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

N687341348

FACILITY: DTE Electric Company - Renaissance Power Plant		**SRN / ID:** N6873
LOCATION: 950 N. Division, CARSON CITY		**DISTRICT:** Grand Rapids
CITY: CARSON CITY		**COUNTY:** MONTCALM
CONTACT: Matt Kaleyta , Plant Supervisor		**ACTIVITY DATE:** 08/29/2017
STAFF: Chris Robinson	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FY '17 on-site inspection to determine the facility's compliance status with ROP MI-ROP-N6873-2015a and other applicable air quality rules and regulations.		
RESOLVED COMPLAINTS:		

DTE Electric Company – Renaissance Power Plant (Renaissance) is located at 950 North Division in Carson City, MI. AQD staff Chris Robinson (CR) arrived at this location at approximately 9:30 am on August 29, 2017 to conduct a scheduled unannounced site inspection for determining compliance status with Renewable Operating Permit (ROP) No. MI-ROP-N6873-2015a and any other applicable air rules and regulations. Weather conditions were approximately 60°F with north-northwest winds at approximately 5mph. CR met with Mr. Matt Kaleyta, Plant Supervisor, and Rebecca Dekorn, Contract Administration, announcing intent to inspect and providing proper identification. Mr. Kaleyta and Ms. Dekorn generously provided CR with a tour of the facility as well as pertinent information. No visible emissions or significant odors were observed during this inspection.

FACILITY DESCRIPTION

Renaissance operates four (4) simple cycle natural gas-fired Siemens 501 FD2 combustion turbine generators (CTG), a diesel-fired emergency generator, a diesel-fired firewater pump engine and a natural gas-fired fuel heater.

In the past the facility had proposed to convert to combined cycle systems by adding four (4) heat recovery steam generators equipped with duct burners for supplemental firing and two (2) steam turbine generators. Based on discussions with Mr. Kaleyta, DTE has decided not to convert the existing simple cycle systems.

Table 1: Emission Units

Emission Unit ID	Emission Unit Description	Install/Mod Date	Flexible Group ID
EU-TURBINE1-4	Natural gas-fired combustion turbine (1,900,000,000 Btus/hour heat input) capable of producing 215 MW of electrical power in simple cycle operation equipped with low NOx burners.	6-8-2001 / NA	FG-TURBINE1-4SC
EU-HEATERSC	In-line natural gas-fired heater for heating natural gas prior to the turbines.		NA
EU-EDG	Diesel fuel-fired reciprocating engine for emergency electric generation. The engine's nominal capacity is about 6,000,000 Btus/hr heat input.		FG-ENGINESC
EU-DFP	Emergency diesel fuel-fired pump for fire control.		
EU-COLDCLEANER	Cold-cleaning parts washer(s) with an air/vapor interface of less than 2 square feet.		FG-COLDCLEANERS

REGULATORY REQUIREMENTS

Renaissance is located in Montcalm County, which is currently designated as attainment/unclassified for all criteria pollutants.

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR), Part 70, because the potential to emit nitrogen oxides (NOx), carbon monoxide (CO), PM-10 and volatile organic compounds (VOCs) exceeds 100 tons per year.

The stationary source is considered to be a minor source of HAP emissions because the potential to emit of any single HAP regulated by the federal Clean Air Act, Section 112, is less than 10 tons per year and the potential to emit of all HAPs combined are less than 25 tons per year.

Emission Units EU-TURBINE1SC-4SC (Turbines 1-4) at the stationary source were subject to review under the Prevention of Significant Deterioration (PSD) regulations of Part 18, PSD of Air Quality of Act 451 40 CFR 52.21,

because at the time of New Source Review permitting the potential to emit of carbon monoxide and nitrogen oxide was greater than 100 tons per year.

New Source Performance Standards (NSPS 40 CFR Part 60):
- EU-HEATERSC; Subpart Dc - Small industrial-commercial-institutional steam generating units
- EU-TURBINE1SC-4SC; Subparts A, GG, and KKKK; Certain requirements for the combustion turbines (monitoring for nitrogen content of natural gas, NOx monitoring method, NOx emission limit and sulfur content of natural gas, per 40 CFR 60, Subpart GG) were subsumed by more stringent requirements (i.e., BACT and CEMS).

National Emission Standards for Hazardous Air Pollutants (NESHAPS 40 CFR Part 63):
- EU-EDG and EU-DFP; Subparts A and ZZZZ - Stationary Reciprocating Internal Combustion Engines (RICE). The AQD does not have delegated authority for this Area Source MACT.

Other Regulations:
- EU-TURBINE1SC-4SC; Federal Acid Rain program promulgated in 40 CFR Part 72
- EU-TURBINE1SC-4SC; Cross-State Air Pollution Rule (CSAPR)
- EU-TURBINE1SC-4SC; Exempt from Federal Compliance Assurance Monitoring (CAM) regulation (40 CFR Part 64) for CO and NOx because 40 CFR 64.2(b)(1)(vi) and 40 CFR 64.2(b)(1)(iii) respectively meet the CAM exemption for a continuous compliance determination method.

COMPLIANCE EVALUATION

➢ **MI-ROP-N6873-2015**

Renaissance submitted a 2016 Annual Certification on 3/9/2017 as well as 2016 Semi-annual Reports on 9/12/2016 & 3/9/2017 as required throughout the ROP. No deviations or issues were reported.

As discussed with Mr. Kaleyta, all emission units located at this facility except for the emergency generator (EU-EDG) and engine pump for fire control (EU-DFP) are natural gas fired only. All records are maintained for a minimum of 5-years. CR did not explicitly measure stacks. However, all stacks were discharged unobstructed vertically to ambient air and appeared to meet dimension requirements specified in the "Stack/Vent Restriction" section of the facility's ROP.

It appears PSD (40 CFR 52.21) requirements are being met.

ROP Limits

Table 2: ROP Material Limits

Emission Unit ID	Material	Limit	Time Period	Equipment
FG-TURBINE1-4SC	Natural gas – sulfur content	0.5 grain per 100 standard cubic feet	Avg. of all results during a sampling period in accordance w/Appendix 3.1	EU-TURBINE1-4SC (individually)
FG-ENGINESC	Diesel fuel oil	21,000 gallons	12-mth rolling	FG-ENGINESC

Table 3: ROP Emission Limits

Emission Unit ID	Pollutant	Limit	Time Period	Equipment
Source-Wide	SO2	47.3 tpy	12-mth rolling	EU-TURBINE1-4SC, EUHEATERSC, EU-EDG, EU-DFP
FG-TURBINE1-4SC	NOx	15 ppmv, at 15% O_2, dry	Daily avg.	EU-Turbine1-4SC (Individual)
		189.2 tpy	12-mth rolling	
	CO	15 ppmv, at 15% O_2, dry	Daily avg.	
		115.2 tpy	12-mth rolling	
	VOC	2 ppmv, at 15% O_2, dry	Daily avg.	
		8.1 tpy	12-mth rolling	

	PM-10	9.0 lbs/hr	Daily avg.	
		14.6 tpy	12-mth rolling	
	Formaldehyde (HCOH)	6.5 tpy	FG-TURBINE1-4SC (combined)	FG-TURBINE1-4SC (combined)
	Opacity	10%, excluding uncombined water vapor	EU-TURBINE1-4SC (individual)	EU-TURBINE1-4SC (individual)

- **Source-Wide Conditions**

Source-wide monthly and 12-month rolling SO2 emission calculations were provided (**Attachment A**) for June 2016 through July 2017. The highest calculated 12-month rolling SO2 emission rate was 3.7 tons in August and September 2016.

The facility is also required to comply with conditions 3.1 and 3.2 of Appendix 8 of the ROP. These conditions require the facility to monitor fuel sulfur content by maintaining a copy of the vendor's fuel analysis. An analysis is conducted annually. The April 2017 analysis was provided and is included in **Attachment B**. This analysis indicates that the facility's fuel sulfur content is 1.0ppmw (0.0001wt%).

- **Emission Unit EU-HEATERSC**

The facility operates a 13MMBtu/hr in-line natural gas-fired heater (boiler) used for heating natural gas prior to the turbines. There are no emission or material limits specified in the facility's ROP for this emission unit. A process flow diagram for this process is provided below.

Natural Gas → two (2) Condensate Knock out Pots (*see note 1) → two (2) Filters → Heater (See Note 2) → Turbines**

***Note No. 1** - Condensate is sent to a small storage tank and eventually shipped off-site for recycling.
** **Note No. 2** - The heater heats natural gas by heating re-circulated glycol and passing it through the natural gas stream in a closed loop system.

This heater (EU-HEATERSC) was not operating at the time of this inspection. Based on the information plate attached to the heater, the heater was built in 2001 and is therefore subject to 40 CFR 60 Subpart Dc, which requires an initial notification of startup. CR informed Mr. Kaleyta of this requirement as well as the requirement to record fuel flow and provided the notification form via email.

- **Flexible Group FG-Turbine1-4SC**

PROCESS/OPERATIONAL RESTRICTION(S)

None of the turbines operated during this inspection. Mr. Kaleyta provided CR print outs from the control room confirming current operating status as well as requested emissions records (**Attachment C**). The printouts indicate that the facility continuously monitors and records megawatts and pollutant concentrations as provided by the CEMS for CO and NOx.

The facility conducts weekly calibrations of each CEMS unit on all turbines regardless of operating status. During times of operation the units will conduct an automatic calibration within the first hour of operation.

Water is injected into the unit(s) at a rate of 5-7 gallons per minute to keep NOx emissions down. A slight increase in megawatt can be achieved by increasing the water through a process called fogging. An alarm sounds in the control room when the instantaneous averages for NOx and CO hit the 15ppm emissions limit. Because the limit is based on a calendar day average, one instantaneous reading is not an immediate issue. There were no alarms for a greater than 15 ppm exceedance recorded for NOx or CO. Based on the records provided by the facility (Attachment D), and summarized below in table 4, the facility is appears to be within the emission limits specified in the Special Condition (SC) FG-TURBINE1-4SC I.1-9.

Table 4: August 2017 CEMS data with September 2016 through August 2017 12-month rolling data.

Emission Unit	Time Period	NOx		CO		VOC	PM-10		HCOH
ROP Emission Limit		*15 ppm@15% O2 dry	189.2 (tpy)	*15 ppm@15% O2 dry	115.2 (tpy)	8.1 (tpy)	9 lbs/hr)	14.6 (tpy)	6.5 (tpy)
Turbine 1 (CT1)	Max Daily (lbs)	11.6	--	1	--	--	5.5	--	--
	12-month rolling (tons)	--	15.3	--	5.4	1.7	--	1.5	0.1

Turbine 2 (CT2)	Max Daily (lbs)	11.2	--	0.4	--	--	5.2	--	--
	12-month rolling (tons)	--	18.5	--	11.5	1.9	--	2.0	0.2
Turbine 3 (CT3)	Max Daily (lbs)	11.2	--	0.3	--	--	5.4	--	--
	12-month rolling (tons)	--	19.4	--	10.4	2.6	--	2.2	0.3
Turbine 4 (CT4)	Max Daily (lbs)	12	--	0.6	--	--	5.3	--	--
	12-mth rolling (tons)	--	19.6	--	10.3	2.5	--	1.7	0.2

* Average of all operating hours in a calendar day

Table 5: Turbine Summary of Hours of Operation for August and September 2016 through August 2017

Emission Unit	Time Period	Startup/Shutdown Time Daily Total	Turbine On-Time Daily (hrs.)
Limit		N/A	3,250
Turbine 1 (CT1)	August 2017 total	2	27
	*12-month rolling	14	434
Turbine 2 (CT2)	August 2017 total	1	12
	*12-month rolling	17	516
Turbine 3 (CT3)	August 2017 total	2	26
	*12-month rolling	19	576
Turbine 4 (CT4)	August 2017 total	2	27
	*12-month rolling	17	556

***12-month rolling for September 2016 through August 2017**

The facility maintains a current SSM and MAP plan. As part of these plans it is standard operating procedure to minimize NOx, CO, VOC and PM-10 emission rates during startup and shutdown which are in accordance with the turbine manufacturer's recommendations. Mr. Kaleyta provided CR with a copy of the most recent SSM plan.

The facility tracks monthly and 12-month operating hours, which is summarized in table 5, for each turbine. None of the turbines exceeded the 3,250 hours of operation limit specified in SC III.3. Operating hours as of August 2017 were as follows: Turbine1 (434), Turbine2 (516), Turbine3 (576) and Turbine4 (556).

Renaissance is also subject to the NOx and SO2 standards promulgated in NSPS Part 60, Subparts GG and KKKK. Performance testing was conducted to determine a NOx emission limit of 15 ppm, at 15% oxygen, as noted in table 3 above. The SO2 standards below are also noted in table 3. The facility appears to have demonstrated compliance with NSPS Subpart GG and KKKK by complying with the NOx and SO2 emission limits and fuel SO2 material limit specified in ROPMI-ROP-N6873-2015a and noted in tables 1-3 above.

TESTING/SAMPLING

Emission testing for VOC, PM10 and HCOH is required to be conducted once every ROP cycle. The last verification was conducted on November 20, 2013 with no issues. Notifications and final reports were properly submitted to the AQD and demonstrated compliance.

Opacity readings are taken by a certified reader and are generally taken concurrently with the RATAs. The facility tracks hours between opacity readings to ensure that readings are taken at least once every 1,624 hours as required in SC FG-TURBINE1-4SC V.1.

MONITORING/RECORDKEEPING

The facility continuously monitors and records natural gas usage to each turbine as well as CO, NO_X and O_2 emissions using CEMS. RATAs are conducted as required in SC FG-TURBINE1-4SC VI.13 and conducted

within a maximum of four (4) operating quarters. The last RATA was conducted during the week of July 24, 2017. Per discussions with Mr. Kaleyta, no issues occurred during the test.

The following records are maintain as required and included in **Attachments C and D:**
- Daily average, monthly, and previous 12-month rolling NOx, CO, VOC, PM-10 emission calculations
- Monthly and previous 12-month rolling HCOH emission calculations
- Hours of startup and shutdown for each turbine
- Records of CO, NOx, PM-10 and VOC emissions for each startup and shutdown for each turbine
- Monthly records of hours of operation for each turbine

REPORTING
The AQD was properly notified of the 2017 RATA. According to Mr. Kaleyta there were no issues during the testing and a report will be submitted to AQD as soon as it's finalized. Quarterly excess emission reports have been submitted to AQD as required. No issues were noted.

- **Flexible Group FG-ENGINESC**

PROCESS/OPERATIONAL RESTRICTION(S)
Emergency generator EU-EDG and EU-DFP did not operate during this inspection. There is no emission limit specified in the facility's ROP for these emission units. These engines are subject to 40 CFR Part 63, Subpart ZZZZ. All requirements appear to be properly addressed and implemented. Required hour meter and operating logs were readily accessible on the control panel. Metered hours through the date of this inspection for the generator was 902 hours and 426 hours on the Fire engine. These engines don't operate for more than 500 hours per year. Therefore, oil changes and inspections are conducted annually. The most recent service record was provided for EU-EDG and is included in **Attachment E.** The AQD does not have delegated regulatory authority for this Area Source MACT.

MONITORING/RECORDKEEPING
These units are subject to a 21,000 gallon diesel fuel usage per 12-month rolling time period. The facility tracks diesel fuel usage with the Source-wide SO2 emission calculations included in **Attachment A.** From January 2016 through August 2017 the facility used approximately 3,504 gallons of diesel fuel.

- **Flexible Group FG-COLDCLEANERS**

The facility utilizes a small (<10ft^2) non-agitated and non-heated cold cleaner installed in approximately 2005 and was provided by and maintained by Safety Kleen. Operating procedures were clearly posted and the lid was closed. Per discussions with Mr. Kaleyta, the cold cleaner is equipped with a device for draining cleaned parts and parts are drained for no less than 15 minutes. Information regarding the cold cleaner is maintained as required in SC FG-COLDCLEANERS VI.2. There is no emission limit specified in the facility's ROP for this emission unit.

➢ **2016 MAERS Submittal**
Emission units were properly reported to MAERS.

COMPLIANCE DETERMINATION
Per discussions with Mr. Kaleyta, an initial notification for NSPS Subpart Dc will be submitted to AQD. Based on observations, discussions and a records review, Renaissance Power appears to be compliant with ROP No. MI-ROP-N6873-2015a and any other applicable air rules and regulations.

Attachments
A - Diesel Fire Pump & Diesel Generator Log
B - 2017 Gas Analysis Report
C - Control Room Screen Printouts
D - Emission Calculations
E - Emergency Engine Service Record

NAME _____ DATE 10/10/2017 SUPERVISOR _____