

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

N652654848

FACILITY: CMS Generation, Livingston Generating Station		SRN / ID: N6526
LOCATION: 155 N. Townline Road, GAYLORD		DISTRICT: Gaylord
CITY: GAYLORD		COUNTY: OTSEGO
CONTACT: Steve Ellison , Plant Operator		ACTIVITY DATE: 08/06/2020
STAFF: Becky Radulski	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: FY20 inspection and records review		
RESOLVED COMPLAINTS:		

Traveled to N6526 CMS Generation Michigan Power LLC - Livingston Generating Station on August 6, 2020 to conduct a Full Compliance Evaluation (FCE) FY20 scheduled inspection to determine compliance with MI-ROP-N16526-2014. The facility is a peaking plant and was not operating during the inspection.

The facility required a health screening due to COVID-19 prior to entrance. A mask was worn in addition to standard safety equipment (steel toe boots, safety glasses, hardhat and vest).

Present for the inspections was Mr. Steve Ellison, Plant Operator. The facility is located at 155 North Townline Road, Gaylord, in Otsego County.

## INSPECTION NOTES

The facility is a peaking plant, which only operates when it is called up by Midcontinent Independent System Operator (MISO) during peak operating times. There are 4 Dresser-Ran natural gas turbine units, each with 2 engines. The turbines are equipped with water injection systems and are rated at 39 MW.

The units ran some during the recent 2020 heat wave, and also in November and December of 2019. They did not operate January through May of 2020.

Turbine 4 had a catastrophic failure while operating on November 19, 2019. There was an explosion and fire at the facility. No injuries, no damage to the other 3 units. A news article from the event is printed for the file. CMS indicates this is not a total replacement of a unit, and will provide information to clarify.

MISO does not control the startup or shutdown of these turbines remotely, they are controlled onsite by the Operator. The engines are not black start capable. It is possible the facility may request to put in generators in the future to allow for black start.

Although the units are rated at 39 MW, they were tested at 33 MW; therefore they do not operate the units above 33 MW.

The turbine units are equipped with water injection systems to control NOx emissions – the water is injected to reduce temperatures, which reduces the formation of NOx. A water to fuel ratio is continuously calculated during operation. Each unit was tested during June 2017 to determine the appropriate water to fuel ratio range that the units must operate within to demonstrate compliance with NOx and CO limits. The control panel for each turbine was viewed in the control room. Each unit has a screen to monitor operating parameters. Above

each monitor is posted the appropriate operating parameters for that turbine, including the water to fuel ratio range that was tested for that particular turbine.

**REGULATORY DISCUSSION**

The facility is subject to MI-ROP-N6526-2014, which was issued January 28, 2014. The facility has the potential to emit over 100 tons per year of each NOx and CO. The ROP is currently going through renewal, which was discussed onsite.

The facility is not major for HAPS.

Four combustion turbine units, EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 at the stationary source are subject to the New Source Performance Standards for Stationary Gas Turbines promulgated in 40 CFR, Part 60, Subparts A and GG.

EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 at the stationary source are subject to the federal Acid Rain program promulgated in 40 CFR, Part 72.

EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 at the stationary source were subject to the Clean Air Interstate Rule NOx annual trading program pursuant to Rules 802a, 803, 821, and 830 through 834. CAIR expired in December 2014. Brian Carley, AQD, reopened the permit to incorporate applicable requirements associated with the Cross State Air Pollution Rule (CSAPR), compliance is determined by US EPA. The ROP revision was finalized June 16, 2016 with updated tables.

EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 at the stationary source were subject to the Clean Air Interstate Rule NOx ozone season trading program pursuant to Rules 802a, 803 and 821 through 826. CAIR expired in December 2014. Brian Carley, AQD, reopened the permit to incorporate applicable requirements associated with the Cross State Air Pollution Rule (CSAPR), compliance is determined by US EPA. The ROP revision was finalized June 16, 2016 with updated tables.

EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 at the stationary source were subject to the Clean Air Interstate Rule SO2 annual trading program pursuant to Rule 420. CAIR expired in December 2014. Brian Carley, AQD, reopened the permit to incorporate applicable requirements associated with the Cross State Air Pollution Rule (CSAPR), compliance is determined by US EPA. The ROP revision was finalized June 16, 2016 with updated tables.

FGCOMTURB SC III.1 as the following streamlined/subsumed requirement:

<p><b>Streamlined Limit/ Requirement</b></p>	<p><b>Permittee shall burn only natural gas as defined in 40 CFR 60.331(u)</b></p>	<p><b>Permittee shall not burn natural gas containing more than 0.8 percent sulfur by weight, as required by 40 CFR 60.333(b)</b></p>	<p><b>Natural gas as defined by 40 CFR 60.331(u) contains no more than 0.068% sulfur by weight, which is lower than the standard of 0.8</b></p>
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		percent sulfur by weight in 40 CFR 60.333(b)
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EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 are subject to Compliance Assurance Monitoring (CAM) for their NOx limit in parts per million (SC I.1). Each emission unit uses water injection to lower the temperature which in turn lowers NOx emissions. The facility uses a ratio of water injection to fuel burned as an indicator that the control is operating properly.

**SPECIAL CONDITIONS AND RECORDS REVIEW**

FGCOMBTURB (EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4): Four Dresser-Rand ER-224 combustion turbines rated at 39 MW each

Emission Limits:

SC I.1, 2, 4 and 6 are determined by stack testing. The most recent stack test took place in June 2017 for EUCOMBTURB1, and September 2012 for EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4.

SC I.1 limits NOx to 75 parts per million by volume at 15% oxygen on a dry basis, individually. Stack test results were reviewed and each EU is below the limit.

SC I.2 limits NOx to 624.0 pounds/hour for FGTURBINE. Stack test results were reviewed and the combined pounds/hour is below the limit.

SC I.3 limits NOx to 224 tons/year for FGTURBINE, 12 month rolling. Records were viewed and facility and provided. NOx emissions are 30 tons/12 month rolling, with Turbine 3 having the majority of the emissions at 21 tons.

SC I.4 limits CO to 0.487 pounds per million BTU heat input, individually. Stack test results were reviewed and each EU is below the limit.

SC I.5 limits CO to 844.0 pounds/hour for FGTURBINE. Stack test results were reviewed and each EU is below the limit.

SC I.6 limits CO to 224.0 tons/year for FGTURBINE, 12 month rolling. Records were viewed and facility and provided. CO emissions are 52 tons/12 month rolling, with Turbine 3 having the majority of the emissions at 33 tons.

Material Limits:

n/a

Process Operational Restrictions:

SC III.1 only natural gas is burned in the turbines. A fuel analysis was provided.

SC III.2 capacity factor must be under 10% averaged over 3 year period; annual capacity factor under 20% for calendar year. The capacity factors were provided – 3 year average is less than 10%; the annual capacity factor for the past calendar year was less than 20%.

SC III.3 must operate at % load, and water to fuel ratio as determined by stack testing. The

facility operates within these parameters. Each turbine was tested at 33 MW instead of 39 MW max capable, therefore only operates at 33 MW. The facility monitors the water to fuel ratio, which is different for each turbine, and maintains operation within these ranges.

Design/Equipment Parameters:

SC IV.1 and IV.2 – must have a working injection system; must continuously monitor water to fuel ratio. The four combustion turbine units are equipped with a working water injection system, and a system to continuously monitor water to fuel ratio. Alarms are triggered if the ratio is beyond the appropriate range.

Testing/Sampling:

SC V.1 NOx testing and V.2 CO testing. The facility tested in 2017 and met limits of the ROP. Ranges were set for the water to fuel ratio.

Monitoring/Record Keeping:

SC VI.1 continuously monitor and record the fuel and water injection flows by volume for each unit. The facility continuously monitors and records the fuel and water flows. Monitors were viewed and printouts are attached of the operating conditions. It is also on the End of Run Summary, provided.

SC VI.2 continuously calculate and record the water to fuel ratio, by volume for each unit. The water to fuel ratio is kept continuously. The ratio setpoint can be seen on the screen shots from the monitors, as well on the End of Summary Report.

SC VI.3 shall record hours of operation for each calendar month. Hours are tracked and were viewed on site, and are provided. The hours are also recorded and submitted quarterly. Tracking shows the four units did not operate January – May of 2020, then Turbines 1-3 operated for the summer months.

SC VI.4 shall calculate the annual capacity factor for the facility each year. The annual capacity factor is calculated and was provided when requested (see SC III.2).

SC VI.5 shall monitor and record natural gas usage on an hourly and monthly basis for each turbine unit. Natural gas records are maintained and were viewed – a portion of the records are attached.

SC VI.6 shall monitor and record the operating load with associated water to fuel ratio for each turbine unit. The operating load is continuously monitored and recorded. The units will not operate above 33 MW, as that is the load used when the water to fuel ratio was established during testing.

SC VI.7 shall calculate and record the NOx and CO emissions on an hourly, monthly and 12 month rolling basis. NOx and CO are calculated and recorded. A portion of the records is attached and were also discussed above.

SC VI.8 shall analyze fuel burned in FGCOMBTURB. Fuel is sent for analysis – results provided.

SC VI.9 – VI.13 – CAM conditions – As mentioned in the Regulatory Summary Section of this report, EUCOMBTURB1, EUCOMBTURB2, EUCOMBTURB3, and EUCOMBTURB4 are subject to CAM for their NOx limit in parts per million (SC I.1). Each emission unit uses water injection to lower the temperature which in turn lowers NOx emissions. The facility uses a

ratio of water injection to fuel burned as an indicator that the control is operating properly. CAM requires continuous monitoring of fuel consumption and water injection, as well as the calculation of water to fuel ratio, to demonstrate proper operation of the control. The ratios ranges are determined during stack testing for each turbine every 5 years. The ratio is different for each unit. The facility submits reports on excursions or exceedances, excess emissions and monitor downtimes as required. These reports are reviewed as they are received.

#### Reporting:

The facility reports required reporting on time. Up until March 2019, the facility chose to submit CAM reporting on a quarterly basis although only needed semi-annually. After March 2019, the CAM reports were submitted semi-annually as required.

#### Stacks:

Each turbine unit has a stack with minimum height requirements of 39 feet, and maximum exhaust dimensions of 258.8 x 145.2 inches. The stacks have not been modified and based on visual estimation, appear to meet this specifications.

#### Other Requirements:

SC IX.1 – continuous compliance plan. The facility has a Continuous Compliance Plan, which was updated in November 2017 following the June 2017 stack test. The plan includes updated water to fuel ratio ranges for each turbine unit.

SC IX.2-9 – these conditions refer to CSPAR, acid rain. The facility is responsible for working with US EPA for compliance.

SC IX.10 – 11 – update CAM plan and comply with CAM. The facility submits CAM reports as required and has a CAM Plan dated November 2017.

SC IX.12 – comply with New Source Performance Standards for Stationary Gas Turbines promulgated in 40 CFR, Part 60, Subparts A and GG. The facility appears to be in compliance with GG, no information has come forward to indicate otherwise.

### **COMPLAINTS**

There have been no complaints reported for this facility in past fiscal year. There is no history of complaints in MACES.

### **MAERS**

MAERS was submitted and reviewed separately. There were no issues.

### **COMPLIANCE**

This facility appears to be in good operating conditions. No visible emissions or odors were observed during the onsite visit. The facility appears to be in compliance with MI-ROP-N1266-2014 and all applicable requirements.

Becky  
Radulski

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