

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection



N711354203

FACILITY: Michigan Public Power Agency		SRN / ID: N7113
LOCATION: 1750 Prough Road SW, KALKASKA		DISTRICT: Gaylord
CITY: KALKASKA		COUNTY: KALKASKA
CONTACT: Matt Burk , Power Feneration Services Lead		ACTIVITY DATE: 07/09/2020
STAFF: Sharon LeBlanc	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled site inspection for 2020 Fiscal Year. sgl		
RESOLVED COMPLAINTS:		

On Thursday, July 9, 2020, AQD District Staff mobilized to the Michigan Public Power Agency – Kalkaska CT#1 Facility (MPPA-Kalkaska) to conduct a scheduled site inspection. The referenced facility is located at 1750 Prough Road, Kalkaska, Kalkaska County, Michigan. (N7113). The referenced facility is a peaking unit, providing electricity during peak load periods. The referenced facility operates under Renewable Operating Permit (ROP) MI-ROP-N7113-2016a.

Mr. Matt Burk and other Traverse City Light & Power Staff provided information regarding the site and site activities. The site was not operating at the time of the inspection.

The previous site inspection was conducted on February 8, 2018. The facility was determined to be in compliance at the time of the inspection.

FACILITY

The MPPA-Kalkaska Facility is an unmanned peaking station located at 1750 Prough Road, Kalkaska, Michigan. The facility is in an industrial area southeast of the City of Kalkaska occupied by other energy related facilities. A drive-by of the area identified a limited number of industrial properties (predominantly oil and gas) including Merit Energy (B4292), Wolverine Power Supply (N6522), DTE Kalkaska Compressor Station (N3341) Kalkaska Gas Processing Plant (B8972), and undeveloped parcels in the immediate vicinity of the MPPA-Kalkaska Facility. A limited number of residential properties are located along the south side of Thomas Road.

The facility was constructed in 2002 and is reported to be ran for short periods of time to provide additional power during periods of high load. The Facility may run one or both turbines as required and is reported to be able to be started and brought on-line quickly and remotely. When in operation, an operator is normally onsite to monitor the activities, which can also be monitored remotely from Company offices in Traverse City. Noteworthy to visitors is the unique lightening array system utilized onsite which has been reported to have prevented damage to the Facility during the approximately 10 years since it was installed onsite.

The Facility is controlled using operating software that is programmed using operating curves of water to fuel ratios established during testing. The software is reported to shut down the Facility should any parameters exceed the ranges and thresholds established during testing.

Changes at the facility included: installation of a trailer to act as an office/breakroom for staff when onsite. At the time of the February 8, 2018 site inspection, changes at the Facility included: replacement of EUHTRBOILER as well as an upgrade of turbine control hardware and software in 2017.

At the time of the inspection, a borescope inspection of the turbines was scheduled to be completed. This allows for inspection of hard to access portions of the turbine using an optical device equipped with a flexible tube. Boreoscope inspection of the turbines was being conducted by a contractor. Discussions with MPPA staff indicated that the inspections are conducted to observe the conditions of inaccessible points within the turbine for cracks and breakage, some of which may require immediate repairs, or may be monitored over a period of time to provide data on the life of parts.

Weather conditions at the time of the site inspection consisted of mostly sunny skies, and temps in the low-mid 70's. The turbines were not in operation at the time of the inspection due to the ongoing boreoscope inspection.

PERMITTING

As indicated above, the MPPA-Kalkaska Facility is presently operating under ROP MI-ROP-N7113-2016a. The document was approved on July 1, 2016 and modified on February 21, 2018. The purpose of the modification was to incorporate PTI 25-02B, which was approved on September 1, 2017. The Initial PTI 25-02 was approved on May 13, 2002 and was rolled into the ROP on August 5, 2005.

REGULATORY

The MPPA-Kalkaska Facility has the following classifications based on Potential to Emit (PTE):

CLASSIFICATION	PARAMETER	COMMENT
Major	NOx	PSD synthetic minor for NOx
Minor	SO2, CO, Pb, PM, VOC	
Area	HAPs	

In addition, the source is subject to the following:

EMISSION UNIT	40 CFR SUBPART	TITLE
Source	Part 70	State Operating Permit Program
EU-TURBINE1A & EU-TURBINE1B	Part 75	Federal Acid Rain Program
EU-TURBINE1A & EU-TURBINE1B	Part 97, Subpart AAAAA	Federal Transport Rule NOx Annual Trading Program
EU-TURBINE1A & EU-TURBINE1B	Part 97, Subpart BBBBB	Transport Rule NOx Ozone Trading Program
EU-TURBINE1A & EU-TURBINE1B	Part 97, Subpart CCCCC	Transport Rule SO2 Group 1 Trading Program
EU-TURBINE1A	Part 60, Subpart A	Standards of Performance for

& EU-TURBINE1B	and GG	Stationary Gas Turbines
EU-FPENGINE	Part 63, Subpart A and ZZZZ	National Emission Standards for HAPs for Stationary Reciprocating Internal Combustion Engines (RICE)

The Facility appears to not be subject to the following subparts for the given reasons:

40 CFR SUBPART	COMMENT
40 CFR Part 60 Subpart DC – Small Steam Generating Units	EU-HTRBOILER has a design heat input of less than 2.9 MW (10 MMBtu/hr)
40 CFR Part 63, Subpart DDDDD -- Industrial, Commercial and Institutional Boilers and Process Heaters (BOILER MACT)	EU-HTRBOILER is a hot water boiler with a heat input of less than 1.6 million BTU/hr which are not subject to Boiler MACT. EU-GASHEATER is not classified as a boiler, and would not be subject to Area Boiler MACT requirements.
40 CFR Part 60 Subpart JJJJ – Spark Ignition RICE	EU-FPENGINE has an installation date of 2002 (prior to 2006 applicability date)
40 CFR Part 60 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines	This subpart is applicable only to Turbines greater than 10 MMBtu/hr heat input at peak load constructed, modified or reconstructed after February 18, 2005 (after the 2002 construction date).

EQUIPMENT

EUs identified in the ROP EU Summary Table consist of:

- **EU-TURBINE1A,**
- **EU-TURBINE1B,**

Two NG-fired, simple cycle, 273.15 MMBtu/Hr nominal heat input, Pratt and Whitney FT8-1 Twin Pac turbine set (FG-TURBINES). They are nominally rated at 55 MW and 546.3 MMBtu/Hr combined.

The two EUs are equipped with low NOx-burners and water injection for pollution controls. The water injection system controls the flame temperature in turbine engine (AKA gas generator) to manage NOx emissions. Demineralized water is drawn from the storage tank, pressurized and then injected through the fuel nozzles into the turbine combustion chambers.

The startup procedures are fully automated once the start sequence is initiated by the operator. NG is obtained by directly from the pipeline and is reported to be conditioned by heating (if necessary) prior to use as fuel.

- **EU-FPENGINE**

One John Deere, 6.8 liter, 210 HP diesel engine used as backup power for the fire pump. The EU is reported to be an emergency generator, used once per year for maintenance purposes, and in case of emergency when the primary electric motor for

the pump is unavailable. The main energy source for the fire pump is reported to be electrical energy off the grid. Permit conditions associated with the referenced EU are required under 40 CFR Part 63, Subpart ZZZZ for RICE.

All three of the above EUs were reported to have been installed in 2002.

In addition to the above referenced EUs, a review of MAERS identified the following additional EUs which are reported to be exempt from permitting under Rule 282 (2)(b) (i):

- **EU-HEATBLR**

250,000 Btu/Hr boiler used for seasonal heating the building enclosing the turbines. Installed in 2002. The unit was replaced in 2017 with a replacement boiler system rated from 45,000 to 260,000 BTU/Hr for enclosure heating. A review of exemptions indicates that the unit may be exempt from permitting under rule 282(2)(b) for space heaters.

- **EU-GASHEATER**

1MMBtu/Hr heat input, inline NG-fired heater for incoming NG fuel for FG-TURBINES. Installed in 2006. This EU has been identified in previous site inspection reports as being exempt from permitting under Rule 282(b)(i). At the time of the July 9, 2020, site inspection, maintenance activities were being conducted on the regulator(s) associated with the NG heater.

Additional equipment onsite consists of:

- One approximately 210,000-gallon water tank of water for fire suppression, and
- One approximately 330,000-gallon tank of demineralized water for NOx control

COMPLIANCE

At the time of report preparation, no complaints are of record for the facility and no Violation Notices (VNs) have been issued to the facility.

Compliance status for the facility had been based on information provided during the February 8, 2018, site inspection, as well as on supplemental data and reports submitted upon request or to meet permit requirements identified under MI-ROP-N7113-2016a. Each EU will be addressed independently.

FG-TURBINES -

The two simple-cycle turbines (EU-TURBINE1A and EUTURBINE1B) onsite represent the major emissions source(s) for the Facility. The pair of simple-cycle turbines have exhaust stacks of 114 inches in diameter and 60 feet above land surface, in compliance with SC VIII.1 & 2 which limits the stacks to a maximum of 150-inches in diameter and a minimum of 45 feet in height.

OPERATION LIMITS - With respect to FG-TURBINES, the referenced EUs burn NG for fuel (SC III.1) and are reported to be operated in compliance with both an AQD approved Startup, Shutdown and Malfunction Plan (SSMP) (SC III.2) and Parameter Monitoring Plan (PMP) (SC III.3 and IX.4).

Document	Date Submitted	Date Approved
Startup, Shutdown and Malfunction Plan/Parameter Monitoring Plan	February 24, 2014	March 3, 2014

The documents describe both the Data Control System and Program Logic Control interactions and the safety measures and alarms programmed to insure proper operations.

The maximum operational load at any point being limited by the maximum exhaust gas temperature. More specifically, the units are designed to operate up to the 320 MMBtu heat rate but are dependent on ambient conditions and limited by exhaust temperature. On cold days the turbines can operate at their full output while still maintaining the proper exhaust temperature. When the heat rate is above the highest tested value the facility uses substitute data as allowed under 40 CFR Part 75, Appendix E, Data Substitution.

As previously noted, the system is automated, and should water injection not initiate at the specified exhaust temperature of 925 degrees Fahrenheit, or water pressure drop, the system will automatically initiate shutdown actions or corrective actions.

Copies of the Hourly Emissions & Operations Report indicate that system continuously monitor and record at minimum:

- NG consumption (hscf/Hr) (SC IV .1 & 3)
- Heat Inputs (mmBtu/Hr)
- Megawatts
- Inlet temperature and Exhaust temperature (degrees Fahrenheit)
- NOx (lb/mmBtu and lb/Hr) and
- Operation of the water injection system (water injection rate in gal/Hr, water to fuel ratio and the compressor discharge pressure) (SC IV.2 & 3).

Select hourly Operations data for select dates is summarized below:

DATE	CT-1A/ CT-1B	CT-1A/ CT-1B	CT-1A/ CT-1B
	January 15, 2019	March 4, 2020	June 19, 2020
NG Consumption (hscf/hr)	201.2 / 313.8	1493.2/ 1529.3	1830.0 / 1911.6
Inlet temperature (degrees Fahrenheit)	39 / 36	42 / 37	79 / 78
Exhaust Temperature (degrees Fahrenheit)	104 / 105	213 / 211	491 / 492
NOx (lb/MMBTU)	0.090 / 0.086	0.088 / 0.084	0.087 / 0.083
NOX (lb/Hr)	1.9 / 2.8	13.7 / 13.2	16.8 / 16.7
Water to fuel ratio	0.584 / 0.355	0.949 / 1.082	0.979 / 1.116
Compressor discharge pressure	17 / 17	37 / 39	82 / 85

Power generation for the FG for the period of February 2018 to June 2020 ranged from 34 MW (April 2020) to 5948 MW (September 2018). The 12-month rolling average between January 2019 and June 2020 ranged from 1583 MW (April 2020) to 3285 MW (January 2019)

MATERIAL LIMITS -Per permit, FGTURBINES are limited to a total use of not to exceed 595.6 million cubic feet of NG (based on 12-month rolling total) (SC II.1), with a sulfur content of 1.5 grains per 100 standard cubic feet (or 23.6 ppmv) (SC II.2). Data provided by the Facility:

Time Period	NG Limit (MMCF) (SC II.1)	Reported NG Usage (MMCF)
Calendar Year 2018	595.6	395.865
Calendar Year 2019	595.6	236.208
12-month rolling total as of June 20, 2020	595.6	200.639

Laboratory analytical data provided by the Facility reported total sulfur levels for samples collected on April 5, 2019; September 10, 2019; and April 28, 2020. All samples collected reported total sulfur concentrations of <1.0 PPMV.

EMISSION LIMITS – Emission limits associated with FG-TURBINES have historically included for NOx both 12-month rolling totals (SC I.3) as well as daily emission averages (SC I.1) and Visible Emission (VE) limits (SC I.4). During the ROP modification, the facility requested and permitted the following changes to the permit:

POLLUTANT	PREVIOUS LIMIT	NEW LIMIT
NOx (SC I.1)	25 ppmv dry at 15% oxygen, average of all operating hours in a calendar day	31 lb/hr per turbine
Visible Emissions (VE) (SC I.4)	10% opacity except for uncombined water vapor	No Limit

A review of annual emissions reporting for 2018 and 2019 indicated that for MAERS purposes, annual emissions for NOx and SO2 are reported to be determined using Predictive Emission Monitoring (PEM), which was confirmed by Facility Representatives. Annual emissions for CO, PM10, PM2.5 and VOC are determined using MAERS emission factors. MAERS data reported since the last site inspection includes the following NOx emissions:

DATE	12 MONTH ROLLING NOX LIMIT (tpy) (SC I.3)	REPORTED EMISSIONS (tpy)
2018	34.6	16.46
2019	34.6	10.52

Testing activities have verified emission rates below ROP limits and are discussed below.

TESTING ACTIVITIES -Verification testing of NOx emissions is required under SC V.1 and V.2. Testing is conducted every 5 years in compliance with the permit condition(s) and is summarized below:

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DATE	EMISSION LIMIT (SC I.1)	EU-TURBINE1A	EU-TURBINE1B
October 16 & 17, 2012	25 ppmv dry @ 15% oxygen	17.3 -17.7 ppmv dry @ 15% O2	17.4 – 18.6 ppmv dry @ 15% O2
May 10, 2017**	25 ppmv dry @ 15% oxygen	20 - 21 ppmv dry @ 15% O2	21 - 22 ppmv dry @ 15% O2
April 4 & 5, 2018*	31 lb/hr	20.08 – 26.35 lb/hr	19.85 – 25.34 lb/hr

*Test activities were not conducted to meet ROP requirements, but to meet NOx testing requirements resulting from a self-reported, January 5, 2018 exceedance of the 16-hour operation limit in 40 CFR Part 75 Appendix E 2.3.1. Values at the time of testing were used to re-determine NOx emission rate to heat input correlation as required by Rule.

**Though occurring before the February 8, 2018, scheduled site inspection, the required 2017 testing activities had initially been attempted on April 12, 2017. This first attempt (services were provided by Network Environmental) was ended prior to completion when NOx emissions from EUTURBINE1B were at 25.6 ppmv and could not be decreased during testing by adjusting the water injection rate. Based on documentation in the district files, and discussions with Facility Representatives, the problem was determined to be issues with the operating software. The Facility had consulted a turbine company to evaluate the system controls and make adjustments to the turbines. A complete upgrade of control hardware and software was completed in June 2017. The second testing activities (above) were conducted by McHale & Associates, Inc. on May 10, 2017.

Copies of test protocols (SC VII.4), 7-day notifications (SC VII.5) and test reports (SC VII.6) for the 2017 and 2018 testing activities were received in a timely manner. Test results are used by the Facility to determine proper water-to-fuel ratios and operating loads to maintain compliance with permit limits.

MONITORING/RECORDKEEPING –In compliance with the permit, the facility maintains daily, monthly and 12-month rolling turbine operational records which include;

- NG usage/fuel consumption (SC VI.1 &3),
- Average operating load (megawatts) (SC VI.1), and
- Water-to-fuel ratio for each turbine during operation (SC VI.1 & 3).

The records were provided for review upon request and determined to be complete and in compliance with permit conditions.

NOx emissions for the facility are calculated per calendar month and as a 12-month rolling total (SC VI.2). The facility uses the PEMs to determine NOx emissions. Monthly NOx emission rate 2019 and 2020

Calendar Year	NOx Lowest Monthly (Lbs)	NOx Highest Monthly (Lbs)	Highest 12-month rolling total for the period (tons)
2019	558 (March 2019)	4,652 (July 2019)	16.5 (Feb. 2019)
2020 to date	29 (April 2020)	2,228 (June 2020)	9.5 (Jan. 2020)

REPORTING - In compliance with their permit, the facility has submitted annual (SC VII.3)

and semi-annual (SC VII.2 & 7) reports of monitoring and deviations in a timely manner. Submittals have been complete and in compliance with permit conditions.

OTHER REQUIREMENTS- Conditions within this section of the ROP include high level citations for Federal Standards/Requirements. SC IX.1 requires compliance with all applicable provisions of 40 CFR Part 60, Subparts A and GG (NSPS for Stationary Turbines). Based on compliance with permit conditions required per the referenced regulations, it appears that the Facility is operating in general compliance with the Subpart.

SC IX.2 & 3, require compliance the Acid Rain Permitting Provisions as well as with the Acid Rain SO₂ requirements. As part of the 2016 ROP renewal process, an Acid Rain Permit was issued and incorporated into the ROP in compliance with SC IX.2. Compliance with the SO₂ requirements of the Acid Rain program by the Facility is determined by USEPA.

With respect to the following Transport Rule Programs, Michigan is only authorized as the permitting authority, compliance is determined by USEPA :

- NO_x Annual Trading Program (40 CFR Part 97, Subpart AAAAA) (SC IX.5)
- NO_x Ozone Trading Program (40 CFR Part 97, Subpart BBBB) (SC IX.6) and
- SO₂ Group 1 Trading Program (40 CFR Part 97, Subpart CCCCC) (SC IX.7)

SC IX.4 requires the Facility to maintain a PMP onsite. As previously indicated the Facility has developed the appropriate plan, and District Staff confirmed that a copy of the PMP was onsite at the time of the July 9, 2020, site inspection.

EU-FPENGINE

The referenced EU has no restrictions with respect to stack height, emission or material limits and testing/sampling requirements. Other permit conditions are discussed below.

OPERATION LIMITS – Process and operation restrictions associated with EU-FPENGINE consist of operational limits associated with emergency engines of <500 Hp required under 40 CFR Part 63, Subpart ZZZZ and include:

- Operation and maintenance of any emergency RICE, associated air pollution control equipment and associated monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions (SC III.1 and VI.2)
- No more than 100 hours of operation for non-emergency activities including maintenance, testing, emergency demand response and no-more than 50-hours of the 100 hours of operation in other non-emergency situations. (SC III.2 and VI.2)

The EU is equipped with a non-resettable hour meter (SC IV.1), and the above referenced required records were reviewed onsite. Total hours of operation were well below the referenced operational limits. The total hours on the hour meter indicated only 74.7 hours of operation since installation. No emergency operation was reported.

Based on discussions with Facility Representatives, maintenance and operating logs it appears that EU-FPENGINE is inspected monthly, maintained and operated in

compliance with the following condition for the emergency RICE;

- In a manner consistent with safety and good air pollution practices for minimizing emissions (SC III.1)
- In accordance with the manufacturer's emission related written instructions or one developed by the Facility (SC III.4) and
- Minimizing the engines time at idle during startup to a not to exceed 30 minutes. (SC III.5)

The Facility reports that maintenance activities are conducted on a semiannual schedule and are recorded on activity log sheets. The log sheets were provided upon request and verified completion of maintenance activities in compliance with the conditions. Required maintenance activities include emergency engines of < 500 Hp completing the following activities every 500 hours of operation or annually, whichever comes first:

- oil and filter changes (SC III.3.a) and
- inspection of all hoses and belts (SC III.3.c)

As well as inspection of air cleaner (for compression ignition units) or spark plugs (for spark ignition units) every 1,000 hours of operation or annually whichever comes first and replace as necessary (SC III.3.b). Based on the low number of hours the engine has been operated, annual maintenance activities are conducted to comply with the requirements. The most recent being conducted on August 30, 2019.

RECORD KEEPING & MONITORING - Existing emergency RICE of less than or equal to 500 HP are required to keep records of:

- Maintenance conducted on the RICE unit (SC VI.1)
- Action taken during period of malfunction to minimize emissions, including corrective actions to restore the equipment (SC VI.4) and
- Each occurrence and the duration of each malfunction of operation of the engine, or the air pollution control and monitoring equipment, (SC VI.3)

As reported above, the Facility provided copies of the above referenced records, in compliance with the permit. The records indicated that no malfunctions are associated with the equipment.

REPORTING -In compliance with their permit, the facility has submitted annual (SC VII.3) and semi-annual (SC VII.2 & 7) reports of monitoring and deviations in a timely manner.

SUMMARY

On Thursday, July 9, 2020, AQD District Staff mobilized to the Michigan Public Power Agency – Kalkaska CT#1 Facility (MPPA-Kalkaska) to conduct a scheduled site inspection. The referenced facility is located at 1750 Prough Road, Kalkaska, Kalkaska County, Michigan. (N7113). The referenced facility is a peaking unit, providing electricity during peak load periods. Facility Representatives provided information regarding the site and site activities.

At the time of the inspection, a borescope inspection of the turbines was scheduled to be completed. Not operating at the time of the inspection, the MPPA-Kalkaska Facility is an unmanned

peaking station. The Facility is controlled using operating software that is programmed using operating curves of water to fuel ratios established during testing. The software is reported to shut down the Facility should any parameters exceed the ranges and thresholds established during testing.

The referenced facility operates under Renewable Operating Permit (ROP) MI-ROP-N7113-2016a. Information obtained in conjunction with the scheduled site inspection appear to indicate general compliance with the Facilities ROP.

NAME _____

DATE _____

SUPERVISOR _____

Sharon LeBlanc

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