

ATTACHMENT 10
AMBIENT AIR MONITORING PROGRAM
SAMPLING AND ANALYSIS PLAN

Attachment B5.B1

Ambient Air Monitoring Sampling and Analysis Plan

**MASTER CELL VI
WAYNE DISPOSAL, INC. SITE #2
MID 048 090 633**

1. INTRODUCTION

In accordance with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD), Materials Management Division (MMD) Part 111, ambient air monitoring will be conducted as a requirement of the Hazardous Waste License. The ambient air monitoring plan is an attachment to the license and a stand-alone document.

1.1 Monitoring Network

Ambient air quality is monitored at seven (7) stations around the perimeter of the Wayne Disposal, Inc. (WDI) Belleville, Michigan landfill Site #2 property. The ambient air monitoring program described is used to characterize the air quality associated with both Michigan Disposal Waste Treatment Plant (MID 000724831) and Wayne Disposal, Inc. (MID 048090633) Site #2. All seven sites are monitored for the following constituents:

- Polychlorinated Biphenyls (PCBs) using a polyurethane foam (PUF) sampler,
- Metals using a high volume Total Suspended Particulate (TSP) sampler, and
- Volatile Organic Compounds (VOCs) using a sorbent tube sampler.

Site 9 (82983) is a collocated site that has pairs of each sampling device. The AQD and MMD approved the discontinuation of sampling for PM₁₀ (particulate with a diameter of 10 microns and less).

The sampling for all parameters will be conducted in accordance with the methods specified by the United States Environmental Protection Agency (USEPA) in Title 40 of the Code of Federal Regulations (CFR) Parts 50, 53, 58 and the Toxic Organic Compendium Method, TO-17 for solid sorbent tubes. Sampling is conducted in accordance with USEPA's 1-in-12-day sampling schedule.

At each station in the network, particulate samples are collected using TSP high-volume samplers for subsequent analysis by an analytical laboratory to determine TSP and metals concentrations, specifically, lead (Pb), cadmium (Cd), and chromium (Cr) in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). TSP concentrations are determined in accordance with 40 CFR Part 50, Appendix B. Metal concentrations are determined using EPA Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry which is the same method as outlined in 40 CFR Part 50, Appendix G. PCB samples are collected using high-volume PUF air samplers and are analyzed for total PCBs (as Aroclors) using EPA Method TO-4A, Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using High Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic-Mass Spectrometry in Selected Ion Monitoring Mode (GC-MS SIM). Sorbent tubes are utilized to measure VOC's which are analyzed by the analytical laboratory for 1,1,1-trichloroethane, benzene, carbon tetrachloride, chloroform, ethylbenzene, xylene, methylene chloride, tetrachloroethene, toluene, trichloroethene, , and 1,1-dichloroethane.

The locations of the monitoring stations are presented in Table 1-1. Figure 1.1 presents a Google Earth image showing monitoring station location.

Table 1-1 Republic Service's Belleville Michigan Monitoring Network Site Locations

Station	Site ID
Site 5	82981
Site 6	82975
Site 7	82977
Site 8	82982
Site 9 (colocated samplers)	82983
Site 10	82984
Site 11	82989

Figure 1.1 Map Showing Republic Service's Belleville Michigan Monitoring Network Site Locations



2. SAMPLING

The following sections present the sampling methods for PCB's, TSP and metals, and VOCs.

2.1 PCB Sampling

At each sampling location in the monitoring network, sampling for PCB's is conducted utilizing high volume PUF samplers. Samples collected from the PUF sampler are analyzed and reported as total PCBs (as Aroclors). Sampling and analysis for PCB compounds is performed in accordance with USEPA's Toxic Organic Compendium Method TO-4A: Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using High Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)¹. The PUF samplers are collected every 12 days in accordance with USEPA's 12-day sampling schedule. Samples are collected over a 24-hour period and then returned to the analytical for analysis.

PCB air samples are collected by pumping air through a sampler containing a quartz fiber filter and adsorbent trap (PUF sample) at a flow rate of approximately 8 standard cubic feet per minute (cfm) or 0.225 cubic meters per minute (m³/min) to obtain a total sample volume of greater than 300 standard cubic meters (scm) over a 24-hour period to separate the particle bound and vapor phase fractions.

The holding times for PUF samples are crucial for maintaining the integrity of the analysis. The extraction should be done within 7 days of the sample collection, and the PUF media has a shelf life of 30 days from its certification date. PUF samples are stored after sample collection and shipped at <4°C to prevent degradation or loss of analyte. The PUF samples are shipped by the site technician to the analytical laboratory within 7 days of sample collection.

After sample collection, the PUF cartridges are extracted by the analytical laboratory to release the adsorbed compounds. These extracted compounds are then analyzed by GC/MD SIM to identify and quantify PCB concentrations. The analytical laboratory contracted to analyze these samples analyzes for Total PCBs (as Aroclors), and Aroclors 1242 and 1260, specifically. Results of the analysis are presented in micrograms (µg).

In accordance with the WDI Chemical Waste Landfill approval order, the analytical method must achieve a minimum method detection limit of two hundredths micrograms per cubic meter (0.02 ug/m³) for PCBs (total) which is being achieved by the contract laboratory.

The reportable detection limit (RDL), which is the same as the practical quantitation limit (PQL), is determined by the lowest calibration for the sample. For Aroclors 1242 and 1260, the PQL is 2.50 µg. For total PCBs (as Aroclors), the PQL is 5.00 µg.

For the PCB samplers, single point checks are performed prior to and after each 24-hour test period using a calibrated orifice transfer standard. This calibration check verifies the operational flow before each 24-hour sampling event. The purpose of this check is to track the sampler's calibration stability.

2.2 Metals

Metal concentrations of lead (Pb), cadmium (d), and chromium (Cr) are determined from samples collected using high-volume Total Suspended Particulate (TSP) samplers and in accordance with 40 CFR Part 50, Appendix B, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere High-Volume and Appendix G, Reference Method for the Determination of Lead in Total Suspended Particulate Matter.

The TSP high-volume air sampler vacuum motor pulls ambient air into a covered housing and onto the 8" x 10" Whatman EPM 200 glass microfiber filters at a flow rate between 36-60 cubic feet per minute (cfm) during a 24-hour sampling period every 12 days in accordance with EPA's 1-in-12-day sampling schedule. TSP air particulate samplers do not use a particle separator which results in the collection of all ambient particulates. The glass fiber filters are weighed pre- and post-sample, and the weight is used to determine the total suspended particulate matter. A filter is weighed before and after use to determine the net (mass) gain. The total volume of air sampled, corrected to EPA standard conditions (25 °C, 760 mm Hg [101 kPa]), is determined from the measured flow rate and the sampling time. The concentration of total suspended particulate matter in the ambient air is computed as the mass of collected particles divided by the volume of air sampled, corrected to standard conditions, and is expressed in micrograms per standard cubic meter ($\mu\text{g}/\text{std m}^3$).

The analysis from the TSP filters for metals follows of the analysis methods discussed in 40 CFR Part 50, Appendix G. This method is for the analysis of Pb from TSP filters by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) using a heated ultrasonic bath with nitric acid (HNO_3) and hydrochloric acid (HCl) or a heated block (hot block) digester with HNO_3 for filter extraction.

The detection limit for the metals (cadmium, chromium, and lead) are presented in Table 2-1. The RDL or PQL for cadmium, chromium, and lead is 5.00 μg .

Table 2-1 Metals Detection Limits

Metal	Detection Limit ($\mu\text{g}/\text{m}^3$)
Cadmium	0.005
Chromium	0.009
Lead	0.025

2.3 VOC

The monitoring procedure for VOC sampling involves pulling a volume of air through sorbet packing to collect VOCs followed by a thermal desorption-capillary GC/MS analytical procedure using TO-17. VOC sampling is conducted following EPA's 1-in-12-day sampling schedule.

At each monitoring location, the sorbent tubes, which have been stored at a temperature of $<4^\circ\text{C}$ prior to sampling, are removed from their storage and transportation container and are equilibrated to ambient temperature during the sampling period. The site technician, using clean gloves, removes the sample tubes from the container, takes off their caps, and attaches the sample tubes to the sampling lines with non-outgassing flexible tubing. The pump flow rate is set using a mass flow monitor. A constant flow sampling pump is operated at approximately 0.10 liters per minute (lpm). Once sampling is complete, the site technician removes the sorbent tube from the pump, recaps the sorbent tube, and places

the sorbet tube in the original container for shipment. Once sampling is complete, the sorbent tubes must again be kept at <4°C during transport back to the lab. The sorbent tubes must be analyzed within the 30-day holding time window.

VOC samples are collected at a flow rate adequate to reach the required limits of detection which are presented in Table 2-1.

Table 2-2 Organic Compound Ambient Air Detection Limits

Compound	Detection Limit ($\mu\text{g}/\text{m}^3$)
Benzene	0.04
Carbon Tetrachloride	0.25
Chloroform	0.05
Ethylbenzene	1.0
Methylene Chloride	1.0
1,1-Dichloroethane	1.0
1,1,1-Trichloroethane	1.0
Tetrachloroethene	0.1
Trichloroethene	0.1
Toluene	1.0
Xylene (total)	1.0

2.4 Meteorological Data

Meteorological data are routinely collected by WDI from the Willow Run Airport tower which is located approximately 0.4 miles north of the landfill. Meteorological parameters measured using an Automated Surface Observing System (ASOS/AWOS) weather station operated by the Federal Aviation Administration (FAA), consist of hourly measurements of wind speed, wind direction, weather conditions, temperature, station pressure, relative humidity, and precipitation. Meteorological measurements are not made on-site at the landfill.

3. DATA REPORTING

In accordance with the WDI Hazardous Waste License, within 60 days after the end of the month in which data are collected, all ambient air monitoring data will be reported in an acceptable electronic format to the EGLE, AQD. WDI will keep copies of all ambient air data on-site for at least 3 years. A request can be made to the Chief of the WDHM to modify the monitoring plan if one year of sampling events show non-detectable levels of that parameter. The determination to alter the ambient air monitoring plan shall be made by staff from both the MMD and AQD. The final approval letter regarding any changes to the ambient air monitoring plan will be issued by the MMD.

The monthly data, by site, are provided to MMD and AQD in an electronic submittal which includes the following information:

- Analytical laboratory reports and associated Quality Assurance/Quality Control (QA/QC) information
- Sampler flow data
- Sample results
- Chain of custody documentation
- Sampling narrative, which can include a certification statement and signature, and any issues identified.
- An evaluation of the data including any supporting figures and tables

In addition, on a quarterly basis, WDI will submit a report within sixty (60) days following the end of each quarter as required by the WDI EPA permit. This report includes the following data for the quarter:

- a tabular summary of all PCB analytical results of air monitoring, and
- all PCB analytical data reports from the air monitoring.

The quarterly results are presented to EPA in a spreadsheet, by month. The following data elements are presented in each monthly spreadsheet:

- UL Sample No.
- Sample ID
- Analyte
- Analytical Data
- Unit
- Method
- Matrix
- Date/Time Sampled
- Airflow
- Concentration in Micrograms per Cubic Meter
- Minimum Detection Limit

4. QUALITY ASSURANCE/QUALITY CONTROL

A site technician visits the monitoring station weekly to check that monitoring equipment is operational and to conduct flow checks and calibrations, when necessary. Calibrations are performed using National Institute of Standards and Technology (NIST) traceable standards and reference standard certificates for the certified reference standards are kept on file by WDI.

4.1 Sampling Equipment Calibration

Calibrations on air sampling equipment ensure accurate and reliable air sample collection, crucial for determining contaminant concentrations and assessing exposure levels. Brief descriptions of the calibration methods used for the PUF (PCB), TSP (metals), and VOC sampling equipment are presented below.

4.1.1 PUF Sampler

According to the manufacturer and EPA, PUF samplers used for PCB measurements should be calibrated at installation, after major repairs or maintenance, and at least annually. The PUF high volume sampler is calibrated using a calibrated orifice flow rate transfer standard without a foam plug. Generally, a five-hole resistance plate or a variable orifice is installed between the orifice and the filter adapter. Using manometers, adjust both manometers' midpoints by sliding their movable scales until the zero corresponds with the meniscus. Gently shake or tap any air bubbles remaining on the tubing connectors. The motor is turned on and the sampler is run for five minutes. The motor is then turned off and the site technician ensures that the manometers are set to zero. The motor is turned on again and the time, in minutes, that is required to pass a known volume of air (approximately 200 to 300 ft³ of air for each resistance plate) through the roots meter by using the roots meter's digital volume dial and stopwatch is recorded. The manometer readings and roots meter manometer readings are recorded along with the ambient temperature and barometric pressure. The measured volumes are calculated on the calibration data sheets using equations in the PUF sampler operator manual.

Figure 4.1 Example PUF Sampler Calibration Data Sheet

High Volume Sampler Calibration Data Sheet					
Site# <u>Station 3</u> Calibrated By <u>BB</u> Date <u>8/27/2024</u>					Slope 0.500035 Intercept 1.354481
Digital Manometer # <u> </u> Orifice ID # <u>1.90</u> Motor ID# <u> </u>					
Temperature (Deg. C) <u>32</u>		Barometric Pressure (mm Hg) <u>746.25</u>			
Tc (Deg. F) <u>89</u>		(Patm) (inches Hg) <u>29.38</u>			
Standard Temperature=25 C=298 K			Standard Pressure=29.92 inches of Hg		
Run Number	Pressure Reading at Orifice inches of H2O (Po)	Flowrate through Orifice cfm (Q)	Flowrate at Actual Conditions cfm (Qa)	Flowrate Corrected to Std. Conditions cfm (Qstp)	Pressure Readings Across HI-VOL inches of H2O (Phv)
1	5.9	54.9	56.58	54.35	5.20
2	5.0	50.6	52.09	50.03	4.40
3	3.8	44.1	45.41	43.61	3.50
4	3.0	39.2	40.35	38.75	2.50
5	2.1	32.8	33.76	32.42	1.90
Q=flowrate through calibration orifice		0.9957 correlation			
Qa=Q ((273 + Deg C) / (273 + 25 Deg C))*(760mm Hg / Patm)		0.4976 slope			
Qstp=Qa*(298 / (273 + Deg C))*(Patm/29.92)		1.3778 intercept			

4.1.2 TSP (Metals) Sampler

For TSP and metals measurements, the manufacturer and EPA recommend that TSP samplers be calibrated upon installation, after any motor maintenance, and annually. The calibration is performed using resistance plates that vary air flow or a variable orifice calibrator which uses an adjustable or variable orifice.

The calibration is conducted by disconnecting the sampler motor from the mass flow controller and connecting the motor to a stable power source. A calibrator orifice and top loading adapter plate is mounted on the sampler with no filter installed. The motor is turned on and allowed to warm up to its normal operating temperature. Leak checks are conducted by covering the hole on top of the orifice and pressure tap on the orifice with your hands. If a high-pitched sound is heard, a leak is present and the top loading adapter hold-down nuts need to be tightened. A manometer is connected to one side of the pressure tap on the orifice with a rubber vacuum tube. The opposite side of the manometer is left open to the atmosphere. A resistance plant and gasket are inserted and the collar is tightened securely under the orifice and the manometer reading is recorded from the orifice and the continuous flow recorder reading (or manometer) from the sampler. This procedure is repeated five times using all resistance plates or, if using a variable orifice, five flow rates are achieved by adjusting the knob on the variable orifice to five different positions and taking five different readings.

The ambient air temperature, barometric pressure, sampler serial number, orifice serial number, orifice slope and intercept with date of last certification, today’s date, site location, and operator’s initials are recorded on the calibration field data sheet. The sampler motor pump is disconnected from the power source and the orifice and top loading adapter plate are removed. The sampler motor is reconnected to the electronic mass flow controller. The manometer readings are converted to standard air flows using the equations in the TSP operator manual. An example calibration data sheet is presented in Figure 4.1.

Figure 4.2 Example High Volume Sampler Calibration Sheet

High Volume Sampler Calibration Data Sheet					
Site# 82923 Calibrated By BB Date 8/27/2024					Slope 0.500055
Digital Manometer # Orifice ID # 190 Motor ID#					Intercept 1.354481
Temperature (Deg. C) 28			Barometric Pressure (mm Hg) 746.51		
Tc (Deg. F) 82			(Patm) (inches Hg) 29.39		
Standard Temperature=25 C=298 K			Standard Pressure=29.92 inches of Hg		
Run Number	Pressure Reading at Orifice inches of H2O (Po)	Flowrate through Orifice cfm (Q)	Flowrate at Actual Conditions cfm (Qa)	Flowrate Corrected to Std. Conditions cfm (Qstp)	Pressure Readings Across HI-VOL inches of H2O (Piv)
1	6.4	57.2	58.53	56.97	6.90
2	5.3	52.1	53.27	51.84	5.70
3	4.3	46.9	47.98	46.69	4.70
4	3.8	44.1	45.10	43.89	3.80
5	2.0	32.0	32.72	31.84	1.70
Q=flowrate through calibration orifice		0.9975 correlation			
Qa=Q ((273 + Deg C) / (273 + 25 Deg C))* (760mm Hg / Patm)		0.4076 slope			
Qstp=Qa*(298 / (273 + Deg C))*(Patm/29.92)		1.4061 intercept			

4.1.3 VOC Sampler

For VOC sampling, sampling pumps are calibrated according to manufacturer instructions. Pump flow rates are verified at the end of each sampling period to make sure a pump constant pump rate was maintained throughout the sample collection period. The flow rate measured at the end of sampling should agree within 10% with that measured at the start

of the sampling period for the sample to be considered valid and the average value should be used. An example calibration data sheet for the VOC pumps is presented in Figure 4.2.

Figure 4.3 Example VOC Calibration Verification Sheet

Date	8/15/2024	
Time	12:00 PM	
Site Location	Michigan 82989	
Rotometer Setting	0.26	mlpm
Calibrated by	BB	
Dry Gas Meter ID	Bios DC-Lite S/N 3950	
	Calibration Run	Results
	1	0.1015 lpm
	2	0.1014 lpm
	3	0.1013 lpm
	4	0.1015 lpm
	5	0.1014 lpm
	AVERAGE	0.1014 lpm
	Standard Deviation	8.37E-05
Target Flow Rate =	100	ml/min
	0.100	lpm
CF = Target/AVERAGE		
	CF =	0.9860

4.2 Sample Quality Assurance

On each run day, samples from the colocated site (Site 9) shall be analyzed and reported to the EGLE AQD for the assessment of sampler precision. To assess sampler precision, Republic will identify a primary sampler and review the colocated filter-based results on a quarterly basis per the requirements of 40 CFR Part 58 Appendix A Section 4.2.1. Republic will review sample results to evaluate whether filter-based sampling is meeting a 75% completeness objective on a quarterly basis. If the completeness objective is not met, Republic will analyze the issues that led to incomplete data and take corrective action.

On one sample day per month, one blank sorbent tube and metals filter shall accompany the samples to the colocated site, not have air pulled through it, then submitted to the laboratory as a “trip blank”.

If any parameter that is analyzed by the laboratory and determined to be non-detectable, the value of the method detection level is reported.