

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

N600668458

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: 08/02/2023
STAFF: Chris Robinson	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: FY '23 on-site inspection to determine the facility's compliance status with respect to MI-ROP-N6006-2023 and any other applicable air quality rules and regulations.		
RESOLVED COMPLAINTS:		

A) Introduction

Staff Chris Robinson (CR) from Michigan's Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD) conducted an inspection at Waste Management's Autumn Hills Recycling and Disposal Facility (RDF) and Kinder Morgan's, formerly NANR, Compressor and Generating Station on August 2, 2023. These facilities are considered one stationary source therefore operate under the same SRN, N6006. The landfill is located at 700 56th Avenue and the compressor/generating station is located at 5615 Adams Street, both in Zeeland, Ottawa County, Michigan.

The purpose of this inspection was to determine the facility's compliance status with the requirements of the federal Clean Air Act; Part 55 (Michigan's Air Pollution Control Rules) of Act 451 of the Natural Resources and Environmental Protection Act (NREPA); Renewable Operating Permit (ROP) MI-ROP-N6006-2023 and any other applicable state and federal air quality rules and regulations.

Prior to entry CR surveyed the perimeter of the facilities for odors and visible emissions, none were observed. CR then met with Waste Management staff Fred Sawyers, Area Disposal Manager, and Matt Rosser, District Manager, to conduct an inspection of the landfill. Once completed CR met with Branden Boone from Kinder Morgan to conduct an inspection of the compressor and generating station. Identification was provided and CR informed both companies of the purpose of the inspections which began by reviewing the ROP requirements. Most of the landfill's records were reviewed onsite.

Weather conditions were partly cloudy with a temperature of approximately 81 degrees Fahrenheit and southwest winds at approximately 13 mph (www.weatherunderground.com).

B) Regulatory Evaluation

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70 because the potential to emit of carbon monoxide (CO) exceeds 100 tons per year (tpy). In addition, the potential to emit of any single HAP regulated by Section 112 of the federal Clean Air Act, is equal to or more than 10 tpy and/or the potential to emit of all HAPs combined is equal to or more than 25 tpy.

Also, the stationary source 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. This NSPS requires a Part 70 Renewable Operating Permit. The NMOC emissions from the landfill are greater

than 34 megagrams per year, so the source is required to install and maintain a landfill gas collection and control system.

EULANDFILL at the stationary source is subject to the Standards of Performance for Municipal Solid Waste Landfills that commenced construction, reconstruction, or modification after July 17, 2014, promulgated in 40 CFR Part 60, Subparts A and XXX.

EUASBESTOS at the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants for Asbestos promulgated in 40 CFR Part 61, Subparts A and M.

EULANDFILL, EUACTIVECOLL, EUOPENFLARE, and EUTREATMENTSYS at the stationary source are subject to the National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills as promulgated in 40 CFR Part 63, Subparts A and AAAA. The landfill meets the applicability criteria of accepting waste after November 8, 1987, has additional capacity for waste deposition and meets the criteria of being collocated with a major source as defined in 40 CFR 63.2. Beginning no later than September 27, 2021, all landfills described in 40 CFR 63.1935 must meet the requirements of this subpart.

EUENGINE1, EUENGINE2R, and EUENGINE4 at the stationary source are subject to the New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines promulgated in 40 CFR Part 60, Subparts A and JJJJ. Additionally, FGSIRICEMACT (EUENGINE1, EUENGINE2R and EUENGINE4) are subject to the National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines promulgated in 40 CFR Part 63, Subparts A and ZZZZ.

C) Facility Description Land

Autumn Hills RDF is located in Zeeland, Michigan, Ottawa County and is classified as a Type II landfill or Municipal Solid Waste (MSW) landfill.

Autumn Hills RDF began accepting waste in March 1992. The landfill was modified in 2014 and currently has a design capacity of 20 million cubic yards. Wastes accepted includes municipal waste, construction and demolition debris, foundry sand, ash, low-level contaminated soils, and asbestos containing materials.

After waste is transported to the landfill, it is placed in one of the active working areas, known as cells, and is covered daily with soil or other cover materials. When a cell reaches its design capacity, a liner is installed to cover the waste. Over time, natural biological processes transform the waste materials and produce leachate and landfill gas (LFG). Initially, decomposition is aerobic until the oxygen supply is exhausted. Anaerobic decomposition of buried refuse creates most of the LFG. The LFG is comprised of methane (CH₄), carbon dioxide (CO₂), carbon monoxide (CO), hydrogen sulfide (H₂S), volatile organic compounds (VOC) and non-methane organic compounds (NMOC). NMOC is the primary regulated air pollutant associated with LFG generation. The uncontrolled mass emissions of NMOC calculated by the EPA Landfill Gas Model are 60.06 megagrams per year (Mg/yr.). This requires the facility to have an active landfill gas collection and control system (GCCS). The GCCS uses a series of interconnected vertical and horizontal gas extraction wells that are operating under negative pressure to collect LFG throughout the landfill and route the gas to a main header, which then routes the gas either to an open flare, a treatment

system for located at the neighboring Generating station, or to both. The open flare has the capacity to burn 3,000 standard cubic feet per minute of LFG.

Kinder Morgan's Compressor and Generating Station, located at 5615 Adams Street, consists of two buildings, one building houses the landfill gas treatment system and the second building houses three internal combustion engines used to generate electricity. LFG produced at the Autumn Hills RDF is routed through a 1,200-foot pipeline to the treatment system where the gas is filtered, dewatered, compressed, and cooled for subsequent reuse. Once treated, the landfill gas is either sent to the internal combustion engines to produce electricity or is introduced into a pipeline which routes the gas to a nearby Zeeland Farm Services (ZFS) facility that burns the gas in boilers and turbines.

The site also includes a solidification process and a composting operation. The facility has discontinued leachate recirculation.

The stack height on Engine 1 was measured using a Forestry Pro II laser rangefinder. The ROP requires a minimum stack height of 68-feet above ground and the measured height was 65.7-feet. However, the accuracy of the rangefinder, stabilization of the camera, and material differences between the base of the stack (concrete) and the top of the stack (metal) account for this discrepancy. Therefore, there are no stack height concerns at this time. No other stack heights were measured.

D) Compliance Evaluation

No odors or visible emissions were observed onsite during the inspection. All 2022 and 2023 (thus far) semi-annual and annual reports have been submitted on time. Only stack for EUENGINE1 was measured, which is discussed in section EUENGINE1 below. The remaining stacks appeared to meet the requirements specified in the ROP.

1) ROP Section 1: Autumn Hills RDF (Waste Management Inc.)

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 and 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. These records were reviewed onsite, and no asbestos was received on the day of the inspection. The company generally tries to avoid digging in asbestos areas however, if necessary, then Waste Management provides notification to AQD prior to construction activities in or near asbestos areas in accordance with the NESHAP.

FGLANDFILL-XXX & FGLANDFILL-AAAA:

The landfill has a design capacity of 20 million cubic yards. Since this capacity is greater than 2.5 million cubic meters the landfill is required to install and maintain a collection and control system that captures landfill gas. Both horizontal and vertical collectors are being utilized for collection and a 3,000 scfm open flare, treatment system, and engines are being used for control. Use of these control devices is discussed in the facility description section above.

As of April 4, 2023, the facility has approximately 13,617,338 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.

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. The facility is making necessary repairs in a timely manner.

Surface Emissions Monitoring (SEM) event is conducted quarterly in accordance with the NSPS. It is monitored at 30-meter intervals, using a TVA-1000 (FB) organic vapor analyzer. Surface monitoring records for 2022 and 2023 were reviewed; and are attached. The following table is a summary of those records.

Quarter	Date	Results >500 (ppm)	Location	Response	10/10/30/10 day rescans
3rd 2022	8/17/2022	871.9	GW0059R2 (N42.77839, W-85.91733)	Dirt Cover	2,829.4/113.6/89.6/0.0
		6,435.5	AHLR0102 (N42.7784, W-85.91806)	Dirt Cover	65.3/0.0/3,031/33.4
4 th 2022	10/27/2023	No exceedances			
1 st 2023	3/1/2023	3,500	42.776913N & - 85.913865E	Hydrated bentonite clay seal	130.10 /NA/ 58.00/NA
2 nd 2023	5/17/2023	1,126.50	GW0058R3 (42.778181N, - 85.917893E)	Hydrated bentonite clay seal	143.40/NA/157.80/NA
		1,485.30	HC000014 (42.777032N, - 85.917160E)	Hydrated bentonite clay seal	223.40/NA/336.50/NA

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.

FGACTIVECOLL-XXX & FGACTIVECOLL-AAAA:

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. A diagram of the current collection system is maintained onsite. 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 for August 2022 through August 2023 the following table summarizes well parameter exceedances identified during monthly monitoring events. All wells were returned to compliance after the required recheck. Records are attached.

Collector	Temp > 131oF	Positive Pressure
GW000152	8/18/22 – 8/26/2022 (7 Days)	--
GW000132	--	1/16 -17/2023 (1 day)
GW0003R2	--	8/3-7/2023 (4 days)
GW00061R	--	8/7/2023 (<1 day)
GW00102R	--	8/10/2023 (<1 day)
GW0013R2	--	8/18 – 22/2022 (4 days)
HC000017	--	8/7/2023 (<1 day)
HC000023	--	6/13/2023 (<1 day)
HC000032	--	8/5/2022 (<1 day)
HC000032	--	8/8/2023 - unresolved
HC00028A	--	8/4 - 5/2022 (1 day)
HC00028B	--	8/5/2022 (<1 day)

Based on discussions and observations all wells appear to be installed with required equipment and operating properly.

FGOPENFLARE-XXX & FGOPENFLARE-AAAA:

In general, most of the landfill gas generated from the landfill is routed to an off-site treatment system, owned, and operated by Kinder Morgan who 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 ensure 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 Kinder Morgan engine plant is receiving all of the gas.

During the inspection, there was approximately 2,375 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. The company does not have a bypass line to the atmosphere. Flare temperature was around 800°F.

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

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.

2) ROP Section 2: Gas Compressor and Electric Generating Plant (Kinder Morgan Inc.)

The 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 #	CA-00000TZBA01084	CAT63520EGZJ00714	CAT63520AGZJ00636
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.	158,202	21,481	47,110
Max 12-month Hrs. (August 2022 – July 2023)	4,350	4,417	3,997
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	Yes	Yes	Yes
Flow during inspection	--	--	--

EUENGINE1, EUENGINE2R, EUENGINE4 & FGRICEMACT

Kinder Morgan monitors on a continuous basis, many parameters for engine operation including gas flow rate from the main header, gas flow rate, gas flow rate into the entire engine plant and 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-N6006-2023, 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).

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 engines are equipped with non-resettable hour meters and fuel flow meters. 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.

Parameter	Permit Limit	Actual Value	Most Recent Stack Test	Compliance
CO (g/bhp-hr.)	3.1	1.4.	4/19/23	Yes
NOx (g/bhp-hr.)	2.0	1.0.		
SO2 (pph)	2.96	0.98		
VOCs (w/o Formaldehyde, pph)	0.41	0.10		
Formaldehyde (pph)	1.72	0.64		
** Treated landfill gas usage (MMSCF)	158.84	78.80 (Max Mthly)	--	
CO (pph / g/bhp-hr.)	16.3	10.2	4/12/22	Yes
	3.3	2.09		
NOx (pph / g/bhp-hr.)	2.97	1.10		
	0.6	0.23		
** SO2 (pph / tpy)	5.16	1.74	2/13/2020	Yes
	22.6	2.37 tons (Max Mthly)	--	
VOCs (pph / g/bhp-hr.)	3.20	0.76	4/12/22	Yes
	1.0	0.16		
Formaldehyde (pph)	2.20	1.35		
** Treated landfill gas usage (MMSCF)	304.3	103.0 (Max Mthly)	--	
CO (pph / g/bhp-hr.)	16.3	9.75	4/12/22	Yes
	3.3	1.99		
NOx (pph / g/bhp-hr.)	2.97	1.16		
	0.6	0.24		
** SO2 (pph / tpy)	5.16	1.73	2/13/20	Yes
	22.6	2.13 tons (Max Mthly)	--	
VOCs (pph / g/bhp-hr.)	3.20	0.67	4/12/22	Yes
	1.0	0.14		
Formaldehyde (pph)	2.20	1.24		
** Treated landfill gas usage (MMSCF)	304.3	101.7 (Max Mthly)	--	

** Annual emission limits are based on a rolling 12-month rolling time period. Data reviewed for this inspection was for the months of August 2022 through July 2023.

Kinder Morgan verifies the hydrogen sulfide (H₂S) and/or the total reduced sulfur content (TRS) of the treated landfill gas prior to being combusted in the engines using Draeger Tubes monthly and lab analysis semi-annually. Draeger tube results indicate TRS concentrations for the past 12 months ranged from 200 to 325 ppm, which is below the required limit of 892 ppm. Based on the most recent lab analysis (5/26/2023) using ASTM Method D5504 and Method GPA 2261 the TRS concentration was 316.4 ppm, and the H₂S concentration was 310 ppm, both well 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-N6006-2023. 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. Records are maintained on-site in accordance with

ROP No. MI-ROP-N6006-2023 and in accordance with the preventative maintenance plan. The company uses a daily record sheet to monitor engine parameters.

FGTREATMENTSYS-XXX & FGTREATMENTSYS-AAA:

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 Kinder Morgan, 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°F. At the time of the inspection approximately 1,483 scfm of gas was being treated.

The presence of a treatment system excludes the engines from the testing and control requirements contained in Subparts XXX. 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, 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. Treatment system operating parameters are checked and recorded on a daily basis.

Maintenance records of the treatment system are being kept on site in a logbook, which was reviewed onsite.

Kinder Morgan 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 and no issues identified.

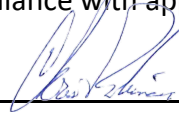
3) MAERS

Report submittal was received on time (March 10, 2023) and was reviewed by AQD on April 5, 2023. Total emissions reported are listed in the table below.

Pollutant	Amount (tons)
CO	58.84
NMOC	16.18
NOx	8.95
PM10, FLTRBLE	9.58
P10, PRIMARY	0.58
PM2.5, PRIMARY	0.58
SO2	14.54
VOC	3.87

E) Conclusion

Based on observations, discussions and a records review, Waste Management's Autumn Hills Landfill and Kinder Morgan's Compressor and Generating Station appears to be operating in compliance with applicable air quality rules and regulations including ROP MI-ROP-N6006-2023.

NAME 

DATE 9/21/2023

SUPERVISOR 