

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection**

N600659420

FACILITY: Waste Management of Michigan, Inc. – Autumn Hills		SRN / ID: N6006
LOCATION: 700 56th Ave., ZEELAND		DISTRICT: Grand Rapids
CITY: ZEELAND		COUNTY: OTTAWA
CONTACT: Robert Pliska , District Engineer		ACTIVITY DATE: 08/19/2021
STAFF: David Morgan	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT:		
RESOLVED COMPLAINTS:		

At 9:00 A.M. on August 19, 2021, Air Quality Division (AQD) staff Dave Morgan conducted a scheduled, on-site inspection of the Autumn Hills Recycling and Disposal Facility (RDF) located at 700 56th Avenue in Zeeland. The purpose of the inspection was to determine the facility's compliance with state and federal air pollution regulations as well as Renewable Operating Permit (ROP) No. MI-ROP-N6006-2018a. Accompanying AQD staff on the inspection was Bob Pliska, Site Engineer; and Chad Dammen, Landfill Gas Technician for Waste Management. All Covid protocols were followed.

FACILITY DESCRIPTION

Autumn Hills RDF is a municipal solid waste landfill owned and operated by Waste Management Inc. Autumn Hills was modified after July 17, 2014 and has a design capacity greater than 2.5 million cubic meters, and is therefore subject to the New Source Performance Standard (NSPS) for Municipal Solid Waste Landfills promulgated in 40 CFR Part 60, Subparts A and XXX. Because the non-methane organic compound (NMOC) emissions are greater than 34 megagrams per year, the company is required to install a landfill gas collection and control system.

The site is also subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Municipal Solid Waste Landfills promulgated in 40 CFR Part 63, Subparts A and AAAA. This is primarily because the landfill meets the criterion of 40 CFR 63.1935(3) due to the landfill having NMOC emissions greater than 34 Megagrams per year. It is noted that the requirements under 40 CFR Part 60, Subpart WWW also apply to the stationary source because 40 CFR Part 63, Subpart AAAA adopts Subpart WWW requirements by reference. It is noted that because both Subpart WWW and XXX apply and have similar requirements, the company will have to comply with the more restrictive requirements in the standards. Changes to Subpart AAAA that correct regulation overlap will apply to the site in September 2021.

Landfill gases are either controlled by a flare or are treated for subsequent reuse. The site also includes a solidification process and a composting operation. The facility has discontinued leachate recirculation.

North American Natural Resources Inc. (NANR), which treats the landfill gas for Autumn Hills is located adjacent to Autumn Hills RDF. NANR is subject to the NSPS under 40 CFR Part 60, Subpart XXX because it controls emissions from an NSPS affected source. The NANR facility is also permitted under ROP No. MI-ROP-N6006-2018a. Formerly, the two companies were operating under separately issued ROPs, but have been combined into one ROP due to an AQD policy change.

COMPLIANCE EVALUATION

Landfill (FGLANDFILL-WWW and FGLANDFILL-XXX):

The landfill has a design capacity of 20 million cubic yards. As of June 2021 the facility has approximately 12,975,643 million cubic yards of waste in place according to the most recent site survey.

Records pertaining to maximum design capacity, year-by-year acceptance rate, and amount of waste in place are maintained on site in accordance with the NSPS.

Surface Monitoring:

Cover integrity and necessary cover repairs are done on a monthly basis and recorded. The company uses a method of cover documentation which includes locations and pictures of problem areas. These records were reviewed on site. Leachate outbreaks and washouts were documented and addressed.

The surface concentration of methane is monitored at 30 meter intervals, using a TVA-1000 (FB) organic vapor analyzer, on a quarterly basis in accordance with the NSPS and the ROP. Surface monitoring records for 2020 and 2021 were reviewed; the following table is a summary:

Quarter	Results > 500 ppm	Response	Compliance
3rd 2020	2 penetration exceedances near wells GW153 and GW128 (range 7,135 - 17,149 ppm)	tuned wells and added dirt	Y
4th 2020	1 penetration exceedance at well W32 (21,498 ppm)		Y

		installed a boot around W32	
1st 2021	2 penetration exceedances at GW92 and GW156 (range 625-841 ppm)	tuned wells	Y
2nd 2021	3 penetration exceedances (527-619 ppm) 3 surface exceedances (551-715 ppm)	Tuned wells/added dirt	Y

Corrective actions were taken and re-monitoring was conducted within required timeframes. No additional wells needed to be added to the system to address exceedances. Required calibrations were conducted in accordance with the NSPS and ROP prior to the surface monitoring events, this included a response time under 10 seconds and a stable span concentration with a less than 10% deviation. Monitoring was conducted with an infrared IRwin® Methane Leak Detector. All locations are plotted on a map and latitude and longitude coordinates recorded.

Active Landfill Gas Collection System (FGACTIVECOLL-WWW and FGACTIVECOLL-XXX):

Gas generated by the landfill is collected through a series of vertical and horizontal gas extraction wells that are piped to a main header. The gas collection and control system (GCCS) is designed and constructed in accordance with NSPS requirements. On a monthly basis, in accordance with the ROP, the company monitors the vacuum pressure of the collection header, as well as the oxygen concentration, temperature and pressure at each wellhead using a Landtec GEM monitoring device. By design each wellhead has a thermometer and sampling port installed. According to company records, there are approximately 134 active collection devices with 113 subject to NSPS monitoring, as of July 2021. This number will increase due to the 2021 wellfield expansion.

According to company records for August 2020 through July 2021 the following table summarizes initial well parameter exceedances identified during monthly monitoring events. All wells were returned to compliance after the required recheck or were approved for an alternate operating timeline. Records are attached.

Month	O2 > 5%	Temp >131°F	Positive Pressure
August 2020	HC28B, HC33, HC16A, HC24, HC22, HC31B, GW7R, LCR6c,	-	HC26, GW31, GW34R
September 2020	LCR14B, LCR6B, HC16A, HC22, HC30, GW24R		GW133, GW144
October 2020	HC22, LCR6B		-
November 2020	HC26, HC29, HC22, GW14R2	-	GW126
December 2020	HC17, HC22, HC32, HC30, GW14R2	-	HC31A, HC31B, LCR6B, LCR63
January 2021	HC17, HC23, HC29, HC28A, HC31A, GW13R2		
February 2021	HC29, LCR14B, GW13R2	-	
March 2021	HC17, HC23	-	HC30, GW132
April 2021	LCR14B	-	HC16A, HC22, GW13R2, GW14R2
May 2021	HC23, HC30, HC31A, HC31B, HC32	-	HC32, GW14R2
June 2021	HC23	-	GW14R2
July 2021	HC16A, GW13R2, GW14R2,		HC31A, GW13R2, GW61R, GW98

AQD staff observed wells GW47R, GW110, GW62, HC19, GW58R3. All wells were installed with required equipment and operating properly. During the inspection Chad Dammen used an Elkins Gas Analyzer to verify methane, oxygen, pressure and temperature from the observed wells. All wells met NSPS requirements. Landfill gas odor was observed around GW62.

Open Flare (FGOPENFLARE-WWW and FGOPENFLARE-XXX):

In general, most of the landfill gas generated from the landfill is routed to an off-site treatment system, owned and

operated by NANR, that treats the gas for subsequent reuse. Any remaining portion of landfill gas generated is routed to an open flare with a rated capacity to burn 3,000 scfm of landfill gas. The flare is equipped with an infrared detection sensor that continuously monitors flame presence. The flame controller shuts the blower down and the main well field valve upon detection of flame absence. There is also a backup thermocouple which monitors flame temperature and will shut the flare down if the temperature falls below the set point. Automatic attempts are made to reignite the flame if extinguished. The company continuously monitors and records the temperature of the flare.

There is an interlock between the flame controller and the flow valve to insure that gas will not flow to the flare without a flame present. Gas flow to the flare is monitored and recorded on a continuous basis. Gas flow to the flare was verified. When there is no flow to the flare either ZFS or the NANR engine plant is taking all the gas or the flare is not igniting.

During the inspection, there was approximately 268 scfm of gas going to the flare. Typically flow to the flare is under 500 scfm with the remainder of gas flow going to the treatment system. Approximately 2,813 scfm of gas was going to the NANR plant. The company does not have a bypass line to the atmosphere. Flare temperature was around 700°F. No visible emissions were observed from the flare.

Startup, Shutdown, Malfunction:

The company has developed and is implementing a startup, shutdown, malfunction plan in accordance with 40 CFR Subpart 63, Subpart AAAAA. Waste Management is maintaining the necessary documentation of startup, shutdown, malfunction events in accordance with the ROP.

Asbestos Waste (EUASBESTOS):

Asbestos waste is usually received in small quantities and immediately covered over once placed in the landfill. All disposal of waste is plotted on a site map (attached). The company is maintaining all required records including the date of receipt, generator, transporter, location within the landfill (northing and easting coordinates), elevation, and amount. Records were obtained during the inspection and are attached. For the August 2020 through July 2021 approximately 780 yards of friable asbestos waste was received. It is noted that the company provides notification to AQD prior to construction activities in or near asbestos areas in accordance with the NESHAP. The company generally tries to avoid digging in asbestos areas. No asbestos was received on the day of the inspection.

Parts Washer (FGCOLDCLEANERS):

The company has one small maintenance cold cleaner, using mineral spirits, in which no non-compliance issues were identified. At the time of inspection, the lid was closed.

EVALUATION SUMMARY

Autumn Hills RDF appears to be in compliance with all applicable requirements. Records of well monitoring data for August 2020 through July 2021 have been written to CD and are attached to this report.

At 11:15 A.M. on August 19, 2021, AQD staff Dave Morgan conducted a scheduled, on-site 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-N6006-2018a. The NANR representatives were Austin Boone and Justin Boone, Plant Operators.

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. At the time of the inspection, total gas flow to the electric generating plant was around 950 scfm and to Zeeland Farm Services was around 1,132 scfm. 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 three engines (EUENGINE1, EUENGINE2R & EUENGINE4) at the facility.

Although NANR 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

The NANR electric generating plant has one Caterpillar 3516LE and two Caterpillar 3520C internal combustion engines used to generate electricity from burning landfill gas and generally operate 24 hours per day, 7 days per week depending on the amount of gas available. The following is a summary of facility engines:

Parameter	Engine 1	Engine 2R	Engine 4
Type	Caterpillar G3516	Caterpillar G3520C	Caterpillar G3520C
Serial #	ZBA01084	GZJ00714	GZJ00630
Rating	450 kW (1,148 hp)	1600 kW (2242 hp)	1600 kW (2242 hp)
Mfg Date/installed date	2007/9-2018	2016/11-25-2019	2012/1-2019
Total Operating Hrs	~52,055	~12,998	~38,741
12-month Hrs	7,388	8,042	6,453
Non resettable Hrs meter	Y	Y	Y
NSPS JJJJ Subject	Y	Y	Y
MACT ZZZZ Subject	Y	Y	Y
Original NSR PTI	212-08	86-19	212-08
Operating @ inspection	No	Yes	Yes
Flow during inspection	0	337.1 scfm	340.9 scfm

NANR monitors on a continuous basis, many parameters for engine operation including gas flow rate from the main header, gas flow rate into the engines, gas quality, electricity production, and hours of operation. Each engine can process approximately 400 to 500 cubic feet of landfill gas per minute. Under ROP No. MI-ROP-N6006-2018a, 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 is maintaining 12-month rolling gas usage, operating hours and emissions information for the engines in accordance with the ROP. The following table is a summary of emission and material records for the period from August 2020 through July 2021. Records obtained are attached to this report.

Equipment	Parameter	Actual Value	Permit Limit	Stack test Date	Compliance	Comments
EUENGINE1	CO	2.58 g/bhp-hr	3.1 g/bhp-hr	12/2020	Yes	
	NOx	0.54 g/bhp-hr	2.0 g/bhp-hr	12/2020	Yes	
	SO2		2.96 pph		Yes	Testing required by 4/2023
	VOC	0.20 g/bhp-hr	0.41 g/bhp-hr	12/2020	Yes	
	Formaldehyde	0.67 pph	1.72 pph	9/2018	Yes	Testing required by 4/2023
	Landfill gas usage	137.2 MMscf/yr	158.84 MMScf/yr	NA	Yes	
EUENGINE2R	CO	14.1 pph	16.3 pph	12/2020	Yes	
		2.98 g/bhp-hr	3.1 g/bhp-hr	12/2020	Yes	
	NOx	2.21 pph	2.97 pph	12/2020	Yes	
		0.45 g/bhp-hr	0.6 g/bhp-hr	12/2020	Yes	
	SO2*	1.74 pph	5.16 pph	2/2020	Yes	
		5.68 tpy	22.6 tpy		Yes	Mass balance used
VOC		1.0 g/bhp-hr	12/2020	Yes		

		0.16 g/bhp-hr				
		0.79 pph	3.20 pph	12/2020	Yes	
	Formaldehyde	1.35 pph	2.20 pph	2/2020	Yes	
	Treated landfill gas	177.2 MMscf/yr	304.3 MMscf/yr	NA	Yes	
EUENGINE4	CO	9.70 pph	16.3 pph	2/2021	Yes	
		1.96 g/bhp-hr	3.3. g/bhp-hr	2/2021	Yes	
	NOx	1.34 pph	2.97 pph	2/2021	Yes	
		0.37 g/bhp-hr	0.6 g/bhp-hr	2/2021	Yes	
	SO2		5.16 pph		Yes	Testing required by 4/2023
		4.57 tpy	22.6 tpy		Yes	
	VOC	0.36 pph	3.20 pph	2/ 2021	Yes	
		0.07 g/bhp-hr	1.0 g/bhp-hr*	2/2021	Yes	
	Formaldehyde	1.24 pph	2.20 pph	2/2020	Yes	
	Treated landfill gas	140.2 MMscf/yr	304.3 MMscf/yr	NA	Yes	

NANR has been verifying the hydrogen sulfide (H2S) content of the gas using Draeger Tubes in accordance with the permit. AQD staff observed spent Draeger tubes which are kept on site. Draeger tube recorded results indicate H2S concentrations for the past 12 months ranged from 200 to 563 ppmv which is below the 892 ppm H2S concentration limit in the permit. In addition, a lab analysis of the gas in April 2021 using ASTM Method D5504 and Method GPA 2261 resulted in a total reduced sulfur concentration of 458 ppm which is also below the 892 ppm limit.

The company conducts appropriate engine maintenance in accordance with a malfunction abatement/preventative maintenance plan and ROP No. MI-ROP-N6006-2018a. The engine maintenance logbook was reviewed on site. There were no apparent issues identified with the engine maintenance records. Maintenance of the engines consisted primarily of oil and filter changes and other general engine maintenance. Engine 1 had a top-end done in November 2020, Engine 2R had a top-end done in February 2021 and Engine 4 was sent out for a major overhaul in December 2020. Records are maintained on-site in accordance with ROP No. MI-ROP-N6006-2018a and in accordance with the preventative maintenance plan. The company uses a daily record sheet to monitor engine parameters.

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

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 inlet temperature to the aftercooler was around 200 °F and the outlet temperature was around 101°F. The gas then goes through a refrigerator/dryer unit which cools the gas even further to around 40°F. At the time of the inspection the chiller was not operational. The plant operator indicated that this was due to incorrect voltage from Consumers Energy.

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 automatically routed to an open flare located at the Autumn Hills RDF.

The facility has developed as part of the facility's overall preventative maintenance plan a site-specific treatment system monitoring plan. According to that plan (attached), monitored parameters 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. According to the plant operator, treatment system operating parameters are checked on a daily basis, however, the operator is not documenting or recording these operating parameters. Since the company is not maintaining daily records of filtration, de-watering, and compression parameters that ensure the treatment system is operating properly as outlined in the NANR site-specific monitoring plan a

violation of ROP No. MI-ROP-N6006-2018a, FGTREATMNTSYSTEM-XXX, Special Condition III.3.a will be cited. A QD staff will also request that NANR improve 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).

Maintenance records of the treatment system are being kept on site in a log book. The only documented maintenance on the treatment system was the replacement of the scrubber filter on March 20, 2021.

Startup, Shutdown, Malfunction:

NANR maintains a start-up, shutdown, malfunction plan for the treatment system as required by 40 CFR 63, Subpart AAAAA. SSM records were reviewed on site and no issues identified.

EVALUATION SUMMARY

NANR will be sent a violation notice for the violation identified above. Records obtained during the inspection including maintenance and engine operating records are attached.

NAME David L. Ryan

DATE 9/1/2021

SUPERVISOR HH