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**Compliance Test Report
Determination of
Tier 2
Non-methane Organic Compound Concentrations**

**Central Sanitary Landfill
Pierson, Michigan**



Prepared for:

Central Sanitary Landfill
21545 Cannonsville Road
Pierson, MI 49339

Prepared by:

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130 E. Main Street
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May, 2016

1.0 INTRODUCTION

Environmental Information Logistics, LLC (EIL) was retained by Central Sanitary Landfill to perform Tier 2 landfill gas sampling and analysis at the site located in Pierson, Michigan. 40 CFR 60.754(a)(3)(iii) requires the landfill owner to retest the site-specific NMOC concentration every five years. The previous test occurred on April 11, 2011.

A Tier 2 five year re-test workplan was submitted to the Michigan Department of Environmental Quality (MDEQ) on February 24, 2016. No comments were received from the MDEQ. The Tier 2 re-test was conducted on March 31st, 2016.

2.0 REGULATORY BACKGROUND

The facility is subject to the New Source Performance Standards (NSPS), 40 CFR 60 Subpart WWW. Central Sanitary Landfill performed the Tier 2 landfill gas sampling and analysis to show the facility NMOC emissions may be less than the 50 Mg/year NSPS emission threshold. The Tier 2 NMOC value must be retested every 5 years.

The USEPA published a "MSW Landfill NSPS and EG Questions and Answers" guidance document on their Air Toxics Website for MSW Landfills in November, 1998 (see Appendix A). The guidance document was last updated in May, 2002. On page 20 of the document, a question was asked on how to calculate NMOC emissions from a landfill that has a gas collection system already in place (such as Central). The USEPA responded that to determine NMOC emissions for NSPS applicability from a site that has a collection system in place, it would be appropriate to use the equation (which requires an actual measured landfill gas flow rate) and NMOC concentration measurement procedures in 40 CFR 60.754(b), which requires measurement of the NMOC at the common header pipe of the collection system prior to the control device. If there are areas of the landfill from which gas is not collected, then the Tier procedures would be used for these areas.

This approach is used for the calculation of NMOC emissions from the Central Sanitary Landfill facility. The average measured NMOC concentration from the three samples collected at the main header was 347.6 ppm NMOC as hexane. As shown in Figure 1, the gas collection system is installed in all of the constructed landfill cells. Therefore, the Tier 2 sample probe procedures were not required for any areas. The average flow rate obtained from manual readings at the flare station before and each sample was collected was 788 cfm. Field measurements are provided in Table 1. Recorded flare data is provided in Table 2. The average recorded flow reading was 788.3 cfm.

Calculation methodology is provided in Appendix B. Laboratory results are provided in Appendix C. The results indicate that the NMOC emissions rate from the area controlled by the active gas collection system is 14.62 Mg/year in the year 2016.

Based on the sampling results provided in this report, gas collection and control requirements are still not applicable to the facility, since NMOC emissions using the new Tier 2 value do not exceed 50 Mg/yr.

NMOC emissions calculations will be prepared and submitted annually using the new NMOC value, and the landfill's average gas flow rate to the flare for each calculation year, as determined by the previous month's flow data. These calculations will be submitted to MDEQ on or before the anniversary of the NMOC re-test date (i.e. on or before March 31 each year).

The Tier 2 testing results are valid for five years according to 40 CFR 60.754. A new site-specific NMOC concentration will have to be obtained on or before March 31st, 2021.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 Sample Locations

The NSPS requires collection of two samples per hectare of landfill surface area in which waste has been in-place for a minimum of two years. At the Central Sanitary Landfill, approximately 60.7 acres of waste have been in place at least two years and were subject to Tier 2 sampling.

As shown in Figure 1, the existing gas collection system covers all of the landfill cells eligible for Tier 2 sampling. Gas is directed to a utility flare owned and operated by the site. Three (3) samples from the main header to the utility flare were collected for Tier 2 sampling. One additional canister was collected at the flare station as a spare.

3.2 Sampling and Analysis

Each four (4) liter sample canister was pre-filled with less than 2 liters of helium. The attached Table 1 contains the information for each sample point including collection times, beginning and ending cylinder vacuums, barometric pressure and ambient temperatures as required by Method 25C. Flare flow rates before and after sampling were also recorded. The sample flow rate was set between 100 - 200 cc/min (100 - 200 ml/min) and was adjusted as necessary during the sampling to maintain a constant sample flow rate. Field measurements of methane, carbon dioxide, and oxygen levels in the sample probes were measured with a Landtec™ GEM gas analyzer to assure the samples were valid in the field (less than 5

percent O₂ or 20 percent N₂). Digital landfill gas flow readings obtained from the flare's calibrated flow meter were recorded before and after each gas sample was collected.

Analysis was performed at the laboratory with gas chromatography equipped with a flame ionization detector (GC/FID) for 25C and gas chromatography equipped with a thermal conductivity detector (GC/TCD) for 3C. All three samples were analyzed for oxygen and nitrogen (following Method 3C). Each sample was also analyzed for methane, carbon dioxide and NMOC (following Method 25C). NMOC results are reported as carbon, and must be divided by six to obtain NMOC values as hexane for use in the emissions equation. A schematic of the Method 25C sampling train is found in Figure 2.

4.0 RESULTS

Samples cannot contain oxygen and nitrogen above the acceptable thresholds (i.e. greater than 5% oxygen or greater than 20% nitrogen). All samples were acceptable for use in the calculations so the spare canister did not need to be analyzed. Laboratory analytical data is provided in Appendix C. A summary of laboratory results is shown in Table 3.

The average NMOC value for the site was 347.6 parts per million (ppm) as hexane. The equation provided in 40 CFR 60.754(b) was used to calculate Tier 2 emissions from the landfill.

The NMOC emission rate of 14.62 Mg/yr for the year 2016 is well below the 50 Mg/year trigger for installation of gas collection and control systems. The site will submit annual NMOC emissions rates reports using the methodology provided in this Tier 2 test - i.e. average gas flow rates to date for the current year, the new Tier 2 NMOC value, and the use of the equation in 40 CFR 60.754(b).

Laboratory Quality Control/Quality Assurance reports and chain-of-custody records are included in Appendix D. A calibration certificate for the flow meter at the flare station is provided in Appendix E.

**Table 1: Central Sanitary Landfill
2016 Tier 2 Sampling Field Data
Pierson, Michigan**

Sample ID	Date	Sample Time Start	Sample Time End	Sample PSI Range ("Hg) Start	Sample PSI Range ("Hg) End	Sample PSI Volumn ("Hg) Total	Ambient Temp (deg F.)	Barometric Pressure (Inches w.c.)	Methane (CH ₄)	Carbon Dioxide (CO ₂)	Oxygen (O ₂)	Nitrogen (N ₂)	Total % Gas Concentration	Tank ID	Gas Flow Flare and Pilot SCFM (pre-post)
1	3/31/2016	10:39 AM	10:47 AM	-18.00	-3.00	-15.00	57	28.34	57.4	38.5	0.6	3.5	100	N59	810-796
2	3/31/2016	10:47 AM	10:55 AM	-18.00	-3.00	-15.00	57	28.34	58.5	38.2	0.4	2.9	100	N171	796-784
3	3/31/2016	10:56 AM	11:03 AM	-18.00	-3.00	-15.00	57	28.34	59.6	38.1	0.1	2.2	100	N323	784-781
Spare	3/31/2016	11:04 AM	11:11 AM	-18.00	-3.00	-15.00	57	28.34	59.5	38.4	0.2	1.9	100	N42	781-770

Average

788

TABLE 3
SUMMARY OF METHOD 25C AND METHOD 3C DATA
Central Sanitary Landfill
Pierson, Michigan

Sample ID Number	Sample Location	Date Sampled	CH4 (%)	CO2 (%)	O2 (%)	N2 (%)	NMOC (ppm as carbon)	NMOC (ppm as hexane)
Sample 1	Flare header Upstream of Blower	3/31/2016	54.1	37.8	0.59	4.4	2,004.0	334
Sample 2			52.5	36.8	0.51	4.1	1,799.0	300
Sample 3			53.4	37.4	0.49	3.9	2,453.0	409
		Average	53.3	37.3	0.5	4.1	2085.3	347.6

CH4: methane (From Method 3C results)

CO2: carbon dioxide (From Method 3C results)

O2: oxygen

N2: nitrogen

NMOC as hexane: Non Methane Organic Compounds as hexane (NMOC as carbon divided by six)



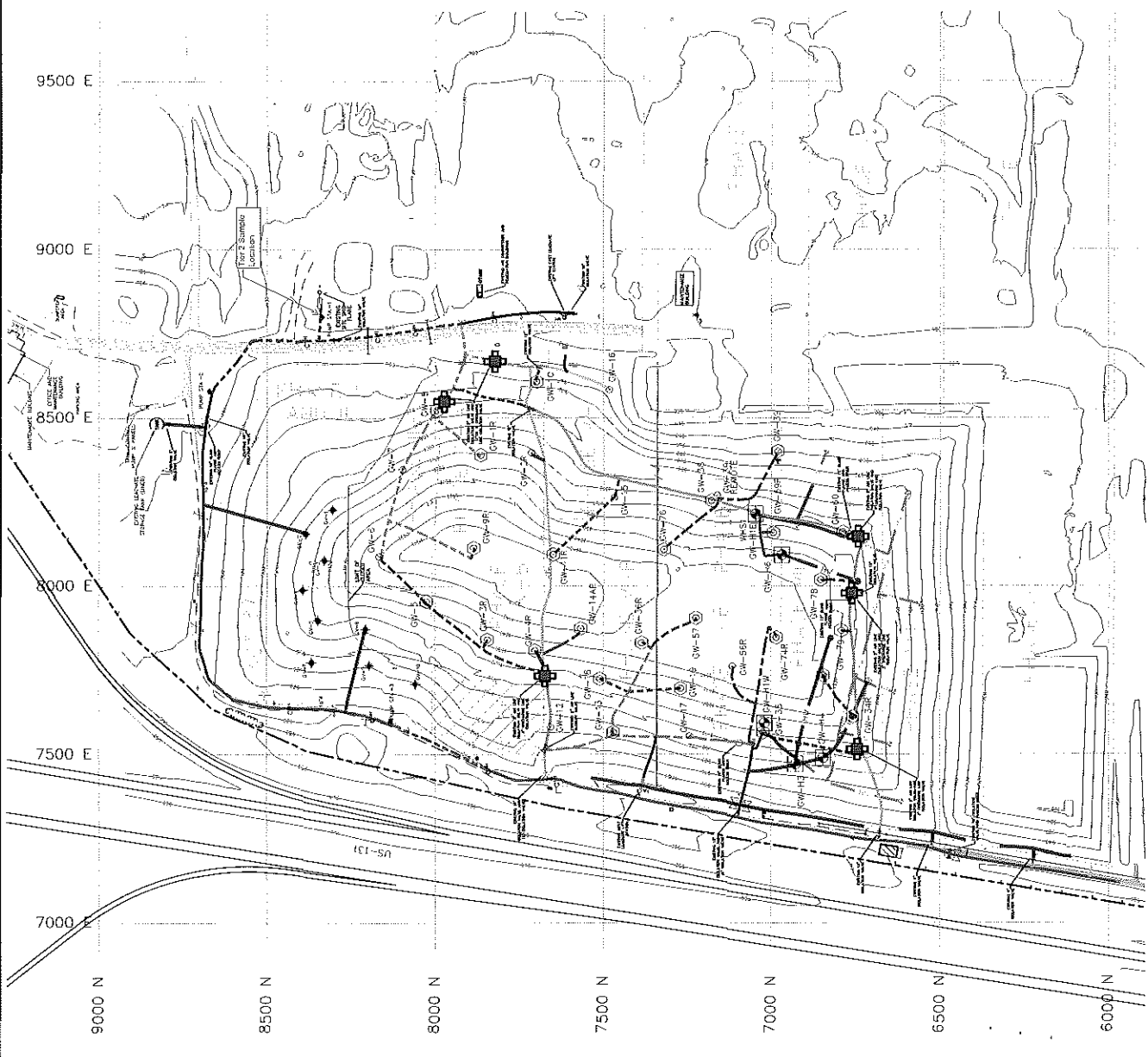
CENTRAL SANITARY LANDELL - GAS SYSTEM MAP

LEGEND

- | | | |
|------------|--------------------------------------|---|
| — 12" — | PROPERTY LINE | — 18" LANDFILL GAS HEADER |
| — 10" — | LANDFILL GAS HEADER | — 18" LANDFILL GAS HEADER WITH 2" DUAL CONTAINED DISCHARGE LINE |
| — 8" WBO — | EXISTING SPACES | — 18" LANDFILL GAS HEADER WITH 2" DUAL CONTAINED DISCHARGE LINE AND 2" AIR LINE |
| — 6" — | LPG EXTRACTION WELL | — 12" LANDFILL GAS HEADER |
| — 4" — | CONDENSATE TRAP | — 12" LANDFILL GAS HEADER WITH 2" DUAL-HEADER LINE AND 2" AIR LINE |
| — 3" — | UNDERGROUND CONTROL VALVE | — 8" LANDFILL GAS HEADER |
| — 2" — | REDUCER FITTING | — 8" LANDFILL GAS HEADER WITH 2" DISCHARGE LINE AND 2" AIR LINE |
| — 1" — | BLIND FLANGE | — 6" LANDFILL GAS HEADER |
| — 1/2" — | FLANGE CONNECTION | — 6" LANDFILL GAS HEADER WITH 2" DISCHARGE LINE AND 2" AIR LINE |
| — 1/4" — | HIGH POINT | — 4" LANDFILL GAS HEADER |
| — 1/8" — | GAS HEADER ACCESS RIDER | — 4" LANDFILL GAS HEADER WITH 2" DISCHARGE LINE AND 2" AIR LINE |
| — 1/16" — | GAS COMBO WELL | — 2" LANDFILL GAS HEADER |
| — 1/32" — | LPG INDEPENDENT EXTRACTION WELL HEAD | — 2" AIR LINE |
| — 1/64" — | LPG INDEPENDENT EXTRACTION SUMP | — 2" DISCHARGE LINE AND 2" AIR LINE |
| — 1/128" — | 6" HOPE CAPPED PEER | — 2" AIR LINE |
| — 1/256" — | 8-INCH HORIZONTAL GAS WELL | — 2" AIR LINE |
| — 1/512" — | 6-INCH HORIZONTAL GAS WELL | — 2" AIR LINE |

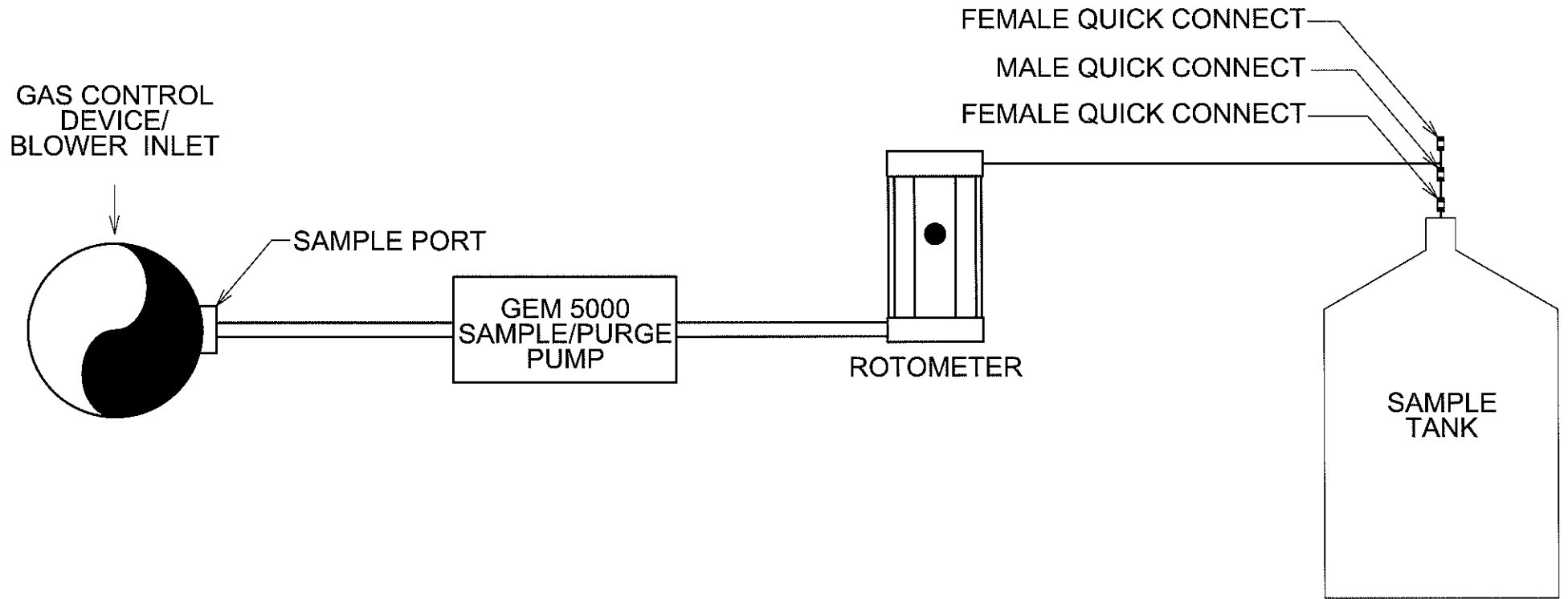
NOTES

1. PROVISIONAL 2015 AND 2016 ALLOWANCE MAPS BY FIELD TECHNOLOGY SERVICES



CENTRAL SANITARY LANDELL SITE GAS EXPANSION MAP	
MONTGOMERY COUNTY, MARYLAND	
SITE MAP SEPTEMBER 2015	
DATE	PROJECT NAME
NOTED	ISS-15-008-08
DATE	PROJECT NO.
09/15/15	8
2	

Field Technology Services	
DATE	PROJECT NAME
09/15/15	ISS-15-008-08
DATE	PROJECT NO.
09/15/15	8
2	



PREPARED BY



FIGURE 2

METHOD 25C & 3C TOTAL NON-METHANE
ORGANIC COMPOUND SAMPLING TRAIN

CENTRAL SANITARY LANDFILL, INC.
PIERSON, MONTCALM COUNTY, MICHIGAN

160111

MAY 2016