

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

N735073902

FACILITY: MICHIGAN TECHNOLOGICAL UNIVERSITY		SRN / ID: N7350
LOCATION: 1400 TOWNSEND DR., HOUGHTON		DISTRICT: Marquette
CITY: HOUGHTON		COUNTY: HOUGHTON
CONTACT: David Krings , Director of Energy Management and Sustainability		ACTIVITY DATE: 09/24/2024
STAFF: Joe Scanlan	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Unannounced inspection to determine compliance with PTI No. 91-04A		
RESOLVED COMPLAINTS:		

REGULATORY AUTHORITY

Under the Authority of Section 5526 of Part 55 of NREPA, the Department of Environment, Great Lakes, and Energy may upon the presentation of their card, and stating the authority and purpose of the investigation, enter and inspect any property at reasonable times for the purpose of investigating either an actual or suspected source of air pollution or ascertaining compliance or noncompliance with NREPA, Rules promulgated thereunder, and the federal Clean Air Act.

FACILITY DESCRIPTION

The Michigan Technological University (MTU) Central Energy Plant generates and delivers steam to each main campus building for space heating, cooking, and domestic hot water, and also provides electricity to the entire campus during emergency power outages. The Central Energy Plant houses four large boilers which operate primarily on natural gas but may also be fired with No. 2 fuel oil during natural gas curtailments. The Plant also houses four large emergency generators that are fired on No.2 fuel oil to provide power to the entire campus during emergency power outages. Adjacent and to the Central Energy Plant are seven (7) 30,000-gallon tanks containing No. 2 fuel oil and/or biodiesel to supply the boilers and emergency generators.

EMISSIONS

The facility has a potential to emit greater than the emission thresholds of 100 tons per year (tpy) of CO, 40 tpy of NOx, or 40 tpy of SO2. PTI No. 91-04A is an opt-out permit, which establishes emission and operational limits, enforceable by the AQD and/or the United States Environmental Protection Agency (USEPA), to reduce a source's potential to emit to below the major source thresholds and therefore allows the source to avoid the requirements of the Renewable Operating Permit program. Therefore, PTI No. 91-04A contains source-wide emission limits in FGPLANT for CO, NOx, and SO2.

MTU operates four (4) large boilers (FGBOILERS) with emission limits for CO, NOx, and SO2. These four boilers are primarily fired with natural gas but may also fire No. 2 fuel oil during natural gas curtailments. CO and NOx emission limits are due to the combustion of natural gas and No. 2 fuel oil, and there are separate emission limits for each fuel type. Combustion of pipeline quality natural gas produces trace amounts of SO2 due to a very low sulfur content, therefore the SO2 emission limit for FGBOILERS is for when the emission units are burning only No. 2 fuel oil.

MTU also operates four (4) identical Caterpillar G3516B 69.0-liter V-16 diesel generator sets (FGGENERATORS) with emission limits for CO and NOx. These engines may operate on either No. 2 fuel oil or biodiesel with separate emission limits for each fuel. Each generator is capable of producing 2,250 kW, and all four generators combined can produce a total generating capacity of 9.0 MW at 12,470 volts during emergency situations. Engine exhaust is vented to the atmosphere through identical individual exhaust systems extending from the engine to stacks exiting the roof of the building. Emissions are controlled by oxidation catalyst between the engines and exhaust stacks. These units are subject to 40 CFR Part 63, Subpart ZZZZ.

EMISSIONS REPORTING

As a Title V opt-out and synthetic minor source, MTU Central Energy Plant was required to report its annual emissions via the Michigan Air Emissions Reporting System (MAERS), and more recently via MiEnviro Portal . Facility staff was not aware of the annual reporting requirements and has never reported annual emissions, although will began to do so beginning with the FY25 reporting season.

COMPLIANCE HISTORY

The facility has not received any violation notices in the past.

INSPECTION

Marquette District AQD staff Joseph Scanlan (myself) and Jarod Maggio arrived at the facility on 9/24/2024 and met with David Krings, Director of Energy Management, and Steve Store, Energy Plant Manager.

Emission Unit ID	Description of Emission Unit	PTI#	Installation/Modification Date
EUBOILER1R	156 mmBtu/hr boiler fired w/nat. gas and #2 fuel oil	PTI# 91-04A FGBOILERS	1971
EUBOILER2	39.4 mmBtu/hr boiler fired w/nat. gas and #2 fuel oil	PTI# 91-04A FGBOILERS	1950
EUBOILER3	39.4 mmBtu/hr boiler fired w/nat. gas and #2 fuel oil	PTI# 91-04A FGBOILERS	1957
EUBOILER4	96 mmBtu/hr boiler fired w/nat. gas and #2 fuel oil	PTI# 91-04A FGBOILERS	1964
EUGENERATOR1	Caterpillar model 3516B 2250 kilowatt diesel generator set	PTI# 91-04A FGGENERATORS	10/01/2006

Emission Unit ID	Description of Emission Unit	PTI#	Installation/ Modification Date
EUGENERATOR2	Caterpillar model 3516B 2250 kilowatt diesel generator set	PTI# 91-04A FGGENERATORS	10/01/2006
EUGENERATOR3	Caterpillar model 3516B 2250 kilowatt diesel generator set	PTI# 91-04A FGGENERATORS	10/01/2006
EUGENERATOR4	Caterpillar model 3516B 2250 kilowatt diesel generator set	PTI# 91-04A FGGENERATORS	10/01/2006

FGBOILERS

On the day of inspection, EUBOILER2 was the only unit operating, producing steam at 14,772 lb/hr and firing 16,837 standard cubic feet per hour (SCFH) of natural gas. No fuel oil had been used on that day.

SC 1.1a – 1.1e

FGBOILERS has emission limits in PTI No. 91-04A for CO, NO_x, and SO₂ when firing either natural gas or No. 2 fuel oil. These emission limits may be verified by testing at the request of the AQD. No testing has been requested by AQD or conducted to date.

SC 1.2, 1.3 & 1.5

FGBOILERS emission units only fire natural gas or No. 2 fuel oil.

Natural gas usage shall not exceed 390 million cubic feet (MMcf) per 12-month rolling time period. Natural gas usage can be monitored daily from the local gas line totalizer at the Central Energy Plant or from monthly usage statements provided by the supplier (SEMCO). Natural gas usage records for FGBOILERS were provided for each month from September 2020 through September 2024 and show a 12-month rolling maximum of 326.8 MMcf (December 2022). 12-month rolling natural gas usage through August 2024 was 289.1 MMcf. The facility is in compliance with the natural gas limits for FGBOILERS.

No. 2 fuel oil usage shall not exceed 390,000 gallons per 12-month rolling time period. No. 2 fuel oil usage is tracked daily using flow rate monitors from the tank farm to the individual emission units. Fuel oil usage records were provided for each month from September 2020 through September 2024 and show a 12-month rolling maximum of 46,993 gallons (January 2022). 12-month rolling No. 2 fuel oil usage through August 2024 was 16 gallons. The facility is in compliance with the No. 2 fuel oil usage limits for FGBOILERS.

SC 1.4 & 1.6

Sulfur content of No. 2 fuel oil is not to exceed 0.5% by weight. Compliance with this limit is shown by maintaining fuel supplier certification records which state the specifications of the oil comply with the sulfur limit.

The most recent fuel analysis provided by the supplier (Flint Hills Resources) dated 11/02/2023 shows a sulfur content of 0.0015%.

SC 1.7a – 1.7d

Stack height was not verified by AQD staff; however, the facility provided the following measurements:

Section 1.7 - Stack/Vent Data

	Dia (in)	Maximum	Height (ft)	Minimum
1.7a SVBOILER1R	4.8	5.0	55.8	55.5
1.7b SVBOILER2	3.5	3.6	56.5	55.6
1.7c SVBOILER3	3.5	3.6	56.5	55.6
1.7d SVBOILER4	4.3	4.5	58.0	58.0

FGGENERATORS

On the day on inspection, none of the emergency generators were operating. Based on conversations with facility staff and fuel supply certification records provided, the facility only utilizes No. 2 fuel oil in the FGGENERATORS emission units. No biodiesel is on site or planned to be delivered. Each generator is equipped with a non-resettable hour meter.

SC 2.1a – 2.1d

FGGENERATORS has emission limits in PTI No. 91-04A for CO and NOx when firing either No. 2 fuel oil or biodiesel. These emission limits may be verified by testing at the request of the AQD. No testing has been requested by AQD; however, these emission units are also subject to 40 CFR Part 63, Subpart ZZZZ (RICE MACT), which requires testing every 3 years to show compliance with the MACT CO emission limit of 47.0 ppmvd@15% O2. The RICE MACT requirements applicable to the emission units in FGGENERATORS is not addressed in PTI No. 91-04A. The most recent stack test showing compliance with the CO emission limit in the MACT was conducted in September 2023, with CO emissions of 7.22 ppmvd@15% O2. This is well below the MACT limit. This test also showed CO emissions of 0.01 lb/MMBtu, which also well below the CO limit of 0.26lb/MMBtu in PTI No. 91-04A. No data exists for NOx emissions.

SC 2.2, 2.3, 2.4, & 2.5

FGGENERATORS emission units only fire No. 2 fuel oil. No biodiesel is on site or planned for delivery.

No. 2 fuel oil usage shall not exceed 329,918 gallons per 12-month rolling time period. No. 2 fuel oil usage is tracked daily using flow rate monitors from the tank farm to the individual emission units. Fuel oil usage records were provided for each month from September 2020 through September 2024 and show a 12-month rolling maximum of 10,665 gallons (July 2024). 12-month rolling No. 2 fuel oil usage through August 2024 was 8,866 gallons. The facility is in compliance with the No. 2 fuel oil usage limits for FGGENERATORS.

Sulfur content of No. 2 fuel oil is not to exceed 0.05% by weight. Compliance with this limit is shown by maintaining fuel supplier certification records which state the specifications of the oil comply with the sulfur limit.

The most recent fuel analysis provided by the supplier (Flint Hills Resources) dated 11/02/2023 shows a sulfur content of 0.0015%.

SC 2.6a – 2.6d

Stack height was not verified by AQD staff; however, the facility provided the following measurements:

Section 2.6 - Stack/Vent Data

	Dia (in)	Maximum	Height (ft)	Minimum
2.6a SVGENERATOR1	12	12	42	40
2.6b SVGENERATOR2	12	12	42	40
2.6c SVGENERATOR3	12	12	42	40
2.6c SVGENERATOR4	12	12	42	40

FGPLANT

FGPLANT has source-wide CO, NOx, and SO2 emission limits for the Central Energy Plant.

At the request of the AQD, spreadsheets were provided for the years 2020 through August of 2024 showing monthly and 12-month rolling fuel usage, monthly and annual emissions of CO, NOx, and SO2 for FGBOILERS and FGPLANT, and monthly and annual emissions of CO and NOx for FGGENERATORS. 12-month rolling

emissions calculations were not provided for any emission units. Additionally, it appears SO₂ emission calculations for FGGENERATORS were not included in the monthly or annual emission calculations for FGPLANT that were provided. No emission factors were cited for emission calculations provided. Total annual emissions in tons are listed in the table below for 2023:

Pollutant	Equipment	Limit (tpy)	Time Period Required in PTI	Time Period Provided by Facility	2023 Annual Emissions
CO	FGPLANT	24.8 tons per year	Rolling 12-month time period.	Annual	13.2 tons per year
NO _x	FGPLANT	89.1 tons per year	Rolling 12-month time period.	Annual	45.0 tons
SO ₂	FGPLANT	17.9 tons per year	Rolling 12-month time period.	Annual	0.05 tons

COMPLIANCE

Prior to this compliance inspection, the facility had no records of monthly or 12-month rolling emissions and had not been calculating actual emissions on a monthly or 12-month rolling basis based on daily fuel use information aggregated for the calendar month. This condition is specified in Appendix A of PTI No. 91-04A and is required to demonstrate compliance with the emission limits contained in special condition 3.1 of FGPLANT and Michigan Air Pollution Control Rule R 336.1205(3). Records shall be maintained for a period of five years.

The facility will need to amend their recordkeeping and emission calculation procedures to be in compliance with the emissions limits in PTI No. 91-04A. A violation notice will be issued due to prior noncompliance with R 336.1205(3) and the emissions calculation and recordkeeping requirements specified in Appendix A to show compliance with special condition 3.1 of PTI No. 91-04A.

NAME

DATE 11-22-24

SUPERVISOR