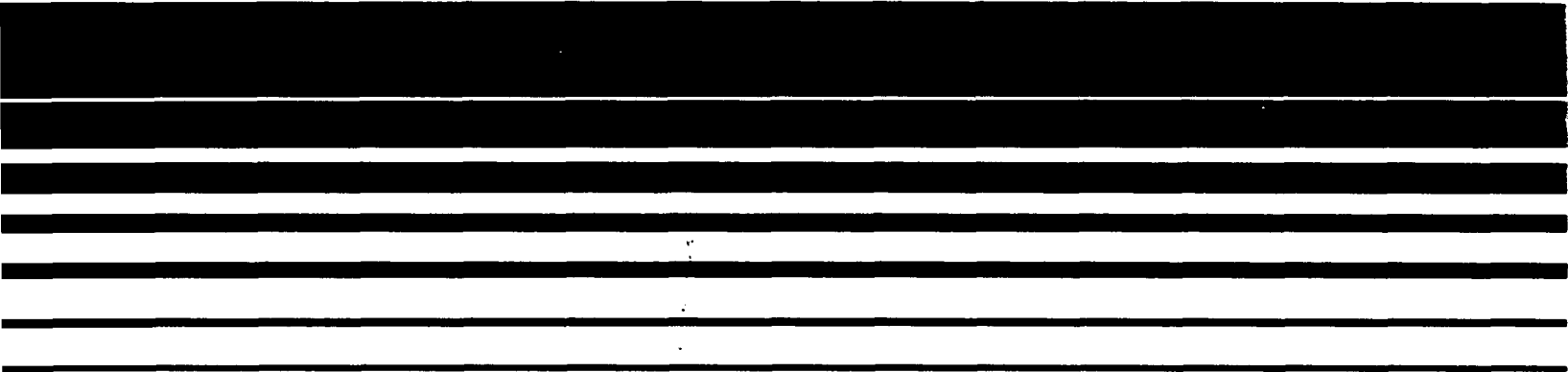


Air



Hazardous Waste Treatment, Storage, and Disposal Facilities

Site-Specific Test Report SCA Chemical Services Model City, New York



SITE-SPECIFIC TEST REPORT

SCA CHEMICAL SERVICES, INC.
MODEL CITY, NEW YORK

ESED 85/12
EMB 85FPE03

Prepared by:

Entropy Environmentalists, Inc.
Post Office Box 12291
Research Triangle Park, North Carolina 27709

Contract No. 68-02-3852 and 68-02-4336
Work Assignments No. 2⁴ and 1
PN: 302⁴ and 3501

EPA Task Manager
Clyde E. Riley

U. S. ENVIRONMENTAL PROTECTION AGENCY
EMISSION MEASUREMENT BRANCH
EMISSIONS STANDARDS AND ENGINEERING DIVISION
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

July 1986

Disclaimer

This document has been reviewed by the Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, Office of Air, Noise and Radiation, Environmental Protection Agency, and approved for publication. Mention of company or product names does not constitute endorsement by EPA. Copies are available free of charge to Federal employees, current contractors and grantees, and nonprofit organizations - as supplies permit - from the Library Services Office, MD-35, Environmental Protection Agency, Research Triangle Park, NC 27711.

Order: EMB Report 85-FPE-03

CONTENTS

	<u>Page</u>
Figures	v
Tables	vi
1.0 INTRODUCTION	1-1
2.0 SUMMARY AND DISCUSSION OF RESULTS	2-1
2.1 Background Samples	2-4
2.2 Landfill (SLF 11), Cell A, Area III (Process J)	2-8
2.3 Landfill (SLF 11), Cell A, Area I (Process K)	2-9
2.4 Conclusions	2-10
3.0 PROCESS DESCRIPTION AND OPERATION	3-1
3.1 Landfill (SLF 11)	3-1
4.0 SAMPLING AND ANALYSIS	4-1
4.1 Site Plot Plan	4-1
4.2 Landfill (SLF 11), Cell A, Area III (Process J)	4-1
4.3 Landfill (SLF 11), Cell A, Area I (Process K)	4-7
5.0 QUALITY ASSURANCE	5-1

CONTENTS (continued)

APPENDICES	<u>Page</u>
A RAW FIELD DATA AND SAMPLING LOGS	A-1
Process Data Sheets and Sampling Grid Sketches	A-3
Chain of Custody Forms	A-7
B ANALYTICAL DATA	B-1
EMB Split Sample Inventory	B-3
Moisture Determination Data Sheets	B-4
Screening Data Sheets	B-28
Percent PM ₁₀ Determination Data Sheets	B-46
Metals Analysis Results	B-55
Organic Cleanup Data Sheet	B-56
Organics Analysis Results	B-57
Quality Assurance Data	B-72
C SAMPLING AND ANALYTICAL PROCEDURES	C-1
Sampling Apparatus	C-3
Sampling Location Selection and Documentation	C-8
Sample Collection Procedures	C-11
Sample Handling and Transport	C-14
Drying and Sieving Procedures	C-16
Chemical Analyses	C-19
Quality Assurance (QA) Procedures	C-25
D SAMPLING PROGRAM PARTICIPANTS AND OBSERVERS	D-3
E PROCESS OPERATIONS DATA	E-1
Summary of Processes Sampled During Site Survey	E-3
Summary of Equipment for Processes Sampled During Site Survey	E-4

FIGURES

<u>Number</u>		<u>Page</u>
4.1	Schematic showing dimensions of Cell A and locations of subcells in active landfill (SLF 11) at SCA.	4-2
4.2	Sampling grid, process dimensions, and sample numbers for active landfill (SLF-11, Cell A, Area III: General Organics) at SCA (Process J).	4-4
4.3	Sampling grid, process dimensions, and sample numbers for active landfill (SLF-11, Cell A, Area I: Metals) at SCA (Process K).	4-10
C.1	Example process grid.	C-10
C.2	Label used for sample jars.	C-12

TABLES

<u>Number</u>		<u>Page</u>
2.1	Sampling Plan for SCA	2-3
2.2	Analytical Results of Silt Screening, Weight Loss on Drying, and PM ₁₀ Sieving, Fugitive Particulate from TSDF (85/12), SCA Site, Model City, NY	2-5
2.3	Analytical Results for Metals and Semivolatile Organics, Fugitive Particulate from TSDF (85/12)	2-6
4.1	Sample Drying Procedure Summary	4-3
4.2	Metals, Measurement Methods, and Detection Limits	4-6
4.3	Semivolatile Organics Analyzed For and Their Quantifiable Detection Limits at Medium Concentration Levels	4-8
5.1	Quality Assurance Results For Metals Analysis	5-2
5.2	Quality Assurance Results For Semivolatile Organics Analysis	5-3
C.1	Sampling Equipment Specifications	C-5
C.2	Sampling Equipment Preparation and Clean-Up	C-7
C.3	Metals and Measurement Methods	C-20
C.4	Semivolatile Organic Compounds Measured	C-22
C.5	Pesticides Analyzed For and Their Quantifiable Detection Limits	C-23
C.6	Spiking Compounds: Acid Extractables II	C-27
C.7	Spiking Compounds: Neutral Extractables V	C-28
C.8	Spiking Compounds: Neutral Extractables VI	C-29
C.9	Spiking Compounds: Pesticides II	C-20
C.10	Spiking Compounds: Metals	C-31

1.0 INTRODUCTION

On October 15 and 16, 1985, Entropy Environmentalists, Inc. collected soil samples from one treatment, storage, and disposal related process at the SCA Chemical Services, Inc. facility located in Model City, New York. The purpose of this sampling program was to provide preliminary data on the magnitude of fugitive particulate emissions from various processes at treatment, storage, and disposal facilities (TSDF's) and the degree to which these emissions are contaminated. The U. S. Environmental Protection Agency (EPA) anticipates utilizing the analytical data from this program with emission models to estimate contaminated fugitive particulate emissions from TSDF's. The information generated by this study may ultimately be used by the Office of Air Quality Planning and Standards (OAQPS) of EPA to assess the adequacy of regulations governing contaminated fugitive particulate emissions from TSDF's.

To accomplish the overall goals of this study, soil samples were collected from representative processes at this plant and were submitted for the appropriate analyses in order to determine the following:

- The percent by weight of silt in the soil (i.e., material that passes through a 200 mesh screen and has a nominal diameter less than 75 um) and the percent by weight of moisture in the soil.
- The degree of contamination of the soil silt fraction with metals, cyanide, and semivolatile organics.
- The percent by weight of soil silt that is less than 20 um in diameter based on a sonic sieving technique.

- The particle size dependency of the degree of contamination (i.e., greater or lesser degree of contamination in particles with diameters not in excess of 20 μm) by conducting separate analyses of different soil particle size fractions.
- The repeatability and reproducibility of the sampling and analytical procedures for the entire sampling program (not included in this report since no samples were collected for this purpose at SCA).

At SCA, the process sampled was an active landfill (SLF 11). Within this landfill two areas were sampled: (1) Cell A, Area III: Organics and (2) Cell A, Area I; Metals. A pair of background samples were also taken.

Samples taken were analyzed for silt content, PM_{10} content, metals, cyanide, and semivolatile organics as described in Chapter 4. Research Triangle Institute (RTI) conducted the analyses for metals and cyanide. PEI and Associates performed the analyses for the semivolatile organics. Additional cleanup of the semivolatile organic extracts was performed by Triangle Laboratories, Inc.

Field sampling was performed by Mr. Steve Plaisance and Mr. Bernie von Lehmden of Entropy Environmentalists. Mr. Phillip Englehart and Mr. Tom Lapp of Midwest Research Institute (MRI) directed Entropy personnel regarding specific processes to be sampled and the boundaries of the processes and recorded the pertinent process and operating characteristics. Mr. Gene Riley (EPA Task Manager) of the Emission Measurement Branch (EMB) observed the sampling program. Mr. Dean Venturin, Environmental Engineer, served as the contact for SCA.

This report is organized into several chapters addressing various aspects of the sampling and analysis program. Immediately following this chapter is the "Summary and Discussion of Results" chapter which presents table summaries of data on silt and PM_{10} content and degree of contamination for each sample fraction analyzed. Following the "Summary and Discussion of Results" chapter

is the "Process Description" chapter (supplied by MRI) which includes descriptions of each process sampled. The next chapter, "Sampling and Analysis," presents the plot plan and sampling grid for each process. The method of selecting the sampling grid and the sample collection procedures are outlined, including any deviations and problems encountered. This chapter also describes the sample preparation and analytical procedures used for each sample; any deviations from the normal procedures are addressed. The appendices present the Raw Field Data and Sampling Logs (Appendix A); Analytical Data (Appendix B); detailed Sampling and Analytical Procedures (Appendix C); Sampling Program Participants and Observers (Appendix D); and Process Operations Data (Appendix E).

2.0 SUMMARY AND DISCUSSION OF RESULTS

This chapter presents a summary of the sampling and analysis results and a brief discussion of significant deviations from the proposed sampling and analysis protocol for this program. Since the standard sampling and analytical procedures are not addressed in this chapter, it is recommended that those individuals who are not familiar with the sampling and analytical procedures used in this study review Chapter 4, "Sampling and Analysis," prior to reading this chapter.

Soil samples were collected from the active landfill (SLF 11) at SCA Chemical Services, Inc. located in Model City, New York. Within this landfill two areas were sampled: (1) Cell A, Area III: Organics and (2) Cell A, Area I: Metals. Sampling and analysis were conducted using the procedures described in the Sampling and Analysis Protocol, which was written specifically for this sampling program. The protocol was provided to the facility prior to the sample collection. The procedures described in this protocol are described again in detail in Chapter 4 and Appendix C of this report.

As described in the Sampling and Analysis Protocol, this site-specific report is intended to present the data relevant to the samples obtained at one site in this study and the procedures used to obtain these samples. Some statistical analyses will be performed on the data concerning this site; however, the majority of statistical analyses will involve the data collected over the entire study and will be included in the summary report to be completed at the conclusion of the program. With the exception of the data from the screening conducted to determine silt contents, there is not sufficient data to conduct meaningful statistical analyses on a site- or process-specific basis.

The sampling plan for SCA is shown in Table 2.1. The sampling procedures were designed to obtain a representative sample of that portion of the contaminated soil which could become airborne. The analyses of the collected samples were conducted to measure the concentration of the most likely compounds or elements that could be soil contaminants (metals, cyanide, semivolatile organics, and pesticides). The sample collection techniques were generally as follows: (1) for undisturbed hard surfaces a sweeping technique was used to obtain surface samples only; (2) for moderately disturbed surfaces a scooping technique was used to obtain near surface samples; and (3) for surfaces that were mechanically disturbed to a specific depth, coring was used to sample to the depth of the disturbance. The number of samples collected within each process was a function of the variability expected in the degree of contamination and/or the amount of sample that was needed for the analyses.

According to the Sampling and Analysis Protocol, the collected samples were to be analyzed for metals, cyanide, semivolatile organics, and pesticides. The semivolatile organics of interest were taken from the Hazardous Substance Lists (HSL) in the EPA Contract Laboratory Program (CLP), Statement of Work. If significant quantities of cyanide, semivolatile organics, or pesticides were not expected to be present in a particular process, the analyses for these compounds were not performed. MRI decided that at this particular site, pesticides would not be present in significant quantities and therefore, pesticides analyses were deleted. All samples were analyzed for metals and cyanide. Only the silt and PM₁₀ fractions (when generated) were analyzed for semivolatile organics. As a cost saving measure and because the evaluation of the particle size dependency on the degree of contamination requires only the values for the silt and PM₁₀ fractions, the other soil fractions generated were not analyzed for semivolatile organic compounds.

TABLE 2.1. SAMPLING PLAN FOR SCA

Process Sampled	Process Designation	Number of Samples	Collection Method	Analyses
Landfill (SLF 11), Cell A, Area III: General Organics	J	8	Scooping	Loss on drying Silt and PM ₁₀ content Metals and cyanide Semivolatile organics
Landfill (SLF 11), Cell A, Area I: Metals	K	8	Scooping	Loss on drying Silt and PM ₁₀ content Metals and cyanide Semivolatile organics
Background Samples	BGD	2	Scooping	Loss on drying Silt and PM ₁₀ content Metals Semivolatile organics

When the semivolatile organic extracts were screened, they were found to contain significant quantities of organic compounds. Because of this, the extracts would have required significant dilution before analysis, resulting in a higher detection limit than desired. Therefore, the extracts were subjected to an alternative cleanup procedure intended to remove non-HSL aliphatic compounds. The cleaned extracts were then analyzed at a detection limit closer to the desired detection limit for the semivolatile organic compounds. Complete lists of compounds or elements for which analyses were conducted and their desired detection limits are presented in Chapter 4 (see Tables 4.2 and 4.3).

The analytical results are discussed in the following subsections. Complete sampling data sheets are presented in Appendix A and all analytical data sheets are presented in Appendix B.

2.1 BACKGROUND SAMPLES

Because many compounds and elements are either naturally occurring in the soil or may be present as a result of factors other than those which may be attributed to SCA's activities, two background samples were taken at a point off-site and analyzed. The percent weight loss on drying (LOD) measured for these samples averaged 13.69 percent. The background samples were oven-dried at 105°C for 5 hours prior to being screened for silt. The silt content of the two background samples taken (sample identification numbers BGD-317 and BGD-318) averaged 19.0 percent by weight (see Table 2.2). The silt material (sample identification number BGD-342) separated from the samples (BGD-317 and BGD-318) was sonic sieved. Material passing through the 20 um sieve constituted the PM₁₀ content. The PM₁₀ content averaged 37.49 percent by weight of the silt material.

Results of the analyses for metals and semivolatile organics are shown in Table 2.3. The analytical results for the metals in the background silt sample

TABLE 2.2.
ANALYTICAL RESULTS OF SILT SCREENING, WEIGHT LOSS ON DRYING, AND PM₁₀ SIEVING
FUGITIVE PARTICULATE FROM TSDF (85/12)
SCA SITE, MODEL CITY, NY

Site and Process	Sample ID	Percent Silt	Percent Loss on Drying	Sample ID	Percent PM ₁₀
SCA, Model City, NY Landfill (SLF 11), Cell A, Area III: Organics (Process J)	J-301	13.9	28.02		
	J-302	16.0	22.96		
	J-303	10.8	38.75		
	J-304	5.7	35.56		
	J-305	24.9	18.26		
	J-306	9.3	35.51		
	J-307	16.5	32.88	J-326	49.40
	J-308	12.7	40.78	J-326	48.97
	Average	13.7	31.59		49.19
	Std. Dev.	5.7	7.36		0.30
SCA, Model City, NY Landfill (SLF 11), Cell A, Area I: Metals (Process K)	K-309	22.7	17.87		
	K-310	15.1	10.22		
	K-311	28.6	12.69		
	K-312	35.2	13.63		
	K-313	25.6	15.33		
	K-314	30.9	15.39		
	K-315	26.7	14.82	K-336	38.02
	K-316	34.1	14.70	K-336	36.19
	Average	27.4	14.33		37.11
	Std. Dev.	6.5	2.09		1.29
SCA, Model City, NY Background Samples	BGD-317	12.2	11.17	BGD-342	37.80
	BGD-318	25.7	16.21	BGD-342	37.18
	Average	19.0	13.69		37.49
	Std. Dev.	9.5	2.52		0.44

TABLE 2.3. ANALYTICAL RESULTS FOR METALS AND SEMIVOLATILE ORGANICS
FUGITIVE PARTICULATE FROM TSDF (85/12)

Metals Analysis		Active Landfill 11-III			Active Landfill 11-I			Background
Sample Identity	Silt J-321	PM10 J-323	>PM10 J-325	Silt K-331	PM10 K-333	>PM10 K-335	Silt BGD-341	
Element	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	
Aluminum (Al)	19,886	26,458	17,910	10,161	20,483	7,842	10,331	
Antimony (Sb)	8.6	10.8	6.8	3.4	8.1	4.5	<0.5	
Arsenic (As)	8.5	11.7	6.0	9.0	22.2	10.0	4.2	
Barium (Ba)	102	124	96.2	86.9	189	71.2	73.3	
Beryllium (Be)	0.47	0.49	0.45	0.34	0.70	<0.3	<0.3	
Cadmium (Cd)	<3	4.4	<3	12.2	58.0	23.0	<3	
Chromium (Cr)	2,038	3,243	1,786	294	828	374	57.4	
Cobalt (Co)	14.0	22.9	13.1	<11	14.4	<11	<11	
Copper (Cu)	1,602	2,434	1,459	3,229	7,961	2,770	57.9	
Iron (Fe)	17,992	20,088	16,418	16,511	27,448	13,619	15,497	
Lead (Pb)	5,562	8,750	4,936	503	1,145	551	43.5	
Magnesium (Mg)	11,652	12,754	11,891	16,291	13,437	9,810	7,124	
Manganese (Mn)	533	603	513	579	792	463	460	
Mercury (Hg)	0.20	1.21	0.23	9.75	30.10	10.90	<0.13	
Molybdenum (Mo)	190	289	175	31.3	50.4	22.3	22.0	
Nickel (Ni)	345	541	308	197	359	160	12.3	
Osmium (Os)	<27	<27	<27	<27	<27	<27	<27	
Selenium (Se)	0.6	1.0	1.0	0.9	1.0	0.7	<0.5	
Silver (Ag)	46.4	82.1	44.8	<11	17.2	<11	<11	
Thallium (Tl)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Vanadium (V)	37.3	43.5	32.8	29.5	48.4	24.1	31.1	
Zinc (Zn)	41,469	64,726	35,709	1,301	3,115	1,426	287	
cyanide	101	122	91.7	17.2	37.5	22.1	-	
Organic Analysis		Active Landfill 11-III			Active Landfill 11-I		Background	
Sample Identity	Silt J-320	PM10 J-322		Silt K-330	PM10 K-333		Silt BGD-340	
Compound	(ug/g)	(ug/g)		(ug/g)	(ug/g)		(ug/g)	
Phenol	N.D.	3.8 J		1.1	3.1		N.D.	
Napthalene	N.D.	N.D.		N.D.	0.06 J		N.D.	
Dimethyl-phthalate	N.D.	N.D.		N.D.	0.07 J		N.D.	
Fluorene	N.D.	N.D.		N.D.	0.10 J		N.D.	
Phenanthrene	N.D.	15.0		0.17 J	N.D.		N.D.	
Pyrene	N.D.	1.8 J		0.27 J	0.80		N.D.	
Di-n-butylphthalate	N.D.	N.D.		0.74 B	N.D.		0.2 JB	
Benzo(a)anthracene	N.D.	N.D.		0.07 J	0.17 J		N.D.	
bis(2-ethylhexyl)phthalate	N.D.	N.D.		N.D.	0.19 J		N.D.	
Di-n-octylphthalate	N.D.	N.D.		0.48	N.D.		N.D.	
Chrysene	N.D.	N.D.		N.D.	0.40		N.D.	
Sample Detection Limit (ug/g)	4.9	7.2		0.33	0.33		0.33	

N.D. = less than quantifiable detection limit for the sample

J = Estimated value where the compound meets the mass spectral criteria but the result is less than the quantifiable detection limit.

B = compound detected in method blank as well as sample

(sample ID BGD-341) are in terms of micrograms of the metal or cyanide per gram of silt sample (dry basis). These results reflect the nominal concentrations of these materials present in the soil which are not a result of SCA activities. The results for the background samples have not been subtracted from the results for the other samples since risk assessments utilize the inclusive value of the degree of contamination. It should be understood, however, that the actual outside contribution to the degree of contamination of the soil is that portion of the contaminate concentration which exceeds the nominal background level.

For the analysis of the semivolatile organic compounds, the background silt sample was extracted as a low-level sample following the U.S. EPA Contract Laboratory Program, Statement of Work for Organic Analysis, 7/85 Revision (referred to as the CLP in this report). The extract was concentrated and subjected to an adsorption chromatography cleanup procedure instead of the CLP gel permeation chromatography (GPC) cleanup procedure. The adsorption chromatography procedure was developed to remove more aliphatic compounds from the extract than possible with the GPC procedure. The presence of excessive amounts of aliphatic material would require dilution of the extracts prior to the gas chromatograph/mass spectrometer (GC/MS) analysis and a corresponding increase in the sample detection limit. The dilution would be necessary to protect the GC/MS from samples with large amounts of aliphatic compounds.

For the background sample, no dilution, as determined by GC/flame ionization detection (GC/FID), was required prior to the GC/MS analysis. This resulted in a detection limit of 0.33 ug/g. One of the CLP hazardous substance list (HSL) semivolatile compounds was found in the background sample at concentrations below the quantifiable detection limit. This compound met the mass spectral criteria, but is reported as an estimated value only.

With the exception of the additional adsorption chromatography cleanup on the organic sample extracts prior to analysis, all procedures followed the Sampling and Analysis Protocol.

2.2 LANDFILL (SLF 11), CELL A, AREA III (PROCESS J)

Area III of Landfill (SLF 11), Cell A (Process J) was sampled using a grid layout. Eight samples were collected within this grid in a random manner as described in Chapter 4. The scoop sampling technique was used to obtain near surface samples. The weight loss on drying measured for the samples averaged 31.59 percent by weight. The samples were oven-dried at 105°C for 5.5 hours and desiccated for 19 hours prior to silt screening. Each of the eight samples (sample identification numbers J-301 through J-308) were screened for silt content which averaged 13.7 percent silt by weight (see Table 2.2). The homogeneous silt composite (sample identification number J-326), resulting from screening samples J-301 through J-308, was then sonic sieved (using a 20 μm sieve) for PM_{10} content which averaged 49.19 percent by weight in the silt sample. Three fractions (silt, $>\text{PM}_{10}$, and PM_{10}) were produced from the combined silt sample from Cell A, Area III. The portion of the silt sample that did not pass through the 20 μm sieve was referred to as the "greater than PM_{10} " ($>\text{PM}_{10}$) fraction. Portions of all three fractions were analyzed for metals and cyanide by RTI. Only the silt and PM_{10} fractions were analyzed by PEI for semivolatile organics as shown in Table 2.3. The fractions were analyzed to determine both (1) the degree of contamination and (2) the possible particle size dependency of the degree of contamination. The results for the metals are expressed in micrograms of the metal per gram of sample on a dry basis. The concentrations measured for the background sample were not subtracted from the sample results.

Like the background silt sample, the Cell A, Area III samples were extracted by the low-level method. The extracts were concentrated and cleaned using the adsorption chromatography procedure. The silt fraction sample (J-230) sample extract was diluted 14.7-fold before the GC/MS analysis, resulting in a quantifiable detection limit of 4.9 ug/g. No semivolatile organic compounds were detected in this sample. The PM₁₀ fraction sample (J-322) was diluted 21.9-fold, resulting in a quantifiable detection limit of 7.2 ug/g. Three HSL semivolatile organic compounds were detected in this sample. One compound, phenanthrene, was detected at 15.0 ug/g. Two other compounds, phenol and pyrene, were found at concentrations below the quantifiable detection limit, but met the mass spectral criteria. The concentrations reported for these compounds are estimated values only.

With the exception of the use of the adsorption chromatography cleanup procedure, the dilution of the semivolatile organic sample extracts prior to analysis, and the slight increase in the quantifiable detection limit, all procedures followed the Sampling and Analysis Protocol.

2.3 LANDFILL (SLF 11), CELL A, AREA I (PROCESS K)

Area I of Landfill (SLF 11), Cell A (Process K) was sampled using a grid layout. Eight samples were collected within this grid in a random manner as described in Chapter 4. The scoop sampling technique was used to obtain near surface samples. The weight loss on drying measured for the samples averaged 14.33 percent by weight (see Table 2.2). The samples were oven-dried at 105°C for 4 hours prior to silt screening. Each of the eight samples were individually screened for silt content which averaged 27.4 percent by weight.

The homogeneous silt composite (sample ID K-336), resulting from screening samples K-309 to K-316, was sonic sieved for PM₁₀ content which averaged

37.11 percent by weight of the silt. Portions of the silt fractions (silt, PM_{10} , and PM_{10}) were analyzed for metals and cyanide to determine both (1) the degree of contamination and (2) the possible particle size dependency of the degree of contamination. Only the silt and PM_{10} fractions were analyzed for semivolatile organics. The analytical results for metals and semivolatile organics are shown in Table 2.3.

The silt and PM_{10} samples from Cell A, Area I were prepared for organic analysis like the background sample. Neither of the extracts required dilution prior to the GC/MS analysis, resulting in a quantifiable detection limit of 0.33 ug/g. Six HSL semivolatile organic compounds were detected in the silt fraction. Three of these, phenol at 1.1 ug/g, di-n-butylphthalate at 0.74 ug/g, and di-n-octylphthalate at 0.48 ug/g were above the quantifiable detection limit. Three other compounds, detected below the quantifiable detection limit, were identified using the mass spectral criteria, but the magnitude of their reported results are only an estimate. Eight semivolatile organic compounds were detected in the PM_{10} fraction. Three of these, phenol, pyrene, and chrysene, showed concentrations above the quantifiable detection limit. The remaining five were below the quantifiable detection limits, which means that the reported values are only an estimate. The analytical results for the background sample were not subtracted from the sample results.

With the exception of using the adsorption chromatography cleanup procedure, all procedures followed the Sampling and Analysis Protocol.

2.4 CONCLUSIONS

No major problems were encountered during sample collection. However, due to rain, parts of the site were covered with water, making sample collection

slightly more difficult and resulting in relatively high LOD values. Otherwise, the sampling program was considered successful in obtaining representative samples.

In the analyses of the samples, no problems were encountered in obtaining silt content or determining PM₁₀ content. The results of the metals analyses are also believed to be accurate.

The only significant problem encountered during the analyses was the fact that the samples contained a significant amount of organics not found on the Hazardous Substances List. This prevented the semivolatile organics analyses from being conducted at the level described in the analytical protocol. Because of the high concentrations of organics, an alternative sample cleanup procedure was used on the samples to remove these organics. The cleanup procedure used on the semivolatile organic sample extracts appeared to have little effect on the samples from this site. However, the detection limits for these samples were believed to be the lowest levels practical for the analysis of HSL semivolatile compounds by GC/MS.

3.0 PROCESS DESCRIPTION

At this facility, sampling was undertaken for only one process, landfill. The term "process" refers to a source of potentially contaminated fugitive particulate emissions within a facility. All roads used by incoming trucks to the landfill were asphalt paved. Dust control on the paved roads was maintained by use of a water truck and road sweeper (brush type).

The following process descriptions are based upon the information provided by the facility and observations made during the course of the survey/sampling effort.

3.1 LANDFILL (SLF 11)

According to information supplied by the facility, the landfill consists of a master cell (SLF 11) with division into four smaller cells, designated A through D. The smaller cells are separated by berms 30 to 40 ft in height and 10 to 15 ft in width at the top. Water and CaCl_2 are used on the operating berms for dust control. Under adverse meteorological conditions, the operating berms are not used. This landfill has been in operation since the summer of 1984 (~ 1.2 years). The total design capacity for SLF 11 is 700,000 yd³. The smaller cells within the master cell typically are subdivided into five areas for waste segregation based on compatibility. These five areas and characteristic components are:

1. Metals: heavy metals plus oxidizers and acid sensitive materials (e.g., sulfides, cyanides); maintain leachate > pH 8.5; lime mixed into landfill cover for pH adjustment.
2. Pseudo metals: amphoteric metals; maintain leachate between pH 5.5 and 8.5.
3. Organics: use published hazard ratings (e.g., Sax, chemical dictionaries) to decide between this cell and toxics cell; if waste not stated to be highly toxic, goes to organics cell; other materials include reducing agents, acid-generating wastes, and solvents.
4. Toxics (TSCA): PCBs and other highly toxic wastes.
5. Flammable: wastes with flash points between 80 and 140°F.

Only solid waste is deposited in the landfills; neither liquids nor stabilized liquids are deposited. Fine dusts (e.g., EAF dust) must be containerized prior to transport onto the site. During the past year, approximately 120,000 yd³ of hazardous waste was landfilled in SLF 10 and Cell A of SLF 11. The four largest waste streams to the SLF in 1984 were:

<u>Waste Stream No.</u>	<u>Quantity (lb)</u>
F001, F002, F003	24,657,200
F002	7,030,000
F005 and PCBs	4,998,000
PCB solids and sludge	4,292,000

According to plant personnel waste streams F001, F002, and F003 represent spill debris and cleanup materials.

Landfill activity in SLF 11 is concentrated in the initial cell (Cell A); Cell B is currently under construction. The dimensions of Cell A are 675 ft x 370 ft x 18 to 24 ft deep; the anticipated lifetime is 18 ± 3 months. In this cell, only four waste areas are used; no pseudo metals area is present. The areas of the four subcells vary according to the type of material being deposited. In Cell A, the percentage of the area devoted to each of the four areas is: toxics (TSCA), 35%; metals, 30%; organics, 20%; and flammable wastes, 15%. Of the hazardous waste deposited in this cell, 75 to 80% is bulk waste and 20 to 25% is containerized waste.

The principal equipment types, functions, and approximate level of activity for the Cell A landfill operations are given below.

<u>Equipment (commercial designation if available)</u>	<u>Function</u>	<u>Activity units</u>
2 Bulldozers (1 CAT D5B) second dozer unidentified	Waste/cover material spreading	Facility supplied figure-- 6 hr/day.
Front-end loader (Huff 90E)	Not observed during survey.	Assume 6 hr/day as above.
Excavator (Case Linkbelt)	No activity observed during survey. Functions probably include distribution of bulk solid wastes as well as cover material.	As above.
2 Forklifts (John Deere, model numbers unknown)	Transfer and placement of containerized wastes.	As above.
Commercial hauler traffic--assume 5-axle, 18-wheel trucks		
Water truck, road sweeper (brush type)	Dust control	Program details unavailable.

The landfill primarily operates only one shift per day. During the survey, the only activity being performed was bulldozer operations in the toxics (TSCA) cell. All other cells were idle.

According to facility personnel, containerized wastes are transferred from the flatbed truck or other hauler vehicle to the landfill cell using a forklift. Bulk solids are discharged directly onto the active lift surface from trucks on the berm or the trucks proceed to a designated clean area within the cell and discharge the solids in a specified area. The designated clean areas were selected portions of the cell which were heavily graveled to prevent resuspension of the particulates. It is presumed that a bulldozer and/or an excavator is used to distribute the bulk solids on the active lift surface. Highly toxic materials and particulate materials that could become airborne are covered immediately after landfilling. The need for immediate covering is made during the initial evaluation of the waste. The landfill cover is primarily virgin silt plus sand and is applied daily. The cover is about 6 in. thick and has a permeability of 10^{-4} .

4.0 SAMPLING AND ANALYSIS

This chapter outlines the procedures used for (1) the sampling conducted at SCA Chemical Services and (2) the analysis of the samples collected. Included are descriptions of the location of each area sampled and the sampling grid used for sample collection. Sample handling, preparation, and/or analysis specific to this facility or any process therein are described in detail. Any deviations from the standard sampling and analysis procedures (see Appendix C) are discussed.

The process sampled at SCA was the active landfill (SLF 11). Within this landfill two areas were sampled: (1) Cell A, Area II: Organics and (2) Cell A, Area I: Metals. The samples from each area were analyzed for silt and PM_{10} content, metals, cyanide, and semivolatile organics. A tabular presentation of the sampling plan for SCA which specifies the number and types of samples and the locations at which they were collected can be found in Chapter 2 (see Table 2.1). The subsections that follow further describe the sampling locations, sampling grid schemes, and applicable sampling and analytical procedures.

4.1 SITE SCHEMATIC

Figure 4.1 is a schematic of the landfill (SLF 11) sampled at SCA in Model City, New York. The scale is approximately 1 inch equals 167 feet. The location of each process sampled is indicated on this schematic using the designated process letter.

4.2 LANDFILL (SLF 11), CELL A, AREA III (PROCESS J)

Cell A, Area III in the landfill, designated Process J, is located in the southwest corner of the Landfill SLF 11 at SCA (see Figure 4.1). The process

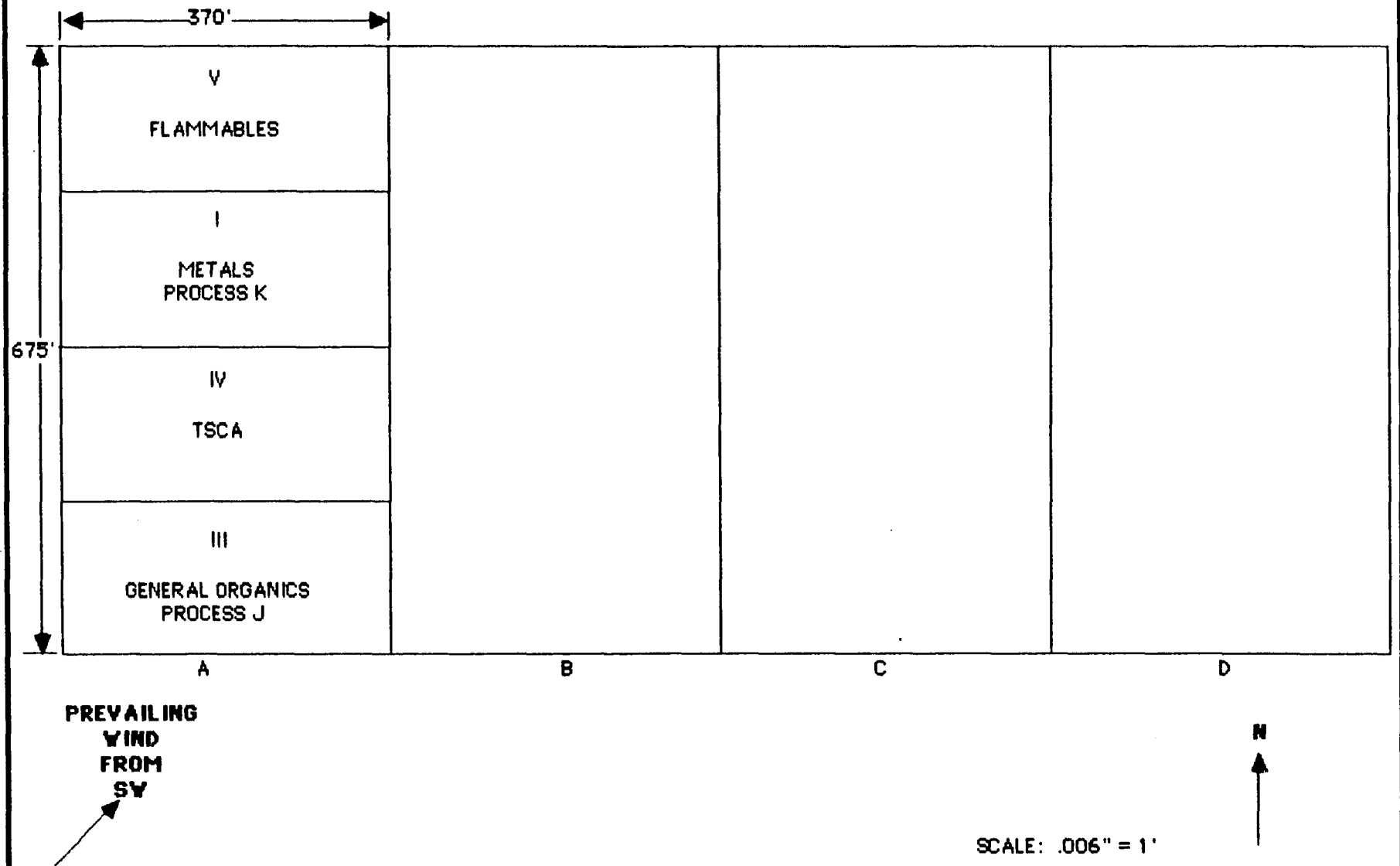


FIGURE 4.1. SCHEMATIC SHOWING DIMENSIONS OF CELL A AND AREAS SAMPLED IN LANDFILL (SLF 11) AT SCA.

boundaries were determined to approximate a rectangle 225 by 305 feet. The sampling grid was located near the center of the long side, but towards the southern end in the shorter dimension of the rectangle (see Figure 4.2). The grid itself was a 120-foot square containing 64 15-foot square grid cells (Figure 4.2). These grid cells were numbered from left to right starting in the northwest corner of the sampling grid.

MRI determined that eight of the grid cells would be sampled. A random number table was used to select the grid cells for sampling (Appendix C). One grid cell originally selected (#42) was eliminated due to the presence of a dirt pile within the cell boundaries.

Because this process involved a temporary soil cover which is a moderately disturbed surface, MRI decided that it would be sampled using the scooping technique (see Appendix C). Within each cell, a sampling template was randomly tossed four times. The sample from each cell consisted of the four soil aliquots (two scoops each) taken from inside the areas defined by the template. The eight samples were numbered J-301 through J-308. Figure 4.2 shows each sample and the corresponding grid cell from which it was taken.

A portion of each of the samples from this process was first analyzed for weight loss on drying (LOD) by drying for 12 to 16 hours in a 105°C oven. Later, all samples were dried in an oven at 105°C for 5.5 hours followed by 19 hours of desiccation (see Table 4.1). Following drying, the samples were analyzed for percent silt content (see Appendix C for specifics of sample handling during each of these analyses).

TABLE 4.1. SAMPLE DRYING PROCEDURE SUMMARY

Sample ID	Process Description	Drying Procedure
J	Active Landfill 11-III	Oven dried at 105°C for 5.5 hours followed by 19 hours of desiccation
K	Active Landfill 11-I	Oven dried at 105°C for 4 hours
BGD	Background Sample	Oven dried at 105°C for 5 hours

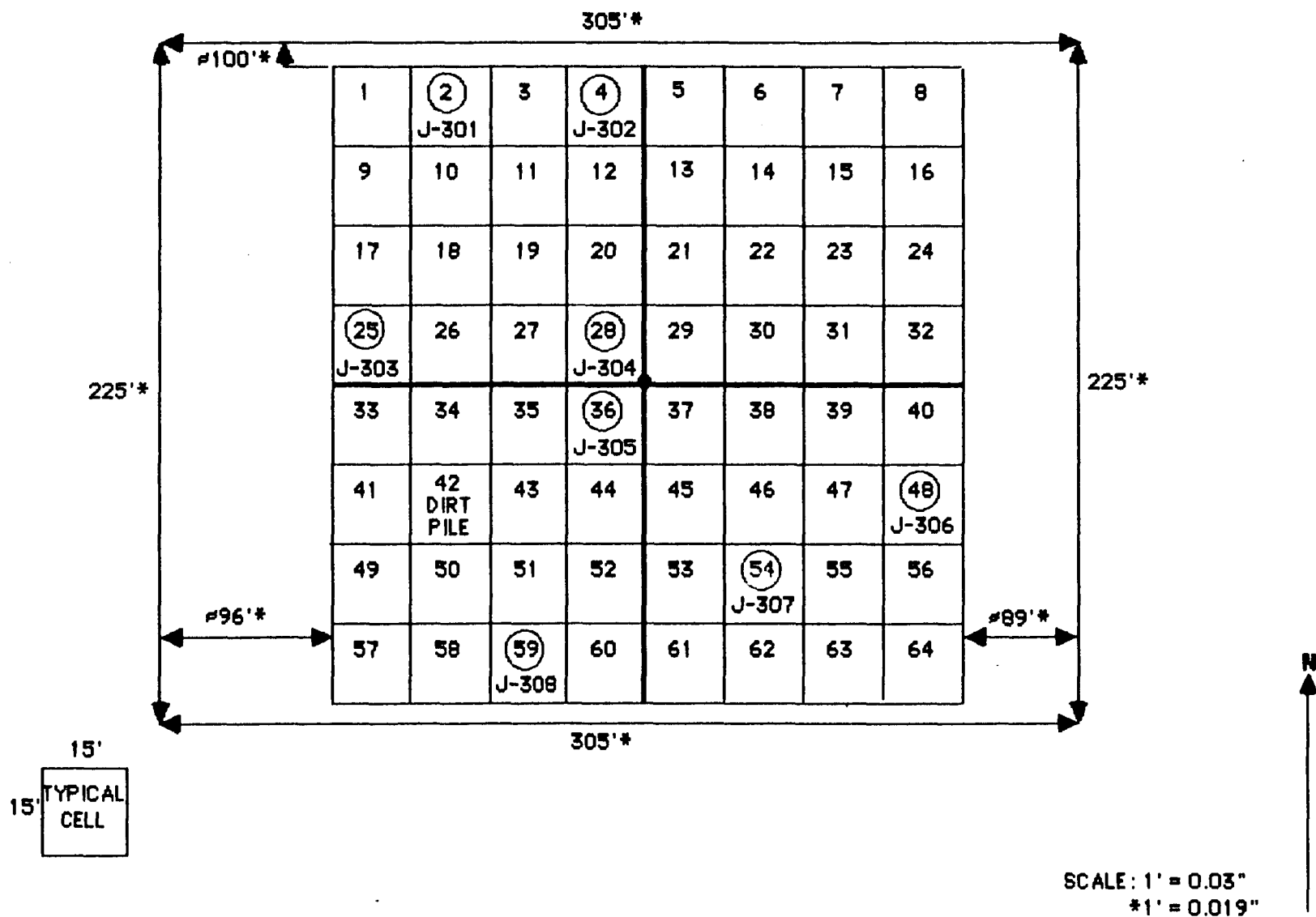


FIGURE 4.2. SAMPLING GRID, PROCESS DIMENSIONS, AND SAMPLE NUMBERS FOR ACTIVE LANDFILL (SLF - 11, CELL A, AREA III: GENERAL ORGANICS) AT SCA (PROCESS J).

Using the screening and sieving techniques described in Appendix C, all the samples from this process were utilized to make composite samples of the silt, PM_{10} , and $>PM_{10}$ fractions. Material passing through the 20 um sonic sieve constituted the PM_{10} fraction. The portion of the silt fraction that did not pass through this sieve was referred to as the "greater than PM_{10} " ($>PM_{10}$) fraction.

Portions of all three fractions were sent to RTI for metals and cyanide analysis. The procedures used for analysis of the metals followed the methods outlined in the EPA publication "Testing Methods for Evaluating Solid Waste," SW-846. The metals measured and the detection limits for the analytical methods used are shown in Table 4.2. Samples for analysis of all metals except mercury (Hg) were prepared by acid digestion using EPA Method 3050 (SW-846). Mercury (Hg) samples were prepared and analyzed by the cold vapor atomic absorption procedure following EPA Method 7471. Two modifications were used in the final dilutions of the digestates. The samples for inductively-coupled argon plasmography (ICAP) determination by EPA Method 6010 and furnace atomic absorption determination of antimony (Sb) by EPA Method 7041 were diluted to achieve a final concentration of 5% HCl. The sample digestates for arsenic (As) determination by EPA Method 7060, for selenium (Se) determination by EPA Method 7740, and for thallium (Tl) determination were diluted to achieve a final concentration of 0.5% nitric acid.

Cyanide determinations were done by colormetric measurement following EPA Method 335.3 found in "Methods for the Evaluation of Water and Wastewater," EPA-600/4-79-020. The analyses for metals and cyanide were performed without any problems.

Portions of the the silt and PM_{10} fractions only were sent to PEI for semivolatile organics analysis. As a cost saving measure, the $>PM_{10}$ fraction

TABLE 4.2. METALS, MEASUREMENT METHODS, AND DETECTION LIMITS*

Element	ICAP***	Detection Limits (ug/g)*	
		GFAA***	Cold Vapor AA***
Aluminum (Al)	75.0	-----	
Antimony (Sb)	-----	0.05	
Arsenic** (As)	-----	0.1	
Barium** (Ba)	0.3	-----	
Beryllium (Be)	0.1	-----	
Cadmium** (Cd)	0.1	-----	
Chromium** (Cr)	0.3	-----	
Cobalt (Co)	0.5	-----	
Copper (Cu)	2.0	-----	
Iron (Fe)	75.0	-----	
Lead** (Pb)	-----	0.3	
Manganese (Mn)	0.1	-----	
Mercury** (Hg)	-----	-----	0.01
Molybdenum (Mo)	0.2	-----	
Nickel (Ni)	1.2	-----	
Osmium (Os)	0.1	-----	
Selenium** (Se)	-----	0.05	
Silver** (Ag)	0.2	-----	
Thallium (Tl)	-----	0.2	
Vanadium (V)	0.8	-----	
Zinc (Zn)	0.1	-----	

* Detection limits were calculated as three times the standard deviation of the values measured for compounds at or near the suspected detection limit in the background sample. For compounds not detected in the background sample, the detection limits were calculated as three times the standard deviation of the background noise. Fe, Mg, and Al detection limits were determined using low level standards as three times the standard deviation of the values measured.

** Eight RCRA metals

*** ICAP = Inductively-Coupled Argon Plasmography
 GFAA = Graphite Furnace Atomic Absorption
 AA = Atomic Absorption

was not analyzed for semivolatile organics since the particle size dependency of the degree of contamination will be determined using only the concentration values for the silt and PM₁₀ fractions. The samples sent to PEI were analyzed for the semivolatile organic compounds listed in Table 4.3. They were prepared by sonication extraction (EPA Method 3550, SW-846), using the procedure specified in the EPA Contract Laboratory Program (CLP), Statement of Work for Organic Analysis, 7/85 Revision. The extracts were prepared at the low concentration level and then screened by gas chromatography with a flame ionization detector (GC/FID). They were then transferred to Triangle Laboratories for cleanup by adsorption chromatography. The extracts were concentrated and 200 mg portions removed. The 200 mg portions were redissolved in methanol/methylene chloride (1:1) and chromatographed on Sephadex LH-20. The cleanup procedures used only 6.8% of the original silt sample, representing a 14.7-fold dilution, and 4.6% of the PM₁₀ sample, representing a 21.9-fold dilution.

The cleaned extracts were returned to PEI and screened again by GC/FID. Based on the results of the screening, neither sample required further dilution to protect the gas chromatograph/mass spectrometer (GC/MS). The initial dilutions raised the silt sample's quantifiable detection limit to 4.9 ug/g and the PM₁₀ sample's limit to 7.2 ug/g.

4.3 LANDFILL (SLF 11), CELL A, AREA I (PROCESS K)

Process K, Cell A, Area I of the landfill (SLF 11), is located towards the northwest corner of the landfill (see Figure 4.1). The process boundaries approximated an irregular trapezium with side dimensions of 250, 174, 260, and 174 feet. MRI determined that the sampling grid would be laid out towards the center of the process and would have to be slightly irregular to avoid a dirt pile (see Figure 4.3). The grid cells were 15 feet square and were numbered as shown in Figure 4.3.

TABLE 4.3. SEMIVOLATILE ORGANIC COMPOUNDS FOR ANALYSIS

ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO (a) ANTHRACENE
BENZOIC ACID
BENZO (a) PYRENE
BENZO (ghi) PERYLENE
BENZO (b) FLUORANTHENE
BENZO (k) FLUORANTHENE
BENZYL ALCOHOL
BIS (2-CHLOROETHOXY) METHANE
BIS (2-CHLOROETHYL) ETHER
BIS (2-CHLOROISOPROPYL) ETHER
BIS (2-ETHYHEXYL) PHTHALATE
4-BROMOPHENYL PHENYL ETHER
BUTYL BENZYL PHTHALATE
4-CHLOROANILINE
4-CHLORO-3-METHYLPHENOL
2-CHLORONAPHTHALENE
2-CHLOROPHENOL
4-CHLOROPHENYL PHENYL ETHER
CHRYSENE
DIBENZO (a,h) ANTHRACENE
DIBENZOFURAN
1,2 DICHLOOROBENZENE
1,3 DICHLOOROBENZENE
1,4 DICHLOOROBENZENE
3,3'-DICHLOOROBENZIDINE
2,4-DICHLOOROPHENOL
DIETHYLPHTHALATE
2,4-DIMETHYLPHENOL
DIMETHYL PHTHALATE
DI-N-BUTYLPHTHALATE
2,4-DINITROPHENOL
2,4-DINITROTOLUENE
2,6-DINITROTOLUENE
DI-N-OCTYL PHTHALATE
FLUORANTHENE
FLUORENE
HEXACHLOOROBENZENE
HEXACHLOOROBUTADIENE
HEXACHLOOROCYCLOPENTADIENE
HEXACHLOOROETHANE
INDENO(1,2,3-cd) PYRENE
ISOPHORONE
2-METHYL-4,6-DINITROPHENOL
2-METHYLNAPHTHALENE
2-METHYLPHENOL
4-METHYLPHENOL
NAPHTHALENE
2-NITROANILINE
3-NITROANILINE

(Continued)

TABLE 4.3. (continued)

4-NITROANILINE
NITROBENZENE
2-NITROPHENOL
4-NITROPHENOL
N-NITROSO-DI-N-PROPYLAMINE
N-NITROSODIPHENYLAMINE
PENTACHLOROPHENOL
PHENANTHRENE
PHENOL
PYRENE
1,2,4-TRICHLOROBENZENE
2,4,5-TRICHLOROPHENOL
2,4,6-TRICHLOROPHENOL

MRI directed that eight grid cells be sampled; a random number table was used to select the specific grid cells for sampling (see Appendix C). No selected sample cells were rejected. Sample number K-315 was taken at the active face of the process.

MRI determined that for the sample collection, the scooping technique should be used at this process (see Appendix C). As previously described for Process J, a sampling template was randomly tossed four times within each cell sampled. The sample from each cell consisted of the four soil aliquots (two scoops each) taken from inside the areas defined by the template. The eight samples were numbered K-309 through K-316.

Because the weight loss on drying (LOD) determination on Process K samples had an average value greater than 10 percent, the samples from this process were oven-dried at 105°C for 4 hours. They were then analyzed for percent silt and PM₁₀ content (see Appendix C for a complete explanation of sample handling during these analyses).

All fractions were analyzed for metals and cyanide by RTI and the silt and PM₁₀ fractions were analyzed for semivolatile organic compounds by PEI as described previously for the samples from Process J. As a cost saving measure, the >PM₁₀ fraction was not analyzed for semivolatile organics since the

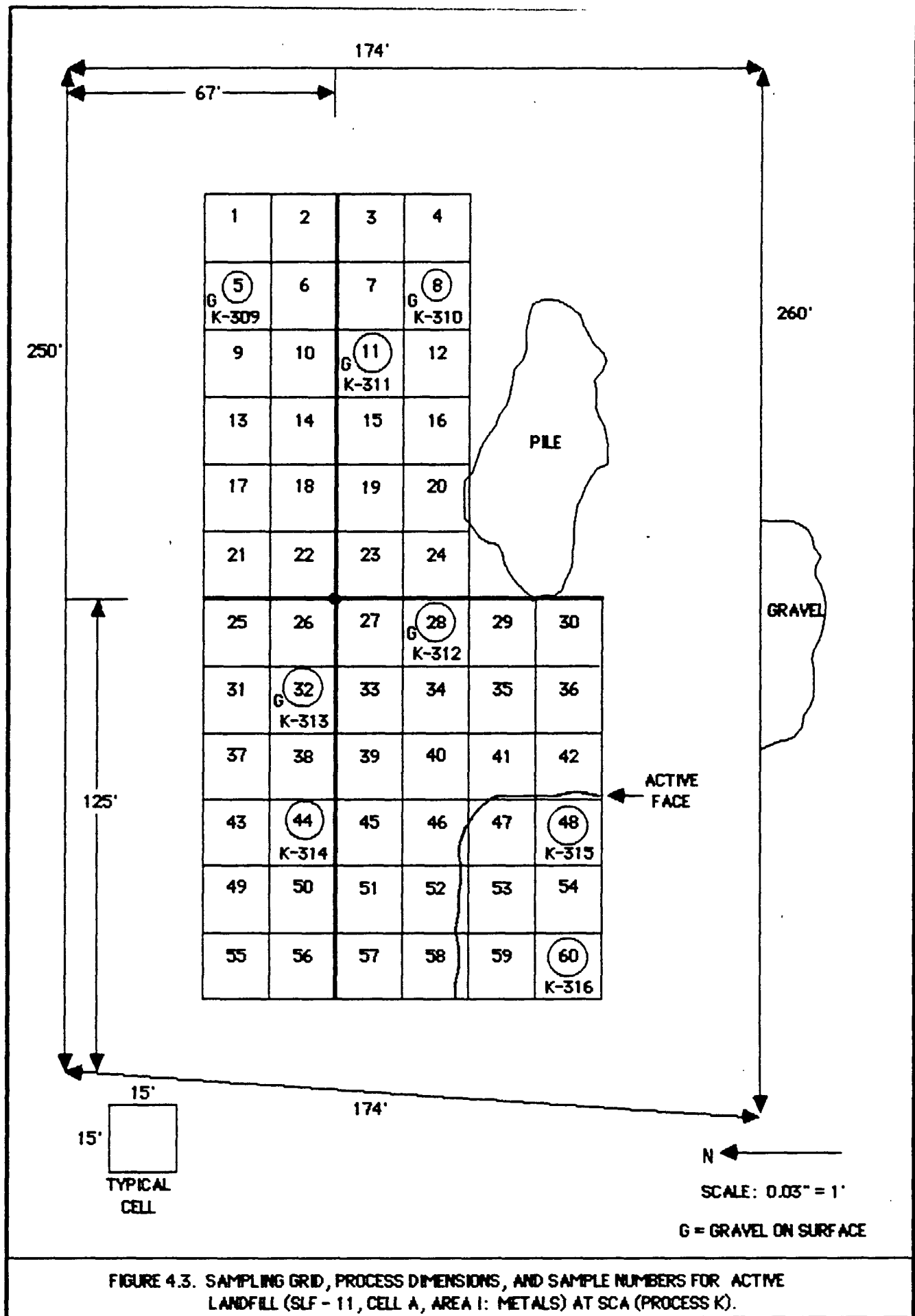


FIGURE 4.3. SAMPLING GRID, PROCESS DIMENSIONS, AND SAMPLE NUMBERS FOR ACTIVE LANDFILL (SLF - 11, CELL A, AREA I: METALS) AT SCA (PROCESS K).

particle size dependency of the degree of contamination will be determined using only the concentration values for the silt and PM₁₀ fractions. Unlike the Process J sample extracts, the Process N extracts required no dilution prior to GC/MS analysis which resulted in a quantifiable detection limit of 0.33 ug/g.

4.4 BACKGROUND SAMPLES

The background samples for SCA were taken on either side of a road. The midpoint of the road was located 1,445 feet west and 800 feet north of groundwater monitoring well B-110. Sample number BGD-318 was taken approximately 100 yards east of that part of the road, and sample number BGD-317 was taken approximately 20 yards west of the road (see Figure 4.4). The scooping technique was used for sample collection.

A portion of each of the background samples was analyzed for weight loss on drying and then both samples were dried in a 105°C oven for 5 hours. The samples were then analyzed for percent silt and percent PM₁₀ content (see Appendix C).

Portions of the silt fraction generated by screening were sent to RTI and PEI for metals and semivolatile organics analysis, respectively. They were analyzed for metals and semivolatile organic compounds as described previously for the composite samples from Process J. The low-level extraction and adsorption chromatography cleanup procedure used resulted in the quantifiable detection limit of 0.33 ug/g because no dilution was required prior to the GC/MS analysis.

DATE: 10/16/85

PROCESS LETTER: BGD

SITE NAME SCA

LOCATION MODEL CITY, N.Y.

SAMPLING TEAM S. PLAISANCE

PROCESS NAME BACKGROUND SAMPLES

SAMPLING TECHNIQUE SCOOP

PROCESS LAYOUT (Indicate Cell #, Sample #, and Dimensions)

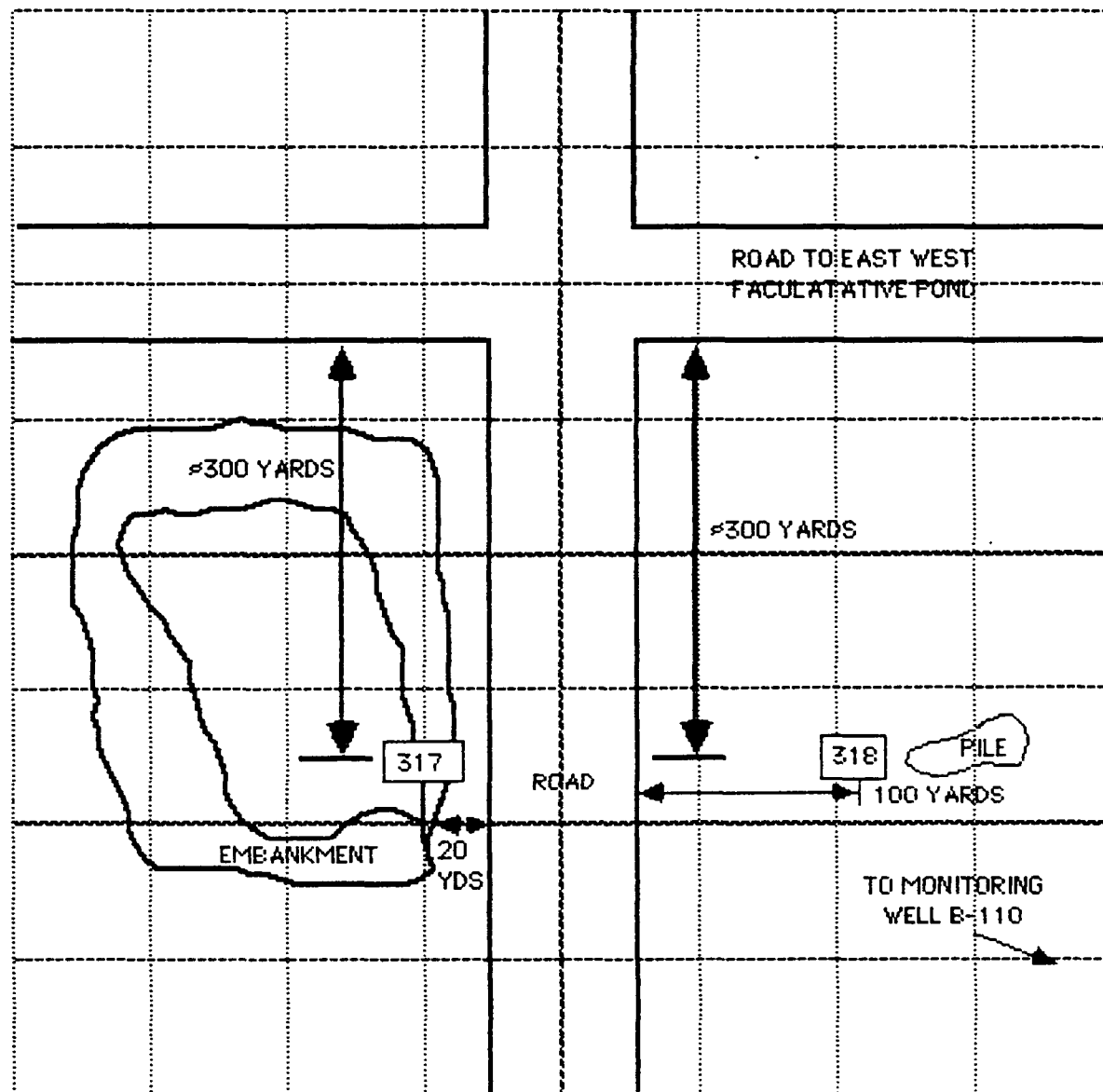


FIGURE 4.4. SKETCH SHOWING APPROXIMATE LOCATIONS OF BACKGROUND SAMPLES TAKEN AT SCA.

5.0 QUALITY ASSURANCE

The quality assurance (QA) measures for the chemical analyses were conducted internally by each laboratory. For the metals analysis, RTI used National Bureau of Standards (NBS) water (1643 B) as check samples for the accuracy of the instrumentation. A marine sediment reference material (MESS-1) acquired from the Marine Analytical Chemistry Standard Program of the National Research Council of Canada and an NBS fly ash sample (1633 A) were used as QA samples to check the overall accuracy of the digestion and analysis procedures. One process sample was spiked with eight elements and their percent recoveries calculated to assess matrix effects. Another sample (K-335) was prepared and analyzed in duplicate to demonstrate analytical precision. Results of these checks are presented in Table 5.1.

For the QA on the analysis of the semivolatile organics, PEI used a sample (J-320) for a matrix spike (MS) and a matrix spike duplicate (MSD). The percent recoveries were determined and the relative percent difference (RPD) for the duplicates calculated (see Table 5.2). The percent recovery for 1,2,4-trichlorobenzene was below the QA limit for the MS sample and within the QA limits for the MSD sample. For 2,4-dinitrotoluene and phenol, the percent recoveries were outside the QA limits. For pyrene, the percent recovery for the MS sample was above the QA limit and for the MSD sample was within the QA limit. The percent recovery for 4-nitrophenol was above the QA limit for the MS sample and the compound was not detected in the MSD sample. The percent recoveries for acenaphthene and 4-chloro-3-methylphenol were within the QA limits for both MS and MSD samples. The other four matrix spike compounds

TABLE 5.1. QUALITY ASSURANCE RESULTS FOR METALS ANALYSIS

Sample Identity	NBS Water 1643 B		NBS Fly Ash 1633 A		NRC Sediment MESS-1		Matrix Spike Recovery			Duplicates	
	Expected	Found	Expected	Found	Expected	Found	Added	Recovered	Percent	K-335	K-335
Elements (ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)	(ug/g)		(ug/g)	(ug/g)
Aluminum (Al)	-	-	140,000	17,000	58,000	18,000	-	-	-	7,842	8,026
Antimony (Sb)	8.2	8.8	7.0	2.6	0.73	<0.5	-	-	-	4.5	5.2
Arsenic (As)	76.0	74.0	145	129	10.6	7.9	10.0	8.9	89.0%	10.0	10.4
Barium (Ba)	4.4	4.3	1,500	700	-	87.3	100.0	239	239.0%	71.2	70.9
Beryllium (Be)	1.9	1.9	12.0	4.2	1.9	1.4	100.0	94.2	94.2%	<0.3	<0.3
Cadmium (Cd)	2.0	2.2	1.0	5.5	0.6	0.4	100.0	90.2	90.2%	23.0	23.7
Chromium (Cr)	1.9	1.7	196	35.4	71.0	40.1	100.0	97.1	97.1%	374	367
Cobalt (Co)	2.6	2.6	46.0	25.0	10.8	10.2	-	-	-	<11	<11
Copper (Cu)	2.2	2.3	118	38.5	25.1	22.3	100.0	96.5	96.5%	2,770	2,709
Iron (Fe)	<100	<100	94,000	22,200	30,500	25,000	-	-	-	13,619	13,864
Lead (Pb)	-	-	72.4	31.8	34.0	53.2	10.0	8.6	86.0%	551	553
Manganese (Mn)	2.8	3.2	190	27.9	513	322	100.0	102.0	102.0%	463	468
Mercury (Hg)	1.5	1.5	-	-	-	-	0.40	0.36	90.0%	10.9	-
Molybdenum (Mo)	8.5	9.8	-	-	-	25.4	100.0	91.5	91.5%	22.3	29.6
Nickel (Ni)	4.9	5.2	127	53.3	29.5	22.8	100.0	93.7	93.7%	160	159
Osmium (Os)	-	-	-	-	-	-	-	-	-	<27	<27
Selenium (Se)	10.0	12.0	10.3	7.7	0.4	0.4	11.0	10.0	90.9%	0.7	<0.5
Silver (Ag)	-	-	-	-	-	-	100.0	81.8	81.8%	<11	<11
Thallium (Tl)	7.0	5.7	5.7	3.3	0.7	0.3	10.0	11.0	110.0%	<0.5	<0.5
Vanadium (V)	4.5	5.0	300	121	72.4	42.9	100.0	32.8	32.8%	24.1	25.7
Zinc (Zn)	6.6	6.6	220	69.2	191	247	100.0	81.8	81.8%	1,426	1,392
cyanide	-	-	-	-	-	-	-	-	-	22.1	-

TABLE 5.2. QUALITY ASSURANCE RESULTS FOR FIRST SEMIVOLATILE ORGANICS ANALYSIS
SOIL SURROGATE PERCENT RECOVERY SUMMARY

Sample Identity	Silt J-320	PM-10 J-322	Silt K-330	PM-10 K-332	Silt B6D-340	Sample Blank	Matrix Spike	Matrix Spike Duplicate
Surrogate Compounds								
Nitrobenzene-d5	5%	1%	17%	30%	1%	0%	0%	1%
2-Fluorobiphenyl	1%	4%	37%	58%	23%	6%	7%	6%
Terphenyl-d14	6%	5%	55%	100%	118%	147%	7%	7%
Phenol-d5	1%	2%	28%	43%	10%	1%	0%	1%
2-Fluorophenol	0%	0%	8%	9%	1%	0%	0%	0%
2,4,6-Tribromophenol	1%	0%	14%	33%	56%	39%	1%	1%

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SUMMARY

Sample Identity J-320	Spike Conc.	Unspiked Sample	Matrix Spike	Percent Recovery	Matrix Spike Duplicate	Percent Recovery	RPD
Compound	(ug/g)	(ug/g)	(ug/g)		(ug/g)		
1,2,4-Trichlorobenzene	3.3	0.0	1.2 J	35%	1.7 J	50%	34%
Acenaphthene	3.3	0.0	4.3 J	130%	3.6 J	108%	19%
2,4-Dinitrotoluene	3.3	0.0	3.6 J	107%	0.0	0%	200%
Pyrene	3.3	0.0	6.4	192%	3.9 J	118%	48%
N-Nitrosodi-n-Propylamine	3.3	0.0	0.0	0%	0.0	0%	0%
1,4-Dichlorobenzene	3.3	0.0	0.0	0%	0.0	0%	0%
Pentachlorophenol	6.6	0.0	0.0	0%	0.0	0%	0%
Phenol	6.6	0.0	0.7 J	11%	1.0 J	14%	25%
2-Chlorophenol	6.6	0.0	0.0	0%	0.0	0%	0%
4-Chloro-3-methylphenol	6.6	0.0	5.4	82%	5.1	77%	7%
4-Nitrophenol	6.6	0.0	9.4 J	143%	0.0	0%	200%
Fluorene	0.0	0.0	2.3 J	-	1.0 J	-	81%
N-nitrosodiphenylamine	0.0	0.0	12.0	-	5.5	-	74%
Phenanthrene	0.0	0.0	6.4	-	4.3 J	-	39%
Fluoranthene	0.0	0.0	2.8 J	-	3.3 J	-	16%
Benzo(a)anthracene	0.0	0.0	0.0	-	2.5 J	-	200%
bis(2-ethylhexyl)phthalate	0.0	0.0	0.0	-	6.8	-	200%
Chrysene	0.0	0.0	0.0	-	2.5 J	-	200%
Di-n-octylphthalate	0.0	0.0	0.0	-	5.0	-	200%
Sample Detection Limit		(ug/g)	(ug/g)		(ug/g)		
Pentachlorophenol and 4-Nitrophenol		23.5	25.9		22.9		
All other compounds listed above		4.9	5.3		4.7		

J = Estimated value where the compound meets the mass spectral criteria
but the result is less than the quantifiable detection limit.

METHOD BLANK SUMMARY FOR SEMIVOLATILE ORGANIC ANALYSIS

Sample ID	Compound	Concntration
Sample Blank	Di-n-butylphthalate	(ug/g) 0.36

were not detected. The spike concentrations were all below the quantifiable detection limit for the unspiked MS and MSD samples, except for phenol, 2-chlorophenol, and 4-chloro-3-methylphenol because of the dilutions from the LH-20 cleanup procedure.

Eight compounds were detected in the MS and/or MSD that were not detected in the unspiked sample. The dilution of the samples was probably the cause of the compounds not being found in the unspiked sample.

All samples and the laboratory blanks were spiked with surrogate compounds and the percent recoveries of these compounds were determined (see Table 5.2). For nitrobenzene-d₅, the recoveries were below the QA limit for all samples except sample K-332, which was within the QA limits. For phenol-d₅ and 2-fluorobiphenyl, samples K-330 and K-332 had recoveries within the QA limits, and all the other samples had recoveries below the limit. For 2-fluorophenol, the surrogate recoveries were below the QA limit for all samples. For 2,4,6-tribromophenol, only sample K-332, the method blank, and the background sample had recoveries within the QA limits. For terphenyl-d₁₄, samples K-330, K-332, and the background sample had recoveries within the QA limits; the remaining samples were outside the QA limits. Again, the dilution of the sample prior to the GC/MS analysis was thought to be the cause of the surrogate compounds not being detected.

Semivolatile organics analysis was conducted on a blank sample consisting of a purified solid matrix spiked with surrogate compounds and carried through extraction and concentration. The CLP specifies limits for the blanks as well as limits on the levels of common phthalate esters and Hazardous Substances List (HSL) compounds. The blank had surrogate recoveries outside the QA limits except for the compound 2,4,6-tribromophenol. The blank contained di-n-butylphthalate below the QC limits. No other HSL compounds were detected in the blank.