

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

ACTIVITY REPORT: Scheduled Inspection

N600649600

FACILITY: Waste Management of Michigan, Inc. – Autumn Hills		SRN / ID: N6006
LOCATION: 700 56th Ave., ZEELAND		DISTRICT: Grand Rapids
CITY: ZEELAND		COUNTY: OTTAWA
CONTACT: Austin Boone, Site Operator		ACTIVITY DATE: 07/11/2019
STAFF: David Morgan	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: North American Natural Resources - Autumn Hills Compression and Generation Facility (Section 2) Inspection		
RESOLVED COMPLAINTS:		

At 9:00 A.M. on July 11, 2019, Air Quality Division (AQD) staff Dave Morgan conducted a scheduled inspection at North American Natural Resources (NANR) - Autumn Hills Compressor and Generating Stations located at 5615 Adams Street in Zeeland. The purpose of the inspection was to determine NANR's compliance with state and federal air pollution regulations, Renewable Operating Permit (ROP) No. MI-ROP-N6006-2018 and observe stack testing. The NANR representative was Austin Boone, Plant Operator. Stack testers included Andy Rusnak and Jory VanEss of Impact Environmental. Dave Patterson of the AQD Technical Programs Unit was also on site.

FACILITY DESCRIPTION

The Autumn Hills Compressor and Generating Stations are landfill gas treatment and electric generating facilities owned and operated by NANR. The site consists of two buildings where one building houses the landfill gas treatment system and the second building houses three internal combustion engines used to generate electricity. Landfill gas produced at the Autumn Hills Recycling and Disposal Facility (RDF) located at 700 56th Avenue in Zeeland, is routed through a 1,200 foot pipeline to the NANR Autumn Hills Compressor Station where the gas is filtered, dewatered, compressed, and cooled for subsequent reuse.

Once treated, the landfill gas is either sent to the NANR Autumn Hills Generating Station where it is burned in internal combustion engines to produce electricity or the gas is introduced into a pipeline where it is then burned in boilers or turbines at the Zeeland Farm Services (ZFS) facility in Zeeland. Any gas not treated in the system is burned in the open flare located on the Autumn Hills RDF site. It is noted that the open flare at Autumn Hills RDF is sized to burn all collected gas generated by the landfill.

There are currently two engines (EUENGINE1 & EUENGINE4) at the facility and a third engine (EUENGINE2) has been removed. The two active engines are a Caterpillar 3516 LE and a Caterpillar G3520C. The company is in the process of installing an additional G3520C engine.

Although NANR Inc. is a separate entity and located adjacent to Autumn Hills RDF, it is also subject to 40 CFR Part 60, Subparts XXX (and Subpart WWW) because it controls emissions from an NSPS affected source. Formerly, the two companies were operating under separately issued ROPs, but are now combined into one ROP due to an AQD policy change. In addition, the internal combustion engines at NANR are subject to the NSPS under 40 CFR Part 60, Subpart JJJJ.

COMPLIANCE EVALUATION

Stack Testing:

At the time of inspection, a stack test was being performed on EUENGINE1 and EUENGINE4 as required under the ROP and Subpart JJJJ. Sampling was conducted under U.S.EPA Methods 1 through 4, 7E, 10, and ALT 096 (for VOC).

The following is a summary of facility engines:

Engine Slot	Type	Serial #	Rating	Manufacture Date	Original Online Date	Installed under PTI/Rule	Operating Hours at time of inspection	NSPS JJJJ	MACT ZZZZ	Comments
EUEngine 1	Caterpillar 3516 LE	ZBA01084	450 kW (1,148 hp)	2007	2008	212-08	39,225	Y	Y	
EUEngine2	Caterpillar 3516 LE	ZBA01095	450 kW (1,148 hp)	2007	2008	212-08	na			This unit has been removed from the facility
EUEngine 4	Caterpillar G3520C	GZJ00630	1600 kW (2233 hp)	2014	2008	212-08	24,561	Y	Y	
EUEngine	Caterpillar	GZJ00714	1600 kW	2016	TBD	86-19				

The company tested EUENGINE4 first and would then test EUENGINE1. Only one engine was operating during the test. No performance issues with the process were noted.

The following operating parameters were recorded during the performance test:

Engine No. 1 (SN: GZJ00630) Run 1			
Time	kW	Mass Flow (lb/hr)	CH4
8:06	1608	382.7	52.2
8:21	1611	380.8	52.2
8:36	1618	381.5	52.2
8:51	1603	380.5	52.2
9:06	1601	375	52.2

The AQD will review test results when they are received.

Gas Treatment System (FGTREATMNTSYSTEM-XXX & FGTREATMNTSYSTEM-WWW):

Under NSPS, landfill gas may be controlled by routing collected gas from a landfill to a treatment system that processes the gas for subsequent sale or use. The US EPA considers de-watering, filtering through at least a 10 micron screen, and compression prior to the combustion of the gas in energy recovery devices such as boilers, process heaters, turbines, or internal combustion engines to satisfy the definition of treatment. At NANR, the gas entering the treatment system first goes through a knockout scrubber vessel, which contains a 4 micron filter element and a 6 micron retention demister pad. The gas flows from the knockout into a 300 HP electric compressor. Compressed gas enters an after-cooler system which cools the gas to a temperature around 90 degrees. At the time of the inspection, the temperature was 110 degrees. The gas then goes through a refrigerator/dryer unit which cools the gas even further to around 40 degrees. The temperature gauge read 32 degrees during the inspection. There are no atmospheric vents or emissions from the landfill gas conditioning system.

In the treatment system, there appeared to be no equipment additions or changes since the last AQD inspection. Based on previous inspections, the treatment system's only filter mechanism for particulates is the knockout scrubber. Preventative maintenance is conducted on the treatment system in accordance with a facility maintenance plan and a log book of all maintenance activities is kept on site. Maintenance records are attached. The coalescing filter was replaced on May 24, 2017. During treatment system downtime, landfill gas is automatically routed to an open flare located at the Autumn Hills RDF.

As part of Subpart XXX requirements, the facility is to develop a site-specific treatment system monitoring plan which the company has developed as part of the facility's overall preventative maintenance plan. According to that plan (attached), parameters are monitored for treatment system operation which consist of the scrubber vessel differential pressure and condensate site tube level, the compressor oil level and maximum operating temperatures, the water/oil separator gauges, and the gas cooler maximum inlet and outlet temperatures. The plant operator is checking and recording this information on a daily basis. AQD staff will request that NANR improve upon the existing plan by further specifying monitoring methods and providing justification for the parameters and ranges used as allowed by 40 CFR 60.768(b)(5).

In the treatment building, NANR monitors various process parameters including gas quality and quantity. At the time of the inspection, the methane content of the gas was around 52% and the oxygen content was around 0.4%. Total gas flow to the plant was around 875 scfm.

The presence of a treatment system excludes the engines from the testing and control requirements contained in Subparts XXX and WWW. However, any atmospheric vent from the gas treatment system is subject to the NSPS requirements. There are no atmospheric vents or emissions from the landfill gas treatment system. If the treatment system fails or shuts down, all gas is essentially burned in the open flare located at the Autumn Hills RDF.

Startup, Shutdown, Malfunction:

NANR maintains a start-up, shutdown, malfunction plan for the treatment system as required by 40 CFR 63, Subpart AAAA. SSM records were reviewed on site. Actions were taken consistent with the SSM plan. Most of the shutdowns were the result of well-field upgrades, maintenance activities, or power outages. During these shutdowns, gas was burned in the landfill's open flare or the blower to the entire gas collection system was shutdown.

(FGENGINES and EUENGINE4):

The NANR electric generating plant is permitted under ROP No. MI-ROP-N6006-2018 for two Caterpillar 3516LE and one Caterpillar 3520C internal combustion engines used to generate electricity from burning landfill gas. EUENGINE1 (SN#: ZBA01084) began operation on August 26, 2009, EUENGINE2 (SN#: ZBA01095) was removed in 2019. EUENGINE4 (Serial #GZJ00630) was installed in August 2014. The 3516LE engine has a capacity of 1,148 brake-horsepower and the 3520C engine has a capacity of 2,242 brake-horsepower. A pending permit and approved construction waiver have been submitted for an additional 3520C engine. These engines can generally operate 24 hours per day, 7 days per week, however whether a particular engine is running is dependent on the amount of gas that the landfill is generating and how much gas is diverted to Zeeland Farm Services. At the time of the inspection only EUENGINE4 was operating, with a gas fuel flow rate around 335 cfm.

Under ROP No. MI-ROP-N6006-2018, each engine is limited to a specific landfill gas feed rate in cubic feet per 12-month rolling time period as determined at the end of each month. (see table below) NANR monitors the gas flow rate from the main header as well as the gas flow rate into the entire engine plant on a continuous basis. There are also flow meters which record the amount of gas going to each engine as required by Subpart JJJJ. The gas usage is being monitored and recorded on a daily and monthly basis. In addition, the company is required to record the hours of operation on 12-month rolling basis. The company had adequate records to verify 12-months of fuel usage but needs to improve the 12-month rolling recordkeeping. For the period from July 2018 through June 2019 gas usage was as follows:

	Gas Burned	Limit	Material Limit Met (Y/N)	Compliance with limits
Engine 1	approx. 95 MMcf	158.84 MMcf/ 12-month rolling	Y	Yes
Engine 2	approx. 83 MMcf	158.84 MMcf/12-month rolling	Y	Yes
Engine 4	approx. 166.2 MMcf	255.75 MMcf/12-month rolling	Y	Yes

The most recent performance test results were from testing in February 2018. The table below is a summary of those results:

Equipment	Parameter	Emissions	Limit	Stack test Date	Compliance Determined During Test (see file for test report)
EUENGINE1	CO	1.78 g/bhp-hr	3.1 g/bhp-hr	2/21-22/2018	Yes
	NOx	1.38 g/bhp-hr	2.0 g/bhp-hr	2/21-22/2018	Yes
	SOx	Not tested	2.96 pph	NA	testing not required until 4/23/23
	VOC	0.12 g/bhp-hr	0.41g/bhp-hr	2/21-22/2018	Yes
	Formaldehyde	not tested	1.72 pph	NA	
EUENGINE2	CO	1.89 g/bhp-hr	3.1 g/bhp-hr	2/21-22/2018	Yes
	NOx	1.1 g/bhp-hr	2.0 g/bhp-hr	2/21-22/2018	Yes
	SO2	Not tested	2.96 pph		testing not required until 4/23/23
	VOC	0.12 g/bhp-hr	0.41g/bhp-hr	2/21-22/2018	Yes
	Formaldehyde	0.67 pph	1.72 pph	na	
	CO	2.2 g/hp-hr	5.0 g/bhp-hr	2/21-22/2018	Yes
		10.86 pph	20.7 pph	2/21-22/2018	Yes
	NOx	0.27 g/hp-hr	0.5 g/hp-hr	2/21-22/2018	Yes

EUENGINE4		1.31 pph	2.46 pph	2/21-22/2018	Yes
	VOC	0.14 g/hp-hr	1.0 g/hp-hr	2/21-22/2018	Yes
		0.68 pph	3.20 pph	2/21-22/2018	Yes
	Formaldehyde	NA	2.20 pph	2/21-22/2018	Yes

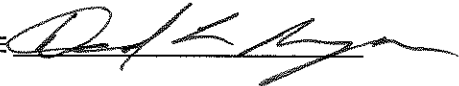
The test report is in the AQD district files. Under 40 CFR Part 60, Subpart JJJJ, the company will need to retest each engine after every 8,760 hours of operation or three years, whichever occurs first. The company is monitoring the operating hours between tests to determine testing schedules. Results from the July 2019 test will be reviewed and documented.

The company conducts appropriate engine maintenance in accordance with a malfunction abatement/preventative maintenance plan. All engine maintenance activities are maintained in a logbook located on site which was reviewed by staff. There were no apparent issues identified with the engine maintenance records kept.

No visible emissions were observed during the site visit and all stack heights appeared to meet permitted dimensions.

EVALUATION SUMMARY

NANR appears to be in compliance with all applicable requirements. Records obtained during the inspection including maintenance and engine operating records are attached.

NAME 

DATE 8/6/19

SUPERVISOR 