

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

N652168075

<b>FACILITY:</b> Consumers Energy Co. - Zeeland Generating Station		<b>SRN / ID:</b> N6521
<b>LOCATION:</b> 425 Fairview Rd., ZEELAND		<b>DISTRICT:</b> Grand Rapids
<b>CITY:</b> ZEELAND		<b>COUNTY:</b> OTTAWA
<b>CONTACT:</b> J. Homer Manning III , Environmental Health & Safety Specialist		<b>ACTIVITY DATE:</b> 06/13/2023
<b>STAFF:</b> Michael Cox	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> MAJOR
<b>SUBJECT:</b> Scheduled Unannounced Inspection		
<b>RESOLVED COMPLAINTS:</b>		

On Tuesday June 6, 2023, and Tuesday June 13, 2023 Air Quality Division Staff Michael Cox (MTC) conducted an unannounced, scheduled inspection of Consumers Energy Company – Zeeland Generating Station located at 425 Fairview, Zeeland Michigan. The purpose of the inspection was to determine compliance with MI-ROP-N6521-2020a and all other applicable air quality rules and regulations, as well as observe required stack testing. MTC met with Mr. J. Homer Manning III, who supplied MTC with all of the pertinent records as well as provided a walkthrough of the facility. Prior to entering the facility visible emissions and odor observations were conducted. No odors or visible emissions were observed associated with the facility aside from the steam noted coming from the cooling towers.

### Facility Description

The Consumers Energy Company – Zeeland Generating Station (ZGS) is a natural gas fired electric generating facility consisting of four (4) combustion turbines. Two (2) of the turbines are simple cycle, and the other two (2) are combined cycle, which also include duct burners and a steam generator. The total output for the facility is about 800 megawatts.

### Regulatory Analysis

ZGS is subject to the Title V program and is currently operating under MI-ROP-N6521-2020a and is a major source for Nitrogen oxides (NOx), Carbon Dioxide (CO), Particulate Matter (PM10), and Volatile Organic Compounds (VOC's). Each of the turbines are subject to Title IV, Acid Rain promulgated under 40 CFR Part 72. The turbines, and the duct burners are also subject to New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart Da for Electric Utility Steam Generating Units and NSPS 40 CFR Part 60, Subpart GG for Stationary Gas Turbines. The auxiliary boiler is subject to NSPS 40 CFR Part 60, Subpart Dc for Small Industrial-Commercial-Institutional Steam Generating Units. The diesel fired emergency combustion engine, is subject to National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63 Subpart ZZZZ for Stationary Reciprocating Internal Combustion Engines, as an area source. The AQD does not have delegation for Subpart ZZZZ.

**Compliance Evaluation**

**EUNEWAXBLR:**

This emission unit consists of one (1) natural gas-fired auxiliary boiler rated at 17.82 MMBTU/hr. This emission unit is subject to the provisions of NSPS 40 CFR 60, Subpart Dc. This emission unit was verified during the inspection as only firing natural gas for fuel and no changes have been made to the auxiliary boiler. ZGS is keeping track of natural gas consumption from the auxiliary boiler as required. Natural gas usage records were reviewed on site for the time period of January 2022 through May 31, 2023. No issues were noted. ZGS is reporting semi-annual and annual certifications as required.

**FGSIMPLECYCLE:**

This flexible group covers two (2) General Electric natural gas fired combustion turbines (EUGT1A and EUGT1B) operating in simple cycle mode. Both units are equipped with dry low-NOx combustors. Both units are subject to the Federal Acid Rain Program, and to NSPS 40 CFR Part 60 Subpart GG for Stationary Gas Turbines. Several of the emission limits or recordkeeping requirements specified in Subpart GG, or Subpart Da, have been subsumed by more stringent emission limits or recordkeeping requirements. The table below outlines the various emission limitations for this flexible group. Unless otherwise noted, the emission limit applies to each turbine, individually. Additionally, some emission limits do not apply during periods of startup, shutdown, or malfunction and cumulative emissions for both FGSIMPLECYCLE and FGCOMBINEDCYCLE; these limits are noted in the table below.

**Emission Limits for FGSIMPLECYCLE**

Pollutant	Emission Limit	Observed Value	Averaging Time
		Unit 1A	
		Unit 1B	
NOx	0.04 lb./MMBtu Heat Input	0.028 lb./MMBtu (Unit 1B)	Average of all operating hours in a calendar day*

		<b>0.028 lb./MMBtu (Unit 1B)</b>	
<b>NOx</b>	<b>9.0 ppmv, at 15% oxygen, dry<sup>2, a</sup></b>	<b>See row above</b>	<b>See row above</b>
	<b>(This is equivalent to 0.04 pound per million BTU heat input)</b>		
<b>NOx</b>	<b>334.6 tons per year (tpy)</b>	<b>75.94 tpy(Unit 1A) 95.89 tpy(Unit 1B)</b>	<b>12-month rolling time period</b>
<b>PM-10</b>	<b>10.8 pounds per hour (pph)</b>	<b>6.1 pph(Unit 1A) 4.0 pph(Unit 1B)</b>	<b>Average of all operating hours in a calendar day*</b>
<b>PM-10</b>	<b>47.3 tpy</b>	<b>9.28 tpy(Unit 1A) 3.32 tpy(Unit 1B)</b>	<b>12-month rolling time period</b>
<b>CO</b>	<b>0.021 pounds per MMBtu heat input</b>	<b>0.002 lb./MMBtu (Unit 1A) 0.001 lb./MMBtu (Unit 1B)</b>	<b>Average of all operating hours in a calendar day*</b>
<b>CO</b>	<b>175.6 tpy</b>	<b>22.17 tpy (Unit 1A) 30.96 tpy (Unit 1B)</b>	<b>12-month rolling time period</b>
<b>VOC</b>	<b>5.8 pph</b>	<b>1.20 pph(Unit 1A) 0.60 pph(Unit 1B)</b>	<b>Average of all operating hours in a calendar day*</b>
<b>VOC</b>	<b>25.4 tpy</b>	<b>1.87 tpy Unit 1A 1.02 tpy Unit 1B</b>	<b>12-month rolling time period</b>
<b>Formaldehyde (HCHO)</b>	<b>9.4 tpy** all turbine operations</b>	<b>3.80 tpy **</b>	<b>12-month rolling time period**</b>

<b>Opacity</b>	<b>10%</b>	<b>0% (Unit 1A)</b>	<b>6-minute average</b>
		<b>0% (Unit 1B)</b>	

**\*This limit does not apply during periods of startup, shutdown, or malfunction.**

**\*\*This limit is applicable to FGSIMPLECYCLE and FGCOMBINEDCYCLE combined.**

Testing is required for VOC's, PM-10, and Formaldehyde. Testing is required for one (1) of the two (2) units every five (5) years from the date of the last test date. Testing was most recently done on Unit 1B in November of 2018. Unit 1B was noted to have emission rates of 0.33 pph for VOC, 3.34 pph for PM-10, and 0.0002 lb./MMBtu for Formaldehyde based on the test results. Each turbine also has an opacity limit of 10%, based upon a 6-minute average. No opacity was noted during the inspection. The most recent method 9 reading for each unit was conducted on June 6, 2023, with a 6-minute average opacity reading of 0%, for each turbine. Unit 1A is currently scheduled for testing on June 14, 2023, and June 15, 2023, following the date of this inspection.

The turbines only burn pipeline quality natural gas with sulfur content at less than or equal to 0.0006 lb./MMBtu. The facility maintains a startup, shutdown, malfunction (SSM) plan. Each of the units are limited to 182 hours of startup and 85 hours for shutdown, both based upon 12-month rolling time periods. Records of startup and shutdown hours were requested and provided for the time period of January 2022 through May 2023. Highest 12-month rolling startup and shutdown hours for Unit 1A were noted to be 32.45 hours of startup during the 12-month period ending in April 2023 and 22.62 hours of shutdown during the 12-month period ending in May 2023. Highest 12-month rolling startup and shutdown hours for Unit 1B were noted to be 39.76 hours of startup during the 12-month period ending in September 2022 and 30.85 hours of shutdown during the 12-month period ending in October 2022.

MTC observed the Continuous Emissions Monitoring (CEMS) systems for both Units 1A and Unit 1B in the control room where the CEMS values could be observed. MTC also reviewed daily calibration data for the CEMS unit, with no issues noted. ZGS is reporting as required, including the Excess Emissions Reports (EER).

Two (2) stacks are listed in association with Unit 1A and Unit 1B. The stacks were observed venting unobstructed vertically. The stacks appeared to be consistent with the dimensions listed in MI-ROP-N6521-2020a.

**FGCOMBINEDCYCLE:**

This flexible group consists of two (2) combined cycle combustion turbines with heat recovery steam generators with integral duct burners. Also associated with this flexible group is mechanical cooling towers and a common steam turbine. The combustion turbines and heat recovery steam generator/duct burners are arranged in a 2-on-1 design with the steam turbine. Both turbines have Dry-Low NOx burners and selective catalytic reduction (SCR) systems. Both units were in operation at the time of the virtual inspection.

The table below outlines the various emission limitations for this flexible group.

**Emission Limits for FGCOMBINEDCYCLE**

Pollutant	Emission Limit	Observed Value	Averaging Time
		Unit 2A Unit 2B	
Sulfur Dioxide (SO <sub>2</sub> )	0.20 lb./MMBtu***	The use of pipeline quality gas meets this requirement.	At all times of operation for each individual Duct Burner
NO <sub>x</sub>	0.013 pounds per MMBtu heat input	0.010 lb./MMBtu (Unit 2A) 0.010 lb./MMBtu (Unit 2B)	Average of all operating hours in a calendar day
NO <sub>x</sub>	119.6 tons per year (tpy)	78.72 tpy(Unit 2A) 77.14 tpy(Unit 2B)	12-month rolling time period**
PM-10	14.7 pounds per hour (pph)	6.0 pph (Unit 2A) 4.6 pph(Unit 2B)	Average of all operating hours in a calendar day**

PM-10	64.4 tpy	22.39 tpy (Unit 2A) 15.96 tpy (Unit 2B)	12-month rolling time period**
CO	0.042 pounds per MMBtu heat input	0.002 lb./MMBtu (Unit 2A) 0.002 lb./MMBtu (Unit 2B)	Average of all operating hours in a calendar day**
CO	238.0 tpy	79.26 tpy (Unit 2A) 74.53 tpy (Unit 2B)	12-month rolling time period**
VOC	16.8 pph	1.40 pph (Unit 2A) 0.30 pph (Unit 2B)	Average of all operating hours in a calendar day**
VOC	73.6 tpy	5.16 tpy (Unit 2A) 0.95 tpy (Unit 2B)	12-month rolling time period**
Formaldehyde (HCHO)	9.4 tpy*	3.80 tpy	12-month rolling time period*
Ammonia	27.1 pph	6.00 pph*** (Unit 2A) 4.8 pph*** (Unit 2B)	Average of all operating hours in a calendar day**
Opacity, except for uncombined water vapor	10%	0% (Unit 2A) 0% (Unit 2B)	6-minute average**

\*This limit is applicable to FGSIMPLECYCLE and FGCOMBINEDCYCLE combined.

\*\*This limit applies individually to each turbine either with or without the duct burner

\*\*\*This limit is the ammonia slip associated with the SCR and is calculated pursuant to

#### Appendix 7.

Testing for VOC's, PM-10, and Formaldehyde was last conducted in 2018, while Unit 2A had previously been tested in 2013. Each turbine also has an opacity limit of 10%, based upon a 6-minute average. No opacity was noted during the inspection. The most recent method 9 reading for each unit was conducted on June 6, 2023, with a 6-

minute average opacity reading of 0%, for each turbine. Unit 2A was currently undergoing testing during the inspection. The permit requires only one (1) of the two (2) units to be tested every five (5) years from the date of the last test date.

The turbines only burn pipeline quality natural gas with sulfur content at less than or equal to 0.0006 lb./MMBtu. The facility follows and maintains a startup, shutdown, malfunction (SSM) plan. Each of the units have startup and shutdown limitations. The limits for the various start conditions are listed in the table below. Each unit is limited individually, and the limits are based upon a 12-month rolling time period.

#### FGCOMBINEDCYCLE startup and shutdown hours

	Cold Start	Warm Start	Hot Start	Shutdown
Limit	564 hrs.	456 hrs.	341 hrs.	85 hrs.
Unit 2A	50.47 hrs.	17.84 hrs.	121.99 hrs.	14.75 hrs.
Unit 2B	59.31 hrs.	15.56 hrs.	103.46 hrs.	16.25 hrs.

Unit 2A and Unit 2B are not operated simultaneously at loads of greater than 60% for longer than 16 continuous hours.

MTC observed the Continuous Emissions Monitoring (CEMS) systems for both Units 2A and Unit 2B in the control room where the CEMS values could be observed. MTC also reviewed daily calibration data for the CEMS unit, with no issues noted. ZGS is reporting as required, including the Excess Emissions Reports (EER).

Two (2) stacks are listed in association with Unit 2A and Unit 2B. The stacks were observed venting unobstructed vertically. The stacks appeared to be consistent with the dimensions listed in MI-ROP-N6521-2020a.

#### FGCIRICEMACT:

This flexible group includes one (1) emergency stationary compression ignition reciprocating internal combustion engine. This unit is currently subject to the provisions of NESHAP 40 CFR Part 63 Subpart ZZZZ. This engine was installed prior

to June 12, 2006; therefore, it is not currently subject to NSPS. The AQD does not have delegation for 40 CFR Part 63 Subpart ZZZZ. The emission unit was observed on site and was noted to be equipped with a non-resettable hour meter. ZGS conducts regular maintenance on the unit, with the most recent maintenance done on October 12, 2022, with the hour meter reading 194.4 hours. Fuel analysis records also indicate ultra-low sulfur diesel (ULSD) fuel is used in the engine.

**FGPARTSWASHER:**

This flexible group applies to any cold cleaner that is grandfathered or exempt from Rule 201 permitting pursuant to Rule 278 and Rule 281(2)(h) or Rule 285(2)(r)(iv). ZGS currently has one (1) of these units on site. The parts washer was noted to be closed and also had the operating procedures posted. The parts washer was not in used during the inspection. The facility uses a small amount of "ZEP 143" solvent. The solvent is made up of 100% distillates (petroleum) hydrotreated light.

**Compliance Determination**

Based upon the observations made during the inspection and a subsequent review of the records, Consumers Energy Company – Zeeland Generating Station appears to be in compliance with MI-ROP-N6521-2020a and other applicable air quality rules and regulations.

NAME Michael T. Corp

DATE 7/11/2023

SUPERVISOR MM