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

P026430714

FACILITY: NORTH AMERICAN NATURAL RESOURCES INC.		**SRN / ID:** P0264
LOCATION: 5615 ADAMS STREET, ZEELAND		**DISTRICT:** Grand Rapids
CITY: ZEELAND		**COUNTY:** OTTAWA
CONTACT: Kyle Wildschut , Site Operator		**ACTIVITY DATE:** 08/20/2015
STAFF: David Morgan	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT:		
RESOLVED COMPLAINTS:		

At 9:45 A.M. on August 20, 2015 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, and Renewable Operating Permit (ROP) No. MI-ROP-P0264-2012b. The NANR representative was Kyle Wildschut, Plant Operator.

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 three 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.

This facility is subject to the NSPS under 40 CFR Part 60, Subpart WWW because it controls emissions (via the treatment system) from an NSPS affected source. In addition, the internal combustion engines at NANR are subject to the NSPS under 40 CFR Part 60, Subpart JJJJ. The NANR facility is also permitted under Renewable Operating Permit No. MI-ROP-P0264-2012b. A ROP minor modification was finalized in 2014 to incorporate the requirements of a new Caterpillar 3520 engine which began operation in December 2014.

COMPLIANCE EVALUATION

(EUTREATMNTSYSTEM):

Under 40 CFR 60.752(b)(2)(iii)(C), 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. 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. The gas then goes through a refrigerator/dryer unit which cools the gas even further to around 40 degrees. There are no atmospheric vents or emissions from the landfill gas conditioning 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. The preventative maintenance plan for the treatment system needs updating and the company was advised to make the plan consistent with similar equipment operated by the company across the state.

During the past 12-months, records on site show that there were several events where the treatment system was down due to landfill wellfield maintenance and other plant maintenance. During treatment system downtime, landfill gas is automatically routed to an open flare located at the Autumn Hills RDF.

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 52.2% and the oxygen content was around 0.6%. Also at that time, approximately 602 cfm was going to ZFS; 450 cfm to NANR engines and 0 cfm to the Autumn Hills flare.

The presence of a treatment system excludes the engines from the testing and control requirements contained in 40 CFR Subpart 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 open flare or the blower to the collection system was shutdown.

NANR appears to be meeting the requirements contained in ROP No. MI-ROP-P0264-2012b, EUTREATMNTSYSTEM.

(FGENGINES and EUENGINE4):
The NANR electric generating plant is permitted under ROP No. MI-ROP-P0264-2012b for two Caterpillar 3516LE and one Caterpillar 3520C internal combustion engines used to generate electricity from burning landfill gas. The 3516LE engines each engine have a capacity of 1,148 brake-horsepower and the 3520C engine has a capacity of 2,242 brake-horsepower. EUENGINE1 (Serial # ZBA01084) began operation on August 26, 2009, EUENGINE2 (ZBA01095) began operation on September 2, 2009. EUENGINE4 (Serial #GZJ00630) was installed in August 2014. 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.

Under ROP No. MI-ROP-P0264-2012b, 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 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 compliance. For the period from August 2014 through July 2015 gas usage was as follows:

	Gas Burned	Limit	Material Limit Met (Y/N)	Engine Hours
Engine 1	approx. 44 MMcf	158.84 MMcf/ 12-month rolling	Y	3,982
Engine 2	approx. 58 MMcf	158.84 MMcf/12-month rolling	Y	4,228
Engine 4	approx. 48 MMcf	255.75 MMcf/12-month rolling	Y	2,950
Total	151 MMcf			

All gas usage was below applicable limits.

On February 17 and 18th, 2015, NANR conducted performance testing of the engines in accordance with 40 CFR Part 60, Subpart JJJJ. The table below summarizes the testing:

Equipment	Parameter	Emissions	Limit	Stack test Date	Compliance Determined During Test (see file for test report)
EUENGINE1	CO	2.21 g/bhp-hr	3.1 g/bhp-hr	2/17-18/2015	Yes
	NOx	0.9 g/bhp-hr	2.0 g/bhp-hr	2/17-18/2015	Yes
	SOx	Not tested	2.96 pph	NA	NA
	VOC	0.00 g/bhp-hr	0.41g/bhp-hr	2/17-18/2015	Yes
	Formaldehyde	not tested	1.72 pph		
EUENGINE2	CO	2.39 g/bhp-hr	3.1 g/bhp-hr	2/17-18/2015	Yes
	NOx	0.9 g/bhp-hr	2.0 g/bhp-hr	2/17-18/2015	Yes
	SO2	Not tested	2.96 pph		NA

	VOC	0.04 g/bhp-hr	0.41g/bhp-hr	2/17-18/2015	Yes
	Formaldehyde	not tested	1.72 pph		
EUENGINE4	CO	2.04 g/hp-hr	5.0 g/bhp-hr	2/17-18/2015	Yes
		10.1 pph	20.7 pph	2/17-18/2015	Yes
	NOx	0.3 g/hp-hr	0.5 g/hp-hr	2/17-18/2015	Yes
		1.5 pph	2.46 pph	2/17-18/2015	Yes
	VOC	0.04 g/hp-hr	1.0 g/hp-hr	2/17-18/2015	Yes
		0.4 pph	3.20 pph	2/17-18/2015	Yes
	Formaldehyde	1.6 pph	2.20 pph	2/17-18/2015	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.

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.

MISCELLANEOUS

New information obtained by the AQD in the past year indicates that formaldehyde emissions from burning landfill gas in internal combustion engines can be significant. Other facilities around the state have had formaldehyde emissions exceeding the major source thresholds. The AQD Permit Section has permitted 3516LE engines using a 0.75 pound per hour formaldehyde emission factor. Based on this emission factor, the potential to emit for formaldehyde from the two engines at 8,760 hours of operation is 6.5 tons. Since this is less than the major source threshold for individual HAPs, the facility is considered an area source of HAP emissions.

Because the facility is considered an area source of HAP emissions and the engines were installed after June 6, 2012, the company is subject to the requirements of 40 CFR Part 63, Subpart ZZZZ. It is noted that under Subpart ZZZZ, the engines are to comply with 40 CFR Part 60, Subpart JJJJ. Although Subpart JJJJ is identified in the ROP, the applicability of Subpart ZZZZ will need to be incorporated as a citation in ROP No. MI-ROP-P0264-2012b.

EVALUATION SUMMARY

NANR appears to be in compliance with all applicable requirements.

NAME [signature] DATE 9/10/15 SUPERVISOR PAB