

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

N132460683

<b>FACILITY:</b> South Kent Landfill		<b>SRN / ID:</b> N1324
<b>LOCATION:</b> 10300 South Kent Drive SW, BYRON CENTER		<b>DISTRICT:</b> Grand Rapids
<b>CITY:</b> BYRON CENTER		<b>COUNTY:</b> KENT
<b>CONTACT:</b> Dan Zimmerman , Compliance Manager		<b>ACTIVITY DATE:</b> 11/01/2021
<b>STAFF:</b> David Morgan	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> MAJOR
<b>SUBJECT:</b>		
<b>RESOLVED COMPLAINTS:</b>		

At 8:15A.M. on November 1, 2021, Air Quality Division staff Dave Morgan conducted a scheduled inspection at the South Kent Landfill and Energy Developments of Byron Center LLC (EDBC) 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, Renewable Operating Permit (ROP) No. MI-ROP-N1324-2018b and to observe stack testing. Accompanying staff on the inspection was Dan Young, EDL Operator, and Jake Ripke, EDL Regional Operator. Additional records were provided by Dan Zimmerman, EDL Senior Compliance Manager. Stack testing was being performed by Andrew Eisenberg and Blake Bednow of Impact Compliance and Testing Inc.

**FACILITY DESCRIPTION**

The South Kent Landfill is a municipal solid waste landfill which has an active capacity of over 10 million cubic meters. In September 2017, the South Kent Landfill received a construction permit to expand the landfill size and commenced construction for the expansion in May 2019, subjecting the facility to the New Source Performance Standards (NSPS) under 40 CFR Part 60, Subpart XXX for New Municipal Solid Waste (MSW) Landfills.

Because the Non-methane Organic Compound (NMOC) emissions do not exceed 34 megagrams per year the South Kent Landfill is not required to have a collection and control system under Subpart XXX. However, the County voluntarily operates an active landfill gas collection system and an open flare on the active portion of the landfill. Collected landfill gas is routed to EDBC 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 and engine plant are currently covered under ROP No. MI-ROP-N1324-2018b which was a modification issued on February 25, 2021.

**COMPLIANCE EVALUATION**

**Energy Developments of Byron Center LLC**

AQD staff first went to EDBC to observe stack testing and conduct a compliance evaluation.

**FGICEENGINES:**

EDBC 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 gas was burning in the flare.

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	GZJ00550	1600 kW (2233 hp)	2011		swap	5/2021		Y	Y
Engine 2	Caterpillar G3520C	GZJ00335	1600 kW	9/10/2007	2008	212-08B	9/2021	~101,236**	N	Y

(2233  
hp)

\*\* 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.

Sampling was conducted under U.S.EPA Methods 1 through 4, 7E, 10, ALT 096 (for VOC) and 205. The company tested Engine 1 (GZJ00550) first and would then test Engine 2 (GZJ00335). Both engines were operating during the test. No performance issues with the process were noted.

The following operating parameters were recorded during the performance test:

Engine No. 1 (SN: GZJ00550) Run 1

Time	kW	Mass Flow (lb/hr)	CH4	Inlet Press (psi)	Air-to-fuel ratio	mmBtu
8:07	1570	2238	54.8	7.0	8.2	calculated
8:22	1595	2216	54.8	7.0	8.2	calculated
8:37	1601	2201	54.8	7.0	8.2	calculated
8:52	1601	2221	54.8	7.0	8.3	calculated
9:07	1601	2205	54.8	7.0	8.2	calculated

Engine No. 1 (SN: GZJ00550) Run 2

Time	kW	Mass Flow (lb/hr)	CH4	Inlet Press (psi)	Air-to-fuel ratio	mmBtu
9:30	1592	2221	54.8	7.0	8.9	calculated
9:45	1589	22201	54.7	7.1	8.9	calculated
10:00	1593	2213	54.8	7.0	8.2	calculated
10:15	1603	2220	54.8	7.0	8.2	calculated
10:30	1591	2224	54.8	7.0	8.2	calculated

The company is monitoring the mass flow rate to each engine rather than the gas volumetric flow rate. However, the total landfill gas flow rate to both engines was around 988 cfm during the test. It is noted that approximately 440 cfm of gas was also being burned in the open flare.

No problems were identified with the test. According to Impact Compliance and Testing staff, preliminary results indicated compliance with applicable limits. The AQD will review official test results when they are received.

The engines at the site have emission limits for CO, NOx, VOC, SO2 and formaldehyde. Under ROP No. MI-ROP-N1324-2018b, the company is required to verify the emission rates of these pollutants. Based on the last performance testing results and other records, emissions are within applicable limits.

Pollutant	Result		Limit	Test Date
	Engine1	Engine2		
VOC	0.19 g/bhp-hr	0.11 g/bhp-hr	1.0 g/bhp-hr	11/2019
CO	13.51 lb/hr	12.68 lb/hr	16.23 lb/hr	11/2019
	2.7 g/bhp-hr	2.6 g/bhp-hr	5.0 g/bhp-hr	11/2019
NOx	2.13 lb/hr	2.67 lb/hr	4.92 lb/hr	11/2019
	0.43 g/bhp-hr	0.54 g/bhp-hr	<b>3.0 g/bhp-hr</b>	11/2019
SO2	NA	NA	5.5 lb/hr	NA (every 5 years from 11/2019)
	23.65 tons 12-month rolling		48.2 tons 12-month rolling	NA
Total reduced sulfur	539 ppm		1,000 ppmv	10/13/2021
formaldehyde	NA	2.02 lb/hr	2.10 lb/hr	12/4/2018 (every 5 years)

EDBC is required to monitor the sulfur content of the landfill gas burned. The company conducted an initial total reduced sulfur analysis by approved EPA gas sampling methods and laboratory analysis in June 2020. In addition, the company is taking monthly gas samples using a Draeger tube. It is noted that the company missed the May 2021 monthly gas sulfur analysis due to personnel changes. According to EDL, "the employee tasked with sampling left the company before taking the monthly sample. Their replacement was transferred to the facility in early June. The previous month's sample was substituted for the May facility calculations." Sulfur values are consistently around 600 ppm which is well below the 1,000ppm limit. Even using the average of the results prior to and subsequent to May 2021 would result in no emissions exceedances. The company reported this as a deviation to the ROP and a violation notice will not be sent at this time for missing the May 2021 sampling event.

Per ROP No. MI-ROP-N1324-2018b, EDBC 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. Landfill 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 %	54.0%
O2 %	0.0%
Flow	988 scfm
Kilowatt Output	2,202 kw

Records are maintained on-site in accordance with ROP No. MI-ROP-N1324-2018b, and 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 November 2020 through October 2021 was 471.56 million cubic feet which is less than the permit limit of 565.88 million cubic feet. The average monthly methane content ranged from 48.39% to 54.60%. 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 on October 27, 2021 a top-end overhaul was done on Engine 1 and on September 30, 2021 Engine #2 was sent offsite for a major overhaul and was subsequently replaced (with GZJ00335).

Under ROP No. MI-ROP-N1324-2018b, 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. The flare was operating with a gas inlet flow rate of 440 scfm. EDL staff indicated that there is enough gas, after additional wells were installed on the landfill, to warrant another engine.

**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). EDBC 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-N1324-2018b. The company submitted an initial notification on June 6, 2012. EDBC appears to be meeting Subpart ZZZZ requirements at this time.

At 10:00AM, AQD staff met with Dan Rose, Landfill Operations Manager to conduct the landfill portion of the 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 34 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 September 2019, 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 90.1 parts per million (ppm) as hexane and NMOC emissions were calculated to be 29.1 megagrams through 2024. Because NMOC emissions are under the 34 megagram per year threshold in Subpart XXX, the County 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. 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 XXX and the ROP. According to County records, approximately received approximately 144,255 tons of refuse was accepted between January and June 2021; there are 8,401,958 tons of waste in place.

It is noted that no dust issues were observed on the landfill haul roads.

**SUMMARY:**

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

NAME David L. Ryan DATE 11/23/2021 SUPERVISOR HH