

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

B614563722

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| FACILITY: DTE Electric Company - Greenwood Energy Center | | SRN / ID: B6145 |
| LOCATION: 7000 KILGORE ROAD, AVOCA | | DISTRICT: Warren |
| CITY: AVOCA | | COUNTY: SAINT CLAIR |
| CONTACT: Zachary Josefiak , Environmental Specialist Coordinator | | ACTIVITY DATE: 07/20/2022 |
| STAFF: Kaitlyn Leffert | COMPLIANCE STATUS: Compliance | SOURCE CLASS: MAJOR |
| SUBJECT: FY2022 Inspection | | |
| RESOLVED COMPLAINTS: | | |

On July 20, 2022, I conducted a scheduled inspection of DTE Greenwood Energy Center (B6145), located at 7000 Kilgore Road, Avoca, MI. The purpose of the inspection was to determine the facility's compliance with the requirements of the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); the administrative rules; and the conditions of Renewable Operating Permit (ROP) No. MI-ROP-B6145-2018.

Greenwood Energy Center is an electric generating facility that is permitted to operate one main 785 MW boiler, two auxiliary boilers, and three peaking units, as well as cold cleaners, a fire pump, and a gasoline dispensing tank. The source is a major source for emissions of nitrogen oxides (NOx), sulfur oxides (SOx), Volatile Organic Compounds (VOCs), and Hazardous Air Pollutants (HAPs). Section 1 of the facility's ROP covers the main electric generating unit, which includes the main boiler, auxiliary boilers, cold cleaners, and a fire pump engine. Section 2 covers the three natural gas-fired peaking units.

I conducted the inspection on the same day as PM stack testing was to be completed on Boiler 1. The stack test observation is documented in a separate activity report. I arrived at the facility and first went to the testing area to observe testing. During the second test run, I departed the testing area to conduct my inspection. I met with Zach Josefiak, Environmental Specialist Contractor, DTE, and Rick Volz, Shift Supervisor, DTE, who led me on a walk-through of the facility. During my visit, I also discussed records collection and requested that all records be emailed to me for review following the in-person portion of the inspection.

Site Inspection

DTE Greenwood is considered a cycling plant and is used to fill long term gaps in electric supply. There have not been any significant changes to the operation of the plant since the previous inspection in July 2021. We first went by the East and West Auxiliary boilers. The West Auxiliary Boiler continues to be inoperable, as has been the case for many years now. The East Auxiliary Boiler is still utilized by the facility and was not operating at the time of my inspection. Next, we visited the main boiler room, where EUBOILER1 is located. Due to the stack test on the day of my inspection, the boiler was operating at peak conditions.

The facility has both a Continuous Emissions Monitoring Systems (CEMS) and Continuous Opacity Monitoring System (COMS), which measure emissions and opacity generated by the main boiler that exit through the main stack at the facility. The CEMS unit is required for SO2 monitoring as specified in 40 CFR Part 75, Subpart B, and for NOx monitoring as specified in 40 CFR Part 75, Subpart H. I reviewed the readout of the CEMS/COMS while at the facility. The readout showed the

current SO₂ emission rate was 0.002 lb/hour and the current NO_x emission rate was 0.49 lb/min. The COMS was reading 0.82% opacity the time of my inspection.

The facility continues to operate the same two cold cleaners that had been observed in previous inspections. One of the cold cleaners is in the machine shop, which as an air/vapor interface of 2.8 square feet, and the other on the first level of the plant, with an air/vapor interface of 5.5 square feet. During my inspection, I observed both cold cleaners. I noted that the covers were closed and operating instructions were clearly posted on both cold cleaners.

There is also a fire pump at the facility, which is for use in the case of emergencies. The emergency fire pump is powered by a Cummins Fire Power engines which is subject to 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. To satisfy the requirements of the NSPS, the fire pump engine is certified and a log of the hours that the engine operates is maintained by the facility. The fire pump has not yet been operated for use in emergencies, but it does run for approximately fifteen minutes per week to test it.

DTE Greenwood has a small gas pump on site, which is used for fueling DTE vehicles on-site. The gas pump has an associated 2,500 gallon gasoline underground storage tank. The gasoline dispensing equipment at this facility is subject to 40 CFR Part 63, Subpart CCCCC, National Emissions Standards for Hazardous Air Pollutants for Gasoline Dispensing Facilities. To achieve compliance with the MACT standard, the ROP requires that the pump be equipped with a permanent submerged fill pipe and a vapor balance system. The gas pump is equipped with this equipment. During my inspection, I did not observe any signs of leaks, spills, or vapor releases in the vicinity of the gas pump.

Following our inspection of the main building of the facility, we visited the peaking units (FG-CTGS), which are located adjacent to the main building. The peaking units are three natural gas-fired simple-cycle turbines equipped with dry low-NO_x combustors. During my inspection, the peaking units were not operating.

Stack Height

While on-site, I took measurements of the stack height on the main boiler using the Nikon Forestry Pro II Rangefinder. The permit requires that the stack height be at least 498 feet above ground level. The first measurement I made read 463 feet. The second measurement read 505 feet. Following the second measurement, I continued looking through the lens and noted heights ranged from 500 to 510 feet. The accuracy specified in the manufacturer's manual for the tool is +/-0.9 feet. While the first measurement I took was below the minimum stack height allowed by the permit, I attribute that to user error, since I was still getting used to the function of the device. Since additional measurements were above 500 feet, I consider the stack height to be in compliance with the minimum required height of 496 feet (EUBOILER1, VIII.1).

Recordkeeping and Reports: Section 1

The following review of the provided records and reports is broken out by the corresponding emissions unit or flexible group for Section 1 of the ROP, which covers the main boiler and associated equipment in the main building of the facility.

Main Boiler (EUBOILER1)

Sulfur dioxide emissions from EUBOILER1 are limited to 0.80 lb per million Btu heat input, as determined on a 3-hour average (Special Condition I.1). This sulfur dioxide limit is applicable to fuel oils burned at the facility. According to footnote (a) of the emission limit table, this emission limit is considered equivalent to using oil fuels with 0.78% sulfur content and a heat value of 19,390 Btu's per pound. The facility maintains records of sulfur fuel content, as well as heat input into the boilers, as required by S.C. V.1 and VI.2. The sulfur content of No. 2 fuel oil is 0.001%, with a heat value of 19,541 BTU/lb. The sulfur content of the No. 6 fuel oil is 0.62% sulfur, with a heat value of 17,490 BTU/lb. The sulfur content of the fuel oils used at the facility meet the sulfur dioxide emission limit specific in I.1.

Sulfur dioxide (SO₂) emissions are additionally limited to 5,760 pounds per hour, based on a 3-hour average (S.C. I.1). Compliance with this emission rate limit is based on the CEMs data. DTE Greenwood submits quarterly reports of excess emissions and monitoring system performance to show continued compliance with these emission limits. The quarterly reports submitted over the last year show ongoing compliance with the sulfur dioxide emission rate. Reported sulfur dioxide emissions are often 0.00 lb/hr, since natural gas has a very low sulfur content and is the primary fuel combusted in the main boiler.

Particulate matter (PM) emissions from EUBOILER1 are limited to 0.072 lb/BTU heat input, 518.4 lbs/hr, and 0.10 lbs/1,000 lbs of exhaust gases, all determined based on a 1-hour average (S.C. I.2). Compliance with the particulate matter emission limits for EUBOILER1 is demonstrated through stack testing, which is conducted every 3 years (S.C. V.2). PM stack testing was being conducted on the same day as my inspection. The results of that stack test were received on September 8th and reported a PM emission rate of 0.001 lbs/1,000 lbs of exhaust gases. The stack test results indicate compliance with the permitted PM emission rates.

Nitrogen oxide (NO_x) emission limits vary based on the fuel burned in EUBOILER1. The main boiler primarily operates on natural gas, but some fuel oils were also used in 2021 and 2022 so far. Therefore, the associated NO_x emission limits is 1,494 lbs/hour (S.C. I.3). Compliance with this emission rate is determine using CEMS data. The quarterly monitoring reports submitted by the facility in the past year indicate ongoing compliance with the hourly NO_x emission limit.

Opacity from the main boiler is limited to 20% per 6-minute period, except for one 6-minute period of not more than 27% (S.C. I.4). Opacity is measured by the continuous opacity monitor (COMS) and compliance with this limit is based on the COMS data. The quarterly reports submitted by the facility as well as the observed opacity of 0.82% on the day of the inspection indicate ongoing compliance with the permitted opacity limit.

The main boiler is permitted to utilize No. 2 fuel oil, No. 6 fuel oil, specification used oil, natural gas, or blends of these fuels (S.C. II.1). The provided fuel records indicate that natural gas, No. 2 fuel oil, and No. 6 fuel oil were burned. The last time No. 6 fuel oil was used at the facility was in July 2021. Since then, No. 2 fuel oil and natural gas were the only fuel combusted in the main boiler. Used specification oil was not used at the facility. The ROP contains additional limits on the quantity of halogens, lead, cadmium, chromium, arsenic, and PCBs in any specification used oil burned in the

main boiler. Since specification used oil is not currently used at the facility, these limits are not applicable.

I was provided monthly records of heating value of oil fuels, heat input to the main boiler from natural gas and from oil fuels, sulfur content of oil fuels, total operating hours, and the quantity of fuels burned in the main boiler, as required by EUBOILER1, S.C. VI.2. In June 2022, the boiler operated for 306 hours, and total heat input was 755,317 MMBTU from natural gas and was 204 MMBTU from No. 2 fuel oil.

The facility is required to submit semiannual reports of monitoring and deviations, annual certification of compliance, as well as quarterly excess emission, monitoring system, and opacity reports (S.C. VII.1 through VII.7). All required reports over the past year have been submitted in a timely manner and demonstrate compliance with the ROP conditions.

The main boiler also has an acid rain permit and is subject to the requirements of the Transport Rule (S.C. IX.1, and IX.5 through IX.7). Compliance with these programs is assessed by the Environmental Protection Agency (EPA).

East Auxiliary Boiler (EUEASTAUXBOILER)

NO_x emissions from the East Aux Boiler are limited to 0.090 lbs/MMBTU and 202.5 lbs/hr (S.C. I.1 and I.2). Compliance with these emission limits is determined based on stack testing (S.C. V.1). Stack testing is to be conducted upon request from EGLE AQD. There have not been any recent requests to conduct stack test on this unit.

Opacity from the East Aux Boiler is limited to 20% per 6-minute period, with the exception of any one 6-minute period of not more than 27% (S.C. I.3). To determine compliance with this standard, the facility is required to make regular visible emission (VE) observations and maintain records of these readings (S.C. VI.1 and VI.2). Appendix 3-1.5 in the ROP specified the frequency at which visible emissions observations should be made, based on the operating hours of the unit in each week. Regardless of actual operating hours, DTE chooses to instead take daily VE readings, which is the maximum possible frequency which readings may be required by the ROP. I was provided copies of the VE observation records for July 2021 through July 2022. The provided records indicate that visible emissions observations were made on every day that the boiler operated and that no visible emissions were observed any day that the boiler was operated.

The East Auxiliary boiler is subject to 40 CFR Part 63, Subpart DDDDD, National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters (Boiler MACT). In order to comply with these standards, the facility is required to complete five-year tune-ups and submit boiler tune-up reports to EPA (S.C. III.2, VII.5 and VII.6). In addition, the facility is to maintain records of each notification and report prepared to comply with the Boiler MACT standards (S.C. VI.4). DTE Greenwood has been completing the five-year boiler tune-ups and submitted the required reports.

I was provided copies of monthly records of hours of operation, total volume of natural gas consumed, as well as heat value (in BTUCF) and heat input (MMBTU), which satisfies the recordkeeping requirements in S.C. VI.3. Natural gas is the only fuel used in the east auxiliary boiler,

as required by S.C. II.1. In June 2022, the east aux boiler operated 79.15 hours had a heat input of 2,723 MMBTU.

West Auxiliary Boiler (EUWESTAUXBOILER)

As previously stated, the West Auxiliary Boiler is currently inoperable and there are no immediate plans to operate this unit. Therefore, no records were reviewed for this boiler.

Gasoline Distribution Area MACT (EU-GDF)

The gas pump at the facility is to be operated with a throughput less than 10,000 gallons per month, otherwise the equipment will become subject to additional regulatory requirements. The records provided by the facility indicate that monthly gasoline throughput ranged from 405 to 1,056 gallons per month over the past year.

Cold Cleaners (FG-COLDCLEANERS)

S.C. VI.2 requires that the facility maintain records of the model and serial numbers, installation date, air/vapor interface, Rule 201 exemption, Reid vapor pressure, and the type of solvent used for all cold cleaners located at the facility. The information on the cold cleaners has not changed since the previous inspection. Both of the cold cleaners use Zep Dyna 143 as the solvent. The Reid vapor pressure of each cold cleaner is 0.0097 psia. The ROP contains additional requirements if the Reid vapor pressure of the solvents exceeds 0.3 psia. S.C. IV.1 requires that the air/vapor interface of each cold cleaner be no more than 10 square feet. The provided records indicate that the air/vapor interface for the cold cleaner in the machine shop is 2.8 square feet, while the air/vapor interface for the one on the first floor is 5.5 square feet.

Rule 290 Exempt Sources (FG-RULE290)

The facility is required to keep an inventory of emission units that are claiming a permit exemption under Rule 290, as well as records of the type and quantity of air contaminants emitted from these units. The facility does not have any emission units exempt according to Rule 290 and therefore the requirements of this flexible group are not currently applicable.

Recordkeeping and Reports: Section 2

Section 2 of the ROP covers three natural gas-fired combustion turbine peaking units, which comprise one flexible group in the ROP (FG-CTGS). The units are subject to 40 CFR Part 60 Subpart A and Subpart GG. The emissions limits and associated testing, monitoring, and recordkeeping requirements in the ROP are used to demonstrate compliance with these standards. I was provided records of monthly and 12-month rolling NO_x, CO, formaldehyde, and PM emissions, as well as records of natural gas usage, total hours of startup and shutdown for each of three engines, capacity factors, and visible emission readings.

These peaking units are subject to 12-month rolling emission limits for nitrogen oxides (NO_x), carbon monoxide (CO), formaldehyde (HCHO), and particulate matter (PM) (S.C. I.1, I.2, I.3, and I.5). I was provided records of monthly and 12-month rolling emissions calculations for pollutants, as required by S.C. VI.3. The following table summarizes the permitted 12-month rolling total emission limits, the 12-month rolling total as of June 2022, as well as the highest recorded 12-month rolling total for FG-CTGS. For all pollutants, the highest 12-month rolling emissions over the past year were

recorded in May 2022. The provided records indicate that DTE Greenwood is operating in compliance with all permitted annual emission limits.

Table 1: Summary of 12-Month Rolling Emissions of NO_x, CO, Formaldehyde, and PM for FG-CTGS

| Pollutant | 12-Month Rolling Total Emission Limit (tpy) | 12-Month Rolling Total as of July 2022 (tpy) | Highest 12-Month Rolling [May 2022] (tpy) |
|--------------------|--|--|---|
| Nitrogen Oxides | 522 | 37.46 | 37.96 |
| Carbon Monoxide | 856 | 42.34 | 42.92 |
| Formaldehyde | 9.9 | 0.54 | 0.54 |
| Particulate Matter | 102 | 4.12 | 4.19 |

The permit also limits emissions of NO_x to 9 ppm by volume (ppmv) and emission of CO to 25 ppmv, both as averaged over operating hours in a calendar day (S.C. I.1 and I.2). Compliance with these emission limits is based on stack testing (S.C. V.1 and V.2). Stack testing of NO_x and CO emission rates is to be conducted every 20 calendar quarters. Testing to verify NO_x and CO emissions rates was completed the week before the inspection. Emissions of NO_x and CO are measured and reported at four different load levels: High, Mid-High, Mid-Low, and Low. The highest NO_x emissions measured during the stack test were 6.9 ppmv for CTG 11-1, 7.7 ppmv for CTG 11-2, and 6.0 ppmv for CTG 12-1. The highest CO emissions recorded were 6.1 ppmv for CTG 11-1, 19.8 ppmv for CTG 11-2, and 11.4 ppmv for CTG 12-1. The test results indicate that the facility is operating in compliance with the daily ppmv NO_x and CO emission limits.

Visible emissions from the peaking units are limited to 10% six-minute average opacity (S.C. I.4). Opacity is to be measured at least once every 1,812 hours of operation (S.C. V.3). Visible emissions observations were last completed on July 27, 2020 and no emissions were observed. All three of the units are approximately have operated for 1,400 – 1,460 hours since the last visible emissions observations were completed.

Natural gas usage from FG-CTGS is limited to 27,300 million cubic feet per 12-month rolling time total for FG-CTGS (S.C. II). I was provided records of natural gas usage, as required by S.C. VI.1. As of June 2022, 12-month rolling natural gas usage was 2,511.31 million cubic feet. The largest 12-month rolling natural gas usage over the previous year was 2,544.11 million cubic feet in May 2022. According to the provided records, natural gas is the only fuel burned in the peaking units, as required by S.C. III.4.

FG-CTGS S.C. III.2 limits total hours of startup, shutdown, and malfunction to 500 hours per turbine, as determined on a 12-month rolling period. The facility maintains records of the total number of start-up and shutdown hours per month per turbine (S.C. VI.2). Total 12-month rolling hours of startup, shutdown, and malfunction in June 2022 were 53.5 for CTG 11-1, 45.5 for CTG 11-2, and 48.8 for CTG 12-1. The highest 12-month rolling total hours of startup, shutdown, and malfunction were observed in May 2022, with 53.5 hours for CTG 11-1, 54.8 hours for CTG 11-2, and 59.4 hours for CTG 12-1.

The facility is required to monitor and record the capacity factor of each turbine in FG-CTGS each calendar year (S.C. VI.5). If the capacity factor for a single year exceeds 20% for an individual unit, or exceeds 10% averaged over three calendar years, then the facility is required to install a Continuous Emission Monitor System (CEMS) for NOx. The 3-year average capacity factors from 2020 to 2022 range from 4.4 to 4.7% for each individual turbine.

Conclusion

Based on my inspection of DTE Greenwood Energy Center and review of the recordkeeping, I find the facility to be operating in compliance with the conditions of Renewable Operating Permit MI-ROP-B6145-2018, as well as all other applicable air quality rules and regulations.

NAME *Kaitly Leffert*DATE 10/11/2022SUPERVISOR *K Kelly*