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Open Flare Performance Test Report

Brent Run Landfill

May 2016

Prepared for:
Brent Run Landfill
8335 Vienna Road
Montrose, MI 48457

39395 W. 12 Mile Road, Suite 103
Farmington Hills, MI 48331
(630) 633-5520

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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RENEWABLE OPERATING PERMIT REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating (RO) Permit program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name: Brent Run Landfill — County: Genessee

Source Address: 8335 Vienna (M-57) Road — City: Montrose

AQD Source ID (SRN): N5987 — RO Permit No.: MI-ROP-N5987-2015 — RO Permit Section No.: 1

Please check the appropriate box(es):

☐ **Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the RO Permit.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred.

☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

☒ **Other Report Certification**

Reporting period (provide inclusive dates): From _____ To _____

Additional monitoring reports or other applicable documents required by the RO Permit are attached as described:

Open Flare Compliance Test Report

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete, and that any observed, documented or known instances of noncompliance have been reported as deviations, including situations where a different or no monitoring method is specified by the RO Permit.

Tim Church	District Manager	810-639-3077
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 5/4/16

* Photocopy this form as needed.

EQP 5736 (8/99)

1 INTRODUCTION

The Brent Run Landfill, INC. (BRL) retained Cornerstone Environmental Group, LLC, (Cornerstone) to conduct an open flare performance test on the landfill's 1,350 standard cubic feet per minute (scfm) open flare at BRL in Montrose, Michigan. The open flare is utilized to provide backup landfill gas (LFG) control when the LFG to energy plant is not operating or there is excess LFG beyond the capacity of the energy plant.

The test was performed as required by the facilities Title V Permit MI-ROP-N5987-2015 (Section 1) conditions EUOPENFLARE V(1) and V(2). In accordance with the permit and the New Source Performance Standard (NSPS) for Municipal Solid Waste Landfills (40 Code of Federal Regulations [CFR] 60, Subpart WWW) the performance test was required to be conducted within 180 days of permit issuance. MI-ROP-N5987-2015 was issued on October 13, 2015 requiring the test to be performed by April 10, 2016.

Cornerstone conducted the field work on March 16, 2016 in accordance with the above regulations and the test plan submitted to the Michigan Department of Environmental Quality (MDEQ) on February 15, 2016.

The names, addresses and telephone numbers of those involved with the open flare testing are listed in the below table:

Name and Title	Company and Address	Phone Number
Khaled Mahmood, P.E. Senior Project Manager (Office Support for test)	Cornerstone Environmental Group, LLC 39395 W. 12 Mile Road, Suite 103 Farmington Hills, MI 48331	(630) 633-5856 (Tel) (248) 994-5465 (Fax)
Matthew Boudreau, P.E. Project Manager (Performance Tester)	Cornerstone Environmental Group, LLC 39395 W. 12 Mile Road, Suite 103 Farmington Hills, MI 48331	(630) 633-5853 (Tel) (248) 994-5465 (Fax)
Summer Hitchens, MPH Project Scientist (Performance Tester)	Cornerstone Environmental Group, LLC 39395 W. 12 Mile Road, Suite 103 Farmington Hills, MI 48331	(630) 633-5854 (Tel) (248) 994-5465 (Fax)
Tim Church District Manager (Site Support for Test)	Brent Run Landfill 8335 Vienna Road Montrose, MI 48457	(810) 639-3077 (Tel)

2 SUMMARY OF RESULTS

The BRL open flare serves as a back-up control device for when the LFG to energy plant is not operating or there is excess LFG beyond the capacity of the energy plant. The flare is designed to meet the performance requirements of 40 CFR 60.18 at flows up to 1,350 scfm. The flare operated at an average measured inlet volumetric flow rate of approximately 700 scfm during the testing.

The results of tests were:

- Visible emissions: no accumulated emission time,
- Average net heating value of the gas being combusted: 18.70 mega joules per standard cubic meter (MJ/m^3), and
- Average exhaust gas exit velocity: 32.725 feet per second (ft/sec).

The performance criteria are less than 5 minutes visible emissions in a 30 minute period, a net heating value of greater than 7.45 MJ/m^3, and maximum exit velocity less than 60 ft/sec.

The test results demonstrate that the BRL open flare meets the performance requirements of 40 CFR 60.18, and thus also satisfies the requirements of 60.752(b)(2)(iii)(B), at the test flow rate.

3 SOURCE DESCRIPTION

The BRL is located in Montrose, Michigan and is a solid waste landfill that began accepting waste in 1993. Approximately 155 acres are permitted for waste disposal with approximately 30 acres having reached final grades and have been closed. The landfill has an overall design capacity of 33.279 million cubic yards and is therefore required to collect and control the landfill gas from the facility. The BRL does this via a landfill gas collection and control system (GCCS).

The primary control device at the facility is the LFG treatment system. The LFG treatment system involves: compression through one of two Lamson blowers to at least 8 psig, filtering through a Mueller steam strainer, Jenco scrubber and coalescing filter consisting of a 2-micron filter and dewatering through a series of three knock-out pots and an air cooler. The LFG treatment system discharges the LFG to an energy plant for destruction to produce electricity.

The open flare rated for 1,350 scfm is used as backup control devices. The BRL also owns and operates an enclosed flare with capacity of 1,389 scfm as additional backup control.

4 SAMPLING AND ANALYTICAL PROCEDURES

Cornerstone conducted the measurements in accordance with USEPA approved alternative methods as explained in the test plan. A copy of the approved test plan is included in Appendix A. The test procedures are summarized below:

4.1 Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares (Method 22, Alternative 42)

Cornerstone conducted a single, 30 minute, non-continuous observation of the open flare exhaust for smoke emissions. Cornerstone observed continuously for 10 minutes, then took a break for 2 minutes, and resumed observation until a full 30 minute period of observation time had accrued. A copy of Method 22 observation data is presented in Appendix B.

4.2 Determination of the Net Heating Value of the Landfill Gas (Method 3C, Alternative 42)

Cornerstone used Method 3C to determine the net heating value of the landfill gas. Cornerstone conducted a single 30 minute test supplemented by 2 methane readings from an Elkins Earthworks Envision meter (Envision). Cornerstone submitted the samples to Air Technology Laboratories, Inc. (Air Technology), City of Industry, California. Air Technology analyzed the samples for carbon dioxide (CO2), methane (CH4), nitrogen (N2), and oxygen (O2). The Air Technology laboratory analytical report is presented in Appendix C. Net heating values were then calculated in accordance with 40 CFR 60.754(e) for the two (2) methane readings as well as the laboratory analyzed sample. The net heating value calculations for the open flare have been included in Appendix D.

4.3 Stack Gas Velocity and Volumetric Flow Rate (Method 2C, Alternative 55)

On May 20, 2009, USEPA approved the use of a mass flow meter in place of Method 2C to measure the flow rate to a utility flare. This alternative stipulated that the calibration had to be "recent". Cornerstone used the flare flow meter to measure the flow rate at the Phase 4 flare. The flow meter calibration documentation is presented in Appendix E. The open flare exhaust velocity calculations have been included in Appendix D.

5 TEST RESULTS AND DISCUSSION

Cornerstone performed the performance testing in accordance with the test methods as proposed in the open flare test plan. Mr. Matthew Boudreau and Ms. Summer Hitchens performed the testing as detailed below. The open flare operated as designed with no upset conditions during the test. Therefore no re-testing was required. Additionally, during the three months prior to the test there was no significant maintenance activities performed on the open flare. Find below a detailed discussion of the test methods utilized, person or persons performing the testing, and discussion of the results and compliance status of the open flare.

5.1 Method 22, Alternative 42

Visible emissions testing by Method 22, Alternative 42 was performed by Ms. Hitchens of Cornerstone. Ms. Hitchens observed continuously for 10 minutes, took a break for 2 minutes and resumed observation until a full 30 minute period of observation time had accrued. A copy of Ms. Hitchens observations including weather conditions including wind direction during the test are included with the field forms in Appendix B. No visible emissions were observed during the testing period in compliance with 40 CFR 60.18(f)(1) which requires less than 5 minutes of visible emissions during a 30 minute test period.

5.2 Method 3C, Alternative 42

The net heating value of the gas being combusted in the flare was tested by Method 3C, Alternative 42. Mr. Boudreau with the assistance of Ms. Hitchens performed the LFG sampling. During the performance test, a gas sample was taken using a 6-L Summa canister and sent to Air Technology Laboratory for analysis. In addition, two (2) methane readings were taken using an Envision at the common header prior to the open flare. The two (2) gas readings were taken prior to and after the collection of the LFG sample.

The results of the gas readings and laboratory analytical results are detailed in the below table:

Date	Time	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance (%)	Heating Value (MJ/m^3)
March 16, 2016	09:00	54.83	42.10	0.00	3.06	18.57
March 16, 2016 (Laboratory Analysis)	09:12 - 09:42	56.00	41.00	ND	5.9	18.97 (calculated)
March 16, 2016	09:50	54.76	42.50	0.00	2.74	18.55

Sample calculations of the net heating value in accordance with 40 CFR 60.18(f)(3) can be found in Appendix D. As detailed in the above table and supporting calculations the net heating value for the LFG combusted in the open flare is at least 7.45 MJ/m^3 and is therefore in compliance with 40 CFR 60.18(f)(3).

5.3 Method 2C, Alternative 55

The actual exhaust velocity of the open flare was determined by Method 2C, Alternative 55. During the testing period the flow rate to the open flare was monitored by a mass flow meter and recorded in 10 minute intervals by a yokogawa data recorder. The exhaust velocity was then determined by dividing the volumetric flow rate (obtained by Method 2C Alternative 55) by the unobstructed cross sectional area of the flare tip. The exhaust velocity at the beginning and end of the testing period are provided in the below table:

Date	Time	Flow (scfm)	Exit Velocity (ft/sec)
March 16, 2016	09:00	721.5	34.47
March 16, 2016	10:50	648.5	30.98

Sample calculations of the open flare exhaust velocity calculations and recorded flow information are included in Appendix D. As detailed in the above table and supporting calculations because the actual exhaust velocity is less than 60 ft/sec and is therefore in compliance with 40 CFR 60.18(f)(4)(i).

5.4 Conclusions

The test results demonstrate that the BRL open flare meets the performance requirements of 40 CFR 60.18, and thus also satisfies the requirements of 60.752(b)(2)(iii)(B), at the test flow rate.

LIMITATIONS

The work product included in the attached was undertaken in full conformity with generally accepted professional consulting principles and practices and to the fullest extent as allowed by law we expressly disclaim all warranties, express or implied, including warranties of merchantability or fitness for a particular purpose. The work product was completed in full conformity with the contract with our client and this document is solely for the use and reliance of our client (unless previously agreed upon that a third party could rely on the work product) and any reliance on this work product by an unapproved outside party is at such party's risk.

The work product herein (including opinions, conclusions, suggestions, etc.) was prepared based on the situations and circumstances as found at the time, location, scope and goal of our performance and thus should be relied upon and used by our client recognizing these considerations and limitations. Cornerstone shall not be liable for the consequences of any change in environmental standards, practices, or regulations following the completion of our work and there is no warrant to the veracity of information provided by third parties, or the partial utilization of this work product.