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

B652746353

FACILITY: Midland Cogeneration Venture		**SRN / ID:** B6527
LOCATION: 100 E. Progress Place, MIDLAND		**DISTRICT:** Saginaw Bay
CITY: MIDLAND		**COUNTY:** MIDLAND
CONTACT: Barbara VanderKelen ,		**ACTIVITY DATE:** 09/19/2018
STAFF: Kathy Brewer	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Compliance inspection for ROP. All monitoring and records required were available for review.		
RESOLVED COMPLAINTS:		

On site inspection coordinated with RATA. Units 11-14 were running. RATA being performed on Units11 & 12. Barb Vanderkelen of MCV provided records and accompanied me during my inspection.

MCV is subject to requirements in MI-ROP-B6527-2014a issued on September 30, 2014 and revised on June 16, 2016. MI-ROP-B6527-2014a expires on September 30, 2019. The facility is also subject to 40 CFR Part 60 Subparts A, Da, Db, GG, and Part 63 Subparts DDDDD and ZZZZ.

MAERS 2017 reported emissions were:

Pollutant	Emissions reported (Ton)
Ammonia	3.5
CO	757
NOx	2958
PM 10/ PM2.5	193
SO2	178
TOC	65

We viewed the CEMS shelter and operations screens to verify instantaneous monitoring. All required monitoring was being conducted. Required records were maintained and available for review on site or via email.

MCV operates 12 natural gas fueled combined cycle turbines, with a net facility electrical output of greater than 1550 megawatts (MW). The twelve gas turbines (GTs) are equipped with heat recovery steam generators (HRSGs) with a combined steam capacity of 1,200,000 lbs/hr. GTs 9-14 are equipped with duct burners (DBs) for supplemental firing each unit with a maximum heat input capacity of 249 million British thermal units per hour (MMBtu/hr). The gas turbines are also equipped with a fogging system to reduce inlet air temperature during the warm weather season. The fogging system usually operates at temperatures above 88 degrees Fahrenheit and relative humidity above 55%. Nitrogen Oxide (NOx) emissions from GT 3-11, 13, 14 are controlled using steam injection. NOx emissions from GT 12 are controlled using a dry low NOx burner.

The facility also operates 6 natural gas fired boilers, each with a heat capacity of 370 MMBtu/hr. The boilers are capable of supplying 250,000 pounds per hour (lb/hr) of steam used to generate electricity and for purchase by process steam customers located near the facility.

The facility received a PTI (103-12) for two additional natural gas fired combustion turbine generators and one condensing steam generator on April 23, 2013. This PTI was voided when rolled into the most current ROP (2014). The facility has not installed any of the generators. MCV had an extension for installation ending in April 2016 but have never installed, and do not plan to install, the equipment. The company will request removal of the FG-CTG1-2 and FG-CTG/DB1-2 with ROP renewal application due no later than March 30, 2019.

The facility currently operates under an approved Malfunction Abatement Plan (MAP), which covers each of the boilers and gas turbines. The most recent MAP found in the file was approved on July 27, 2013.

The facility has reported deviations and monitoring semiannually and submitted compliance certifications annually. Quarterly CEMS emissions/exceedance reports have been submitted as required by the ROP.

Also included in the most recent ROP are a diesel generator and a cold cleaner. At the time of my

inspection the diesel generator was dismantled and inoperable. The facility does not think it will operate in the future, they are currently debating the installation of a newer replacement. The cold cleaner has limited use, safety clean provides maintenance service and removal/replenishment of solvents annually or less.

Annual, monthly, daily, hourly and instantaneous records were reviewed for various dates between January 2017 and July 2018. Copies of some required records are attached to the report. All information reviewed indicates compliance with operating requirements.

The 2017 RATA report found all turbine units and boilers passed.

EUDIESEL: Compliant

Unit has not been operated for several years. No fuel oil used or purchased in 2016, 2017 or 2018 to date. EUDIESEL is subject to 40 CFR, Part 63, Subpart A and Subpart ZZZZ.

EUTURBINE 12: Compliant

Description: Combined cycle gas turbine equipped with a dry-low NOx burner. Equipped with fogger to reduce inlet air temperature during the warmer months.

Emission Unit	Emission Limits	Process/Operational Restrictions	Monitoring/Record Keeping	Reporting
EU-TURBINE12	*NOx Start-up 400 lbs Shut Down 200lbs Ozone Season 0.10 lbs/MMBTU Calendar Year 0.10lbs/MMBTU 12monthRolling time period 429.2 tpy*	*Must Comply with 40 CFR Part 60 GG Combined hours of operation of the foggers for EU-TURBINE12 and FG-SITURBINES shall not exceed 20,400 hours on a 12 month rolling time period*	*NOx emission records NOx emissions during start up and shut down, Written or electronic log of the number of start ups and shut downs for EU-TURBINE12 for each month and 12 month rolling time period Record of the hours of operation of the fogger for EU-TURBINE12 and of each Fogger for FG-ITURBINES*	*Prompt reporting of deviations Semiannual Reporting of monitoring and deviations March 15 and Sept 15 Annual Certification of compliance*
Records Checked	Yes	Yes	Yes	Yes
Compliance Status	Compliance	Compliance	Compliance	Compliance

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

An August 18 and 19, 2017 stack test for units 11 & 12 NOx and CO emissions demonstrated compliance with limits at 50% and 100% loadings.

SC III.2, SC VI.4 12 month rolling averages of combined fogger operation hours EU-TURBINE12 and FGTURBINES. Limit of 20,400 hours on a 12-month rolling time period.

Dec 2017: EU-Turbine12 = 2,465 hours	TOTAL for EU3 through EU14= 12,555 hours
Aug 2017: EU-Turbine12 = 2,881 hours	TOTAL for EU3 through EU14= 16,689 hours

SC VI.1 24 hour records of hourly emissions NOx emissions were reviewed for January 10, 2017; August 10,2017; March 10, 2017 and September 19, 2018. Hourly emissions recorded by CEMS and emissions during periods of startup & shutdown were within allowed limits.

NOx emissions 12 month rolling TPY limit is 429.2. NOx emissions for the period of August 2017 through July 30 2018 were 309.4 TPY .

On September 19, 2018 the range of NOx emission averages (w/o duct burner) was 84.9 – 94.1 lbs/hr, below the 98 lbs/hr limit.

SC VI.2, SC VI.3 NOx emissions startup & shutdown

Hourly emission records note periods of Startup, Shutdown, & duct burner status based on MW generated.

24 hour records of hourly emissions NOx emissions were reviewed for January 10, 2017; August 10,2017; March 10, 2017 and September 19, 2018. Emissions over the 98 lbs/hr limit are evaluated for startup or shutdown status and recorded.

The facility is subject to 40 CFR Part 60 GG. Based on information reviewed it appears they are in compliance.

FGBOILERS 1-6: Compliant

Six (6) 370 MMBtu/hr natural gas-fired cycling boilers controlled by low NOx burner technology and flue gas recirculation. Each capable of supplying 250,000 lb/hr steam at 800 psig and 750°F. The boilers were not operating during the inspection. The site has been using the boilers infrequently (for the past year <500 hours per quarter per boiler).

Unit IDs are used in the records attached and correspond with the following Boiler numbers: Boiler 1= Unit16 Boiler 2=Unit 17 Boiler 3-Unit 18 Boiler 4=Unit 19 Boiler 5= Unit 20 Boiler 6=Unit 21

SC V.1. Stack testing for VOCs and PM emissions was done in 2014 to verify compliance with the following limits: VOC: 0.0054 lb/mmBTU PM: 0.0075 lb/mmBTU

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

SC III.3, SC VI.1. Max heat input < 370 MMBTU/hr for each boiler.

July 3, 2018 heat input ranges MMBTU/ hr range per boiler

Hourly: 0 – 226.35 MMBTU/hr

Daily: 0 – 226.35 MMBTU/hr

SC VI.1 Monthly: (Aug 2017 – July 2018) 0 – 50,110 MMBTU

Annual: (Aug 2017 – July 2018) 27,527 – 197,051 MMBTU

Fuel use total for all boilers (Aug 2017 – July 2018) 525, 462 MMBTU

MAERS reported values for 2017 total fuel use was 1,438, 094 MMBTU

SC VI.2 Pounds per hour of natural gas usage are maintained for each boiler and summed for monthly and annual reported values

July 3, 2018 pounds natural gas flow ranges per boiler

Hourly : 0 – 124 lbs/hr.

Daily: 0 - 1544 lbs gas

SSM time are based on increases or reductions in fuel use for each boiler

SC VI. 3., SC VI. 4, SC VI .5 CEMS are installed and used to monitor emissions. Quarterly EERs and CEMs reports are submitted. The 2017 RATA found all EUBOILERS passed.

NOx and CO emission records attached are summarized below.

Each Boiler Limits NOX pph NOx Lb/MMBTU	NOx limit 13.7 pph (range using monthly avg tons/hours operation) Aug 2017 – July 2018	NOx limit 0.2 lbs/MMBTU (Monthly avg tons/fuel use) Aug 2017 – July 2018	CO limit 21.8 pph (range using monthly avg tons/hours operation) Aug 2017 – July 2018	CO limit 50 ppmv (recorded hourly data for July 3, 2018)
Unit 16	3.35	0.02	1.67	0.3
Unit 17	3.95	0.02	0	2.8
Unit 18	3.98	0.03	1.04	8.7
Unit 19	3.68	0.03	0.39	
Unit 20	4.6	0.03	1.32	
Unit 21	2.9	0.02	2.9	

NOx emissions were below the 24 hour rolling time period emission limit of 0.037 lb/mmBTU and 13.7 lbs/hr for each boiler

CO emissions were below the 24 hour rolling time period emission limit of 50 ppmv and 21.8 lbs/hr

SC VI. 7. Natural gas sulfur values are based on monthly sample results. Sulfur analysis reviewed for quarterly EER/CEM reports for October 2017 – April 2018 showed all results below 0.2 grains/100 scf with a range of < 0.032 – 0.044 grains/100 scf.

FG-TURB/DB12:Compliant

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

SC II.1. , SC VI.7 Natural gas sulfur values are based on monthly sample results. Sulfur analysis reviewed for quarterly EER/CEM reports for October 2017 – April 2018 showed all results below 0.2 grains/100 scf with a range of < 0.032 – 0.044 grains/100 scf.

SC V.2 , VI.6 VE readings were conducted once every six months between January 2017 and March 2018. All observations were reported as less than the limit of 10%.

Daily NOx emissions ranged from 0 to 84.3 lbs/hr according to records from January 10, 2017, August 10, 2017 and March 10, 2018 .

FG-SITURBINES: Compliant

Combined-cycle gas turbines which use steam injection for NOx control. Units are equipped with a fogger to reduce inlet air temperatures during warm weather months.

Emission Units: EU-T03, EU-T04, EU-T05, EU-T06, EU-T07, EU-T08, EU-T09, EU-T10, EU-T11, EU-T13, EU-T14

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

SC III. 3. 4 12 month rolling averages of combined fogger operation hours FGTURBINES

Limit is 18,700 combined FGTURBINE hours on a 12-month rolling time period

Dec 2017	TOTAL for EU3 through EU14= 12,555 hours
Aug 2017	TOTAL for EU3 through EU14= 16,689 hours

SC V.2 VE readings were conducted once every six months between January 2017 and March 2018. All observations were reported as less than the limit of 10%.

SC VI. 2. NOx emissions 12 month rolling TPY limit is 697 TPY per turbine.

NOx emissions for the period of August 2017 through July 30 2018 were 309.4 TPY .

NOx emission records attached are summarized below

Turbine	NOx limit Aug 2017 – July 2018 TPY
Unit 3	356
Unit 4	248
Unit 5	363
Unit 6	328
Unit 7	247
Unit 8	287
Unit 9	302
Unit 10	322
Unit 11	282
Unit 13	213
Unit 14	330

SC VI.5 Hourly emission records note periods of Startup, Shutdown, & duct burner status based on MW generated.

24 hour records of hourly emissions NOx emissions were reviewed for January 10, 2017; August 10, 2017; March 10, 2018. Individual turbine emissions over the 159 lbs/hr limit are evaluated for startup or shutdown status and recorded. Instances of NOx emissions >159 lbs/hr were found to be due to Start up or shutdown with one exception due to a malfunction. On January 10, 2017 Unit 7 had NOx lbs/hr emission of 997 lbs/hr and 355 Nox lbs/hr at 10 PM and 11 PM respectively. The NOx emission levels were due to a temperature control valve malfunction.

On September 19, 2018 the range of NOx emission averages for Turbine 11 were 0 – 121 lbs/hr, except for 207 lbs/hr at 6 AM during start up.

SC VI.6 FGTURBINES 12 month rolling number of Startup & shutdowns

records attached are summarized below

Turbine	Starts Aug 2017 – July

	2018
Unit 3	197
Unit 4	206
Unit 5	156
Unit 6	235
Unit 7	159
Unit 8	164
Unit 9	246
Unit 10	203
Unit 11	229
Unit 13	211
Unit 14	246

FG-DUCTBURNERS: Compliant

Natural gas-fired duct burners used to supplement the steam producing capabilities of turbines 9-14.

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

SC VI.1 Fuel usage August 10, 2018

Fuel use records attached are summarized below

Duct burner	Fuel combusted Aug 2017 – July 2018 MMBTU
Unit 9	283,016
Unit 10	203,458
Unit 11	188,368
Unit 12	252,702
Unit 13	144,865
Unit 14	227,178

FG-SITURB/DB:Compliant

RECORDS REVIEWED &/or ATTACHED

On site and file records for a variety of dates were reviewed to evaluate compliance.

Combined cycle gas turbines that use steam injection for NOx control and natural gas fired duct burners. Unit is equipped with a fogger to reduce inlet air temperatures during warm weather months.

Emission Units: EU-T09, EU-T10, EU-T11, EU-T13, EU-T14, EU-DUCTBURNER09, EU-DUCTBURNER10, EU-DUCTBURNER11, EU-DUCTBURNER13, EU-DUCTBURNER14

SC V.2 VE readings were conducted once every six months between January 2017 and March 2018. All observations were reported as less than the limit of 10%.

SC VI. 2., SC VI. 3.CEMS are installed and used to monitor emissions. Quarterly EERs and CEMs reports are submitted. The 2017 RATA found all turbines passed.

NOx and CO emission records attached are summarized below.

Each turbine	NOx limit	CO limit

and duct burner	806.1 TPY Aug 2017 – July 2018	266.8 TPY Jan 2017 – Dec 2017
Unit 9	302	73
Unit 10	322	78
Unit 11	282	69
Unit 13	213	68
Unit 14	330	89

SC VI.1., VI.5.

Fuel use records attached are summarized below

Duct burner	Fuel combusted DB Aug 2017 – July 2018 MMBTU	Fuel combusted Total Aug 2017 – July 2018 MMBTU
Unit 9	283,016	5,966,813
Unit 10	203,458	5,191,160
Unit 11	188,368	5,175,000
Unit 13	144,865	4,672,321
Unit 14	227,178	5,783,788

FG-CTG1-2 & FG-CTG/DB1-2: NA

Units were not installed and will be removed from the ROP during the renewal process in 2019

FG-CLDCLR: Compliant

Viewed on site in maintenance area. Proper signage was displayed. Safety Clean disposes of any waste.

NAME J Brun DATE 11/1/2018 SUPERVISOR C. Hare