

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

N497542343

<b>FACILITY:</b> Michigan Power Limited Partnership		<b>SRN / ID:</b> N4975
<b>LOCATION:</b> 5795 W. 6th Street, LUDINGTON		<b>DISTRICT:</b> Cadillac
<b>CITY:</b> LUDINGTON		<b>COUNTY:</b> MASON
<b>CONTACT:</b> Becky Sparks , I & E Tech/Environmental Coordinator		<b>ACTIVITY DATE:</b> 10/17/2017
<b>STAFF:</b> Caryn Owens	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> MAJOR
<b>SUBJECT:</b> Scheduled Inspection and Records Review		
<b>RESOLVED COMPLAINTS:</b>		

On Tuesday, October 17, 2017, Caryn Owens of the DEQ-AQD conducted a scheduled field inspection and records review of Michigan Power Limited Partnership (Michigan Power) (SRN: N4975) located at 5795 West Sixth Street, Ludington, Mason County, Michigan. The site is located on the south side of West 6th Street and consists of one main building in the central portion of the site and a few smaller buildings, along with above ground storage tanks in the northern portion of the site, a condenser on the eastern portion of the site, and transmission lines for power generation.

The field inspection and records review were to determine compliance with the Renewable Operating Permit (ROP) MI-ROP-N4975-2014. The site is currently an area source for hazardous air pollutants (HAPs), and is subject to the following New Source Performance Standards (NSPS): Standards of Performance for Electric Utility Steam Generating Units promulgated in 40 CFR, Part 60, Subpart Da; Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units in 40 CFR, Part 60 Subpart Db; and Standards of Performance for Stationary Gas Turbines in 40 CFR, Part 60, Subpart GG. The facility is subject to the federal Compliance Assurance Monitoring (CAM) Rule in 40 CFR Part 64.

Additionally, the facility is subject to the federal Acid Rain Program in 40 CFR Part 72, the Cross-State Air Pollution Control Rule (CSAPR) in 40 CFR Part 97, and the National Emission Standard for Hazardous Air Pollutants (NESHAP): for Stationary Reciprocating Internal Combustion Engines for area sources in 40 CFR, Part 63, Subpart ZZZZ (RICE MACT); however, the DEQ does not have delegation of the Acid Rain program, CSAPR, and area source RICE MACT and these areas were not reviewed during the field inspection and records review.

**Summary:**

The activities covered during the field inspection and records review for the facility indicates the facility was in compliance with ROP MI-ROP-N4975-2014 and no additional actions are necessary at this time. Specific permit conditions that were reviewed are discussed below.

**On-site Inspection:**

Michigan Power is a cogeneration utility plant that produces electricity and steam. The main portion of the facility consists of a natural gas fired turbine equipped with a heat recovery system generator (HRSG). Air pollution control equipment on the turbine and HRSG includes a low NOx burner and a Carbon Monoxide Oxidation System. Also at the facility are two natural gas fired boilers for steam generation. These boilers are equipped with low NOx burners and a flue gas recirculation system. Other sources of emissions at the facility are an emergency diesel fired generator and diesel fired emergency fire pump. The emissions from these are uncontrolled. The weather conditions were clear, with gusting winds from the southwest about 10 miles per hour, and approximately 60 degrees Fahrenheit. I met with Mr. Dan Cox, the Compliance Manager, and Ms. Becky Sparks, the Senior IC&E Technician of Michigan Power, for a facility inspection and records review, and both accompanied me through the facility to observe the permitted emission units and associated processes. At the time of the inspection, Relative Accuracy Test Audit (RATA) and particulate matter (PM) testing was being conducted on the turbine and HRSG by Environmental Stack Testing, Inc. The PM testing appeared to be going well, but the testers equipment for the RATA for was experiencing difficulties, so AQD was not able to observe the RATA testing while present onsite.

During the inspection I observed the raw data from the continuous emission monitoring systems for the turbine and two boilers. Typically, only one boiler operates at a time, where one boiler was operating and the other boiler is in standby. However, during the RATA testing, both boilers were on pilot. The following was read from the Continuous Emission Monitoring Systems (CEMS):

Turbine	CEMS Reading
NOx:	9.00 ppmv
CO:	2.23 ppmv
O2:	13.69%

Boiler A	CEMS Reading
NOx:	7.59 ppmv
O2:	18.73%

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Combustion Turbine load:	78.46 MW
Combustion Turbine gas flow:	927.44 kscf
Duct Turbine gas flow:	188.56 kscf
Steam Turbine load:	46.54 MW

Boiler B	
NOx:	7.17 ppmv
O2:	18.75%

**Records Review:**

**Source-Wide Conditions:** No Source-Wide Conditions are applicable for the facility.

**EUFIREPUMP:** A less than 500 horsepower diesel engine (Caterpillar 3406) used to power the emergency fire water pump. The diesel engine is uncontrolled and is subject to 40 CFR Part 63, Subpart ZZZZ.

**I. Emission Limits:**

EUFIREPUMP was not operating at the time of the field inspection. EUFIREPUMP is limited to 10 percent opacity based on a six-minute average when operating. Based on the records I reviewed, Visible emission (VE) checks are completed daily and indicate compliance with the 10% opacity limit.

**II. Material Limits:**

Sulfur and BTU content of the diesel fuel is limited to 0.05% sulfur. The most recent fuel analysis (attached) from May 15, 2017 indicated a sulfur content of 0.004%.

**III. Process/Operational Restrictions:**

At the time of the inspection EUFIREPUMP was equipped with a non-resettable hour meter and had operated for a total of 601 hours since it was installed. According to Mr. Cox, EUFIREPUMP is operated about 30 minutes per week to test the engine. The usage is well below the permit limit of 500 hours per 12-month rolling time period.

On June 1, 2016, DEQ received an updated Malfunction Abatement Plan (MAP) & Preventative Maintenance Plan for Gas Turbine Generator, HRSG Duct Burner, Fire Pump, Emergency Generator and Boilers A and B. The facility is following the MAP for EUFIREPUMP.

**IV. Design/Equipment Parameters:**

Design/Equipment Parameters are not applicable for EUFIREPUMP.

**V. Testing/Sampling:**

Testing/Sampling is not applicable for EUFIREPUMP.

**VI. Monitoring/Recordkeeping:**

Records of sulfur content in the fuel, hours of operation, and VE readings are maintained as required.

**VII. Reporting:**

The semi-annual reports and annual compliance reports for ROP certification were submitted to the DEQ in a timely manner. During the reporting period the permittee reported all monitoring and associated recordkeeping requirements.

**VIII. Stack/Vent Restrictions:**

Stack parameters for EUFIREPUMP have not changed from the previous inspection and appear to be accurate.

**IX. Other Requirements:**

As previously stated, the facility is following the MAP for EUFIREPUMP.

**EUGENERATOR:** A Diesel engine (Caterpillar 3526 DITA) powered emergency generator. The facility does not operate the emergency generator and FGTURBINES/HRSG at the same time except during maintenance, weekly testing, and required regulatory purposes. The diesel engine is uncontrolled and is subject to 40 CFR Part 63, Subpart ZZZZ.

**I. Emission Limits:**

EUGENERATOR was not operating at the time of the field inspection. EUGENERATOR is limited to 10 percent opacity based on a six-minute average when operating. Based on the records I reviewed, VE checks are completed daily and indicate compliance with the 10% opacity limit.

**II. Material Limits:**

Sulfur and BTU content of the diesel fuel is limited to 0.05% sulfur. The most recent fuel analysis (attached) from May 15, 2017 indicated a sulfur content of 0.004%.

**III. Process/Operational Restrictions:**

At the time of the inspection EUGENERATOR was equipped with a non-resettable hour meter and had operated for a total of 737 hours since it was installed. According to Mr. Cox, EUGENERATOR is operated about 15-20 minutes per week to test the engine. The usage is well below the permit limit of 500 hours per 12-month rolling time period.

On June 1, 2016, DEQ received an updated MAP & Preventative Maintenance Plan for Gas Turbine Generator, HRSG Duct Burner, Fire Pump, Emergency Generator and Boilers A and B. The facility is following the MAP for EUGENERATOR.

**IV. Design/Equipment Parameters:**

Design/Equipment Parameters are not applicable for EUGENERATOR.

**V. Testing/Sampling:**

Testing/Sampling is not applicable for EUGENERATOR.

**VI. Monitoring/Recordkeeping:**

Records of sulfur content in the fuel, hours of operation, and VE readings are maintained as required.

**VII. Reporting:**

The semi-annual reports and annual compliance reports for ROP certification were submitted to the DEQ in a timely manner. During the reporting period the permittee reported all monitoring and associated recordkeeping requirements.

**VIII. Stack/Vent Restrictions:**

Stack parameters for EUGENERATOR have not changed from the previous inspection and appear to be accurate.

**IX. Other Requirements:**

As previously stated, the facility is following the MAP for EUGENERATOR.

**FGTURBINE/HRSG:** A 1136.5 MMBtu per hour natural gas fired turbine equipped with Dry Low NOx (DLN) combustors, 341 MMBtu per hour natural gas fired low NOx Duct Burners and a Heat Recovery Steam Generator (HRSG) equipped with a Carbon Monoxide Catalytic Oxidation System for control. This flexible group covers EUTURBINE and EUHRSG.

**I. Emission Limits:**

Compliance with the NOx, CO, VOC, and PM-10 emissions from the FGTURBINE/HRSG are demonstrated by CEMS and stack testing (see limits below). Records of this are kept electronically and calculated through the source Data Acquisition System (DAS). The emissions identified below were within the permitted emission limits. Opacity from the FGTURBINE/HRSG is limited to 10%. VEs are checked twice daily and logged on the "Auxiliary Log Sheet". Based on the records I reviewed, no VEs were observed.

<b><u>Pollutant</u></b>	<b><u>Limit</u></b>	<b><u>Highest reported record</u></b>	<b><u>Equipment</u></b>
NOx	9 ppmv @ 15% Oxygen, dry 24-hour rolling average determined each hour	8.4 ppmv	EUTURBINE
NOx	13.6 ppmv @ 15% Oxygen, dry 24-hour rolling average determined each hour	8.4 ppmv	FGTURBINE/HRSG
NOx	303.5 tons/yr based on a 12-month rolling time period determined at the end of each calendar month	121.5 tons/yr	FGTURBINE/HRSG
CO	10 ppmv @ 15% Oxygen, dry based on a 3-hour rolling average	2.6 ppmv	EUTURBINE

	<b>determined each hour</b>		
CO	10.7 ppmv @ 15% Oxygen, dry based on a 3-hour rolling average determined each hour	2.6 ppmv	FGTURBINE/HRSG
CO	150.3 tons/yr based on a 12-month rolling time period determined at the end of each calendar month	16.1 tons/yr	FGTURBINE/HRSG
VOCs	2.0 pounds/hr	0.32 pounds/hr	EUTURBINE
VOCs	11.9 pounds/hr	0.32 pounds/hr	FGTURBINE/HRSG
VOCs	52.1 tons/yr based on 12-month rolling time period determined at the end of each calendar month	6.3 tons/yr	FGTURBINE/HRSG
PM-10	7.0 pounds/hr	0.1 pounds/hr	EUTURBINE
PM-10	10.4 pounds/hr	0.1 pounds/hr	FGTURBINE/HRSG
PM-10	45.6 tons/yr based on a 12-month rolling time period determined at the end of each calendar month	17.6 tons/yr	FGTURBINE/HRSG

## **II. Material Limits:**

The sulfur content of the natural gas is not to exceed 2.5 grains sulfur per 100 cubic feet of gas. This is confirmed by testing from the supplier and the facility has a new 5 year contract with the suppliers to deliver gas of this quality.

## **III. Process/Operational Restrictions:**

According to Michigan Power, the HRSG cannot operate unless the turbine is operating. The proper operation of the carbon monoxide catalyst system is evaluated during RATA testing. The CO concentrations before and after the catalyst are measured to determine the efficiency of the catalyst. The most recent catalyst efficiency was evaluated during the October 17-19, 2016 RATA, and all instruments passed the RATA. Alarms are built into the DAS to ensure that start-up and shut-down do not exceed 5 hours and 1 hour respectively. The hourly operation is recorded in the daily reports.

Additionally, AQD approved a Start-up/Shutdown Malfunction (SSM) Plan and a revised MAP, received by AQD on June 1, 2016. Michigan Power appeared to be following their SSM Plan and MAP for the facility.

## **IV. Design/Equipment Parameters:**

During the inspection, the dry low-NOx combustors, the oxidation catalyst, and the CEMS for NOx, CO, and O2 appeared to be properly installed and operating properly.

## **V. Testing/Sampling:**

VOC and PM-10 emission tests were conducted most recently the week of October 16, 2017, and were underway during the field inspection. The results of the performance testing have not been received, and the previous performance test was completed October 22, 2012 with satisfactory results for VOC, but PM-10 emissions exceeded the permit limits. Compliance for PM-10 was retested January 16-17, 2013 and demonstrated compliance with the 10.4 pound per hour limit for the combined FGTURBINE/HRSG and the 7 pound per hour limit for EUTURBINE alone. The stack testing company believed the first PM-10 test was biased due to build-up of particulate matter in the stack. More details regarding the initial PM-10 test and re-test are available in the stack test reports and activity reports.

## **VI. Monitoring/Recordkeeping:**

Records of natural gas to FGTURBINE/HRSG are being kept by the source on a continuous basis. All monthly and 12-month rolling time period CEMS data is collected and retained appropriately at the site. CEMS are calibrated and logged daily (see attached daily calibration checks log).

## **VII. Reporting:**

The semi-annual reports and annual compliance reports for ROP certification were submitted to the DEQ in a timely manner. During the reporting period the permittee reported all monitoring and associated recordkeeping requirements. Exceedances of the limit, when they occur are reported throughout the year and in quarterly excess emission reports (EERs). No excess emissions were reported during the last year.

Semi-annual reporting of CAM excursion/exceedances, and monitor downtime were submitted to the DEQ in a timely manner. During the reporting period the permittee reported no CAM excursion/exceedances and 3 incidents where monitor downtime was reported due to calibration drift and sample line replacement. Testing protocols and test reports, established in the ROP, were submitted within appropriate time frames. NSPS Subpart Da requirements were streamlined with the State limits in the ROP, and the record keeping is submitted quarterly with the EERs. The permittee appears in compliance with the NSPS Subpart GG and Subpart Da requirements.

#### **VIII. Stack/Vent Restrictions:**

Stack parameters for FGTURBINE/HRSG have not changed from the previous inspection and appear to be accurate.

#### **IX. Other Requirements:**

The facility appears to comply with the CAM Plan, the NSPS 40 CFR Part 60, Subpart Da, and NSPS 40 CFR Part 60, Subpart GG requirements for FGTURBINE/HRSG. The facility is subject to Acid Rain (40 CFR Part 72), and CSAPR (40 CFR Part 96), formerly known as CAIR. However, the state of Michigan does not have delegation over these programs, and therefore, these portions of the ROP were not reviewed at this time.

**FGBOILERS:** Two 265 MMBtu/hr natural gas fired auxiliary boilers, equipped with low NOx burners and flue gas recirculation system. This flexible group covers EUBOILERA and EUBOILERB.

#### **I. Emission Limits:**

Compliance with the NOx, CO, VOC, and PM-10 emissions from FGBOILERS are demonstrated by CEMS and stack testing (see limits below). The PM-10, VOCs, and CO emissions are reported below from the daily CEMS of the previous day of the inspection. Records of this are kept electronically and calculated through the source Data Acquisition System (DAS). Typically, only one boiler operates at a time, and due to the RATA testing, both boilers were on pilot. The emissions identified below were within the permitted emission limits. Opacity from FGBOILERS is limited to 10%. VEs are checked twice daily and logged on the "Auxiliary Log Sheet". At the time of the inspection and the records I reviewed, no VEs were observed from the boiler stacks.

<b><u>Pollutant</u></b>	<b><u>Limit</u></b>	<b><u>Highest reported record</u></b>
NOx (firing rate of 25% to 100% of the maximum heat input rate)	0.06 pounds/MMBtu heat input Hourly, determined on a 30-day rolling average.	0.051 pounds/MMBtu (EUBOILERA) 0.031 pounds/MMBtu (EUBOILERB)
NOx (firing rate less than 25% of the maximum heat input rate)	0.2 pounds/MMBtu heat input Hourly, determined on a 30-day rolling average	0.080 pounds/MMBtu (EUBOILERA) 0.076 pounds/MMBtu (EUBOILERB)
PM-10	2.65 pounds/hr	0.000 pounds/hr - EUBOILERA 0.0002 pounds/hr - EUBOILERB
VOCs	1.1 pounds/hr	0.000 pounds/hr - EUBOILERA 0.0001 pounds/hr - EUBOILERB
CO	19.9 pounds/hr	0.00 pounds/hr - EUBOILERA 0.00 pounds/hr - EUBOILERB

#### **II. Material Limits:**

The sulfur content of the natural gas is not to exceed 2.5 grains sulfur per 100 cubic feet of gas. This is confirmed by testing from the supplier and the facility has a new 5 year contract with the suppliers to deliver gas of this quality.

#### **III. Process/Operational Restrictions:**

Michigan Power has an approved MAP that covers the entire source including the boilers. There were no malfunctions of the boilers during the review period.

#### **IV. Design/Equipment Parameters:**

The boilers are equipped with low NOx burners, a device to record natural gas usage, and NOx and O2 CEMS to monitor emissions.

#### **V. Testing/Sampling:**

The most recent performance test was conducted October 2017, however, the results of the performance testing have not been received. Based on the previous performance testing in October 2012, the testing results indicated the boilers met the permitted limits for CO, VOCs and PM-10. The CEMS for FGBOILERS have quarterly Quality Assurance tests to determine the accuracy of the CEMS. No problems with the quarterly Quality Assurance tests have been reported to the AQD.

#### **VI. Monitoring/Recordkeeping:**

As previously stated, VEs are checked twice daily and logged on the "Auxiliary Log Sheet". Records of natural gas to the boilers are kept by the source on a continuous basis. CEMS are installed, operated and tested in accordance with the applicable requirements. This is verified through quarterly audits and annual RATA (see reports received records). NSPS Subpart Db record keeping is submitted quarterly with EER. No excess emissions were reported during the last year.

#### **VII. Reporting:**

The semi-annual reports and annual compliance reports for ROP certification were submitted to the DEQ in a timely manner. During the reporting period the permittee reported all monitoring and associated recordkeeping requirements. Exceedances of the limit, when they occur are reported throughout the year and in quarterly EERs. No excess emissions were reported during the last year.

Testing protocols and test reports, established in the ROP, were submitted within appropriate time frames.

#### **VIII. Stack/Vent Restrictions:**

Stack parameters for FGBOILERS have not changed from the previous inspection and appear to be accurate.

#### **IX. Other Requirements:**

As previously stated, Michigan Power has an approved MAP that covers the entire source including the boilers. There were no malfunctions of the boilers during the review period. Additionally, although the ROP does not address FGBOILERS subject to the NSPS 40 CFR Part 60, Subpart Db under "Other Requirements", the facility appeared to comply with the NSPS requirements.

**FG-MACT-ZZZZ-EMERGENCY RICE:** A less than 500hp Caterpillar 3406 compression ignition (CI) emergency reciprocating internal combustion engine (RICE), stand by fire water pump and one less than 500hp Caterpillar 3516 DITA CI RICE emergency stand by diesel-fired generator as identified within 40 CFR, Part 63, Subpart ZZZZ, 63.6590(a)(1). EUFIREPUMP and EUGENERATOR are not connected to the public electrical grid and are only used to provide a backup water pumping capability and to supply power internally. AQD does not have delegation over the area source FG-MACT-ZZZZ-EMERGENCY RICE, and therefore, this section was not reviewed at this time.

**FGCOLDCLEANERS:** This flexible group includes any cold cleaner that is grandfathered or exempt from Rule 201 pursuant to Rule 278 and Rule 281(2)(h) or Rule 285(2)(r)(iv), existing cold cleaners that were placed into operation prior to July 1, 1979, and new cold cleaners that were placed into operation on or after July 1, 1979.

#### **I. Emission Limits:**

Emission Limits are not applicable for FGCOLDCLEANERS.

#### **II. Material Limits:**

Cleaning Solvents containing more than 5 percent by weight of the following halogenated compounds: methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, or any combination thereof shall not be used. Michigan Power keeps log right next to the cold cleaner at the facility. Vesco Oil services the cold cleaner and replaces any solution that is necessary approximately two times per year.

#### **III. Process/Operational Restrictions:**

The facilities parts cleaner appeared to be well maintained. According to Mr. Cox, the parts are dried appropriately, and as previously stated, routine maintenance is completed by an outside contract.

#### **IV. Design/Equipment Parameters:**

During the inspection, the cold cleaner appeared to in compliance with the listed design and equipment parameters. The solvent is not agitated or heated to clean the parts. DEQ observed the lid closed and proper instructions on the parts cleaner.

#### **V. Testing/Sampling:**

Testing/Sampling requirements are not applicable for FGCOLDCLEANERS.

#### **VI. Monitoring/Recordkeeping:**

During the field inspection, I observed the file on the side of the cold cleaner that gave proper use instructions of the cold cleaner, and the file listed: the serial number; the date the unit was installed; the Reid vapor pressure of each

solvent used. Additionally, monthly records showed the amount of solvent evaporated into the atmosphere, and what was replaced back into the container.

**VII. Reporting:**

Reporting of any semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in a timely manner. No deviations were reported for FGCOLDCLEANERS.

**VIII. Stack/Vent Restrictions:**

Stack/Vent Restrictions requirements are not applicable for FGCOLDCLEANERS.

**IX. Other Requirements:**

Other Requirements are not applicable for FGCOLDCLEANERS.

NAME *Caryn Owens*      DATE *10/17/17*      SUPERVISOR *SN*