Attachment B5.E

LYSIMETER MONITORING SAMPLING AND ANALYSIS PLAN

WAYNE DISPOSAL SITE #2 HAZARDOUS WASTE LANDFILL
MID 048 090 633

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1.0 INTRODUCTION

The following sampling and analysis plan outlines the procedures to be used for the collection and analysis of samples from the suction lysimeters present beneath the hazardous waste management areas (HWMA) of Master Cells V and VII at Wayne Disposal Site #2 Hazardous Waste Landfill. The lysimeter monitoring program functions as an early leak detection program beneath the lowest point (leachate collection sumps) of the HWMA subcells within these Master Cells. There are ten lysimeters in place. They were installed as five pairs so that adequate volume could be extracted for samples at each location. Pairs are located beneath cells V-B, VII-A, VII-B and VII-C (2 pairs identified as VII-C west and VII-C east). The locations of the lysimeters are shown on Figure 1.

This sampling and analysis plan has been prepared to direct the efforts of monitoring personnel in the collection and analysis of samples so as to meet the requirements of Michigan Act 451, Part 111 for the facility and to ensure sound practices for the collection of these data. This plan must be revised if there are any changes to the procedures contained herein. Any proposed changes must be submitted to the Waste & Hazardous Materials Division (WHMD) of the Michigan Department of Environmental Quality (MDEQ) for review and approval before the changes are implemented..

2.0 DESCRIPTION OF EQUIPMENT

The lysimeters were placed beneath the cell by angle drilling at an angle of approximately 65^{o} from vertical to a depth approximately 50 feet below ground surface and at least 5 feet below the lowest point of the bottom of the cell. A drawing of a typical installation is shown on Figure 2. The suction lysimeter system consists of a lysimeter, which takes in the moisture from the surrounding soil, vacuum tubing, and because of the depth, a transfer vessel at mid-depth. The lysimeters were manufactured by Timco Manufacturing and are composed entirely of Teflon™ , as is the tubing and transfer vessel. There is a 2-inch PVC casing attached to the transfer vessel. The "sand-pack" placed around the lysimeter is a silica flour slurry. The whole system is cased in a 6-inch steel casing to within four feet of the lysimeter assembly. Bentonite pellets were used to seal the lysimeter and silica pack from possible seepage from above. At the surface there are three lines with stop-cocks: (one with a pressure gauge) for pressurizing the lysimeter, one to pressurize the transfer vessel and one for transmitting the sample.

3.0 SAMPLE COLLECTION PROCEDURES

Samples of the water collected by the lysimeters are collected on a semi-annual basis. The sampling process involves applying a vacuum to the system to draw moisture into the lysimeter, transferring the water from the lysimeter to the transfer vessel and then applying pressure to the transfer vessel to drive the sample to the surface. This is generally a 3-day process. During the first day, check to make sure the gauge is in working order. Then, set the initial vacuum by opening the stop-cock on the line with the pressure gauge and applying 10-20 psi using a hand

pump. Close the stop-cock. On the second day, repeat this process. To sample the system on the third day, hook-up a breathable quality compressed air tank or nitrogen tank to the line with the gauge. Open the stop-cocks on each line. Apply about 8-10 psi for 2-3 minutes. Hook-up the compressed gas tank to the transfer vessel pressure line and apply 25-30 psi. The sample will be discharged from the sample line. Collect the samples and close the stopcocks. Samples from pairs may be composited if insufficient sample is collected from a single lysimeter.

Protective gloves must be worn during sample collection and care should be taken to ensure minimal agitation/aeration of the samples. The vials must be filled completely with zero head-space. Each sample container must be carefully labeled with the sampling location, time and date, and the sampler's initials. After collection, the samples must be stored in a clean cooler containing ice or ice packs. The coolers containing samples must be stored in a secure location until transport to the laboratory.

A field blank must be collected with each lysimeter sample collected. A trip blank must be maintained for each day the lysimeters are sampled. Due to the difficulty in getting enough sample for analysis, duplicate samples are not collected for the lysimeter monitoring program.

A chain of custody form must be filled out for each sampling event. This form must be filled out fully for each sample submitted for analysis and each person responsible for the handling of these samples must sign and date the form. When the samples are delivered to the laboratory and the lab has signed for their receipt, a copy of this form must be forwarded to the QEHS Department.

4.0 SAMPLE ANALYSIS

Each sample must be analyzed for the parameters listed on Figure 3, which also contains the analytical methods and targeted method detection limits. Laboratory Quality control frequencies and precision/accuracy requirements are provided in the Quality Assurance Manual for the current contract laboratory, TriMatrix Laboratories, which is contained in the Groundwater Sampling and Analysis Plan for this facility. This manual describes the internal policies, guidelines and procedures of TriMatrix. This manual is not intended to describe the specific details of this particular monitoring program. Rather, we are to use this document as a guideline in evaluating the current laboratory's QA/QC and standard operating procedures to ensure that generally acceptable practices are employed.

5.0 RECORD KEEPING AND INSPECTION REQUIREMENTS

There are two items required to ensure adequate record keeping for the lysimeter monitoring program. First, the lysimeter sampling and inspection log (Figure 4) must be filled out at each sampling location during each sampling event. The log must include the identity of sampling personnel, the dates and time when samples are collected, a description of the sampling event, and any pertinent observations of sample characteristics or sampling environment. In addition, this form must be used to record an inspection of the lysimeter outlet including the pressure gauges, stopcocks and the outer protective casing. Second, a chain of custody form must be filled out for each sampling event, as described above. This form must be filled out fully for each sample submitted for analysis and each person responsible for the handling of these samples must sign and date the form.

6.0 DATA EVALUATION AND REPORTING REQUIREMENTS

The data must be received from the laboratory, evaluated and transmitted to the MDEQ within 60 days of sampling. The statistical analysis of the data is identical to that for the LDCRS monitoring program and is provided as Attachment A. An apparent statistically significant increase identified by the statistical test must be reported to MDEQ within 24 hours. An apparent statistically significant increase must be confirmed or refuted by resampling. In general, the lysimeters do not recharge for at least several months. Any lysimeter yielding an apparent statistically significant must be resampled within 3 months unless insufficient sample can be collected. If there is insufficient sample within 3 months this result must be reported to MDEQ along with a schedule for attempting the next sample. . Confirmed statistically significant increases must also be transmitted immediately to the MDEQ.

The semi-annual reports must include a description of the sampling event, a summary of field and laboratory QA/AC information, the field logs and a summary of any non-compliances or maintenance performed.

THE ENVIRONMENTAL QUALITY COMPANY

LOCATION: WAYNE DISPOSAL SITE #2

SCALE: 1" = 300'

DATE: 10/11/95

FILENAME: WDS2LYS

TITLE: LYSIMETER LOCATION PLAN

E 5000

PROPERTY LINE

APPROXIMATE CELL BOUNDARY

MASTER CELL V

VI-B

E 6000

VII-A

VII-B

MASTER CELL VII

E 7000

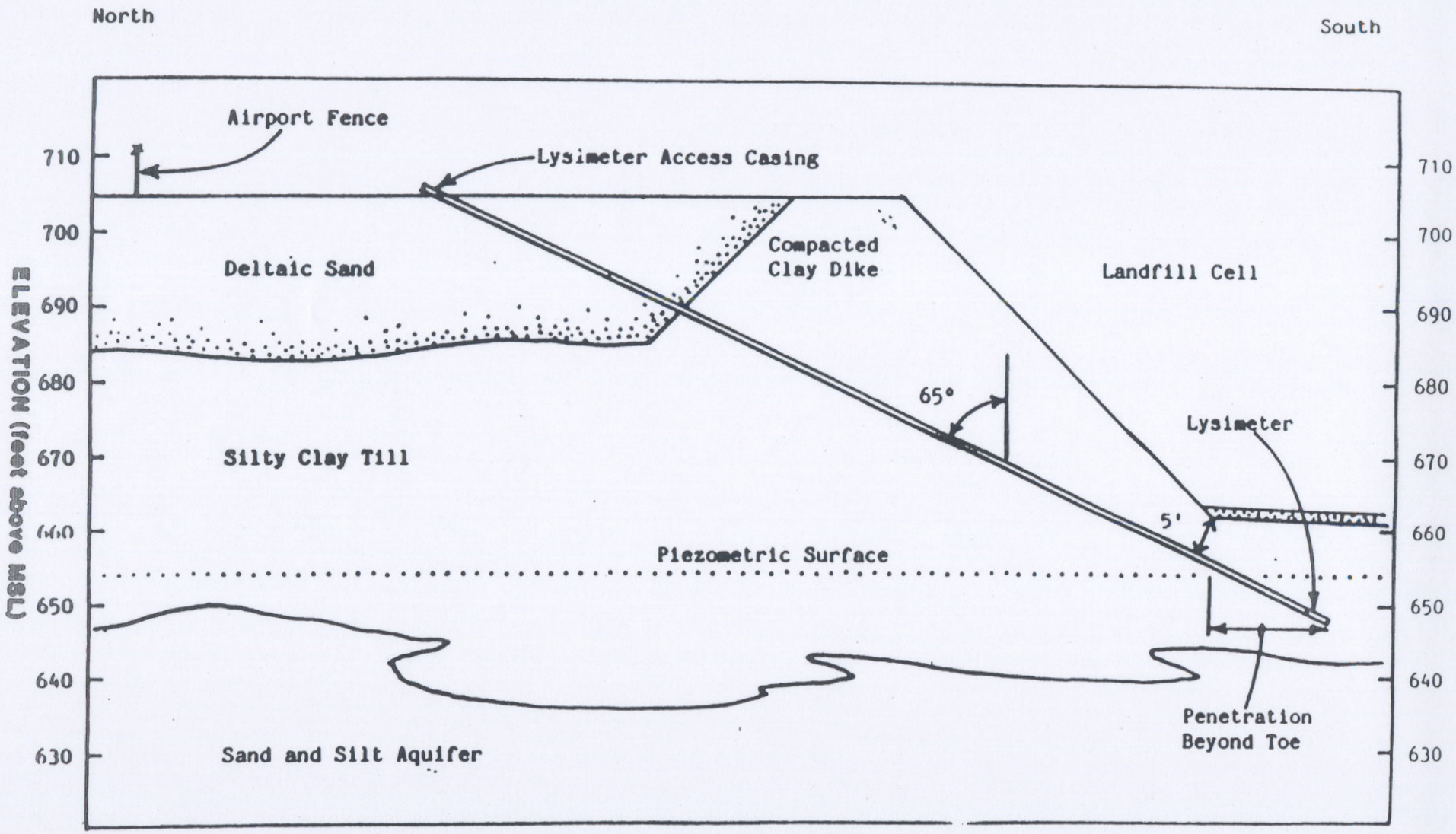
VII-CW

VII-CE

HAZARDOUS WASTE BOUNDARY

N 8000

N 9000



Lysimeter Installation Geometry at Wayne Disposal.

(HORIZONTAL NOT TO SCALE)

Figure 2

FIGURE 3. METHOD DETECTION LIMITS - ORGANIC ANALYSIS

Parameter	Method Reference	Detection Limit (mg/l)
Acetone	8260B	0.020
Bromodichloromethane	8260B	0.001
Bromoform	8260B	0.001
Bromomethane	8260B	0.005
Carbon tetrachloride	8260B	0.001
Chlorobenzene	8260B	0.001
Chloroethane	8260B	0.005
2-Chloroethylvinyl Ether	8260B	0.010
Chloroform	8260B	0.001
Chloromethane	8260B	0.001
Dibromodifluoromethane	8260B	0.001
1,2 Dichlorobenzene	8260B	0.001
1,3 Dichlorobenzene	8260B	0.001
1,4 Dichlorobenzene	8260B	0.001
Dichlorodifluoromethane	8260B	0.001
1,1-Dichloroethane	8260B	0.001
1,2-Dichloroethane	8260B	0.001
1,1-Dichloroethene	8260B	0.001
1,2-Dichloroethene	8260B	0.001
1,2 Dichloropropane	8260B	0.001
cis-1,3 Dichloropropene	8260B	0.001
trans-1,3 Dichloropropene	8260B	0.001
1,1,1,2, Tetrachloroethane	8260B	0.001
1,1,2,2, Tetrachloroethane	8260B	0.001
Tetrachloroethene	8260B	0.001
1,1,2-Trichloroethane	8260B	0.001
1,1,1-Trichloroethane	8260B	0.001
Trichloroethene	8260B	0.001
Trichlorofluoromethane	8260B	0.001
Vinyl Chloride	8260B	0.001
Methylene Chloride	8260B	0.005
2- Butanone (MEK)	8260B	0.005
Benzene	8260B	0.001
Toluene	8260B	0.001
Ethylbenzene	8260B	0.001
Total Xylenes	8260B	0.003

Note: Detection limits meet those in MDEQ Operational Memo Gen-8 Revision 8 - 12/22/06. This table should be revised in the event Op Memo Gen-8 is updated

Reference: Methods referenced from TEST METHODS FOR EVALUTION SOLIDS WASTE, USEPA SW-846

Figure 4. Lysimeter Sample Collection and Inspection Log - WDI Site #2

Sample ID:	Sample Date:	Sample Time:
Sample Location:	Sampling Method:	Sampler:
Sample Description/Comments*:		
Inspection Items: (indicate by checkmark if OK, comment if not) Pro-Casing:_____________	Gauge:__________________	Stopcocks:______________________________

Sample ID:	Sample Date:	Sample Time:
Sample Location:	Sampling Method:	Sampler:
Sample Description/Comments*:		
Inspection Items: (indicate by checkmark if OK, comment if not) Pro-Casing:_____________	Gauge:__________________	Stopcocks:______________________________

Sample ID:	Sample Date:	Sample Time:
Sample Location:	Sampling Method:	Sampler:
Sample Description/Comments*:		
Inspection Items: (indicate by checkmark if OK, comment if not) Pro-Casing:_____________	Gauge:__________________	Stopcocks:______________________________

Sample ID:	Sample Date:	Sample Time:
Sample Location:	Sampling Method:	Sampler:
Sample Description/Comments*:		
Inspection Items: (indicate by checkmark if OK, comment if not) Pro-Casing:_____________	Gauge:__________________	Stopcocks:______________________________

Attachment A
Statistical Analysis

Attachment A – Lysimeter Statistical Monitoring Plan

INTRODUCTION

The following statistical monitoring plan provides a description of the statistical procedures used for identifying a statistically significant increase of monitoring parameters in the lysimeter monitoring program at WDI. The program is intended to provide an early warning that hazardous waste constituents may be penetrating the liner systems of cells V-B, VII-A, VII-B and VII-C East and VII-C West.

STATISTICAL EVALUATION

The statistical program for lysimeter monitoring utilizes Nonparametric Prediction Limits (NPPLs) to evaluate the monitoring data. In order to balance false positive and statistical power with this test, resamples are used, the number of which are determined by the number of sampling points and the number of background observations. Since there is no "upgradient" in the lysimeter network, and there were pre-waste disposal samples collected from these devices, the definition of background is not defined in a traditional sense.

The NPPL is defined as the highest concentration of a monitoring parameter detected in a background sample. For parameters that are never detected in the background, the NPPL is defined as the reported detection limit. Since the parameters to be analyzed statistically are all volatile organic compounds, the reported detection limit, as listed on Figure 3 of the Lysimeter

Sampling and Analysis Plan are the NPPLs. Therefore, any reported concentration of a Figure 3 parameter at or above these limits is considered an apparent statistically significant increase.

If a Figure 3 compound is detected, then the NPPL been exceeded and WDI will immediately notify the Materials Management Division (MMD) of the Michigan Department of Environment, Great Lakes and Energy (EGLE) and arrange resampling as soon as possible to confirm or refute the apparent statistically significant increase. Quadruplicate samples, if there is sufficient volume, will be collected for confirmation purposes and analyzed for the offending parameter(s). Since these quadruplicates are not independent samples, it does not constitute a multiple resampling as defined by the NPPL test. Therefore, the quadruplicate samples constitute a single resampling. If three of the four quadruplicate samples are clean, then the statistical increase is not confirmed. If two or more of the quadruplicates contain the compound of interest the apparent increase will be deemed confirmed and WDI shall respond in accordance with the current Operating License.