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

N132435131

FACILITY: South Kent Landfill		**SRN / ID:** N1324
LOCATION: 10300 South Kent Drive SW, BYRON CENTER		**DISTRICT:** Grand Rapids
CITY: BYRON CENTER		**COUNTY:** KENT
CONTACT: Dan Rose , Solid Waste Operations Manager		**ACTIVITY DATE:** 06/22/2016
STAFF: David Morgan	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT:		
RESOLVED COMPLAINTS:		

At 1:30 P.M. on June 22, 2016, Air Quality Division staff Dave Morgan conducted a scheduled inspection at the South Kent Landfill and Granger Electric of Byron Center LLC located at 10300 South Kent Drive SW, in Byron Center. 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 No. MI-ROP-N1324-2012 as part of a full compliance evaluation. Accompanying staff on the inspection was Dan Rose, Kent County Solid Waste Operations Manager. A DEQ Inspection Brochure was presented to Mr. Rose.

FACILITY DESCRIPTION

The South Kent Landfill is a municipal solid waste landfill which has an active capacity of over 10 million cubic meters, making it subject to the Federal Plan requirements for Municipal Solid Waste (MSW) Landfills under 40 CFR Part 62, Subpart GGG. Because the Non-methane Organic Compound (NMOC) emissions do not exceed 50 megagrams per year the South Kent Landfill is not required to have a collection and control system. In July 2008 the County voluntarily installed an active landfill gas collection system and an open flare on the active portion of the landfill. Collected landfill gas is routed to Granger Electric of Byron Center where two internal combustion engines burn the landfill gas to produce electricity.

The landfill is currently covered under ROP No. MI-ROP-N1324-2012, 40 CFR Part 62, Subpart GGG, and 40 CFR Part 63, Subpart AAAA. The engines are also covered under ROP No. MI-ROP-N1324-2012, and also subject to the NSPS for Stationary Spark Ignition Internal Combustion Engines (40 CFR Part 60, Subpart JJJJ) and the major source requirements of the NESHAP for Stationary Reciprocating Combustion Engines (40 CFR Part 63, Subpart ZZZZ).

COMPLIANCE EVALUATION

EULANDFILL<50:The South Kent Landfill has a design capacity greater than 2.5 million cubic meters and NMOC emissions (based on established Tier 2 values) less than 50 megagrams. Because of this, the County has to conduct a Tier II test every five years to demonstrate whether gas collection and control is required or not. In September 2011, Kent County conducted a Tier II test to determine the NMOC concentration and NMOC emission rate from the entire landfill including both closed and active portions. The Tier II results indicated that the average NMOC concentration from the site was 56.8 parts per million as hexane and NMOC emissions were calculated to be 9.19 megagrams through 2015. Because NMOC emissions are under the 50 megagram per year threshold in Subpart GGG the County is not subject to landfill gas collection and control requirements including operation, monitoring and recordkeeping requirements. The next round of Tier II testing will be due in September 2016. According to Mr. Rose, the County is in the process of bidding out the testing.

All records including the maximum design capacity, the year-by-year waste acceptance rate, and the current amount of MSW in place are being kept in accordance with the permit. The landfill currently accepts approximately 400 tons of refuse per day. Records of the current amount of MSW in place is maintained on a quarterly basis. Although records are not maintained on-site, it is available within 4 hours which is in compliance with Subpart GGG and the ROP. According to County records, approximately 290,410 tons of waste was received in 2015. In addition as of December 2015, there was a total of approximately 6.7 million cubic meters of waste in place.

Granger Electric of Byron Center LLC

AQD staff met with Justin Jachim, the operator of the Granger engine plant. In addition, maintenance records and the daily engine parameter records were hanging in the control room and were reviewed on site. Some records were obtained from Dan Zimmerman, Director of Compliance for Granger in follow-up to the site visit.

FGICEENGINES:

Granger Electric operates two Caterpillar G3520 internal combustion engines used to generate electricity from burning landfill gas. The two engines were originally installed in 2008 and operate under ROP No. MI-ROP-N1324-2012.

Engine 1 was replaced in December 2015 with a rebuilt engine that has a new serial number and manufacture date (see engine table at the end of the report). Landfill gas entering the generating plant is sent through a treatment system to de-water, filter and cool the gas prior to combustion. The two internal combustion engines generally operate 24 hours per day, 7 days per week. (A summary table of engines is at the end of this report.) Any landfill gas that is not burned in the engines is routed to an open flare. At the time of the inspection, both engines were operating and no gas was being sent to the flare. The engines at the site have emission limits for CO, NOx, VOC and formaldehyde. Under ROP No. MI-ROP-N1324-2012 the company is required to verify the emission rates of these pollutants. The last performance testing results are as follows:

Pollutant	Result		Limit	Test Date
	Engine1	Engine2		
VOC	0.10 g/bhp-hr	0.15 g/bhp-hr	1.0 g/bhp-hr	1/2016
CO	9.2 lb/hr	12.6 lb/hr	16.23 lb/hr	1/2016
NOx	1.84 lb/hr	2.52 lb/hr	4.92 lb.hr	1/2016
formaldehyde	1.65 lb/hr	NA	2.10 lb/hr	8/2012

It is noted that the engines do not have SO2 emission limits. In discussion with Mr. Jachim he indicated that the landfill gas had been analyzed in the past for hydrogen sulfide (H2S) and that the concentration in the gas was around 800 ppm. AQD staff received additional information from Granger indicating that the last analysis of gas contained 672 ppm of H2S. Granger indicated that these results were not quality assured or controlled. Regardless, credible evidence indicates that the H2S content in the landfill gas currently being burned is different than the H2S content used in the original permit evaluation of the engines and what is used by Granger to calculate SO2 emissions from the engines.

In the original 2008 permit application, a H2S concentration of 35.50 ppmv (based on U.S.EPA , *Compilation of Air Pollutant Emission Factors, Volume 1. Stationary Point and Area Sources* "AP-24") was used to estimate the contribution of H2S to SO2 emissions from the process. This value has also been carried forward in reporting SO2 emissions to the Michigan Air Emissions Reporting System (MAERS).

Because site specific information exists regarding the quality of the landfill gas, Granger was instructed to 1) submit revised potential to emit calculations for SO2 within 45 days (or by August 29, 2016); and 2)calculate SO2 emissions that are more representative of actual site conditions and report this to MAERS during the next reporting cycle. These two items should be addressed using the best available site specific information.

Based on rough calculations by AQD staff, SO2 emissions are not anticipated to exceed significant thresholds, however AQD staff will review potential to emit calculations when submitted by the company.

Per ROP No. MI-ROP-N1324-2012 Granger 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 and the gas is analyzed at regular intervals to verify the quality of the gas.

At the time of the inspection, the following parameters were noted:

Parameter	Total for Both Engines
Methane %	50.3%
O2 %	0.46%
Flow	1,040 scfm
Kilowatt Output	2,935 kw

Records are maintained on-site in accordance with ROP No. MI-ROP-N1324-2012 and in accordance with the preventative maintenance plan. A daily record sheet is used record various engine and treatment system parameters. According to company records, the total landfill gas feed rate for June 2015 through May 2016 was 485 million cubic feet which is less than the permit limit of 565.88 million cubic feet. The company also records, once per day, the kilowatt output from each engine and maintains a monthly and a 12-month rolling record of the hours of operation. It is noted that the company uses non-resettable hours meters.

Based on facility records, a preventative maintenance program is conducted. Routine maintenance is conducted on the engines in accordance with manufacturer specifications which include replacing engine spark plugs, oil, and lubrication. Maintenance is also conducted on an as needed basis. In addition, a "top-end" overhaul, which includes replacing/cleaning cylinder heads, turbochargers and valves, is conducted on each engine after approximately 10,000 hours of operation. This is typically completed on site. Under ROP No. MI-ROP-N1324-2012, each engine is required to have a minimum stack height of 65.0 feet above ground level and maximum diameter of 14 inches. All stack dimensions are currently being met.

The site operates an open flare which is used when there is extra gas that the engines cannot process, or in the event of a catastrophic failure of the engines and bypass is needed. Since the flare is installed after the treatment system, the flare is not subject to the testing and control requirements. At the time of the inspection, the flare was not operating.

Records are maintained on-site in accordance with with the preventative maintenance plan. A daily record sheet is used to record various engine and treatment system parameters including kilowatt output, fuel flow, landfill gas quality, coalescing filter pressure drop and others. It is noted that the company uses non-resettable hours meters to record engine hours. The company maintains appropriate records to determine compliance with the permit.

Engine Slot	Type	Serial #	Rating	Manufacture Date	Original Online Date	Installed under PTI/Rule	Known Replacement	Operating Hours	**NSPS JJJJ**	**MACT ZZZZ**
Engine 1	Caterpillar G3520C	GZJ00335	1600 kW (2233 hp)	2007	2008	212-08	12/2015	~58,000**	N	Y
Engine 2	Caterpillar G3520C	GZJ00680	1600 kW (2233 hp)	2014	2008	212-08	12/2014	~13,000	Y	Y

** Since a non-resettable hours meter is installed, the operating hours reflect total hours of engine operation since it initially went into service, not just when it was installed at the South Kent Landfill site.

40 CFR Part 60, Subpart JJJJ:
The engines are subject to the requirements of 40 CFR Part 60, Subpart JJJJ based on the engine installation and manufacture dates. The company submitted an initial notification on June 6, 2012 and Subpart JJJJ requirements were incorporated into ROP No. MI-ROP-N1324-2012. Under the NSPS an initial performance test and subsequent testing is required every 8,760 hours of operation (or 3 years). The engines have operated less than 4,000 hours since the last performance test, therefore the testing requirement has not been triggered. Granger appears to be meeting Subpart JJJJ requirements at this time.

40 CFR Part 63, Subpart ZZZZ:
The potential to emit of formaldehyde from the engines is 18.4 tons which is above the major source threshold of 10 tons for a single HAP. Because the engines are considered a major source of HAPs and were installed after December 12, 2002, they are subject to the requirements of 40 CFR Part 63, Subpart ZZZZ , which were incorporated into ROP No. MI-ROP-N1324-2012. The company submitted an initial notification on June 6, 2012.

Granger appears to be meeting Subpart ZZZZ requirements at this time.

SUMMARY:
South Kent Landfill and Granger Electric Company appear to be in compliance with all applicable requirements included ROP No. MI-ROP-N1324-2012. Records are attached.

NAME _____ DATE 7/25/16 SUPERVISOR _____