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1.0 INTRODUCTION

In accordance with the New Source Performance Standards for Municipal Solid Waste Landfills (Landfill NSPS), 40 CFR 60, Subpart WWW, Tier 2 landfill gas sampling and analysis was conducted at the Central Sanitary Landfill in Pierson, Michigan. 40 CFR 60.754(a)(3)(iii) requires the landfill owner to retest the site-specific non-methane organic compound (NMOC) concentration every five years. The purpose of this report is to document the results of the five-year NMOC retest program at the landfill. The tests were performed on March 16, 2021.

Environmental Information Logistics, LLC (EIL) submitted a Tier 2 test plan to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on February 9, 2021, detailing that per the facility ROP, EULANDFILL, V.1 and VI.2, the annual NMOC emission rates would be calculated using methods outlined in Appendix 7-1, or the most recent version of USEPA's Landfill Gas Emissions Model (LandGEM), using the average NMOC concentration from the collected Tier 2 samples. EGLE had no comment on the test plan.

2.0 REGULATORY BACKGROUND

Central Sanitary Landfill began accepting waste in 1959. Approximately 70.0 acres of waste (28.33 hectares) have been in place for at least two years and were suitable for Tier 2 sampling.

To comply with the NSPS the facility submitted an Initial Design Capacity Report and an NSPS Tier 1 calculation report as required by 40 CFR 60.752. Central Sanitary Landfill decided to improve the accuracy of the emission calculation by performing Tier 2 landfill gas sampling and analysis to show the facility NMOC emissions may be less than the 50 megagrams per year (Mg/yr) NSPS emission threshold. The Tier 2 NMOC value must be retested every five years in accordance with 40 CFR 60.754(a)(3)(iii).

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.

The measured site-specific NMOC concentration was determined to be 274 ppm NMOC as hexane. This value was used in the NSPS equation to calculate NMOC emissions of 49.93 Mg/year in 2021.

NMOC emissions are estimated to exceed 50 Mg/yr during the next five years, using an assumed MSW waste intake rate of 300,000 Mg/year. The five-year projection is provided in Appendix A of this report. Pursuant to 40 CFR 60.757(b)(1)(ii), the landfill owner or operator may submit a five-year report in lieu of annual reports, as long as the actual waste volumes received in subsequent years are less than the estimated projections.

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 in 2025, or earlier if actual waste intake approaches assumed waste intake rate.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 Sample Locations

The NSPS [60.754(a)(3)] 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 70.0 acres met the two-year age criteria.

As shown in Figure 1, the existing gas collection system (GCS), consisting of vertical and horizontal gas extraction wells, provides coverage for the entire 70.0 acres eligible for Tier 2 sampling. The NSPS further states "For active collection systems, samples may be collected from the common header pipe before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe."

The required three (3) samples for Tier 2 sampling were collected from the main header prior to the flare and Landfill Gas to Energy Plant blowers.

Actual sampling locations at the header pipe in the gas plant are shown on the map on Figure 1.

3.2 Analysis

The samples were collected from the header at a flow rate of less than 500 ml/min. A six-liter summa canister was utilized for each of the main header samples. Each summa canister was pre-charged with helium so that the samples could be safely shipped as non-hazardous. The methane and oxygen levels recorded from the gas plant analyzer panel. Ambient temperature was

measured with a thermocouple and recorded. Barometric pressure was obtained from the portable landfill gas analyzer (see Table 1).

Analysis was performed at the AtmAA, Inc. laboratory in Calabasas, California. All three samples were analyzed for oxygen and nitrogen (following Method 3C). The three header samples collected from the active system showed concentrations of oxygen below 5% and nitrogen concentrations below 20%; thus, they were all suitable for Method 25C analysis and were all included in the final average for the landfill. Each sample was also analyzed for methane, carbon dioxide and NMOC (following Method 25C). NMOC results are reported as carbon and were 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. Laboratory analytical data is provided in Appendix B. A summary of laboratory results is shown in Table 2.

The average NMOC value for the site was 274 parts per million (ppm) as hexane for the areas of the landfill older than two years and covered by the active gas collection system. The equation provided in 40 CFR 60.754(a)(1) was used to calculate Tier 2 emissions (Appendix A). Actual values for degradable wastes such as MSW and yard waste were utilized for annual waste receipts. The NSPS allows facilities to exclude non-degradable wastes from Tier 2 calculations, as long as the volume of material is documented.

The NMOC emission rate of 49.93 Mg/yr for the year 2021 is below the 50 Mg/year trigger for installation of gas collection and control systems. The Tier 2 sampling results (Appendix B) are valid for five years (until 2025). At that time, a new Tier 2 value will need to be obtained.

Appendix A also contains the calculations for projected yearly uncontrolled NMOC emissions for the next five years, as permitted by 40 CFR 60.757(b)(1)(ii). Based on the projected waste intake rates, emissions of NMOC exceed 50 Mg/year in the next five years at 52.39 Mg/year in 2022. The facility will compare actual MSW waste received each year against the projected volume of 300,000 Mg/yr to verify that the five-year calculation is still valid.

TABLES

Table 1: Central Sanitary Landfill
Tier 2 Sampling Field Data Collected March 16, 2021
Pierson, Michigan

Sample #	Canister #	Barometric Pressure (inches w.c.)	Pre-Test Ambient Temperature (°C)	Weather	Post-TestSample Temperature (°C)	System Flow During Sampling (from process data)	
1	00183	28.98	0.3	Mostly Cloudy	0.5	Time	System Flow (scfm)
Gas Quality Check	Time	%CH4		%O2			
	9:39	52		1.2			
Leak Check	Vac.	Time	Vac.	Time		9:40	1314
	-21.1	9:33	-21.1	9:38		10:50	1311
Sample	Sample Date	Sample Time	Initial Vac. (inches Hg)	Sample End Time	End Vac (inches Hg)		
	3/16/2021	9:40	-21.1	10:50	10.3	Average	1314

Sample #	Canister #	Barometric Pressure (inches w.c.)	Pre-Test Ambient Temperature (°C)	Weather	Post-TestSample Temperature (°C)	System Flow During Sampling (from process data)	
2	00192	28.98	0.8	Mostly Cloudy	3	Time	System Flow (scfm)
Gas Quality Check	Time	%CH4		%O2			
	11:04	51.7		1			
Leak Check	Vac.	Time	Vac.	Time		11:04	1311
	-21.3	10:53	-21.1	10:58		12:16	1305
Sample	Sample Date	Sample Time	Initial Vac. (inches Hg)	Sample End Time	End Vac (inches Hg)		
	3/16/2021	11:05	-21.1	12:15	-8	Average	1307

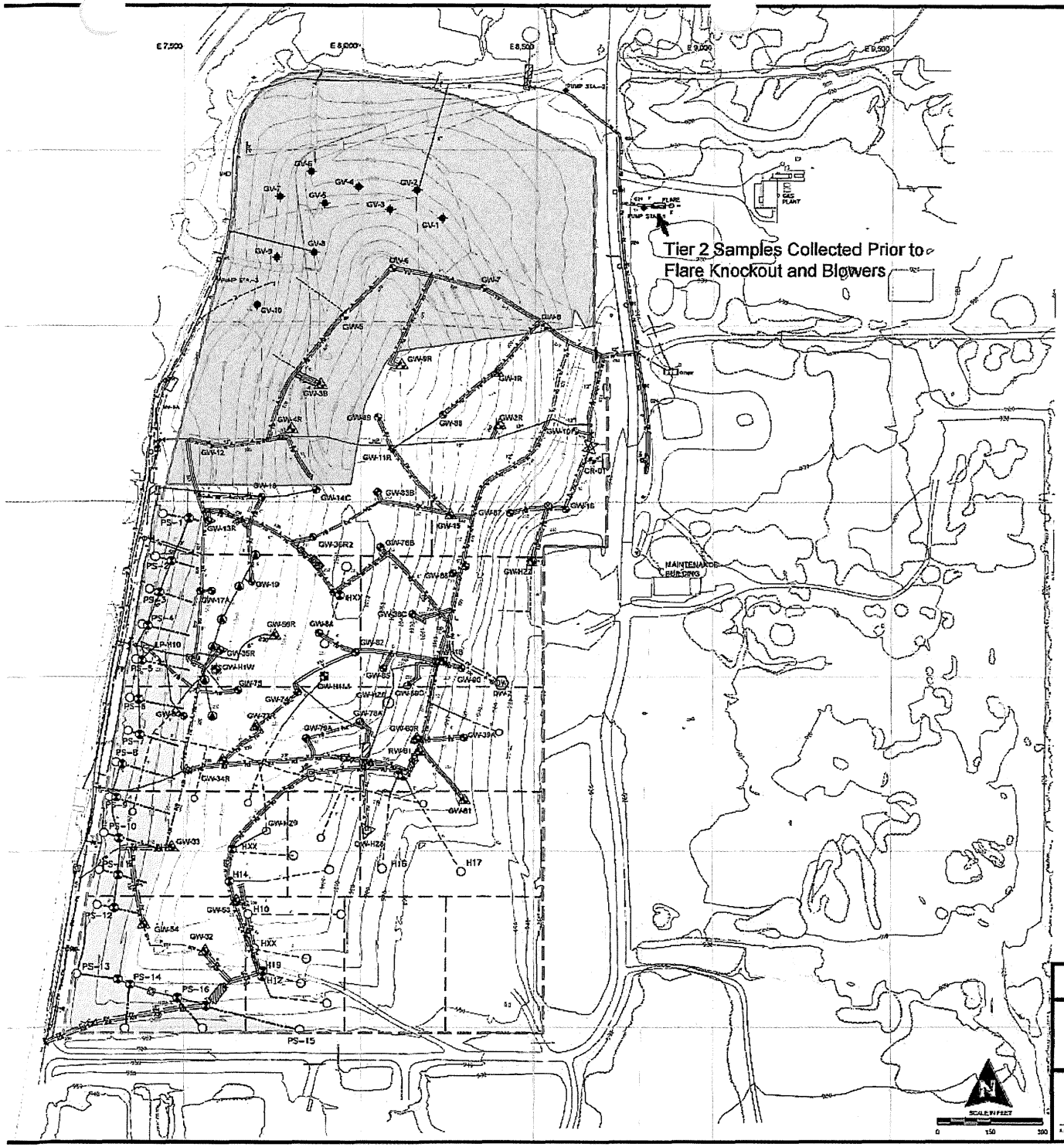
Sample #	Canister #	Barometric Pressure (inches w.c.)	Pre-Test Ambient Temperature (°C)	Weather	Post-TestSample Temperature (°C)	System Flow During Sampling (from process data)	
3	00193	28.99	3.3	Partly Cloudy	5	Time	System Flow (scfm)
Gas Quality Check	Time	%CH4		%O2			
	12:23	51.3		1.09			
Leak Check	Vac.	Time	Vac.	Time		12:24	1306
	-21.7	12:17	-21.6	12:22		13:36	1309
Sample	Sample Date	Sample Time	Initial Vac. (inches Hg)	Sample End Time	End Vac (inches Hg)		
	3/16/2021	12:25	-21.6	13:35	-8	Average	1304

Table 2: Central Sanitary Landfill
Summary of Method 25C and Method 3C Data
March 16, 2021

ID	Sample Location Description	CH4 (%)	CO2 (%)	O2 (%)	N2 (%)	NMOC ppm (As Carbon)	NMOC ppm (As Hexane)	Sample Canister#
CSL Tier 2 #1	Main Header prior to Flare and Gas Plant	50.9%	34.5%	1.92%	12.5%	1551	258	00183
CSL Tier 2 #2		50.5%	34.8%	1.97%	12.7%	1645	274	00192
CSL Tier 2 #3		50.2%	34.7%	1.91%	13.0%	1732	289	00193
Average		50.5%	34.7%	1.93%	12.7%	1643	**274**	

Notes: NMOC Results corrected for the presence of air.

FIGURES



LEGEND

- SOLID WASTE BOUNDARY
- CONSTRUCTED CELL LIMITS
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING LANDFILL GAS HEADER
- EXISTING FORCE MAIN
- EXISTING AIR LINE
- EXISTING HORIZONTAL COLLECTOR
- EXISTING GRAVITY CONDENSATE LINE
- EXISTING ADS SURFACE COLLECTOR
- EXISTING LEACHATE COLLECTION PIPE
- EXISTING EXTRACTION WELLHEAD
- EXISTING EXTRACTION WELLHEAD WITH PUMP
- EXISTING REMOTE WELLHEAD
- EXISTING HORIZONTAL WELLHEAD
- EXISTING LEACHATE MANHOLE
- EXISTING ROCK SUMP
- EXISTING HEADER ACCESS RISER
- EXISTING CONDENSATE SUMP STATION
- EXISTING BLIND FLANGE
- EXISTING FLANGE CONNECTION
- EXISTING CONTROL VALVE
- EXISTING FORCEMAIN AIR RELEASE VALVE
- EXISTING LEACHATE CLEANOUT
- EXISTING LFG VENTS
- EXISTING STUB UP FOR FUTURE EXPANSION
- EXISTING DEWATERING WELL
- EXISTING ROAD CROSSING
- EXISTING FINAL COVER AREA
- EXISTING TEMPORARY COVER AREA

CENTRAL SANITARY LANDFILL

2020 LANDFILL GAS SYSTEM CONSTRUCTION AS-BUILT PLAN VIEW

BEL ENVIRONMENTAL ENGINEERING

PROJECT NUMBER: 2020.279

ENG	-	AERIAL SURVEY DATE	3/13/21
CAD	PAB	SUBMITTAL DATE	5/13/21
CHK	-	PLOT DATE	5/13/21
REV.	DATE	DESCRIPTION	
-	-		

DRAWING 1 OF 1

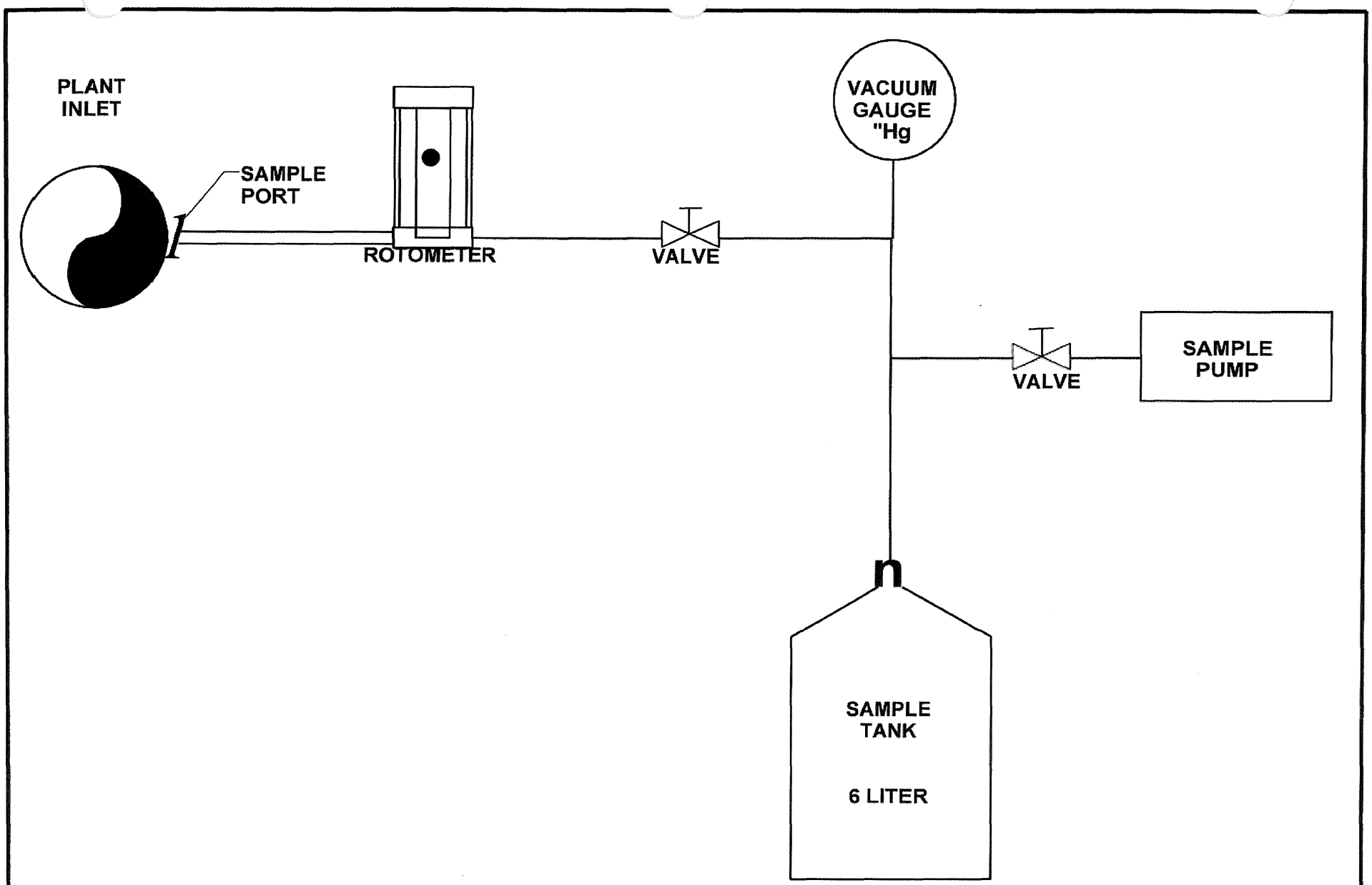


FIGURE 2

TOTAL NON-METHANE
ORGANIC COMPOUND SAMPLING TRAIN

REPUBLIC SERVICES OF MICHIGAN IV, LLC
CENTRAL SANITARY LANDFILL
MONTCALM COUNTY, MICHIGAN MARCH 16, 2021