the name Champion Spark Plugs) moved their developmental and testing operations from their Toledo facility to the Plymouth site.

Federal Mogul's laboratory facilities originally operating in Ann Arbor have been relocated to Plymouth at the new building area constructed west of the old Federal Mogul building. During the site visit of May 23, 2018, it was observed that the building expansion project was almost completed, waiting for the hook-up of the equipment. On 11/14/2019 I was informed about the completion of the Plymouth Technical Center expansion project and the most recent negotiations and business operations that have occurred since the last Air Quality Division (AQD) inspection on May 23, 2018.

The total area of the building after the expansion is about 142,000 sq. ft, which includes 59,000 sq. ft for offices and 83,000 sq. ft for the labs. As indicated earlier, the new area is mostly

occupied by the equipment from the Ann Arbor facility for material development work and testing (i.e. rubber-oil seals), bench testing, etc. See building areas illustration and labs identification details in the Appendix.
Federal-Mogul Corporation has been acquired by Tenneco, Inc., headquartered for the present in Lake Forest, Illinois. The acquisition was completed on October 1, 2018. Currently the two business divisions of Federal-Mogul – Powertrain and Motorparts – are being operated as separate divisions of legacy Tenneco, Inc. The Plymouth Technical Center remains within the Powertrain division, and part of the Federal-Mogul Powertrain LLC legal entity. All internal and external signage has however been changed to the new Tenneco company identification. New Tenneco, in mid-2020, will be split from the current portfolio of legacy Tenneco companies, and together with a sister division – Tenneco Clean Air – will become a focused original equipment supplier of engine components and exhaust aftertreatment systems to global automotive, heavy-duty and industrial engine and vehicle manufacturers.
The original Federal-Mogul Motorparts division will be partnered with legacy Tenneco companies to form a wholly separated organization, renamed DRiV. For details of the cited acquisition, refer to the illustration included in the Appendix.

The operations regulated by the AQD at Federal-Mogul Plymouth Technical Center (hereinafter Federal-Mogul) are those related to the testing of engines and engine components in dynamometer cells. The test cells are located in the south side of the building, opposed to the entrance lobby. Federal-Mogul does engine testing for the Big 3 automakers as well as some small-engine manufacturers. Some tests run only during day shift, but there are others that can run unattended overnight and sometimes over weekends.

The facility currently operates one shift, Monday through Friday (6:30 A.M. to 3:00 P.M.). The number of employees have increased from about 160 employees (in 2016) to about 280 employees at the time of the inspection on 11/14/2019.

EQUIPMENT/PROCESS DESCRIPTION:
Federal-Mogul is permitted to operate a total of sixteen dynamometer cells. For details about the location of the cells refer to the illustration included in the Appendix, which was copied from the ROP AQD files.
Cells 1 to 8 are located in the west wing and Cells 9 to 16 are in the east wing. Each of the test cells is equipped with fuel lines that can accommodate gasoline, diesel and E-85. E-85 (a gasoline/ethanol blend) is tracked as gasoline for calculation of emission and material throughput. A variety of engines types and sizes, ranging from 250 to 600 brake-horsepower (bhp) are tested. During testing, the engine is connected to a dynamometer that simulates a vehicle load on the engine. Testing can last for a few hours up to several days in duration. The type of testing is specified by the clients and could include Developmental, Deep Thermal Shock, and Durability.
Deep Thermal Shock or DTS testing is that in which engines alternate between idle and peak power.
During Durability Testing the engines are usually tested for a period ranging from two weeks to three months. There are four cycles in which engines can be tested for durability: Durability Cycles A, B, C, and D.
Developmental testing consists of a variety of tests where engines typically operate at low and intermediate loads. The engines are operated in rich burn conditions (O2 concentrations of less than 15 %) and the tests are usually of shorter durations than the Durability tests.

Engines are fueled directly from underground storage tanks through a “fuel bank”, which meters various fuels into each test cell through flexible hoses.

With the exception of Cell 2, Cells 1 through 12 are generally used for testing gasoline engines; Cells 14, 15 and 16 are generally used for diesel engines. However, if necessary, all cells except Cell No.13, may be used for either gasoline or diesel engines testing. Cell No.13 is used exclusively for small engine testing (max engine rating 40 HP) and the cell has stands for testing small (2-cylinder) gasoline engines and ignition testing.
As indicated in the previous inspection report, dated 6/28/2018, Cell No. 13 was split into two cells with a partition wall. The alteration occurred in March 2016. The cells are now identified as Cell 13.1 (with two testing stands) and 13.2 (with one testing stand). The wall was built to allow safer working conditions for the technicians, who might have to do mechanical work on one engine while the other engine is running. Also, the control room was isolated from the wing hallway to keep noise down when the one engine requires the operator to listen to its operation while running. In addition, the exhaust pipe was split to eliminate pressure pulses from one engine from affecting the other engine due to the nature of the testing. The two individual exhaust pipes are coming out the back walls. The engines tested in Cell 13 are small single-cylinder engines, for testing spark plug and to measure piston/ring/liner friction. Also, other types of small twin-cylinder and single-cylinder engines can be tested in Cell 13.

The changes reported for Cell 2, in the previous inspection report, remain in-place. The dynamometers and the ancillary equipment for engine testing/monitoring have been removed from Cell 2. Motorized cylinders heads have been placed in Cell No. 2 for valve-rotator testing or GVT Spin Rigs Testing. This type of testing does not generate air emissions from the connected stack.

Federal-Mogul installed an Air Injection Control System (AICS) in 2004 to control CO and VOC emissions from the test cells exhaust stacks. The AICS works by injecting a measured stream of air into the exhaust gas, which is hotter than the auto ignition point of CO, causing the CO to oxidize in the exhaust pipe. The exhaust temperature is monitored before and after air injection to assure sufficient destruction efficiency. The exhaust temperature must reach 1100 F to oxidize CO; exhaust temperatures using the AICS usually exceeds 1400 F. The AICS does, however, cause a minor increase in NOx emissions. The air injection rate (scfm) is dependent on the type of test being performed. According to permit conditions, the AICS is required when gasoline is used as fuel and during Durability and Deep Thermal Shock testing. No controls are required when using diesel fuel, or when testing small engines (Briggs & Stratton), or when Developmental Testing is conducted.

The test cells are supported by multi-compartment underground storage tanks (USTs) located at the east wing of the building- picture attached-. To follow this description, please refer to the attached copy of the tank-layout drawing received via email on 2/13/15 during the ROP renewal. One of the tanks has two compartments, UST 1 and UST 2, with 6,000 gallons each, storing iso-octane and premium unleaded gasoline. The other tank is a 6,000-gallon UST with three (3) 2,000-gallon compartments: UST 10, UST 3 and UST 4 for storage of Ethanol E-100, Racing Fuel and Ethanol E-85, respectively.
There are two (2) additional multi-compartment USTs with capacities of 8,000 gallons and 6,000 gallons. The 8,000-gallon tank is divided in two compartments: UST 5 (a 2,000-gallon blow-off tank) and UST 6 (6,000-gallon diesel tank). The 6,000-gallon tank has three 2,000-gallon compartments identified as UST 7, UST 8 and UST 9 used for storage of lab blow off, used oil and used anti-freeze respectively.

The cold room chassis dynamometer was added in 2011. The chassis-dynamometer is a fully enclosed unit, equipped with an exhaust stack, into which motor vehicles are placed for emissions testing under various use conditions. When a vehicle is tested, it is mounted on the chassis dynamometer and the dynamometer measures the horse- power and torque produced by the vehicle. The tested vehicles are EPA emission compliant vehicles that are

equipped with a catalytic converter and fueled by diesel, E-85, or gasoline. This equipment has not been used much since its installation.

Additional minor equipment include: three (3) parts washers that use a petroleum-based solvent with 100 % VOC content; the thrust ring electric driven bearing tester, where oil mist emissions are expected from the use of bearing coolants; seal-shaft testing equipment using oil and roof-top space heaters.

COMPLIANCE HISTORY

The last inspection to the facility was on May 23, 2018 and the facility was found to be in compliance with the ROP requirements and all the air quality applicable regulations. There have been no complaints associated with the operations at the facility, no pending administrative consent orders, and no violation notices issued since the last inspection.

INSPECTION NARRATIVE:

The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451 and the Michigan Department of Environment, Great Lakes, and Energy - Air Quality Division (EGLE-AQD) rules.

On November 14, 2019 I arrived at the facility at approximately 10 AM and I was greeted by Keri Westbrooke, the Director of Engineering and Technology at the Plymouth Technical Center. He introduced me to the facility representatives and to the consultants who were all gathered at the conference room. At the meeting, representing the facility, were Troy Kantola, Technical Services Manager; Brad Pritchett, EHS Coordinator; Karly St. Aubin, EHS Intern and Chris Cummings, Engineering Instrumentation Associate. Mary E. Mello and Chloe M. Palajac were there from NTH consultants.

After the introductions I explained the purpose of my visit and I asked for an update of the expansion project and any changes in the facility operations, equipment additions, and/or modifications on the type of testing that are conducted at the test cells, that have occurred during the last couple of years.
Mr. Keri Westbrooke provided an update of the business operations and the negotiations that occurred since the last Air Quality Division (AQD) inspection on May 23, 2018. The details are illustrated on an infographic included in the Appendix. The information was cited earlier in this report under “Facility Background”. In a few words, Federal-Mogul Corporation has been acquired by Tenneco, Inc. on October 1, 2018, but the Plymouth Technical Center (PTC) remains within the Powertrain Division, and part of the Federal-Mogul Powertrain LLC legal entity. A split from the current portfolio of legacy Tenneco companies, is expected to occur in 2020, but it appears as if the business operations at PTC will continue as it is now and the company doesn’t expect major changes in the operations and/or type of testing conducted at the engine testing cells.
I was informed that no additional equipment or emission units regulated by AQD have been incorporated into the facility since the last inspection. As of 11/14/2019 the facility continues conducting most of its operations utilizing diesel engines and gasoline engines during developmental testing, whereas durability tests and DTS testing are less common. However, during the meeting, I leaned that there is a special project that PTC wants to implement, and it is going to be installed soon. The scope of the project was explained during the meeting and pictures illustrating the proposed equipment were submitted with the records sent to AQD via email on 11/20/2019. According to the information, the facility wants to conduct testing of valve seats (seals) in cylinder heads engines at high temperatures using heated compressed natural gas (CNG). The equipment will be installed in one of the test cells that was used as a

storage room at the time of the 11/14/2019 inspection. NTH is currently working on the exemption letter to reflect the test lab equipment to be installed. They are planning on using the permit to install exemption cited on Rule 283 – "Permit to install exemption; testing and inspection equipment".

With Mr. Terry Walter's retirement and the transition of his responsibilities I considered appropriate to explain and briefly described the sections of the Renewable Operating Permit (ROP) No. MI-ROP-N6327-2015; with emphasis in the regulated pollutant emission rates, material limits and the monitoring/recordkeeping and reporting conditions for the main emission units grouped under FG-ALLCELLS. As I read through the permit conditions, I asked for the pertinent records.

Some of the requested records (which are included in the appendix) were handed out at the meeting and the rest of them were provided via email on 11/20/2019, except for the diesel fuel specs records, which was provided on 11/21/2019.

After the ROP discussion we proceeded to walkthrough the facility. During the first portion of the plant tour we observed the operations located in the new area of the building. I verified that the work has been completed and the new testing equipment from the Ann Arbor Sealing System Technical Center was up and running.
The labs are identified on a layout provided to me during the inspection. A copy is included in the Appendix. The west machine shop and the sealing test labs identified in the plot plan with No. 1 and No. 2 respectively, were observed from the outside window. Then, we visited other labs (No. 5 to No. 8) which included the mill room, the press room, the material testing lab, the oven room and the coating lab. I did not have the opportunity to inspect the cited labs during my visit in 2018 because they were not fully operating.

The operations taking place at each lab had been described in a preliminary evaluation prepared by NTH consultants dated May 13, 2016, after NTH visited the Sealing System Technical Center in Ann Arbor on April 6, 2016.The summary table included with the evaluation described the emission sources, the estimated potential emissions and the applicability of permit to install exemptions. The analysis indicated that the lab activities for the sealing system operations corresponded to research and development activities with minimal potential emissions and demonstrated the applicability of Rule 283 exemption. Based on the equipment inspection and the description given by the lab specialist during our walkthrough on 11/14/2019, it seems like the demonstration presented in 2016 was accurate. After the lab walkthrough, I still requested NTH to check the 2016 report to verify if it needs to be updated to reflect the current operations.

The parts washers installed on 2/1/2016 are still in the same locations. They are parts-washers maintained by "Safety Clean". Two are identified as Model 81 (max fill volume 80 gal) and one is Model 30 (max fill volume 15 gallons).
Model 81 washers are in the mechanical room, east test wing. Per information dated 6/26/2018, the dimensions of the openings on top of the units are: 45" W x 27" D, for a surface area of approximately 8.5 sq. ft. Model 30, located in the high dB laboratory near the bearing test rig, is 34" W x 22.5" D, for a surface area of 5.3 sq. ft. The equipment identification and written operating procedures are posted on each one of the cold cleaners.

At the end of walkthrough, I observed each one of the cells and checked them against the draft- diagram and description provided in the meeting. At the time of the walkthrough only cells number 5 and 11 had test activities going on or recently completed. Cell 8 was down for repairs and the walls on cell 1 had been recently painted. Cell 4 was used as a storage room at the time of the inspection. The facility will provide an updated cells description and layout with the ROP renewal application to reflect the minor changes described earlier.

At the closure meeting I went over the requested records and said that AQD's final compliance determination will be assessed once the records are received and evaluated. A written report will contain a detailed evaluation of the permit conditions.

Here is the list of the records requested:
1) Updated building layout and acquisition infographic.
2) Material throughput and emission reports for the period from November 2018 to October 2019.
3) Stack test results for most recent testing.
4) Ultra Low Sulfur Diesel Fuel #2 – certificate of analysis and recent purchases.
5) Thermocouple and flow meter certificates of calibration.
6) Safety Kleen Part Washers - in/out reports and Safety Data Sheet for solvent.
7) Bearing Thrust Rig – Rule 290 lubricating oil usage records
8) Space Heaters – Potential to Emit (PTE) estimated emissions.
9) Sealing system equipment exemption evaluation.
10) New Testing Equipment – equipment and description for proposed gas firing system.
11) FG NESHAP CCCCCC - Fuel underground storage tanks and excerpt from fuel delivery procedures.

I left the facility at about 1:30 PM.

I visited the facility again on 01/22/20 During this short visit I talked to Mr. Kantola about the results of the stack test conducted in May of year 2019 and I took pictures of the dynos that are currently installed at each cell to verify their maximum capacities.

REGULATORY APPLICABILITY AND PERMIT UPDATES

The regulatory analysis for this source was described on the ROP Staff Report dated May 18, 2015. Here is a summary of the applicable requirements:

This stationary source is subject to Title 40 of the Code of Federal Regulations (CFR), Part 70, because has the potential to emit carbon monoxide (CO) over 100 tons per year.

The stationary source is considered to be a minor source of HAP emissions because the potential to emit of any single HAP regulated by the federal Clean Air Act, Section 112, is less than10 tons per year and the potential to emit of all HAPs combined are less than 25 tons per year.

The source is considered a synthetic minor source in regard to the Prevention of Significant Deterioration regulations of 40 CFR, Part 52.21 because the stationary source accepted legally enforceable permit conditions limiting the potential to emit of carbon monoxide to less than 250 tons per year.

FG-ALLCELLS at the stationary source is subject to the federal Compliance Assurance Monitoring (CAM) rule under 40 CFR, Part 64. These emission units have a control device and potential pre-control emissions of CO greater than the Title V major source threshold level. An air injection control system (AICS) is used in all gasoline engine test cells to control CO and VOC emissions. The pre-control device potential VOC emissions from each emission unit are less than 100 tons per year.

Rule 201 exemptions:

- The Thrust Ring Electric Driven Bearing Tester is exempt from state permitting. The facility submitted a Rule 290 exemption analysis for this process when the equipment was installed, and it was determined that an air permit was not required. During the inspection on

11/14/2019, AQD staff determined that there have been no changes to the equipment and/or its process operations. Therefore, the exemption analysis (on-file) is still valid. The facility keeps monthly records of the lubricant usage at this machine. The records collected for year 2018 showed no emissions.

- The part washers are exempt from permitting via Rule 281 (2)(h). According to the dimensions of the openings (W x D), all part washers have an air/vapor interface of not more than 10 square feet. The solvent usage is monitored and recorded. The records collected for period from 5/1/2018 to 11/14/2019 (1.5 years) showed a total solvent purchase of 1,184 gallons and total used solvent of 1,021 gallons, for a net usage of 163 gallons. MAERS 2018 reported a solvent usage of 84 gallons and VOC emissions of 70 pounds.

- Federal-Mogul submitted a demonstration on December 22, 2010 validating that the cold room chassis dynamometer is exempt from state permitting per Rule 285 (2)(g). This exemption does not require recordkeeping. The demonstration (on file) includes the analysis required by Rule 278a validating the applicability of the cited exemption. There have been no changes to the chassis and/or its operations; therefore, the demonstration is still current.

- The facility has space heaters burning natural gas which are exempt from permitting via Rule 282 (2)(b)(i). Each space heater has a rated heat input capacity of not more than 50,000,000 Btu per hour. Eighteen (18) space heaters were added during the building expansion. An updated summary table with the number of existing "roof-top- units "(RTU) was provided by Federal Mogul via email on 6/28/2018 and the information has been attached to this report. The table shows that previous to the building expansion there were 28 existing RTUs. All RTUs listed have a rated heat input capacity below 50 MMBTU per hour. The highest rated units (RTU 45 and 46) have an input capacity of 450,000 BTU per hour. AQD estimated the Potential to Emit (PTE) calculations on 6/28/2018 using the heat input capacities provided by the facility and the EFs listed in MAERS for SCC 10500106 (external combustion using natural gas in space heaters). The aggregated hourly heat input estimated by AQD in 2018 for a total of 46 space heaters (18 existing + 28 new) totaled 7.47 MMBtu/hr and the estimated PTE was about 4.60 ton/year. AQD reminded the facility to update the PTE calculations for the space heaters whenever they add new heating units.

During the inspection of 11/14/2019 NTH consultants provided an update of the PTE calculations for the space heaters. The results were presented in a summary table that shows the potential emissions for criteria pollutants. According to the table, the aggregated hourly heat input after the completion of the expansion project totaled 9.22 MMBtu/hr. The table does not include the total number of space heaters used for the calculation of the total rate of heat input. The PTE in tons per year estimated by NTH was 8.21 ton/year with CO emissions reported as 3.33 tons per year. It was noticed that AQD's emissions estimate (4.6 total tons per year and 0.64 tons CO per year) was lower than the NTH's estimate . The difference is in the value of CO emissions. In fact, NTH used a higher EF to calculate the CO emissions; 84 lbs. CO / MMCF versus 20 lbs. / MMCF used by AQD.

In any case, despite the differences in estimate (AQD vs. NTH) the results of the PTE calculations indicate that even for the worst-case scenario (operating 24 hrs. / 7 days a week, in a year) an increase in combustion of natural gas for the usage of additional space heaters would not result in an increase in emissions greater than the significance levels for CO (100 TPY) or NOx (40 TPY). The rest of the pollutants (PM, SO2 and VOC) have even lower contributions. The PTE for each individual criteria pollutant is less than 5 tons per year.

In this inspection AQD did not collect natural gas usage records to estimate actual emissions from the space heater but those are negligible. The 2018 MAERS report did not specify emissions from the space heaters. In the previous inspection the actual NOx and CO

emissions from the space heaters were calculated by AQD using the annual natural gas usage records for year 2017. The actual emissions were very low. The facility reported an annual natural gas usage of 4,887.7 thousand cubic feet per year. The highest emissions were shown for NOx (0.244 TPY) and CO (0.205 TPY).

During the ROP renewal process, in February 2015, the facility submitted a demonstration validating that the requirements of Rule 201(1) to obtain a permit to install do not apply to the underground storage tanks used for the storage of the following waste products: used oil, used anti-freeze, engine coolant and diesel fuel. The tanks are exempt pursuant to the rules cited below:

UST 6 (Diesel Fuel Storage Tank): R 336.1284 (2)(d)

EU-UST 7 and UST 8 (Used Hydraulic Oil and Engine Coolant Storage Tanks): R 336.1284 (2)(c)

EU-UST 9 (Used Antifreeze Storage): R 336.1284 (2)(i)

The gasoline tanks associated with the dynamometers cells for the engine testing facilities (EU-GASOLINE_TANKS.) are exempt from permitting under Rule 201 pursuant to exemption Rule 284(2)(g) (iii) which exempt equipment exclusively serving dynamometer cells facilities for gasoline and/or gasoline/ethanol blends storage and handling.

- The shaft seal operations (EUSHAFTSEAL in 2018 MAERS) reported a throughput of 0.4 tons of material usage generating 798 lbs (0.40 tpy) of VOC.

ROP Updates:
Federal-Mogul operates under a Renewable Operating Permit (ROP) first issued in 2003 and renewed under No. MI-ROP-N6327-2015 on August 21, 2015. The ROP expires on August 21, 2020. For details of the changes that were incorporated into the ROP during the ROP renewal process that took place in 2015 please refer to the ROP updates in the previous inspection report or to the ROP staff report and technical notes in the AQD files. Here is a brief summary of the main changes.

- EU-GASOLINE_TANKS was added to the ROP. This emission unit is subject to a MACT standard under the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Category: Gasoline Dispensing Facilities promulgated in 40 CFR, Part 63, Subparts A and CCCCCC.
The applicable requirements for the gasoline tanks are those specified under §63.11116 (i.e. maximum monthly gasoline throughput has been below 10,000 gallons).

- Terms and conditions for EU-SAFETYKLEEN and EU-BEARINGTESTER were incorporated into Section D of the ROP using the specific ROP templates for Flexible Groups (i.e. FG-COLD CLEANERS and FG-RULE 290). These exempt emission units had not been included in previous ROP.

For more details about this regulatory analysis and the applicable requirements, please refer to the permit to install and ROP files.

APPLICABLE RULES/ PERMIT CONDITIONS:
As it was indicated earlier, the facility operates under MI-ROP-N6327-2015 issued on August

APPLICABLE RULES/ PERMIT CONDITIONS:
As it was indicated earlier, the facility operates under MI-ROP-N6327-2015 issued on August 21, 2015.
For the purposes of determining compliance with the ROP, the fuel usage and emission records for the period from November 2018 to October 2019 were reviewed. When determining compliance with 12-month rolling time-period limits, the most recent month with the highest fuel usage/emissions is cited in parentheses.

ROP No. MI-ROP-N6327-2015 –FLEXIBLE GROUP CONDITIONS:

FG-ALLCELLS includes EU-TESTCELL1 through EU-TESTCELL16

I. Emission Limits: Evaluating period from November 2018 to October 2019

Pollutant	Emission Limit	Highest 12-Month Rolling Emission Total	Compliance Status
VOC	5.6 tons per 12-month rolling time period	2.7 tons (Nov, Dec, Jan, Oct)	In compliance
CO	223.3 tons per 12-month rolling time period	104.6 tons (January)	In compliance
NOx	62.1 tons per 12-month rolling time period	15.8 tons (August)	In compliance

II. Material Limits

Material	Limit	Highest Fuel Usage	Compliance Status
Gasoline/E85	2,630,750 lbs. per 12-month rolling time period	583,736 lbs. (January)	In compliance
Gasoline/E85	16,713 lbs. per day	2,548 lbs. per day (October)	In compliance
Gasoline/E85	2,327 lbs. per hour	153.5 lbs. per hour (October)	In compliance
Diesel	1,418,000 lbs. per 12-month rolling time period	345,329 lbs. (August)	In compliance
Diesel	19,143 lbs. per day	3,111.6 lbs. per day (July)	In compliance
Diesel	0.30% sulfur content in fuel	0.00088% sulfur*	In compliance

*Federal-Mogul uses an "ultra-low sulfur premium diesel fuel" which has a specification of less than 15 ppm (0.0015%) sulfur content. The analytical result in the table is for a fuel sample collected on 11/20/2019 and analyzed on 11/22/2019.

IV. Design/Equipment Parameters- **In Compliance**

Test	Minimum Air Injection Rate	Compliance Status

	(scfm)	
Durability Cycle A	45	In compliance
Durability Cycle B	50	In compliance
Durability Cycle C	72	In compliance
Durability Cycle D	50	In compliance
Deep Thermal Shock	45	In compliance

AICS injection rate is monitored during engine testing. Monthly engine test records for the cited period were reviewed to verify that the AICS was reaching the minimum air injection rate during each test cycle. It appears as if for all instances the AICS has been used as required by the ROP conditions.
As it has been indicated in previous inspections reports, the facility has safeguards programmed into the test code that require the minimum parameters to be met (as part of their CAM). If they are not met, the test shuts down.

V.1 Testing/Sampling – **Compliance**
Federal-Mogul is required to verify NOx and CO emission rates from a representative number of cells by testing once during the term of the ROP. A test protocol shall be submitted and approved by AQD staff before testing. To comply with this requirement for the term period from 2015 to 2020, a test protocol to determine the CO and NOx emission rates at the exhaust pipe was received by AQD-Detroit Office on April 30, 2019, with a cover letter dated April 25, 2019. AQD field staff concurred with the proposed test protocol and approved the test conditions in a letter dated April 19, 2019.
The test was performed on May 7, 2019 with the attendance of AQD district staff, the facility's consultants, testing company personnel and facility representatives. The test was conducted using a large 6.2-liter gasoline powered engine. The engine was tested on Cell 12 under two different testing conditions: Uncontrolled Developmental Testing (without AICS) and Durability Cycle-B Test (with AICS). In general, the tests ran smoothly, and all the operational parameters remained within the expected ranges specified in the ROP. A separate record has been created in the Michigan Air Compliance and Enforcement System (MACES) database for the stack test observations. The record reports the details about test performance and the preliminary results. Please refer to "Field Observation Report: Stack Testing" report in the AQD files.
A complete report with the details about the stack test procedures, recorded parameters, number of runs and the emission test results was prepared and timely submitted by the testing company. The report was received by the AQD Detroit office on July 8, 2019. A summary table containing the test results has been included in the appendix of this inspection report. The stack test results were used to calculate emission factors (EFs) for NOx and CO for both conditions, with and without AICS. For the Developmental Testing scenario (without AICS), the average EFs were 0.010 lb. of NOx / lb. fuel and 0.32 lb. of CO / lb. fuel. Likewise, the EFs obtained from Durability Testing showed average values of 0.0065 lb. of NOx / lb. fuel and 0.16 lb. of CO / lb. fuel.
The NOX and CO emission factors measured as a result of the stack test conducted on May 7, 2019 showed values below the EFs specified in the Appendix 7 of the ROP for the Developmental Testing conducted on the large size (6.2 Liter) engine powered by gasoline. Likewise, the NOx EF measured during the Durability Testing – Cycle B showed a value below the one cited on Appendix 7. However, that was not the case for the EF measured for CO emissions during Durability Testing – Cycle B. According to Tables 1 and 2 of Appendix 7, the maximum estimated EF for controlled CO emissions is 0.12 lb CO /lb. fuel (i.e. 0.693 * (1-0.83) = 0.12 lb CO /lb. fuel). The stack test result reported an EF value of 0.16 lb CO / lb. of fuel; which is above the maximum estimated EF from Appendix 7.
This issue was discussed with Federal Mogul representatives and their consultants in a meeting

that took place at the AQD Detroit District Office on January 27, 2020. As a result of the discussion, we all agreed on adjusting the current uncontrolled CO emission factor cited on Table 1, Appendix 7 of the ROP for the 6.0 L engine to match the results of the stack test. This modification will be proposed during the ROP renewal process, which will be initiated by Federal Mogul in the coming months. This type of modification is allowed by the ROP special condition VI.18 for FG-ALLCELS, that reads : "...Appendix 7 may be updated and applied by the permittee provided any changes have been submitted to and approved by the District Supervisor". The AQD Acting District Supervisor agreed and approved the modification during the meeting.

VI. Monitoring/Recordkeeping
Records are computerized/ maintained on file for a period of 5 years.

VI.1 to 5 – In compliance
The permittee calibrates, maintains and operates the Automatic Data Acquisition System (DAS) in a satisfactory manner to monitor and record on a continuous basis the following parameters: The gasoline and diesel flow for each engine tested; the exhaust gas temperature just upstream of the air injection point and downstream of the air injection point (when the AICS is operating); the air injection rate (in scfm) when the AICS is operating.

Calibration calendar and records are contained in Gage Trak, a program that notifies when calibrations are due. The program also stores the results of the completed calibrations. The interval for calibration is flagged by Gage Trak. Examples of the calibration procedures used at the facility were requested by AQD at the inspection. The examples were provided via email and are in the appendix with the rest of the records collected during this inspection.
Certification and maintenance of the testing equipment is scheduled on a regular basis. Air flow meters are sent to the manufacturer at the time flagged by Gage Trak (usually every 2-3 years). Fuel totalizers are verified on-site, and thermocouples are calibrated when flagged by Gage Trak (generally every 6 months internally)
Necessary parts for routine repair for some of the monitoring equipment are available on-site. Spare thermocouples and air flow meters are kept on-site. Fuel flow meters have never failed and therefore they do not keep spares. However, if a fuel flow meter should fail, the facility would swap one in from an idle test cell until repairs could be made. The DAS must be functional to operate the test cell; therefore, no test can be run unmonitored.

VI. 6 to 8 – In Compliance
The permittee keeps in a satisfactory manner, monthly and previous 12-month NOx, CO and VOC emission calculation records for FG-ALLCELLS. The emissions are calculated according to the procedure explained in Appendix 7 of the ROP.

The permittee calculates the hourly gasoline usage rate for FG-ALLCELLS based upon calendar monthly recordkeeping prorated to an hourly rate using actual operating hours.
The permittee calculates the daily diesel and gasoline usage rate for FG-ALLCELLS based upon calendar monthly recordkeeping prorated to a daily rate using actual operating days.

During the inspection of 01/11/2016 AQD discussed the time periods and the calculation procedures used by the permittee to estimate the gasoline and diesel usages in lbs./hr. AQD agreed with the procedure. The procedures have not changed. The discussion is summarized under section VI.9 to VI.15 of this inspection report.

The gasoline and diesel usage in pounds per hour, as well as the operating hours are reported with the monthly records at the end of each month.

VI.9 to VI.15 – In Compliance

Records detailing fuel rate, hours of operation, and AICS operational parameters are recorded and maintained as required by the permit.

For this inspection, records from November 2018 through October 2019 were examined to determine compliance. Copies of the cited records can be found in the Appendix.
The permit limits gasoline usage per day and per hour. It also limits diesel usage per day. However, Federal Mogul is not required by the permit to track fuel usage on an hourly or daily basis to determine compliance with these usage limitations. Rather, per the methodology stated within SCs VI.9 and VI.10, the facility tracks fuel usage on a monthly basis and prorates the usage to a daily usage and an hourly usage based upon the total operating days and operating hours within the calendar month. Because the permit's material limits, "usage", is understood to reflect the time when fuel is actually being combusted and because the material limits are written for the flexible group FG-ALLCELLS and not for any individual engine test cell, the term operating hours is understood to mean any hour within the calendar month when one or more engine test cells is combusting the fuel in question and similarly so for the term operating day. Thus, any hour when gasoline is combusted within FG-ALLCELLS is counted as a single operating hour for the purposed of permit tracking, no matter how many of the individual cells (one to sixteen) within the flexible group are actually operating at that time.

The days of the month when diesel engines are tested are tallied separately from the gasoline testing days. Therefore, in a particular month, there will be “diesel operating days” and “gasoline operating days”. The duration of a test depends upon the type of testing. Some tests only run on the day shift (6:30 AM – 3:00 PM) M-F. Other tests, mainly the Durability Tests, can run unattended overnight and sometimes over weekends.

For illustrative purposes, the details about an “actual” diesel testing conducted at Federal-Mogul on February 2014, is saved and filed with the rest of the records for the 2016 inspection in the District Office facility file –Orange Folder.

In 2018 the total hour run for FG-ALLCELLS under gasoline testing totaled 8,502 hours whereas for diesel testing totaled 2,496 hours. The hours of testing using gasoline increased in about 45 % with respect to 2017, whereas diesel testing hours showed a 15 % increase.

VI.16 – In Compliance
The facility follows the procedure highlighted in Appendix 7 of the ROP to calculate the annual average destruction efficiency for CO and VOC.

VI.17 – In Compliance
ROP specifies a maximum sulfur content of 0.30 % (3,000 ppm). To demonstrate compliance with the percent sulfur limit in fuel oil the permittee adequately maintains fuel purchased records. The information collected for this inspection includes copies of the “bill of lading” – detailed receipt given by BP Amoco and the carrier Corrigan Oil Co. to Federal Mogul for the diesel purchases - for period 8/2018 to 10/2019. The information includes the volumes and the product specifications for each shipment received. The product is identified as Ultra Low Sulfur Diesel # 2 (ULSD 15 ppm max).
In addition, AQD requested sample records of recent fuel deliveries. Certificate of analysis for diesel samples taken on 8/23/2019 and 11/20/2019 were provided. The lab results showed ULSD with sulfur content of 9 ppm and 8.8 ppm, respectively.

VI. 18 - In Compliance
Air injection control system (AICS) is always used when Durability and Deep Thermal Shock testing of gasoline engines is conducted. The AICS is maintained satisfactorily and the cycle average exhaust temperature just upstream of the air injection point and downstream of the air

injection point is maintained at a minimum of 1300 °F. Records for year 2017 were reviewed and they showed temperatures above 1300 °F whenever AICS is used. Operating below 1300 °F for more than 30 minutes is an excursion. No excursions were detected or reported during the analyzed period.

VI.19 - In Compliance
N/A -No excursions were reported during the analyzed period.

VI. 20 – In Compliance
As the permittee has indicated in the semiannual and annual ROP compliance reports, there have been no situations of monitor malfunction/downtime. All monitoring is done with the DAS. If DAS is not functioning the test cell cannot be operated, thus no operation is possible unless it is being monitored.

VI. 21 – N/A
A Quality Improvement Plan (QIP) is required under 40 CFR 64.8 for sources that experience excessive excursion/exceedances during a reporting period. Federal Mogul has not experienced any excursions or exceedances during the last two years, as reported in the semiannual ROP compliance reports and as such, AQD has not required a QIP.

VII. Reporting - **In compliance**
Annual and Semiannual ROP Certification Reports and Deviation Reports are submitted in a timely manner, as required. Since the last inspection the technical center building has been expanded and additional space heaters have been added (-refer to exempt equipment earlier in this report).
Except for the modification of Cell No. 13 (for operation flexibility) no changes in equipment have occurred in FG-ALLCELLS and no deviations have been reported. There has not been a change in land use.

VIII. Stack/Vent Restrictions- **In compliance**
The exhaust gases from the stacks are discharged vertically upwards to the ambient air. I did not climb to the roof of the building to take a close look at the stacks; however, no visible emissions were observed at the time of the inspection.
In March 2016, when a dividing wall was added to Cell No. 13, two stacks with diameter of 4 inches and height of 32 inches were installed, replacing one (1) stack with diameter of 6 inches and height of 32 feet. For details, refer to the notification letter dated June 15, 2018. Except for the modifications of the exhaust stack from Cell No. 13, which were necessary to add operational flexibility, there have been no changes to the rest of the stacks.

IX. Other requirements – **N/A**
Failures to achieve compliance have not been identified. No modifications to the CAM have been required.

FG-NESHAP CCCCCC (EPA is the delegated authority)
The specific measures for a gasoline dispensing facility (GDF) with monthly throughput less than 10,000 gallons are cited under 40 CFR 63.11116(a)(1) to (4) and are listed under the special conditions cited for the flexible group FG-NESHAP CCCCCC, emission unit EU-GASOLINE_TANKS.

This Area Source MACT has not been adopted into the State of Michigan, Air Quality Division, Part 9 rules. The State of Michigan has not accepted delegation from the EPA to implement and enforce the provisions of 40 CFR Part 63, Subpart CCCCCC. Consequently, the EPA is the authority responsible for the enforcement and implementation of the special condition included in

this section of the ROP.
For this inspection Federal Mogul provided some records to show compliance with the special conditions cited for FG-NESHAP CCCCCC. The records were collected and will be placed in the facility files for reference purposes, but they will not be reviewed or evaluated by AQD for compliance determination.

FG-COLD CLEANERS
The cold cleaners are considered "new" cold cleaners because they were put into service after July 1, 1979. They are exempt from Rule 201 pursuant Rule 281 (2)(h).

EU-SAFETYKLEEN
II.Material Limits – **N/A**
The permittee doesn't use cleaning solvents containing halogenated compounds. For the physical and chemical properties of the cleaning solvent refer to the SDS collected during the inspection.

III.Process/Operational Restrictions
1. Cleaned parts shall be drained for no less than 15 seconds or until dripping ceases. The cold cleaners were not in operation at the time of the visit. **Not evaluated**
2. The permittee performs routine maintenance on each cold cleaner as recommended by the manufacturer. **In Compliance** -

IV.Design /Equipment Parameters – **In Compliance**
The cold cleaners at Federal-Mogul meet the following design requirements:
1b. The cold cleaners are used for cleaning metal parts and the emissions are released to the general in-plant environment.
2. The cold cleaners were equipped with a device for draining cleaned parts.
3. All the cold cleaners were equipped with a cover and the covers are closed when they are not in use.
4. The Reid vapor pressure of the cleaning solvent used at Federal-Mogul is less than 0.1 psia. The solvent is not agitated, nor heated. Therefore, the requirement of having a mechanically assisted cover does not apply.
5. This condition is not applicable to Federal-Mogul's cold cleaners

V. Testing/Sampling – **N/A**

VI.Monitoring/Recordkeeping – **In Compliance**
Records are maintained on file for a period of five years

1 – **N/A**

2. The following information (required by section VI. 2) was provided to AQD on 6/27/2018. The information written on stickers labels was posted on the cleaners and are still in-place:
a. A serial number, model number, or another unique identifier for each cold cleaner.
b. The date the unit was installed, manufactured or that it commenced operation.
c. According to the dimensions of the openings (W x D), all part washers have an air/vapor interface of not more than 10 square feet.
d. The applicable Rule 201 exemption is cited
e. The Reid vapor pressure of each solvent used. This information is listed on the MSDS.
f. **N/A**
For detailsabout the capacities and dates of installation of the cold cleaners, please refer to the 2018 inspection report

3. The permittee shall maintain written operating procedures for each cold cleaner. These written procedures shall be posted in an accessible, conspicuous location near each cold cleaner. The manufacturer operating procedures, as well as the AQD orange-stickers are posted near each one of the cold cleaners

4. The solvent is not a safety hazard. Records of solvent usage and solvent lost are kept in a monthly basis. Closed containers are used for the storage of solvent cleaner.

FG-RULE 290 – In Compliance

As indicated earlier in this report the Thrust Ring Electric Driven Bearing Tester (EU-BEARINGTESTER) is exempt from the requirements of Rule 201 pursuant to Rules 278 and 290. The facility submitted a Rule 290 exemption analysis for this process when the equipment was installed, and it was determined that an air permit was not required. The facility keeps monthly records of the lubricant usage at this machine. The permittee is in compliance with all the special conditions listed in the ROP for this flexible group.

MAERS REPORT REVIEW

The facility is required to report to the Michigan Air Emission Reporting System (MAERS). The 2018 MAERS report was timely submitted on 3/14/2019 with no errors detected. AQD audited the report and observed that there was a 31% increase in the total emissions reported for 2018; from 93 tons in 2017 to 122 tons in 2018, with CO representing 84% of the total emissions. This increase in emission correlates with the fuel throughput increase, from 85,500 gals in 2017 to 123,900 gals in 2018. The figures represent an increase of 62% in gasoline usage and 11% increase in diesel usage with respect to 2017. For details refer to MACES report CA N632748763

FINAL COMPLIANCE DETERMINATION

Federal-Mogul Corporation appears to be in compliance with the evaluated ROP No. MI-ROP-N6327-20015 requirements and the evaluated state and federal air emissions standards, rules and regulations.

NAME A Handoval DATE 3/10/2020 SUPERVISOR JK