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

H587768050

FACILITY: EASTERN MI UNIVERSITY		**SRN / ID:** H5877
LOCATION: 812 OAKWOOD, YPSILANTI		**DISTRICT:** Jackson
CITY: YPSILANTI		**COUNTY:** WASHTENAW
CONTACT: Scott Storrar , Executive Director		**ACTIVITY DATE:** 06/28/2023
STAFF: Mike Kovalchick	**COMPLIANCE STATUS:** Non Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: Compliance Inspection of EMU. EMU failed to conduct required NOX testing of their COGEN turbine.		
RESOLVED COMPLAINTS:		

Minor Source: Opt-out Source for CO and NOx. Full Compliance Evaluation (FCE): SRN H5877

Contact

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Purpose

On June 28, 2023, I conducted an announced compliance inspection of Eastern Michigan University located in Ypsilanti, Michigan (Washtenaw County). The purpose of the inspection was to determine the facility's compliance status with applicable federal and state air pollution regulations, particularly Michigan Act 451, Part 55, Air Pollution Control Act and administrative rules and Permit to Install (PTI) 39-18. This facility was last inspected on August 29, 2017, and found to be in compliance. (Note: Brian Merle with AQD-Jackson Office accompanied me on this inspection in a training capacity.)

Background

Eastern Michigan University (EMU) principal source of emissions is a turbine cogeneration system that began operations in 2018.

Currently, EMU operates the cogenerations system along with several other minor sources of emissions under Opt-out 39-18. The Cogen uses natural gas to power the turbine, which generates electricity and heat from the exhaust air stream, thus producing electric and thermal energy from a single source of fuel. The Solar Turbine is equipped with *SoLoNOx* burners which use lean-premixed combustion technology to ensure uniform air/fuel mixture and to prevent formation of regulated pollutants.

The exhaust air stream, at approximately 950 F is channeled into a Heat Recovery Steam Generator (HRSG). The steam is then sent out to campus via the steam distribution system. When the University's thermal load exceeds the recoverable energy from the exhaust, a supplemental duct burner in the HRSG provides additional thermal capacity at 90% + efficiency.

The Turbine is subject to 40 CFR 60 Subparts A and KKKK requirements, *not* the former Subpart GG requirements. Subpart KKKK currently regulates NOX and SO2 emissions from stationary simple-cycle or combined cycle combustion turbines.

The emergency generators are generally exempt from 40 CFR Part 63, Subpart ZZZZ because they are institutional emergency stationary RICE which that operate for less than 15 hours per year per calendar year (for non-emergency circumstances). They are subject to some recordkeeping/maintenance requirements under 40 CFR Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

There originally were three grandfathered steam boilers that were installed prior to 8/15/1967, and therefore did not require a permit to install (PTI). EU-HP-BLR3-PT001 has been physically removed from the site. EU-HP-BLR1-PT003 and EU-BLR2-PT004 remain on site and are used in a limited fashion. They are natural gas fired with fuel oil/diesel as backup. The source has not changed fuel oil suppliers or type of fuel since the last inspection, which has a sulfur content less than the limit of 0.1%.

The following is a listing of all the emission units and when they were installed:

EU-DENG-MJ	**Mark Jefferson Emergency Diesel Generator, 4-Stroke V-12, 32.1 L Displacement, 1502 HP, 1000 kW, peak-shaving duty requested**	**12/01/2010**
EU-DENG-PG	**Portable Emergency Diesel Generator, 4-Stroke, IL-6, 10.8 L Displacement, 470 HP, 300 kW**	**06/01/2010**
EU-DENG-PG2	**Portable Emergency Diesel Generator, 6.7 L Displacement, 295 HP, 220 kW**	**08/11/2012**
EU-DENG-PH	**Pray-Harrold Emergency Diesel Generator, 4-Stroke V-12, 27 L Displacement, 1214 HP, 750 kW**	**08/31/2010**
EU-DENG-PS	**Public Safety Emergency Diesel Generator, 4-Stroke IL-6, 8.3 L Displacement, 470 HP, 275 kW**	**06/09/2009**
EU-HP-BLR1-PT003	**Steam generating equipment for Main Campus heating/cooling systems. Maximum input is 120 MMBTU. Fuel is normally natural gas. For back-up, unit is fuel oils #1-6 capable using steam atomizing burners.**	**01/01/1967**
EU-HP-BLR2-PT004	**Steam generating equipment for Main Campus heating and cooling systems. Maximum input is 120 MMBTU. Fuel is normally natural gas. For back-up unit is #1-6 oil capable using steam atomizing burners.**	**01/01/1967**

EU-MISCELLANEOUS	**Miscellaneous natural gas burning equipment such as furnaces, boilers, Bunsen burners, kitchen equipment and clothes dryers. Aggregated total annual throughput CAN BE greater than 50 MMCF.**	**01/04/2002**
EU-PARTS-CLEANER	**Small cold cleaner < 10 SF in the University Grounds Equipment area. (Not inspected.)**	**01/01/1985**
EU-PWRGENERATION	**One Solar turbine with heat recovery steam generator (HRSG). Turbine is a Solar Taurus 70-10801S Axial turbine fired with natural gas. The turbine is equipped with So-Lo-NOx technology for the control of NOx emissions. The turbine has a rated heat release of 90.3 MMBtu/hr. The emission unit also includes a 62.2 MMBtu/hr. duct burner and heat recovery boiler fired with natural gas.**	**12/01/2017**
EU-WOODCOVERS	**Various wood coatings applications on a non-production basis in the University Carpentry shop. (Not inspected.)**	**01/01/1995**

Compliance Evaluation

We arrived at a parking lot adjacent to the Physical Plant. No visible emissions or odors were noted although the air was very smoky due to Canadian wildfires.

We held a brief meeting in the parking lot prior to the inspection with Geoffrey McGowan, the Foreperson for the Energy Center where the cogeneration system along with 2 older natural gas fired boilers and a couple of diesel-powered emergency generators are located.

We then traveled over to the Energy Center to begin the inspection. Outside, we first measured height using our range finder. It was measured to be 75 feet high which matched permit requirements. We then located at steam boilers EU-HP-BLR1-PT003 and EU-HP-BLR2-PT004. See attached photos. They were not operating and typically do not operate in the Summer and are only operated during particularly cold conditions in the Winter. Despite their age, they appeared to be well maintained.

Next, we went to the control room of the Cogen unit and spoke with the Operator there. The Campus was using 6302 KW of power with only 286 KW being imported from offsite. One of the five duct burners was operating. (Note: PTI only mentions one duct burner.)

The SoLoNOx mode was "enabled". Natural gas flow was at 3104 lb/hour. The "Turbine Load Bias" was at 87% which meant the SoLoNOx system as operating properly. If it drops below 47%, an alarm sounds and a clock starts till the load bias improves. If below, 47%, it would likely indicate an NOx exceedance. So far in 2023, only 23 minutes were in alarm condition. The Operator was unable to fully describe the term "Turbine Load Bias" as some of the info that goes into this number is proprietary from the maker of the Turbine; Solar.

Next, we looked at 2 emergency generators that were in/outside the Power Center. They appeared to be well maintained. Reportedly, they are operated 15 minutes each week to test them. One of them is used to start the Cogen from a cold start while the other smaller one is used for general plant purposes. We found the name plate on one of them which indicated that it was 1214 Hp in size, June 2017 model and had been operated for a total of 163 hours since installed. This was probably EU-DENG-PH although that one is listed as being installed in 2010 per MAERS report. Reportedly, they have a company that comes in to do the required monthly maintenance. We did not look at the other 3 generators that are located elsewhere on Campus. (Note: PTI suggests at least one natural gas fired emergency generator while MAERS suggests that they are oil fired.) EMU maintains the engines regularly with oil and filter changes along with routine startups. Non-resettable hour meters were observed at the time of inspection, all of which were well below the 100 hour limit per 12-month rolling time period for required maintenance.

EMU submitted their 2022 MAERS report back in March. It showed a total of 30 tons of NOx, 25 tons of CO, and lesser amounts of other pollutants. All of these numbers suggest compliance with their emission limits.

As a follow-up to the onsite inspection, the following email was sent to EMU later in the day to request records to further investigate compliance with their opt-out permit:

"We completed our inspection earlier this afternoon and have some follow-up questions/records that we would like to request.

1. ***When has air emission stack testing been conducted on EU-POWERGENERATION and what were the results?***
2. ***Per condition VI. MONITORING/RECORDKEEPING 1., please provide a copy of a parameter monitoring plan for EU-POWERGENERATION.***
3. ***Per condition VI. MONITORING/RECORDKEEPING 2.a for FG-FACILITY, please provide monthly fuel usage records for all fuel burning equipment in FG-FACILITY for 2023 through the end of May.***
4. ***Per condition VI. MONITORING/RECORDKEEPING 2.b For FG-FACILITY, please provide NOx and CO emissions on a monthly and rolling 12-month rolling timer period for FG-FACILITY for 2023 through the end of May."***

A response was received on 7/10/2023.
Wanted to follow up with the information requested per your recent inspection:

1. *When has air emission stack testing been conducted on EU-POWERGENERATION and what were the results?* *The test was conducted on May 22, 2018 and the results are attached.*
2. *Per condition VI. MONITORING/RECORDKEEPING 1., please provide a copy of a parameter monitoring plan for EU-POWERGENERATION.* *A parameter monitoring plan is not in place.*
3. *Per condition VI. MONITORING/RECORDKEEPING 2.a for FG-FACILITY, please provide monthly fuel usage records for all fuel burning equipment in FG-FACILITY for 2023 through the end of May.* *Currently attached.*
4. *Per condition VI. MONITORING/RECORDKEEPING 2.b For FG-FACILITY, please provide NOx and CO emissions on a monthly and rolling 12-month rolling timer period for FG-FACILITY for 2023 through the end of May.* *Attached is the NOx and CO emissions data on a monthly basis for 2023.*

Review of the information provided by EMU showed compliance except for one testing issue associated with the COGEN boiler.

PTI 39-18 has the following condition:

"V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. (R 336.1201(3))

1. Within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup, federal Standards of Performance for New Stationary Sources require verification of NO_X emission rates from EU-POWERGENERATION, by testing at owner's expense, in accordance with 40 CFR Parts 60.8 and 60.4400.

a. The permittee shall conduct three separate test runs, at least 20 minutes each, at ambient temperatures greater than 0 °F, and at any load condition within ±25 percent of 100 percent peak load.
b. Testing must be conducted annually (at least every 14 calendar months).
c. **If the stack test result is less than or equal to 75 percent of the NOx limits in SC I.3, I.2, and I.4, the test plan can be changed to once every two years (at least every 26 calendar months). If subsequent test results yield NO_X emissions greater than 75 percent of the NO_X limit in SC I.1, I.2, and I.3, annual testing must be resumed.**
d. Subsequent stack testing is not required if the permittee shows continuous compliance with the NOx emission limits with the continuous parameter monitoring system pursuant to 40 CFR 60.4340(b)(ii), as specified in SC VI.1.
e. Stack testing procedures and the location of stack testing ports shall be in accordance with the applicable Federal Reference Methods, 40 CFR Part 60 Appendix A."

Since it has been more than 5 years since last stack test and EMU doesn't have a continuous parameter monitoring plan that can be used in lieu of stack testing, they are out of compliance with PTI 39-18 Condition: EU-POWERGENERATION V. TESTING/ SAMPLING 1.

Compliance Determination and Recommendations

After onsite inspection and review of provided documents which were provided via email on 7-10-2023 and review of the 2021 MAERS, I have determined that this facility is out of compliance with PTI 39-18 Condition: EU-POWERGENERATION V. TESTING/SAMPLING 1. EMU has failed to test for NOx every 2 years from the COGEN boiler as required by the PTI and federal regulations.

EMU will be issued a Violation Notice and given 21 days to provide a written response that includes the date the violation occurred; an explanation of the causes and duration of the violation; whether the violation is ongoing; a summary of the actions that have been taken and are proposed to be taken to correct the violation and the dates by which these actions will take place; and what steps are being taken to prevent a reoccurrence.

Image 1(Boiler 1) : Steam Boiler 1 (Grandfathered) Natural gas

Image 2(Boiler 2) : Natural gas fired Boiler 2.

Image 3(COGEN Diagram) : COGEN Diagram

NAME Mike Kovalchick DATE 6/28/2023 SUPERVISOR