

M4854  
manilaDEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: On-site Inspection

M485468780

FACILITY: Sumpter Generating Plant		SRN / ID: M4854
LOCATION: 8509 RAWSONVILLE RD, BELLEVILLE		DISTRICT: Detroit
CITY: BELLEVILLE		COUNTY: WAYNE
CONTACT: Michael Wood , Generation Manager		ACTIVITY DATE: 08/22/2023
STAFF: Samuel Liveson	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Fiscal Year 2023 Inspection		
RESOLVED COMPLAINTS:		

SCHEDULED INVESTIGATION REPORT  
(PCE for an FCE source)**Date of Investigation:** August 22, 2023**Source:** Wolverine Power Sumpter Generation Plant**SRN:** M4854**Address:** 8509 Rawsonville Road, Belleville, Michigan 48111**Subject:** Fiscal Year 2023 Inspection**Author:** Sam Liveson and Jeff Korniski, Air Quality Division, Detroit District Office**Safety Equipment/Safety Training/Security:**

A hard hat, safety glasses, and steel-toed boots were worn during the visit. Visitors to the site must contact plant personnel from a phone outside the gate and wait for admittance. Once inside the gate, the plant office is in the near end of the building which is to the immediate right. This facility operates on-demand as a peaking plant; therefore, it is best to coordinate site visits with plant personnel. Typically, the plant will be aware of its operational status one day in advance.

**Facility Background:**

The Wolverine Power Sumpter Generation Plant (Wolverine Sumpter) is an electric power plant located at 8509 Rawsonville Road in Sumpter Township, just southwest of Belleville. This facility operates four natural gas fired combustion turbines as a peaking plant. Unlike a daily operated baseload plant, a peaking plant operates intermittently as the demand for electricity fluctuates.

This source is a Title V major source permitted to emit over 100 tons per year of carbon monoxide (CO) and nitrogen oxides (NOx). The source is a synthetic minor with regards to the Prevention of Significant Deterioration (PSD) regulations, as the facility accepted legally enforceable conditions to limit CO and NOx emissions to less than 250 tons per year each when the plant was constructed. Each combustion turbine is subject to the federal Standards of Performance for Stationary Gas Turbines (NSPS GG), the federal Acid Rain Program and the federal Cross-State Air Pollution Control Rule (CSAPR).

**Process Description:**

Wolverine Sumpter operates four General Electric PG7121 (EA) simple cycle combustion turbines. Each combustion turbine is fueled by pipeline quality natural gas, is equipped with low NOx burners, and has a nominal electrical output capacity of 83 megawatts (MW). None of the combustion turbines are equipped with add-on pollution control devices. Each combustion turbine vents to the ambient air through a dedicated stack that is equipped with a continuous emissions monitoring system (CEMS) for the measurement of NOx. The combustion turbines are termed "simple cycle" because the turbines vent to the atmosphere without additional heat recovery.

The facility also operates two 3.7 million British thermal unit per hour (MMBtu/hr) natural gas fired dew point heaters for moisture removal, a 1.48 MMBtu/hr diesel fired fire water pump engine, and small maintenance and machining areas.

**Summary of Facility Visit:**

On 8/22/2023 at approximately 2:45 PM, Air Quality Division (AQD) staff Sam Liveson and Jeff Korniski arrived at Wolverine Sumpter for an onsite inspection. Michael Wood, Generation Manager, provided information and a tour of facility operations relating to air quality permits and regulations. The site visit was scheduled the previous day, when

AQD was informed by Wolverine Sumpter that the plant was likely to operate on the 22nd. All four of the combustion turbines were in operation at the time of the visit.

The tour began with observation of the maintenance area, which is immediately east of the office in the same building. Here welding and machining are performed as needed for necessary repairs, and emissions are released to the general in-plant environment. There are no cold cleaners installed in the machining area.

The two dew point heaters were then observed. Dew Point Heater #1 is to the south and Dew Point Heater #2 is to the north. The dew point heaters heat the natural gas that comes into the plant from the pipeline to about 175°F, using propylene glycol as the heating medium, in order to remove residual moisture from the natural gas prior to combustion in the turbines. Both dew point heaters were in operation during the site visit. Each dew point heater is itself fueled by natural gas and is equipped with a totalizing gas flowmeter which registers a running total of the amount of gas combusted in the heater. At the time of the inspection, the meter for Heater #1 read 06800.47 hundred cubic feet, corrected for temperature, and the meter for Heater #2 read 93976.53 hundred cubic feet, corrected for temperature.

Next, the diesel fired fire water pump engine was observed. The engine is equipped with an hour meter that read 213 hours. The diesel fire water pump is the back up to the electric fire water pump that is also located in the same building.

The CEMS trailers for Unit 3 and then Unit 4 were visited, where the following values were recorded from the NOx CEMS. The values fluctuated during transcription and therefore are not concurrent with one another for either CEMS. The term “HSCFH” stands for hundred standard cubic feet per hour.

Parameter	Unit 3	Unit 4
O2 (%)	15.03	14.93
NOx Hi (ppm)	11.24	8.049
NOx Low (ppm)	11.66	8.099
Gas flow (HSCFH)	6980	6943
Load (MW)	55.44	55.11
Stack temperature	-25	-25
NOx (ppm)	11.61	8.2
NOx corr (ppm)	11.6	8.162
NOx (lb/MMBtu)	0.04237	0.03043
NOx (lb/hr)	0.494	0.3442

The first five parameters are the actual readings from the CEMS, while the final four parameters represent the CEMS calculated NOx values based on the monitored data. The “NOx Hi” and “NOx Low” values represent NOx readings measured by the dual NOx analyzers, one measuring with a span range of 0-100 ppm and the other measuring with a span range of 0-20 ppm. The “NOx Low” value was preferentially selected by the system as the “NOx” value at the time of the inspection because the ppm measured was below 20 ppm; if the NOx measured higher than 20 ppm the “NOx Hi” value would have been used for “NOx”. The “NOx corr” value is the “NOx” adjusted to an oxygen content of 15%. The stack temperature channel appears to not have been configured on either CEMS.

Finally, the control room was visited, where the following values were recorded from the monitoring data displayed for each of the four combustion turbines.

Parameter	Unit 1	Unit 2	Unit 3	Unit 4
Gas flow (HSCFH)	6954.0	6925.1	6900.4	6934.1
Load (MW)	55	54	54	55
O2 (%)	15.0	14.9	15.0	14.9
NOx Low (ppm)	8.5	6.8	11.9	8.3
NOx Hi (ppm)	8.3	7.2	11.3	8.3
NOx corr (ppm)	8.6	6.7	11.9	8.2

The State of Michigan is part of MISO (Midcontinent Independent System Operator), an electric power transmission system that covers portions of fifteen States in the Midwest and the South. As a peaking plant, the facility’s operations are dictated on a daily basis by the total amount of power that MISO forecasts will be required on its transmission lines and the price per MW that Wolverine Sumpter needs for its plant to run profitably. The local temperature registered in

the low 70s°F during the inspection but the high heat index throughout the MISO region was resulting in high demand and the need for additional MW to be supplied to the transmission system from peaking plants like Wolverine Sumpter. When operating, the number of combustion turbines Wolverine Sumpter chooses to run is determined by the additional MW needed and the limits of the four units at the plant. Each combustion turbine is nominally rated at a maximum of 83 MW. The efficiency of a combustion turbine decreases with load and so Wolverine Sumpter will rarely operate a turbine below of minimum of around 54-55 MW.

As a gas fired facility, Wolverine Sumpter is able to reach its required working load relatively quickly. Within the facility's Renewable Operating Permit (ROP) startup and shutdown is defined as the time periods in which the combustion turbine is operating at less than 41.5 MW (i.e. half-capacity) while either ramping up or ramping down from its target operating MW for the day. It was explained that it takes about 15 minutes from initial firing for a combustion turbine to warm and begin to ramp up in MW to the desired operating load. Once warm, a turbine is capable of increasing its power production at a rate of 7 MW per minute to reach its operating load. Therefore, it only takes approximately one half-hour for a turbine to transition from initial firing to full operating capacity.

The facility conducts a daily calibration each morning on each CEMS, in case one or more turbines are called upon to operate later that day. When a turbine operates the CEMS also undergoes a calibration as the turbine is firing on natural gas and then an evening calibration after the turbine shuts down. The facility will not further operate a turbine that fails a CEMS calibration.

The site visit concluded at about 4:30 PM.

#### **Compliance Status:**

Wolverine Sumpter was issued renewal ROP No. MI-ROP-M4854-2021 on 1/1/2021. No Permits to Install (PTI) have been issued to the facility since ROP renewal. Prior to the inspection of 8/22/2023 the last site inspection was conducted on 7/21/2021. In general, this report covers compliance activities that have occurred in the past year. On 8/31/2023, Wolverine Sumpter responded to a request for further information (8/31/2023 submittal). Compliance information was also obtained from the annual emissions inventory (MAERS) submitted by Wolverine Sumpter.

#### MI-ROP-M4854-2021, General Conditions (GC)

GC 11 – Compliance – Visible emissions limited to 20% over a six-minute average, with the exception of one 27% six-minute period per hour, unless otherwise specified in the ROP or in a federal new source performance standard. This limit applies to point source (non-fugitive) emission units at the plant

All four combustion turbines were in operation during the 8/22/2023 inspection. The exhaust point from the stack of each turbine was observable and no visible emissions were noted at any time during the site visit.

GC 12 – Compliance – Nuisance emissions prohibited – No citizen complaints have been received by the AQD Detroit District Office for Wolverine Sumpter in the period since the last inspection.

GCs 19 through 23, 25 (and under individual EU/FG tables at SCs VII.1 through 3) – Compliance – Semiannual deviation reports, Rule 912 reports, compliance certifications and report certifications – The most recent semiannual deviation reports were received on 9/20/2022 and 3/14/2023 and the annual certification was received on 3/14/2023.

GC 24 – Compliance – Submissions to the Emissions Inventory – The AQD received this facility's MAERS database for calendar year 2022 on 3/14/2023.

#### MI-ROP-M4854-2021, SOURCE-WIDE, Special Conditions (SC)

SOURCE-WIDE contains facility wide emission limits for CO and NOx to ensure the stationary source was a synthetic minor source for the Prevention of Significant Deterioration (PSD) regulations during its initial construction and during subsequent modifications to date. A fuel restriction for the dew point heaters is included within SOURCE-WIDE.

The dew point heaters are each rated at 3.7 MMBtu/hr, are fired on natural gas, and appear exempt from the PTI program pursuant to Rule 282(2)(b)(i) because the heat input of each heater is less than 50 MMBtu/hr. The dew point heaters are not subject to 40 CFR Part 63, Subpart DDDDD as the facility is not a major source of hazardous air pollutants (HAPs) as defined in 40 CFR 63.7485. The dew point heaters are not subject to 40 CFR Part 63, Subpart JJJJJ as the heaters do not meet the definition of an industrial, commercial, or institutional boiler, as defined in 40 CFR 63.11237.

SCs I.1 and 2, VI.2 – Compliance – Facility-wide emissions of CO and NOx each limited to less than 249 tons per 12-month rolling period; records required; these limits apply to aggregate emissions from permitted, exempt, and grandfathered equipment – Facility-wide CO and NOx emissions are reported at 40.4 tons and 53.1 tons, respectively, for

calendar year 2022 in MAERS. This facility started operations in 2002. The highest annual totals reported to MAERS occurred in calendar year 2018 when facility-wide CO and NOx emissions were reported at 61.1 tons and 88.9 tons, respectively.

SCs II.1, VI.3 – Compliance – Natural gas usage for the facility preheaters shall not exceed 60.12 million cubic feet on a 12-month rolling period; records required for each fuel burning process.

Natural gas usage for the preheaters is reported at 3.644 million cubic feet (MMcf) for calendar year 2022 in MAERS. The dew point meter readings for Heater #1 (South) and Heater #2 (North) from the end of 5/2022 through the end of 7/2023 were provided in the 8/31/2023 submittal. Monthly usage is calculated from the difference between the last two readings, which always occur at the end of the month. Usage was 12294 hundred cubic feet in Heater #1 and 11914 hundred cubic feet in Heater #2 for the 12-month period ending 7/2023, totaling 2.420 million cubic feet for both. It is noted that Heater #1 read “99900” at the end of 1/2023 and “620” at the end of 2/2023, indicating that the meter turns over at “99999”.

Diesel fuel usage for the fire water pump is reported at 124 gallons for calendar year 2022 in MAERS. Natural gas usage for the turbines in calendar year 2022 is reported at 761.1 MMcf (Unit 1), 775.87 MMcf (Unit 2), 737.39 MMcf (Unit 3), and 726.66 MMcf (Unit 4).

#### MI-ROP-M4854-2021, EU-FWP, Special Conditions

These special conditions pertain to the diesel fired compression ignition engine working the emergency fire water pump which, according to the ROP, was installed in 2002 when the plant was constructed.

The compression ignition engine is rated at 1.48 MMBtu/hr and appears exempt from the PTI program pursuant to Rule 285(2)(g) because the heat input capacity is less than 10 MMBtu/hr. This 2001 model year engine is not subject to 40 CFR Part 60, Subpart IIII because it was manufactured prior to 4/1/2006 (40 CFR 60.4200(a)).

The compression ignition engine is subject to 40 CFR 63, Subpart ZZZZ as an existing engine at an area source of HAPs (40 CFR 63.6585). The requirements in this subpart are incorporated into the ROP within this emission unit table. The engine is not equipped with add-on air pollution control and therefore SCs III.4, VI.5, and VI.7 are not applicable at this time. The facility does use an oil analysis program for the engine and therefore SCs III.5 and V.1 are not applicable at this time.

SCs II.1, VI.3 – Compliance – Combust only diesel fuel and with sulfur content limited to 0.05 percent by weight; records of sulfur content – Diesel is the only fuel reported for the fire water pump during calendar year 2022 in MAERS. The analytical results for the most recent shipment of diesel fuel, dated 6/22/2021, shows a sulfur content of 0.00020 percent by weight (8/31/2023 submittal).

SCs III.1, III.6 through 8, IV.1, VI.1 and 2 – Compliance – Limited to 500 hours per 12-month rolling time period, 100 hours per year for maintenance/readiness checks, 50 hours per year for non-emergency situations; must minimize engine's time at idle during startup, not to exceed 30 minutes; non-resettable hour meter on fire water pump engine; records.

The non-resettable hour meter was installed and displayed 213 hours at the time of the inspection. Based on the engine hour readings on the maintenance logs the engine only operates about 20-30 hours a year. The hour meter was likely installed in 2011 or 2012 for the purpose of complying with MACT ZZZZ.

SCs III.2, III.3, and VI.8 – Compliance – Operate and maintain the engine in a manner to minimize emissions; change the oil and filter, inspect the air cleaner, and inspect hoses/belts on an annual basis; records.

These work practice requirements may be performed every 500/1,000 hours or annually, depending on the usage of the engine. As an emergency engine that has not be utilized extensively the work practice standards default to annual maintenance. Maintenance records were provided in the 8/31/2023 submittal which document the annual maintenance is being conducted.

SCs VI.4 and 6 – Compliance – Keep records of malfunctions and actions taken during malfunctions to minimize emissions. As this engine is only operated for 20-30 hours per year, and presumably for short periods of time to test for readiness, the engine is assumed to be in compliance with this condition. No malfunctions have been reported on the most recent ROP semiannual deviation reports.

SC IX.1 – Compliance – Shall comply with the federal National Emissions Standards for Hazardous Air Pollutants as specified in 40 CFR 63, Subparts A and ZZZZ, for Stationary Reciprocating Internal Combustion Engines – Applicable provisions of this standard are the basis for most of the SCs within EU-FWP.

MI-ROP-M4854-2021, FG-TURBINES, Special Conditions

SCs I.1 through 3, V.1, VI.8, Appendix 3 – Compliance – CO emissions from each combustion turbine limited to 63.8 pounds per hour during startup and shutdown and 0.057 pounds per million Btu (hourly basis) during normal operation; collectively, CO emissions from all turbines operating at all times limited to 246.1 tons per 12-month period; annual CO testing required; records required.

The CO emission limit of 63.8 pounds per hour during startup and shutdown is a calculated value estimated by the original permittee (FirstEnergy) and submitted as part of the original PTI application for this source (PTI No. 247-00).

The estimate was based on emissions vs. load curves provided by the manufacturer (General Electric) and assumes a typical transition through startup and shutdown. Compliance with the limit has been assumed provided that a combustion turbine does not stop and operate for long periods during startup or shutdown mode, which is defined in the ROP as an operating load less than 41.5 MW.

Compliance with the CO emission limit of 0.057 pounds per million Btu during normal, or steady-state, operation is determined through an annual stack test rotated amongst each of the four turbines such that each turbine is tested once every four years. The most recent results, in pounds per million Btu, are 0.005 for Unit 2 (2023), 0.006 for Unit 1 (2022), 0.027 for Unit 4 (2021), and 0.0056 for Unit 3 (2020).

Compliance with the annual CO emission limit of 246.1 tons per year across all turbines and operating conditions is the sum of startup/shutdown emissions and steady-state emissions. Startup/shutdown emissions are calculated by assuming each startup/shutdown event lasts for one hour and emits 63.8 pounds CO. Steady-state emissions are calculated from the stack test data and the annual fuel flow in each turbine. In the MAERS for 2022, there were a total of 686 startup/shutdown hours across all turbines resulting in CO emissions of 21.9 tons. Natural gas combusted in the turbines totaled 3001 million cubic feet in calendar year 2022 and resulted in CO emissions of 18.4 tons. Total CO emissions from the combustion turbines sum to 40.3 tons for 2022.

SCs I.4 and 5, V.2, VI.3 and 4 and 7, VII.5 and 6, Appendix 3 – Compliance – NOx emissions from each combustion turbine limited to 75 parts per million by volume (ppmv) on a 4-hour rolling average, dry basis and 15% oxygen which does not apply to periods of startup and shut down; NOx emissions from all turbines operating at all times limited to 244.4 tons per 12-month period; NOx monitored by CEMS meeting requirements under 40 CFR 75; records required; quarterly reports of NOx CEMS performance.

All four combustion turbines were observed operating during the inspection of 8/22/2023 and emitting NOx in concentrations less than 75 ppmv as measured by a CEMS; the NOx concentration from Unit 3 was the highest at around 12 ppmv. In addition, NOx emissions in ppmv were measured by both the CEMS and by stack test during the annual Relative Accuracy Test Audits (RATA) conducted from 6/13/2023 to 6/16/2023 on Units 1 through 4. The average NOx measured for Units 1, 2, 3, and 4 during the RATA were 8.2 ppmv, 6.8 ppmv, 10.7 ppmv, and 8.8 ppmv, respectively. No exceedances of the NOx limit have been reported in the quarterly excess emissions reports or in the semi-annual deviation reports for the past year. In the MAERS for 2022, NOx Units 1, 2, 3, and 4 are tabulated at 13.0 tons, 10.8 tons, 15.5 tons, and 13.6 tons, respectively, for a total of 52.9 tons across all turbines. CEMS downtime, as reported in the quarterly reports, has been minimal.

SCs II.1 through 3, VI.2 and 5 and 6 – Compliance – Turbines shall only combust natural gas with a sulfur content limited to 20 grains per 100 standard cubic feet and gross caloric value between 950 and 1100 Btu; natural gas usage limited to 8,449 MMcf per 12-month rolling time period; monitoring of fuel usage on each turbine; sulfur content limited to 20 grains per 100 standard cubic feet; monitoring and records of sulfur content and fuel usage.

Fuel use was observed being monitored for each combustion turbine during the inspection. Natural gas use was around 6,900 hundred cubic foot per hour for each turbine. Natural gas use is tracked on a 12-month rolling time period. From the MAERS, calendar year 2022 use ranged from 776 MMcf in Unit 2 to 727 MMcf in Unit 4 and totaled 3,001 MMcf for all four turbines combined. Analytics of a natural gas sample dated 7/27/2023 measured a sulfur content of 0.076 grains per 100 cubic feet and a gross caloric value of 1066 Btu (dry) and 1047 Btu (wet).

SCs III.1 and 2, VI.9 and 11 – Compliance – Maintain and operate in accordance with an approved plan for the minimization of emissions from startups, shutdowns, and malfunctions; minimize startup and shutdowns; keep a record of startups and shutdowns.



An approved Startup, Shutdown, and Malfunction Abatement Plan of July 2015 is maintained and is followed. Startup/shutdown hours are tracked and were reported in the MAERS for 2022 as 190 hours for Unit 1, 174 hours for Unit 2, 162 hours for Unit 3, and 160 hours for Unit 4.

SC VI.10 – Compliance – Maintain documentation acceptable to AQD confirming the installation of dry low NO<sub>x</sub> natural gas burners – Documentation was submitted during the original permit application (PTI No. 247-00) that low NO<sub>x</sub> burners would be a part of the installation, and the combustion turbines are emitting NO<sub>x</sub> in the range of performance expected from use of this technology (approximately 10 ppmv).

SCs VIII.1 through 4 – Compliance – Each combustion turbine shall vent unobstructed vertically at a height not less than 60.0 feet above ground and with a maximum diameter/dimension of 180 inches – These stacks were from ground level during the inspection of 8/22/2023 and judged in compliance with these requirements, though measurements were not performed.

SC IX.1 – Compliance – Shall comply with the federal Standards of Performance for New Stationary Sources as specified in 40 CFR 60, Subparts A and GG for Stationary Gas Turbines.

Applicable provisions from NSPS GG have been incorporated into MI-ROP-M4854-2021, FG-TURBINES at SCs I.4, II.1 and 2, and VI.5. The initial performance test required under 40 CFR 60.8 was conducted on each turbine in 2002. Each turbine met the NO<sub>x</sub> emission limit of 75 ppmv on a dry gas basis and at 15% oxygen, as specified in 40 CFR 60.332(a)(1) and incorporated into SC I.4; the highest NO<sub>x</sub> concentration measured 7.5 ppmv.

SCs IX.2 through 7 – Compliance – Shall comply with the federal Acid Rain program and the federal Cross-State Air Pollution Rule (CSAPR).

Appendix 9 of the ROP contains the facility's Phase II Acid Rain Permit No. MI-AR-7972-2021. Appendix 10 of the ROP contains provisions of the CSAPR applicable to the facility. A review of the Acid Rain and CSAPR compliance data on the EPA Clean Air Markets webpage ([campd.epa.gov](http://campd.epa.gov)) for Wolverine Sumpter, listed under the ORIS code 7972, indicates the facility is in compliance with these federal programs for calendar year 2022.

#### Permit to Install Exempt Equipment

The following equipment at the facility appears to be exempt from the requirement to obtain a Permit to Install under Rule 201(1) by the following:

\*The dew point heaters are each rated at 3.7 MMBtu/hr, are fired on natural gas, and appear exempt pursuant to Rule 282 (2)(b)(i) because the heat input of each heater is less than 50 MMBtu/hr.

\*The compression ignition engine is rated at 1.48 MMBtu/hr and appears exempt pursuant to Rule 285(2)(g) because the heat input capacity is less than 10 MMBtu/hr.

\*Activities in the machining area appear exempt pursuant to Rules 285(2)(l)(vi)(B) because emissions are released into the general in-plant environment. Welding activities are exempt pursuant to Rule 285(2)(i).

#### **Conclusion:**

At the time of completion of the investigation the Wolverine Power Sumpter Generation Plant appears to be in compliance with applicable State and federal regulations.

NAME

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DATE

11/19/2024

SUPERVISOR

JK