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

K213159663

FACILITY: Western Michigan University		SRN / ID: K2131
LOCATION: 1903 West Michigan Ave, KALAMAZOO		DISTRICT: Kalamazoo
CITY: KALAMAZOO		COUNTY: KALAMAZOO
CONTACT: George Jarvis , Director, Power Plant		ACTIVITY DATE: 08/18/2021
STAFF: Monica Brothers	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Announced, scheduled inspection		
RESOLVED COMPLAINTS:		

This was an announced scheduled inspection. I emailed George Jarvis and Mark Weiss on Wednesday, August 11, 2021 and scheduled a 9:00 am inspection for the following Wednesday, August 18, 2021. I arrived at the WMU Power Plant at 9:00 am and met with George Jarvis, Power Plant Director, Mark Weiss, Director of Environmental Health and Safety, Mike Walden, Chief Operating Engineer, and Keith Pung, Environmental Specialist. No visible emissions were observed upon arrival. I introduced myself and briefly discussed with them what equipment I would like to look at and what kinds of records I would be looking to review. George and Mark had already acquired some of the required records, so we decided to do the records review first. Mark said that they now have only five parts washers. They removed the unit at the Miller Parking Ramp on May 18, 2021. They have moved the printing presses that were operating under Rule 290 to Floyd Hall at the Business, Technology, and Research Park (BTR Park). There are no longer any emission units operating under Rule 290 at this location. After the records review, we took a tour of the power plant equipment, and then Mark and I went over to the main campus to view some of the generators and parts washers. I left the facility at about 11:30 am.

MI-ROP-K2131-2021:

FGENGINES:

This flexible group is for two 3,500 (2.5 MW) natural gas-fired RICE, equipped with oxidation catalysts to reduce CO and VOC emissions. The emission units are EU-ENGINE1 (Peaker Engine #9) and EU-ENGINE2 (Peaker Engine #10). These units started up about a year ago, and they are required by their ROP to conduct a stack test for NOx, CO, and VOC (including formaldehyde) within one year of startup. WMU completed this testing by the July 15th deadline, except for VOC (including formaldehyde) testing for EU-ENGINE2. During the original testing date, EU-ENGINE2 malfunctioned and needed to be repaired. By the time the unit was repaired, the testing due date had passed. The facility will be reporting this as a deviation on their ROP certification form. EU-ENGINE2 was then successfully tested for VOC (including formaldehyde) on August 10, 2021. The ROP also required WMU to submit a Malfunction Abatement Plan (MAP) within 180 days of trial operation. The facility submitted this MAP to EGLE on January 14, 2021, in compliance with this requirement.

The permit limits the operating hours of FGENGINES to 9,300 hours per year, on a 12-month rolling basis. I viewed records of operation time, and they are under this limit. The permit also limits NOx emissions to 35.9 tpy, CO emissions to 72 tpy, and VOC to 30 tpy, on a 12-month rolling basis. Their records show that they are under each of these limits. They are also keeping the required maintenance records.

EUPABOILER 6:

This is a 65,000 lbs steam/hr, 88MMBtu/hr, natural gas-fired boiler that was installed in 1965. This boiler is only operated as a back-up when needed. It was operated for only four months in the past two years. In November 2018 it used 51.9 MCF, in January 2019 it used 977.9 MCF, in February 2019 it used 358.8 MCF, and in December 2019 it used 3521.8 MCF. They are keeping the required monthly and 12-month rolling records of natural gas usage. The last time it was tested was in April of 2010. Within 180 days of issuance of MI-ROP-K2131-2021, which was on June 7, 2021, they will need to test this unit again.

EU-149-EMERGEN-01:

This is a 2.75 MMBTU/hr (250 kW) diesel emergency generator that was installed in 2013. I viewed records of the sulfur content of the diesel fuel, and it indicated that the fuel is compliant with the 15 ppm sulfur limit. They are keeping track of the number of hours this unit runs per year, and I observed the documentation that this unit is a certified engine. During the inspection tour, the non-resettable hour meter read 269.9.

EU-02-PEAKGEN:

This unit is a natural gas-fired peaking and black start generator that is rated at 7.5MMBtu/hr. It was installed in 1998. It has an oxidation catalyst as its pollution control device, which has a Continuous Parameter Monitoring System (CPMS) that records the inlet temperature at 15-minute intervals. During the inspection, I reviewed these temperature records. The temperatures, while the unit is running, are usually around 730°F, which shows compliance with the requirement to be between 450° and 1350°F. The CPMS logs the temperature in a 4-hour average format as well. These were reviewed and were in compliance.

George also showed me their records of maintenance and repairs on the generator. They have a preventative maintenance service agreement with MI CAT, who comes out to do maintenance checks. These maintenance activities are done according to how many hours the unit is run. They have records of each time MI CAT has come out, either to fix something on the unit, or to do maintenance activities. They are also keeping track of the hours of operation of the unit. During the facility tour, the non-resettable hour meter read 23,950.

FG-BOILERS 9&10:

Each of these boilers produces 65,000 lbs steam/hr and are rated at 90MMBtu/hr for natural gas and 88 MMBtu/hr for fuel oil. Fuel oil is used only for backup, and they have not used fuel oil in either boiler since before 2014. The highest 12 month rolling NOx emissions for Boiler 9 since January 2018 were in March 2020, with about 5.17 tons/year. The highest 12-month rolling NOx emission for Boiler 10 were in September 2020, with about 5.00 tons/year being emitted. This is far under their limit of 35.9 TPY for each boiler. They are keeping track of the number of hours they run fuel oil and the amount of each fuel used per 12 month rolling time-period. These records are attached to this report. Boiler 9 was tested in November of 2015, and they were in compliance with the test limits in the ROP. Within 180 days of issuance of MI-ROP-K2131-2021, which was on June 7, 2021, they will need to test Boiler 10, and alternate boilers for subsequent tests every 5 years.

FGPBTUHR-78:

Turbines 7 and 8 are both natural gas-fired and were installed on July 1, 1997. Each has a max heat input rate of 60 MMBTU/hr, and they also each have a duct burner that can also produce energy for the heat recovery steam generator. The duct burners are controlled by low-NOx burners, which are required to be operating at all times while the units are running.

This equipment is allowed to burn only pipeline quality natural gas, and the total sulfur content of the gas must be 20.0 grains/ 100scf or less. They provided a document from Consumers Energy about the natural gas they receive, and it showed that the natural gas contains no more than 5.0 grains/ 100scf.

Emissions testing was conducted on both turbines back in November of 2015 and showed that the NOx and CO emissions were in-compliance with the permit limits. Within 180 days of issuance of MI-ROP-K2131-2021, which was on June 7, 2021, they will need to test these units again. Their records show that they are keeping track of the monthly hours of operation for each mode of operation (exhaust mode with the turbines running, and fresh air mode with only the duct burners supplying energy). For the month of July 2021, they have run 50.5 hours on Turbine 7 and 0 hours on Turbine 8 in exhaust mode. They very rarely run in fresh air mode, but they did just a few times for about 286.5 hours total in December 2019, and February – May 2020. They are also keeping track of their natural gas usage per month and on a 12-month rolling timescale.

NOx emissions are also calculated monthly and on a 12-month rolling timescale, and there is a 44.7 tons/year limit on their NOx emissions from operating only in fresh air mode on each unit. They do not have a NOx limit while operating in exhaust mode. The 286.5 hours that they operated in fresh air mode within the past two years, resulted in 0.89 tons/ year in NOx emissions, which is far under the 44.7 tons/year limit.

FG-NSPS IIII:

This flexible group applies to all emergency generators at the facility that are fired by diesel fuel or No. 2 fuel oil and were manufactured on or after 2006. The units are EU-42-EMERGEN-02, EU-44-EMERGEN-01, EU-82-EMERGEN-01, and EU-149-EMERGEN-01. The ROP requires that they test the No. 2 fuel oil either once per year or for each shipment of fuel, whichever is less frequent. Mark said that they test once per year and showed me the test results for July 2020. The sulfur content is 14.92ppm and the permit limit is 15ppm. The cetane index is required to be 40 or higher, and the test results show that the fuel oil has a cetane index of 44.1.

Mark also gave me a copy of their records for hours of operation for each generator. They are far under the limits of 500 hours or less per 12 month rolling timescale and under the 100 hours per year for maintenance checks and readiness testing. During the facility tour, the non-resettable hour meter on EU-149-EMERGEN-01 (Zang Legacy Center) read 269.9.

These engines are also required to be certified; otherwise, testing is required. Mark showed me the certifications for each of these emergency generators. Maintenance of each of the generators at the facility is scheduled and logged in a computer system. There is also a list of preventative maintenance operations that are scheduled for each unit.

FG-NSPS JJJJ:

This flexible group applies to all emergency generators at the facility that are fired by natural gas and installed or manufactured on or after 2010. The units are EU-29-EMERGEN-02, EU-59-EMERGEN-01, and EU-138-EMERGEN-01. They are keeping track of the hours of operation for each unit in the same manner as for FG-NSPS IIII. All units are in-compliance and under the permittable hours. Each of these units is also a certified engine, except for EU-138-EMERGEN-01, located at Sangren Hall. Because this engine is not certified, they are required to test the unit for NOx, CO, and VOC either every 8,760 hours or every three years, whichever comes first. The last time this unit was tested was in February 2019, and the test showed that they were in-compliance with the ROP limits of 160 ppmvd NOx, 540 ppmvd CO, and 86 ppmvd VOC, all at 15% oxygen.

FG-EMGEN-GAS:

This flexible group applies to all emergency generators at the facility that are fired by propane or natural gas and were manufactured before 2004. The units are EU-56-EMERGEN-01 (60kW), EU-71-EMERGEN-01(60kW), EU-72-EMERGEN-01(60kW), EU-73-EMERGEN-01(100kW), and EU-145-EMERGEN-01(500kW). The hours of operation for each unit are being tracked in the same manner as for FG-NSPS IIII. All units are in compliance and under the permittable hours. During the facility tour the non-resettable hour meter on EU-145-EMERGEN-01 was 259.8.

FG-EMERGEN-OIL:

This flexible group applies to all emergency generators at the facility that are fired by diesel or No. 2 fuel oil and were manufactured or installed before 2003. The units are EU-13-EMERGEN-01 (200kW), EU-15-EMERGEN-01(200kW), EU-28-EMERGEN-01(100kW), EU-29-EMERGEN-01 (300kW), EU-46-EMERGEN-01(60kW), EU-61-EMERGEN-01(100kW), EU-75-EMERGEN-01(60kW), EU-107-EMERGEN-1(230kW). The hours of operation for each unit are being tracked in the same manner as for FG-NSPS IIII. All units are in-compliance and under the permittable hours. They use the same fuel oil in these units as for the units regulated under FG-NSPS IIII. The sulfur content cannot exceed 0.05%, and the attached fuel oil sample test shows that they are in-compliance with this condition. The test also shows the density and the BTU/gal of the fuel. They have the fuel oil tested once each year.

FG4JEXEMPTENG:

This flexible group applies to all emergency generators at the facility that are subject to NSPS JJJJ but are exempt from new source review permitting. This applies to EU-001-EMERGEN-01, EU-174-EMERGEN-01, and EU-175-EMERGEN-01. The hours of operation for each unit are being tracked in the same manner as for FG-NSPS IIII. All units are in compliance and under the permittable hours. Each of these units is also a certified engine. During the facility tour, the non-resettable hour meter on EU-001-EMERGEN-01 was 192.8.

FGPARTSWASH:

They have five parts washers at the facility that were each installed after July 1, 1979. During the facility tour, I looked at the units in the power plant, the garage, and in the landscaping building. All three had the lid closed, and I gave Mark some AQD stickers to put on the new units. Mark said that none of the units were heated or agitated and that the units were maintained by an outside service provider. He said that they never keep used solvent on site. None of the units

have an air/vapor interface larger than 10sq. ft., and they are all covered units. The units all use the same mineral spirits. The SDS for this material shows that it has a Reid vapor pressure less than 0.3psia and contains no halogenated compounds. The units seemed to be in-compliance at the time of inspection.

FGRULE290:

There are no longer any units at the facility that are exempt under Rule 290. The printing presses and paper machine that used to be on campus have been moved to a different off-site WMU location at Floyd Hall.

The facility seemed to be in compliance with their permit at the time of inspection.

NAME Monica Brooks DATE 9/24/21 SUPERVISOR RJL 9/28/21