

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

N132445297

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: 07/25/2018
STAFF: David Morgan	COMPLIANCE STATUS: Compliance
SUBJECT:	SOURCE CLASS: MAJOR
RESOLVED COMPLAINTS:	

At 8:00 A.M. on July 25, 2018, Air Quality Division staff Dave Morgan conducted a scheduled inspection at the South Kent Landfill and Energy Developments (ED) 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 (ROP) No. MI-ROP-N1324-2018 as part of a full compliance evaluation. Accompanying staff on the inspection was Dan Rose, Kent County Solid Waste Operations Manager and Justin Jachim, engine plant operator.

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.

It is noted that in September 2017, the South Kent Landfill received a construction permit to expand the landfill size. Once construction begins on the approved expansion, the facility will be subject to 40 CFR Part 60, Subpart XXX for New Municipal Solid Waste Landfills. The landfill is in the process of recovering settled air space prior to actually beginning construction in the expansion area. Mr. Rose indicated that expansion would likely occur in 2019.

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 Energy Developments of Byron Center where two internal combustion engines burn the landfill gas to produce electricity.

The engines are 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).

The landfill is currently covered under ROP No. MI-ROP-N1324-2018 Section 1, and the engines are covered under ROP No. MI-ROP-N1324-2018 Section 2.

COMPLIANCE EVALUATION

EULANDFILL:

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 conducts a Tier II test every five years to demonstrate whether gas collection and control is required or not. In August 2016, 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 69.1 parts per million as hexane and NMOC emissions were calculated to be 14.34 megagrams through 2020. Because NMOC emissions are under the 50 megagram per year threshold in Subpart GGG the South Kent Landfill is not subject to landfill gas collection and control requirements including operation, monitoring and recordkeeping requirements.

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 345,800 tons of waste was received in 2017.

Energy Developments of Byron Center LLC

After touring the landfill, AQD staff met with Justin Jachim at the engine plant.

FGICEENGINES:

ED operates two Caterpillar G3520 internal combustion engines used to generate electricity from burning landfill gas. 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. 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. However, at the time of the inspection both engines were operating at about 75% load. Mr. Jachim indicated that additional gas extraction wells in the landfill were needed to boost engine load to 100% which helps the engines run more efficient.

The two engines were originally installed in 2008. Engine 1 was replaced in December 2015 with a rebuilt engine that has a new serial number and manufacture date. The following table is a summary of each engine at the plant.

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	~76,628**	N	Y
Engine 2	Caterpillar G3520C	GZJ00680	1600 kW (2233 hp)	2014	2008	212-08	12/2014	~31,654	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.

The engines at the site have emission limits for CO, NOx, VOC and formaldehyde. Under ROP No. MI-ROP-N1324-2018 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	0.13 g/bhp-hr	0.11 g/bhp-hr	1.0 g/bhp-hr	12/2017
CO	12.8 lb/hr	9.94 lb/hr	16.23 lb/hr	12/2017
NOx	2.36 lb/hr	2.86 lb/hr	4.92 lb/hr	12/2017
formaldehyde	1.65 lb/hr	NA	2.10 lb/hr	8/2012

Per ROP No. MI-ROP-N1324-2018 ED 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 %	50.9%
O2 %	0.13%
Flow	833.7 scfm
Kilowatt Output	2,258 kw

Records are maintained on-site in accordance with ROP No. MI-ROP-N1324-2018 and in accordance with the preventative maintenance plan. A daily record sheet is used to record various engine and treatment system parameters. According to company records, the total landfill gas feed rate for July 2017 through June 2018 was 496 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. Again, 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. Attached records show that a top-end overhaul was done on July 13, 2017 for Engine 1 and on November 29, 2017 for Engine 2.

Under ROP No. MI-ROP-N1324-2018, 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.

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. Under the NSPS an initial performance test and subsequent testing is required every 8,760 hours of operation (or 3 years). ED 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-N1324-2018. The company submitted an initial notification on June 6, 2012. ED appears to be meeting Subpart ZZZZ requirements at this time.

SUMMARY:

South Kent Landfill and Energy Developments of Byron Center appear to be in compliance with all applicable requirements included ROP No. MI-ROP-N1324-2018. Records are attached.

NAME  DATE 7/27/18 SUPERVISOR 