

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

B404960290

FACILITY: GM Technical Center		SRN / ID: B4049
LOCATION: 31295 Charles Kettering Road, WARREN		DISTRICT: Warren
CITY: WARREN		COUNTY: MACOMB
CONTACT: Marianne Secrest , Environmental Engineer		ACTIVITY DATE: 06/15/2021
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: FY2021 ROP CMS scheduled inspection (on-site) of General Motors, LLC - Warren Technical Center (B4049) ("GM" or "Tech Center")		
RESOLVED COMPLAINTS:		

General Motors, LLC - Warren Technical Center (B4049)
31295 Charles Kettering, Warren, Michigan 48092
(Previously, 6250 Chicago Road)
Warren, Michigan 48090-9005

NAICS: 336211

ROP: MI-ROP-B4049-2019 expiring October 16, 2024. Effective date: September 29, 2014. Renewal Application due between April 16, 2023, and April 16, 2024.

Active Permit: 46-20 (incorporated into the 2019 ROP).

NOx PSD: PSD for 13 engines including 9 DRUPs (Diesel Rotary Uninterruptible Power supply system) to be installed in phases. Only six (6) of nine (9) DRUPs have been installed. Rest 3 DRUPs will NOT be installed and the permit (PTI No. 160-11A, AQD Engineer: Jennifer Bixby) was allowed to expire. Hence, Rule 201 permit is required for any additional DRUPs.

Gas1 (natural gas) restriction: GM obtained PTI No. 42-14 (AQD Engineer: Riddle) for dual fueled (natural gas / fuel oil No. 6) Boiler Nos. 1-6 to restrict to Gas1 only for Major Source Boiler MACT 5D purposes. The restriction applies to all boilers at GM Tech Center. At any rate, Boiler Nos. 1-6 have been removed from April 2016 thru January 2018. GM does not use fuel oil anymore in any boiler at GM Tech Center. All fuel oil tanks have been removed. Three (3) new boilers covered by PTI No. 102-16 (108 MM BTU per hour, NG, low NOx burner, NSPS Db) replaced these six (6) boilers.

Active Permit: PTI No. 46-20 (AQD Engineer: Trowhill & PTI App No.: APP-2020-0075) dated June 17, 2020, for thermal testing of battery cells (FGBATTERY: large area for thermal testing of battery cells (EU-HIGHBAY) and small area for thermal testing of battery cells (EU-LOWBAY)) controlled by baghouse in series with a HEPA filters. The permittee shall not operate EUHIGHBAY and EULOWBAY within FGBATTERY simultaneously during thermal testing, i.e., only one bay can be operated at any given time. GM Tech Center is conducting thermal testing of electric vehicle batteries. The project involves installing two (2) particulate control systems, each consisting of a baghouse followed by a HEPA filter. The project pertains to the High Bay and Low Bay areas of the Estes Building. Thermal battery testing consists of testing battery cells, modules which contain up to 24 battery cells and battery packs which include up to 8 modules. During the

February 2020 inspection, this process was not present. During FY 2021 inspection, these battery thermal testing cells were installed and operating properly.

Emission Units

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EUHIGHBAY	Large area for thermal testing of battery cells, modules or packs. Controlled by baghouse in series with a HEPA filter	TBD	FGBATTERY
EULOWBAY	Small area for thermal testing of battery cells, modules or packs. Controlled by baghouse in series with a HEPA filter	TBD	FGBATTERY

Flexible Group

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGBATTERY	Battery Thermal testing areas	EUHIGHBAY, EULOWBAY

PTI No. 46-20, FGBATTERY material limits in terms of cells tested: 1,833 cells per month & 22,000 cells per year for EU-HIGHBAY and 125cells per month & 1,500 cells per year for EU-LOWBAY.

Permit rolled into MI-ROP-B4049-2019: PTI No. 102-16 for three (3) new boilers (EU-NewBoiler1-3, 108 MM BTU per hour, NG, low NOx burner, flue gas recirculation, NSPS Db) and NSPS 4J SI RICE (NG, 60Kw, 80.5 hp) generator. The new natural gas only boilers (EUNewBoiler1-3) replaced dual fueled natural gas / fuel oil no. 6 old boilers (EU-BOILER1 [240 MM BTU per hour, 05-03-1969], EU-BOILER5 [143 MM BTU per hour, 01-01-1955] & EU-BOILER6 [144 MM BTU per hour, 02-04-1991]). However, all old dual fuel (NG & Fuel Oil No. 6) boilers (6 Boiler Nos. 1-6, PTI No. 42-14 dated April 14, 2014) have been removed from April 2016 thru January 2018. Boiler Nos. 2, 3, 4 and 5 were grandfathered (installed before August 15, 1967). Three (3) new boilers (EU-NewBoiler1-3) were installed in October 2017, November 2017 and January 2018. Three new boilers (108 > 100 MM BTU per hour, NG only, constructed after June 19, 1984) are subject to NSPS Db. Hence, GM must install CEMS / PEMS for NOx. NOx limits are: 0.064 pounds per MM BTU heat input and 34 tons per year. GM performed PEMS RATA Test during February 26, 2018 through March 2, 2018 using BT Environmental Consulting, Inc. (BTEC Project No. 049AS-313759 April 18, 2018; Messrs. Steve Smith, Mike Nummer, and Jake Zott of BTEC). The three new boilers (currently, known as EU-Boiler1-107 [11-07-2017], EU-Boiler2-107 [10-20-2017], EU-Boiler3-107 [09-27-2017]) are equipped with oxygen trim systems. The three new boilers have been rolled into MI-ROP-B4049-2019. EU-NewBoiler1-3 have been renamed as EU-BOILER1-107 thru EU-BOILER3-107 upon issuance of MI-ROP-B4049-2019. The boilers may also be referred to as Boiler1, Boiler2 & Boiler3 (Boiler Nos. 1-3), respectively

PTIs rolled into ROP (11): PTI Nos 42-14 (Approved: 4/14/2014 and Voided: 10/01/2014. Limit the use of fuel oil so the boiler is a Gas 1 boiler under Boiler MACT 5D); 42-13 (Approved: 7/10/2014 and Voided: 10/01/2014. 1,099 kilowatts (kW) or 1.099 MW [1,474 bhp] NSPS 4I CI RICE Emergency Generator); 160-11B (Approved:

01/14/2015 and Voided: 09/1/2015. 13 CI RICE DRUPS [EU-DRUPS1 through 9] Emergency Generators, Model Year 2010, 3,634 HP (2500 kW) Caterpillar (CAT) 3516C-HD engines. 13 engines in phases. 9 of the 13 proposed engines are part of a Diesel Rotary Uninterruptible Power supply system (DRUPS), only 6 of 9 DRUPS have been installed and rest 3 DRUPS will not be installed as the permit is allowed to expire for these 3 DRUPS); 160-11A (Approved: 07/13/2012 and Voided: 04/9/2013. 13 engines and later PTI modified to update EUGENERATORS1 through 4: four identical model year 2010 3,634 HP (2500 kW) Caterpillar (CAT) 3516C-HD engines; 82-11 (Approved: 7/12/2011 and Voided: 11/28/2012. Emergency Generators); 127-04 (Approved: 9/7/2004 and Voided: 8/18/2009. Relocate vehicle validation process to CCO Bldg.); 96-04 (Approved: 10/28/2004 and Voided: 8/18/2009. Increase fuel heat input limits); 298-99 (Approved: 1/18/2000 and Voided: 7/3/2002. 6 Dynamometer test cells at R & D Bldg.); 40-95 (Approved: 6/20/1996 and Voided: 7/3/2002. 6 Dynamometer test cells); 654-91 (Approved: 4/29/1993 and Voided: 7/3/2002); 34-69 (Approved: 3/5/1969 and Voided: 7/3/2002. Boiler).

PTIs voided: 35

PTI Applications voided: 4

Once-in-Always-in [OIAI] Policy: According to May 16, 1995, EPA memorandum entitled “Potential to Emit for MACT Standards – Guidance on Timing Issues” from John Seitz, Director of OAQPS, Major Sources of HAPs on the “first compliance date” are required to comply permanently with the applicable MACT standard to ensure that maximum achievable reductions in toxic emissions are achieved and maintained. In other words, in order not to be a major source, the company should have obtained federally enforceable permit limiting its potential-to-emit (PTE) below major source threshold for HAPs before the first compliance date (timeliness). In addition, Clean Air Act (CAA), as amended, requires all major sources to obtain a Title V (RO) permit This OIAI policy has been repealed Effective on February 8, 2018, US EPA Issuance (“Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act”) and withdrawal (“Potential to Emit for MACT Standards—Guidance on Timing Issues.”) of guidance memorandums, Page 5543, Federal Register /Vol. 83, No. 27 /Thursday, February 8, 2018 / Rules and Regulations. The repeal of the policy was proposed on January 3, 2007, US EPA (Page 69, Federal Register / Vol. 72, No. 1 / Wednesday, January 3, 2007 / Proposed Rules) to replace this policy (May 16, 1995, EPA memorandum entitled “Potential to Emit for MACT Standards – Guidance on Timing Issues” from John Seitz) so that a major MACT source may become an area source any time. On July 26, 2019, EPA published a proposed rule to codify the 2018 Guidance retracting the OIAI policy.

On November 19, 2020, EPA published a final rule (“November Rule”) to go into effect on January 18, 2021. Fourteen (14) multiple environmental groups have expressed they will file suit challenging the November Rule.

Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act: Page 73854 Federal Register / Vol. 85, No. 224 / Thursday, November 19, 2020 / Rules and Regulations/ Final rule. These amendments implement the plain

language reading of the “major source” and “area source” definitions of section 112 of the Clean Air Act (CAA) and provide that a major source can be reclassified to area source status at any time upon reducing its potential to emit (PTE) hazardous air pollutants (HAP) to below the major source thresholds (MST) of 10 tons per year (tpy) of any single HAP and 25 tpy of any combination of HAP. This final rule is effective on January 19, 2021.

As is explained in the memorandum, the plain language of the definitions of “major source” in CAA section 112(a)(1) and of “area source” in CAA section 112(a)(2) compels the conclusion that a major source becomes an area source at such time that the source takes an enforceable limit on its potential to emit (PTE) hazardous air pollutants (HAP) below the major source thresholds (i.e., 10 tons per year (tpy) of any single HAP or 25 tpy of any combination of HAP). In such circumstances, a source that was previously classified as major, and which so limits its PTE below the major source thresholds, will no longer be subject either to the major source MACT or other major source requirements that were applicable to it as a major source under CAA section 112. The guidance signed on January 25, 2018, supersedes the May 1995 Seitz Memorandum.

Subject to Major Source Boiler MACT 5D. OIAI Policy repeal is under litigation. However, GM may remove major MACT (especially MACT 5D) conditions from ROP based upon OIAI policy repeal. US EPA has promulgated Area Source MACT for natural gas fired boilers pursuant to 6J. GM obtained PTI No. 42-14 to restrict fuels to Gas1 (principally natural gas) only. In any case, all dual fuel boilers (FG-BOILERS: Boiler Nos. 1 thru 6) have been removed (April 2016 thru January 2018). GM may become synthetic minor for neither HAP (< 10 tpy Single HAP and < 25 tpy Aggregate HAPs) nor Criteria (< 100 tpy) Pollutants in to preserve operational flexibility. It turns out that recent actual NOx emissions are slightly higher than 100 tons per year. MAERS-2019 NOx emissions are 88,817.20 pounds or 44 tons per year.

NSPS Dc boilers: Two (2: EU-BOILER1CL [1998, 12.5 MM BTU per hour] and EU-BOILER2CL [1998, 12.5 MM BTU per hour]) natural gas fired steam boilers are subject to: NSPS Dc, New Source Performance Standards (NSPS) for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR, Part 60, Subpart Dc). All boilers (2) at Climatic Wind Tunnel (CWT) have design heat input capacity of > 10 MM BTU per hour. All boilers were installed after June 9, 1989. Only NSPS Dc requirement for pipeline quality natural gas fired boilers (no fuel oil backup) is fuel usage recordkeeping. GM complies with this requirement via annual MAERS submittal and the natural gas usage and corresponding emission records.

NSPS Dc Revisions:

1. 72 FR 32759 = Page 32759 Federal Register / Vol. 72, No. 113 / Wednesday, June 13, 2007 / Rules and Regulations / Final Rule – to add compliance alternatives and to revise certain recordkeeping and reporting requirements.
2. 74 FR 5091 = Page 5091 Federal Register / Vol. 74, No. 17 / Wednesday, January 28, 2009 / Rules and Regulations / Final Rule - to correct technical and editorial errors.

The NSPS Dc revisions simplified the natural gas usage recordkeeping. ROP and MAERS natural gas recordkeeping satisfies NSPS Dc.

NSPS Db Boilers: Three (3) new boilers (EU-NewBoiler1-3, 108 > 100 MM BTU per hour, NG, low NOx burner, flue gas recirculation, installed about 2017 after June 19, 1984) are subject to 40 CFR Part 60 Subpart Db, NSPS Db—Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units —each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hour)). 72 FR 32742, June 13, 2007, Federal Register / Vol. 72, No. 113 / Wednesday, June 13, 2007 / Rules and Regulations. GM is submitting quarterly Excess Emissions Reports (EER) and performing quarterly RAA and annual RATA. GM is required to perform stack test within 180 days to verify NO_x emission rates from each boiler EUNewBoiler1, EUNewBoiler2, EUNewBoiler3 (PTI No. 102-16, V.1). Three new boilers are equipped with Oxygen Trim Systems. An Oxygen Trim System is system of monitors that is used to maintain excess air (EA) at the desired level in a combustion device. PTI No. 102-16 covers both 108 MM BTU per hour boilers (3: natural gas fired low NOx burners achieved with flue gas recirculation) and 60kW (80.5 HP) natural gas fired spark ignited NSPS 4J emergency generator. On July 17, 2019, AQD approved one single mid-year RAA and one annual RATA as PEMS is installed in lieu of a CEMS at GM Tech Center as follows:

1. One single mid-year PEMS RAA (Relative Accuracy Audit, customarily, a quarterly audit of the PEMS) shall be performed within 180 days of the most recent RATA and
2. One annual PEMS RATA (Relative Accuracy Test Audit, customarily, performed at least once every four calendar quarters after the initial certification test while the PEMS is operating at the normal operating level) shall be performed as well within 180 days of the most recent RAA.

Predictive Emission Monitoring System or PEMS is an emission estimate based upon a mathematical model / algorithm using process parameters and the estimate is compared to CEMS during the test. The details can be found in 40 CFR, Part 60, Appendix B, Performance Specification 16 or PS16. PEMS must pass a relative accuracy (RA) test and accompanying statistical tests in the initial certification test to be acceptable for use in demonstrating compliance with applicable requirements. Ongoing quality assurance tests also must be conducted to ensure the PEMS is operating properly.

The SmartCEMS™ -60 Predictive Emission Monitoring System (PEMS) provides continuous data recording and report generation for compliance with 40 CFR Part 60 regulations. The data acquisition system provides a secure and reliable means of collecting and retrieving compliance data. This application has been customized to meet the requirements of gas-fired boiler under 40 CFR Part 60, Subpart Db; and as a predictive emissions monitoring system (PEMS), an alternative to continuous emissions monitoring

under 40 CFR Part 60, Performance Specification 16 for Predictive Emissions Monitoring Systems (PEMS) (PS-16) "Example Specifications and Test Procedures for Predictive Emission Monitoring Systems".

On or about, July 30, 2019, AQD received NO_x (pounds per MM BTU) RAA results for Boiler Nos. 1 thru 3 using US EPA Reference Methods 3A and 7E. Montrose Air Quality Services, LLC of Royal Oak, MI 48073 conducted the NO_x sampling (Document Number: 049AS-569030-RT-94, Test Dates: June 28, 2019 (EUBOILER1, EUBOILER2) and July 22, 2019 (EUBOILER 1)). The RAA testing was conducted to satisfy the requirements of Performance Specification 16, 40 CFR, Part 60, Appendix B (PS-16, "Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources') based upon three 30-minute test runs at normal load conditions while combusting pipeline quality sweet natural gas. Concerning Boiler Nos. 1-3, respectively, RM NO_x Vs PEMS NO_x (in pounds of NO_x per MM BTU heat input) were: 0.031 Vs 0.032 (EUBOILER1), 0.029 Vs 0.031 (EUBOILER2) and 0.041 Vs 0.042 (EUBOILER3) resulting in percent Relative Accuracy of 1.1, 5.4 & 2.9, respectively << 20%, 40 CFR Part 60, % Relative Accuracy Limit.

On or about, September 30, 2021, AQD received (PDF copy via E-mail) NO_x (pounds per MM BTU) RATA) results for Boiler Nos. 1 thru 3 using US EPA Reference Methods 1, 3A, 7E and 19. Montrose Air Quality Services, LLC of Royal Oak, MI 48073 conducted the NO_x sampling (Document Number: 049AS-569030-RT-22R0, Test Dates: March 27-28, 2019 (EUBOILER1, EUBOILER2 & EUBOILER2), Test Plan: 049AS-569030 dated 2/25/2019). The RATA (Relative Accuracy Test Audit) testing was conducted to satisfy the requirements of Performance Specification 16, 40 CFR, Part 60, Appendix B (PS-16, "Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources') based upon three 30-minute test runs at normal load conditions while combusting pipeline quality sweet natural gas. The purpose of this test was to conduct the Annual QA RATA for the PEMS associated with Boilers No. 1, 2, and 3. Ten (10) RA runs, at each boiler, were performed during Normal Load conditions in accordance with PS-16 to determine the RATA between the PEMS and the applicable RMs. Concerning Boiler Nos. 1-3, respectively, RATA NO_x (in pounds of NO_x per MM BTU heat input) were: 0.00026 (EUBOILER1, 3/28/2019), 0.00166 (EUBOILER2, 3/27/2019) and 0.00140 (EUBOILER3, 3/27/2019).

On or about, September 30, 2021, AQD received (PDF copy via E-mail) NO_x (pounds per MM BTU) RAA, 2020 Relative Accuracy Audit) results for Boiler Nos. 1 thru 3 using US EPA Reference Methods 1, 3A, 7E and 19. Montrose Air Quality Services, LLC of Royal Oak, MI 48073 conducted the NO_x sampling (Document Number: MW049AS-004027-RT-558, Test Date: November 24, 2020 (EUBOILER1, EUBOILER2 & EUBOILER2), Submittal Date: December 16, 2020). The RATA (Relative Accuracy Test Audit) testing was conducted to satisfy the requirements of Performance Specification 16, 40 CFR, Part 60, Appendix B (PS-16, "Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources') based upon three 30-minute test runs at normal load conditions while combusting pipeline quality sweet natural gas. The purpose of this test was to conduct the Annual Relative Accuracy Audit (RAA) for the PEMS associated with Boilers No. 1, 2, and 3. Ten (10) RA runs, at each boiler, were performed during Normal Load conditions in accordance with PS-16 to determine the RATA between the PEMS and the applicable RMs. Concerning Boiler Nos. 1-3, respectively, RAA NO_x (in pounds of NO_x per MM BTU heat input) were: -5.9 (EUBOILER1, November 24, 2020, -5.8 ppmvd), -1.7 (EUBOILER2,

November 24, 2020, -3.4 ppmvd) and -9.0 (EUBOILER3, November 24, 2020, -7.7 ppmvd). All RAA < ± 20%.

On or about, September 30, 2021, AQD received (PDF copy via E-mail) NO_x (pounds per MM BTU) RATA) results for Boiler Nos. 1 thru 3 using US EPA Reference Methods 1, 3A, 7E and 19. Montrose Air Quality Services, LLC of Royal Oak, MI 48073 conducted the NO_x sampling (Document Number: M049AS-006607-RT-703, Test Dates: May 11-12, 2021 (EUBOILER1 on 05/11/2021, EUBOILER2 on 05/11/2021 & EUBOILER2 on 05/12/2021), Submittal Date: May 26, 2021). The RATA (Relative Accuracy Test Audit) testing was conducted to satisfy the requirements of Performance Specification 16, 40 CFR, Part 60, Appendix B (PS-16, "Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources') based upon three 30-minute test runs at normal load conditions while combusting pipeline quality sweet natural gas. The purpose of this test was to conduct the Annual QA RATA for the PEMS associated with Boilers No. 1, 2, and 3. Ten (10) RA runs, at each boiler, were performed during Normal Load conditions in accordance with PS-16 to determine the RATA between the PEMS and the applicable RMs. Concerning Boiler Nos. 1-3, respectively, RA NO_x (in pounds of NO_x per MM BTU heat input) were: 6.21 (EUBOILER1, May 11, 2021, 6.38 ppmvd), 4.18 (EUBOILER2, May 11, 2021, 8.77 ppmvd) and 7.41 (EUBOILER3, May 12, 2021, 8.49 ppmvd). All RA < ± 20%. RM CEMS Information: Thermo Electron Model No. 42i HL and Serial No. 631018883 with NO_x range 0-89 ppmv.

GM Tech submitted 2021 RATA test plan for NO_x via ROP Report Certification dated April 09, 2021, for Boiler1-107 thru Boiler3-107. Tester is Montrose Air Quality Services, LLC of Royal Oak, MI 48073 (Document Number: M049AS-006607-PP-321, Proposed Test Dates: May 11-12, 2021)

NSPS Db Boilers PEMS Info: Concerning Boiler Nos. 1 thru 3, Manufacturer: CMC Solutions, Model No. SmartCEMS-60™ Analyzer, Serial Nos . GMBL122041 for O₂ & GMBL122042 for NO_x.

Not Subject to (cold-cleaners): NESHAP/ MACT T, area source National Emission Standards for Hazardous Air Pollutants: Halogenated Solvent Cleaning (40 CFR, Part 63, Subpart T; NESHAP/ MACT T); Correction; 29484 Federal Register / Vol. 60, No. 107 / Monday, June 5, 1995 / Rules and Regulations; amended National Air Emission Standards for Hazardous Air Pollutants: Halogenated Solvent Cleaning (40 CFR, Part 63, Subpart T); Final Rule; Page 25138 Federal Register / Vol. 72, No. 85 / Thursday, May 3, 2007 / Rules and Regulations. GM does NOT use the MACT T listed halogenated HAP solvents (>5%w: methylene chloride (CAS No. 75-09-2), perchloroethylene (CAS No. 127-18-4), trichloroethylene (CAS No. 79-01-6), 1,1,1-trichloroethane (CAS No. 71-55-6), carbon tetrachloride (CAS No. 56-23-5), and chloroform (CAS No. 67-66-3)) in the cold-cleaners. While only 8 cold-cleaners are in use, total 29 cold-cleaners are present. About 6 aqueous parts cleaners are present.

Subject to Major Source Boiler MACT 5D (until removed from ROP due to the repeal of OIAIP and then Area Source MACT 6J) (reconsidered [2011] MACT 5D: Annual Tune-up or Pentennial / Quinquennial (1/5Yr) Tune-up if boiler is equipped with oxygen trim system, one time Energy Assessment (EA) or ISO 50001): Major Source Boiler NESHAP / MACT 5D, 40 CFR Part 63, Subpart DDDDD, National Emission

Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, Page 7138, Federal Register / Vol. 78, No. 21 / Thursday, January 31, 2013 / Rules and Regulations / Final rule; notice of final action on reconsideration. GM's new natural gas boilers (3: EUNewBoiler1-3, 108 MM BTU per hour heat input), which replaced dual fuel boilers (Boiler Nos. 1-6) that have been removed by January 2018, are equipped with Oxygen Trim Systems. An Oxygen Trim System is system of monitors that is used to maintain excess air (EA) at the desired level in a combustion device. A typical system consists of a flue gas analyzer for oxygen (O₂) and / or carbon monoxide (CO) and a feedback signal to the combustion controller. In other words, an Oxygen Trim System is designed to continuously measure and maintain optimum air-to-fuel ratio in the combustion zone. If such system exists, annual tune-up is not required; however, pentennial / quinquennial (1/5Yr) tune-up is required. GM does not follow ISO 50001, Energy Management System for continuous improvement of energy performance, energy efficiency, energy consumption and for reduction of energy use, energy costs, greenhouse gas emissions (GHG), etc. If ISO 50001 is followed properly, one-time energy assessment (EA) is not required. Hence, GM performed one-time Energy Assessment (EA): Burns McDonnell Boiler MACT 5D Energy Assessment dated August 2015. However, GM replaced old dual fuel boilers with new low NO_x natural gas fired boilers (3: EUNewBoiler1-3, 108 MM BTU per hour heat input, each).

NSPS 4J: Natural gas fired emergency generators are subject to (73 FR 3591, January 18, 2008, 76 FR 37972 June 28, 2011, 78 FR 6697 January 30, 2013): NSPS 4J, 40 CFR, Part 60, Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (natural gas fired Spark Ignition). The provisions of NSPS 4J are applicable to owners and operators and manufacturers. Owners or operators of Emergency SI RICE are subject to this NSPS 4J if engine is manufactured after January 1, 2009, emergency engines greater than 19 kW (25 HP) engine power. The standard requires certified engine (if not testing for emissions) and maintenance (change oil and filters annually, check hoses, etc.).

On June 15, 2021, I conducted a level-2 **FY2021 ROP CMS scheduled inspection (on-site)** of General Motors, LLC - Warren Technical Center (B4049) ("GM" or "Tech Center"), located at 31295 Charles Kettering, Warren, Michigan 48092 (previously, 6250 Chicago Road, Warren, Michigan 48090-9005). The inspection was conducted 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; Michigan Department of Environment, Great Lakes and Energy, Air Quality Division (EGLE-AQD) administrative rules; and ROP No. MI-ROP-B4049-2019.

During the inspection, Ms. Marianne Secrest (Cell: 248-535-5032; E-mail: Marianne.Secrest@GM.com; Mail Code: 480-101-240), Environmental Engineer, Warren Tech Center, Facilities Operations, and assisted me. Also present was Ms. Lisa M. Parks (Cell: 248-410-2591; E-mail: Lisa.Parks@GM.com), CHMM, Site Environmental Supervisor, GM Global Technical Center. Also participated from the corporate side Jessica Alderton (Phone 586-863-8490; E-mail: Jessica.Alderton@GM.com), Environmental Engineer, Josh Hager (Phone 586-606-7953; E-mail: Josh.Hager@GM.com), Sr. Community Leader.

Also, Ms. Sandra K. Spires (Phone: 586-986-8225; Cell: 586-596-4344; E-mail: Sandr.Spires@GM.com; Mail Code: 480-106-RA3), Global Operations Manager, Mr. Dave

Sandzik (Cell: 248-343-7321; Email: Dave.Sandzik@gm.com), VVO Paint Shop, Mr. Stephen Hill (Cell: 586-942-0103; E-mail: Stephen.T.Hill@gm.com), VVO Paint Shop, Mr. Jeff Bradsher (Cell: 586-709-2506; E-mail: Jeff.Bradsher@gm.com), Manufacturing B – Paint Shop, assisted me, previously.

General Motors LLC owns and operates the Warren Technical Center, occupying several buildings bounded by Mound Road and Van Dyke Avenue, and 12-Mile Road and Chicago Road. GM Tech Center, 710-acre tech campus with about four man-made lakes filled with municipal water, is heart of engineering since its inauguration in 1956. The GM Tech complex also occupies buildings at the south side of 12-Mile Road and Lorna Street. GM Technical Center conducts research on all aspects of automobile development and production, including design, engineering and manufacturing. This facility operates a powerhouse that provides process steam and space heating at the Technical Center complex. It also operates an IT Center that has several emergency diesel engine electric generators to provide power during an outage. GM Tech Center employs about 22,000 employees.

Current active ROP is MI-ROP-B4049-2019 dated October 16, 2019.

The following is emission units summary:

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU-VVO	Vehicle Validation operation located at Building 205. Validates both the equipment that will be used in actual assembly line and the operating parameters of the equipment. Miscellaneous solvents are used for wiping, purging, and associated cleaning activities. The process includes conventional body shop equipment, cleaning, coating, curing, and assembly. One paint spray booth installed.	07-11-2005	NA
VVO is located in CCO building. About December 2016, GM removed R&D Dynos (EU-RDDYNO2-6, EU-RDDYNO16, EU-ETS106 & EU-ETS102). All dynos (grandfathered and permitted) are now located at GM Pontiac Engineering Center (PEC)			
EU-COLDCLNR	New cold solvent cleaners exempt from Rule 201 pursuant to Rule 278 and Rule 281(2)(h) or Rule 285(2)(r) (iv).	After 07-01-1979	FG-COLDCLNRS
About 25 cold-cleaners are present.			
EU-GTCL3	2,500 gallon gasoline UST 3, dispensing to chassis dynamometers; Building 105.	01-01-1998	FG-GASTANKS
EU-GTCL4	2,500 gallon gasoline UST 4, dispensing to chassis dynamometers; Building 105.	01-01-1998	FG-GASTANKS
EU-GTCL5		01-01-1998	FG-GASTANKS

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
	5,000 gallon salvage fuel UST 5; located at Building 105.		
	About November 2016, as dynos either moved to GM PEC or dismantled, the gasoline storage tanks as listed in the previous ROP have been either removed or emptied, disconnected and purged. ALL 3 (EU-GTCL3 thru 5) tanks removed early 2020 while they were decommissioned Dec 2019.		
EU-WOODSHOP	Wood machining units.	After 08-15-1967	FG-WOODMETAL
	About 103 wood machining units are present		
EU-GRINDER	Machining/grinding/ sanding operations.	After 08/15/1967	FG-WOODMETAL
	About 11 machining/grinding/sanding operations units are present.		
EU-BLASTER	Sandblasters/shotblasters.	After 08-15-1967	FG-WOODMETAL
EU-R287-BLDG101	One coating line (Maintenance/Site Operations) located in Building 101. Subject to Part 6 and 7 Rules.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG108	One coating line (Coatings Lab) located in Building 108. Emissions from the Coatings Lab are controlled by downdraft water wash system.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG113	Nine (9) coating/paint spray booths (Nos. 36, 37, 41, 42, 43, 44, 45, Plaster 12/Parting, and Plaster12/Paint) located in Building 113. Particulate emissions are controlled using dry filters.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG105	One coating/paint spray booth (Garage) located in Building 105.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG109	Two (2) coating/paint spray booths (DQ&V/IAH13 and GAC Lab Weld) located in Building 109.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG 111	One coating/paint spray booth (West Shop) located in Building 111.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG114	One coating/paint spray booth (Refinish L3 Body) located in Building 114.	01-01-1970/ 01/01-2000	FG-RULE287C
EU-R287-BLDG204	One coating/paint spray booth (Refinish L3 Body) located in Building 204. Subject to Part 6 and 7 Rules.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG207	Two coating/paint spray booths (Engine Cut Away and Stress Coat/L502) located in Building 207.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG208	One coating/paint spray booth (Performance Garage) located in Building 208.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG210	One coating/paint spray booth (West/Truck Mockup) located in Building 210 (West).	01-01-1970/ 01-01-2000	FG-RULE287C
EU-R287-BLDG301	One coating/paint spray booth (Spray Booth and Floor) located in Building	01-01-1970/ 01-01-2000	FG-RULE287C

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
	301. Coatings are applied using aerosol cans.		
EU-R287-BLDG106	One coating/paint sprays booth (RML Foundry) located in Building 106.	01-01-1970/ 01-01-2000	FG-RULE287C
EU-PS302	Gas tank purge system located at Building 302.	12-31-1999	FG-RULE290
EU-PS111	Gas tank purge system located at Building 111.	01-01-1990	FG-RULE290
EU-EMGEN101	One natural gas-fueled, 530 HP emergency generator engine manufactured by Cummins and located at Building 101.	04-2017	FG-SUBPARTJJJ
	Cummins, Inc., US EPA Cert. No. HCEXB19.0ENA-016 for Engine Family HCEXB19.0ENA Effective 12/14/2016		
EU-EMGEN102	One gasoline-fueled, 114 HP emergency generator engine manufactured by Onan and located at Building 102.	Estimated 1977	FG-RICEMACT
EU-EMGEN106.1	One diesel-fueled, 685 HP, 511 kW, <10 L/cylinder displacement emergency generator engine manufactured by Detroit Diesel and located at Building 106.	06-2007	FG-SUBPARTIII
EU-EMGEN106.2	One diesel-fueled, 600 HP, 448 kW, <10 L/cylinder displacement emergency generator engine manufactured by MTU and located at Building 106.	02-2016	FG-SUBPARTIII
EU-EMGEN107	60kW (80.5 HP) natural gas-fired spark ignited emergency generator and located at Building 107.	03-2017	NA
	Cummins, Inc., US EPA Cert. No. GCEXB06.8GDC-002 for Engine Family GCEXB06.8GDC Effective 09/03/2015		
EU-EMGEN108	One natural gas-fueled, 691 HP, 515 kW emergency generator engine manufactured by Caterpillar and located at Building 108.	Mfg. Date: 10-2008	FG-SUBPARTJJJ
EU-EMGEN115	One diesel-fueled, 130 HP emergency generator engine manufactured by Detroit Diesel and located at Building 115.	1997	FG-RICEMACT
EU-ENGINE7000BLDG202	One 1,099 kW, 1,474 bhp, diesel-fueled emergency engine manufactured in 2012 and located at Building 202.	05-16-2013	NA
EU-EMGEN202.2	One diesel-fueled, 1495 HP, 1115 kW, <10 L/cylinder displacement emergency generator engine manufactured by MTU Detroit Diesel and located at Building 202.	Install Date: 2008	FG-SUBPARTIII
EU-EMGEN202.3	One diesel-fueled, 1495 HP, 1115 kW, <10 L/cylinder displacement	Mfg. Date: 2000	FG-RICEMACT

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU-EMGEN202.4	emergency generator engine manufactured by Detroit Diesel and located at Building 202. One natural gas-fueled, 671 HP, 500 kW emergency generator engine manufactured by Onan-Cummins and located at Building 202.	Mfg. Date: 03-2004	FG-RICEMACT
EU-EMGEN202.5	One diesel-fueled, 630 HP, 1115 kW, <10 L/cylinder displacement emergency generator engine manufactured by Detroit Diesel and located at Building 202.	Estimated: 1986	FG-RICEMACT
EU-GENERATOR1	Diesel-fueled emergency generator engine, Model year 2012, 2710 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR). No add-on control. Located at Building 206.	Mfg. Date: 2011 Install Date: 11-2012	FG- BACKUPGENSBLD206
EU-GENERATOR2	Diesel-fueled emergency generator engine, Model year 2012, 2710 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR). No add-on control. Located at Building 206.	Mfg. Date: 2011 Install Date: 11-2012	FG- BACKUPGENSBLD206
EU-GENERATOR3	Diesel-fueled emergency generator engine, Model year 2014 and greater, 2710 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR). No add-on control. Located at Building 206.	Mfg. Date: 2015 Install Date: 02-2016	FG- BACKUPGENSBLD206
EU-GENERATOR4	Diesel-fueled emergency generator engine, Model year 2014 and greater, 2710 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR). No add-on control. Located at Building 206.	Mfg. Date: 2015 Install Date: 02-2016	FG- BACKUPGENSBLD206
EU-DRUPS1	Diesel-fueled emergency generator engine, Model year 2011, 3490 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206.	Mfg. Date: 12-2011 Install Date: 11-2012	FG- BACKUPGENSBLD206
EU-DRUPS2	Diesel-fueled emergency generator engine, Model year 2011, 3490 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206.	Mfg. Date: 08-2012 Install Date: 05-2013	FG- BACKUPGENSBLD206
EU-DRUPS3	Diesel-fueled emergency generator engine, Model year 2012, 3490 kW	Mfg. Date: 03-2015	FG- BACKUPGENSBLD206

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU-DRUPS4	and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206. Diesel-fueled emergency generator engine, Model year 2012, 3490 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206.	Install Date: 02-2016 Mfg. Date: 12-2011 Install Date: 11-2012	FG- BACKUPGENSBLD206
EU-DRUPS5	Diesel-fueled emergency generator engine, Model year 2014 and greater, 3490 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206.	Mfg. Date: 08-2012 Install Date: 05-2013	FG- BACKUPGENSBLD206
EU-DRUPS6	Diesel-fueled emergency generator engine, Model year 2014 and greater, 3490 kW and displacement <10 liters per cylinder, designed with injection timing retardation (ITR), part of a DRUPs system. No add-on control. Located at Building 206.	Mfg. Date: 03-2015 Install Date: 02-2016	FG- BACKUPGENSBLD206
EU-EMGEN207	One natural gas-fired, 132 HP emergency generator engine manufactured by Cummins and located at Building 207.	05-2019	FG-SUBPARTJJJJ
EU-EMGEN210.1	A 2000 kW, 2682 HP, diesel-fueled emergency engine manufactured in 2001. Located at Building 210. (This engine is an "affected source" under NESHAP ZZZZ but has no requirements if it is operated as an emergency engine per 40 CFR 63.6590(b)(3)(iii)).	2001	FG- GENERATORSBLDG210
EU-EMGEN210.2	A 2000 kW, 2682 HP, diesel-fueled emergency engine manufactured in 2001. Located at Building 210. (This engine is an "affected source" under NESHAP ZZZZ but has no requirements if it is operated as an emergency engine per 40 CFR 63.6590(b)(3)(iii)).	2001	FG- GENERATORSBLDG210
EU-EMGEN207	One diesel-fueled, 268 HP emergency generator engine manufactured by Detroit Diesel and located at Building 207.	Estimated: 1999	FG-RICEMACT
EU-EMGEN210.3	One diesel-fueled, 1502 HP emergency generator engine manufactured by Detroit Diesel and located at Building 210.	Mfg. Date: 06-2002 Install Date: 2002	FG-RICEMACT

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU-EMGEN219	One diesel-fueled, 69 HP, 51 kW, <10 L/cylinder displacement emergency generator engine manufactured by Cummins and located at Building 219. (This engine is an "affected source" under NESHAP ZZZZ but has no requirements per 40 CFR 63.6590(c) (7)).	Install Date: 08-2017	FG-SUBPARTIII
EU-EMGEN501.2	One diesel-fueled, 680 HP, 507 kW emergency engine with <10 L/cylinder displacement, manufactured by Cummins and located at Building 501.	Mfg. Date: 07-2015 Install Date: 05-2015	FG-SUBPARTIII
EU-EMGEN501.3	One diesel-fueled, 755 HP emergency generator engine with <10 L/cylinder displacement, manufactured by Cummins and located at Building 501.	02-16-2019	FG-SUBPARTIII
EU-EMGEN129	One natural gas-fueled, 125 kW emergency generator engine manufactured by Cummins.	Mfg. Date: 02-2018 Install Date: 07-2018	FG-SUBPARTJJJ
EU-EMGEN221	One natural gas-fueled, 150 kW emergency generator engine manufactured by Cummins.	Mfg. Date: 09-2017 Install Date: 07-2018	FG-SUBPARTJJJ
EU-BOILER1CL	Climatic Boiler 1 is an existing natural gas-fired with rated capacity of 12.5 MMBtu/hour.	09-14-1998	FG-BOILERSCL FG-BOILERMACT
EU-BOILER2CL	Climatic Boiler 2 is an existing natural gas-fired with rated capacity of 12.5 MMBtu/hour.	09-15-1998	FG-BOILERSCL FG-BOILERMACT
EU-Boiler1-107	Natural gas-fired boiler with a maximum nameplate heat input capacity of 108 MMBtu/hour, low NOx burner, and flue gas recirculation.	11-07-2017	FG-BOILERSBLDG107
EU-Boiler2-107	Natural gas-fired boiler with a maximum nameplate heat input capacity of 108 MMBtu/hour, low NOx burner, and flue gas recirculation.	10-20-2017	FG-BOILERSBLDG107
EU-Boiler3-107	Natural gas-fired boiler with a maximum nameplate heat input capacity of 108 MMBtu/hour low NOx burner, and flue gas recirculation.	09-27-2017	FG-BOILERSBLDG107
EU-MISCBOIL7000 (1-3)	Three natural gas-fired boilers each with a rated heat input capacity of 3.3 MMBtu/hour and located in building 202.	10-01-2018	FG-BOILERMACT
EU-MISCBOILGAE (1-2)	Two natural gas-fired boilers each with a rated heat input capacity of 2.36	10-18-2017	FG-BOILERMACT

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EU-MISCBOILMTS (1-2)	MMBtu/hour and located in building 203. Two natural gas-fired boilers each with a rated heat input capacity of 6 MMBtu/hour and located in building 301.	2012	FG-BOILERMACT

MI-ROP-B4049-2019, EU-VVO (Vehicle Validation Operation) aka Preproduction North Bldg. 205

PTI No. 127-04 dated September 7, 2004. CCO Building 205.

Vehicle Validation Operation (VVO) located at CCO (Chevy Central Office or Pre-production Body Center North) Building 205. GM Tech validates both the equipment that will be used in actual assembly line and the operating parameters of the equipment. Miscellaneous solvents are used for wiping, purging, and associated cleaning activities. Process includes conventional body shop equipment, cleaning, coating, curing, and assembly. One paint spray booth is installed. Paint overspray particulate emissions are controlled by a back-draft dry filter system.

Emission source is primarily the assembly-plant-size coating line, which includes the paint spray booth, a phosphate application line, an oven, and a flash off tunnel. There is only one booth used for prime coat, topcoat and clearcoat. After priming, the vehicle body is transferred to an oven and goes back to the booth for application of topcoat and clearcoat, if needed. Most of the time (>90%), the vehicle bodies are just primed. The vehicle bodies are coated with low gloss gray primer to prevent reflection so that the high-speed cameras can record the crash dummies during crash testing. The vehicle bodies are coated with white primer to locate where the stress points are.

Particulate emissions from the paint spray booth are controlled by back-draft dry filters. N-Butyl Acetate (CAS # 123-86-4, C₆H₁₂O₂, BP = 126.1 °C (259.0 °F; 399.2 K) at 760 mmHg) is used as reducer. Recycled solvents are used for purge and cleanup. HVLP spray guns (Model SATA Jet 5000) are used. Paint usage is estimated from production. The number of full auto bodies coated are counted and multiplied by an emission factor that was derived from measuring a typical amount of coating used per auto body. Emission factor depends on the coating used. Body panels count as a fraction of a full body. The supervisor for this area Dave Sandzik is responsible for monitoring paint usage (number of auto bodies coated).

Number of operating days is recorded. Facility keeps a list of the VOC content of the coating, reducer and purge/cleanup solvents.

Three (3) Magneheilic pressure differential gauges for pressure drop across filters are present: North & South for paint overspray and Ceiling for intake air. Three bake ovens are present: Oven A (325 °F, Primer), Oven B (295 °F, Second Primer), Oven C (265 °F, Topcoat BC & CC). Sealers are used as well.

All painting is manual. Painted vehicles are not sold but sent to Milford Proving Grounds for testing. Or scrapped.

There is another vehicle validation operation located at the General Services Bldg. There is no paint spray booth installed at that GS building. Spray cans may be used at GS building (Rule 287(2)(b))

Dec 2019: 82 gallons coatings per month, with associated 363.4 pounds of VOC, were used. Average VOC content = $363.4 / 82.5 = 4.40$ pounds of VOC per gallon of coating. $363.4 / 15$ operating days = **24** pounds of VOC per day emitted based upon an average of 15 operating days (MI-ROP-B4049-2019, EU-VVO.I.1 limit: 400 pounds per day)

CY 2019: 1,664 gallons per year were used. **3.6** tons of VOC per year were emitted (MI-ROP-B4049-2019, EU-VVO.I.2 limit: 36 tons per year).

Dec 2020: 104 gallons coatings per month, with associated 451 pounds of VOC, were used. Average VOC content = $451 / 104 = 4.31$ pounds of VOC per gallon of coating. $451 / 17$ operating days = **26.5** pounds of VOC per day emitted based upon an average of 17 operating days (MI-ROP-B4049-2019, EU-VVO.I.1 limit: 400 pounds per day)

CY 2020: 414 gallons per year were used. **0.92** tons of VOC per year were emitted (MI-ROP-B4049-2019, EU-VVO.I.2 limit: 36 tons per year).

The coating data was provided by David Sandzik, Nickolus Kekhoua, Marcus M Marek

Filters were installed properly. (MI-ROP-B4049-2019, EU-VVO.IV: filters) ...

GM-specific SDS VOC content information is used (MI-ROP-B4049-2019, EU-VVO.IV: Testing).

Daily, monthly, annual VOC emissions information is kept (MI-ROP-B4049-2019, EU-VVO.IV: Recordkeeping).

Emergency generators

NSPS 4I requires:

1. Non-resettable hours-meter. See the readings.
2. Ultra-Low Sulfur Diesel (ULSD 15 ppm S) Diesel only. Generally, ULSD is only fuel available in the market for economic reasons.
3. 500 hours per year for emergency generator: Only annual testing is performed.

4. 100 hours per year for maintenance and testing: Only annual testing is performed.
5. US EPA certificate: As stated, AQD received US EPA NSPS 4I Certificates for all NSPS 4I (CI) and NSPS 4J (SI) RICE engines.
6. Operate in accordance with manufacturer recommendations.

Reminder - Emergency Engine Electronic Reports due March 31, 2016. Owners of emergency engines > 100 HP operated or contractually obligated to be available >15 hours/year for emergency demand response or voltage or frequency deviations, or operated for local reliability must submit an annual report electronically through the Compliance and Emissions Data Reporting Interface (CEDRI) accessed through EPA's Central Data Exchange at <http://www.epa.gov/cdx>. The annual report must cover a range of information on 2015 operations as specified in CEDRI. For CEDRI help you may contact CEDRI@epa.gov.

GM has **not** entered into any contractual agreement with a local utility, DTE. Hence, reporting to CEDRI is not required.

PTI Exemption - CI RICE Engines

Fuel usage for Caterpillar Generators is as follows:

1500 kW ≈ 105 gallons per hour diesel (DMC)
1050 kW ≈ 74 gallons per hour diesel
750 kW ≈ 55 gallons per hour diesel
600 kW ≈ 46 gallons per hour diesel
300 kW ≈ 28 gallons per hour diesel

Based upon the above information, assuming 1 MW generator consumes 75 gallons of diesel per hour, knowing 138,000 BTU per gallon of diesel, heat input of 1 MW generator is 10.4 million BTU per hour. Hence, a diesel generator up to 1 MW is exempt from Rule 336.1201 (Permit-to-Install) pursuant to Rule 336.1285(2)(g). It may be noted that some engines convert heat to work more efficiently than others. Recent engine designs have efficiencies up to 40% for heat to shaft work conversion. Converting work to electricity is up to 95% efficient.

RICE MACT 4Z

Emergency generators may be subject to Area Source NESHAP / MACT ZZZZ or 4 Z, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines; New Source Performance Standards for Stationary Internal Combustion Engines / Final rule (Page 6674 Federal Register / Vol. 78, No. 20 / Wednesday, January 30, 2013 / Rules and Regulations / Final rule.). AQD has no delegation of these standards and therefore no attempt has been made to evaluate the

Denso's compliance with NESHAP / MACT 4 Z. Compliance with NSPS 4I is deemed compliance with MACT 4Z.

RICE MACT 4Z requirements may be summarized as:

1. Change oil and filter: every 500 hours of operation or annually whichever occurs first. GM performs oil sampling and analysis as well.
2. Inspect air cleaner: every 1,000 hours of operation or annually whichever occurs first.
3. Inspect all hoses: every 500 hours of operation or annually whichever occurs first.
4. Operate / maintain engine and control devices according to manufacturer's recommendation
5. Install non-resettable hours meter and maintain records
6. Keep maintenance records
7. Notification not required

Emergency engines:

1. 100 hours per year for maintenance checks and readiness testing
2. 50 hours per year for non-emergency (non-income generating)
3. No hours limit for genuine emergency

GM performs annual maintenance (check oil, filters, hoses, etc.) for both CI and SI engines. Previously, GM also performed oil testing to determine if oil replacement is necessary. GM quit oil testing about the end of 2018. Instead engine oil will be replaced with virgin oil.

MI-ROP-B4049-2019, EU-ENGINE7000BLDG202 (FG-RICEMACT)

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1,099 kW kilowatts (kW) or 1.1 MW (1,474 BHP) diesel-fueled emergency engine manufactured in 2012 located at 7000 North Bldg. 202. This 1.1 MW SI RICE engine is certified pursuant to NSPS 4I. NSPS 4I = Yes.

There are five (5) generators in all in this building; 4 of 5 are not permitted and are covered by other FGs.

Caterpillar Engine Model and Serial Nos.: 1000SC2 & CAT00C32EJAZ00403.

Caterpillar Generator Model and Serial Nos.: PRH03237 & 3597340 10.

Manufacture date: 2013. Installation date: June 2013

Only 15 ppm sulfur ultra-low sulfur diesel (15 ppm S ULSD) is fired in CI RICE engines (MI-ROP-B4049-2019, EU-ENGINE7000BLDG202.II.1: only 15 ppm S diesel fuel)

1502 HP, 1.12 MW SI RICE engine Caterpillar Model (Model Year 2012, Manufactured 2013) CCPXL32.0NZS located 7000 Building 202 North is certified: CCPXL32.0NZS-20 Effective 09/02/2011 Expire 12/31/2012 (MI-ROP-B4049-2014a, EU-ENGINE7000BLDG202.III.3 & V: NSPS 4I certified engine, testing not required as engine is certified and operated accordingly).

4,695 gallons of ULSD used in CY 2017. Hours-meter readings: Jan 2017 = 62, Dec 2017 = 93 and July 2018 = 97.2 and Dec 2019 = 110.7 hours, Jan 2020 = 111, Dec 2020 = 118. Hours operated based upon hours-meter readings: CY2016 = 5.2, CY2017 = 31.3, YTD-July 2018 = 3.8 hours CY2019 = 7.6, CY2020 = 7.3 (MI-ROP-B4049-2019, EU-ENGINE7000BLDG202.III.1, 2, IV.1 & VI.3,4).

MI-ROP-B4049-2014a, FG-RDDYNOS (EU-RDDYNO2, EU-RDDYNO3, EU-RDDYNO4, EU-RDDYNO5, EU-RDDYNO6, EU-RDDYNO16)

PTI No. 96-04 dated October 28, 2004, for Dynamometer Test Cells used for Research and Development. **All these dynos were removed about 2017**

MI-ROP-B4049-2014a, FG-EXMPTDYNOS (EU-ETS106, EU-ETS102)

About December 2016, 13 Grandfathered (< August 15, 1967) and 6 permitted dynos were removed from REL Building and some dynos relocated to GM Pontiac North Campus (currently known as GM Pontiac Engineering Center (PEC). REL Building is now used for storage. These exempt dynos were in the same building as FG-RDDYNOS

Flexible Groups

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG-COLDCLNRS	Any cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278, Rule 278a and Rule 281(2)(h) or Rule 285(2)(r)(iv). Existing cold cleaners were placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.	EU-COLDCLNR

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG-GASTANKS	Gasoline storage tanks dispensing to either engine dynamometers, or motor vehicles which are exempt from the requirements of R 336.1201 pursuant to R 336.1284(2)(g), but subject to the requirements of R 336.1703	EU-GTCL3, EU-GTCL4, EU-GTCL5
GTCL tanks removed in early 2020.		
FG-WOODMETAL	Wood and metal machining operations exempt from the requirements of R 336.1201 pursuant to R 336.1285(2)(l) (vi), but subject to the requirements of R 336.1331. The number of wood and metal machining units constantly varies depending on project needs.	EU-WOODSHOP, EU-GRINDER, EU-BLASTER
FG-RULE287C	Any emission unit that emits air contaminants and is exempt from the requirements of Rule 201 pursuant to Rule 278, Rule 278a and Rule 287(2)(c). Emission units installed/modified before December 20, 2016, may show compliance with Rule 287 in effect at the time of installation/modification.	EU-R287-BLDG101, EU-R287-BLDG108, EU-R287-BLDG113, EU-R287-BLDG105, EU-R287-BLDG109, EU-R287-BLDG111, EU-R287-BLDG114, EU-R287-BLDG204, EU-R287-BLDG207, EU-R287-BLDG208, EU-R287-BLDG210, EU-R287-BLDG301, EU-R287-BLDG106
FG-RULE290	Any emission unit that emits air contaminants and is exempt from the requirements of Rule 201 pursuant to Rules 278 and 290. Emission units installed/modified before December 20, 2016, may show compliance with Rule 290 in effect at the time of installation/modification.	EU-PS302, EU-PS111
FG-GENERATORSBLDG210	Two 2,000 kW diesel-fueled emergency generators manufactured in 2001.	EU-EMGEN210.1, EU-EMGEN210.2
FG-BACKUPGENSBLD206	Ten (10) diesel-fueled emergency generator engines. All engines are designed to operate with injection timing retardation (ITR) for the purpose of exhaust emissions optimization. All engines are subject to NSPS IIII and NESHAP ZZZZ.	EU-DRUPS1, EU-DRUPS2, EU-DRUPS3, EU-DRUPS4, EU-DRUPS5, EU-DRUPS6, EU-GENERATOR1, EU-GENERATOR2, EU-GENERATOR3, EU-GENERATOR4
FG-RICEMACT	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) applicable to existing RICE less than 500 HP, existing RICE greater than 500 HP, and new RICE greater than 500 HP that commenced construction on or before July 11, 2005.	EU-EMGEN102, EU-EMGEN115, EU-EMGEN202.2, EU-EMGEN202.3, EU-EMGEN202.4, EU-EMGEN202.5, EU-EMGEN207, EU-EMGEN210.3
FG-SUBPARTIIII	New Source Performance Standards for Compression Ignition Internal Combustion	EU-EMGEN106.1, EU-EMGEN106.2, EU-

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG-SUBPARTJJJJ	Engines (CI ICE) applicable to emergency EMGEN202.2, EU-CI engines with <10 L/cylinder EMGEN219 displacement that were constructed EU-EMGEN501.2, EU-(ordered) after July 11, 2005 and EMGEN501.3 manufactured after April 1, 2006.	EMGEN202.2, EU-EMGEN219, EU-EMGEN501.2, EU-EMGEN501.3
FG-SUBPARTJJJJ	New Source Performance Standards for EU-EMGEN101, EU-Spark Ignition Internal Combustion Engines EMGEN108, (SI ICE) applicable to emergency SI EU-EMGEN129, EU-engines greater than or equal to 100 EMGEN207, horsepower (except gasoline or rich burn EU-EMGEN221 LPG) that were constructed (ordered) after June 12, 2006 and manufactured on or after January 1, 2009.	EU-EMGEN101, EU-EMGEN108, EU-EMGEN129, EU-EMGEN207, EU-EMGEN221
FG-BOILERSBLDG107	Three natural gas-fired boilers with a EU-Boiler1-107, EU-Boiler2-maximum nameplate heat input capacity of 107, 108 MMBtu-hr (subject to NSPS Db and EU-Boiler3-107 NESHAP DDDDD).	EU-Boiler1-107, EU-Boiler2-107, EU-Boiler3-107
FG-BOILERSCL	Natural gas-fired boilers used for creating EUBOILER1CL, climatic conditions to conduct physical EUBOILER2CL analysis of vehicles and its components. Boilers are also used to provide comfort heating.	EUBOILER1CL, EUBOILER2CL
FG-BOILERMACT	Natural gas-fired and dual fuel boilers and process heaters subject to 40 CFR 63, Subpart DDDDD. Unit designed to burn gas 1 subcategory includes any boiler or process heater that burns only natural gas, refinery gas, and/or other gas 1 fuels. Gaseous fuel boilers and process heaters that burn liquid fuel for periodic testing of liquid fuel, maintenance, or operator training, not to exceed a combined total of 48 hours during any calendar year, are included in this definition. Gaseous fuel boilers and process heaters that burn liquid fuel during periods of gas curtailment or gas supply interruptions of any duration are also included in this definition.	EUBOILER1CL, EUBOILER2CL, EU-MISCBOIL7000(1-3), EU-MISCBOILGAE(1-2), EU-MISCBOILMTS(1-2)

MI-ROP-B4049-2014a, FG-EXMPTDYNOS (EU-ETS106, EU-ETS102)

These exempt dynos were located in the same building as FG-RDDYNOS. **These dynos have been removed prior to 2017.**

MI-ROP-B4049-2019, FG-COLDCLNRS

Any cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278, Rule 278a and Rule 281(2)(h) or Rule 285(2)(r)(iv). Existing cold cleaners were placed into operation prior to July 1, 1979. New cold cleaners were placed into operation on or after July 1, 1979.

There are twenty-five (25) Crystal Clean parts cold cleaners with spray a brush and an associated solvent tank and about five (5) aqua cleaners.

EGLE decals, or its equivalent messages, for “cold-cleaner operating procedures” were posted. I asked the company to follow the common-sense work practice in the procedures.

The cold-cleaners are NOT Subject to: 40 CFR, Part 63, Subpart T, NESHAP/ MACT T, since solvents containing halogenated compounds are not used.

Crystal Clean 142 Mineral Spirits. Heritage-Crystal Clean, LLC of Elgin, IL 60123-9211 (E-mail: cc_ehs@crystal-clean.com; www.crystal-clean.com) SDS No. 915876

100% Petroleum Distillates CAS # 64742-47-8

100% VOC solvent. Flash Point (FP) = > 142.0 °F (> 61.1 °C) TCC (Tag Closed Cup). Auto Ignition = > 440 °F (> 226.67 °C). Boiling Point (BP) = > 366.8 °F (> 186 °C) @ 760 mm Hg. Vapor Pressure (VP) = 1 mm Hg at 68 °F. Specific Gravity (SG, Water = 1.0) = 0.78-0.81. Density (ρ) @ 68 °F = 6.9 pounds / gallon (0. 0.78-0.81 kg /L). Flammability range = 1 %v (LEL) – 6%v (UEL). Viscosity = 1.69 cSt (77 °F (25 °C))

Aqueous Cleaner

Mirachem M2750 Low Foam, Low Temperature Cleaner / Degreaser. Mirachem, LLC of Phoenix, Arizona 85063-4059.

Proprietary surfactant blend < 10%

Both aqueous and solvent cold-cleaners are serviced by Crystal Clean. GM keeps Cold Cleaner Inventory (Building ID, Dept., AQD ID, GM ID, Install date, etc.)

MI-ROP-B4049-2019, FG-GASTANKS (EU-GTCL3, EU-GTCL4, EU-GTCL5)

Removed: EU-GTCPCFV1, EU-GTCPCFV2, EU-GTCPCFV3, EU-GTRFB1, EU-GTRFB2, EU-GTRFB3, EU-GTRFB4, EU-GTRFB5, EU-GTRFB6, EU-GTRFB7, EU-GTRFB8)

Except EU-GTCL3 at CWT (Climatic Wind Tunnel), EU-GTCL4 at CWT and EU-GTCL5 for salvage fuel, all tanks have been removed. While EU-GTCL3, EU-GTCL4 are gas tanks, EU-GTCL5 is salvage fuel tank. In the previous ROP renewal, 28 exempt gasoline UST and AST were listed: 5 at Engineering, 3 at Climatic Wind Tunnel, 9 at Powertrain, 3 at Powertrain (for fleet vehicles), and 8 at Research Fuel Blend. The tanks at the Research Fuel Blend are located in an above ground vault. Since the grandfathered engine dynamometer test cells at Engineering and Powertrain have been removed, all gasoline storage tanks in the Engineering and Powertrain Building subject to this flexible group requirements have been drained of fuel, cleaned, purged and subsequently removed in July 2011.

Three (3) tanks are located outside CWT (Climatic Wind Tunnel) building. The salvage tank is emptied once in about 10 years. The 2,000-gallon salvage tank consists of two compartments: one 1,000-gallon compartment for diesel and one 1,000-gallon compartment

for gasoline. Outside CWT, two (2) 2,000-gallon gas tanks, two 1,000-gallon diesel tanks, one 2,000-gallon salvage tank, one 5,000-gallon holding/spill tank (water from WWT water and snow testing) are located.

A GM Tech technician observes vapor balance system connections when gasoline is delivered. Each gasoline tank is equipped with a submerged fill pipe. (MI-ROP-B409-2019, FG-GASTANKS, IV.1,2,3: submerged fill pipe and vapor balance).

EU-GTCL3 thru EU-GTCL5 have been decommissioned about December 2019 and they will be removed. GM Tech Center may install above ground tanks.

MI-ROP-B4049-2019, FG-WOODMETAL (EU-WOODSHOP, EU-GRINDER, EU-BLASTER)

Wood and metal machining operations exempt from the requirements of R 336.1201 pursuant to R 336.1285(2)(I)(vi), but subject to the requirements of R 336.1331. Number of wood and metal machining units constantly varies depending on project needs.

Metal shop exhausts all gases to in-plant environment.

In the woodshop at Design Center, all particulate matter is collected by dedicated capture systems and saw dust laden exhaust air is ducted via one common manifold to a dust collector system, consisting of three (3) cyclones and three (3) Farr baghouses, located outside the woodshop. Each dust collector consists of a cyclone (primary for large, high momentum particles due to larger mass) and Farr Dust Collector (Farr Company, Los Angeles, CA) baghouse (secondary for fine particles). For each dust collector, one cyclone and one baghouse are arranged in series. Each baghouse, and each cyclone as well, has its own dedicated hopper. The hoppers are inspected daily and emptied on as needed basis. The bags are inspected once in six months. (MI-ROP-B4049-2019, FG-WOODMETAL, I.1 & IV.1: 0.1 pounds of PM per 1,000 pounds of exhaust & proper operation of dust collectors).

MI-ROP-B4049-2019, FGRULE287C (EU-R287-BLDG101, EU-R287-BLDG108, EU-R287-BLDG113, EU-R287-BLDG105, EU-R287-BLDG109, EU-R287-BLDG111, EU-R287-BLDG114, EU-R287-BLDG204, EU-R287-BLDG207, EU-R287-BLDG208, EU-R287-BLDG210, EU-R287-BLDG301, EU-R287-BLDG106)

Pollutant	Limit	Time Period/ Operating Scenario	Equipment
1. VOC	2000 lbs/month	Calendar month	Each coating line, purge and clean-up operations in EU-R287-BLDG101 and EU-R287-BLDG204
2. VOC	10 tpy	12-month rolling time period as determined at the end of each calendar month	Each coating line, purge and clean-up operations in EU-R287-BLDG101 and EU-R287-BLDG204
3. VOC	30 tpy	12-month rolling time period as determined	All coating lines combined in FG-RULE287C

Pollutant	Limit	Time Period/ Operating Scenario	Equipment
		at the end of each calendar month	

Paint spray booths that are exempt under Rule 336.1287(2)(c) are installed in the following locations: Manufacturing A (Bldg. 109), Manufacturing B (Bldg. 108), Powertrain (Bldg. 207), Powertrain Emissions (Bldg. 208), Engineering South (Bldg. 111), Aero Lab (Bldg. 114), Climatic Wind Tunnel (Bldg. 105), Service Ops (Bldg. 204), Vehicle Engineering Center (VEC, Bldg. 210 West), Parts Fab (Bldg. 301), General Services 1 (Bldg. 302), R & D (Bldg. 106) and Design (Bldg.113).

A paint usage log is kept for each paint spray booth. Purge and cleanup solvents are collected in buckets and transferred to a hazardous waste drum. The gun cleaning station uses a little basin with solvent (not considered cold cleaners). Purge and cleanup solvent usage is not reported.

GM keeps filter inspection / replacement documentation for all booths that are using more than 100 gallons per year. Only the paint spray booths located in the Design Building, Manufacturing B Building (coating lab), and Service Ops Building use more than 100 gallons per year. (MI-ROP-B4049-2019, FGRULE287C, IV.1, VI.1.b: proper installation of filters, filter replacement documentation).

The following booths are installed in the Design Building: five large booths (Booth Nos. 36, 37, 42, 43, and 44), two small booths (Booth Nos. 41 and 45 – these booths are rarely used), and two booths used for plastering and resin casting. For the five large downdraft booths, floor dry filters are changed once a week; roof exhaust filters, twice a year. Aramark is the contractor that replaces all the filters. The log of filter change includes Booth No., date the filters were changed.

The two booths used for plastering and casting use a parting compound (release agent). A daily log is kept tracking parting compound usage. The usage is estimated based on the number of jobs.

All coatings are stored in the paint mix room. Hazardous waste is stored in drums at the paint mix room. Paint viscosity is carefully measured before it is sprayed. Spray guns use a disposable cup to hold the coating. As a result of using disposable cups, less purge and cleanup solvent are used. Air assisted HVLP spray guns are used. Established formulations which are used in the assembly plant are generally used. Cleanup solvents are recorded but not reported as part of Rule 287 records. Booth No. 36 and 37 are state of the art booths (excellent humidity control) and are typically used more than the other large booths

The coatings lab (located at Manufacturing B Bldg. used for painters training purposes) resembles a coating line at an assembly plant. Experiments (as well as painter training) are conducted to properly setup the robotic spray guns in the assembly line. The coating line paint overspray, like an assembly plant, is controlled by a downdraft water wash system.

July 2018, Mr. Jeff Bradsher of Manufacturing B stated that only two assembly plants have manual painting: Silao, Mexico, and Wentzville, MO.

Paint log sheets are sent to Marianne Secrest monthly. Paint usage record for each booth is kept. Based upon the logs (Paint Booth Log 2017) annual usage is less than 300 gallons per year. Coatings Lab booth used maximum coatings (515 gallons per year). (MI-ROP-B4049-2019, FGRULE287C, I.1 limit: coating usage < 200 gallons per month)

The maintenance paint spray booths at Site Operations and Service Ops (Service Technology) are subject to additional Part 6/7 rules pertaining to plastic and metal coatings (Design Bldg. maintenance paint spray booth has been removed). In accordance with Rule 621 and Rule 632, the facility is exempt from these rules if all of the following is not exceeded: VOC emissions of 2,000 pounds per line per month, 10 tons per line per year, and 30 tons per year for all metal and plastic parts coating lines. GM keeps separate emissions records to show that VOC emissions from these paint booths are within the limits, and thus exempt from Rule 621 and Rule 632. NOTE: Service Technology spray booth is used to repair corporate cars used by company executives.

CY 2019: Service Technology Building 204 emissions = 595.08 pounds of VOC per year. Site Operations Maintenance emissions = 0 pounds of VOC per year. (MI-ROP-B4049-2019, FGRULE287C, I.1-3 limits: VOC emissions < 2,000 pounds per month per line, 10 tons per year per line, 30 tons per year at GM Tech).

CY 2020: Annual coating usage in gallons: Eng South - Bldg 111 (Mark A. Taylor) = **8**, Aero Lab - Bldg 114 (Marc Fortier) = **1**, Serv Ops - Bldg 204 (Richard Michels) = **58**, PT Emis - Bldg 208 (Joseph Ciagala) = **0**, VEC - Bldg 210 (West) (Michele Kennedy, Aerosol Cans) = **22**, Parts Fab - Bldg 301 (Manual Pickup) = **0**, R&D - Bldg 106 (Nick Irish Aerosol Cans) = **0**, (MI-ROP-B4049-2019, FGRULE287C, I.1-3 limits: VOC emissions < 2,000 pounds per month per line, 10 tons per year per line, 30 tons per year at GM Tech). No coating booth, including Man B - Bldg 108 (Jeff Bradsher), Design - Building 113 (James Wyne, Mikoya Laws), Design - Building 113 (Scott Schutzki), CWT - Bldg 105 (Jordan Bollaert) Mfg A - Bldg 109 (Duane Peruski (backup Michael Shar)), exceeded 200 gallon per month. Total usage in all booths = 795 gallons per year.

MI-ROP-B4049-2019, FGRULE290

There are two gasoline purge units under this flexible group. These are located at the GSB-1 Bldg. and the Engineering Bldg. For safety reasons, GM does not want any gasoline (or diesel) stored in a vehicle gas tank for an extended period of time (more than 2-3 days). After the vehicle gasoline tanks have been worked on, gasoline is emptied from the gas tank. The tanks are then cleaned and purged using a liquid alkaline cleaner called SLIX. An air hose bubbles the SLIX in the gas tank for approximately 8 hours to purge the remaining gasoline in the tank. After the cycle, the SLIX is pumped back to the reservoir. Another 8 hours is required to air dry the tank. The gas tank is scrapped or stored and worked on again.

GM established an emission factor for each tank that is purged: 0.21 pounds of VOC per purge. Gasoline specific gravity = 0.74. Benzene content = 4.9% by volume. Gasoline ITSL is not established. IRSL = 2 µg/m³.

Purging emissions, on annual basis, are follows:

1. Engineering Bldg. VOC emissions = 1.68 pounds and corresponding 0.27 gallons per year (2018) . = 0.21 pounds and corresponding 0.03 gallons per year (2019). 0.00 pounds (2020).
2. GSB-1 Bldg. VOC emissions = 38.2 pounds and corresponding 6.2 gallons per year (2018). = 19.53 pounds and corresponding 3.17 gallons per year (2019). = 8.40 pounds and corresponding 1.36 gallons per year and 40 tanks purged (2020)

Rule 290 limit is 20 pounds of VOC or gasoline emissions per month.

**MI-ROP-B4049-2019, FG-GENERATORSBLDG210 (EU-EMGEN210.1, EU-EMGEN210.2)
- FG-RICEMACT VEC Building**

PTI No. 82-11 dated July 12, 2011. Two (2) Caterpillar 2,000 kilowatts (kW) or 2 megawatts (MW) 2,682 HP diesel-fueled emergency generators manufactured in 2001. The CI RICE (diesel) engines are subject CI (diesel) RICE NESHAP / MACT 4Z but not CI (diesel) RICE NSPS 4I (manufactured in 2001 < April 1, 2006). The generators are not subject to NSPS 4I.

2 MW generators were installed in 2001 as Rule 285(2)(g) exempt units but permitted in July 12, 2011. Up to 1 MW generators are exempt pursuant to Rule 285(2)(g). Rule 702(a) BACT for these engines is proper operation and maintenance.

Two (2) Caterpillar 2 MW generators are located at the VEC Bldg (northeast and northwest). At the time of installation in 2001, GM thought the capacity of the generators was below 10 MM BTU per hour heat input and exempt from permits. NSPS 4I = No.

Caterpillar Engine Model and Serial Nos.: 3516 & NBZRY (both engines EU-ENGINE1 & EU-ENGINE2).

Caterpillar Generator Model and Serial Nos.: NA & 4FN01671 (both generators EU-ENGINE1 & EU-ENGINE2).

Manufacture and installation dates: 2001 & June 2001 (both engines EU-ENGINE1 & EU-ENGINE2).

Based upon an emission factor of 10.52 g NO_x/hp-hr, fuel (ULSD diesel) usage and hours of operation, 15.5 tons of NO_x per year emissions limit deemed to have been met (MI-ROP-B4049-2014a, FG-GENERATORSBLDG210, I.1 & 2: 15.5 tons of NO_x per year).

Only 15 ppm sulfur ultra-low sulfur diesel (15 ppm S ULSD) is fired in CI RICE engines (MI-ROP-B4049-2019, FG-GENERATORSBLDG210, II.1: only 15 ppm S diesel fuel)

210-VEC Northeast: 19 hrs per year (Jan & Dec 2019 hrs meter readings: 271 & 287 hrs) <6 tpy NO_x, 07/21/2019 annual maintenance, etc. 19 hrs per year (hrs meter readings: 271 hrs in Jan 2021, 287 on Dec 16, 2019. Annual maintenance = July 21, 2019.

210–VEC Northwest: <17 hrs per year (Jan & Dec 2019 hrs meter readings: 289 & 303 hrs) <5 tpy NOx, 08/16/2019 annual maintenance, etc. 13 hrs per year in 2020. hrs meter readings: 305 hrs in Jan 2020. = 316 hrs on Dec 19, 2020. 09/01/2020 annual maintenance, at 316 hrs meter reading.

(MI-ROP-B4049-2019, FG-GENERATORSBLDG210, III.1, IV.1 & VI.1,2).

MI-ROP-B4049-2019,FG-BACKUPGENSBLDG206 (EU-DRUPS1, EU-DRUPS2, EU-DRUPS3, EU-DRUPS4, EU-DRUPS5, EU-DRUPS6, EU-GENERATOR1, EU-GENERATOR2, EU-GENERATOR3, EU-GENERATOR4). DRUPS7-9 have never been installed; 3 DRUPS in all.

PTI No.160-11B dated January 14, 2015. This flexible group is for four (4: EUGENERATOR1, EUGENERATOR2, EUGENERATOR3, EUGENERATOR4) generator sets and nine (9: EUDRUPS1, EUDRUPS2, EUDRUPS3, EUDRUPS4, EUDRUPS5, EUDRUPS6, EUDRUPS7, EUDRUPS8, EUDRUPS9) Diesel Rotary Uninterruptible Power Supply (DRUPS) generator sets located at the Cadillac Bldg. (IT Center). All CI (diesel) RICE emergency generators (Cat 1-4: Caterpillar, 3634 HP, 2710 kW or 2.71 MW) and DRUPs (6: DRUP A1-A3 & DRUP B1-B3, MTU-Detroit Diesel, 4680 HP, 3490 kW or 3.49 MW) are installed in #206 Cadillac Building. All emergency generators (Cat 1-4 and DRUP A1-A3 & DRUP B1-B3) are subject to CI RICE NSPS 4I.

PTI No.160-11B (PSD for NOx) increased the size of the four mechanical engines under PTI 160-11A which was issued on July 13, 2012. DRUPs engine size increased from 3,010 kW or 3.01 MW to 3,490 Kw or 3.49 MW. During the permit review, the 13 proposed engines, were considered as a single project, emitted NOx in excess of its PSD significance threshold of 40 tpy. Nine engines are part of a Diesel Rotary Uninterruptible Power supply system (DRUPs). The purpose of the DRUPs generators is to ensure an uninterrupted electricity supply, meaning there is zero lag-time between a power supply outage and provision of electricity by the DRUPs. When electricity is supplied by the grid, the DRUPs system spins a wheel to generate momentum to store electrical energy as mechanical energy. When the electricity supply is interrupted, mechanical energy from the wheel sustains the generator until the diesel engine fires up and assumes powering of the generator.

Only six (6) of nine (9) DRUPs have been installed and the permit expired for the rest three (3) DRUPs. However, all four Caterpillar 2,710 kW (displacement <10 liters per cylinder, designed with injection timing retardation (ITR)) CI RICE engines have been installed.

Concerning DRUPS, when the main electricity supply fails, the stored energy in the flywheel drives the emergency electric generator practically instantaneously. At the same time, the diesel engine, with some delay, takes over the flywheel to drive the electric generator. Each 3.4 MW DRUPs' flywheel weighs 15,000 pounds (7.5 tons) and rotates at 3,300 rpm. Six (6) flywheels in all; one flywheel for each DRUPs. Flywheels are electrically driven when electric power supply is available thus storing electrical energy as mechanical energy. When power supply fails, electricity is generated from flywheels' mechanical energy with 9 second time lag when generator picks up load.

Monthly load test for one half hour is conducted for DRUPs.

All CI (diesel) RICE emergency generators (Cat 1-4: Caterpillar, 3634 HP, 2710 kW or 2.71 MW) and DRUPs (6: DRUP A1-A3 & DRUP B1-B3, MTU-Detroit Diesel, 4680 HP, 3490 kW or 3.49 MW) are installed in #206 Cadillac Building. All emergency generators (Cat 1-4 and DRUP A1-A3 & DRUP B1-B3) are subject to NSPS 4I.

Cat 1-4, Caterpillar, 3634 HP, 2710 kW or 2.71 MW: Caterpillar Engine Model and Serial Nos: 3516C & 3665370 16.

Manufacture and installation dates: 2011 & November 2012 (Cat 1 & 2) and 2015 & February 2016 (Cat 2 & 4).

DRUP A1-A3 & DRUP B1-B3, MTU-Detroit Diesel, 4680 HP, 3490 kW or 3.49 MW: Model Nos. 20V4000G83L. Serial Nos: 5282010029 (DRUP A1), 5282010097 (DRUP A2), 5282010398 (DRUP A3), 5282010030 (DRUP B1), 5282010096 (DRUP B2) and 5282010399 (DRUP B3),

Manufacture and installation dates: Dec 2011 & Nov 2012 (DRUP A1), Aug 2012 & May 2013 (DRUP A2), March 2015 & Feb 2016 (DRUP A3), Dec 2011 & Nov 2012 (DRUP B1), Aug 2012 & May 2013 (DRUP B2) and March 2015 & Feb 2016 (DRUP B3).

Only 15 ppm sulfur ultra-low sulfur diesel (15 ppm S ULSD) is fired in CI RICE engines (MI-ROP-B4049-2019, FG-BACKUPGENSBLDG206, II.1, VI.5: only 15 ppm S diesel fuel).

206 Cadillac: **7,920** (Cat 1), **7,875** (Cat 2), **7,950** (Cat 3), **7,935** (Cat 4) **7,800** (DRUP A1), **7,854** (DRUP A2), **7,880** (DRUP A3), **7,795** (DRUP B1) **7,818** (DRUP B2) and **7,888** (DRUP B3) gallons of ULSD used in CY 2017.

Hours operated based upon hours-meter readings:

1. CY2016 = 10.8 (Cat 1), 10.5 (Cat 2), 8.2 (Cat 3), 8.4 (Cat 4), 8.97 (DRUP A1), 8.95 (DRUP A2), 6.24 (DRUP A3), 10.85 (DRUP B1), 9.06 (DRUP B2) and 6.25 (DRUP B3).
2. CY2017 = 52.8 (Cat 1), 52.5 (Cat 2), 53 (Cat 3), 52.9 (Cat 4), 52.0 (DRUP A1), 52.36 (DRUP A2), 52.53 (DRUP A3), 51.97 (DRUP B1), 52.12 (DRUP B2) and 52.59 (DRUP B3).
3. CY2019= 12 (Cat 1), 11 (Cat 2), 11.9 (Cat 3), 12.3 (Cat 4), 13.06 (DRUP A1), 16.49 (DRUP A2), 11 (DRUP A3), 8 (DRUP B1), 13 (DRUP B2) and 22 (DRUP B3).

(MI-ROP-B4049-2019, FG-BACKUPGENSBLDG206, III.1, 2, IV.1 & VI.1,2, 4).

NSPS 4I Certificate = Yes as follows (MI-ROP-B4049-2019, FG-BACKUPGENSBLDG206, III.3, V.2)

1. Building 206 Cat 1 and Cat 2: Caterpillar CCPXL78.1NZZ-028 Model Year 2012 Effective 11/28/2011 Expiring 12/31/2012.
2. Building 206 Cat 3 and Cat 4: Caterpillar FCPXL78.1NZZ Model Year 2015 Effective 07/01/2014 Expiring 12/31/2015.
3. Building 206 DRUP A1 and DRUP B1: MTU Detroit Diesel MDD-NRCI-11-04.2 Model Year 2011 Effective 10/21/2011 Expiring NA. Engine Family: BMDDL95.4XTR.
4. Building 206 DRUP A2 and DRUP B2: Tognum America, Inc. CMDDL95.4XTR-006-R01 Model Year 2012 Effective 04/10/2012 Expiring 12/31/2012. Engine Family: CMDDL95.4XTR.
5. Building 206 DRUP A3 and DRUP B3: MTU America, Inc FMDDL95.4XTR-005 Model Year 2015 Effective 11/20/2014 Expiring 12/31/2015. Engine Family: FMDDL95.4XTR.

MI-ROP-B4049-2019, FG-RICEMACT

National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) applicable to existing RICE less than 500 HP, existing RICE greater than 500 HP, and new RICE greater than 500 HP that commenced construction on or before July 11, 2005.

Emission Units:

Existing RICE (commenced construction before June 12, 2006) less than or equal to 500 HP
EU-EMGEN102, EU-EMGEN115, EU-EMGEN207

Existing RICE (commenced construction before December 19, 2002) greater than 500 HP
EU-EMGEN202.3, EU-EMGEN202.5, EU-EMGEN210.3

New RICE (commenced construction on or after December 19, 2002) greater than 500 HP
EU-EMGEN202.4

This flexible group covers all exempt emergency generators less than 10 MM BTU/hr. that are subject to the RICE MACT. GM submitted emergency generator list. NOTE: If an emergency generator is permitted, it is included in a separate emission unit or flexible group.

Each gen set is limited to 500 hours of operation per year based on a rolling 12-month period. For the purpose of necessary maintenance checks and readiness testing, each gen set is limited to 100 hours of operation per year based on a rolling 12-month time period. Each emergency gen set may operate up to 50 hours of non-emergency situations per year

based on a rolling 12-month time period. The 50 hours count towards the 100 hours per year allowed for maintenance and testing. The gen sets are equipped with a non-resettable hour meter. See attached records of operation hours.

1. 102 – REL, Onan 114 HP, NSPS = No, CY 2017 = 0 hours of operation, CY 2019 = 0 (out of service) hours of operation
2. 108 – Manufacturing B, Caterpillar 691 HP = 515 kW, NSPS = No, CY 2017 = 75 hours of operation, CY 2019 = 29 hours of operation
3. 115 – Main Gate Fire Pump, Detroit Diesel 130 HP, NSPS = No, CY 2017 = 29 hours of operation, 725 Gal, CY 2019 = 22.5 hours of operation
4. 202 – 7000 White, Detroit Diesel 1495 HP = 1115 kW, NSPS = No, CY 2017 = 36.7 hours of operation, 920 Gal, CY 2019 = 13.9 hours of operation
5. 202 – 7000 Green, Onan-Cummins 671 HP = 500 kW NSPS = No, CY 2017 = 35.3 hours of operation, 0.21 MM CF CY 2019 = 12.6 hours of operation
6. 202 – 7000 South Detroit Diesel 630 HP, NSPS = No, CY 2017 = 32.62 hours of operation, 815 Gal, CY 2019 = 0 hours of operation
7. 210 – VEC South Caterpillar 1502 HP, NSPS = No, CY 2017 = 130 hours of operation, 3,250 Gal, CY 2019 = 53 hours of operation
8. 501 – VEC East Detroit Diesel 630 HP, NSPS = No, CY 2017 = 19.8 hours of operation, 500 Gal, CY 2019 = 26 hours of operation

(MI-ROP-B4049-2019, FG-RICEMACT, III.1, 2, 3).

Other generators subject the requirements of other EU/FG are not listed here.

Annual maintenance is performed: change oil, filters, inspect hoses, etc. (MI-ROP-B4049-2019, FG-RICEMACT, III.4).

All hours of operation mostly correspond to testing.

MI-ROP-B4049-2019, FG-SUBPARTIII

New Source Performance Standards for Compression Ignition Internal Combustion Engines (CI ICE) applicable to emergency CI engines with <10 L/cylinder displacement that commenced construction (ordered) after July 11, 2005 and manufactured after April 1, 2006.

Emission Units:

CI internal combustion engine with maximum engine power less than 100 HP
EU-EMGEN219

CI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP
NA

CI internal combustion engine greater than 500 HP
EU-EMGEN106.1, EU-EMGEN106.2, EU-EMGEN202.2, EU-EMGEN501.2, EU-EMGEN501.3

Only 15 ppm sulfur ultra-low sulfur diesel (15 ppm S ULSD) is fired in CI RICE engines (MI-ROP-B4049-2014a, (MI-ROP-B4049-2014a, FG-RICEMACT, II.1, VI.1: only 15 ppm S diesel fuel).

1. 106 – R&D East, Detroit Diesel, 685 HP = 511 kW, NSPS 4I = Y, CY 2017 = 67.8 hours of operation, 1,695, Gal, CY 2019 = 7 hours of operation US EPA Certificate = Y (Detroit Diesel Corp., US EPA Cert. No. DDX-NRCI-07-01 for Engine Family 7DDXI14.0VLD Effective 08/25/2006)
2. 106 – R&D West, MTU, 448 kW, NSPS 4I = Y, CY 2017 = 4.54 hours of operation, 115 Gal, CY 2019 = 11 hours of operation US EPA Certificate = Y (MTU America, Inc., US EPA Cert. No. GMDDL14.0ZWK-005 for Engine Family GMDDL14.0ZWK Effective 12/14/2015)
3. 202 – 7000 North: See EU-ENGINE7000BLDG202 Caterpillar1502 HP = 1120 kW
4. 202 – 7000 Grey, MTU Detroit Diesel, 1495 HP = 115 kW, NSPS 4I = Y, CY 2017 = 38 hours of operation, 950 Gal, CY 2019 = 14 hours of operation. US EPA Certificate = Y (MTU Detroit Diesel, US EPA Cert. No. MDD-NRCI-08-01 for Engine Family MDDI31.8XRR Effective 11/09/2007)
5. 206 – Cadillac Cat 1-4 and DRUPs A1-A3 & B1-B3. See FG-BACKUPGENSBLDG206.
6. 219 – Engineering Underpass, Cummins, 69 HP = 51 kW, NSPS 4I = Y, CY 2017 = NA hours of operation, NA Gal, CY 2019 = 24. US EPA Certificate = Y (Cummins, Inc., US EPA Cert. No. HCEXL03.3BAA-030 for Engine Family HCEXL03.3BAA Effective 11/17/2016)
7. 501 – VEC East Fire Pump, Cummins, 680 HP = 507 kW, NSPS 4I = Y, CY 2017 = 6.4 hours of operation, 160 Gal, CY 2019 = 7.9 hours of operation US EPA Certificate = Y (Cummins, Inc., US EPA Cert. No. FCEXL015.AAJ-011 for Engine Family FCEXL015.AAJ Effective 08/11/2014)

(MI-ROP-B4049-2019, FG-SUBPARTIIII, III.4, IV.1)

MI-ROP-B4049-2019, FG-SUBPARTJJJJ

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New Source Performance Standards for Spark Ignition Internal Combustion Engines (ICE) applicable to emergency engines greater than or equal to 100 horsepower (except gasoline or rich burn LPG) that commenced construction (ordered) after June 12, 2006 and were manufactured after January 1, 2009.

Emission Units:

SI internal combustion engine with maximum engine power less than 100 HP

NA

SI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP

EU-EMGEN129, EU-EMGEN207, EU-EMGEN221

SI internal combustion engine greater than 500 HP

EU-EMGEN101, EU-EMGEN108

1. 101 – Facilities Operations, Cummins, 530 HP = 395 kW, NSPS 4J = Y, CY 2017 = 57 hours of operation, 0.35 MM SCF, CY 2019 = 37 hours of operation US EPA Certificate = Y (Cummins, Inc., US EPA Cert. No. HCEXB19.0ENA-016 for Engine Family HCEXB19.0ENA Effective 12/14/2016)
2. 107 – Steam Plant, Cummins, 80.5 HP = 60 kW, NSPS 4J = Y, CY 2017 = 55.2 hours of operation, 0.35 MM SCF, CY 2019 = 33 hours of operation US EPA Certificate = Y (Cummins, Inc., US EPA Cert. No. GCEXB06.8GDC-002 for Engine Family GCEXB06.8GDC Effective 09/03/2015)
3. 129 – Design Deck, Cummins, 125 kW, NSPS 4J = Y, Mfg Feb 2018 & Installed July 2018, CY 2017 = NA hours of operation, NA MM SCF, CY 2019 = 8 hours of operation US EPA Certificate = Y (Cummins, Inc., US EPA Cert. No. JCEXB06.8GDB-016 for Engine Family JCEXB06.8GDB-016 Effective 10/02/2017)
4. 210 – VEC Deck, Cummins, 150 kW, NSPS 4J = Y, Mfg Nov 2017 & Installed July 2018, CY 2017 = NA hours of operation, NA MM SCF, CY 2019 = NA hours of operation. US EPA Certificate = Y (Power Solutions International, Inc. US EPA Cert. No. JPSIB8.80EMT-017 for Engine Family JPSIB8.80EMT Effective 09/20/2017)

(MI-ROP-B4049-2019, FG-SUBPARTJJJJ, I.1, VI.1, 2)

MI-ROP-B4049-2019, FG-BOILERS (EU-BOILER1, EU-BOILER2, EU-BOILER3, EU-BOILER4, EU-BOILER5, EU-BOILER6). PTI No. 42-14

Boiler Nos. 1-6 (dual fueled: natural gas / fuel oil No. 6) have been removed from April 2016 thru January 2018. All required GM Tech Center steam is generated by NSPS Db Boiler Nos. 1 thru 3 (EU-BOILER1-107, EU-BOILER2-107, EU-BOILER3-107).

MI-ROP-B4049-2019, FG-BOILERSBLDG107 (EU-BOILER1-107, EU-BOILER2-107, EU-BOILER3-107)

Three natural gas-fired boilers with a maximum nameplate heat input capacity of 108 MMBtu/hr (subject to NSPS Db and NESHAP DDDDD).

PTI No. 102-16 for three (3) new boilers (EU-NewBoiler1-3, 108 MM BTU per hour, NG, low NOx burner, flue gas recirculation, NSPS Db) and NSPS 4J SI RICE (NG, 60Kw, 80.5 hp) generator. The boilers have been renamed as stated before.

FG-BOILERSBLDG107, I.1-2

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Testing Monitoring Method	
1. NOx	0.064 lb/MMBtu heat input ²	30-day average	Each boiler: EU-Boiler1-107 EU-Boiler2-107 EU-Boiler3-107	SC VI.1	
2. NOx	34.0 tpy ²	12-month rolling time as determined at the end of each calendar month.	Combined for all three boilers: EU-Boiler1-107 EU-Boiler2-107 EU-Boiler3-107	SC VI.1	
Test Protocol shall specify averaging time					
Boiler Nos. 1-3. CleaverBrooks, 5,015 Sq. Ft. Heating Surface, 90,000 pounds of 250 psig steam per hour. Model No. NB-300D-70. Serial No. 4449. Built 2016. Serial Nos. 4449, 4450 & 4451, respectively.					

CY 2019: 534,348 M SCF= 534 MM SCF per year pipeline quality natural gas is used in the three boilers (Boiler 1 = 168,719, Boiler 2 = 165,148, Boiler 3 = 200,481 M SCF NG per year) (MI-ROP-B4049-2019, FG-BOILERSBLDG107, II.1-2 limits: only NG, 1,050 million cubic feet of NG per 12-month). Entire GM Tech Center does not use fuel oil anymore as six (6) Boiler Nos. 1-6 (dual fueled: natural gas / fuel oil No. 6) have been removed from April 2016 thru January 2018.

CY 2020: 472,668 M SCF= 473 MM SCF per year pipeline quality natural gas is used in the three boilers (Boiler 1 = 241,566, Boiler 2 = 101,955, Boiler 3 = 129,147M SCF NG per year)

GM calculated 37.4 tons of NOx per year for CY 2019 (MI-ROP-B4049-2019, FG-BOILERSBLDG107, I.2 limit: 34.0 tpy NOx) based upon MAERS EF of 0.014 lb/m MMBtu. I pointed out to GM error in this calculation. The corrected emissions rate 17.1 tons of NOx per year for CY 2019.

CY 2020: 15.1 tons of NOx per year for CY 2020 (limit: 34.0 tpy NOx)

Each boiler is equipped with an Oxygen Trim System (EU-Boiler1-107, EU-Boiler2-107, EU-Boiler3-107) that maintains an optimum air to fuel ratio (MI-ROP-B4049-2019, FG-BOILERSBLDG107, III.1: continuous oxygen trim system on each boiler)

Each boiler is equipped with a gas meter and low NOx burner (MI-ROP-B4049-2019, FG-BOILERSBLDG107, IV.1 & II: a device to monitor and record the daily natural gas usage rate and low NOx burners and flue gas recirculation system)

0.030, 0.031 & 0.039 pounds of NOx per MMBtu for Boiler Nos. 1, 1 & 3, respectively (MI-ROP-B4049-2019, FG-BOILERSBLDG107, I.1 limit: 0.064 lb / MMBtu and V.1: verify NOx emission rates from each boiler). On September 4, 2018, Mark Dziadosz of AQD approved that RATA report received by AQD on August 14, 2018, met Performance Specification 16.

2016 PEMS RATA

PEMS INFORMATION

Analyzer Type	Manufacturer	Model No.	Serial No.
Boiler 1	CMC Solutions	Smart CEMS™-60	GMBL122041
O ₂	CMC Solutions	Smart CEMS™-60	GMBL122042
NOx	CMC Solutions	Smart CEMS™-60	GMBL122042
Boiler 2	CMC Solutions	Smart CEMS™-60	GMBL222041
O ₂	CMC Solutions	Smart CEMS™-60	GMBL222042
NOx	CMC Solutions	Smart CEMS™-60	GMBL222042
Boiler 3	CMC Solutions	Smart CEMS™-60	GMBL322041
O ₂	CMC Solutions	Smart CEMS™-60	GMBL322042
NOx	CMC Solutions	Smart CEMS™-60	GMBL322042

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Feb 26 thru Mar 02, 2016 PEMS RATA Test RM NOx, PEMS NOx, %RA < 20% (relative accuracy) Low, mid and high load levels
1. NOx	0.064 Pounds per MM BTU heat input	30 day average	Each boiler EUNewBoiler1 EUNewBoiler2 EUNewBoiler3	Boiler 1 low: 0.039, 0.041 and 8.6% Boiler 1 mid: 0.034, 0.033 and 3.3% Boiler 1 high: 0.031, 0.032 and 5.8% Boiler 2 low: 0.041, 0.041 and 2.4% Boiler 2 mid: 0.038, 0.037 and 3.1% Boiler 2 high: 0.033, 0.034 and 4.6% Boiler 3 low: 0.054, 0.052 and 3.6%

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Feb 26 thru Mar 02, 2016 PEMS RATA Test RM NOx, PEMS NOx, %RA < 20% (relative accuracy) Low, mid and high load levels
				Boiler 3 mid: 0.044, 0.045 and 3.1% Boiler 3 high: 0.038, 0.040 and 7.9%
2. NOx	34.0 Tons per year	12-month rolling time period as determined at the end of each calendar month.	Combined for all three boilers EUNewBoiler1 EUNewBoiler2 EUNewBoiler3	
<p>BT Environmental Consulting, Inc. (Project No. 049AS-313759, April 18, 2018) of Royal Oak, Michigan, performed RATA testing was conducted February 26, 2018 through March 2,2018. The reported emissions rates and RATA are in compliance.</p> <p>The SmartCEMS™ -60 Predictive Emission Monitoring System (PEMS) provides continuous data recording and report generation for compliance with 40 CFR Part 60 regulations. The data acquisition system provides a secure and reliable means of collecting and retrieving compliance data. This application has been customized to meet the requirements of gas-fired boiler under 40 CFR Part 60, Subpart Db; and as a predictive emissions monitoring system (PEMS), an alternative to continuous emissions monitoring under 40 CFR Part 60, Performance Specification (PS)16 for Predictive Emissions Monitoring Systems (PEMS) (PS-16) "Example Specifications and Test Procedures for Predictive Emission Monitoring Systems". SmartCEMS™-60 was designed to operate on a personal computer with a standard interface to the boiler and a relational database such as the one provided with the Trace Environmental Systems supplied data acquisition systems. The application itself actually consists of two independent databases and three configurable application modules. The first database is secured and contains only data (both raw collected data that is not editable and historical data formatted as specified by the applicable regulations) as well as a compliance message archive with operator comments. The second database contains compliance reporting data including collections statuses, summarized and calculated fields, and formatted electronic data reports (EDR) components.</p> <p>The first application is the data acquisition module that runs on startup of the system and collects the data continuously providing compliance emissions data for reporting purposes. There are two other independent SmartCEMS™ components that work with the data acquisition service. The second application provides the operator interface for display of real-time data, display and acknowledgement of compliance alarms, and input of operator data including gas sampling results and certification test results. The third application provides the reporting and EDR generation capacities. Both of these applications support the operator interface with the data and the data acquisition services and can be run from any workstation on the local area network providing information on the compliance status of the units in real-time.</p> <p>Process data includes natural gas fuel flow, NOx ppm, and O2%.</p>				

BT Environmental Consulting, Inc. (Project No. 049AS-313759, April 18, 2018) of Royal Oak, Michigan, performed RATA (Relative Accuracy Test Audit) testing during February 26, 2018 through March 2,2018. The reported emissions rates and RATA are in compliance. (PTI No. 102-16, FG2017BOILERS, V.1 limit: testing to verify NOx emission rates from each boiler).

Again, in June 2018, BTEC conducted Relative Accuracy Audits (RAA). Mark Dziadosz of AQD-TPU approved RAA results via letter dated September 04, 2018, to Todd Davis. (PTI No. 102-16, FG2017BOILERS, VI.2 limit: Predictive Emission Monitoring System (PEMS) and Appendix A PS 16: PEMS). While PEMS RATA is required annually, PEMS RAA is required quarterly.

GM is submitting excess emission report (EER) and summary report (PTI No. 102-16, FG2017BOILERS, Appendix A 8 limit: excess emission report (EER) and summary report).

As required by Boiler MACT 5D, five-year performance tune-up is performed (MI-ROP-B4049-2019, FG-BOILERSBLDG107, V.3: pentennial or quinquennial 1/5-yr tune-up because of oxygen trim system).

GM monitors NOx emission rates using Predictive Emission Monitoring System (PEMS) that has approved by AQD (Dziadosz) as satisfactory per PS 17 (MI-ROP-B4049-2019, FG-BOILERSBLDG107, VI.1-2: either CEMS (VI.1) or PEMS (VI.2). NOx emissions and O2, or CO2 using CEMS. NOx emission rates using PEMS)

Monthly natural gas usage records are kept (MI-ROP-B4049-2019, FG-BOILERSBLDG107, VI.3: monthly natural gas usage records)

MI-ROP-B4049-2019, FG-BOILERSCL (EU-BOILER1CL, EU-BOILER2CL). NSPS Dc

1. 105 CWT 3rd Floor Left EU-BOILER1CL, Cleaver Brooks 13 MM BTU NG, Installed 1997 (after June 9, 1989), NSPS Dc.
2. 105 CWT 3rd Floor Right EU-BOILER2CL, Cleaver Brooks 13 MM BTU NG, Installed 1997 (after June 9, 1989), NSPS Dc.

The boilers fire only natural gas (MI-ROP-B4049-2019, FG-BOILERSCL, VI.1)

Natural gas usage is reported via MAERS (NSPS Dc, MI-ROP-B4049-2019, FG-BOILERSCL, VI.2)

MI-ROP-B4049-2019, FG-BOILERMACT (EU-BOILER1CL, EU-BOILER2CL, EU-MISCBOILERS)

Natural gas-fired and dual fuel boilers and process heaters subject to 40 CFR 63, Subpart DDDDD.

Unit designed to burn gas 1 subcategory includes any boiler or process heater that burns only natural gas, refinery gas, and/or other gas 1 fuels. Gaseous fuel boilers and process heaters that burn liquid fuel for periodic testing of liquid fuel, maintenance, or operator training, not to exceed a combined total of 48 that burn liquid fuel during periods of gas curtailment or gas supply interruptions of any duration are also included in this definition.

Less than 5 MMBtu/hr	EU-MISCBOIL7000(1-3), EU-MISCBOILGAE(1-2)
Equal to or greater than 5 MMBtu/hr and less than 10 MMBtu/hr	EU-MISCBOILMTS(1-2)
Equal to or greater than 10 MMBtu/hr	EU-BOILER1CL, EU-BOILER2CL

GM Tech Center burns only pipeline quality natural gas (MI-ROP-B4049-2019, FG-BOILERMACT, II.1: burn gas 1 NG only)

In addition to the boilers located at the power plant and climatic wind tunnel, there are other smaller boilers and hot water heaters located at the facility that are subject to the boiler MACT. Compliance requirements that include tune-ups, one-time energy assessment and submission of compliance reports were done. Boiler MACT Energy Assessment was conducted by Burns McConnell on August 2015.

Hot water heaters with more than 120-gallon capacity are subject to the BOILER MACT.

Concerning boilers equipped with oxygen trim system, **boiler tune-up** must be performed by January 31, 2016, and once in 5 years thereafter (MI-ROP-B4049-2014a, FG-BOILERMACT, III. 1: boiler tune-up). Other boilers without oxygen trim system, must perform **annual tune-up** (>10 million BTU per hour) or **biennial tune-up** (<10 million BTU per hour). In addition, GM is required to perform one-time energy assessment (EA) (MI-ROP-B4049-2019, FG-BOILERMACT, II.1: burn gas 1 NG only)

Three new boilers (EU-NewBoiler1-3, 108 MM BTU per hour, NG, low NOx burner, flue gas recirculation) are equipped with oxygen trim systems. Annual

TUNE-UP: One-time Energy Assessment (EA) or ISO 50001 & annual Tune-up for all boilers with heat input capacity of 10 million BTU per hour or greater and Pentennial / Quinquennial (1/5Yr) Tune-up if boiler is equipped with oxygen trim system, are required. In addition, a biennial tune-up for all boilers with heat input capacity of less than 10 million BTU per hour.

GM performed the required tune-up: Honeywell Combustion Safety (216-749-2992) performed tune-up during March 12 thru 16, 2018. Honeywell Certificates of Compliance are valid through March 22, 2019. GM performed one-time Energy Assessment (EA): Burns McDonnell Boiler MACT 5D Energy Assessment dated August 2015. (MI-ROP-B4049-2019, FG-BOILERMACT, III.5: initial tune-up)

GM submitted to CEDRI, on March 02, 2018, Tune-up compliance report (MI-ROP-B4049-2019, FG-BOILERMACT, VI.6, 15).

GM (Mr. Todd Davis signed on July 01, 2016) submitted to George Czerniak, Branch Chief, US EPA Region 5, Notification of Compliance Status dated June 30, 2016, for Boiler MACT 5D.

GM does not use any fuel other than NG (MI-ROP-B4049-2019, FG-BOILERMACT, VI.2: an alternative fuel)

GM keeps fuel (NG) usage records and submits the usage and corresponding emissions information via MAERS (MI-ROP-B4049-2019, FG-BOILERMACT, VI.3)

Notifications

1. Notification of startup (Peter J. Maciejewski's (who retired about December 2018) letter dated November 8, 2017): Building 107 - Boiler 1. 40 CFR Part 63 - Subpart DDDDD - NESHAP for Industrial, Commercial, & Institutional Boilers & Process Heaters and 40 CFR Part 60 - Subpart Db- NSPS for Industrial-Commercial-Institutional Steam Generating Units. Description of Source: Natural Gas-fired Steam Boiler Rated at 108 MMBtu/hr Boiler Tag- Boiler #1; Model No. - NB-300D-70; Serial No. - SP-4451; National Board No. - 4879; Michigan Boiler Serial No - 444574; Startup Date: November 7, 2017.
2. Notification of startup (Peter J. Maciejewski's letter dated October 27, 2017): Building 107 - Boiler 2. 40 CFR Part 63 - Subpart DDDDD - NESHAP for Industrial, Commercial, & Institutional Boilers & Process Heaters and 40 CFR Part 60 - Subpart Db- NSPS for Industrial-Commercial-Institutional Steam Generating Units. Description of Source: Natural Gas-fired Steam Boiler Rated at 108 MMBtu/hr Boiler Tag- Boiler #2; Model No. - NB-300D-70; Serial No. - SP-4450; National Board No. - 4862; Michigan Boiler Serial No - 444575; Startup Date: October 20, 2017.
3. Notification of startup (Peter J. Maciejewski's letter dated October 6, 2017): Building 107 - Boiler 3. 40 CFR Part 63 - Subpart DDDDD - NESHAP for Industrial, Commercial, & Institutional Boilers & Process Heaters and 40 CFR Part 60 - Subpart Db- NSPS for Industrial-Commercial-Institutional Steam Generating Units. Description of Source: Natural Gas-fired Steam Boiler Rated at 108 MMBtu/hr Boiler Tag- Boiler #3; Model No. - NB-300D-70; Serial No. - SP-4449; National Board No. - 4861; Michigan Boiler Serial No - 444576; Startup Date: September 27, 2017.

PTI No. 46-20, FG-BATTERY (EU-HIGHBAY, EU-LOWBAY) Battery Thermal Testing Areas, Building No. 207.

Pollution control equipment: Baghouse followed in series by HEPA filter that controls one bay at a time

During the inspection, Mr. Joseph Rogers (Phone: 248-535-3598), Lab Systems Supervisor, assisted me.

In low-bay area (EU-LOWBAY), there is a prep area. Two cells are present. Each cell has a capture hood. High current failure is introduced such that battery cells catch fire. Upto 3 battery cells can be tested at any given time. The purpose is to validate battery chemistry.

In high-bay area (EU- HIGHBAY), larger scale testing is done for 24-48 hrs. One side exhaust air is drawn to the control system, from other side inlet air louvers to admit outside ambient air.

To control smoke and particulates, a control system is present that consists of a column containing 150 bags followed by HEPA filter system. Exhaust from the system is released to ambient air via a stack of Height = 62 feet and of Diameter = 42 < 44 inches (PTI No. 46-20, FG-BATTERY, VIII, 1. SVHIGHBAY)

Cells tested (Sep thru Dec 2020): EU-HIGHBAY = 479 and EU-LOWBAY = 170 (PTI No. 46-20, FGBATTERY, II, 1 thru 4 limits for cells tested: 1,833 cells per month & 22,000 cells per year for EU-HIGHBAY and 125 calls per month & 1,500 cells per year for EU-LOWBAY).

EUHIGHBAY and EULOWBAY are not operated simultaneously during thermal testing and a baghouse followed in series with HEPA filter are operated properly. Also, number tests recorded. (PTI No. 46-20, FG-BATTERY, III, 1-2 , IV.1-3, VI.1).

US EPA CEDRI Reports:

According to Boiler MACT 5D, GM Tech conducted tune-up on 05/17/2017 as follows: EU-BOILER1CL (13 MM BTU per hour), EU-BOILER2CL (13 MM BTU per hour), EU-BOILER202 (6 MM BTU per hour), EU-BOILER301-1 (6 MM BTU per hour) EU-BOILER301-2 (6 MM BTU per hour). Tod Davis (734-732-7337), Op Grp Manager, signed the report on March 02, 2018.

According to Boiler MACT 5D, GM Tech conducted tune-up on 03/16/2018 as follows: EU-BOILER1CL (13 MM BTU per hour), EU-BOILER2CL (13 MM BTU per hour). Tod Davis (734-732-7337), Op Grp Manager, signed the report on February 28, 2019.

According to Boiler MACT 5D, GM Tech conducted tune-up on 04/11-12/2019 as follows: Unit #1 (Cleaver-Brooks, Boiler - Hot Water, Parts Lab), Unit #2 (Cleaver-Brooks, Boiler - Hot Water, Parts Lab), Wind Tunnel #1 (Left Hand Cleaver-Brooks, Boiler – Steam, 3rd Floor - Left), Wind Tunnel #2 (Right Hand Cleaver-Brooks, Boiler – Steam, 3rd Floor -Right). HoneyWell Combustion Safety performed the tests (Visit: 04/11-12/2019, Report dated: 5/21/2019, Job Number: 23649).

Conclusion

GM Tech Center is compliance with its permits and regulations. GM is also submitting PEMS audit and excess emissions reports per NSPS Db for the boilers.

NAME


DATE December 13, 2021

SUPERVISOR

