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PHASE II REMEDIATION
FINAL REPORT

Pyramid Co. - Ernst Steel Site
Buffalo, New York

prepared for:
Whiteman Osterman & Hanna

PRINTED ON

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CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

A Phase II Site Investigation (SI) was conducted at the Pyramid Company-Ernst Steel Site (Site) between June and September 1988. The program, as described in the report entitled "Work Plan - Phase II Site Investigation" (Work Plan) dated May 1988, was developed by Pyramid and Conestoga-Rovers & Associates (CRA) and was approved by the New York State Department of Environmental Conservation (NYSDEC). This investigation included waste characterization and delineation of the fill areas (excluding the waste piles which were handled separately pursuant to the Interim Remedial Measures Plan), installation of groundwater monitoring wells and sampling of groundwater, soil, surface water and sediment.

The details of these activities are presented in the following sections of this report. The main purpose of this report is to summarize and evaluate the data collected, provide an assessment of the site conditions and a preliminary evaluation of remedial action alternatives.

2.0 TEST PIT INVESTIGATION

The initial activity in the SI was the Test Pit Investigation. This investigation was conducted with the following purposes in mind:

i) To delineate the areal and vertical extent of fill material across the Site.

ii) To determine the type (or types) of fill present at the Site.

iii) To allow for access to the fill types for waste characterization sampling.

iv) To gather the data necessary to estimate the total volume of fill present at the Site.

2.1 SUMMARY

Prior to commencing the excavation of test pits, CRA established a grid across the Site to assure that the test pits would be distributed as evenly as conditions would allow.

CRA then contracted SLC, Inc. of Lockport, NY to provide a backhoe and operator to excavate the test pits. The investigation began on June 9, 1988. On June 10, 1988, work was temporarily suspended pending approval of the Order on Consent from the NYSDEC. Following approval, work resumed and was completed on July 6, 1988. NYSDEC site representatives were present for the completion of the Test Pit Investigation. A total of 32 test pit locations were excavated (see Figure 1).

Excavated materials were placed on the ground surface next to the excavation. Upon completion of the test pit, the excavated materials were replaced in the reverse order from which they had been removed.

Test pits were excavated to the depth at which native soil was observed. Each test pit was logged according to stratigraphy encountered and depth to native soil. A representative sample of the materials encountered in each excavation was collected and retained for geologic record.

At the completion of excavation of each test pit, the spoils pile was scanned with an HNU photoionization unit to determine the presence of organic compounds. Table 1 presents the results of the HNU scanning.

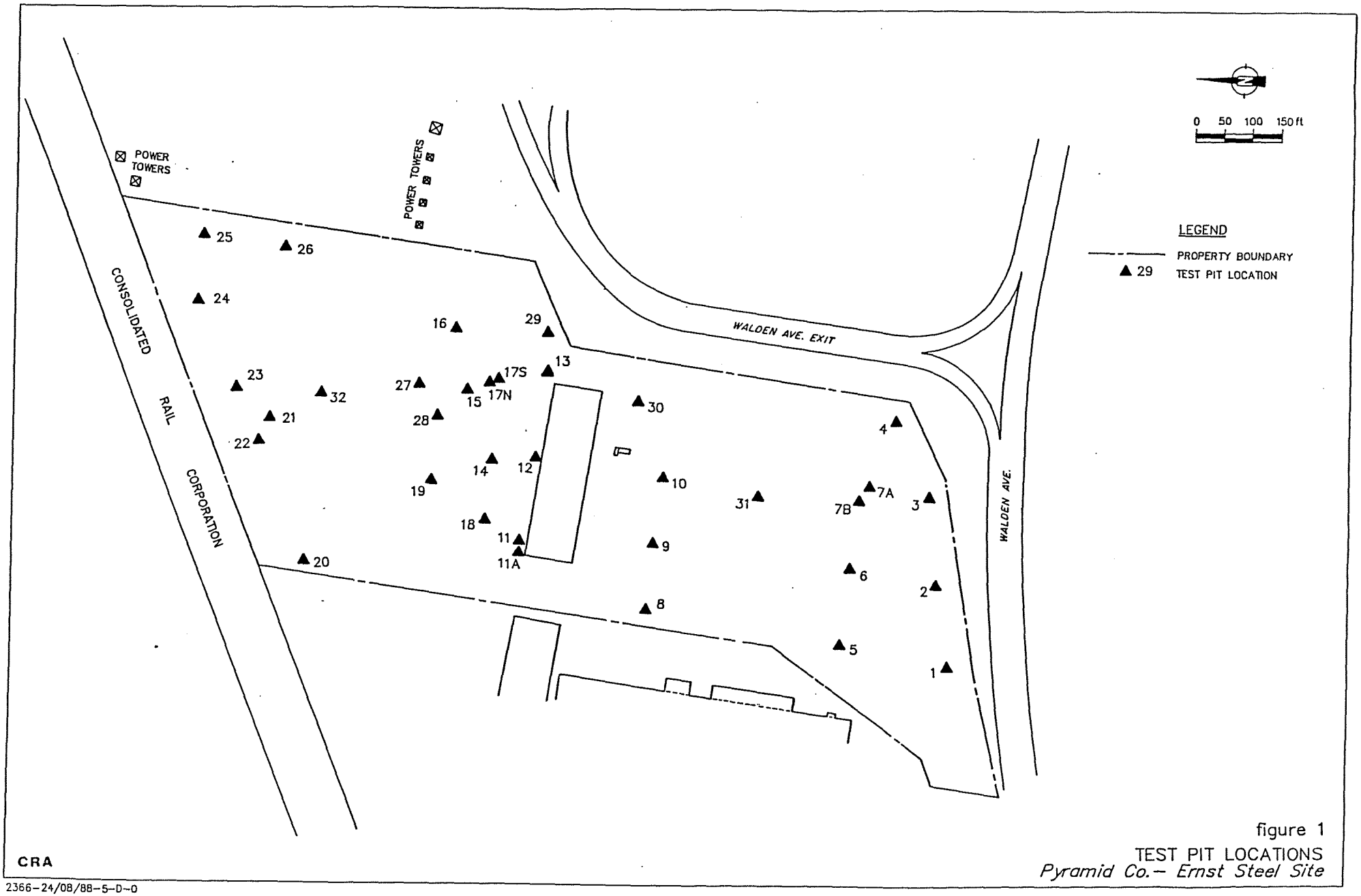

figure 1
TEST PIT LOCATIONS
Pyramid Co.– Ernst Steel Site

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Table 1
HNU Scanning Results
Test Pit Spoils
Pyramid Co.-Ernst Steel Site

Air Monitoring Results

Test Pit Number	Background (ppm)	Results of Scan* (ppm)
1	0.4	0.4
2	0.4	0.4
3	0.4	0.6
4	0.4	0.5
5	0.4	0.5
6	0.4	0.6-0.7
7a	0.4	0.4
7b	0.4	0.8-0.9
8	0.4	0.8
9	0.4	0.7-0.8
10	0.4	0.6
11	0.4	0.9
11A	1.0	0.8
12	0.4	0.8-2.0
12A	1.0	0.8
13	0.4	0.9
14	0.4	0.8
15	0.4	0.6-0.8
16	0.4	0.6-0.7
17	0.4	0.4-0.6
18	0.4	0.4-0.6
18A	1.0	0.8
19	0.4	0.4-0.5
20	0.4	0.4-0.6
21	0.5	0.5-0.6
22	0.5	0.5-0.6
23	0.5	0.5
24	0.5	0.4-0.5
25	0.5	0.5
26	0.5	0.6
27	1.0	0.8-1.0
28	1.0	1.0-1.2
29	1.0	1.0
30	1.0	0.2
31	1.0	0.6
32	1.0	0.6-1.0

* including background levels

Based on the results of the HNU scans during the Test Pit Investigation, organic compound contamination at the Site is not anticipated. Virtually all of the readings were within tenths of a ppm of background indicating no significant organic vapors were present. The highest reading recorded was a scan of the spoil pile at Test Pit #12. The HNU scan indicated a reading of 0.4-1.6 ppm above background although no odors were detected at this location. Subsequent soil sampling indicated no measurable organics were present. Acetone was observed at 46 ppb but this is within the possible concentration range attributable to laboratory or sampling cross-contamination as exhibited in the blank (12 ppb). Well OW-1 is directly downgradient from Test Pit #12. The groundwater from this well was sampled for the derived Site Specific Parameters. No parameters were measured above Class GA Groundwater Standards and therefore no additional sampling at Test Pit #12 was deemed to be required.

An odor was detected at Test Pit #17. The field notes describe the odor as a sweet, non-distinct smell. However, the HNU did not detect any significant organic vapors.

2.2 DECONTAMINATION

Prior to beginning and at the end of the Test Pit Investigation, the backhoe bucket was cleaned using a water wash.

Wash water from the final cleaning was contained in a 55-gallon drum and staged on-site for later disposal.

2.3 RESULTS

Based on the information gathered during the Test Pit Investigation, the following observations have been made:

1. The Site has been extensively filled. In general, fill is absent or very shallow along the eastern boundary of the Site and deepest in the southern third of the Site. Table 2 and Figure 2 detail the stratigraphic information collected.

   There was one test pit location (TP-11) where fill materials were identified to beyond 6.0 feet in depth. The excavation was not continued beyond 6.0 feet due to the relative uncertainty regarding possible underground

Table 2
Test Pit Investigation
Stratigraphic Summary
Pyramid/Ernst Steel Site

Test Pit	Fill Depth (ft BGS)	Fill Type	Native Contact (ft BGS)
1	0.0 - 1.0 1.0 - 3.5	D B	3.5
2	0.0 - 0.8 0.8 - 2.0	D B	2.0
3	0.0 - 1.3	A	1.3
4	N/A	N/A	0
5	0.0 - 0.7 0.7 - 2.5	D A	2.5
6	0.0 - 0.4 0.4 - 1.1 1.1 - 2.1	D B C	2.1
7A	N/A	N/A	0
7B	0.0 - 0.9 0.9 - 2.6	D C	2.6
8	0.0 - 1.2 1.2 - 1.6	E A	1.6
9	0.0 - 0.7 0.7 - 1.2	E B	1.2
10	0.0 - 1.0	E	1.0
11	0.0 - 6.0+	D	6.0+
11A	0.0 - 0.9 0.9 - 1.5	D A	1.5

A = Black Cindery Fill
B = Rust Slag Fill
C = Sand Fill
D = Soil Fill
E = Gravel Fill
+ = Did not reach native, greater than 6.0 ft. BGS

Table 2
Test Pit Investigation
Stratigraphic Summary
Pyramid/Ernst Steel Site

Test Pit	Fill Depth (ft BGS)	Fill Type	Native Contact (ft BGS)
12	0.0 - 0.6 0.6 - 2.5	D B	2.5
13	0.0 - 0.6 0.6 - 2.0	C A	2.0
14	0.0 - 2.0	C	2.0
15	0.0 - 1.4	C	1.4
16	N/A		0
17	0.0 - 1.7	C	1.7
18	0.0 - 1.5 1.5 - 2.1	D A	2.1
19	0.0 - 1.5	C	1.5
20	0.0 - 1.5	A	1.5
21	0.0 - 2.0	A	2.0
22	0.0 - 2.5	A	2.5
23	0.0 - 2.5 2.5 - 3.3	A B	3.3
24	0.0 - 1.2 1.2 - 1.4	D A	1.4
25	0.0 - 1.7	D	1.7
26	N/A		0

A = Black Cindery Fill
B = Rust Slag Fill
C = Sand Fill
D = Soil Fill
E = Gravel Fill

Table 2
Test Pit Investigation
Stratigraphic Summary
Pyramid/Ernst Steel Site

Test Pit	Fill Depth (ft BGS)	Fill Type	Native Contact (ft BGS)
27	N/A		0
28	0.0 - 2.3	C	2.3
29	N/A		0
30	N/A		0
31	0.0 - 1.5 1.5 - 3.5	D C	3.5
32	0.0 - 1.2 1.2 - 2.6	C B	2.6

A = Black Cindery Fill
B = Rust Slag Fill
C = Sand Fill
D = Soil Fill
E = Gravel Fill

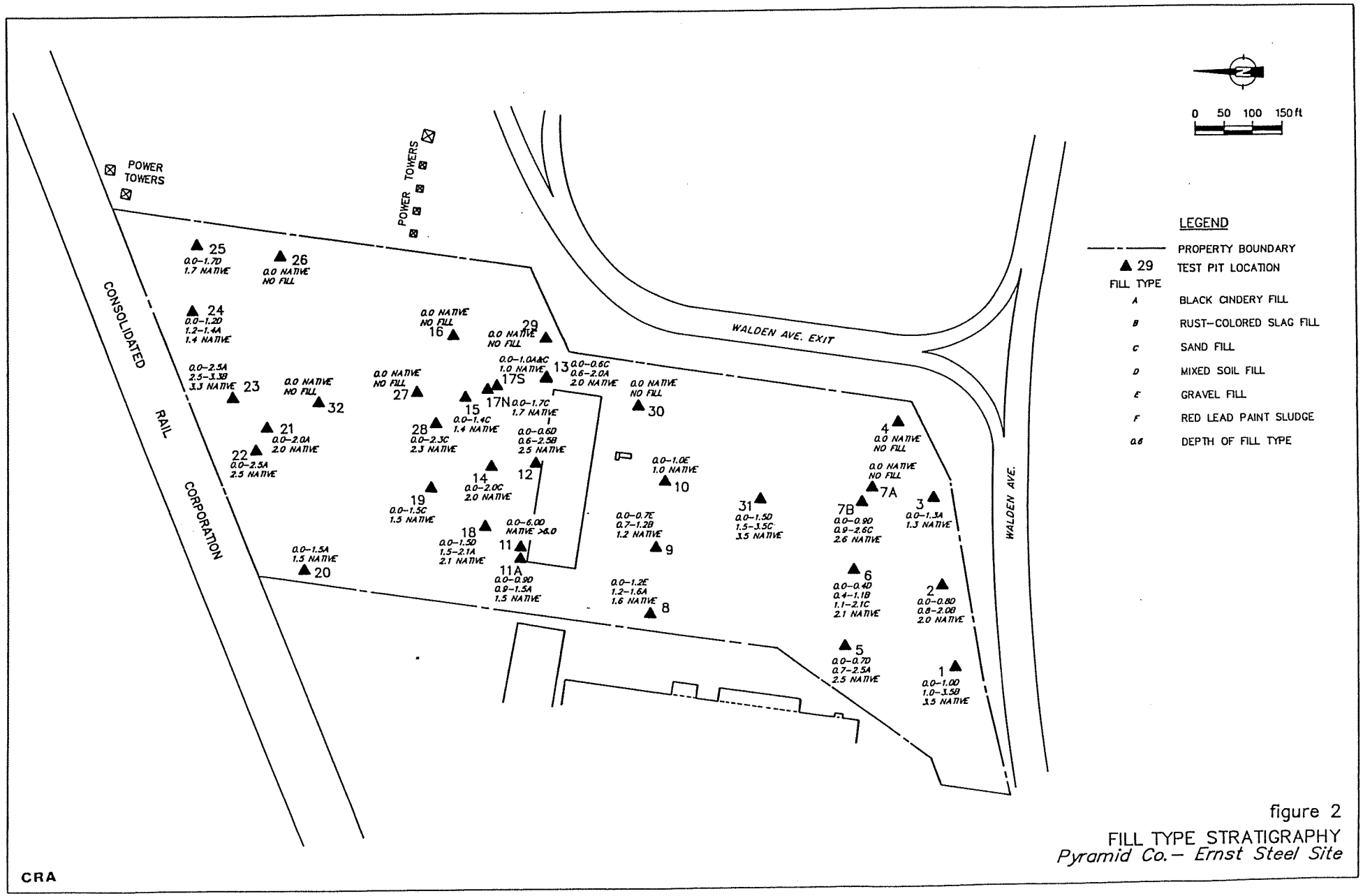

figure 2

FILL TYPE STRATIGRAPHY

Pyramid Co.– Ernst Steel Site

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utilities in the area. Following confirmation that no utilities were present in the area, a confirmation test pit (TP-11A) was excavated a short distance to the west of TP-11 and the fill was present to a depth of 1.5 feet. This indicated that the pocket of fill identified at TP-11 was in fact isolated.

2. Six types of fill were identified visually. They are:

Type A - black cindery fill
Type B - rust-colored slag fill
Type C - sand fill
Type D - mixed soil fill
Type E - gravel fill
Type F - red lead paint sludge.

Based upon the stratigraphic information obtained and presented on Table 2, the volume of fill present at the Site has been estimated. Table 3 summarizes the calculated volume estimates. Figure 3 shows the areas assigned to each test pit to calculate the estimated volume. As can be seen in Table 3, fill types A, B, C and D are present in relatively equal proportions (6,000 to 11,000 cubic yards each). Only 3,000 cubic yards of gravel fill was observed. The total estimated volume of fill present on the Site is on the order of 37,000 cubic yards.

Table 3
Fill Quantification Summary
Pyramid/Ernst Steel Site

Test Pit No.	Test Pit Area ($ft.^2$)	Fill Type A Black Cindery ($ft.^3$)	Fill Type B Rust Slag ($ft.^3$)	Type C Sand Fill ($ft.^3$)	Type D Soil Fill ($ft.^3$)	Type E Gravel Fill ($ft.^3$)
1	10,313		25,781		10,313	
2	15,375		18,450		12,300	
3	7,350	9,955				
4	No Fill					
5	20,625	37,125			14,438	
6	41,250		28,875	41,250	16,500	
7a	No Fill					
7b	11,100			18,870	9,990	
8	35,275	14,110				42,330
9	34,500		17,250			24,150
10	16,500					16,500
11(1)	875	525			788	
12	14,725		27,978		8,835	
13	9,000	12,600		5,400		
14	9,713			19,425		
15	13,313			18,638		
16	No Fill					
17N	8,750			14,875		
17S	12,900			12,900		
18	35,200	21,120			52,800	
19	18,750			28,125		
20	41,600	62,400				
21	9,225	18,450				
22	13,688	34,219				
23	8,100	20,250	6,480			
24	10,925	2,185			13,110	
25	16,150				27,455	
26	No Fill					
27	No Fill					
28	15,300			35,190		
29	No Fill					
30	No Fill					
31	29,250			58,500	43,875	
32*	27,900		39,060	33,480		
Area D	No Fill					
Area E	No Fill					
TOTALS		232,539	163,874	286,653	210,404	82,980

* Only southern portion of Test Pit Area 32 shown on Figure 3 was used for fill estimation. Northern portion was native material.

** Areas 16, 27 and 29 were previously reported as containing fill. Clearing of vegetation allowed redefinition of areas containing fill.

Table 3
Fill Quantification Summary
Pyramid/Ernst Steel Site
(continued)

Type A - Black Cindery Fill	232,539 cubic feet	-	9,000 cubic yards
Type B - Rust Slag Fill	163,874 cubic feet	-	6,000 cubic yards
Type C - Sand Fill	286,653 cubic feet	-	11,000 cubic yards
Type D - Soil Fill	210,404 cubic feet	-	8,000 cubic yards
Type E - Gravel Fill	82,980 cubic feet	-	3,000 cubic yards
Total Fill Volume			37,000 cubic yards

Note:

(1) "Type F" fill was identified and sampled on July 6, 1988, however the volume of this fill has not been quantified.

One drum was observed west of Test Pit 28, contents are unknown.

"Type E" fill was not sampled since gravel and crushed slag are materials commonly used in construction activities.

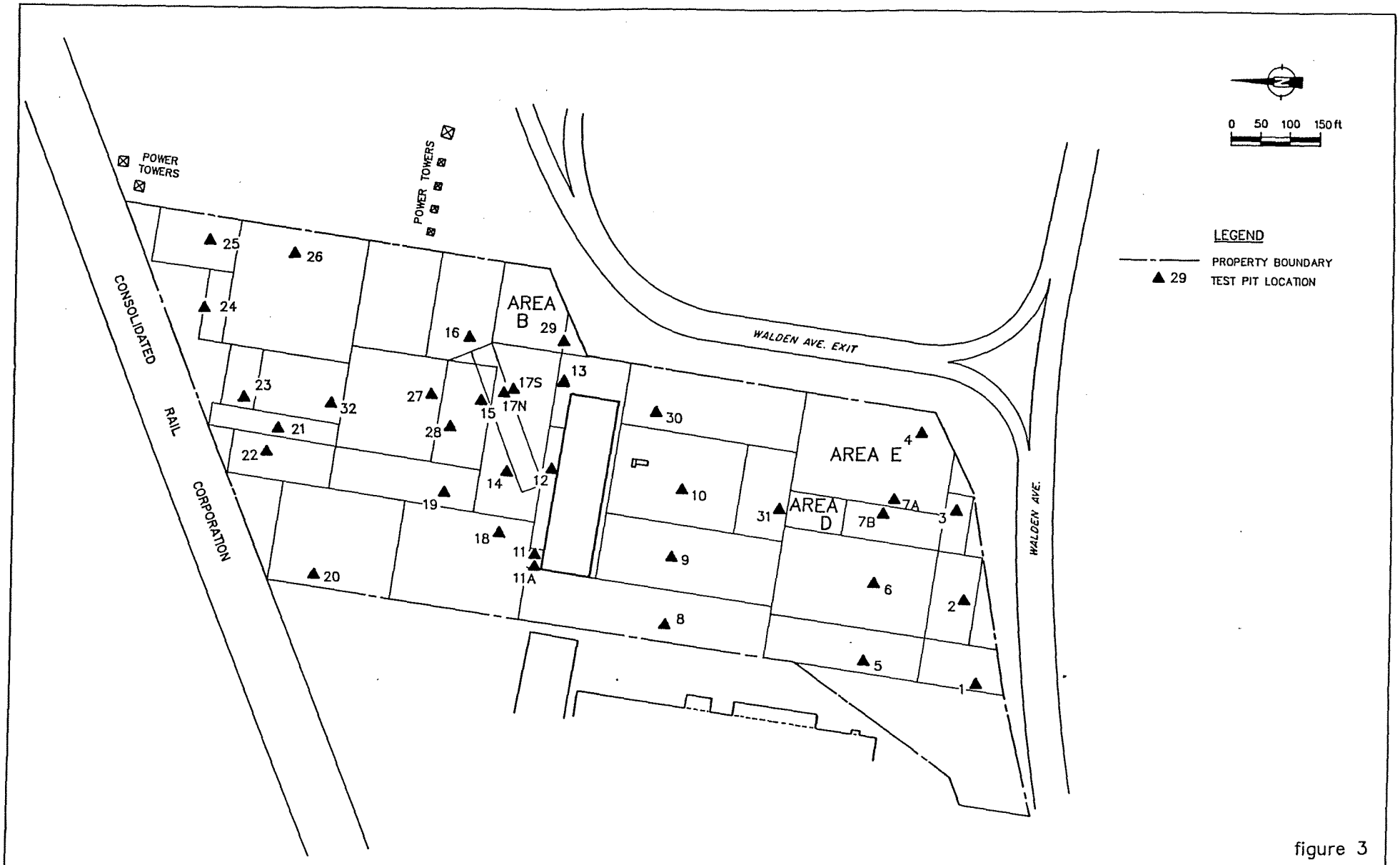

figure 3

AREAS USED TO QUANTIFY FILL VOLUMES

Pyramid Co.– Ernst Steel Site

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This volume had previously been estimated at 43,000 cubic yards. After clearing the Site of trees and vegetation, it was possible to better define the area containing fill material. As a result of this new data, the volume of fill was recalculated to be 37,000 cubic yards.

The presence of the red lead paint sludge was brought to the attention of CRA personnel by the NYSDEC representative late in the test pit investigation program. Removal of this waste was a concern of the Interim Remedial Measures activities performed previously at the Site. The presence of the paint sludge has been noted and it has been sampled, however, the volume of this waste type has not been quantified.

3.0 WASTE CHARACTERIZATION SAMPLING

After the completion of the Test Pit Investigation, a waste characterization sampling program was conducted (July 6, 1988) to determine the site components. The analytical information from these samples would be used to develop a list of Site Specific Indicator Parameters (SSIP) for the subsequent sampling programs. Samples of each of the identified fill types A, B, C, D and F were collected for analysis of the Target Compound List (TCL) parameters and cyanide.

With the concurrence of the NYSDEC site representative, fill type E (gravel fill) was not sampled. Since this fill material is commonly used to construct roads and parking areas it was agreed that it would not contribute to the characterization of this Site.

Waste samples were collected by CRA personnel. NYSDEC site representatives were present throughout the collection of the waste samples. The NYSDEC site representative received splits of all samples collected.

3.1 METHODOLOGY

After reviewing the stratigraphic information collected, the backhoe was used to excavate test pits in areas containing each of the five waste types listed previously for the purpose of sampling.

Test pits were excavated and backfilled in the same manner as during the test pit investigation program.

Samples for waste characterization were collected from test pit excavations in the following manner:

- Using a pre-cleaned garden trowel or stainless steel tablespoon, the wall of the test pit was scraped to remove material which may have come into contact with the backhoe bucket.

- The freshly exposed fill material was then scooped into a pre-cleaned stainless steel bowl using the trowel or spoon until a sufficient volume was collected.

- The sample was mixed thoroughly in the bowl using the sampling tool in order to homogenize the material.

- The homogenized fill was placed into the sample bottles using the spoon or trowel.

Split samples were collected by alternating placement of the fill material between the two sets of sample containers. All glassware was provided by the analytical laboratory.

The sample locations for the preliminary waste characterization program are shown on Figure 4. Sampling information is summarized in Table 4.

3.2 DECONTAMINATION

Sampling tools were cleaned before each use using the following procedure;

- water wash to remove visible soil
- nitric acid rinse
- water rinse.
- methanol rinse
- hexane rinse
- methanol rinse
- distilled water rinse.
- air dry.

All clean equipment was wrapped in clean aluminum foil for transport between sampling locations. All cleaning fluids were contained and placed into a 55-gallon drum which is staged on-site.

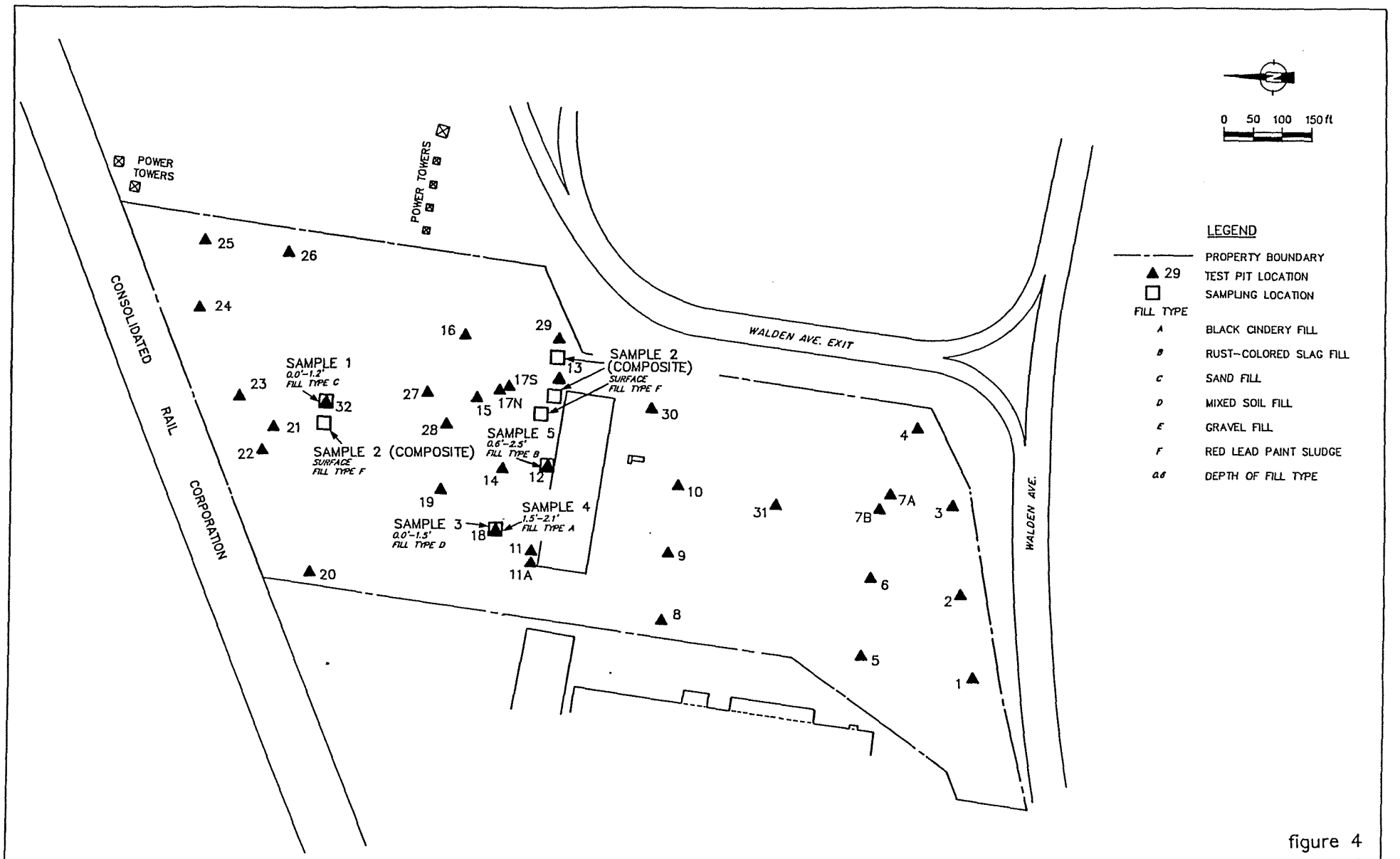

figure 4

FILL CHARACTERIZATION SAMPLING LOCATIONS

Pyramid Co.– Ernst Steel Site

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Table 4
Sample Collection Summary
Pyramid/Ernst Steel Site

Sample 1
Date: 7/6/88
Time: 1420
Location: Collected in Test Pit 32
Depth: 0 - 1.2 feet
Fill Type: C - Sand fill

Sample 2
Date: 7/6/88
Time: 1440
Location: Collected as a composite of surface material observed west of Test Pit 32, west of Test Pit 13, and between Test Pit 13 and Test Pit 29.
Depth: Surface
Fill Type: F - Red Lead Paint Sludge

Sample 3
Date: 7/6/88
Time: 1515
Location: Collected in Test Pit 18
Depth: 0 - 1.5 feet
Fill Type: D - Soil fill

Sample 4
Date: 7/6/88
Time: 1515
Location: Collected in Test Pit 18
Depth: 1.5 - 2.1 feet
Fill Type: A - Black cindery fill

Sample 5
Date: 7/6/88
Time: 1600
Location: Collected in Test Pit 12
Depth: 0.6 - 2.5 feet
Fill Type: B - Rust slag fill

3.3 SAMPLE HANDLING

Immediately after the sample bottles were filled, the jars were labeled and placed into a cooler with ice for storage until shipment to the analytical laboratory. Samples were shipped via Federal Express to EnviroTest Laboratories, Inc. of Newburgh, NY on July 7, 1988. Appropriate Chain of Custody procedures were followed throughout the sampling and shipping process.

3.4 ANALYTICAL RESULTS

The analytical results from the waste characterization study are presented in Appendix A and summarized on Table 5. The following observations have been made.

3.4.1 Metals

The results of the metal analyses presented on Table 5 indicate the following metals above background concentrations:

Table 5
Compounds Detected - Waste Characterization Study
Pyramid/Ernst Steel Site

Metals (ppm)	Sample #1	#2	#3	#4	#5	Background Surface Soil Concentrations (ppm)
Al	3545	7340	10500	3410	5590	4500-100,000
Ba	38.71	546	110	55.43	59.77	10-3000
Be	--	1.63	0.68	--	--	<1-7
Cd	--	4.29	--	--	--	0.41-0.57
Ca	5672	43900	19400	3130	37700	
Cr	9.57	2450	33.98	10.43	15.29	3-1500
Co	--	29.08	7.50	--	--	0.3-50
Cu	184	123	47.39	249	18.74	1-300
Fe	17870	97800	31300	22200	33600	5000-50,000
Pb	208	334	443	376	--	42-544
Mg	1625	11500	6610	--	7380	
Mn	769	2810	682	116	3760	7-3000
Hg	0.14	0.12	0.09	0.09	--	0.01-4.6
Ni	39.78	67.24	25.91	10.87	10.80	<5-200
K	559	995	--	--	--	
Ag	--	1.63	--	--	--	
Na	--	3188	--	--	--	
Thallium	--	--	--	--	--	0.01-2.3
Vanadium	14.52	26.73	32.3	14.67	28.28	
Zn	506	6090	139	29.78	26.21	<5-300
Cyanide	--	2.04	1.14	--	--	
Volatiles (ppb)						
Methylene Chloride	17*	22*	14*	21*	24*	
Acetone	--	110*	110*	--	46*	
BNA (ppb)						
Butylbenzylphthalate	--	580	--	--	--	
bis(2-ethylhexyl)phthalate	--	3420	--	--	--	
naphthalene	--	--	--	1260	--	
2-methylnaphthalene	--	--	--	3330	--	
dibenzofuran	--	--	--	770	--	
phenanthrene	--	--	--	850	--	
Pesticides/PCB (ppm)						
Arochlor 1254	--	17	--	--	--	

* = also present in method blank (methylene chloride - 8.9 ppb, acetone - 12 ppb) indicating possible/probable blank contamination.
-- = Not detected above quantifiable limits.

Sample No.	Metal	Concentration (ppm)	Background Concentration (ppm)
1 (Sand Fill)	Zinc	506	<5-300
2 (Red Lead Paint Sludge)	Cadmium	4.29	0.41-0.57
	Chromium	2450	3-1500
	Iron	97800	5000-50000
	Zinc	6090	<5-300
5 (Rust Slag Fill)	Manganese	3760	7-3000

Background concentrations are for U.S. soils and were obtained from "Trace Elements in Soils and Plants" by Kabata-Pendias and Pendias (1984) except for lead which was obtained from the Interim Remedial Measures Plan.

The only metal above background concentration in the majority of the samples is zinc with concentrations above background in samples 1 and 2. Of the submitted samples, the red lead paint sludge sample has the largest number of metals above background concentrations. Samples 3 and 4 did not contain any metal concentrations that would be in excess of what could be considered typical background concentrations.

3.4.2 Volatiles

The only volatiles detected, methylene chloride and acetone, were also found in the blank at concentrations of 8.9 ppb and 12 ppb, respectively. These results are indicative of laboratory conditions and not site conditions.

3.4.3 Base Neutral/Acid Extractables (BNAs)

For the BNAs, two phthalate compounds were detected in the red lead paint sludge sample (butylbenzylphthalate at 580 ppb and bis(2-ethylhexyl) phthalate at 3420 ppb) while three PAH compounds (naphthalene at 1260 ppb, 2-methylnaphthalene at 3330 ppb and phenanthrene at 850 ppb) and dibenzofuran (770 ppb) were found in the black cindery fill sample. No soil or groundwater standards could be found for the above compounds. However, the partition coefficient, K_{OC}, for the above compounds range from 1,070 to 200,000 indicating that these compounds are highly attenuated in the soils.

3.4.4 PCBs

Arochlor 1254 was found in the red lead paint sludge sample at a concentration of 17 ppm.

3.4.5 Pesticides

No pesticides were detected above quantification limits.

3.4.6 Quality Control

Following receipt of the final analytical data report from EnviroTest, a quality control assessment was conducted by CRA. Appendix A includes this assessment which was sent to EnviroTest for their consideration.

EnviroTest provided the missing dates of cyanide distillation indicating all reported values are correct. Due to semi-volatile surrogate analyses outside of the control limits, these samples were reanalyzed and the results are now within their control limits. The poor spike recoveries of lead, mercury, nickel and selenium result in qualifiers for these metals results indicating that the values are estimated. The average response factor for 2,4-dinitrophenol could not be brought into the required range after reanalysis and therefore the resultant values should be qualified as unusable.

4.0 MONITORING WELL INSTALLATIONS

In order to investigate the groundwater quality and flow conditions beneath the Site, three monitoring wells have been installed. OW-1 is in the northwest corner of the Site, OW-2 is near the northeast corner of the Site, and OW-3 is located near the center of the Site (see Figure 5). The Monitoring Well Installation Program began on July 13, 1988, and was completed on July 18, 1988. Monitoring well locations were selected to avoid conflicts with future site usage. NYSDEC site representatives were present for the majority of the monitoring well installation program and assisted in the selection of locations.

The three monitoring wells installed to date are in the locations specified in the Work Plan. The necessity for a fourth installation was investigated on September 19, 1988 by the drilling of two additional boreholes at the locations shown on Figure 5. Due to the absence of groundwater and following discussions with the NYSDEC site representative, a fourth monitoring well was determined, with the concurrence of NYSDEC personnel, not to be required.

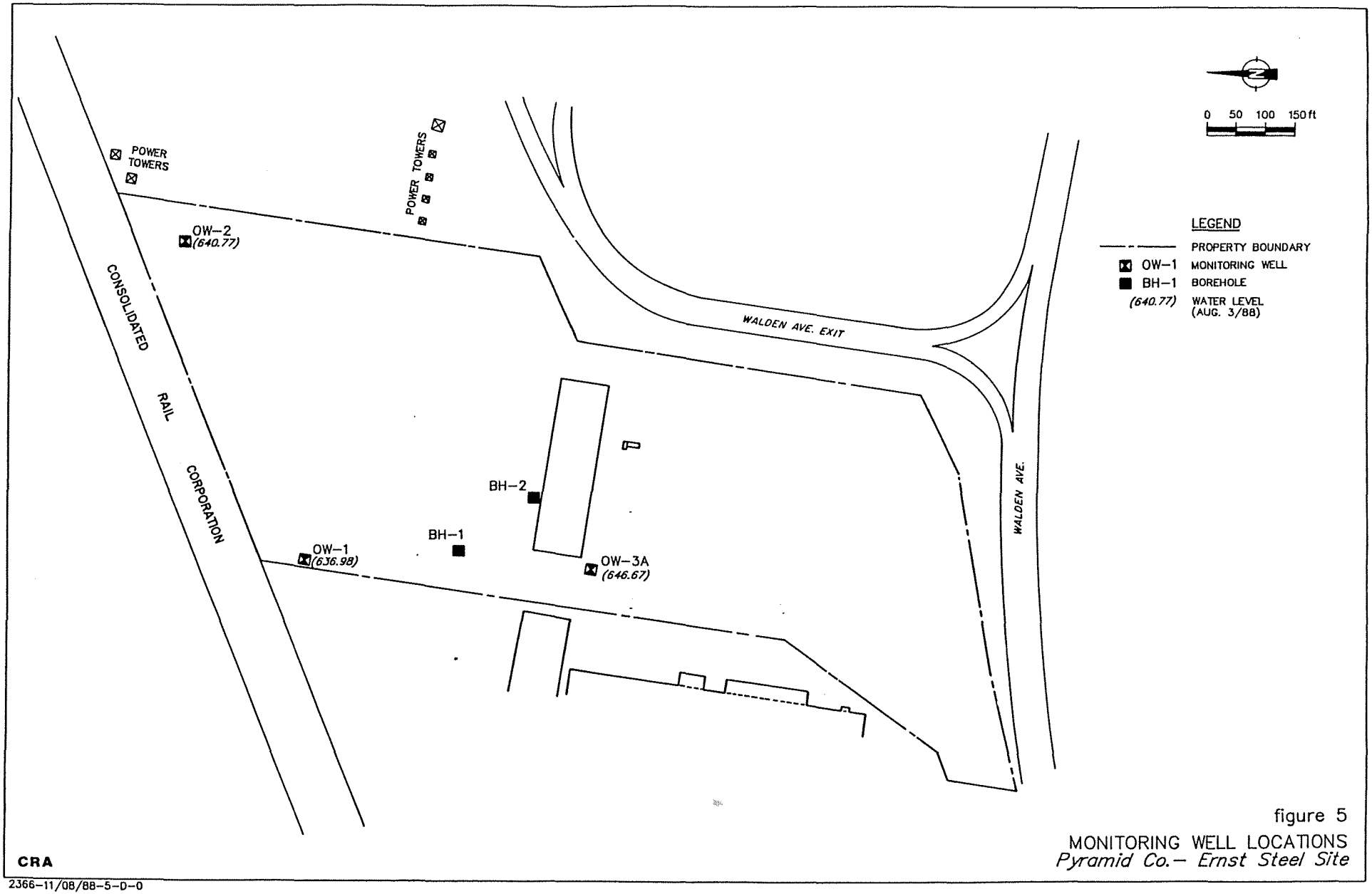

figure 5

MONITORING WELL LOCATIONS

Pyramid Co.– Ernst Steel Site

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4.1 METHODOLOGY

Earth Dimensions, Inc. of East Aurora, NY was contracted by CRA to provide drilling services. Using a truck-mounted Mobile Drill B-61 drilling rig, each monitoring well and borehole location was continuously sampled to define the geologic stratigraphy. Samples were obtained in advance of the augering operation using standard penetration test split spoon sampling techniques. Sampling continued until auger refusal (top of bedrock) was encountered.

Each sample was logged according to geologic stratigraphy encountered by CRA personnel and a sample for geologic record was collected. (The Stratigraphic and Instrumentation Logs are included in Appendix B.) In addition, each split spoon sample from the monitoring well installations was scanned with an HNU photoionization detector immediately upon opening to check for the presence of volatile organic compounds.

In general, the sample HNU readings were equal to or only slightly higher than the background level, with the highest above background level (1 ppm) occurring in the sample from the 20 to 22-foot interval at OW-1. Table 6 lists the results of the HNU scanning.

Based on results of the scans of the soil cores obtained by split spoon sampling, organic contamination is not anticipated at the Site.

Table 6
HNU Scanning Results
Split Spoon Samples
Pyramid Co.-Ernst Steel Site

Well No.	Sample No.	Depth (ft BGS)	Background (ppm)	Total Reading (ppm)
OW-1	1	0-2	0.6-1.0	0.6-1.0
	2	2-4	0.6-1.0	0.6-1.0
	3	4-6	0.6-1.0	1.4
	4	6-8	0.6-1.0	1.4-1.8
	5	8-10	0.6-1.0	1.4-1.8
	6	10-12	0.6-1.0	1.2
	7	12-14	0.6-1.0	1.3
	8	14-16	0.6-1.0	1.4-1.8
	9	16-18	0.6-1.0	1.6
	10	18-20	0.6-1.0	0.6
	11	20-22	0.6-1.0	1.4-2.0
	12	22-24	0.6-1.0	0.6-1.0
	13	24-26	0.6-1.0	1.0
	14	26-28	0.6-1.0	1.0
	15	28-29	0.6-1.0	1.0-1.2
OW-2	1	0-2	1.2-1.6	1.6-1.8
	2	2-4	1.2-1.6	1.4
	3	4-6	1.2-1.6	1.6-2.0
	4	6-8	1.2-1.6	1.2
	5	8-10	1.2-1.6	1.2
	6	10-12	1.2-1.6	1.2-1.4
	7	12-14	1.2-1.6	1.2
	8	14-16	1.2-1.6	1.2
	9	16-18	1.2-1.6	1.2-1.4
	10	18-20	1.2-1.6	1.0
	11	20-22	1.2-1.6	1.4
	12	22-24	1.2-1.6	1.4
	13	24-26	1.2-1.6	1.4-1.6
	14	26-28	1.2-1.6	1.4-1.6
	15	28-29	1.2-1.6	1.2
OW-3	1	0-2	0.8-1.2	1.6
	2	2-4	0.8-1.2	1.4
	3	4-6	0.8-1.2	1.2
	4	6-8	0.8-1.2	1.2-1.5
	5	8-10	0.8-1.2	1.0-1.4
	6	10-12	0.8-1.2	1.4-1.6
	7	12-14	0.8-1.2	1.0
	8	14-16	0.8-1.2	1.0-1.2
	9	16-18	0.8-1.2	1.0-1.2
	10	18-20	0.8-1.2	1.2-1.4
	11	20-22	0.5-0.8	0.8
	12	22-24	0.5-0.8	0.6-0.8
	13	24-26	0.5-0.8	0.8
	14	26-28	0.5-0.8	1.2
	15	28-30	0.5-0.8	1.0
	16	30-32	0.5-0.8	1.0
	17	32-32.5	0.5-0.8	0.8-1.0

Following the completion of split spoon sampling, a monitoring well was installed through the augers at three locations. Well construction materials consisted of a 5-foot long, 2-inch diameter #10 slot stainless steel well screen coupled to 2-inch diameter black steel riser pipe. A sandpack composed of #4 and/or #2 QROC quartzite sand was placed around and above the screen to a height determined by observed field conditions. Above the sandpack, a 2-foot bentonite pellet seal was placed. The remainder of the borehole was backfilled to the ground surface with cement/bentonite grout. Each well was fitted with a locking cap and lock. Table 7 summarizes the well installation details.

Prior to the installation of monitoring wells OW-1 and OW-2, a 2-foot bentonite pellet plug was placed in each borehole at the bedrock/overburden interface to seal off the potential migration pathway for overburden groundwater into the bedrock regime. At the completion of split spoon sampling at OW-3, the borehole was observed to contain a great deal of sloughed material. In order to install a functional well, borehole OW-3 was grouted to the surface and a new borehole was augered (without sampling) five feet west of the original borehole. Since augering was terminated before the bedrock surface was encountered, an artificial migration pathway was not created. Therefore, a bottom bentonite seal was not necessary at this location.

Table 7
Well Installation Detail Summary
Pyramid/Ernst Steel Site

Well No.	Bentonite Seal Over Top of Bedrock (ft BGS)	Bottom of Screen (ft BGS)	Bottom of Sandpack (ft BGS)	Top of Sandpack (ft BGS)	Bentonite Seal (ft BGS)
OW-1	27.0-29.1	26.5	27.0	18.0	16.0-18.0
OW-2	28.0-29.9	27.0	28.0	16.9	15.0-16.9
OW-3	N/A	28.6	29.0	7.0	5.0- 7.0

4.2 DECONTAMINATION

Before initial use, between monitoring well and borehole locations, and at the completion of the program, all drilling tools were decontaminated using a pressurized steam cleaner.

The well screens and riser pipe were cleaned prior to installation using the steam cleaner. In addition, where deemed necessary by CRA personnel, equipment was decontaminated using nitric acid and solvent rinses as described in Section 3.2. This method of decontamination was performed in order to remove oil or cutting fluids from the riser pipe and well screens.

A mud tub was used to contain liquids generated during equipment decontamination. All wash fluids were then transferred to 55-gallon drums which are staged on-site pending determination of an appropriate disposal method.

4.3 WELL DEVELOPMENT

After the well installation program was completed, the wells were developed following the protocols outlined in the Work Plan.

Monitoring wells OW-1 and OW-2 were found to have insufficient water available for continuous development. Consequently, these wells were developed by hand bailing to dryness on each of three consecutive days. The bailer was also used for surging in an effort to draw into the well any fines which were trapped in the sandpack during well construction. Through development over three consecutive days, OW-1 yielded approximately 10 well volumes (20.5 gallons) while OW-2 yielded approximately six well volumes (6.25 gallons).

Well OW-3 was developed by purging ten well volumes (37 gallons) in one day. An ISCO portable peristaltic pump and a bailer were both used to develop and surge OW-3. Clean teflon tubing connected to a peristaltic pump and a bailer were both inserted to the bottom of the well. By simultaneously pumping the well while raising and lowering the bailer, the well was surged and developed.

All purge water was containerized at the well sites and transferred to 55-gallon drums which are staged at the Site pending determination of an appropriate disposal method.

4.4 PHYSICAL SOILS TESTING

In order to determine the permeability of the on-site soils, selected samples collected during the monitoring well installation program were submitted to a laboratory for physical testing including grain size distribution, Atterberg Limits and permeability. The samples submitted are as follows:

Sample Location	Sample Number	Depth		Description
OW-1	S-5	8-10		Silty-Clay
OW-2	S-6	10-12		Silty-Clay
OW-3	S-10	18-20	(composited with OW3, S-11)	Glacial Till
OW-3	S-11	20-22	(composited with OW3, S-10)	Glacial Till

Appendix C contains the physical testing results. The results for each of the two clay samples were similar. The permeability of the clay appears to be in the low 10^{-8} cm/sec range. The submitted till samples could not be tested for permeability because the samples were not cohesive enough to measure the bulk unit weight. This measurement is required prior to recompaction of the samples for permeability testing. Two additional till samples (OW-3, S-7 and S-8) were sent for analysis and the permeability of the composited till samples was 1.1×10^{-7} cm/sec.

5.0 SITE GEOLOGY AND HYDROGEOLOGY

5.1 SITE GEOLOGY

The site stratigraphic units, in descending order with depth, generally are:

i) Fill

ii) Silt

iii) Clay

iv) Till

Not all of the above units are present at all locations. As presented in Section 2, the fill ranges in thickness from 0 to 3.5 feet and consists of a variety of materials. Clay generally underlies the fill material except at well OW-1 and borehole BH-2 where a thin discontinuous layer of native silt (0.5 to 1.0 feet thick) exists. The clay ranges in thickness from 5.1 to 21.2 feet. Underlying the clay is a silt/clay till ranging in thickness from 6.4 to 26.7 feet.

5.2 SITE HYDROGEOLOGY

The site hydrogeology units, in descending order with depth are:

i) Fill/silt and

ii) Clay/Till

The fill/silt and clay/till have been grouped as discrete hydrogeologic units due to similar flow characteristics. This is demonstrated for the clay/till by the physical soils testing data previously presented in Section 4.4 which identifies the clay and till to be similar at least from a hydrogeologic perspective.

The fill/silt layer is a coarser more porous unit that would be expected to be a perched water unit. However, often during the excavation and drilling programs, the fill/silt layer was observed to be dry or moist indicating minimal water presence. No wells are screened in the fill/silt unit since the Work Plan was written with the intent of identifying chemical migration from the Site. The soil sampling programs were designed to evaluate chemical presence within the fill unit itself. The clay/till layer is an aquitard and will be insignificant in terms of groundwater movement as demonstrated by the permeabilities determined in the laboratory (see Appendix C).

Three rounds of groundwater levels have been taken as shown on Table 8. It is noted that the data for OW-2 on July 20, 1988 is not representative of site conditions since this a slow recovering well and had not as yet reached equilibrium on July 20, 1988. The two subsequent rounds of water levels indicate that the limited groundwater flow is to the northwest.

Based upon the geologic stratigraphy descriptions obtained from the borings conducted on the Walden Galleria Site and the Ernst Steel Site, there is considerable information available concerning the subsurface conditions at the Site. Generally, the native soils at the Site are fine grained consisting mostly of clay and silt. Consequently, the native soils are not conducive to extensive groundwater presence or movement. This was confirmed during the excavation of several test pits and holes around the site; many of which remained dry throughout the period for which they were open. As a result, there is little concern or potential for contamination of the groundwater regime beneath the site due to any surface or near-surface activities. The clay and till strata are aquitards and therefore minimal groundwater flow beneath the Site both vertically and horizontally will occur.

TABLE 8

GROUNDWATER ELEVATIONS (ft. amsl)

Monitoring Well	Top of Casing	Sampling Date 7/20/88	8/3/88	9/12/88
OW-1	653.37	639.29	636.98	638.97
OW-2	653.72	632.06	640.77	643.82
OW-3	653.84	647.68	646.67	648.04

6.0 100-FOOT GRID SAMPLING PROGRAM

In conjunction with the Phase II Site Investigation and as a result of the Waste Characterization Sampling Program, further field studies were undertaken to determine the extent of lead presence in the fill materials at the Site. This sampling program concentrated on the extent of lead but also included TCL analysis on selected samples. This analytical data was used in conjunction with the waste characterization analytical data to develop the SSIP list for subsequent sampling programs.

On August 17 and 18, 1988, a 100-foot sampling grid was established on the Site. At each grid point, samples of the entire fill horizon extending from just below the surface material to the top of the underlying native soils were collected and analyzed for total lead. The sampling locations (71 locations) are presented in Figure 6. At eight sampling locations, duplicate soil samples were collected for QA/QC purposes for a total of 79 samples. The analytical results are presented in Appendix D and summarized on Figure 7.

At eight of the 71 locations, the sample was analyzed for EP Toxicity lead as well as total lead. The locations of the EP Toxicity sample points and analytical

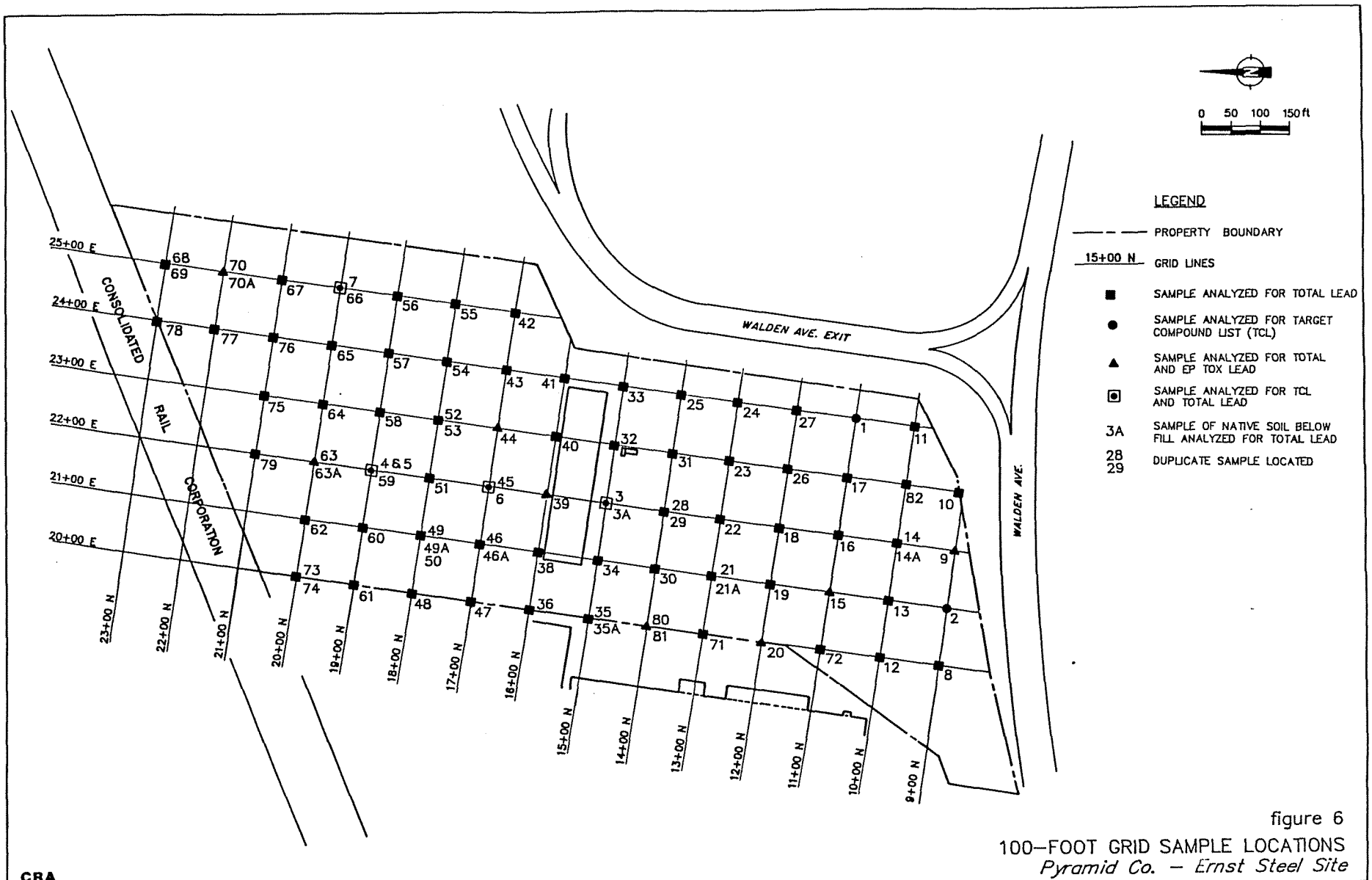

figure 6

100–FOOT GRID SAMPLE LOCATIONS

Pyramid Co. – Ernst Steel Site

CRA

2366–24/08/88–5–D–0

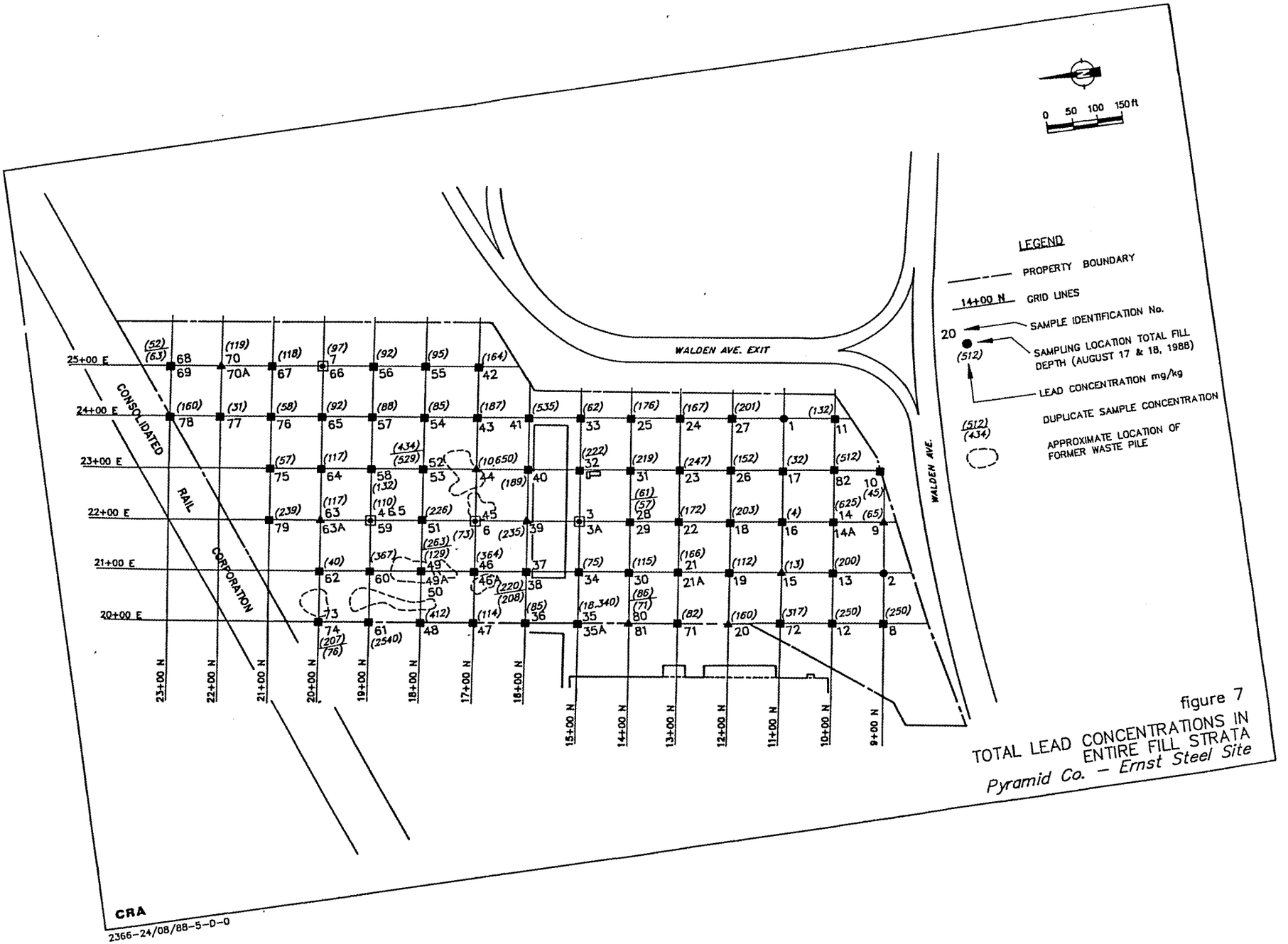

figure 7

TOTAL LEAD CONCENTRATIONS IN ENTIRE FILL STRATA

Pyramid Co. – Ernst Steel Site

results are summarized in Figure 8. The analytical results are presented in Appendix D.

At eight additional locations beneath the area of fill presence, samples of the underlying native material were collected and analyzed for total lead. Figure 9 presents the locations of native soil sample collection as well as the concentrations of total lead in the native materials and overlying fill material at each of these sample points. The analytical results are presented in Appendix D.

As a result of the site work performed, the areal extent of fill has been delineated. Figure 10 presents the boundaries of this area and the depths of fill.

To confirm the waste characterization, additional samples were collected of the entire fill strata at six locations (plus one duplicate sample) and analyzed for the TCL. The sampling locations are presented on Figure 6 and the analytical results are presented in Appendix E.

6.1 METHODOLOGY

At each 100-foot grid sampling location, a backhoe was used to excavate a test pit. The samples of the

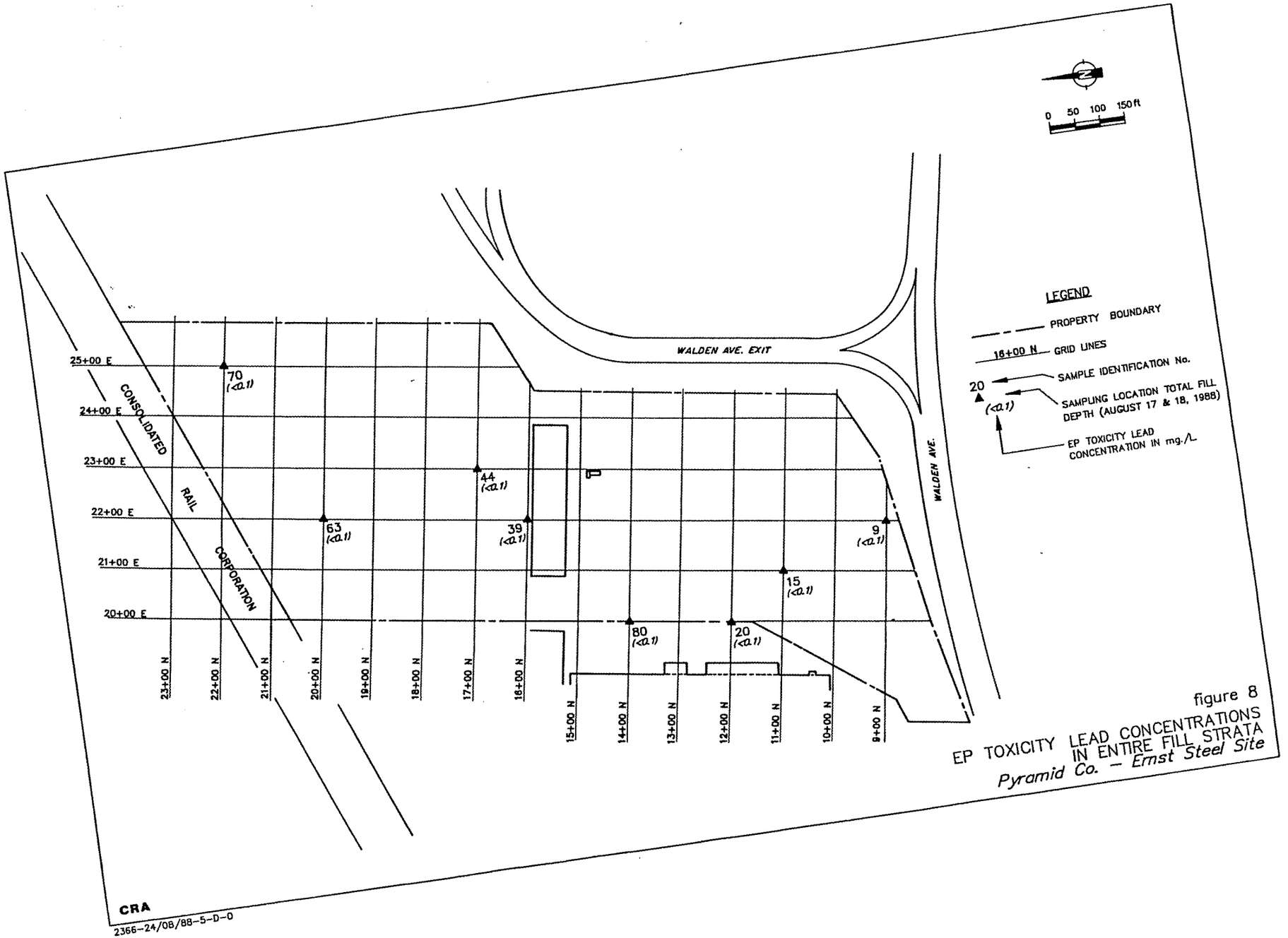

figure 8
EP TOXICITY LEAD CONCENTRATIONS IN ENTIRE FILL STRATA
Pyramid Co. – Ernst Steel Site

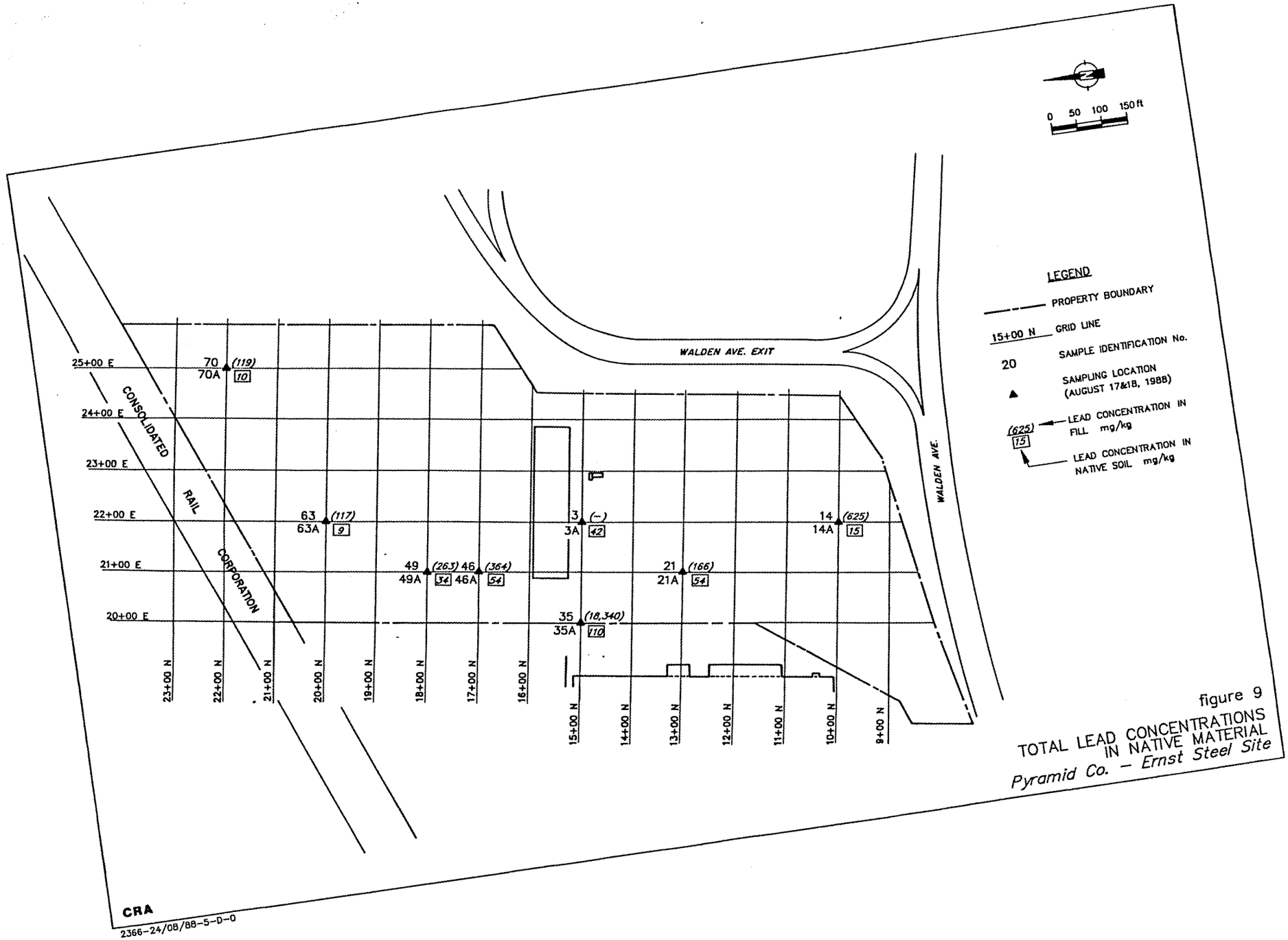

figure 9
TOTAL LEAD CONCENTRATIONS IN NATIVE MATERIAL
Pyramid Co. – Ernst Steel Site

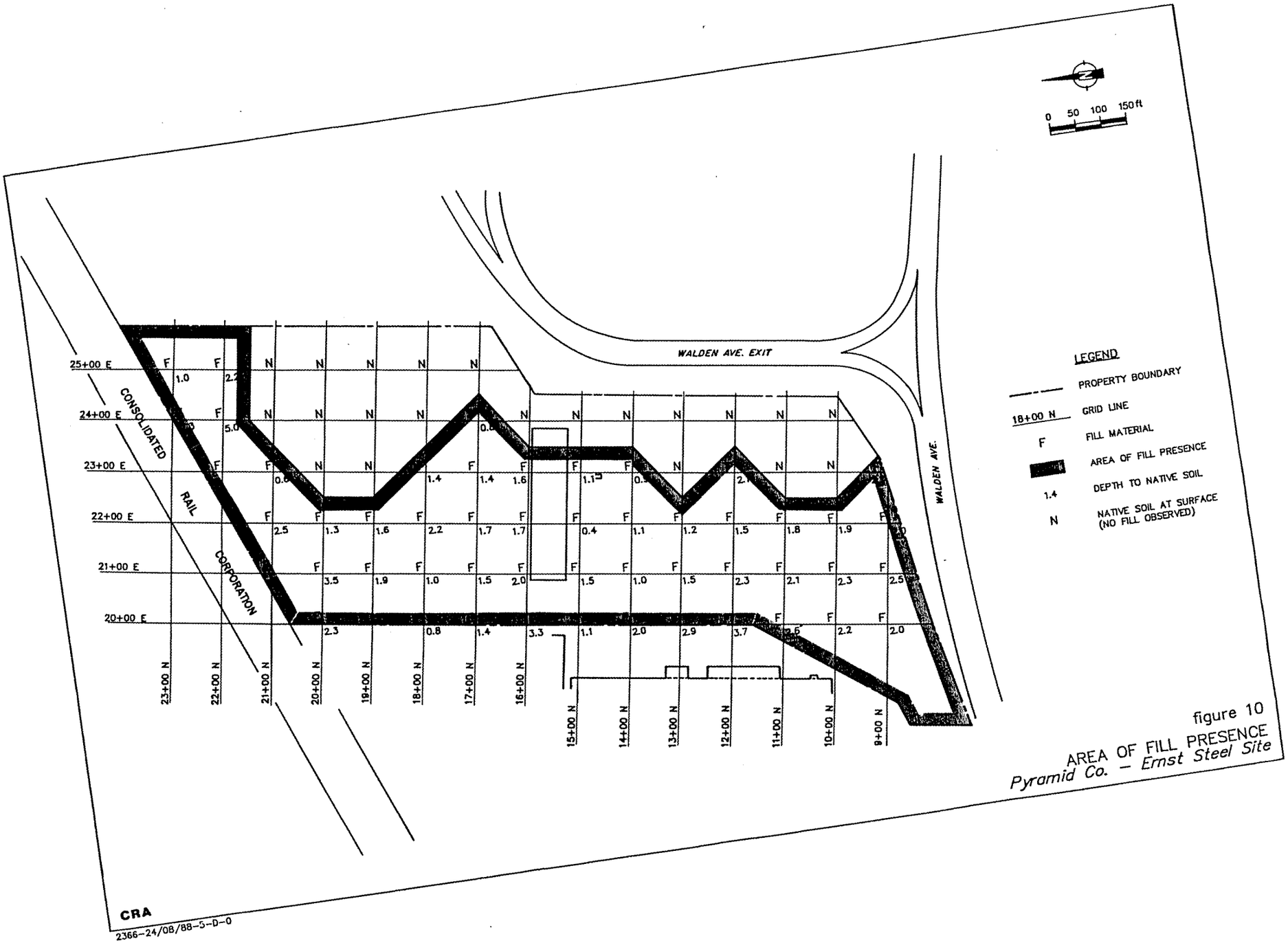

figure 10
AREA OF FILL PRESENCE
Pyramid Co. — Ernst Steel Site

fill or native soil at each location were collected in the same manner as the waste characterization sampling described in Section 3.1.

6.2 DECONTAMINATION

Sampling tools were cleaned and wrapped before each use using the protocols described in Section 3.2. All cleaning fluids were contained and placed into a 55-gallon drum which is staged on-site pending determination of an appropriate disposal method.

6.3 SAMPLE HANDLING

Sample bottles were handled in the same manner as the waste characterization samples (see Section 3.3). The total lead and EP Toxicity lead samples were transported to BLT Technical Services, Inc. of Niagara Falls, New York by CRA personnel. The TCL samples were shipped via Federal Express to Recra Environmental, Inc. of Columbia, MD. Appropriate Chain of Custody procedures were followed throughout the sampling and shipping process.

6.4 ANALYTICAL RESULTS

The analytical results for total lead and EP Toxicity lead are presented in Appendix D and the TCL analytical results from the 100-foot grid sampling study are presented in Appendix E. The TCL data is summarized on Table 9. The following observations have been made.

6.4.1 Metals

The results of the metals analyses indicate the following metals above background concentrations:

Metal	Sample No.	Concentration (ppm)	Background Concentration (ppm)
Cadmium	3	2.0	0.41 - 0.57
	4	0.98	
	7	1.2	
Iron	6	52,100	5000 - 50000
Lead	2	931	42-544
	6	761	
Manganese	2	3,010	7 - 3000
Zinc	6	361	<5 - 300

Background concentrations are for U.S. soils and were obtained from "Trace Elements in Soils and Plants" by Kabata-Pendias and Pendias (1984) except for lead which was obtained from the Interim Remedial Measures Plan.

TABLE 9

COMPOUNDS DETECTED - 100-FOOT GRID SAMPLING STUDY
PYRAMID/ERNST STEEL SITE

Metals (ppm)	#1	#2	#3	#4	#5	#6	#7	Background Concentration
Al	38100	26900	16800	10100	7380	8390	15500	4500 - 100000
As	7.6	8.4	4.9	12	8.9	7.7	9.5	
Ba	106	185	97	77	50	105	70	10 - 3000
Be	1.5	3.9	2.1	1.1	0.93	0.76	0.95	<1 - 7
Cd	--	--	2.0	0.98	--	--	1.2	0.41 - 0.57
Ca	3940	149000	93500	37500	34100	7820	3010	
Cr	21	25	18	16	10	38	16	3 - 1500
Co	4.8	6.2	3.7	7.0	5.9	7.4	3.2	0.3 - 50
Cu	16	36	42	12	35	51	15	1 - 300
Fe	12100	39900	29600	42300	49300	52100	7570	5000 - 50000
Pb	90	931	299	191	105	761	112	42 - 544
Mg	3080	23000	16800	4610	3620	2120	1810	
Mn	51	3010	2590	2330	1340	1610	83	7 - 3000
Ni	12	13	9.5	17	13	19	11	<5 - 200
K	2990	2690	1220	1440	1020	1480	1840	
Na	580	1760	1170	1380	1390	1220	324	
Thallium	--	--	--	0.74	--	--	--	0.01 - 2.3
Vanadium	30	16	13	23	15	21	23	
Zn	108	155	88	211	133	361	89	<5 - 300

continued....

TABLE 9

COMPOUNDS DETECTED - 100-FOOT GRID SAMPLING STUDY
PYRAMID/ERNST STEEL SITE

Volatiles (ppb)	#1	#2	#3	#4	#5	#6	#7	Partition Coefficient K_{OC}
Methylene Chloride*	8	7	9	18	22	23	54	10
Trichlorofluoromethane	5	11	--	10	15	18	10	182
Chloroform	6	7	7	6	6	6	7	50.2
BNA (ppb)								
Naphthalene	--	--	--	--	--	370	--	1070
Phenanthrene	--	1100	--	--	--	510	--	160000
Fluoranthene	--	1000	--	--	--	370	--	44000
Pyrene	--	1700	--	--	350	420	--	44000
Benzo(a)Anthracene	--	860	--	--	--	--	--	220000
Chrysene	--	930	--	--	--	--	--	220000
Benzo(a)Fluoranthene	--	1100	--	--	360	370	--	630000
Benzo(a)Pyrene	--	680	--	--	--	--	--	630000
Pesticides (ppb)	--	--	--	--	--	--	--	

* = also present in method blank (5 ppb)
-- = Not detected above quantifiable limits

All the metals which exceed background concentrations do so only by small amounts.

6.4.2 Volatiles

Only three volatiles, methylene chloride (7-54 ppb), trichlorofluoromethane (ND-18 ppb) and chloroform (6-7 ppb), were detected in the seven samples. All of the detected values are low-level.

6.4.3 BNAs

Three of the seven soil samples indicated the presence of several Polynuclear Aromatic Hydrocarbon (PAH) compounds as presented on Table 9. No soil or groundwater standards could be found for the detected compounds except for benzo(a)pyrene. New York State regulations for class GA potable water states that benzo(a)pyrene must be non-detectable. However, the partition coefficient, K_{OC}, for benzo(a)pyrene is 630,000 indicating that this compound is very highly attenuated in soil. The K_{OC} values for the remaining detected PAH compounds range from 1,070 to 630,000 indicating these compounds are also highly attenuated in the soils.

6.4.4 Pesticides and PCBs

No pesticides or PCBs were detected above quantifiable limits.

6.4.5 Quality Control

A quality control assessment of the BLT analytical results for total and EP Toxicity lead was performed by CRA and is presented with the data in Appendix D. All standard laboratory and field QA/QC requirements were adhered to and therefore the presented analytical data is acceptable.

A quality control assessment of the Recra analytical results for TCL parameters was also performed by CRA and is presented with the data in Appendix E. A number of problems were observed which resulted in the following qualifiers to the data being recommended:

a) Poor surrogate recoveries were achieved in the VOA analyses due to matrix interference and therefore all VOC results associated with the soil samples should be qualified as estimated.

b) Due to poor recoveries on sample spikes for metallic analytes antimony, arsenic, manganese, selenium, silver, thallium and zinc should be qualified as either estimated values or unusable.

c) On the basis of poor precision established for duplicate analyses of copper and nickel, all associated values for these two analytes should be qualified as estimated.

7.0 SITE SPECIFIC PARAMETER SELECTION

Following the waste characterization and 100-foot grid sampling programs, the TCL analytical data was reviewed for selection of the SSIP. As a result of discussions with the NYSDEC on September 8, 1988, the following set of SSIP has been selected:

Parameter	Method	
	Soil	Water
Lead (Total)	SW-846-7420	SW-846-7421
EP TOX Lead (soils only)	SW-846-1310/7420	
Chromium (total)	SW-846-7190	SW-846-7191
EP TOX Chromium (soils only)	SW-846-1310/7190	
Arochlor 1254	SW-846-8080	SW-846-8080
Total Organic Halides (TOX)	SW-846-9020	SW-846-9020
Toluene (water only)		SW-8020

8.0 WORK PLAN SAMPLING PROGRAMS

Following the determination of the SSIP, the remainder of the sampling programs specified in the Work Plan for the Phase II Site Investigation were conducted on September 12 to 20, 1988.

8.1 MONITORING WELL SAMPLING

The wells were purged and sampled following the protocols outlined in the Work Plan. Prior to purging, water level measurements were taken in each well. The results are presented in Table 8.

Monitoring wells OW-1 and OW-2 were purged to dryness on three consecutive days (September 12 to 14, 1988). On September 15, 1988, both wells were sampled for the SSIP by bottom-loading stainless steel bailer. Split samples collected for the NYSDEC were discarded by CRA personnel at the direction of the NYSDEC site representative. In order to collect samples representative of groundwater flow conditions in a porous media, groundwater samples collected for metals analysis were field-filtered during these sampling activities. However, the NYSDEC requested that non-filtered samples be analyzed. To obtain non-filtered samples, the two wells were again purged to dryness on three consecutive days

(September 17 to 19, 1988) and resampled for unfiltered metals analysis on September 20, 1988. The NYSDEC was informed of the resampling and a NYSDEC site representative was on-site during purging, however the NYSDEC representative was not on-site during sampling and no split samples were collected. The samples were collected by low-rate pumping (peristaltic pump) to collect sediment-free samples.

Monitoring well OW-3 was purged of five well volumes (20 gallons) prior to sampling for SSIP on September 12, 1988. Purging was conducted by peristaltic pump and sampling was conducted using a bottom-loading stainless steel bailer. Split samples were collected for and retained by the NYSDEC site representative. The NYSDEC split samples were not field-filtered. On September 20, 1988, the well was resampled for unfiltered metals following purging of five well volumes (20 gallons). Both purging and sampling was conducted by peristaltic pump.

Teflon tubing was dedicated to each well. Bailers were precleaned prior to each sampling event using the protocols described in Section 3.2.

8.2 SURFACE SOIL SAMPLING

Samples of the upper surface of the fill material were collected at the ten locations indicated on

Figure 11. These locations were selected in concurrence with the NYSDEC site representative. Each sample was collected from the upper one-foot of the fill material. This depth was suggested by the NYSDEC field representative as representative of the surface soil. Previous sampling activities have characterized the entire fill strata.

The surface soil samples were collected using the following procedures:

i) dig a hole with a pre-cleaned shovel to a depth of approximately one foot,
ii) scrape the side of the hole with a precleaned garden trowel, and
iii) from the freshly exposed material, scoop and place the sample directly into the sample jar using the trowel.

The sampling tools were cleaned between each sampling location using the protocols described in Section 3.2.

8.3 SURFACE WATER AND SEDIMENT SAMPLES

Surface water and sediment samples were collected from the ditches bordering the Site as specified in the Work Plan. The locations from which samples were collected are presented on Figure 11. The ditch along the

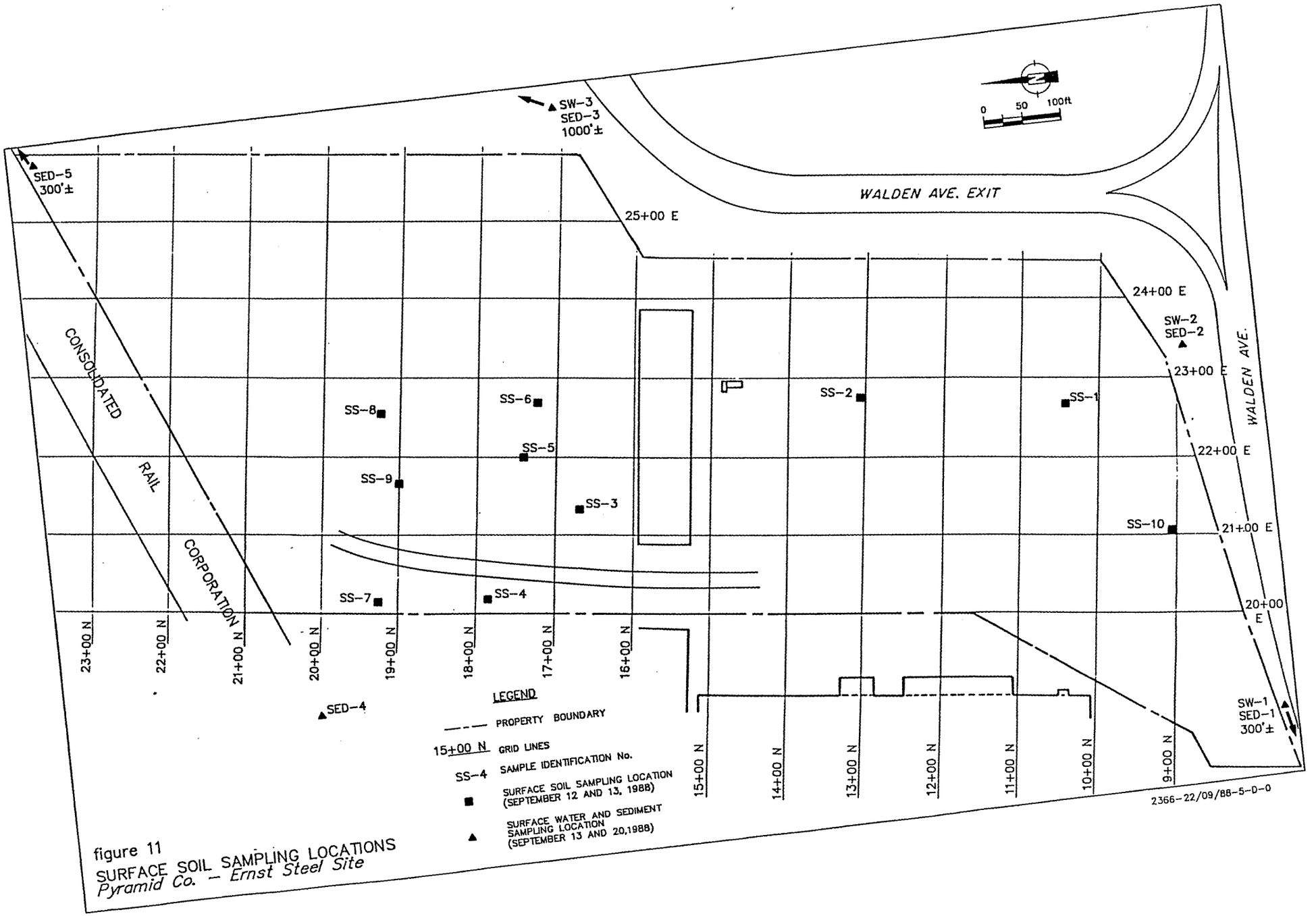

figure 11
SURFACE SOIL SAMPLING LOCATIONS
Pyramid Co. – Ernst Steel Site

south side of the Site contained surface water at the southwest corner of the Site. A surface water sample and a sediment sample were collected at this location. It is noted that the surface water at this location appeared to flow to the west. The remainder of the south ditch was dry between the southwest corner and the surface drain at the southeast corner of the Site. Surface water flowing from the surface drain was sampled prior to the flow entering the ditch. A sediment sample was collected at this location. The flow then continued along the south ditch to the east and north until discharging into the Scajaquada Creek. Surface water and sediment samples were collected from the ditch prior to discharge into the Creek. The north ditch was dry. Consequently, no surface water samples could be collected in the north ditch, however sediment samples were collected at two locations (Sed-4 and Sed-5).

Surface water samples were collected by dipping the glassware in the water or by catching the cascading water as in the surface drain sample. The sediment samples were collected following the procedure specified in the Work Plan.

8.4 DUPLICATE SAMPLING

For quality control purposes, a duplicate sample was collected for each different sample type: groundwater, surface soil, surface water and sediment. No split samples were required by the NYSDEC site representative.

8.5 ANALYTICAL RESULTS

The laboratory report of the analytical results is presented in Appendix F. A summary of the analytical results is presented in Table 10 for all of the SSIP and the following observations have been made.

8.5.1 TOX and Toluene

Total organic halides (TOX) were detected in both the groundwater and surface water samples. The largest detected TOX concentration in the surface water is 60.4 ppb. In the groundwater, the highest TOX concentration is 28.6 ppb. All of the detected concentrations are low considering the group of organics which comprise TOX. One low-level concentration of toluene was also detected in OW1 (0.53 ppb). The New York State Department of Health has recently promulgated Maximum Contaminant Levels (MCL)

TABLE 10

PHASE II SITE SPECIFIC INDICATOR PARAMETER RESULTS

Groundwater	Lead Filtered (ppm)	Lead Unfiltered (ppm)	EP Toxicity Lead (ppm)	Chromium Filtered (ppm)	Chromium Unfiltered (ppm)	EP Toxicity Chromium (ppm)	Arochlor 1254 (ppb)	TOX (ppb)	Toluene (ppb)
OW-1	0.003	<.002		0.013	0.007		<1.0	28.6	0.53
OW-2	<.002	<.002		0.006	0.003		<1.0	<10.0	<0.5
OW-102*		<.002			<.003				
OW-3	<.002	<.002		<.003	<.003		<1.0	<10.0	<0.5
OW-103*	<.002			<.003			<1.0	18.6	<0.5
Surface Water									
SW-1	<.002	0.007		0.005	<.003		<1.0	15.4	<0.5
SW-2	<.002	0.008		<.003	0.003		<1.0	60.4	<0.5
SW-102*	0.002			<.003			<1.0	35.4	<0.5
SW-3	<.002	0.002		<.003	<.003		<1.0	49.0	<0.5
Soil							(ppm)	(ppm)	
SS-1	219		0.049	16		<.02	<.2	44	
SS-2	507		0.048	19.3		<.02	<.2	34	
SS-3	181		0.054	22.5		<.02	<.2	15	
SS-4	29,600		49.9	188		<.02	1.2	34	
SS-5	8,980		15.6	189		0.12	<.2	75	
SS-6	5,570		35.6	479		0.38	0.6	60	
SS-7	14,200		132	165		0.038	1.6	26	
SS-107*	14,200		229	134		0.024	2.2	34	
SS-8	563		0.23	30.1		<.02	<.2	35	
SS-9	312		0.066	19.2		<.02	<.2	25	
SS-10	4,370		50.4	27.8		<.02	<.2	17	
Sediment							(ppm)	(ppm)	
Sed-1	286		0.12	25.1		<.02	<.2	<10	
Sed-2	118		0.057	19.8		0.024	<.2	<10	
Sed-3	38.1		0.035	18.8		<.02	<.2	<10	
Sed-103*	31.5		0.02	19.1		<.02	<.2	<10	
Sed-4	255		0.043	21.2		<.02	<.2	111	
Sed-5	35		<.02	16.7		<.02	<.2	13	

* Duplicates identified in this manner, i.e., OW-102 is duplicate of OW-2.

in Part V of the Sanitary Code. The new MCL for toluene in drinking water is 5 ug/L (ppb). It is noted that all of the toluene concentrations measured at the Site were below the MCL.

8.5.2 Lead and Chromium

Lead was detected in the sediment samples ranging from 32 to 286 ppm and in the surface soil samples ranging from 181 to 29,600 ppm. The lead results for six of the ten surface soil sample locations are above background concentrations while five of these locations also had EP Toxicity results above the 5 ppm concentration which defines a hazardous waste pursuant to the EP Toxicity test. None of the lead results for the sediment samples were above background. In fact, the two downgradient samples (Sed-3 and Sed-5) had lead concentrations of only 38 and 35 ppm respectively which are approximately one order of magnitude lower than the concentrations of the upgradient samples. This indicates that the lead presence at the Site has not migrated via the ditches to the Scajaquada Creek.

Lead was not detected above the quantifiable level (0.002 ppm) in any of the unfiltered groundwater or filtered surface water samples. Lead was detected at or above the quantifiable level (0.002 ppm) in all three unfiltered surface water samples SW-1 (0.007 ppm), SW-2 (0.008 ppm) and SW-3 (0.002 ppm) and in one filtered

groundwater sample OW-1 (0.003 ppm). Although one filtered groundwater sample shows a higher concentration than the associated unfiltered sample, the results are essentially identical within the reproducibility capabilities of the analytical techniques and are therefore, consistent. The New York State Class GA standard for lead is 0.025 ppm.

The higher concentrations of chromium found in the surface soil correspond to the locations of the highest surface lead concentrations. Chromium, like lead, was detected at lower concentrations in the downgradient sediment samples than in the upgradient samples. The three surface soil samples (SS-4, SS-5 and SS-6) where EP Toxicity chromium was detected did not exceed the EP Toxicity criteria for chromium (5 ppm). As well, the samples are located in areas where the lead concentration exceeds 1000 ppm. Therefore, remediation of lead contaminated soils will sufficiently address any chromium contamination as well.

Chromium was detected at or above the quantifiable level (0.003 ppm) in two unfiltered groundwater samples (OW-1 at 0.007 ppm and OW-2 at 0.003 ppm), two filtered groundwater samples (OW-1 at 0.013 ppm and OW-2 at 0.006 ppm), one unfiltered surface water sample (SW-2 at 0.003 ppm) and one filtered surface water sample (SW-1 at 0.005 ppm). Although three filtered samples show higher concentrations than the associated unfiltered samples, the

results are essentially within the reproducibility capabilities of the analytical techniques and are therefore, consistent. The New York State Class GA standard for hexavalent chromium is 0.05 ppm. It is noted that analyses were for total chromium, not just the hexavalent isotope.

The isolated single occurrence of lead concentrations above 1,000 ppm in the southern portion of the Site may be an artifact of sampling. During sampling, a small area (approximately 1 square foot) with an orange/red material was noted. Some of this material was placed in the sample. During collection of this sample, the remains of a paint can were found. No other observances of the orange/red material were made in the vicinity of the area of sample collection. During site excavation, the backhoe removed a small volume of soils (including all the orange/red material) which was transported to a secure landfill site for proper disposal.

8.5.3 Arochlor 1254

Arochlor 1254 was detected at four surface soil sampling locations but was not detected in any of the sediment samples above the quantified limit of 0.2 ppm. The locations of Arochlor 1254 presence (0.6-2.2 ppm)

correspond to areas with lead concentrations above 1000 ppm. Therefore, any Arochlor 1254 contaminated soils will be addressed by the removal of lead contaminated material.

Arochlor 1254 was not detected above the quantified limit (1.0 ppb) in any of the groundwater or surface water samples. The New York State Class GA standard for PCB is 0.1 ppb.

9.0 HEALTH AND SAFETY

The health and safety requirements were as described in the Work Plan and outlined below.

9.1 TEST PIT INVESTIGATION AND WASTE CHARACTERIZATION SAMPLING

Throughout the test pit investigation, air monitoring was performed at 15 minute intervals during active excavation activity. An HNU photoionization instrument was used to scan for organic vapors and a Sibata Dust Indicator was used to measure dust generated by the excavation process. No excursions were noted with either instrument.

CRA personnel were equipped with tyvek coveralls, hard hats, safety glasses, latex gloves and rubber boots. Respirators were on hand but were not worn. A full complement of safety equipment was available for use by the backhoe operator. Since the operator sat in an enclosed cab and did not leave the machine during the test pit investigation, wearing of the protective gear was not necessary.

At the completion of work, the backhoe bucket was cleaned using a water wash. All cleaning water was

contained in a 55-gallon drum and staged temporarily at the Site. All Tyvek, gloves, etc. were collected in plastic garbage bags and also staged temporarily at the Site. During the subsequent site excavation, the staged drums and bags were transported, along with the contaminated soils to a secure landfill site.

9.2 MONITORING WELL INSTALLATION AND WELL DEVELOPMENT

During the drilling and well development programs, the drillers and samplers wore Tyvek coveralls, boots, gloves, hardhats, and safety glasses. Respirators were on hand but were not worn. At each drilling location, a survey site was constructed by placing a ground sheet of polyethylene over the ground. The polyethylene was then covered with sheets of plywood. Finally the survey site was enclosed with plastic construction fencing.

All soil cuttings that were brought to the surface during augering and monitoring well installation were placed into 55-gallon drums. All used Tyvek, gloves, etc. were collected in plastic garbage bags for future disposal. The waste drums have been staged on-site pending analytical work to determine an appropriate method of disposal. The drums and bags were staged until site excavation, at which

time they were transported, along with the contaminated soils, to a secure landfill site.

9.3 WORK PLAN SAMPLING PROGRAMS

During all groundwater, surface water, surface soil and sediment sampling, CRA personnel were equipped with Tyvek coveralls, hard hats, safety glasses, latex gloves and rubber boots. Respirators were on hand but were not worn.

All purge water was staged temporarily at the Site in 55-gallon drums. All Tyvek, gloves, etc. were collected in plastic garbage bags and also staged temporarily at the Site. During the subsequent site excavation, the staged bags were transported, along with the contaminated soils, to a secure landfill site. The drummed water was transported to the same facility for treatment.

10.0 UTILITY INVESTIGATION

To date, the only known underground utilities on-site are a sanitary sewer network and a 24-inch diameter gas main (see Figure 12).

The sewer consists of a north-south segment which is located parallel to the western property line. This 12-inch diameter line flows to the north and empties into a manhole located near the northwest corner of the property (MH-5). In addition there are two lines which appear to run east-west through the Site. One is a 24-inch diameter line which flows from the east into MH-5. The other is a 36-inch diameter line which flows from the east into MH-4 located southeast of MH-5. MH-4 and MH-5 are connected by a 36-inch diameter line.

A visual inspection of MH-1 and MH-3 identified a single flow stream to the north with no other apparent stubs. MH2 has a welded steel plate on top and therefore, could not be inspected. MH-4 has a stub entering from the east and a stub entering from the northwest (to MH-5). Although flow in the sanitary sewer system could be heard in the manhole, there was no detectable flow observed in this manhole. MH-5 has a stub entering from the south. This is the 12-inch diameter north-south line. Effluent from this line cascades to the bottom of MH-5. There is also a

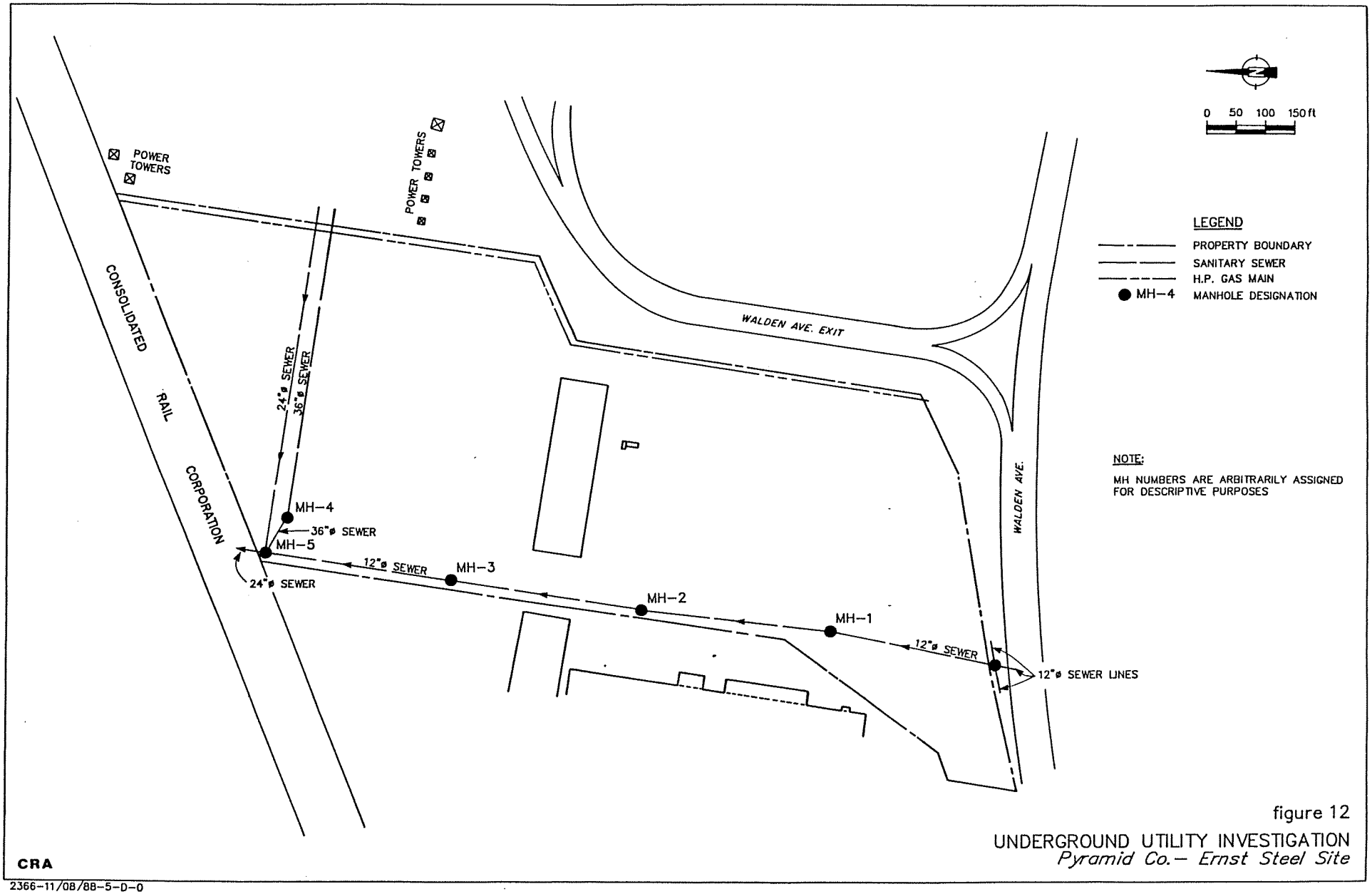

figure 12

UNDERGROUND UTILITY INVESTIGATION
Pyramid Co.— Ernst Steel Site

CRA

2366-11/08/88-5-D-0

36-inch diameter line entering from the southeast (to MH-4), a 24-inch diameter line entering from the east and a 24-inch diameter line heading nearly due north. Visual observation of flow conditions in MH-5 indicate that the direction of flow leaving MH-5 is through the 24-inch diameter line to the north. This line is the deepest service (lowest invert elevation) in the system.

The 24-inch diameter line (from the east to MH-5) is believed to tie into a manhole located east of the Ernst property. The actual origin/termination of the 36-inch line (from the east to MH-4) is unknown.

The sanitary sewer has been observed to be quite deep. During visual inspection of MH-5 the invert of the north-south line was measured to be approximately 17 feet below the rim of the manhole. The bottom of MH-5 was measured to be approximately 23 feet below the rim.

The natural gas line is a large diameter high pressure gas main which generally runs north-south, roughly parallel to the eastern fence line. The gas main is approximately 5 feet west (inside) of the fence and is believed to be approximately 4 feet below the ground surface.

Chemical migration, if any, via the bedding materials of the underground utilities is expected to be minimal due to:

i) the current minimal observed impact on the groundwater due to existing site conditions,

ii) remediation of the Site pursuant to the Interim Remedial Measures Plan reduces the source of chemistry, and

iii) on-site vaulting (see Section 12) will reduce the impact of soils remaining on-site.

11.0 CONCLUSIONS

The analytical results presented and discussed in this report indicate that off-site migration via surface water, sediments and groundwater has not occurred. The impact on the groundwater from the on-site materials has been minimal. This is as expected due to the protection of the groundwater table by the considerable clay/till unit underlying the site. This unit has a low permeability and there were no observations made of any significant waterbearing lenses in the clay/till. Consequently, there is little potential for contamination of the groundwater regime beneath the Site due to Site conditions. No Class GA standards have been exceeded. This statement is qualified by recognizing that the quantifiable limit for Arochlor 1254 was 1 ppb while the Class GA standard is 0.1 ppb.

Future impact on the groundwater, after site remediation, would be less than that currently observed due to removal of material with lead concentrations above 1000 ppm. It is noted that areas with elevated concentrations for other SSIP coincide with areas designated for excavation pursuant to the Interim Remedial Measures Plan. No excavation or removal involved any tampering with the existing clay/till unit beneath the site keeping in place this massive hydrogeologic protection feature.

The only metal found consistently above background levels in the fill is lead with the red lead paint sludge sample accounting for the majority of the other metals found above background concentrations. This red lead paint sludge was observed to be in small quantities mostly on the surface of the fill materials on site.

The Interim Remedial Measures Plan has already been established for the Site, i.e. removal and proper disposal of all soils with lead concentrations above 1000 ppm. It is recommended that a small volume of material from the isolated area in the southern portion of the Site also be excavated and appropriately disposed.

All fill materials with lead concentrations below 1000 ppm can remain on site. A fill handling proposal for this material is presented in the subsequent section of this report.

12.0 FILL HANDLING PROPOSAL

Based upon the fill characterization and additional lead analyses that have been performed for the Site, it is apparent that the fill material which does not exceed the established criteria requiring off-site disposal at a permitted waste facility can be secured on the Site in an environmentally sound manner. The proposed plan is to deposit this fill material into an area on the Site where it will not interfere with future plans for Site development. Based upon current plans, the only available area for the deposition of fill is in the vicinity of the proposed off-ramp from the Walden Avenue exit of the New York State Thruway. This off-ramp loops around south of the proposed detention basin No. 3. Figure 13 illustrates the general layout of the area including the roadways, detention basin and proposed disposal area.

The immediate interest in the southern half of the Site is to gain access to the underlying native soils which have been demonstrated to be clean (see Figure 9). At the same time, it is imperative that the plan for final Site remediation be kept in mind to insure that an overall acceptable plan of remediation is attained for the entire Site and not just the southern half. Consequently, although this proposed plan deals only with the fill material from the southern half of the Site, it is anticipated that the scope of the plan could be enlarged to accommodate the handling of

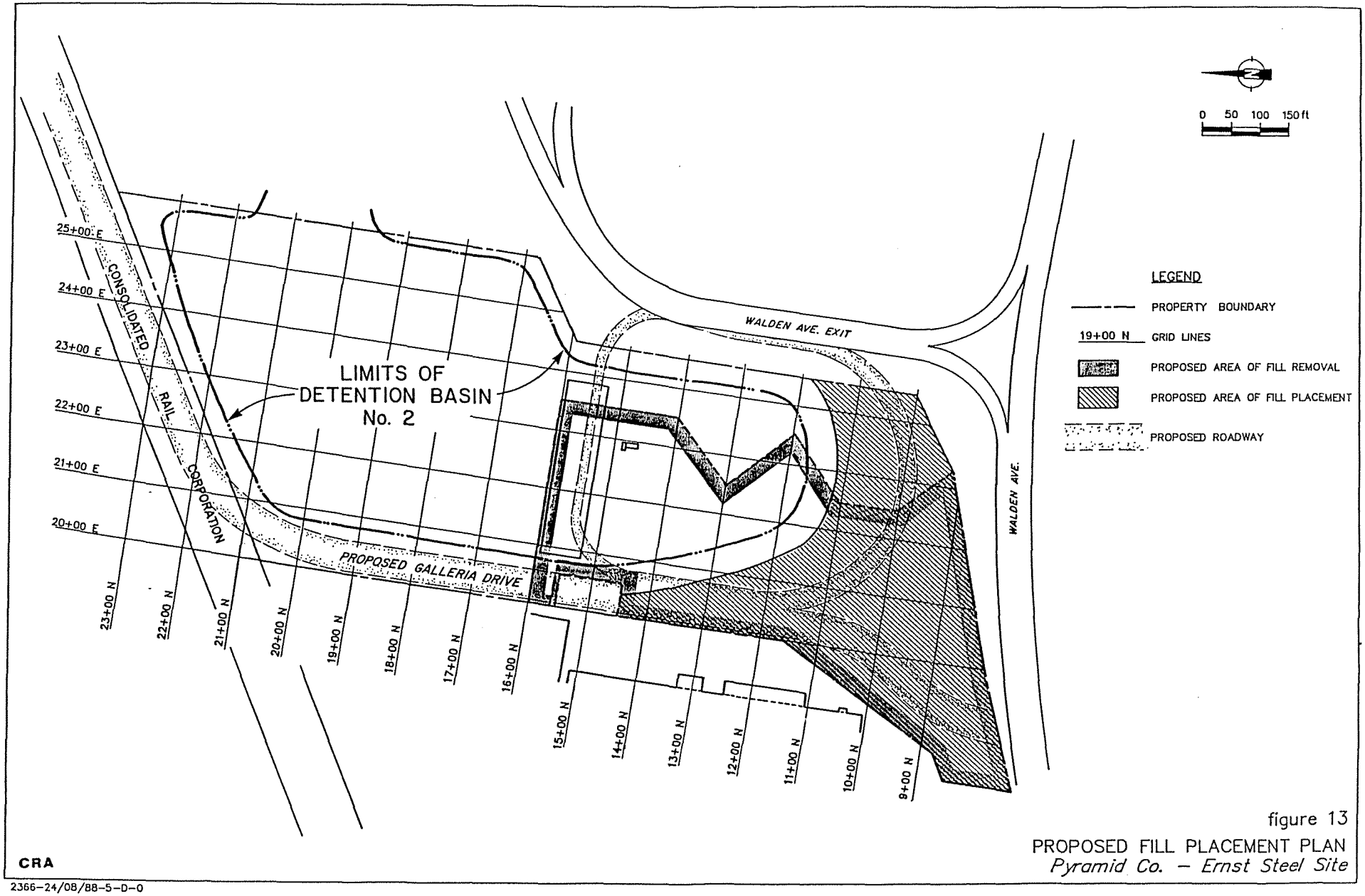

figure 13

PROPOSED FILL PLACEMENT PLAN

Pyramid Co. – Ernst Steel Site

CRA

2366-24/08/88-5-D-0

all fill material left on the Site which contains lead at concentrations of less than 1000 ppm.

The proposed plan to dispose of the fill from the southern half of the Site is presented in the following subsections of this report.

12.1 AREA PREPARATION

In order to dispose of the fill from the southern half of the Site, it will be necessary to overexcavate the area shown on Figure 13. Overexcavation is necessary because the proposed final grades for this area are not significantly different than the existing grades. Therefore, in order to maintain sight lines and surface drainage, it will be necessary to excavate a pit of appropriate depth such that once fill is placed into the pit, the top of the fill would closely match the final proposed grade except for the placement of an overlying cap, the need for which will be discussed in subsequent sections.

The ultimate required depth of the pit/disposal area is dependent upon the following factors:

- Volume of fill to be disposed.
- Available area in which to construct the disposal area.
- Final grades required to accommodate off-ramp construction and surface drainage configuration.
- Thickness of cap over fill.

In order to gain access to the proposed disposal area, the overlying fill material would be removed and placed onto the area shown for the construction of Detention Pond No. 3. The excavation of native soils from the disposal area would then proceed as expeditiously as possible to minimize the time that the fill materials lie in a disturbed state.

12.2 VOLUME OF FILL

The volume of fill to be disposed in the pit would be as follows:

- If only fill from the southern half of the Site is disposed, the volume would be on the order of 13,000 cubic yards. The total fill volume in the southern half of the Site is 16,000 cubic yards. However, approximately 3,000 cubic yards is gravel from the parking area and roadway. This gravel material will be used in other areas of the Mall Project on an as needed basis.

- If all fill including the northern half of the Site (assumes all lead concentrations less than 1,000 ppm) be placed in the disposal area, the volume would be 37,000 cubic yards (total fill volume estimated to be present at the Site) less the 3,000 cubic yards of gravel, less the 850± cubic yards of fill material already removed from the Site, less the remaining volume of fill to be removed from the Site. Thus the maximum volume of fill to be disposed would be somewhat less than 33,000 cubic yards.

12.3 AVAILABLE DISPOSAL AREA

The proposed disposal area would extend across the southern site boundary as shown on Figure 13. A 50± foot buffer zone will be maintained between the disposal area and detention pond. Similarly a 10-foot buffer zone will be maintained between the disposal area and southern and western property boundaries. Beneath the off-ramp along the eastern property boundary, additional fill may be placed if needed.

If the entire on-site area shown on Figure 13 is used for waste disposal, approximately 170,000 square feet

of storage area is available. At this size, the average fill depth deposited in the disposal area would be approximately:

- 2.1 feet to accommodate 13,000 cubic yards
- 5.2 feet to accommodate 33,000 cubic yards.

If the area under proposed Galleria Drive is not included in the disposal area, the disposal area would be reduced to approximately 121,000 square feet which would result in the following impact on fill placement depth:

- 2.9 feet to accommodate 13,000 cubic yards
- 7.4 feet to accommodate 33,000 cubic yards.

Although there is an overall intent to minimize the depth of excavation, this must be weighed against the need to maintain access and accommodate Site conditions encountered.

12.4 EXCAVATION AND HAULING PROCEDURES

Excavation and hauling of native soils will be accomplished by pan scraper, loader and dump truck or other appropriate means.

Initial stripping of the fill from the disposal area will be accomplished by similar means or by use of a bulldozer. Whatever method is employed, precautions will be taken to minimize dust generation from fill material. Should dust be measured above 150 ug/m^3 using air particulate monitoring equipment around the periphery of the excavation operation (i.e. within 200 feet of the excavation or within 50 feet of off-site boundaries) appropriate wetting of the fill will be undertaken to control fugitive dust generation. Measurements will be taken at hourly intervals during fill handling.

Haul routes will be wetted as necessary as is currently done.

12.5 SURFACE WATER CONTROL

During the excavating of native soil, berms will be constructed at the end of each working day and as needed at times of impending threat of rain to keep surface water from draining into the open excavation. This will insure that water accumulating in the excavation is only clean rain water that has fallen directly into the excavation and can therefore be pumped directly into surrounding surface water drainage ditches.

In order to maintain the integrity of the disposal area and consequently the cleanliness of the rainwater falling into the disposal area once fill placement into the disposal area has begun, the following protocols will be followed:

- fill will not be placed in the cell during rain events,
- at the conclusion of each day's fill placement or upon threat of impending rain, the exposed fill material will be covered with a thin layer of clay.

To prevent rainfall contact with freshly disturbed fill materials, the fill material initially scraped aside to gain access to the disposal area will be covered with 6 mil polyethylene and secured in place. This material will be the first material placed in the disposal area once the excavation is complete.

12.6 DISPOSAL AREA CONSTRUCTION

The soil beneath the Site has been typically characterized as clay although some silty layers were occasionally encountered and a layer of till was encountered at the monitoring well installed at the southwest corner of

the overhead crane (OW-3). Consequently, groundwater considerations are not expected to cause a concern at the proposed disposal area. Nonetheless, the following precautions will be taken:

- Sidewalls of the disposal area will be overexcavated and a 5-foot compacted clay plug will be installed to cut off the flow of groundwater from any perched water lens observed.

- Any identified clay discontinuity in the base or sidewalls of the disposal area will be overexcavated and a 2-foot layer of clay compacted in place. On-site clay is suitable for this purpose. Two samples submitted to a physical testing laboratory as part of the Phase II Site Investigation obtained remoulded permeabilities of 1.45×10^{-8} and 3.37×10^{-8} cm/sec.

- Due to the potential for concern regarding long term contact of groundwater with the fill following closure of the disposal area, the fill from the southern portion of the Site will be placed at the bottom of the disposal area. This material typically has very low lead concentration and would pose much less concern, if any at all, with groundwater contact.

- Once all of the fill is in place, the entire disposal area will be capped with 12± inches of compacted clay from the Site. This in turn will be covered with 6± inches of topsoil or road bedding material and asphalt, as appropriate. In order to support any roadways, the fill material would necessarily be compacted as it is placed in accordance with good engineering judgment.

12.7 SUMMARY

Given that the fill materials left at the Site following completion of the waste pile remediation do not constitute hazardous waste, the proposed plan of on-site disposal is environmentally sound and is a responsive solution to the environmental concern.

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APPENDIX A

WASTE CHARACTERIZATION SAMPLING RESULTS

INORGANIC ANALYSIS

Conestoga-Rovers & Associates
Waterloo, Ontario, Canada

Project #2366
Lab #66242

Matrix: Soil

August 9, 1988

FORM I
INORGANIC DATA SHEET

Envirotest Laboratories
CRA Consulting Engineers
Date Collected 7/6/88
Job # 2366

Lab # 66242-001
#1
Log Date 7/8/88

Matrix:Soil

Units: mg/kg

1.	Aluminum	3545		13.	Magnesium	1625	
2.	Antimony	10.75	U	14.	Manganese	769	
3.	Arsenic	2.15	U	15.	Mercury	0.14	
4.	Barium	38.71		16.	Nickel	39.78	
5.	Beryllium	0.54	U	17.	Potassium	559	
6.	Cadmium	1.08	U	18.	Selenium	1.08	U
7.	Calcium	5672		19.	Silver	1.08	U
8.	Chromium	9.57		20.	Sodium	538	U
9.	Cobalt	3.23	U	21.	Thallium	10.75	U
10.	Copper	184		22.	Vanadium	14.52	
11.	Iron	17870		23.	Zinc	506	
12.	Lead	208					
	Cyanide	1.08	U		Percent Solids	93	
	Phenol						

ICP interelement and background corrections applied? NO
If yes, corrections applied before ___ or after ___ generation of raw data.

U = Sample analyzed, result less than the detection limit.

Comments:

FORM I
INORGANIC DATA SHEET

Envirotest Laboratories
CRA Consulting Engineers
Date Collected 7/6/88
Job # 2366

Lab # 66242-002
#2
Log Date 7/8/88

Matrix:Soil

Units: mg/kg

1.	Aluminum	7340	13.	Magnesium	11500
2.	Antimony	10.20 U	14.	Manganese	2810
3.	Arsenic	2.04 U	15.	Mercury	0.12
4.	Barium	546	16.	Nickel	67.24
5.	Beryllium	1.63	17.	Potassium	995
6.	Cadmium	4.29	18.	Selenium	1.02 U
7.	Calcium	43900	19.	Silver	1.63
8.	Chromium	2450	20.	Sodium	3188
9.	Cobalt	29.08	21.	Thallium	10.20 U
10.	Copper	123	22.	Vanadium	26.73
11.	Iron	97800	23.	Zinc	6090
12.	Lead	334			
	Cyanide	2.04		Percent Solids	98
	Phenol				

ICP interelement and background corrections applied?]
If yes, corrections applied before ___ or after ___ generation of raw data.

U = Sample analyzed, result less than the dettection limit.

Comments:

FORM I
INORGANIC DATA SHEET

Envirotest Laboratories
CRA Consulting Engineers
Date Collected 7/6/88
Job # 2366

Lab # 66242-003
#3
Log Date 7/8/88

Matrix:Soil

Units: mg/kg

1.	Aluminum	10500		13.	Magnesium	6610	
2.	Antimony	11.36	U	14.	Manganese	682	
3.	Arsenic	2.27	U	15.	Mercury	0.09	
4.	Barium	110		16.	Nickel	25.91	
5.	Beryllium	0.68		17.	Potassium	568	U
6.	Cadmium	1.14	U	18.	Selenium	1.14	U
7.	Calcium	19400		19.	Silver	1.14	U
8.	Chromium	33.98		20.	Sodium	568	U
9.	Cobalt	7.50		21.	Thallium	11.36	U
10.	Copper	47.39		22.	Vanadium	32.3	
11.	Iron	31300		23.	Zinc	139	
12.	Lead	443					
	Cyanide	1.14		Percent Solids		88	
	Phenol						

ICP interelement and background corrections applied? NO
If yes, corrections applied before ___ or after ___ generation of raw data.

U = Sample analyzed, result less than the detection limit.

Comments:

FORM I
INORGANIC DATA SHEET

Envirotest Laboratories
CRA Consulting Engineers
Date Collected 7/6/88
Job # 2366

Lab # 66242-004
#4
Log Date 7/8/88

Matrix:Soil

Units: mg/kg

1.	Aluminum	3410		13.	Magnesium	544	U
2.	Antimony	10.87	U	14.	Manganese	116	
3.	Arsenic	2.17	U	15.	Mercury	0.09	
4.	Barium	55.43		16.	Nickel	10.87	
5.	Beryllium	0.54	U	17.	Potassium	544	U
6.	Cadmium	1.09	U	18.	Selenium	1.09	U
7.	Calcium	3130		19.	Silver	1.09	U
8.	Chromium	10.43		20.	Sodium	544	U
9.	Cobalt	3.26	U	21.	Thallium	10.87	U
10.	Copper	249		22.	Vanadium	14.67	
11.	Iron	22200		23.	Zinc	29.78	
12.	Lead	376					
	Cyanide	1.09	U		Percent Solids	92	
	Phenol						

ICP interelement and background corrections applied? NO
If yes, corrections applied before ___ or after ___ generation of raw data.

U = Sample analyzed,result less than the detection limit.

Comments:

FORM I
INORGANIC DATA SHEET

Envirotest Laboratories
CRA Consulting Engineers
Date Collected 7/6/88
Job # 2366

Lab # 66242-005
#5
Log Date 7/8/88

Matrix:Soil

Units: mg/kg

1.	Aluminum	5590		13.	Magnesium	7380	
2.	Antimony	11.49	U	14.	Manganese	3760	
3.	Arsenic	2.30	U	15.	Mercury	0.09	U
4.	Barium	59.77		16.	Nickel	10.80	
5.	Beryllium	0.57	U	17.	Potassium	575	U
6.	Cadmium	1.15	U	18.	Selenium	1.15	U
7.	Calcium	37700		19.	Silver	1.15	U
8.	Chromium	15.29		20.	Sodium	575	U
9.	Cobalt	3.45	U	21.	Thallium	11.49	U
10.	Copper	18.74		22.	Vanadium	28.28	
11.	Iron	33600		23.	Zinc	26.21	
12.	Lead	100	U				
	Cyanide	1.15	U	Percent Solids		87	
	Phenol						

ICP interelement and background corrections applied? NO
If yes, corrections applied before ___ or after ___ generation of raw data.

U = Sample analyzed, result less than the detection limit.

Comments:

ORGANIC ANALYSIS

Conestoga-Rovers & Associates
Waterloo, Ontario, Canada

Project #2366
Lab #66242

Matrix: Soil

August 9, 1988

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Assoc.

Lab Number: 66242-001

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #1

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8240

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
74-87-3	Chloromethane	11.U	78-87-5	1,2-Dichloropropane	5.4.U
74-83-9	Bromomethane	11.U	10061-02-6	Trans-1,3-Dichloropropene	5.4.U
75-01-4	Vinyl Chloride	11.U	79-01-6	Trichloroethene	5.4.U
75-00-3	Chloroethane	11.U	124-48-1	Dibromochloromethane	5.4 U
75-09-2	Methylene Chloride	17.B	79-00-5	1,1,2-Trichloroethane	5.4.U
67-64-1	Acetone	38.BJ	71-43-2	Benzene	5.4.U
75-15-0	Carbon Disulfide	5.4.U	10061-01-5	cis-1,3-Dichloropropene	5.4.U
75-35-4	1,1-Dichloroethene	5.4.U	110-75-8	2-Chloroethylvinylether	11.U
75-34-3	1,1-Dichloroethane	5.4.U	75-25-2	Bromoform	5.4.U
156-60-5	Trans-1,2-Dichloroethene	5.4.U	108-10-1	4-Methyl-2-Pentanone	11.U
67-66-3	Chloroform	3.6.J	591-78-6	2-Hexanone	11.U
107-02-2	1,2-Dichloroethane	5.4.U	127-18-4	Tetrachloroethene	5.4.U
78-93-3	2-Butanone	11.U	79-34-5	1,1,2,2-Tetrachloroethane	5.4.U
71-55-6	1,1,1-Trichloroethane	5.4.U	108-88-3	Toluene	5.4.U
56-23-6	Carbon Tetrachloride	5.4.U	108-90-7	Chlorobenzene	5.4.U
108-05-4	Vinyl Acetate	11.U	100-41-4	Ethylbenzene	5.4.U
75-27-4	Bromodichloromethane	5.4.U	100-42-5	Styrene	5.4.U
				Total Xylenes	5.4.U

Data Reporting Qualifiers

Value-If the result is a value greater than or equal to the detection limit, report the value.

U-Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J-Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/l and a concentration of 3.0 ug/l is calculated, report as 3J.

C-This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/ul in the final extract should be confirmed by GC/MS.

B-This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other-Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Associates — Lab Number: 66242-001

Project Name: #2366, Pyramid/Ernst Steel Site — Date Collected: 7/6/88

Sample Location: #1 — Date Received: 7/8/88

Matrix: Soil — SW846 METHOD 8270

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
108-95-2	Phenol	360.U	83-32-9	Acenaphthene	360.U
111-44-4	bis(-2-Chloroethyl)Ether	360.U	51-28-5	2,4-Dinitrophenol	360.U
95-57-8	2-Chlorophenol	360.U	100-02-7	4-Nitrophenol	360.U
541-73-1	1,3-Dichlorobenzene	360.U	132-64-9	Dibenzofuran	360.U
106-46-7	1,4-Dichlorobenzene	360.U	121-14-2	2,4-Dinitrotoluene	360.U
100-51-6	Benzyl Alcohol	360.U	606-20-2	2,6-Dinitrotoluene	360.U
95-50-1	1,2-Dichlorobenzene	360.U	84-66-2	Diethylphthalate	360.U
95-48-7	2-Methylphenol	360.U	7005-72-3	4-Chlorophenyl-phenlyether	360.U
39638-32-9	bis(2-chloroisopropyl)Ether	360.U	86-73-7	Fluorene	360.U
106-44-5	4-Methylphenol	360.U	100-01-6	4-Nitroaniline	360.U
621-64-7	N-Nitroso-Di-n-Propylamine	360.U	534-52-1	4,6-Dinitro-2-Methylphenol	360.U
67-72-1	Hexachloroethane	360.U	86-30-6	N-Nitrosodiphenylamine (1)	360.U
98-95-3	Nitrobenzene	360.U	101-55-3	4-Bromophenyl-phenylether	360.U
78-59-1	Isophorone	360.U	118-74-1	Hexachlorobenzene	360.U
88-75-5	2-Nitrophenol	360.U	87-86-5	Pentachlorophenol	360.U
105-67-9	2,4-Dimethylphenol	360.U	85-01-8	Phenanthrene	360.U
65-85-0	Benzoic Acid	360.U	120-12-7	Anthracene	360.U
111-91-1	bis(-2-Chloroethoxy)Methane	360.U	84-74-2	Di-n-Butylphthalate	360.U
120-83-2	2,4-Dichlorophenol	360.U	206-44-0	Fluoranthene	360.U
120-82-1	1,2,4-Trichlorobenzene	360.U	129-00-0	Pyrene	360.U
91-20-3	Naphthalene	360.U	85-68-7	Butylbenzylphthalate	360.U
106-47-8	4-Chloroaniline	360.U	91-94-1	3,3'-Dichlorobenzidine	360.U
87-68-3	Hexachlorobutadiene	360.U	56-55-3	Benzo(a)Anthracene	360.U
59-50-7	4-Chloro-3-Methylphenol	360.U	117-81-7	bis(2-Ethylhexyl)Phthalate	140.J
91-57-6	2-Methylnaphthalene	360.U	218-01-9	Chrysene	360.U
77-47-4	Hexachlorocyclopentadiene	360.U	117-84-0	Di-n-Octyl Phthalate	360.U
88-06-2	2,4,6-Trichlorophenol	360.U	205-99-2	Benzo(b)Fluoranthene	360.U
95-95-4	2,4,5-Trichlorophenol	360.U	207-08-9	Benzo(k)Fluoranthene	360.U
91-58-7	2-Chloronaphthalene	360.U	50-32-8	Benzo(a)Pyrene	360.U
88-74-4	2-Nitroaniline	360.U	193-39-5	Indeno(1,2,3-cd)Pyrene	360.U
131-11-3	Dimethyl Phthalate	360.U	53-70-3	Dibenzo(a,h)Anthracene	360.U
208-96-8	Acenaphthylene	360.U	191-24-2	Benzo(g,h,i)Perylene	360.U
99-09-2	3-Nitroaniline	360.U			

(1)-Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers | Date Received: 7/8/88

Project: #2366, Pyramid/Ernst Steel | Date Collected: 7/6/88

Laboratory Number: 66242-001 | Matrix: Soil

Sample Location: #1 | Method:SW846-8080

Pesticides/PCBs

CAS NO.	COMPOUND	ug/kg
319-84-6	Alpha-BHC	18.U
319-87-7	Beta-BHC	18.U
319-86-8	Delta-BHC	18.U
58-89-9	Gamma-BHC(Lindane)	18.U
76-44-8	Heptachlor	18.U
309-00-2	Aldrin	18.U
1024-57-3	Heptachlor Epoxide	18.U
959-98-8	Endosulfan I	18.U
60-57-1	Dieldrin	36.U
72-55-9	4,4'-DDE	36.U
72-20-8	Endrin	36.U
33213-65-9	Endosulfan II	36.U
72-54-8	4,4'-DDD	36.U
1031-07-8	Endosulfan Sulfate	36.U
50-29-3	4,4'-DDT	36.U
72-43-5	Methoxychlor	180.U
53494-70-5	Endrin Ketone	36.U
57-74-9	Chlordane	180.U
8001-35-2	Toxaphene	360.U
12674-11-2	Arochlor-1016	180.U
11104-28-2	Arochlor-1221	180.U
11141-16-5	Arochlor-1232	180.U
53469-21-9	Arochlor-1242	180.U
12672-29-6	Arochlor-1248	180.U
11097-69-1	Arochlor-1254	360.U
11096-82-5	Arochlor-1260	360.U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Assoc.

Lab Number: 66242-002

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #2

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8240

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
74-87-3	Chloromethane	10.U	78-87-5	1,2-Dichloropropane	5.4.U
74-83-9	Bromomethane	10.U	10061-02-6	Trans-1,3-Dichloropropene	5.4.U
75-01-4	Vinyl Chloride	10.U	79-01-6	Trichloroethene	5.4.U
75-00-3	Chloroethane	10.U	124-48-1	Dibromochloromethane	5.4 U
75-09-2	Methylene Chloride	22.B	79-00-5	1,1,2-Trichloroethane	5.4.U
67-64-1	Acetone	110.B	71-43-2	Benzene	5.4.U
75-15-0	Carbon Disulfide	5.1.U	10061-01-5	cis-1,3-Dichloropropene	5.1.U
75-35-4	1,1-Dichloroethene	5.1.U	110-75-8	2-Chloroethylvinylether	10.U
75-34-3	1,1-Dichloroethane	5.1.U	75-25-2	Bromoform	5.1.U
156-60-5	Trans-1,2-Dichloroethene	5.1.U	108-10-1	4-Methyl-2-Pentanone	10.U
67-66-3	Chloroform	3.5.J	591-78-6	2-Hexanone	10.U
107-02-2	1,2-Dichloroethane	5.1.U	127-18-4	Tetrachloroethene	5.1.U
78-93-3	2-Butanone	10.U	79-34-5	1,1,2,2-Tetrachloroethane	5.1.U
71-55-6	1,1,1-Trichloroethane	5.1.U	108-88-3	Toluene	5.1.U
56-23-6	Carbon Tetrachloride	5.1.U	108-90-7	Chlorobenzene	5.1.U
108-05-4	Vinyl Acetate	10.U	100-41-4	Ethylbenzene	5.1.U
75-27-4	Bromodichloromethane	5.1.U	100-42-5	Styrene	5.1.U
				Total Xylenes	5.1.U

Data Reporting Qualifiers

Value-If the result is a value greater than or equal to the detection limit, report the value.

U-Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J-Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/l and a concentration of 3.0 ug/l is calculated, report as 3J.

C-This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/ul in the final extract should be confirmed by GC/MS.

B-This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other-Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Associates

Lab Number: 66242-002

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #2

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8270

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
108-95-2	Phenol	340.U	83-32-9	Acenaphthene	340.U
111-44-4	bis(-2-Chloroethyl)Ether	340.U	51-28-5	2,4-Dinitrophenol	340.U
95-57-8	2-Chlorophenol	340.U	100-02-7	4-Nitrophenol	340.U
541-73-1	1,3-Dichlorobenzene	340.U	132-64-9	Dibenzofuran	340.U
106-46-7	1,4-Dichlorobenzene	340.U	121-14-2	2,4-Dinitrotoluene	340.U
100-51-6	Benzyl Alcohol	340.U	606-20-2	2,6-Dinitrotoluene	340.U
95-50-1	1,2-Dichlorobenzene	340.U	84-66-2	Diethylphthalate	340.U
95-48-7	2-Methylphenol	340.U	7005-72-3	4-Chlorophenyl-phenlyether	340.U
39638-32-9	bis(2-chloroisopropyl)Ether	340.U	86-73-7	Fluorene	340.U
106-44-5	4-Methylphenol	250.J	100-01-6	4-Nitroaniline	340.U
621-64-7	N-Nitroso-Di-n-Propylamine	340.U	534-52-1	4,6-Dinitro-2-Methylphenol	340.U
67-72-1	Hexachloroethane	340.U	86-30-6	N-Nitrosodiphenylamine (1)	340.U
98-95-3	Nitrobenzene	340.U	101-55-3	4-Bromophenyl-phenylether	340.U
78-59-1	Isophorone	340.U	118-74-1	Hexachlorobenzene	340.U
88-75-5	2-Nitrophenol	340.U	87-86-5	Pentachlorophenol	340.U
105-67-9	2,4-Dimethylphenol	340.U	85-01-8	Phenanthrene	340.U
65-85-0	Benzoic Acid	340.U	120-12-7	Anthracene	340.U
111-91-1	bis(-2-Chloroethoxy)Methane	340.U	84-74-2	Di-n-Butylphthalate	240.J
120-83-2	2,4-Dichlorophenol	340.U	206-44-0	Fluoranthene	150.J
120-82-1	1,2,4-Trichlorobenzene	340.U	129-00-0	Pyrene	340.U
91-20-3	Naphthalene	340.U	85-68-7	Butylbenzylphthalate	580
106-47-8	4-Chloroaniline	340.U	91-94-1	3,3'-Dichlorobenzidine	340.U
87-68-3	Hexachlorobutadiene	340.U	56-55-3	Benzo(a)Anthracene	340.U
59-50-7	4-Chloro-3-Methylphenol	340.U	117-81-7	bis(2-Ethylhexyl)Phthalate	3420
91-57-6	2-Methylnaphthalene	340.U	218-01-9	Chrysene	340.U
77-47-4	Hexachlorocyclopentadiene	340.U	117-84-0	Di-n-Octyl Phthalate	340.U
88-06-2	2,4,6-Trichlorophenol	340.U	205-99-2	Benzo(b)Fluoranthene	340.U
95-95-4	2,4,5-Trichlorophenol	340.U	207-08-9	Benzo(k)Fluoranthene	340.U
91-58-7	2-Chloronaphthalene	340.U	50-32-8	Benzo(a)Pyrene	340.U
88-74-4	2-Nitroaniline	340.U	193-39-5	Indeno(1,2,3-cd)Pyrene	340.U
131-11-3	Dimethyl Phthalate	340.U	53-70-3	Dibenzo(a,h)Anthracene	340.U
208-96-8	Acenaphthylene	340.U	191-24-2	Benzo(g,h,i)Perylene	340.U
99-09-2	3-Nitroaniline	340.U			

(1)-Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers — Date Received: 7/8/88

Project: #2366, Pyramid/Ernst Steel — Date Collected: 7/6/88

Laboratory Number: 66242-002 — Matrix: Soil

Sample Location: #2 — Method:SW846-8080

Pesticides/PCBs

CAS NO.	COMPOUND	ug/kg
319-84-6	Alpha-BHC	520.U
319-87-7	Beta-BHC	520.U
319-86-8	Delta-BHC	520.U
58-89-9	Gamma-BHC(Lindane)	520.U
76-44-8	Heptachlor	520.U
309-00-2	Aldrin	520.U
1024-57-3	Heptachlor Epoxide	520.U
959-98-8	Endosulfan I	520.U
60-57-1	Dieldrin	1100.U
72-55-9	4,4'-DDE	1100.U
72-20-8	Endrin	1100.U
33213-65-9	Endosulfan II	1100.U
72-54-8	4,4'-DDD	1100.U
1031-07-8	Endosulfan Sulfate	1100.U
50-29-3	4,4'-DDT	1100.U
72-43-5	Methoxychlor	5400.U
53494-70-5	Endrin Ketone	1100.U
57-74-9	Chlordane	5400.U
8001-35-2	Toxaphene	11,000.U
12674-11-2	Arochlor-1016	5400.U
11104-28-2	Arochlor-1221	5400.U
11141-16-5	Arochlor-1232	5400.U
53469-21-9	Arochlor-1242	5400.U
12672-29-6	Arochlor-1248	5400.U
11097-69-1	Arochlor-1254	17,000
11096-82-5	Arochlor-1260	11,000.U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Assoc.

Lab Number: 66242-003

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #3

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8240

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
74-87-3	Chloromethane	11.U	78-87-5	1,2-Dichloropropane	5.4.U
74-83-9	Bromomethane	11.U	10061-02-6	Trans-1,3-Dichloropropene	5.4.U
75-01-4	Vinyl Chloride	11.U	79-01-6	Trichloroethene	5.4.U
75-00-3	Chloroethane	11.U	124-48-1	Dibromochloromethane	5.4 U
75-09-2	Methylene Chloride	14.B	79-00-5	1,1,2-Trichloroethane	5.4.U
67-64-1	Acetone	110.B	71-43-2	Benzene	5.4.U
75-15-0	Carbon Disulfide	5.7.U	10061-01-5	cis-1,3-Dichloropropene	5.7.U
75-35-4	1,1-Dichloroethene	5.7.U	110-75-8	2-Chloroethylvinylether	11.U
75-34-3	1,1-Dichloroethane	5.7.U	75-25-2	Bromoform	5.7.U
156-60-5	Trans-1,2-Dichloroethene	5.7.U	108-10-1	4-Methyl-2-Pentanone	11.U
67-66-3	Chloroform	3.7.J	591-78-6	2-Hexanone	11.U
107-02-2	1,2-Dichloroethane	5.7.U	127-18-4	Tetrachloroethene	5.7.U
78-93-3	2-Butanone	11.U	79-34-5	1,1,2,2-Tetrachloroethane	5.7.U
71-55-6	1,1,1-Trichloroethane	5.7.U	108-88-3	Toluene	5.7.U
56-23-5	Carbon Tetrachloride	5.7.U	108-90-7	Chlorobenzene	5.7.U
108-05-4	Vinyl Acetate	11.U	100-41-4	Ethylbenzene	5.7.U
75-27-4	Bromodichloromethane	5.7.U	100-42-5	Styrene	5.7.U
				Total Xylenes	5.7.U

Data Reporting Qualifiers

Value-If the result is a value greater than or equal to the detection limit, report the value.

U-Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J-Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/l and a concentration of 3.0 ug/l is calculated, report as 3J.

C-This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/ul in the final extract should be confirmed by GC/MS.

B-This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other-Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Associates — Lab Number: 66242-003

Project Name: #2366, Pyramid/Ernst Steel Site — Date Collected: 7/6/88

Sample Location: #3 — Date Received: 7/8/88

Matrix: Soil — SW846 METHOD 8270

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
108-95-2	Phenol	380.U	83-32-9	Acenaphthene	380.U
111-44-4	bis(-2-Chloroethyl)Ether	380.U	51-28-5	2,4-Dinitrophenol	380.U
95-57-8	2-Chlorophenol	380.U	100-02-7	4-Nitrophenol	380.U
541-73-1	1,3-Dichlorobenzene	380.U	132-64-9	Dibenzofuran	380.U
106-46-7	1,4-Dichlorobenzene	380.U	121-14-2	2,4-Dinitrotoluene	380.U
100-51-6	Benzyl Alcohol	380.U	606-20-2	2,6-Dinitrotoluene	380.U
95-50-1	1,2-Dichlorobenzene	380.U	84-66-2	Diethylphthalate	380.U
95-48-7	2-Methylphenol	380.U	7005-72-3	4-Chlorophenyl-phenlyether	380.U
39638-32-9	bis(2-chloroisopropyl)Ether	380.U	86-73-7	Fluorene	380.U
106-44-5	4-Methylphenol	380.U	100-01-6	4-Nitroaniline	380.U
621-64-7	N-Nitroso-Di-n-Propylamine	380.U	534-52-1	4,6-Dinitro-2-Methylphenol	380.U
67-72-1	Hexachloroethane	380.U	86-30-6	N-Nitrosodiphenylamine (1)	380.U
98-95-3	Nitrobenzene	380.U	101-55-3	4-Bromophenyl-phenylether	380.U
78-59-1	Isophorone	380.U	118-74-1	Hexachlorobenzene	380.U
88-75-5	2-Nitrophenol	380.U	87-86-5	Pentachlorophenol	380.U
105-67-9	2,4-Dimethylphenol	380.U	85-01-8	Phenanthrene	150.J
65-85-0	Benzoic Acid	380.U	120-12-7	Anthracene	380.U
111-91-1	bis(-2-Chloroethoxy)Methane	380.U	84-74-2	Di-n-Butylphthalate	380.U
120-83-2	2,4-Dichlorophenol	380.U	206-44-0	Fluoranthene	240.J
120-82-1	1,2,4-Trichlorobenzene	380.U	129-00-0	Pyrene	380.U
91-20-3	Naphthalene	380.U	85-68-7	Butylbenzylphthalate	380.U
106-47-8	4-Chloroaniline	380.U	91-94-1	3,3'-Dichlorobenzidine	380.U
87-68-3	Hexachlorobutadiene	380.U	56-55-3	Benzo(a)Anthracene	380.U
59-50-7	4-Chloro-3-Methylphenol	380.U	117-81-7	bis(2-Ethylhexyl)Phthalate	210.J
91-57-6	2-Methylnaphthalene	350.J	218-01-9	Chrysene	220.J
77-47-4	Hexachlorocyclopentadiene	380.U	117-84-0	Di-n-Octyl Phthalate	380.U
88-06-2	2,4,6-Trichlorophenol	380.U	205-99-2	Benzo(b)Fluoranthene	190.J
95-95-4	2,4,5-Trichlorophenol	380.U	207-08-9	Benzo(k)Fluoranthene	380.U
91-58-7	2-Chlosonaphthalene	380.U	50-32-8	Benzo(a)Pyrene	150.J
88-74-4	2-Nitroaniline	380.U	193-39-5	Indeno(1,2,3-cd)Pyrene	150.J
131-11-3	Dimethyl Phthalate	380.U	53-70-3	Dibenzo(a,h)Anthracene	380.U
208-96-8	Acenaphthylene	380.U	191-24-2	Benzo(g,h,i)Perylene	380.U
99-09-2	3-Nitroaniline	380.U			

(1)-Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers | Date Received: 7/8/88

Project: #2366, Pyramid/Ernst Steel | Date Collected: 7/6/88

Laboratory Number: 66242-003 | Matrix: Soil

Sample Location: #3 | Method:SW846-8080

Pesticides/PCBs

CAS NO.	COMPOUND	ug/kg
319-84-6	Alpha-BHC	39.U
319-87-7	Beta-BHC	39.U
319-86-8	Delta-BHC	39.U
58-89-9	Gamma-BHC(Lindane)	39.U
76-44-8	Heptachlor	39.U
309-00-2	Aldrin	39.U
1024-57-3	Heptachlor Epoxide	39.U
959-98-8	Endosulfan I	39.U
60-57-1	Dieldrin	77.U
72-55-9	4,4'-DDE	77.U
72-20-8	Endrin	77.U
33213-65-9	Endosulfan II	77.U
72-54-8	4,4'-DDD	77.U
1031-07-8	Endosulfan Sulfate	77.U
50-29-3	4,4'-DDT	77.U
72-43-5	Methoxychlor	390.U
53494-70-5	Endrin Ketone	77.U
57-74-9	Chlordane	390.U
8001-35-2	Toxaphene	770.U
12674-11-2	Arochlor-1016	390.U
11104-28-2	Arochlor-1221	390.U
11141-16-5	Arochlor-1232	390.U
53469-21-9	Arochlor-1242	390.U
12672-29-6	Arochlor-1248	390.U
11097-69-1	Arochlor-1254	770.U
11096-82-5	Arochlor-1260	770.U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Assoc.

Lab Number: 66242-004

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #4

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8240

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
74-87-3	Chloromethane	11.U	78-87-5	1,2-Dichloropropane	5.4.U
74-83-9	Bromomethane	11.U	10061-02-6	Trans-1,3-Dichloropropene	5.4.U
75-01-4	Vinyl Chloride	11.U	79-01-6	Trichloroethene	5.4.U
75-00-3	Chloroethane	11.U	124-48-1	Dibromochloromethane	5.4 U
75-09-2	Methylene Chloride	21.B	79-00-5	1,1,2-Trichloroethane	5.4.U
67-64-1	Acetone	5.0.J	71-43-2	Benzene	5.4.U
75-15-0	Carbon Disulfide	5.4.U	10061-01-5	cis-1,3-Dichloropropene	5.4.U
75-35-4	1,1-Dichloroethene	5.4.U	110-75-8	2-Chloroethylvinylether	11.U
75-34-3	1,1-Dichloroethane	5.4.U	75-25-2	Bromoform	5.4.U
156-60-5	Trans-1,2-Dichloroethene	5.4.U	108-10-1	4-Methyl-2-Pentanone	11.U
67-66-3	Chloroform	4.1.J	591-78-6	2-Hexanone	11.U
107-02-2	1,2-Dichloroethane	5.4.U	127-18-4	Tetrachloroethene	5.4.U
78-93-3	2-Butanone	11.U	79-34-5	1,1,2,2-Tetrachloroethane	5.4.U
71-55-6	1,1,1-Trichloroethane	5.4.U	108-88-3	Toluene	5.4.U
56-23-5	Carbon Tetrachloride	5.4.U	108-90-7	Chlorobenzene	5.4.U
108-05-4	Vinyl Acetate	11.U	100-41-4	Ethylbenzene	5.4.U
75-27-4	Bromodichloromethane	5.4.U	100-42-5	Styrene	5.4.U
				Total Xylenes	5.4.U

Data Reporting Qualifiers

Value-If the result is a value greater than or equal to the detection limit, report the value.

U-Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J-Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/l and a concentration of 3.0 ug/l is calculated, report as 3J.

C-This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/ul in the final extract should be confirmed by GC/MS.

B-This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other-Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Associates

Lab Number: 66242-004

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #4

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8270

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
108-95-2	Phenol	360.U	83-32-9	Acenaphthene	360.U
111-44-4	bis(-2-Chloroethyl)Ether	360.U	51-28-5	2,4-Dinitrophenol	360.U
95-57-8	2-Chlorophenol	360.U	100-02-7	4-Nitrophenol	360.U
541-73-1	1,3-Dichlorobenzene	360.U	132-64-9	Dibenzofuran	770
106-46-7	1,4-Dichlorobenzene	360.U	121-14-2	2,4-Dinitrotoluene	360.U
100-51-6	Benzyl Alcohol	360.U	606-20-2	2,6-Dinitrotoluene	360.U
95-50-1	1,2-Dichlorobenzene	360.U	84-66-2	Diethylphthalate	360.U
95-48-7	2-Methylphenol	360.U	7005-72-3	4-Chlorophenyl-phenlyether	360.U
39638-32-9	bis(2-chloroisopropyl)Ether	360.U	86-73-7	Fluorene	360.U
106-44-5	4-Methylphenol	360.U	100-01-6	4-Nitroaniline	360.U
621-64-7	N-Nitroso-Di-n-Propylamine	360.U	534-52-1	4,6-Dinitro-2-Methylphenol	360.U
67-72-1	Hexachloroethane	360.U	86-30-6	N-Nitrosodiphenylamine (1)	360.U
98-95-3	Nitrobenzene	360.U	101-55-3	4-Bromophenyl-phenylether	360.U
78-59-1	Isophorone	360.U	118-74-1	Hexachlorobenzene	360.U
88-75-5	2-Nitrophenol	360.U	87-86-5	Pentachlorophenol	360.U
105-67-9	2,4-Dimethylphenol	360.U	85-01-8	Phenanthrene	850
65-85-0	Benzoic Acid	360.U	120-12-7	Anthracene	360.U
111-91-1	bis(-2-Chloroethoxy)Methane	360.U	84-74-2	Di-n-Butylphthalate	360.U
120-83-2	2,4-Dichlorophenol	360.U	206-44-0	Fluoranthene	360.U
120-82-1	1,2,4-Trichlorobenzene	360.U	129-00-0	Pyrene	160.J
91-20-3	Naphthalene	1260	85-68-7	Butylbenzylphthalate	360.U
106-47-8	4-Chloroaniline	360.U	91-94-1	3,3 -Dichlorobenzidine	360.U
87-68-3	Hexachlorobutadiene	360.U	56-55-3	Benzo(a)Anthracene	120.J
59-50-7	4-Chloro-3-Methylphenol	360.U	117-81-7	bis(2-Ethylhexyl)Phthalate	270.J
91-57-6	2-Methylnaphthalene	3330	218-01-9	Chrysene	190.J
77-47-4	Hexachlorocyclopentadiene	360.U	117-84-0	Di-n-Octyl Phthalate	360.U
88-06-2	2,4,6-Trichlorophenol	360.U	205-99-2	Benzo(b)Fluoranthene	360.U
95-95-4	2,4,5-Trichlorophenol	360.U	207-08-9	Benzo(k)Fluoranthene	360.U
91-58-7	2-Chloronaphthalene	360.U	50-32-8	Benzo(a)Pyrene	360.U
88-74-4	2-Nitroaniline	360.U	193-39-5	Indeno(1,2,3-cd)Pyrene	360.U
131-11-3	Dimethyl Phthalate	360.U	53-70-3	Dibenzo(a,h)Anthracene	360.U
208-96-8	Acenaphthylene	360.U	191-24-2	Benzo(g,h,i)Perylene	360.U
99-09-2	3-Nitroaniline	360.U			

(1)-Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers | Date Received: 7/8/88

Project: #2366, Pyramid/Ernst Steel | Date Collected: 7/6/88

Laboratory Number: 66242-004 | Matrix: Soil

Sample Location: #4 | Method:SW846-8080

Pesticides/PCBs

CAS NO.	COMPOUND	ug/kg
319-84-6	Alpha-BHC	1.8.U
319-87-7	Beta-BHC	1.8.U
319-86-8	Delta-BHC	1.8.U
58-89-9	Gamma-BHC(Lindane)	1.8.U
76-44-8	Heptachlor	1.8.U
309-00-2	Aldrin	1.8.U
1024-57-3	Heptachlor Epoxide	1.8.U
959-98-8	Endosulfan I	1.8.U
60-57-1	Dieldrin	3.6.U
72-55-9	4,4'-DDE	3.6.U
72-20-8	Endrin	3.6.U
33213-65-9	Endosulfan II	3.6.U
72-54-8	4,4'-DDD	3.6.U
1031-07-8	Endosulfan Sulfate	3.6.U
50-29-3	4,4'-DDT	3.6.U
72-43-5	Methoxychlor	18.U
53494-70-5	Endrin Ketone	3.6.U
57-74-9	Chlordane	18.U
8001-35-2	Toxaphene	36.U
12674-11-2	Arochlor-1016	18.U
11104-28-2	Arochlor-1221	18.U
11141-16-5	Arochlor-1232	18.U
53469-21-9	Arochlor-1242	18.U
12672-29-6	Arochlor-1248	18.U
11097-69-1	Arochlor-1254	36.U
11096-82-5	Arochlor-1260	36.U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Assoc.

Lab Number: 66242-005

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #5

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8240

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
74-87-3	Chloromethane	11.U	78-87-5	1,2-Dichloropropane	5.4.U
74-83-9	Bromomethane	11.U	10061-02-6	Trans-1,3-Dichloropropene	5.4.U
75-01-4	Vinyl Chloride	11.U	79-01-6	Trichloroethene	5.4.U
75-00-3	Chloroethane	11.U	124-48-1	Dibromochloromethane	5.4 U
75-09-2	Methylene Chloride	24.B	79-00-5	1,1,2-Trichloroethane	5.4.U
67-64-1	Acetone	46	71-43-2	Benzene	1.5.J
75-15-0	Carbon Disulfide	5.7.U	10061-01-5	cis-1,3-Dichloropropene	5.7.U
75-35-4	1,1-Dichloroethene	5.7.U	110-75-8	2-Chloroethylvinylether	11.U
75-34-3	1,1-Dichloroethane	5.7.U	75-25-2	Bromoform	5.7.U
156-60-5	Trans-1,2-Dichloroethene	5.7.U	108-10-1	4-Methyl-2-Pentanone	11.U
67-66-3	Chloroform	2.7.J	591-78-6	2-Hexanone	11.U
107-02-2	1,2-Dichloroethane	5.7.U	127-18-4	Tetrachloroethene	5.7.U
78-93-3	2-Butanone	11.U	79-34-5	1,1,2,2-Tetrachloroethane	5.7.U
71-55-6	1,1,1-Trichloroethane	5.7.U	108-88-3	Toluene	5.7.U
56-23-6	Carbon Tetrachloride	5.7.U	108-90-7	Chlorobenzene	5.7.U
108-05-4	Vinyl Acetate	11.U	100-41-4	Ethylbenzene	5.7.U
75-27-4	Bromodichloromethane	5.7.U	100-42-5	Styrene	5.7.U
				Total Xylenes	5.7.U

Data Reporting Qualifiers

Value-If the result is a value greater than or equal to the detection limit, report the value.

U-Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration/dilution action (This is not necessarily the instrument detection limit). The footnote should read: U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J-Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicated the presence of a compound that meets the identification criteria but the result is < than the specified detection limit but > than zero (e.g. 10J). If limit of detection is 10 ug/l and a concentration of 3.0 ug/l is calculated, report as 3J.

C-This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >= 10 ng/ul in the final extract should be confirmed by GC/MS.

B-This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns data the user to take appropriate action.

Other-Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers & Associates

Lab Number: 66242-005

Project Name: #2366, Pyramid/Ernst Steel Site

Date Collected: 7/6/88

Sample Location: #5

Date Received: 7/8/88

Matrix: Soil

SW846 METHOD 8270

CAS NO.	COMPOUND	ug/kg	CAS NO.	COMPOUND	ug/kg
108-95-2	Phenol	380.U	83-32-9	Acenaphthene	380.U
111-44-4	bis(-2-Chloroethyl)Ether	380.U	51-28-5	2,4-Dinitrophenol	380.U
95-57-8	2-Chlorophenol	380.U	100-02-7	4-Nitrophenol	380.U
541-73-1	1,3-Dichlorobenzene	380.U	132-64-9	Dibenzofuran	380.U
106-46-7	1,4-Dichlorobenzene	380.U	121-14-2	2,4-Dinitrotoluene	380.U
100-51-6	Benzyl Alcohol	380.U	606-20-2	2,6-Dinitrotoluene	380.U
95-50-1	1,2-Dichlorobenzene	380.U	84-66-2	Diethylphthalate	380.U
95-48-7	2-Methylphenol	380.U	7005-72-3	4-Chlorophenyl-phenlyether	380.U
39638-32-9	bis(2-chloroisopropyl)Ether	380.U	86-73-7	Fluorene	380.U
106-44-5	4-Methylphenol	380.U	100-01-6	4-Nitroaniline	380.U
621-64-7	N-Nitroso-Di-n-Propylamine	380.U	534-52-1	4,6-Dinitro-2-Methylphenol	380.U
67-72-1	Hexachloroethane	380.U	86-30-6	N-Nitrosodiphenylamine (1)	380.U
98-95-3	Nitrobenzene	380.U	101-55-3	4-Bromophenyl-phenylether	380.U
78-59-1	Isophorone	380.U	118-74-1	Hexachlorobenzene	380.U
88-75-5	2-Nitrophenol	380.U	87-86-5	Pentachlorophenol	380.U
105-67-9	2,4-Dimethylphenol	380.U	85-01-8	Phenanthrene	380.U
65-85-0	Benzoic Acid	380.U	120-12-7	Anthracene	380.U
111-91-1	bis(-2-Chloroethoxy)Methane	380.U	84-74-2	Di-n-Butylphthalate	380.U
120-83-2	2,4-Dichlorophenol	380.U	206-44-0	Fluoranthene	380.U
120-82-1	1,2,4-Trichlorobenzene	380.U	129-00-0	Pyrene	380.U
91-20-3	Naphthalene	380.U	85-68-7	Butylbenzylphthalate	380.U
106-47-8	4-Chloroaniline	380.U	91-94-1	3,3'-Dichlorobenzidine	380.U
87-68-3	Hexachlorobutadiene	380.U	56-55-3	Benzo(a)Anthracene	380.U
59-50-7	4-Chloro-3-Methylphenol	380.U	117-81-7	bis(2-Ethylhexyl)Phthalate	240.J
91-57-6	2-Methylnaphthalene	380.U	218-01-9	Chrysene	380.U
77-47-4	Hexachlorocyclopentadiene	380.U	117-84-0	Di-n-Octyl Phthalate	380.U
88-06-2	2,4,6-Trichlorophenol	380.U	205-99-2	Benzo(b)Fluoranthene	380.U
95-95-4	2,4,5-Trichlorophenol	380.U	207-08-9	Benzo(k)Fluoranthene	380.U
91-58-7	2-Chloronaphthalene	380.U	50-32-8	Benzo(a)Pyrene	380.U
88-74-4	2-Nitroaniline	380.U	193-39-5	Indeno(1,2,3-cd)Pyrene	380.U
131-11-3	Dimethyl Phthalate	380.U	53-70-3	Dibenzo(a,h)Anthracene	380.U
208-96-8	Acenaphthylene	380.U	191-24-2	Benzo(g,h,i)Perylene	380.U
99-09-2	3-Nitroaniline	380.U			

(1)-Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET

Client Name: Conestoga-Rovers — Date Received: 7/8/88

Project: #2366, Pyramid/Ernst Steel — Date Collected: 7/6/88

Laboratory Number: 66242-005 — Matrix: Soil

Sample Location: #5 — Method:SW846-8080

Pesticides/PCBs

CAS NO.	COMPOUND	ug/kg
319-84-6	Alpha-BHC	58.U
319-87-7	Beta-BHC	58.U
319-86-8	Delta-BHC	58.U
58-89-9	Gamma-BHC(Lindane)	58.U
76-44-8	Heptachlor	58.U
309-00-2	Aldrin	58.U
1024-57-3	Heptachlor Epoxide	58.U
959-98-8	Endosulfan I	58.U
60-57-1	Dieldrin	120.U
72-55-9	4,4'-DDE	120.U
72-20-8	Endrin	120.U
33213-65-9	Endosulfan II	120.U
72-54-8	4,4'-DDD	120.U
1031-07-8	Endosulfan Sulfate	120.U
50-29-3	4,4'-DDT	120.U
72-43-5	Methoxychlor	580.U
53494-70-5	Endrin Ketone	120.U
57-74-9	Chlordane	580.U
8001-35-2	Toxaphene	1200.U
12674-11-2	Arochlor-1016	580.U
11104-28-2	Arochlor-1221	580.U
11141-16-5	Arochlor-1232	580.U
53469-21-9	Arochlor-1242	580.U
12672-29-6	Arochlor-1248	580.U
11097-69-1	Arochlor-1254	1200.U
11096-82-5	Arochlor-1260	1200.U

COPY

MEMO

To: B. Clegg/K. Schmidtke Reference No. 2366

From: T. Misercola

Date: 9/21/88

Re: Reissue of Memo Dated 8/24/88
Discussion of Results for Pyramid/Ernst Steel

The following memo details as assessment of analytical results reported by Envirotest for soil samples collected from the Pyramid Site. The samples submitted for analysis consisted of the following:

Matrix:	Soil/Fill
Investigative Samples:	5

All samples were submitted for HSL volatile organics, semi-volatile organics, metals and cyanide. CLP-RAS Methods for Organic and Inorganic Analyses were used.

The QA/QC criteria by which these data have been assessed are outlined in the Statement of Work (SOW) for Organic and Inorganic Analyses for Contract Laboratory Programs.

Based on review of this data set and related quality control data, the following are noted:

1. Sample Holding Time

   Based on criteria outlined in Functional Guidelines for Evaluating Organic and Inorganic Analysis prepared by the USEPA, the following holding time requirements have been established for the Contract Lab Program analyses:

VOA (solids)	10 days from verified time of sample receipt
Semi-Volatiles (solids)	10 days from verified time of sample receipt

Pesticides/PCBs (solids)	10 days from verified time of sample receipt till extraction
Metals (solids)	6 months prior to analysis
Mercury (solids)	28 days prior to analysis
Cyanide (solids)	14 days prior to distillation

By comparing the sampling dates of all samples on the Chain of Custody and the actual dates of sample receipt for the dates of extraction and/or analysis, it is noted that all samples were handled properly in regards to holding time requirements. However, it should be noted that in the laboratory data package there was no mention as to the date of the distillation for the cyanide analyses for all five soil samples.

Action: Until notification from laboratory of actual dates of distillation are known, all results for cyanide shall be flagged as follows:

Sample ID = xxxx-oooo-yyy

x = project number
o = time of collection
y = sample number

Sample ID No.	Result (mg/kg)
2366-1420-001	1.08 UJ
2366-1440-002	2.04 J
2366-1515-003	1.14 J
2366-1515-004	1.09 UJ
2366-1600-005	1.15 UJ

UJ = The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or inprecise.
J = The associated value is an estimated value

2. Spike Recoveries and Surrogate Recoveries

Laboratory performance on individual samples is established by spiking activities. All samples submitted for volatile, semi-volatile and pesticides/PCB analysis were spiked with surrogate compounds prior to sample preparation.

A. Discussion of Results - Organics

All samples submitted for VOA and pesticide/PCB analyses yielded surrogate recoveries within the control limits established by CLP-RAS protocols. Therefore, no qualifications of the VOA data is required on this basis.

However, problems did occur in the semi-volatile surrogate recoveries. All surrogate in the base neutral fraction gave acceptable recoveries but four of the five samples for the acid fraction gave at least two surrogates out of the required control limit.

Action: The samples should have been, by contract requirements, re-extracted and reanalyzed. By not doing so, the laboratory failed to perform satisfactorily. However, the following qualifiers should be noted for samples 2366-02 to 2366-05 for use of this data:

2366-1440-002 (1) positive results for acid extractables are flagged as estimated (J)
(2) negative results (less than detection limit) are useable because surrogate recovery was less than 10 percent.

2366-1515-003 (1) positive results for acid extractables are flagged as estimated (J).
(2) negative results (less than detection limit) are unusable because surrogate recovery was less than 10 10 percent.

2366-1515-004 (1) positive results for acid extractables are flagged as estimates (J).

(2) negative results (results less than detection limit) are flagged with the sample quantitation number classified as estimated (UJ).

2366-1600-005 (1) positive results for acid extractables are flagged as estimated (J).

(2) negative results (less than detection limit) are unusable because surrogate recovery was less than 10 percent.

B. Discussion of Results - Inorganics - Matrix Spike Analysis

The matrix spike sample analysis provides information about the effect of sample matrix on the digestion and measurement methodology.

Acceptable spike recovery limits for metal analyses is established as 75-125 percent as indicated in "Functional Guidelines for Evaluating Inorganic Analyses". The following spike recoveries for the metals listed failed to achieve that criteria in sample 2366-1420-001.

Metal	Percent Recovery
Lead	0
Mercury	60
Nickel	71
Selenium	68

In addition, poor spike recovery was found in copper and zinc analysis. However, Functional Guidelines for Evaluating Inorganic Analysis states that spike recovery limits are not acceptable when sample concentration for the analytes of interest exceed the spike concentration by at least a factor of 4 or more.

Action: The following qualifications are made for those metals out of compliance for spike recovery:

Sample I.D. No.	Metal	Result
2366-1420-001	Lead	208 J
	Mercury	0.14 J
	Nickel	39.78 J
	Selenium	1.08 UJ
2366-1440-002	Lead	334 J
	Mercury	0.12 J
	Nickel	67.24 J
	Selenium	1.02 UJ
2366-1515-003	Lead	443 J
	Mercury	109 J
	Nickel	25.91 J
	Selenium	1.14 UJ
2366-1515-004	Lead	376 J
	Mercury	109 J
	Nickel	10.87 J
	Selenium	1.09 UJ
2366-1600-005	Lead	100 UJ
	Mercury	109 UJ
	Nickel	10.80 J
	Selenium	1.15 UJ

J = Associated value is an estimated quantity
UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or inprecise.

3. Laboratory/Reagent Blank Analysis

The assessment of results on blank analyses is for the purpose of determining the existence and magnitude of contamination problems. Laboratory reagent blanks must contain less than the Contract Required Detection Limit (CRDL) for all HSL compounds and less than five times the CRDL of methylene chloride, acetone, toluene and 2-butanone.

All blanks submitted for HSL metals and VOAs met those requirements. However, although no CRDL existed for 1-propanol, high levels of that compound were detected in the following laboratory reagent blanks:

Date	Concentration (ug/l)
6/30/88	59
7/08/88	75
7/14/88	70

No positive results for 1-propanol are reported unless the concentration in the sample exceeds five times the amount in the blank. Correction action at this point would be to flag all data for 1-propanol in all five samples as non-detected and adjust the sample quantitation limit to the value reported in the sample and flag the limit as estimated (UJ):

ID Number	Results (ug/kg)	Detection Limit
2366-1420-001	ND	25 UJ
2366-1440-002	ND	26 UJ
2366-1515-003	ND	9.1 UJ
2366-1515-004	ND	63 UJ
2366-1600-005	ND	37 UJ

UJ = The material was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or inprecise.

4. Continuing Calibration

"Laboratory Functional Guidelines for Evaluating Organic Analyses" specifies that all systems performance calibration compounds (SPCC's) for semi-volatile analyses have average response factors greater than 0.05. Acid extractable compound 2,4-dinitrophenol showed less than required average response factor values.

Action: All sample results for 2,4-dinitrophenol should be flagged as useable.

5. Matrix Spike/Matrix Spike Duplicate Analysis

In general, no action is taken on MS/MSD data to qualify an entire case as these data alone do not give a proper indication of the precision and accuracy of the analysis of a particular sample.

The precision of an analytical method is demonstrated by the reproducibility of the data. Tables 1A and 1B are the Relative Percent Differences (RPD) between duplicate matrix spike analyses.

All MS/MSD recoveries for metals and VOAs were within the control limits established by CLP-RAS protocols as presented in Tables 1A and 1B. Five of the 11 MS/MSD recoveries for base/neutral and acid compounds were out of control. This may imply a high bias in results for those compounds out of the recovery limits, but all concentrations for the five spike compounds were reported as less than detection limit in each sample analyzed.

6. Summary

In summary, Envirotest Labs have been notified verbally and shortly, in writing, as to the deficiencies in the data presented to CRA. Until such time as we receive notification as to what they plan to do about the deficiencies, the data presented is not acceptable for use for the following reasons:

a) No date of distillation for cyanide analysis.
b) At least two surrogate recoveries for the acid fraction in samples 2, 3, 4 and 5 were outside control limit. Lab should re-extract and reanalyze.
c) Spike recoveries for metals were generally out of control, a post digestion spike is required in this case but no data in the report indicates that it was performed.
d) Due to high levels of 1-propanol in laboratory blanks, all results given for that compound should be listed as non-detected.

e) Average response factors in the continuing calibration for 2,4-dinitrophenol were not within their specified limits, making all data for that compound unusable.

References:

1. "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", Technical Directive Document, Prepared by the USEPA Data Validation Work Group, NUS Corporation Superfund Division.

2. "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", prepared by the USEPA Office of Emergency and Remedial Response.

TM:jd
Attachments

Table 1A
Relative Percent Difference
Duplicate Matrix Spike Analysis
Inorganic Parameters

I.D. Number	Parameter	RPD(1)	Spike Recovery (percent)	Dup./Spike Recovery (percent)
2366-1420-001	Antimony	35.2	100	70*
	Arsenic	27.1	113	86
	Barium	2.4	87	85
	Beryllium	2.4	86	84
	Cadmium	4.8	86	82
	Chromium	15.8	89	76
	Cobalt	15.4	96	83
	Cyanide	--	105	--
	Mercury	18.2	60*	50*
	Selenium	3.0	68*	66*
	Silver	2.2	90	88
	Thallium	0	105	105
	Vanadium	3.6	86	83

(1) Relative percent difference between spike duplicate analysis.
* Outside of spike control limits.

Note: Control limits for RPD assumed to be 35± percent.
Control limits for spike recovery are 75-125 percent.

Table 1B
Relative Percent Difference
Duplicate Matrix Spike Data
Organic Parameters

I.D. Number	Parameter	RPD (1)	RPD(2) Control Limits	Spike Recovery (percent)	Dup./Spike Recovery (percent)
GC/MS Volatile Compounds					
2366-1600-005	1,1-Dichloroethene	7.6	22	96	89
	Trichloroethene	3.8	24	106	102
	Chlorobenzene	1.0	21	103	102
	Toluene	3.2	21	91	94
	Benzene	4.9	21	100	105
BNA Compounds					
2366-1600-005	1,2,4-Trichlorobenzene	22	23	70	56
	Acenapthene	21*	19	47	38
	2,4-Dinitrotoluene	23	47	92*	73
	Pyrene	21	36	52	42
	N-Nitroso Di-N-Propylamine	1.7	38	58	59
	1,4-Dichlorobenzene	20	27	82	67
	Pentachlorophenol	129*	47	9.6*	45*
	Phenol	56*	35	31	55
	2-Chlorophenol	73*	50	25	54
	4-Chloro-3 Methylphenol	142*	33	8.8*	52
	4-Nitrophenol	7.4	50	65	70
Pesticides					
2366-1420-001	Lindane	11	51	50	56
	Heptachlor	7.8	31	74	80
	Aldrin	9.6	43	69	76
	Dieldrin	6.9	38	56	60
	Endrin	2.9	45	67	69
	4,4-DDT	0	50	65	65

(1) Relative Percent Difference

(2) Control limits for RPD analysis are detailed in SW-846 (Sept. 1986)

* Values outside QC limits

COPY

MEMO

To: Bruce Clegg Reference No. 2366

From: Tony Misercola

Date: 9/21/88

Re: Envirotest Laboratories - Pyramid/Ernst Steel Site

This memo details Envirotest Laboratories response to the specific concerns on their analytical quality control outlined in my memo dated August 28, 1988.

1. Dates of Cyanide Distillation

On the initial lab report which was done by CLP-RAS protocols, Envirotest failed to report the dates of distillation for total cyanide analyses on the five soil samples submitted. Their response, in letter form, show the dates distillation occurred. All dates of distillation were within the holding time limits established in the SOW for CLP-RAS analyses. Therefore, the qualifier "J" can be removed from my original assessment of this analytical data on cyanide.

Sample ID	Results
2366-001	1.08 U
2366-002	2.04
2366-003	1.14
2366-004	1.09 U
2366-005	1.15 U

U = The material was analyzed for, but not detected. The associated value is an estimated sample quantitation limit.

2. Surrogate Recoveries for Semi-Volatile Analyses

As noted in my memo dated 8/24/88, four of the five soil samples submitted for analyses had at least two surrogates outside control limits established in the SOW for semi-volatiles. Envirotests response was to reanalyze three of the samples for surrogate compliance. Sample No. 5 was not reanalyzed per CLP protocol set forth in the EPA Organics Statement of Work in Exhibit D, Section Iv 7.4.5. (10/86), which states that if surrogate recoveries were out of compliance in the sample and spike, reanalysis is not necessary.

All surrogates for reanalysis on semi-volatiles were within their control limits on reanalysis. Although re-extraction occurred outside prescribed holding time criteria set forth for original analyses, there are currently no holding time guidelines established for re-extraction.

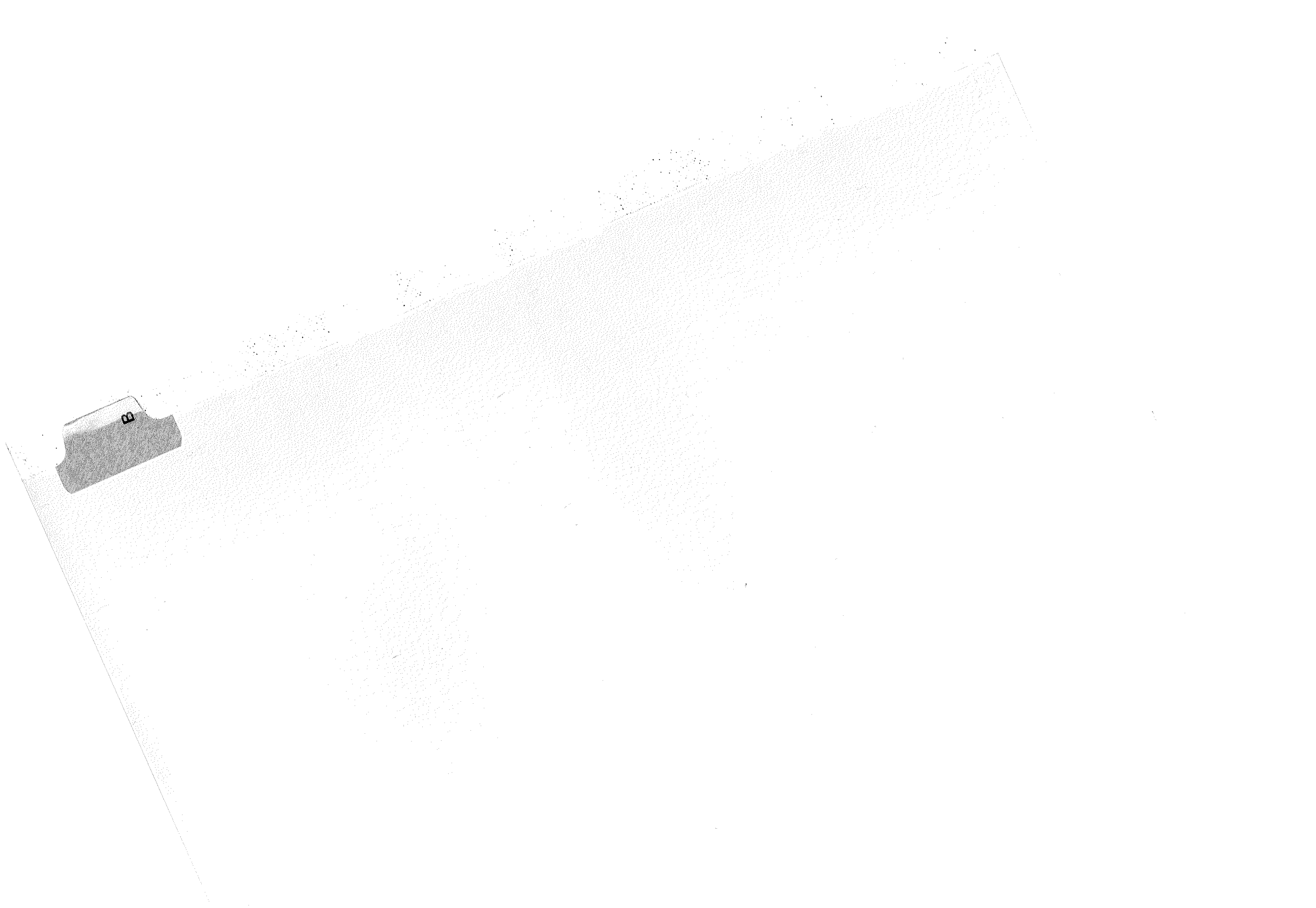
3. Spike Recovery for Metal Analyses

On the initial set of results from Envirotest, spike recovery for lead on Sample 001 was 0 percent. Their response was that they could not explain this but stated that if they could locate the sample it would be reanalyzed. As for the poor recoveries associated with mercury, nickel and selenium, their response was that by flagging their results per CLP protocols, no further action was required. Qualifiers made for those metals out of compliance in my memo of 8/24/88 should not be removed.

4. Continuing Calibration

In the original assessment of Envirotests analytical data, it was noted that system performance calibration compound 2.4-dinitrophenol had lower than required average RF value for that compound in range, but were unsuccessful. Envirotest did reanalyze the samples but were still unable to bring the average RF value for 2,4-dinitrophenol in range. All results for 2,4-dinitrophenol should still be qualified as unusable.

TM:jd


B

APPENDIX B

STRATIGRAPHIC AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

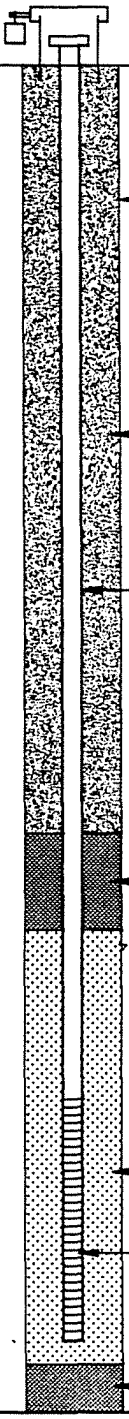
(L-1)

PROJECT NAME: PYRAMID
PROJECT NO.: 2366
CLIENT: PYRAMID
LOCATION: NORTHWEST CORNER OF PROPERTY

HOLE DESIGNATION: OW-1 (Page 1 of 2)
DATE COMPLETED: JULY 13, 1988
DRILLING METHOD: HSA 7.5" O.D.
CRA SUPERVISOR: D. OSCAR

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE ELEVATION (Top of Riser)	653.37
	GROUND ELEVATION	651.3
	Fill – brown and gray silt, some fine sand, fine to medium gravel, rock fragments, trace vegetation, dry	650.8
2.0	Fill – gray and rust slag, dry	649.3
	Fill – rust and brown fine to medium sand size material, some slag, trace fine gravel, dry	648.9 648.4
4.0	Black silt, some clay, trace fine sand, vegetation, moist, native	647.3
	Same, except mottled, gray	
	Brown mottled clay, some silt, trace vegetation, moist, native	
6.0	Brown and gray brown mottled clay, some silt, moist, native	
	Same, except brown	
8.0		
10.0		
	Same, except red brown	
12.0		
14.0		
16.0		635.3
	Red brown and gray brown laminated clay, some silt, trace fine sand and fine gravel, moist, native	
18.0	Same, with trace thin sand lenses, wet, native	
	Same, except moist	632.8
	Gray brown clayey silt, sand, little fine to medium angular to subangular gravel, moist, native, Till	
20.0		631.1
	Brown silt, some fine sand, trace clay, fine angular to subangular Gravel, dry to moist, native, till	
22.0	Same, with increasing sand	
	Same, with rock fragments	
24.0	Brown fine sand, some silt, trace fine gravel, wet, native, till	627.4 627.3
	Brown silt, some fine sand, trace fine angular gravel, dry to moist, native, till	627.0 626.3
26.0	Gray brown fine to medium sand, trace silt, small clay nodules, wet, native	625.3
	Dark brown silt, some clay, trace fine sand, fine angular gravel, dry to moist, native, till	

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE
1SS		31
2SS		9
3SS		23
4SS		21
5SS		21
6SS		15
7SS		8
8SS		6
9SS		7
10SS		11
11SS		56
12SS		118
13SS		79
14SS		44

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-1)

PROJECT NAME: PYRAMID
PROJECT NO.: 2366
CLIENT: PYRAMID
LOCATION: NORTHWEST CORNER OF PROPERTY

HOLE DESIGNATION: OW-1

DATE COMPLETED: JULY 13, 1988
DRILLING METHOD: HSA 7.5" O.D.
CRA SUPERVISOR: D. OSCAR

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
28.0	Brown and gray silt, some clay, trace fine sand, gravel, moist, native	622.8	WELL SCREEN SAND PACK 7.5" ø BOREHOLE BENTONITE PELLET SEAL	14SS		44
	Gray brown silty clay, sand, trace fine gravel, moist, native	622.4		15SS		70
30.0	Gray fine to medium sand, some silt, trace clay, fine gravel, moist, native	622.3				
	augered to 29.1 ft. BGS, no sample	622.2				
32.0	END OF HOLE @ 29.1 FT. BGS					
34.0						
36.0						
38.0						
40.0						
42.0						
44.0						
46.0						
48.0						
50.0						
52.0						

SCREEN DETAILS:
Screened Interval:
21.5 to 26.5 ft BGS
Length –5ft
Diameter –2in
Slot # 10
Material– Stainless Steel

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

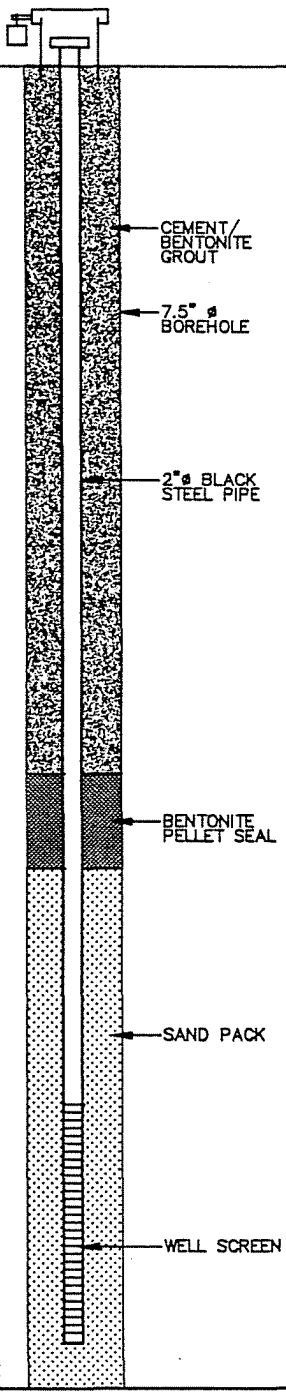
(L-2)

PROJECT NAME: PYRAMID
PROJECT NO.: 2366
CLIENT: PYRAMID
LOCATION: NORTHEAST CORNER OF PROPERTY

HOLE DESIGNATION: OW-2 (Page 1 of 2)
DATE COMPLETED: JULY 15, 1988
DRILLING METHOD: HSA 7.5" O.D.
CRA SUPERVISOR: D. TARNOWSKI

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft. AMSL
	REFERENCE ELEVATION (Top of Riser)	653.72
	GROUND ELEVATION	651.4
	Fill – Brown silt, vegetation, gravel, dry	651.2
	Fill – Brown silty clay, gravel, orangish tan slag, wood fragments, dry	
2.0		649.2
	Red brown, orange, and gray silty mottled clay, silt lenses, dry, native	
4.0		
	Same, except dry to moist	646.2
	Red brown silty clay, dry to moist, native	
6.0	same, except trace gray silt pockets.	
8.0		
10.0	Same, except trace silt seams, softer, moist	
12.0	Same, except no silt seams	
14.0		
16.0		
18.0		
20.0	Brown silty clay, trace fine gravel, wet, native	631.4
22.0	Brown to red brown silty clay, trace fine gravel, trace sand, wet, native	629.4
	Red brown sandy clay, silt, fine gravel, wet, native, Till	627.9
24.0	Same, except brown	
	Brown silty fine sand, trace clay, fine gravel, wet, native, till	625.9
26.0	Brown silty fine to medium sand, fine gravel, wet, native, till	625.4
	Brown sandy clay, silt, fine gravel, wet, native, till	625.0

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE
1SS		15
2SS		14
3SS		21
4SS		24
5SS		32
6SS		16
7SS		8
8SS		5
9SS		6
10SS		4
11SS		3
12SS		4
13SS		3
14SS		3

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-2)

PROJECT NAME: PYRAMID
PROJECT NO.: 2366
CLIENT: PYRAMID
LOCATION: NORTHEAST CORNER OF PROPERTY

HOLE DESIGNATION: OW-2 (Page 2 of 2)
DATE COMPLETED: JULY 15, 1988
DRILLING METHOD: HSA 7.5" O.D.
CRA SUPERVISOR: D. TARNOWSKI

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	Brown silty fine to medium sand, fine gravel, wet, native, till	625.0	WELL SCREEN SAND PACK	14SS		3
28.0	Brown sandy clay, silt, fine gravel, wet, native, till		BENTONITE PELLET SEAL 7.5" ø BOREHOLE	15SS		4
30.0	augered to 29.9 ft. BGS, no sample	621.6 621.5				
	END OF HOLE @ 29.9 FT. BGS		SCREEN DETAILS: Screened Interval: 22.0 to 27.0 ft BGS Length -5ft Diameter -2in Slot # 10 Material- Stainless Steel			
32.0						
34.0						
36.0						
38.0						
40.0						
42.0						
44.0						
46.0						
48.0						
50.0						
52.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-3)

PROJECT NAME: PYRAMID
HOLE DESIGNATION: OW-3 (Page 1 of 2)
PROJECT NO.: 2366
DATE COMPLETED: JULY 18, 1988
CLIENT: PYRAMID
DRILLING METHOD: HSA 7.5" O.D.
LOCATION: SOUTH OF CRANES, WEST SIDE OF PROPERTY
CRA SUPERVISOR: D. TARNOWSKI

DEPTH ft BG	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	REFERENCE ELEVATION (Top of Riser) GROUND ELEVATION	653.84 651.4				
	Fill – brown silt, gravel, vegetation, dry	651.0				
	Fill – black silt, cinders, slag, gravel, dry	650.5	CEMENT/ BENTONITE GROUT	1SS		13
2.0	Orange, brown, and gray silty Clay, dry, native	649.4	7.5"ø BOREHOLE	2SS		19
4.0	Olive green, gray, and brown mottled silty clay, trace silt seams, dry to moist, native	647.4		3SS		14
6.0	Olive green, gray and red brown silty clay, small fine to medium sand pocket, silt seams, dry to moist, native	645.4	BENTONITE SEAL	4SS		17
8.0	Red brown sandy clay, silt, fine angular to subangular gravel, moist to wet, native, till	644.4		5SS		14
	Red brown silty fine sand, trace clay, sub-rounded to subangular gravel, wet, native, till	643.0				
10.0	Same, except moist			6SS		20
	Red brown silty clay, trace sand, subrounded gravel, moist, native, till	641.9	2"ø BLACK STEEL PIPE			
	Red brown silty fine sand, trace clay, subrounded gravel, wet, native, Till	640.4		7SS		33
12.0	Red brown silty clay, orange, olive green, and gray silt inclusions, subrounded gravel, dry to moist, native, till	639.0				
	Red brown silty fine sand, wet, native	638.8		8SS		104
14.0	Red brown silty clay, some sand, subrounded to subangular Gravel, dry to moist, native, till					
	Same, except trace subangular gravel					
16.0	Red brown sandy clay, silt, trace subangular gravel, moist, native, till	635.4				
	Red brown silty fine sand, subrounded gravel, wet, native	634.4 634.3	SAND PACK	9SS		50
18.0	Red brown silty clay, trace sand, subrounded gravel, moist, native, till	633.2 633.0				
	Brown silty fine to medium sand, fine subrounded gravel, wet, native	632.8 632.6		10SS		56
20.0	Red brown silty clay, trace sand, trace fine gravel, moist, native, till	631.4				
	Red brown silty fine sand, trace fine gravel, wet, native	629.9		11SS		38
22.0	Red brown silty clay, trace sand, moist, native, till	629.4				
	Red brown sandy clay, silt, subrounded to subangular gravel, wet, native, till			12SS		54
24.0	Brown silty fine sand, trace fine gravel, wet, native			13SS		42
26.0	Red brown silty clay, trace fine sand and gravel, wet, native, till					
	Red brown silty fine sand, fine gravel, wet, native	624.4	WELL SCREEN	14SS		60

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

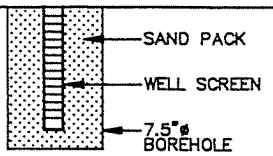
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-3)

PROJECT NAME: PYRAMID
PROJECT NO.: 2366
CLIENT: PYRAMID
LOCATION: SOUTH OF CRANES, WEST SIDE OF PROPERTY

HOLE DESIGNATION: OW-3A

DATE COMPLETED: JULY 18, 1988
DRILLING METHOD: HSA 7.5" O.D.
CRA SUPERVISOR: D. TARNOWSKI

DEPTH ft BG	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	Red brown silty clay, trace fine sand and gravel, wet, native, till	624.4		14SS		60
	Red brown silty fine sand, fine gravel, wet, native	624.3				
28.0	Red brown silty clay, trace fine sand and gravel, wet, native, till			15SS		28
30.0			SCREEN DETAILS: Screened Interval: 23.6 to 28.6 BGS Length – 5ft Diameter – 2in Slot # 10 Material– Stainless Steel			
	Gray silty fine to medium sand, subangular to subrounded gravel, wet, native	620.3		16SS		14
32.0	Same, with rock fragments	618.9		17SS		50
	augered to 32.7 ft. BGS, no sample	618.7				
34.0	END OF HOLE @ 32.7 ft. BGS					
	NOTE: At completion the initial borehole was grouted to ground surface. In an adjacent borehole (5.0 ft. west) a 2.0" ID observation well was installed to 29.0' BGS (OW-3A).					
36.0						
38.0						
40.0						
42.0						
44.0						
46.0						
48.0						
50.0						
52.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

PHYSICAL TESTING RESULTS

GEOTECHNICAL TEST RESULTS
PYRAMID MALL
NEW YORK
JAR SAMPLES

REFERENCE NO.: 88-0155

PERFORMED FOR:

Glynn Geotechnical Engineering
Geotechnical and Civil Engineering Services
6437 Locust Street Extn.
Lockport, New York 14094

PERFORMED BY:

J&L Testing Company, Inc.
938 South Central Avenue
Canonsburg, PA 15317

AUGUST 10, 1988

ENGINEER Mark Glynn
DATE ASSIGNED 7-26-88
DATE DUE 7-30-88

JOB No. 88C340-01
JOB NAME Glynn Geotechnical
Pyramid Mall
New York

DATE REC. 7-27-88
DATE CMP 8-07-88
REC. BY SB
Page No. 1

Reference No.: 88-0155

SUMMARY OF LABORATORY TEST RESULTS

BORING and SAMPLE No.	DEPTH - Feet	CLASSIFICATION	PERM k cm/sec	NATURAL WATER CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	UNCON. COMPRESS.: STRESS (tsf)	UNCON. COMPRESS.: STRAIN (%)	UNIT DRY WGHT. (pcf)	SPECIFIC GRAVITY	GRADATION SIEVE	GRADATION HYDR.	ORG. MOIS	CONSOLID.	TRIAXIAL: U.U.	TRIAXIAL: C.U.	TRIAXIAL: CELL PRESSURE (psi)	TRIAXIAL: BACK PRESSURE (psi)
OM-1 S-5	8-10	Brown Silty Clay		21.8					105.5									
OM-2 S-6	10-12	Brown Silty Clay		25.5					98.6									
OM-3 S-10	18-20	Clay Fill		11.2					N/P									
OM-3 S-11	20-22	Clay Till		12.1					N/P									
OM-1 S-5	8-10	Jar-From Cylindrical Soil Sa.	1.45x 10^{-8}	20.5	28	20			106.5		*	*						
OM-2 S-6	10-12	Jar-From Cylindrical Soil Sa.	3.37x 10^{-8}	26.7					98.6									
OM-3 S-10		Combined Sample		11.8	20	15					*	*						
OM-3 S-11																		
		N/P-Not Possible																

* See Test Curves ✓ TEST COMP and CHECKED ● TEST IN PROGRESS

Summary of Triaxial Permeability Test Results

Client:GLYNN GEOTECHNICAL
Project Location:PYRAMID MALL
Sample Number:OW-1

Date:08-10-1988
Job Number:88C340-01
Description:SAMPLE 5
FROM JAR
DIRECT FR. SPLIT SPOON

Cell Number:16 Fluid:DEAIRED WATER B-Parameter:1.0

Physical Property Data.....

Initial Height(in)	:	2.85	Final Height(in)	:	2.85
Initial Diameter(in)	:	1.35	Final Diameter(in)	:	1.35
Initial Wet Weight (gm)	:	137.40	Final Wet Weight(gm)	:	138.20
Wet Density (pcf)	:	128.32	Wet Density (pcf)	:	128.94
Moisture Content %	:	20.50	Moisture Content %	:	21.23
Dry Density (pcf)	:	106.49	Dry Density (pcf)	:	106.36
Initial Saturation %	:	96.88	Final Saturation %	:	100.01
Initial Void Ratio	:	0.5652	Final Void Ratio	:	0.5670

Test Parameters.....

Cell Pressure (psi):	55.00	0.00	0.00	0.00
Head Water (psi):	50.00	0.00	0.00	0.00
Tail Water (psi):	42.00	0.00	0.00	0.00

Permeability Input Data.....

Flow,Q(cc):	0.50	0.00	0.00	0.00
Length,L(in):	2.85	0.00	0.00	0.00
Area,A(sqin):	1.48	0.00	0.00	0.00
Head,h(psi):	8.00	0.00	0.00	0.00
Time,t(min):	900.00	0.00	0.00	0.00
Temp,T(DegC):	20.0	0.0	0.0	0.0

Computed Permeability.....(cm/sec) at 20 Degrees C

Test 1 k= 1.451544E-08
Test 2 k= 0
Test 3 k= 0
Test 4 k= 0

Summary of Triaxial Permeability Test Results

Client:GLYNN GEOTECHNICAL
Project Location:PYRAMID MALL
Sample Number:OW-2
Date:08-10-1988
Job Number:88C340-01
Description:SAMPLE 8
FROM JAR
DIRECT FR SPLIT SPOON

Cell Number:17 Fluid:DEAIRED WATER B-Parameter:1.0

Physical Property Data.....

Initial Height(in)	:	3.07	Final Height(in)	:	3.05
Initial Diameter(in)	:	1.44	Final Diameter(in)	:	1.42
Initial Wet Weight (gm)	:	163.40	Final Wet Weight(gm)	:	160.90
Wet Density (pcf)	:	123.87	Wet Density (pcf)	:	128.79
Moisture Content %	:	25.70	Moisture Content %	:	23.77
Dry Density (pcf)	:	98.55	Dry Density (pcf)	:	102.44
Initial Saturation %	:	98.19	Final Saturation %	:	100.01
Initial Void Ratio	:	0.7046	Final Void Ratio	:	0.6398

Test Parameters.....

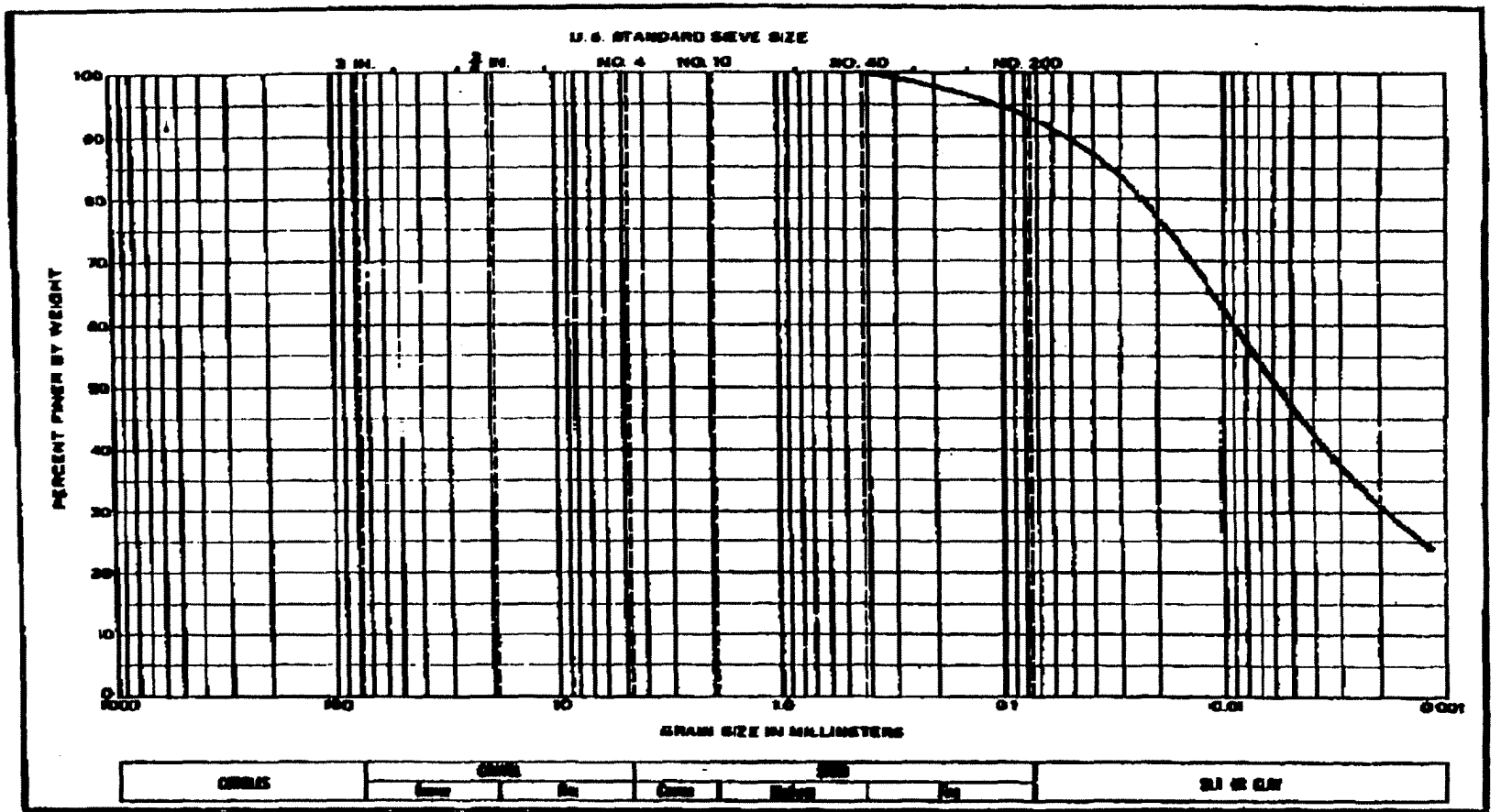
Cell Pressure (psi):	55.00	0.00	0.00	0.00
Head Water (psi):	50.00	0.00	0.00	0.00
Tail Water (psi):	42.00	0.00	0.00	0.00

Permeability Input Data.....

Flow,Q(cc):	1.20	0.00	0.00	0.00
Length,L(in):	3.05	0.00	0.00	0.00
Area,A(sqin):	1.58	0.00	0.00	0.00
Head,h(psi):	8.00	0.00	0.00	0.00
Time,t(min):	800.00	0.00	0.00	0.00
Temp,T(DegC):	20.0	0.0	0.0	0.0

Computed Permeability.....(cm/sec) at 20 Degrees C

Test 1 k= 3.365672-08
Test 2 k= 0
Test 3 k= 0
Test 4 k= 0



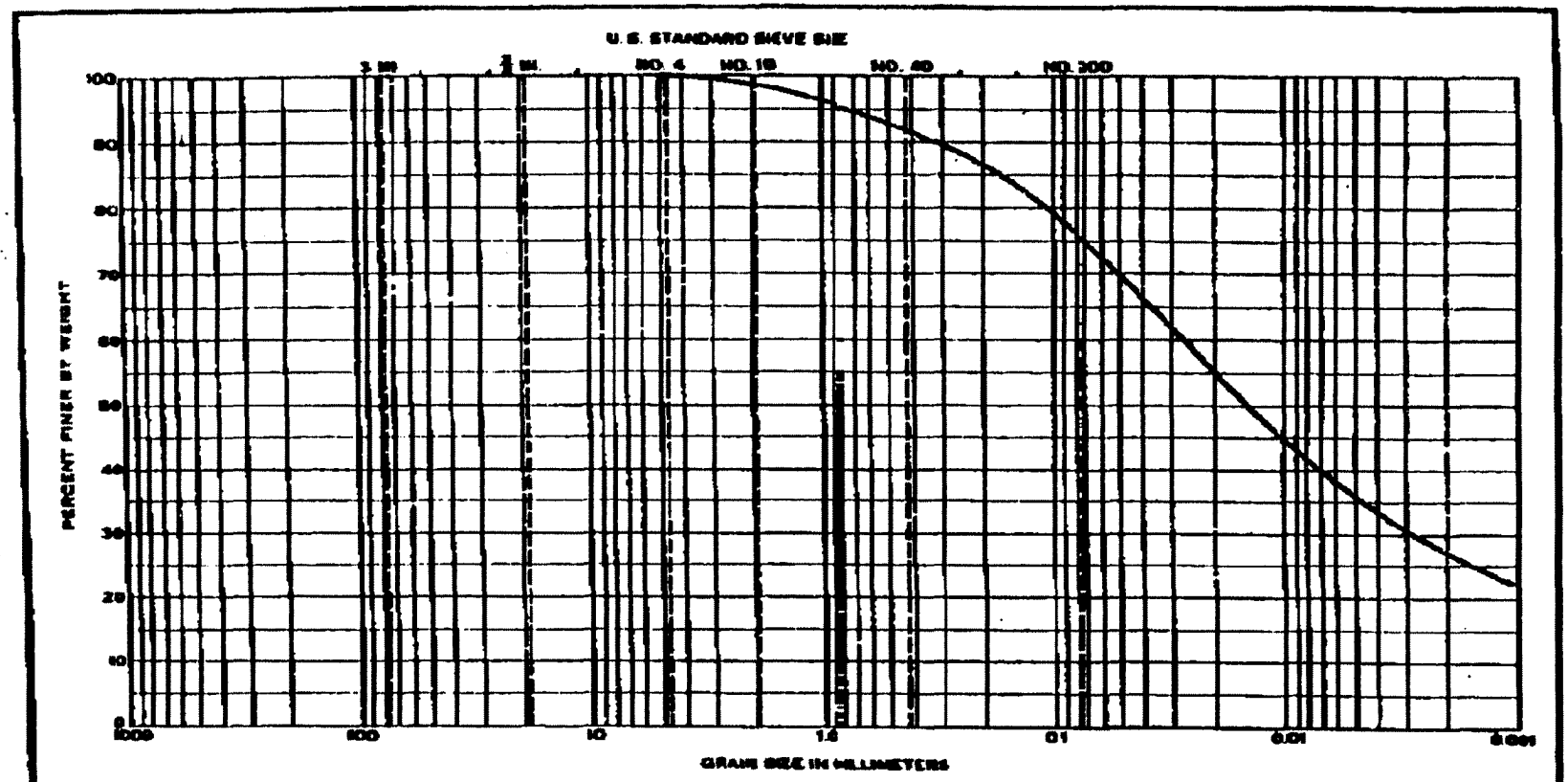
Sample No.	Elev or Depth	Classification	Nat W/C	LL	PL	PI
BH-1 S-5	8-10	Brown Silty CLAY	20.5	28	20	8

GRADATION CURVES

Project: Glynn Geotechnical Engineering
Pyramid Mall
New York

Date: 8-8-88 Job No. 88C340-01

J & L TESTING COMPANY, INC.



BOULDERS	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Sample No.	Elev or Depth	Classification	Nat'l WC	LL	PL	PI
GW-3 S-10	Blended	Brown Sandy Silty CLAY	11.8	20	15	5
GW-3 S-11		Clayey SILT (CL-ML)				

GRADATION CURVES

Project: Glynn Geotechnical Engineering
Pyramid Mall
New York

Date: 8-8-88 Job No. 88C340-81

J & L TESTING COMPANY, INC.

LABORATORY TEST RESULTS
CRA-PYRAMID MALL
COMPOSITE SAMPLES
OW-3 S-8
OW-7 S-7
REFERENCE NO. 88-0155

PERFORMED FOR:

Glynn Geotechnical Engineering
Geotechnical and Civil Engineering Services
6437 Locust Street Extn.
Lockport, New York 14094

PERFORMED BY:

J&L Testing Company, Inc.
[illegible] South Central Avenue
[illegible] PA [illegible]

SEPTEMBER 16, 1988

ENGINEER Mark Glynn
DATE ASSIGNED 8-23-88
DATE DUE ASAP

JOB No. 88C300-02
JOB NAME Glynn Geotechnical Engrg.
88C - Pennwald Mill
Reference No. 88-0855

DATE REC. 8-23-88
DATE COMP. 9-02-88
REC. BY SB
Page No. 1

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE and LABEL No.	DEPTH Feet	CLASSIFICATION	PERM k cm/sec	NATURAL WATER CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT	ATTERBERG LIMITS PLASTIC LIMIT	UNCONFINED COMPRESS. I DEFORM (Def)	UNCONFINED COMPRESS. STRAIN (%)	UNIT DRY WEIGHT (pcf)	SPECIFIC GRAVITY	ORGANIC CONTENT WATER	ORGANIC CONTENT ASHED	ORGANIC LOSS	CONSOLID.	TRIAXIAL MIN	TRIAXIAL CELL	TRIAXIAL CELL PRESSURE (psi)	TRIAXIAL BACK PRESSURE (psi)
CB-3 CB-7	S-8 S-7	Composite Sample of Cla	1.0E-7	32.3	28	14			127.6		*	*						

* See Test Curves
▼ TEST COMP and CO-CNSD
● TEST INCOMPLETE

S 1.0 (8-88)

Summary of Triaxial Permeability Test Results

Client:GLYNN GEOTECHNICAL
Project Location:PYRAMID MALL
Sample Number:COMPOSITE SAMPLE
Date:09-16-1988
Job Number:88C340-01
Description:GW-3 S-8
GW-7 S-7
12-16 FEET

Cell Number:25 Fluid:DEAIRED WATER B Parameter:1.0

Physical Property Data.....

Initial Height(in)	:	1.85	Final Height(in)	:	1.82
Initial Diameter(in)	:	2.86	Final Diameter(in)	:	2.86
Initial Wet Weight (gm)	:	420.20	Final Wet Weight(gm)	:	423.20
Wet Density (pcf)	:	140.46	Wet Density (pcf)	:	144.78
Moisture Content %	:	10.00	Moisture Content %	:	10.80
Dry Density (pcf)	:	127.64	Dry Density (pcf)	:	129.78
Initial Saturation %	:	88.39	Final Saturation %	:	100.10
Initial Void Ratio	:	0.3102	Final Void Ratio	:	0.2891

Test Parameters.....

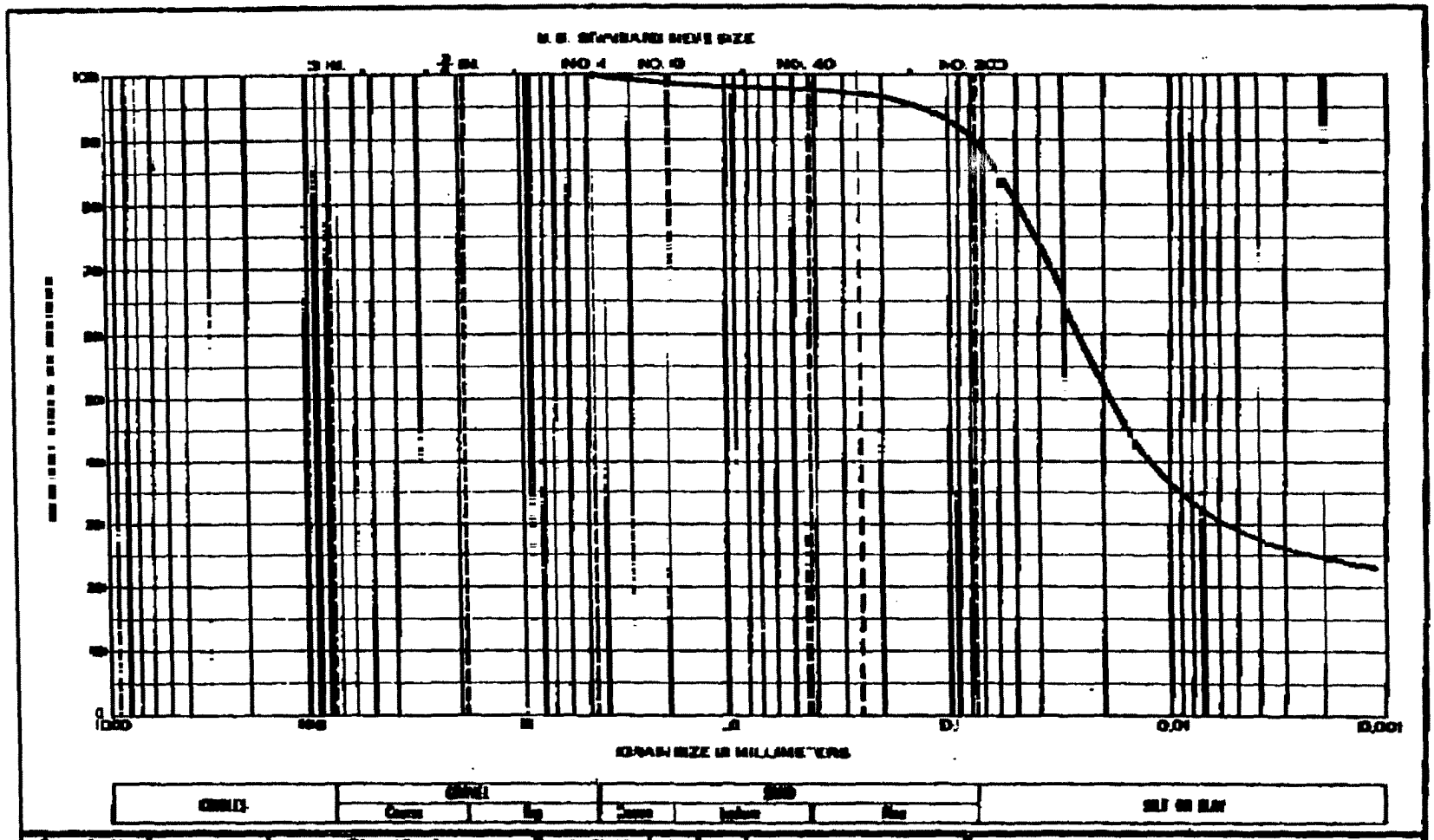
Cell Pressure (psi):	85.00	0.00	0.00	0.00
Head Water (psi):	80.00	0.00	0.00	0.00
Tail Water (psi):	42.00	0.00	0.00	0.00

Permeability Input Data.....

Flow,Q(cc):	17.80	0.00	0.00	0.00
Length,L(in):	1.82	0.00	0.00	0.00
Area,A(sqin):	6.16	0.00	0.00	0.00
Head,h(psi):	8.00	0.00	0.00	0.00
Time,t(min):	500.00	0.00	0.00	0.00
Temp,T(DegC):	24.8	0.0	0.0	0.0

Computed Permeability.....(cm/sec) at 20 Degrees C

Test 1 k= 1.089194E-07
Test 2 k= 0
Test 3 k= 0
Test 4 k= 0



Sample No.	Elev or Depth	Classification	Nat W/C	LL	P.	P
04-3	5-6	Composite Sample		20	14	7
04-7	5-7					

GRADATION CURVES

Project: Glynn Geotechnical Engineering
Pyramid Mall

Date: 9-15-88 Job No. 8C340-02

J & L TESTING COMPANY, INC.
Materials Testing

APPENDIX D

100-FOOT GRID SAMPLING RESULTS

SAMPLES ANALYZED FOR TOTAL AND EP TOX LEAD

TECHNICAL SERVICES, INC.
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Date: August 22, 1988

ANALYTICAL RESULTS
FOR

CONESTOGA ROVERS & ASSOCIATES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM (ELAP)
CERTIFICATION #10797

FIELD INFORMATION

PROJECT NO. 2366

Name of Collector: Steve Supernaut
Site of Collection: Pyramid-Ernst Steel Site
Date of Collection: August 17, 1988 (3 - 29)
August 18, 1988 (30 - 82)

ASSIGNED BLT# I.D.	SAMPLE I.D.#	SAMPLE TYPE	Time of Collection
2326-01	3	Soil	1130 EST
2326-02	8	"	1515 EST
2326-03	9	"	1530 EST
2326-04	10	"	1540 EST
2326-05	11	"	1550 EST
2326-06	12	"	1600 EST
2326-07	13	"	1620 EST
2326-08	14	"	1630 EST
2326-09	14A	"	1640 EST
2326-10	15	"	1655 EST
2326-11	16	"	1705 EST
2326-12	17	"	1715 EST
2326-13	18	"	1730 EST
2326-14	19	"	1740 EST
2326-15	20	"	1750 EST
2326-16	21	"	1805 EST
2326-17	21A	"	1815 EST
2326-18	22	"	1820 EST
2326-19	23	"	1835 EST
2326-20	24	"	1845 EST
2326-21	25	"	1850 EST
2326-22	26	"	1900 EST
2326-23	27	"	1910 EST
2326-24	28	"	1930 EST
2326-25	29	"	1935 EST
2326-26	30	"	0745 EST
2326-27	31	"	0800 EST
2326-28	32	"	0815 EST

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Date: August 22, 1988

ANALYTICAL RESULTS
FOR

CONESTOGA ROVERS ASSOCIATES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM (ELAP)
CERTIFICATION #10797

ASSIGNED BLT# I.D.	SAMPLE I.D.#	SAMPLE TYPE	Site, Time and Date of Collection
2326-29	33	"	0835 EST
2326-30	34	"	0840 EST
2326-31	35	"	0855 EST
2326-32	35A	"	0900 EST
2326-33	36	"	0910 EST
2326-34	37	"	0910 EST
2326-35	38	"	0915 EST
2326-36	39	"	0925 EST
2326-37	40	"	0935 EST
2326-38	41	"	0950 EST
2326-39	42	"	0955 EST
2326-40	43	"	1000 EST
2326-41	44	"	1010 EST
2326-42	45	"	1020 EST
2326-43	46	"	1050 EST
2326-44	47	"	1100 EST
2326-45	46A	"	1055 EST
2326-46	48	"	1110 EST
2326-47	49	"	1125 EST
2326-48	49A	"	1136 EST
2326-49	50	"	1130 EST
2326-50	51	"	1140 EST
2326-51	52	"	1150 EST
2326-52	53	"	1155 EST
2326-53	54	"	1200 EST
2326-54	55	"	1210 EST
2326-55	56	"	1215 EST
2326-56	57	"	1220 EST
2326-57	58	"	1225 EST
2326-58	59	"	1430 EST
2326-59	60	"	1435 EST
2326-60	61	"	1450 EST
2326-61	62	"	1510 EST
2326-62	63	"	1521 EST
2326-63	63A	"	1525 EST
2326-64	64	"	1535 EST
2326-65	65	"	1640 EST

TECHNICAL SERVICES, INC.

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Date: August 22, 1988

ANALYTICAL RESULTS
FOR

CONESTOGA ROVERS ASSOCIATES

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM (ELAP)
CERTIFICATION #10797

ASSIGNED BLT# I.D.	SAMPLE I.D.#	SAMPLE TYPE	Site, Time and Date of Collection
2326-66	66	"	1645 EST
2326-67	67	"	1648 EST
2326-68	68	"	1700 EST
2326-69	69	"	1705 EST
2326-70	70	"	1710 EST
2326-71	71	"	1730 EST
2326-72	72	"	1740 EST
2326-73	73	"	1750 EST
2326-74	74	"	1755 EST
2326-75	75	"	1810 EST
2326-76	76	"	1820 EST
2326-77	77	"	1840 EST
2326-78	70A	"	1825 EST
2326-79	78	"	1855 EST
2326-80	80	"	1930 EST
2326-81	81	"	1935 EST
2326-82	82	"	1955 EST
2326-83	79	"	1905 EST

Laboratory Information

Sample ID	Preservation Status Upon Acceptance	Date/Time Received
2326-(01-83)	Properly preserved and collected	Date: August 18, 1988 Time: Not Available

RELEASED BY: Husein Sitabkhan

TECHNICAL SERVICES, INC.
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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	DUPLICATE
Method Blank	<10	
EPA 1085 (1)	5.33	
3	42	
8	250	
9	65	
10	45	
11	132	
12	250	
13	210	191
13 Spk (2)	336	346
Method Blank	<10	
EPA 1085	5.27	
14	625	
14A	15	
15	13	
16	4	
17	32	
18	203	
19	112	
20	160	
21	166	
21A	54	
22	170	174
22 SPK (2)	302	314

* Dry Weight Basis
(1) Results in mg/L : TV = 5.00 mg/L
(2) Spiked with 100 ppm
(3) Spiked with 50 ppm
(4) Results in mg/L : EP Tox

NOTE Spikes results are "approximations" due to differences in weights between original and spiked samples. See attached explanations

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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	DUPLICATE
Method Blank	<10	
EPA 1085	5.27	
23	247	
24	167	
25	176	
26	152	
27	201	
28	61	
29	54	59
29 SPK (3)	111	89
Method Blank	<10	
EPA 1085	5.49	
30	115	
31	219	
32	222	
33	62	
34	75	
35	18,340	
35A	110	
36	85	
37	220	
38	215	201
38 SPK (3)	266	249
Method Blank	<10	
EPA 1085	5.38	
39	235	
40	189	
41	535	

* Dry Weight Basis
(1) Results in mg/L : TV = 5.00 mg/L
(2) Spiked with 100 ppm
(3) Spiked with 50 ppm
(4) Results in mg/L : EP Tox

TECHNICAL SERVICES, INC.
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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	DUPLICATE
42	164	
43	187	
44	10,650	
45	73	
46	364	
46A	54	
47	107	120
47 SPK (3)	155	160
Method Blank	<10	
EPA 1085	5.21	
48	412	
49	263	
49A	34	
50	129	
51	226	
52	434	
53	529	
54	85	
55	95	
56	92	92
56 SPK (3)	154	161
Method Blank	<10	
EPA 1085	5.38	
57	88	
58	132	
59	110	
60	367	
61	2540	

* Dry Weight Basis
(1) Results in mg/L : TV = 5.00 mg/L
(2) Spiked with 100 ppm
(3) Spiked with 50 ppm
(4) Results in mg/L : EP Tox

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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	DUPLICATE
62	40.0	
63	117	
63A	9	
64	122	112
64 SPK (3)	190	185
65	92	
Method Blank	<10	
EPA 1085	5.44	
66	97	
67	118	
68	52	
69	63	
70	119	
70A	10	
71	77	86
71 SPK (3)	134	134
72	317	
73	207	
74	76	
75	57	
76	58	
77	31	
78	160	
79	239	
80	86	
81	71	72
81 SPK (3)	128	126
Repeat 29	56	50
Repeat 29 SPK	105	94

* Dry Weight Basis
(1) Results in mg/L : TV = 5.00 mg/L
(2) Spiked with 100 ppm
(3) Spiked with 50 ppm
(4) Results in mg/L : EP Tox

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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	% RPD	% Rec
Method Blank	<10		
EPA 1085	5.27		105%
82	512		
9 EP Tox (4)	<0.1		
15 EP Tox (4)	<0.1		
20 EP Tox (4)	<0.1		
39 EP Tox (4)	<0.1		
44 EP Tox (4)	<0.1		
63 EP Tox (4)	<0.1		
70 EP Tox (4)	<0.1		
80 EP Tox (4)	<0.1		
Method Blank	<10		
EPA 1085	5.33		107%

Sample Preparation Method: EPA SW-846 (3050)
Analysis Method: EPA SW-846 (7420)

Samples 3 through 29 Digested 8/18/88
Samples 30 through 82 Digested 8/19/88

All samples analyzed 8/20/88

* Dry Weight Basis
(1) Results in mg/L : TV = 5.00 mg/L
(2) Spiked with 100 ppm
(3) Spiked with 50 ppm
(4) Results in mg/L : EP Tox

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Date: August 22, 1988

ELAP #10797

ANALYSIS FOR: Conestoga Rovers Associates

Project: Pyramid-Ernst Steel Site Project #2366

BLT # 2326

SAMPLE ID	Pb, mg/Kg	DUPLICATE	% RPD
13	210	191	9.48
22	170	174	2.32
29	54	59	8.85
38	215	201	6.73
47	107	120	11.5
56	92	92	0
64	122	112	8.55
71	77	86	11.0
81	71	72	1.40
29 Repeat	56	50	11.3

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Project #2366

WEIGHT CORRECTED % RECOVERIES

Because of the variation in sample sizes, a more sophisticated methemetical approach to % recovery calculations must be used.

1) Calculate Total mg Pb in spiked sample:

$$mg(T)_{spk} = conc.\left(\frac{mg}{1000cc}\right) \times \text{sample vol'm}(100.cc)$$

$$= \left(\frac{conc}{10}\right) mg = \frac{ppm}{10}\, mg$$

2) Calculate sample contribution to spike:

$$mg(T)_{\substack{smpl. \\ cont.}} = \left(\frac{mg}{1000.g}\right)_{Dry} \times wt(g)_{wet}\ (\text{in spike sample}) \times \frac{\%\,Solids}{100}$$

3) %Recovery =

$$\frac{mg(T)_{spk} - mg(T)_{\substack{smpl \\ cont}}}{Amt.\ Spike - mg} \times 100$$

Amount Spike (mg) =

$$\frac{CONC(ppm)}{1000.cc} \times vol.spike(cc)$$

50 ml of 10.0 ppm = 0.05 mg
10.0 ml of 10.0 ppm = 0.10 mg.

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Project #2366

QA/QC

Spike Results

Sample ID	Pb, mg/Kg	Duplicate	% RPD
13	210	191	9.48
13 SPK (1)	335 (3.16)	346 (3.99)	
Wt. Sample (2)	1.1266	1.0286	
% Recovery	117	134	13.5
22	170	174	2.32
22 SPK (1)	302 (3.18)	314 (3.30)	
Wt. Sample (2)	1.2859	1.3103	
% Recovery	106	68	43.7
29	54	59	8.85
29 SPK (1)	111 (1.04)	89 (0.99)	
Wt. Sample (2)	1.0599	1.2495	
% Recovery	106	68	43.7
38	215	201	6.73
38 SPK (3)	266 (2.82)	249 (2.71)	
Wt. Sample (2)	1.2288	1.2654	
% Recovery	108	102	5.71
47	107	120	11.5
47 SPK (3)	155 (1.54)	160 (1.77)	
Wt. Sample (2)	1.0419	1.1608	
% Recovery	96	88	8.70

* Values in parentheses are conc (mg/L) of spiked solution;
  Sample volume = 100.0 ml

(1) Spiked with 10.0 ml of 10 ppm Pb to 100 ml final volume (0.100 mg)
(2) Weight sample used for spike
(3) Spiked with 5.0 ml of 5.0 ppm Pb to 100 ml final volume (0.05 mg)

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QA/QC

Spike Results

Sample ID	Pb, mg/Kg	Duplicate	% RPD
56	92	92	Ø
56 SPK (3)	154 (1.32)	161 (1.21)	
Wt. Sample (2)	1.166Ø	1.Ø19Ø	
% Recovery	1Ø6	1Ø4	1.91
64	122	112	8.55
64 SPK (3)	19Ø (1.65)	185 (1.65)	
Wt. Sample (2)	1.2361	1.2734	
% Recovery	118	13Ø	9.68
71	77	86	11.Ø
71 SPK (3)	134 (1.27)	134 (1.38	
Wt. Sample (2)	1.137Ø	1.2221	
% Recovery	1Ø8	1Ø2	5.71
81	71	72	1.4Ø
81 SPK (3)	128 (1.15)	126 (1.21)	
Wt. Sample (2)	1.1233	1.19Ø8	
% Recovery	1Ø2	1Ø4	1.94
Repeat			
29	56	5Ø	11.3
29 SPK (3)	1Ø5 (1.ØØ)	94 (1.14)	
Wt. Sample (2)	1.Ø8Ø4	1.3656	
% Recovery	92	1Ø8	16.Ø

* Values in parentheses are conc (mg/L) of spiked solution;
  Sample volume = 1ØØ.Ø ml

(1) Spiked with 1Ø.Ø ml of 1Ø ppm Pb to 1ØØ ml final volume (Ø.1ØØ mg)
(2) Weight sample used for spike
(3) Spiked with 5.Ø ml of 5.Ø ppm Pb to 1ØØ ml final volume (Ø.Ø5 mg)

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Project #2366

SOLIDS DATA FOR QA/QC

SAMPLE ID	% SOLIDS
13	83.97
22	80.02
29	88.55
38	86.20
47	95.25
56	73.79
64	70.41
71	83.04
81	80.43

WAT. FILE COPY

MEMO

To: Bruce Clegg Reference No. 2366

From: Tony Misercola

Date: 9/14/88

Re: Analytical Data Validation - Ernst Steel/Pyramid Co.

The following details as assessment and validation of analytical results reported by BLT Technical Services, Inc. for soil/fill samples collected at the Ernst Steel/Pyramid Site on August 17-18, 1988. The samples submitted for analysis consisted of the following:

Matrix	Investigative Samples	Field Duplicates
Soil/Fill	77	6

All samples collected were submitted for total lead by Method 7420 (Test Method for Evaluating Solid Waste, USEPA SW-846, 3rd Edition, September 1986) and 10 percent of those samples were submitted for EP TOX lead by Method 1310/7420 (USEPA SW-846, 3rd Edition).

The QA/QC criteria by which these data have been evaluated are outlined in the aforementioned methods an the documented entitled "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses". Based on this data and other related quality control data, the following are noted:

1. Sample Holding Time

Based on the criteria outlined in USEPA SW-846, the holding time for lead analysis on solids has been established as:

Metals (Solids)	6 months prior to analysis No preservative required other than storing at 4°C until time of analysis.

It was noted that all soil samples were properly collected and stored in coolers until time of analysis. Actual holding times are established by comparison of the sampling dates specified on the Chain of Custody to the reported dates of analysis. All samples were submitted on a rush basis and analyzed prior to the expiration of their prescribed holding time.

2. Blank Analysis

The assessment of blank analyses results is to determine the existence and magnitude of contamination problems. All 10 method blanks analyzed with each set of samples yielded nondetectable concentrations of lead.

3. Laboratory Control Samples

To establish the ability to generate acceptable laboratory accuracy and precision, the laboratory must perform a quality control check sample. In all, 10 EPA check samples were analyzed and demonstrated relatively high accuracy from adequate results of their percent recoveries. Precision was achieved through the low standard deviation between percent recoveries. See Table 1

4. Duplicate Sample Analyses

Duplicate analyses of individual samples are indicators of laboratory precision based on each sample matrix. As outlined in "Functional Guidelines for Evaluating Inorganics Analyses", the RPD Control (relative percent difference) limits is ± 35 percent. Table 2 lists the results of the laboratory selected duplicates and their corresponding RPD values. It is noted that the analyses of these duplicates indicated that acceptable precision was attained for lead.

5. Field QA/QC

Field duplicate samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision, therefore the results may have more variability than laboratory selected duplicates which measure

only lab performance. It is also expected that soil duplicate results will have a greater variance than aqueous matrices due to difficulties associated with collected identical field samples. Small changes in the matrix may have a substantial effect on the reproducibility of the analytical data.

Table 3 lists the results of field duplicate analyses for lead.

The results of field duplicates yielded satisfactory reproducibility with the exception of duplicates collected at Location 49 and 73. The sample collected at Location 49 yielded twice as much lead as its duplicate, while the sample at 73 yielded almost three times as much lead as its duplicate. The discrepancies in these data may be attributed to the inhomogeneity of the sample matrix.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

In general, no action is taken on MS/MSD data to qualify an entire case as these data alone do not give a proper indication of the precision and accuracy of the analyses of a particular sample.

RPD (relative percent difference) control limits of $\pm$20 percent (outlined in USEPA SW-86) for inorganic parameters was determined from waste water analyses. RPD values for eight out of 10 MS/MSD analyses on the soil/fill samples attained acceptable precision, while two RPD values were relatively high (43.7 percent). Again, the discrepancies in the data may be attributed to inhomogeneity in the sample matrix.

The control limits established for spike percent recovery as outlined in USEPA SW-846, have generally been developed for wastewater analyses. The samples being analyzed were a rough mixture of soil and fill and considered a very difficult matrix to deal with. Of the 20 spike analyses, three were outside the control limits of 75-125 percent. Considering the nature of the matrix, the percent recoveries indicate satisfactory accuracy among the analyses. Table 4 presents the precision and accuracy data obtained from the MS/MSD data.

7. Summary

In summary, standard laboratory and field QA/QC were adhered to, making the data acceptable for use with the following qualifications:

a. There were no holding time violations.
b. USEPA SW-846 does not give proper control limits for spike recoveries for solids, nor proper control limits for RPD values for solid MS/MSD samples in conjunction with metals analyses. Even so, most of the quality control done by the Lab was acceptable by wastewater standards established in USEPA SW-846.

References

"Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses", prepared by USEPA Office of Emergency and Remedial Response.

TM:jd
Attachment

TABLE 1

Summary of QC Check Sample Data

Identification No.	EPA 1085
Parameter	Lead
Matrix	Water
Standard Deviation	1.7 Percent

Percent Recovery
106.6
105.4
105.4
109.8
107.6
104.2
107.6
108.8
105.4
106.6

TABLE 2

Comparison of Laboratory Duplicates for Lead Analysis

I.D. No.	Original Value (mg/kg)	Duplicate (mg/kg)	RPD Control Limit (%)	RPD (%)	Matrix
2366-13	210	191	35	9.5	soil/fill
2366-22	170	174	35	2.3	
2366-29	54	59	35	8.8	
2366-38	215	201	35	6.7	
2366-47	107	120	35	11.5	
2366-56	92	92	35	0	
2366-64	122	112	35	8.5	
2366-71	77	86	35	11.0	
2366-81	71	72	35	1.4	

TABLE 3

Lead Results for Field Duplicates

I.D. No.	Original Concentration (mg/Kg)	I.D. No.	Duplicate Concentration (mg/kg)	RPD (%)
2366-28	61	2366-29	57	6.8
2366-37	220	2366-38	208	5.6
2366-49	263	2366-50	129	68.4
2366-52	434	2366-53	529	19.7
2366-68	52	2366-69	63	15.9
2366-73	207	2366-74	76	92.6

TABLE 4

Relative Percent Difference Between Duplicate Matrix Spike Analysis

I.D. No.	Parameter	RPD	Spike[1] Recovery (Percent)	Spike/Dup.[1] Recovery (Percent)
2366-13	Lead	13.5	117	134
2366-22	Lead	43.7*	106	68
2366-29	Lead	43.7*	106	68*
2366-38	Lead	5.7	108	102
2366-47	Lead	8.7	96	88
2366-56	Lead	1.9	106	104
2366-64	Lead	9.7	118	130*
2366-71	Lead	5.7	108	102
2366-81	Lead	1.9	102	104
2366-29 Repeat	Lead	16	92	108

[1]Control limits for percent recovery for lead (75-125 percent) USEPA SW-846, 3rd Edition, September 1986.

RPD = Relative percent difference between spike and duplicate analyses.

* Outside control limits

Note:

Control limits for RPD assumed to be ±20 percent.
Matrix for all samples - soil/fill

APPENDIX E

100-FOOT GRID SAMPLING RESULTS

SAMPLES ANALYZED FOR TARGET COMPOUND LIST

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#1
LABORATORY NUMBER: 8801271
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	8	5
Trichlorofluoromethane	5	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	6	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	126
Bromofluorobenzene	86-115	74-121	84
1,2-Dichloroethane-d4	76-114	70-121	101

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#2
LABORATORY NUMBER: 8801272
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	7	5
Trichlorofluoromethane	11	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	7	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	111
Bromofluorobenzene	86-115	74-121	92
1,2-Dichloroethane-d4	76-114	70-121	101

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#3
LABORATORY NUMBER: 8801273
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	9	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	7	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	110
Bromofluorobenzene	86-115	74-121	90
1,2-Dichloroethane-d4	76-114	70-121	100

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#4
LABORATORY NUMBER: 8801274
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	18	5
Trichlorofluoromethane	10	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	6	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	134
Bromofluorobenzene	86-115	74-121	73
1,2-Dichloroethane-d4	76-114	70-121	96

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#5
LABORATORY NUMBER: 8801275
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	22	5
Trichlorofluoromethane	15	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	6	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	128
Bromofluorobenzene	86-115	74-121	76
1,2-Dichloroethane-d4	76-114	70-121	98

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#6
LABORATORY NUMBER: 8801276
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	23	5
Trichlorofluoromethane	18	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	6	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	119
Bromofluorobenzene	86-115	74-121	83
1,2-Dichloroethane-d4	76-114	70-121	97

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#?
LABORATORY NUMBER: 8801277
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	54	5
Trichlorofluoromethane	10	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	7	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	124
Bromofluorobenzene	86-115	74-121	90
1,2-Dichloroethane-d4	76-114	70-121	102

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

PEDCO ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: METHOD BLANK
SAMPLE ID: NA
LABORATORY NUMBER: METHOD BLANK
DATE COLLECTED/RECEIVED: NA
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) WATER
SAMPLE VOLUME/WEIGHT: 5 ML
UNITS (UG/L OR UG/KG): UG/L
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	5	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	112
Bromofluorobenzene	86-115	74-121	102
1,2-Dichloroethane-d4	76-114	70-121	99

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#1(MS)
LABORATORY NUMBER: 8801271
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	6	5
Trichlorofluoromethane	6	5
1,1-Dichloroethene	78	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	7	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	44	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	63	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	68	5
Chlorobenzene	50	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	123
Bromofluorobenzene	86-115	74-121	88
1,2-Dichloroethane-d4	76-114	70-121	98

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT: CRA
SAMPLE ID: SAMPLE#1(MSD)
LABORATORY NUMBER: 8801271
DATE COLLECTED/RECEIVED: 8/18/88
DATE OF ANALYSIS: 8/18/88

MATRIX: (SOIL/WATER) SOIL
SAMPLE WT/VOLUME: 5GM
UNIT (UG/L OR UG/KG): UG/KG
DILUTION FACTOR: 1

VOLATILE COMPOUNDS	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	10	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	81	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	8	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	44	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	63	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Toluene	66	5
Chlorobenzene	50	5
Ethylbenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS WATER	QC LIMITS SOIL	PERCENT RECOVERY
Toluene-d8	88-110	81-117	117
Bromofluorobenzene	86-115	74-121	85
1,2-Dichloroethane-d4	76-114	70-121	101

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 1 Client: EPA
Laboratory Number: 8811271 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 1

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	73
2-Fluorobiphenyl	(30-115)	74
Terphenyl-d14	(18-137)	100
Phenol-d5	(24-113)	58
2-Fluorophenol	(25-121)	48
2,4,6-Tribromophenol	(19-122)	100

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 2 Client: RMC
Laboratory Number: 8801272 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	330
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 2

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	1100	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	1000	330
Pyrene	1700	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	860	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	930	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	1100	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	680	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	74
2-Fluorobiphenyl	(30-115)	71
Terphenyl-d14	(18-137)	101
Phenol-d5	(24-113)	60
2-Fluorophenol	(25-121)	54
2,4,6-Tribromophenol	(19-122)	89

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 3 Client: EPA
Laboratory Number: 8801273 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/18/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 3

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)Fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	74
2-Fluorobiphenyl	(30-115)	78
Terphenyl-d14	(18-137)	96
Phenol-d5	(24-113)	61
2-Fluorophenol	(25-121)	53
2,4,6-Tribromophenol	(19-122)	99

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

PECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 4 Client: EPA
Laboratory Number: 8801274 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 4

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)Fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	83
2-Fluorobiphenyl	(30-115)	83
Terphenyl-d14	(18-137)	102
Phenol-d5	(24-113)	63
2-Fluorophenol	(25-121)	55
2,4,6-Tribromophenol	(19-122)	102

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

PECPA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 5 Client: EPA
Laboratory Number: 8801275 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 5

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	350	330
Benzidine	ND	870
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	360	330
Benzo(k)Fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	74
2-Fluorobiphenyl	(30-115)	77
Terphenyl-d14	(18-137)	112
Phenol-d5	(24-113)	59
2-Fluorophenol	(25-121)	51
2,4,6-Tribromophenol	(19-122)	88

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 6 Client: CPA
Laboratory Number: 8801276 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/18/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	370	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 6

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	510	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	370	330
Pyrene	420	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	370	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	83
2-Fluorobiphenyl	(30-115)	83
Terphenyl-d14	(18-137)	108
Phenol-d5	(24-113)	65
2-Fluorophenol	(25-121)	58
2,4,6-Tribromophenol	(19-122)	104

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 7 Client: CPA
Laboratory Number: 8801277 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 7

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	80
2-Fluorobiphenyl	(30-115)	80
Terphenyl-d14	(18-137)	11
Phenol-d5	(24-113)	63
2-Fluorophenol	(25-121)	54
2,4,6-Tribromophenol	(19-122)	94

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 7 MS Client: EPA
Laboratory Number: 8801227 MS Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	3100 (M)	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	2500 (M)	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	1300 (M)	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	1700 (M)	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	1100 (M)	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	2600 (M)	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	1500 (M)	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	880 (M)	830
2,4-Dinitrotoluene	1100 (M)	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: SAMPLE # 7_MS

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	3000 (M)	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	2100 (M)	330
Benzidine	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	330
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	83
2-Fluorobiphenyl	(30-115)	81
Terphenyl-d14	(18-137)	108
Phenol-d5	(24-113)	63
2-Fluorophenol	(25-121)	58
2,4,6-Tribromophenol	(19-122)	99

M : MATRIX SPIKE COMPOUND
ND: NOT DETECTED
* : PROBABLE CONTAMINATION

Semivolatiles Continued

Sample Identification: SAMPLE # 7_MSD

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	2700 (M)	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	2400 (M)	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)fluoranthene	ND	330
Benzo(k)fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	99
2-Fluorobiphenyl	(30-115)	83
Terphenyl-d14	(18-137)	125
Phenol-d5	(24-113)	62
2-Fluorophenol	(25-121)	66
2,4,6-Tribromophenol	(19-122)	96

M : MATRIX SPIKE COMPOUND
ND: NOT DETECTED
* : PROBABLE CONTAMINATION

PEDRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: SAMPLE # 2 MSD Client: EPA
Laboratory Number: 8801272 MSD Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/19/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	3200 (M)	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	2700 (M)	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	1500 (M)	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	1900 (M)	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	1200 (M)	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	2700 (M)	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	1600 (M)	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	800 (M)	830
2,4-Dinitrotoluene	1100 (M)	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

PECORA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET FOR SOIL

Sample Identification: METHOD BLANK Client: CRA
Laboratory Number: # 231 Dilution Factor: 1
Date Collected/Received: 8/18/88 Date of Analysis: 8/18/88

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	ND	330
Phenol	ND	330
bis(-2-Chloroethyl)Ether	ND	330
2-Chlorophenol	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
bis(2-Chloroisopropyl)ether	ND	330
N-Nitroso-Di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
2-Nitrophenol	ND	830
2,4-Dimethylphenol	ND	830
bis(-2-Chloroethoxy)Methane	ND	330
2,4-Dichlorophenol	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
4-Chloro-3-methylphenol	ND	830
Hexachlorocyclopentadiene	ND	330
2,4,6-Trichlorophenol	ND	330
2-Chloronaphthalene	ND	330
Dimethyl Phthalate	ND	330
Acenaphthylene	ND	330
Acenaphthene	ND	330
2,4-Dinitrophenol	ND	830
4-Nitrophenol	ND	830
2,4-Dinitrotoluene	ND	330
2,6-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
4,6-Dinitro-2-methylphenol	ND	830
N-Nitrosodiphenylamine	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330

Semivolatiles Continued

Sample Identification: METHOD BLANK # 231

Semivolatile Compounds	Concentration (ug/kg)	Detection Limit (ug/kg)
Pentachlorophenol	ND	830
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-Butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Benzidine	ND	830
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	830
Benzo(a)Anthracene	ND	330
Bis(2-Ethylhexyl)Phthalate	ND	330
Chrysene	ND	330
Di-n-octyl phthalate	ND	330
Benzo(b)Fluoranthene	ND	330
Benzo(k)Fluoranthene	ND	330
Benzo(a)Pyrene	ND	330
Indeno(1,2,3-cd)Pyrene	ND	330
Dibenzo(a,h)Anthracene	ND	330
Benzo(g,h,i)Perylene	ND	330

SURROGATE RECOVERY DATA

Surrogate Compound	QC Limits	Percent Recovery
Nitrobenzene-d5	(23-120)	66
2-Fluorobiphenyl	(30-115)	78
Terphenyl-d14	(18-137)	93
Phenol-d5	(24-113)	57
2-Fluorophenol	(25-121)	48
2,4,6-Tribromophenol	(19-122)	91

ND: NOT DETECTED
* : PROBABLE CONTAMINATION

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 1 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801271 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT 1/
alpha-BHC	ND	8 0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 2 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801272 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8 000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 3 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801273 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT 1/
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 4 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801274 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8 000
P,P'-DDE	ND	16.00
Dieldrin	ND	16 00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16 00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 5 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801275 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 6 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801276 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT 1/
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80 0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION Sample 7 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801277 SAMPLE WT/VOLUME: 30 g

DATE COLLECTED/RECEIVED 8/19/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16 00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16 0

ND - NOT DETECTED

1/

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

PESTICIDE ORGANICS ANALYSIS DATA SHEET FOR SOIL

SAMPLE IDENTIFICATION N/A
MATRIX: (soil/water) Soil
LABORATORY NUMBER Lab Blank
SAMPLE WT/VOLUME: 30 g
DATE COLLECTED/RECEIVED N/A
UNIT (ug/l or ug/kg): ug/kg
DATE OF ANALYSIS 8/20/88

PESTICIDE COMPOUND	CONCENTRATION	DETECTION LIMIT
alpha-BHC	ND	8.0000
beta-BHC	ND	8.000
delta-BHC	ND	8.000
gamma-BHC	ND	80.00
Heptachlor	ND	8.000
Aldrin	ND	8.000
Heptachlor epoxide	ND	8.000
Endosulfan I	ND	8.000
P,P'-DDE	ND	16.00
Dieldrin	ND	16.00
Endrin	ND	16.00
P,P'-DDD & Endo. II	ND	16.00
P,P'-DDT	ND	16.00
Endrin Aldehyde	ND	16.00
Endosulfan Sulfate	ND	16.00
Methoxychlor	ND	80.0
Chlordane	ND	80.0
Toxaphene	ND	160.0
Aroclor 1061	ND	800.0
Aroclor 1221	ND	800.0
Aroclor 1232	ND	800.0
Aroclor 1242	ND	800.0
Aroclor 1248	ND	80.0
Aroclor 1254	ND	160.0
Aroclor 1260	ND	160.0
Endrin Ketone	ND	16.0

ND - NOT DETECTED

Inorganic Data Comment Page

Lab Name RECRA ENVIRONMENTAL, INC.

ICP interelement and background corrections applied? Yes X No ____

If yes, corrections applied before X or after ____ generation of raw data.

Footnotes:

NR - Not required by contract at this time

Form I:

Value - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, report the value in brackets (i.e., [10]). Indicate the analytical method used with P (for ICP), A (for Flame AA) or F (for Furnace AA).

U - Indicates element was analyzed for but not detected. Report with the detection limit value (e.g., 10U).

E - Indicates a value estimated or not reported due to the presence of interference. Explanatory note included on cover page.

S - Indicates value determined by Method of Standard Addition.

N - Indicates spike sample recovery is not within control limits.

* - Indicates duplicate analysis is not within control limits.

+ - Indicates the correlation coefficient for method of standard addition is less than 0.995.

M - Indicates duplicate injection results exceeded control limits.

Indicate method used: P for ICP; A for Flame AA and F for Furnace.

COMMENTS: _____

EPA Sample No.

SAMPLE 1

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4023,4024 QC REPORT NO. 88-1287 QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	38,100			P	13.	Magnesium	3,080			P
2.	Antimony	0.79	U	N	F	14.	Manganese	51		N	A
3.	Arsenic	7.6		N	F	15.	Mercury	0.24	U		CV
4.	Barium	106			A	16.	Nickel	12	*		P
5.	Beryllium	1.5			P	17.	Potassium	2,990			P
6.	Cadmium	0.94	U		A	18.	Selenium	0.79	U	N	F
7.	Calcium	3,940			P	19.	Silver	1.6	U	N	P
8.	Chromium	21			A	20.	Sodium	580			A
9.	Cobalt	4.8			P	21.	Thallium	0.79	U	N	F
10.	Copper	16	*		A	22.	Vanadium	30			P
11.	Iron	12,100			A	23.	Zinc	108		N	A
12.	Lead	90			A	Percent Solids (%)		64.0			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EPA Sample No.

SAMPLE 2

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4026 QC REPORT NO. 88-1287 QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	26,900			P	13.	Magnesium	23,000			P
2.	Antimony	0.57	U	N	F	14.	Manganese	3,010		N	A
3.	Arsenic	8.4		N	F	15.	Mercury	0.17	U		CV
4.	Barium	185			A	16.	Nickel	13		*	P
5.	Beryllium	3.9			P	17.	Potassium	2,690			P
6.	Cadmium	0.68	U		A	18.	Selenium	0.57	U	N	F
7.	Calcium	149,000			P	19.	Silver	1.2	U	N	P
8.	Chromium	25			A	20.	Sodium	1,760			A
9.	Cobalt	6.2			P	21.	Thallium	0.57	U	N	F
10.	Copper	36	*		A	22.	Vanadium	16			P
11.	Iron	39,900			A	23.	Zinc	155		N	A
12.	Lead	931			A	Percent Solids (%)		89.4			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EPA Sample No.

SAMPLE 3

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4027 QC REPORT NO. 88-1287QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	16,800			P	13.	Magnesium	16,800			P
2.	Antimony	0.53	U	N	F	14.	Manganese	2,590		N	A
3.	Arsenic	4.9		N	F	15.	Mercury	0.16	U		CV
4.	Barium	97			A	16.	Nickel	9.5		*	P
5.	Beryllium	2.1			P	17.	Potassium	1,220			P
6.	Cadmium	2.0			A	18.	Selenium	0.53	U	N	F
7.	Calcium	93,500			P	19.	Silver	1.1	U	N	P
8.	Chromium	18			A	20.	Sodium	1,170			A
9.	Cobalt	3.7			P	21.	Thallium	0.53	U	N	F
10.	Copper	42		*	A	22.	Vanadium	13			P
11.	Iron	29,600			A	23.	Zinc	88		N	A
12.	Lead	299			A	Percent Solids (%)		95.4			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EPA Sample No.

SAMPLE 4

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4028 QC REPORT NO. 88-1287QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	10,100			P	13.	Magnesium	4,610			P
2.	Antimony	0.62	U	N	F	14.	Manganese	2,330		N	A
3.	Arsenic	12		N	F	15.	Mercury	0.19	U		CV
4.	Barium	77			A	16.	Nickel	17			* P
5.	Beryllium	1.1			P	17.	Potassium	1,440			P
6.	Cadmium	0.98			A	18.	Selenium	0.62	U	N	F
7.	Calcium	37,500			P	19.	Silver	1.3	U	N	P
8.	Chromium	16			A	20.	Sodium	1,380			A
9.	Cobalt	7.0			P	21.	Thallium	0.74		N	F
10.	Copper	12			* A	22.	Vanadium	23			P
11.	Iron	42,300			A	23.	Zinc	211		N	A
12.	Lead	191			A	Percent Solids (%)		80.8			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EPA Sample No.

SAMPLE 5

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4029 QC REPORT NO. 88-1287QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	7,380			P	13.	Magnesium	3,620			P
2.	Antimony	0.59	U	N	F	14.	Manganese	1,340		N	A
3.	Arsenic	8.9		N	F	15.	Mercury	0.17	U		CV
4.	Barium	50			A	16.	Nickel	13		*	P
5.	Beryllium	0.93			P	17.	Potassium	1,020			P
6.	Cadmium	0.70	U		A	18.	Selenium	0.59	U	N	F
7.	Calcium	34,100			P	19.	Silver	1.2	U	N	P
8.	Chromium	10			A	20.	Sodium	1,390			A
9.	Cobalt	5.9			P	21.	Thallium	0.59	U	N	F
10.	Copper	35		*	A	22.	Vanadium	15			P
11.	Iron	49,300			A	23.	Zinc	133		N	A
12.	Lead	105			A	Percent Solids (%)		85.6			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EPA Sample No.

SAMPLE 6

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4030 QC REPORT NO. 88-1287QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	8,390			P	13.	Magnesium	2,120			P
2.	Antimony	0.55	U	N	F	14.	Manganese	1,610		N	A
3.	Arsenic	7.7		N	F	15.	Mercury	0.17	U		CV
4.	Barium	105			A	16.	Nickel	19		*	P
5.	Beryllium	0.76			P	17.	Potassium	1,480			P
6.	Cadmium	0.66	U		A	18.	Selenium	0.55	U	N	F
7.	Calcium	7,820			P	19.	Silver	1.1	U	N	P
8.	Chromium	38			A	20.	Sodium	1,220			A
9.	Cobalt	7.4			P	21.	Thallium	0.55	U	N	F
10.	Copper	51		*	A	22.	Vanadium	21			P
11.	Iron	52,100			A	23.	Zinc	361		N	A
12.	Lead	761			A	Percent Solids (%)		92.2			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

EPA Sample No.
SAMPLE 7

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

CONTRACT NUMBER _____ LAB RECEIPT DATE 8/17/88

LAB SAMPLE ID. NO. 4031 QC REPORT NO. 88-1287QC

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	15,500			P	13.	Magnesium	1,810			P
2.	Antimony	0.68	U	N	F	14.	Manganese	83		N	A
3.	Arsenic	9.5		N	F	15.	Mercury	0.20	U		CV
4.	Barium	70			A	16.	Nickel	11		*	P
5.	Beryllium	0.95			P	17.	Potassium	1,840			P
6.	Cadmium	1.2			A	18.	Selenium	0.68	U	N	F
7.	Calcium	3,810			P	19.	Silver	1.4	U	N	P
8.	Chromium	16			A	20.	Sodium	324			A
9.	Cobalt	3.2			P	21.	Thallium	0.68	U	N	F
10.	Copper	15		*	A	22.	Vanadium	23			P
11.	Iron	7,570			A	23.	Zinc	89		N	A
12.	Lead	112			A	Percent Solids (%)		73.5			
Cyanide		NR									

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form II

Q. C. Report No. 88-1287QC

INITIAL AND CONTINUING CALIBRATION VERIFICATION[3]

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

SOW NO. _____

DATE _____ UNITS: ug/L

Compound	Initial Calib.[1]			Continuing Calibration[2]					
Metals:	True Value	Found	%R	True Value	Found	%R	Found	%R	Method[4]
1. Aluminum	1,000	1,040	104	1,000	1,020	102			P
2. Antimony	100	103	103	100	100	100			F
3. Arsenic	80	78	98	80	75	94			F
4. Barium	10,000	9,880	99	10,000	10,050	101			A
5. Beryllium	500	492	98	500	477	95			P
6. Cadmium	500	518	104	500	514	103			A
7. Calcium	20,000	21,200	106	20,000	20,600	103			P
8. Chromium	500	479	96	500	487	97			A
9. Cobalt	500	504	101	500	468	94			P
10. Copper	500	498	99	500	510	102			A
11. Iron	800	830	104	800	760	95			A
12. Lead	2,500	2,500	100	2,500	2,590	104			A
13. Magnesium	5,000	5,400	108	5,000	5,200	104			P
14. Manganese	500	508	102	500	512	103			A
15. Mercury	8.0	7.7	96	8.0	7.6	95			CV
16. Nickel	300	330	107	300	300	100			A
17. Potassium	5,000	5,200	104	5,000	4,900	98			A
18. Selenium	50	50	100	50	46	92			F
19. Silver	300	271	90	300	268	89			P
20. Sodium	20,000	21,300	107	20,000	20,200	101			A
21. Thallium	80	82	103	80	84	105			F
22. Vanadium	1,000	1,000	100	1,000	950	95			P
23. Zinc	500	500	100	500	502	101			A
Other: _____									
Cyanide	-	-	-	-	-	-			

[1]Initial Calibration Source * [2]Continuing Calibration Source *

[3]Control Limits: Mercury and Tin 80-120; Other Metals 90-110; Cyanide 85-115

[4]Indicate Analytical Method Used: P - ICP; A - Flame AA; F - Furnace AA

*US EPA or commercially purchased standard

Form III

Q.C. Report No. 88-1287QC

BLANKS

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

DATE _____ UNITS UG/L

Compound	Initial Calibration Blank Value	Continuing Calibration Blank Value 1	2	3	4	Preparation Blank Matrix: SOIL 1	Matrix: 2
Metals:							
1. Aluminum	40U	40U	40U			40U	
2. Antimony	5U	5U				5U	
3. Arsenic	5U	5U				5U	
4. Barium	20U	20U	20U			20U	
5. Beryllium	7U	7U	7U			7U	
6. Cadmium	6U	6U	6U			6U	
7. Calcium	500U	500U	500U			500U	
8. Chromium	10U	10U	10U			10U	
9. Cobalt	30U	30U	30U			30U	
10. Copper	6U	6U	6U			6U	
11. Iron	30U	30U	30U			30U	
12. Lead	160U	160U	160U			160U	
13. Magnesium	100U	100U	100U			100U	
14. Manganese	6U	6U	6U			6U	
15. Mercury	0.2U	0.2U				0.2U	
16. Nickel	20U	20U	20U			20U	
17. Potassium	500U	500U	500U			500U	
18. Selenium	5U	5U				5U	
19. Silver	10U	10U	10U			10U	
20. Sodium	500U	500U	500U			500U	
21. Thallium	5U	5U	5U			5U	
22. Vanadium	30U	30U	30U			30U	
23. Zinc	5U	5U	5U			5U	
Other:							
Cyanide							

[1]Reporting Units: aqueous, ug/L; solid, mg/kg

Form V

Q. C. Report No. 88-1287QC

SPIKE SAMPLE RECOVERY

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287

DATE _____ EPA Sample No. SAMPLE 1

Lab Sample ID No. 4025

Units UG

Matrix SOIL

Compound	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spiked Added (SA)	%R[1]
Metals:					
1. Aluminum	75-125	-	-	-	NR
2. Antimony	"	5U	5U	50	0 N
3. Arsenic	"	45	49	20	0 N
4. Barium	"	2,428	676	2,000	88
5. Beryllium	"	51	9.5	50	83
6. Cadmium	"	53	6U	50	105
7. Calcium	"	-	-	-	NR
8. Chromium	"	324	133	200	96
9. Cobalt	"	467	30	500	87
10. Copper	"	308	99	250	84
11. Iron	"	-	-	-	NR
12. Lead	"	990	573	500	83
13. Magnesium	"	-	-	-	NR
14. Manganese	"	487	324	200	68 N
15. Mercury	"	0.392	0.2U	0.4	98
16. Nickel	"	430	75	400	89
17. Potassium	"	-	-	-	NR
18. Selenium	"	5U	5U	10	0 N
19. Silver	"	10U	10U	50	0 N
20. Sodium	"	-	-	-	NR
21. Thallium	"	29	5U	50	58 N
22. Vanadium	"	601	194	500	81
23. Zinc	"	768	689	200	40 N
Other:					
Cyanide	"				

[1] %R = [(SSR - SR)/SA] X 100

"N" - Out of control

"NR" - Not required

Comments: _____

FORM VI

Q. C. Report No. 88-1287QC

DUPLICATES

LAB NAME RECRA ENVIRONMENTAL, INC.

DATE

CASE NO. 88-1287
EPA Sample No. SAMPLE 1
Lab Sample ID No. 4023,4024
Units MG/KG DRY
Matrix SOIL

Compound	Control Limit[1]	Sample(S)	Duplicate(D)	RPD[2]
Metals:				
1. Aluminum		33,500	30,900	6.9
2. Antimony		0.79U	0.79U	NC
3. Arsenic		7.48	7.78	3.9
4. Barium		109	102	6.6
5. Beryllium		1.56	1.40	11
6. Cadmium		0.94U	0.94U	NC
7. Calcium		3,990	3,890	2.4
8. Chromium		20.7	20.7	0
9. Cobalt		4.52	4.98	9.7
10. Copper		19.2	11.8	46 *
11. Iron		12,000	12,100	0.82
12. Lead		88.7	90.3	1.8
13. Magnesium		3,070	3,080	0.32
14. Manganese		53.6	47.7	12
15. Mercury		0.24U	0.24U	NC
16. Nickel		14	9.3	39 *
17. Potassium		3,020	2,960	3.7
18. Selenium		0.79U	0.79U	NC
19. Silver		1.6U	1.6U	NC
20. Sodium		582	576	0.94
21. Thallium		0.79U	0.79U	NC
22. Vanadium		28.8	31.8	9.9
23. Zinc		112	103	8.3
Other:				
Cyanide	-	-	-	-

* Out of Control

[1] To be added at a later date

[2] RPD = [|S - D|/((S + D)/2)] x 100

NC - Non calculable RPD due to value(s) less than CRDL

Form VII

14

Q.C. Report No. 88-1287QC

INSTRUMENT DETECTION LIMITS AND

LABORATORY CONTROL SAMPLE

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1287 DATE _____

LCS NO. MDS-976

Compound	Required Detection Limits (CRDL)-ug/L	Instrument Detection Limits (IDL)-ug/L ICP/AA ID# PLASMA40 PE 5000	Instrument Detection Limits (IDL)-ug/L Furnace ID# PE 500	Lab Control Sample ug/L mg/kg (circle one) True	Found	%R
METALS:						
1. Aluminum	200	40			4,610	*
2. Antimony	60	-	5		-	
3. Arsenic	10	-	5		1.89	
4. Barium	200	20			-	
5. Beryllium	5	5			0.70	
6. Cadmium	5	5			18.8	
7. Calcium	5000	500			-	
8. Chromium	10	10			189	
9. Cobalt	50	30			-	
10. Copper	25	6			1,020	
11. Iron	100	30			13,700	
12. Lead	5	160	5		489	
13. Magnesium	5000	100			-	
14. Manganese	15	6			213	
15. Mercury	0.2	0.2			6.5	
16. Nickel	40	20			159	
17. Potassium	5000	500			-	
18. Selenium	5		5		-	
19. Silver	10	10			1.1	
20. Sodium	5000	500			-	
21. Thallium	10		5		-	
22. Vanadium	50	30			9.6	
23. Zinc	20	5			1,350	
Other:						
Cyanide	10	NR	NR			

NR - Not Required

* - See Attached

SRM CONFIDENCE LIMITS

ELEMENT	MDS-976 S-1 (ug/g)
Al	2,010-7,110
As	0-88.9
Be	0-2.99
Cd	10.5-27.8
Cr	150-246
Cu	882-1280
Fe	11,200-21,700
Pb	372-680
Mn	182-223
Hg	0-36.1
Ni	164-225
V	1.7-24.4
Zn	1,190-1,450
Ag	0-203
Ti	0-4860

Form X

QC Report No. 88-1287QC

HOLDING TIMES

LAB NAME RECRA ENVIRONMENTAL, INC.

DATE _____ CASE NO. 88-1287

EPA Sample No.	Matrix	Date Received	Mercury Prep Date	Mercury Holding Time[1] (Days)	CN Prep Date	CN Holding Time[1] (Days)
SAMPLE 1	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 2	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 3	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 4	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 5	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 6	SOIL	8/17/88	8/23/88	6	-	-
SAMPLE 7	SOIL	8/17/88	8/23/88	6	-	-

[1]Holding time is defined as number of days between the date received and the sample preparation date.

1/178.1

Reanalysis

COPY

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION SAMPLE 1 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801271 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8-18-88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8-25-88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	85	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	112	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	16	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	132
Bromofluorobenzene	86-115	74-121	76
1,2-Dichloroethane-d4	76-114	70-121	123

ND - NOT DETECTED

1/178.2

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION SAMPLE 2 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801272 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8-18-88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8 25-88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	55	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	65	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3 Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	15	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	123
Bromofluorobenzene	86-115	74-121	86
1,2-Dichloroethane-d4	76-114	70-121	123

ND - NOT DETECTED

1/178.3

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 3 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801273 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	45	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	100	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	15	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88 110	81-117	76
Bromofluorobenzene	86-115	74-121	54
1,2-Dichloroethane-d4	76-114	70-121	73

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.4

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 4 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801274 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/25/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	170	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	90	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	101
Bromofluorobenzene	86-115	74-121	65
1,2-Dichloroethane-d4	76-114	70-121	175

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.5

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 5 MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801275 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	110	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	75	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	40	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	9	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	230	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	50	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88 110	81-117	110
Bromofluorobenzene	86-115	74-121	41
1,2-Dichloroethane-d4	76-114	70-121	67

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.6

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 6 MATRIX: (soil/water) soil

LABORATORY NUMBER 8801276 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	85	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	18	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	9	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	130	5
Dibromochloromethane	ND	5
1,1,2 Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	23	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	101
Bromofluorobenzene	86-115	74-121	46
1,2-Dichloroethane-d4	76-114	70-121	73

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.7

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 7 MATRIX: (soil/water) soil

LABORATORY NUMBER 8801277 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	43	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	30	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	180	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	30	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	73
Bromofluorobenzene	86-115	74-121	55
1,2-Dichloroethane-d4	76-114	70-121	63

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.8

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 1 MS MATRIX: (soil/water) Soil

LABORATORY NUMBER 8801271 SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED 8/18/88 UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	60	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	51	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	25	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	180	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	50	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	16	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	52	5
Chlorobenzene	39	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	86
Bromofluorobenzene	86-115	74-121	48
1,2-Dichloroethane-d4	76-114	70-121	72

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.9

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Sample 1 MSD
MATRIX: (soil/water) Soil
LABORATORY NUMBER 8801271
SAMPLE WT/VOLUME: 5g
DATE COLLECTED/RECEIVED 8/18/88
UNIT (ug/l or ug/kg): ug/kg
DATE OF ANALYSIS 8/26/88
DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	65	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	19	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3 Dichloropropene	ND	5
Trichloroethene	110	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	38	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	57	5
Chlorobenzene	38	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88-110	81-117	93
Bromofluorobenzene	86-115	74-121	21
1,2-Dichloroethane-d4	76-114	70-121	81

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.10

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Method Blank MATRIX: (soil/water) Soil

LABORATORY NUMBER Method Blank SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED N/A UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/25/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	24	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88 110	81-117	92
Bromofluorobenzene	86-115	74-121	96
1,2-Dichloroethane-d4	76-114	70-121	95

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

1/178.11

RECRA ENVIRONMENTAL, INC.
COLUMBIA, MARYLAND

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE IDENTIFICATION Method Blank MATRIX: (soil/water) Soil

LABORATORY NUMBER Method Blank SAMPLE WT/VOLUME: 5g

DATE COLLECTED/RECEIVED N/A UNIT (ug/l or ug/kg): ug/kg

DATE OF ANALYSIS 8/26/88 DILUTION FACTOR: 1

VOLATILE COMPOUND	CONCENTRATION	DETECTION LIMIT
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl Chloride	ND	10
Chloroethane	ND	10
Methylene Chloride	23	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
Trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
1,2-Dichloroethane	ND	5
1,1,1-Trichloroethane	ND	5
Carbon Tetrachloride	ND	5
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
Trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
cis-1,3-Dichloropropene	ND	5
2-Chloroethylvinylether	ND	10
Bromoform	ND	5
Tetrachloroethene	ND	5
1,1,2,2-Tetrachlorethane	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethylbenzene	ND	5

SURROGATE RECOVERY DATA

SURROGATE COMPOUND	QC LIMITS Water	QC LIMITS Soil	PERCENT RECOVERY
Toluene-d8	88 110	81-117	87
Bromofluorobenzene	86-115	74-121	104
1,2-Dichloroethane-d4	76-114	70-121	100

ND - NOT DETECTED
*: PROBABLE CONTAMINATION

MEMO

To: Bruce Clegg Reference No. 2366

From: Tony Misercola

Date: 3/30/89

Re: Analytical Data - Ernst Steel/Pyramid Company
Revised 10-19-89 Memo

This memo details an assessment of analytical results reported by Recra Environmental for seven soil samples collected at the Ernst Steel/Pyramid Site on August 17, 1988. The samples submitted for analysis consisted of the following:

Matrix	Investigative Samples	Field Duplicates	Total
Soil/Fill	6	1	7

All samples were submitted for Target Compound List (TCL) VOAs, BNAs, Pesticides/PCBs and Target Analyte List (TAL) metals. Methods employed for the following parameters were taken from USEPA SW-846 "Test Methods for Evaluating Solid Waste", third edition, September 1986.

Parameter	Method
VOA	8240
BNA	8270
Pest/PCBs	8080
Metals	6010/7000 Series

The QA/QC by which these data have been assessed are outlined in the aforementioned methods and the documents entitled "Laboratory Functional Guidelines for Evaluating Organic and Inorganic Analyses", written by the USEPA.

Based on review of this data set and other related quality control data, the following are noted:

1. Sample Holding Times

Based on criteria in USEPA SW-846, the following holding time requirements have been established:

VOA (Solids)	14 days as long as stored at 4°C
BNA (Solids)	14 days prior to extraction, as long as stored at 4°C 40 days from extraction to analysis
Metals (Solids)	6 months prior to analyses
Mercury (Solids)	28 days prior to analyses

By comparing the sampling dates in the project field book and subsequent Chain of Custody forms to the actual dates of extraction and/or analysis, it is noted that all samples were extracted and/or analyzed prior to the expiration of their prescribed holding times.

2. Surrogate Spike Recoveries

Laboratory performance on individual samples is established by means of spiking activities. All samples submitted for the TCL VOAs, BNAs and Pest/PCBs were spiked with surrogates prior to sample preparation.

All samples submitted for TCL, BNAs and Pest/PCBs yielded surrogate recoveries within the control limits established in USEPA SW-846. Therefore, no qualification of these data is required on this basis.

However, problems did occur in surrogate recoveries for VOAs. Table 1 shows that seven of the 10 samples analyzed (1 MS/MSD and 1 method blank) obtained surrogate recoveries that were outside recommended control limits.

In my memo to Dr. Mohan Khare of Recra Environmental, all poor surrogate recoveries were duly noted. His response was that all calculations were correct as well, all instrumental performance criteria were met. The samples should be re-analyzed to establish whether matrix interference or laboratory error was responsible for the poor surrogate performance.

Upon receiving results of the reanalysis on September 22, 1988, it was noted that surrogates for the VOAs were again outside recommended control limits except for the method blanks. Therefore, based on the results of the reanalysis, it is best assumed that the apparent complexity of the sample matrix not only caused poor recoveries of the surrogates but also caused several detectable compound concentrations which were not evident in the

original analyses. Therefore, the following qualifications shall be made for the results of the VOAs in all seven samples:

a) All positive VOA results are flagged as estimates (J) due to out-of-control surrogate spike recoveries.

b) Sample quantitation limits are flagged as estimated (UJ) due to out-of-control surrogate spike recoveries.

3. Laboratory Reagent/Blank Analyses

The assessment of results on blank analysis is for the purpose of determining the existence and magnitude of contamination problems. Solid laboratory blank samples were prepared from 30g of sodium sulfate while liquid blanks were prepared by deionized water.

All laboratory reagent blanks submitted for TCL, BNAs, Pest/PCBs and TAL metals yielded non-detectable concentrations of the analytes of interest. It should be noted that methylene chloride was detected in the VOA blanks at the method quantitation limit (5 ppb) and in the reanalysis at 23 ppb. This analyte, however, is a laboratory artifact and should have no effect on sample data.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

In general, no action is taken on MS/MSD data to qualify an entire case. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

The precision of an analytical method is demonstrated by the reproducibility of an analytical data. Presented in Table 2A are the relative percent differences between duplicate matrix spike analyses.

All RPD results for VOAs, BNAs, Pest/PCBs were within their control limits established by USEPA SW-846 demonstrating adequate precision among the analyses.

All spike recoveries for MS/MSD analyses for VOAs were within their respective control limits indicating satisfactory accuracy, of the analyses performed. Table 2A shows no more than two spike recoveries in the BNAs and one spike recovery for Pest/PCBs to be outside recommended control limits. This situation is still acceptable in terms of quality control, however, since results for these spike recoveries were lower than method control limit criteria, a slight low bias in 1,2,4-trichlorobenzene and g-bhc results for the soils analyzed may be implied.

5. Matrix Spike and Duplicate Results for TAL Metals

As previously noted, reasoning behind spiking and duplicating sample analyses is to generate accuracy and precision information of a particular matrix. Presented in Table 2B are the results of spike recoveries for the specific metals analyzed for. Problems existed for spike recoveries of seven metals, those being: antimony; arsenic; manganese; selenium; silver; thallium and zinc. As a result of these low recoveries, the qualifications as shown on Table 3A must be made regarding the results of these metals in the seven soil samples.

Duplicate analysis was performed for metals on Sample No. 1 and are presented in Table 2C. Satisfactory precision was demonstrated with low RPD values for all metals except for copper and nickel which exhibited higher RPD values than the recommended control limit of 35± percent. Therefore, all associated values of copper and nickel shall be qualified as presented in Table 3B.

6. Field QA/QC

In accordance with proper QA/QC, one field duplicate was taken at location 19N22E. The two samples were submitted as No. 4 and No. 5 respectively to the laboratory. The results of the field duplicates yielded satisfactory results except two semi-volatiles detected slightly above the detection limit in Sample No.5, showed less than detectable quantities in Sample No. 4. The discrepancies in this data may be attributed to inhomogenity in the sample matrix. Organic analyses are highly dependent on the sample matrix. Slight changes in the matrix may have a substantial effect on the reproducibility of analytical data.

7. Summary

In summary, there were a number of problems that arose that made it necessary for some for the data to be qualified those being:

a) Poor surrogate recoveries in the VOA analyses due to matrix interference. On this basis, all VOC results associated with the soil samples had to be qualified as estimated (data qualifer).

b) Due to poor recoveries on sample spikes for metallic analytes antimony, arsenic, manganese, selenium, silver, thallium and zinc had to be qualified as either estimated values or unusable. The laboratory has been notified of these results in an attempt to find the reason that QC criteria was not met for these analytes.

c) On the basis of poor precision established for duplicate analyses of copper and nickel, all associated values for these two analytes had to be qualified as estimated.

References:

1. "Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses", Technical Directive Document, Prepared by the USEPA Data Validation Work Group, NUS Corporation SuperFund Division.

2. "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses", prepared by the USEPA Office of Emergency and Remedial Response.

TM:jd
Attachments

Table 1
Summary of Surrogates Outside Quality Control
Limits on First Analysis

I.D. No.	Surrogate	Percent Recovery	Percent Control Limit
1	Toluene-d_8	126	81-117
4	Toluene-d_8	134	81-117
	BFB	73	74-121
5	Toluene-d_8	128	81-117
6	Toluene-d_8	119	81-117
7	Toluene-d_8	124	81-117
1 (M/S)	Toluene-d_8	123	81-117
Method Blank	Toluene-d_8	112	88-110

Table 2A
Relative Percent Differences Between
Duplicate Matrix Spike Analysis
Organic Parameters

Lab ID No.	Parameter	RPD[1]	RPD Control Limit[2]	Spike Percent Recovery	Spike/Dup. Percent Recovery	Spik Mat
	GC/MS Volatile Compounds					Soil
1	1,1-Dichloroethene	4	22	156	262	
	Trichloroethene	0	24	88	88	
	Benzene	0	21	126	126	
	Toluene	3	21	136	132	
	Chlorobenzene	0	21	100	100	
	Base/Neutral Acid Compounds					Soil
7	Phenol	2	35	47	48	
	2-Chlorophenol	8	50	38	41	
	1,4-Dichlorobenzene	12	27	40	45	
	N-Nitroso-di-n-Propylamine	7	38	53	57	
	1,2,4-Trichlorobenzene	8	23	34*	37*	
	Chloro-3-Methylphenol	2	33	40	41	
	Acenapthene	2	19	46	47	
	4-Nitrophenol	8	50	13	12	
	2,4-Dinitrotoluene	3	47	33	32	
	Pentachlorophenol	7	47	44	41	
	Pyrene	13	36	58	66	
	Pesticides/PCBs					Soil
7	g-BHC	17	50	51	43*	
	Heptachlor	10	31	92	83	
	Aldrin	31	43	66	48	
	Dieldrin	12	38	64	57	
	Endrin	13	45	88	77	
	4,4-DDT	17	50	62	53	

1 Relative percent difference between spike duplicate percent recoveries.
2 Control limits for RPD analyses detailed in USEPA SW-846 (September 1986).
* Outside spike recovery control limits established in USEPA SW-846 (September 1986).

Table 2B
Spike Recovery Results for Metal Analyses

I.D. No.	Metal	Control Limit	Percent Recovery
Sample 1	Antimony	75-125	0*
	Arsenic	"	0*
	Barium	"	88
	Berylium	"	83
	Cadmium	"	105
	Chromium	"	96
	Cobalt	"	87
	Copper	"	84
	Manganese	"	68*
	Mercury	"	98
	Nickel	"	89
	Selenium	"	0*
	Silver	"	0*
	Thallium	"	58*
	Vanadium	"	81
	Zinc	"	40*
	Lead	"	83

*Outside control limits established in USEPA SW-846 (September 1986).

Table 2C
RPD Values for Duplicate Metal Analyses

I.D. No.	Metal	RPD[1]	Control RPD Limit[2]	Initial Result (mg/Kg)	Duplicate Result
Sample 1	Aluminum	6.9		33,500	30,960
	Arsenic	3.9		7.48	7.78
	Barium	6.6		109	102
	Berylium	11		1.56	1.40
	Calcium	2.4		3,990	3,890
	Chromium	0		20.7	20.7
	Cobalt	9.7		4.52	4.98
	Copper	46*		19.2	11.8
	Iron	0.82		12,000	12,100
	Lead	1.8		88.7	90.3
	Magnesium	0.32		3,070	3,080
	Manganese	12		53.6	47.7
	Nickel	39*		14	9.3
	Potassium	3.7		3,020	2,960
	Sodium	0.94		582	576
	Vanadium	9.9		28.8	31.8
	Zinc	8.3		112	103

[1]Relative Percent Difference between duplicate sample analyses.
[2]RPD Control Limit Assumed to be 35± Percent

Table 3A
Metals Qualified as a Result of
Poor Spike Recoveries

Sample No.	Analyte	Conc. (mg/Kg)	Qualifier
1	Antimony	<0.79	R
	Arsenic	7.6	J
	Manganese	51	J
	Selenium	<0.79	R
	Silver	<1.6	R
	Thallium	<0.79	R
	Zinc	108	J
2	Antimony	<0.57	R
	Arsenic	8.4	J
	Manganese	3010	J
	Selenium	<0.57	R
	Silver	<1.2	R
	Thallium	<0.57	R
	Zinc	155	J
3	Antimony	<0.53	R
	Arsenic	4.9	J
	Manganese	2590	J
	Selenium	<0.53	R
	Silver	<1.1	R
	Thallium	<0.53	R
	Zinc	88	J
4	Antimony	<0.62	R
	Arsenic	12	J
	Manganese	2330	J
	Selenium	<0.62	R
	Silver	<1.3	R
	Thallium	0.74	J
	Zinc	211	J

Table 3A
Metals Qualified as a Result of
Poor Spike Recoveries

Sample No.	Analyte	Conc. (mg/Kg)	Qualifier
5	Antimony	<0.59	R
	Arsenic	8.9	J
	Manganese	1340	J
	Selenium	<0.59	R
	Silver	<1.2	R
	Thallium	<0.59	R
	Zinc	133	J
6	Antimony	<0.55	R
	Arsenic	7.7	J
	Manganese	1610	J
	Selenium	<0.55	R
	Silver	<1.1	R
	Thallium	<0.55	R
	Zinc	361	J
7	Antimony	<0.68	R
	Arsenic	9.5	J
	Manganese	83	J
	Selenium	<0.68	R
	Silver	<1.4	R
	Thallium	<0.68	R
	Zinc	89	J

NOTES:
R - unusable
J - Values should be viewed as estimates

Table 3B
Metals Qualified as a Result of Poor Precision

Sample No.	Metal	Results (mg/Kg)	Qualifier
1	Copper	16	J
	Nickel	12	J
2	Copper	36	J
	Nickel	13	J
3	Copper	42	J
	Nickel	9.5	J
4	Copper	12	J
	Nickel	17	J
5	Copper	35	J
	Nickel	13	J
6	Copper	51	J
	Nickel	19	J
7	Copper	15	J
	Nickel	11	J

NOTES:
J = the associated value is an estimated quantity because quality control criteria were not met.

CRA
Consulting Engineers

CONESTOGA-ROVERS & ASSOCIATES LIMITED
651 Colby Drive,
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510

August 24, 1988 Reference No. 2366

Dr. Kare
RECRA ENVIRONMENTAL INC.
8320 Guilford Road, Building F
Columbia, MD
21048

Dear Dr. Kare:

Re: Surrogate Recoveries for Volatiles

On Thursday, August 18, 1988, Conestoga-Rovers & Associates (CRA) delivered seven soil samples for the Target Compound List of VOAs, BNAs, PCBs/Pesticides. Upon initial review of results sent by telefax on Monday, August 22, 1988, some deficiencies have been identified with surrogate recoveries for five of the soil samples and the additional matrix spike sample. Following is a list of the surrogates outside control limits for the individual samples:

Number	Surrogate	Percent Recovery	Control Limits
1	Toluene d_8	126	81-117
4	Toluene d_8	134	81-117
	BFB	73	74-121
5	Toluene d_8	128	81-117
6	Toluene d_8	119	81-117
7	Toluene d_8	124	81-117
1 (MS)	Toluene d_8	123	81-117

The evaluation of the results is not necessarily straight forward, the sample itself may produce effects due to such factors as interference and high concentrations of analytes.

USEPA-SW-846 states that the following procedures be adhered to when recovery for surrogates is out of control:

1. Check to be sure there are no errors in calculations, check instrument performance.

2. Recalculate the data and/or re-analyze the extract if any of the above checks reveal a problem.

3. If none of the above are a problem, the effected fraction should be repurged to establish whether non-conformance was due to the sample matrix.

If you have any questions pertaining to this letter, please do not hesitate to contact me at 716-283-6720.

Yours very truly,

CONESTOGA-ROVERS & ASSOCIATES

Anthony Misercola per JD

Anthony Misercola
Environmental Chemist

AM:jd
cc: B. Clegg

CRA
Consulting Engineers

CONESTOGA-ROVERS & ASSOCIATES LIMITED
651 Colby Drive,
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510

September 22, 1988 Reference No. 2366

Mr. Jim Miller
Recra Environmental Inc.
10 Hazelwood Drive
Suite 106
Amherst, NY 14150

Dear Mr. Miller:

Re: Deficiencies in QC Results - Ernst Steel/Pyramid Co.

In reviewing the analytical results for TCL metals on the seven soil samples submitted on August 17, 1988 for the above mentioned, some deficiencies were noted. We would like your comments on problems associated with these deficiencies and your corrective actions.

1. Duplicate Analysis

   Duplicate results for copper and zinc on soil sample #1 fell outside the recommended RPD control limits of 35 percent. Because of this, all associated results for copper and zinc in the remaining soil samples had to be qualified as estimates.

2. Matrix Spike Data

   Data obtained on spike recoveries for the following metals were outside the quality control limits established in USEPA SW-846:

Metal	% Recovery
Antimony	0
Arsenic	0
Manganese	68
Selenium	0
Silver	0
Thallium	58
Zinc	40

Why was there such poor recovery for these metals, particularly since the sample itself contained very low concentrations of the above mentioned metals? Was the sample re-extracted or reanalyzed?

All results for the metals that had 0 percent recovery are unusable for quantitative purposes.

3. Form 7, P14, "Laboratory Control Sample Sheet", does not include true values and percent recoveries for the TCL metals.

If you have any questions or need further clarification, please do not hesitate to contact me at 716-283-6720.

Yours very truly,

CONESTOGA-ROVERS & ASSOCIATES

Anthony Misercola
Project Chemist

AM:jd
cc: B. Clegg

F

APPENDIX F

GROUNDWATER SAMPLING RESULTS

HUNTINGDON ANALYTICAL SERVICES
Division of EMPIRE SOILS INVESTIGATIONS INC.
PO Box 250 Middleport New York 14105
Telephone (716) 735-3400 Telex 131246

ENVIRONMENTAL ANALYTICAL REPORT

HAS REF. #30-616, #30-618, #30-622, AND #30-629

STUDY NOS. E046.029 - E046.031 AND E046.033

SEPTEMBER 27, 1988

REPORT CODE LEGEND:

<DL = LESS THAN DETECTION LIMIT
ND = NOT DETECTED
NA = NOT APPLICABLE

HAS

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL REPORT

HAS Reference Numbers: #30-616, #30-618, #30-622, and #30-629

September 27, 1988

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following U.S. Environmental Protection Agency references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods," Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.

Richard D Fitzpatrick

Richard D. Fitzpatrick
Environmental Laboratory Director

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

MODIFIED METHOD 8020

Sample Identification:		OW3-88	OW103-88	Method Blank	SW-1	SW-2	SW-102
HAS Sample #30-		616-001	616-002	--	618-015	618-016	017
Date Sampled:		9/12/88	9/12/88	--	9/13/88	9/13/88	9/13/88
Date Received:		9/13/88	9/13/88	--	9/13/88	9/13/88	9/13/88
Date Analyzed:		9/14/88	9/14/88	9/14/88	9/14/88	9/14/88	9/14/88
Holding Time, Days:		2	2	--	1	1	1
Dilution Factor:		1	1	1	1	1	1
COMPOUND	Detection Limit µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l
Toluene	0.50	<DL	<DL	<DL	<DL	<DL	<DL

Quality Control

Surrogate	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.
α,α,α-Trifluorotoluene	96	91	97	92	93	95

Sample Identification:		SW-3	Method Blank	OW1-88	OW2-88	Method Blank	
HAS Sample #30-		618-018	--	622-001	622-002	--	
Date Sampled:		9/13/88	--	9/15/88	9/15/88	--	
Date Received:		9/13/88	--	9/15/88	9/15/88	--	
Date Analyzed:		9/14/88	9/14/88	9/15/88	9/15/88	9/15/88	
Holding Time, Days:		1	--	0	0	--	
Dilution Factor:		1	1	1	1	1	
COMPOUND	Detection Limit µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l
Toluene	0.5	<DL	<DL	0.53	<DL	<DL	

Quality Control

Surrogate	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.
α,α,α-Trifluorotoluene	93	97	89	91	93	

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8080
POLYCHLORINATED BIPHENYLS

Sample Identification:		OW3-88	OW103-88	Method Blank			
HAS Sample #30-616		001	002	--			
Date Sampled:		9/12/88	9/12/88	--			
Date Received:		9/13/88	9/13/88	--			
Date Prepared:		9/13/88	9/13/88	9/13/88			
Date Analyzed:		9/14/88	9/14/88	9/14/88			
Dilution Factor:		1	1	1			
COMPOUND	Detection Limit µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l
AC-1254	1.0	ND	ND	ND			
Hexabromobenzene (Surrogate) % Rec.		53	55	75			

Sample Identification:		SW-1	SW-2	SW-102	SW-3	Method Blank	
HAS Sample #30-618		015	016	017	018	--	
Date Sampled:		9/13/88	9/13/88	9/13/88	9/13/88	--	
Date Received:		9/13/88	9/13/88	9/13/88	9/13/88	--	
Date Prepared:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	
Date Analyzed:		9/14/88	9/14/88	9/14/88	9/14/88	9/14/88	
Dilution Factor:		1	1	1	1	1	
COMPOUND	Detection Limit µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l
AC-1254	1.0	ND	ND	ND	ND	ND	
Hexabromobenzene (Surrogate) % Rec.		77	71	69	95	124	

Sample Identification:		OW1-88	OW2-88	Method Blank			
HAS Sample #30-622		001	002	--			
Date Sampled:		9/15/88	9/15/88	--			
Date Received:		9/15/88	9/15/88	--			
Date Prepared:		9/15/88	9/15/88	9/15/88			
Date Analyzed:		9/15/88	9/15/88	9/15/88			
Dilution Factor:		1	1	1			
COMPOUND	Detection Limit µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l	Result µg/l
AC-1254	1.0	ND	ND	ND			
Hexabromobenzene (Surrogate) % Rec.		54	60	78			

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8080
POLYCHLORINATED BIPHENYLS

Sample Identification:		SS1-88	SS2-88	SS3-88	Method Blank		
HAS Sample #30-616		003	004	005	--		
Date Sampled:		9/12/88	9/12/88	9/12/88	--		
Date Received:		9/13/88	9/13/88	9/13/88	--		
Date Prepared:		9/13/88	9/13/88	9/13/88	9/13/88		
Date Analyzed:		9/14/88	9/14/88	9/14/88	9/14/88		
Dilution Factor:		1	1	1	1		
COMPOUND	Detection Limit µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g
AC-1254	0.20	ND	ND	ND	ND		
Hexabromobenzene (Surrogate) % Rec.		51	*	125	124		

*Surrogate omitted during preparation.

Sample Identification:		SS-4	SS-5	SS-6	SS-7	SS-107	SS-8
HAS Sample #30-618		001	002	003	004	005	006
Date Sampled:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Received:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Prepared:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Analyzed:		9/15/88	9/15/88	9/15/88	9/15/88	9/15/88	9/15/88
Dilution Factor:		1	1	1	1	1	1
COMPOUND	Detection Limit µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g
AC-1254	0.20	1.2	ND	0.60	1.6	2.2	ND
Hexabromobenzene (Surrogate) % Rec.		100	106	73	67	87	59

Sample Identification:		SS-9	SS-10	Sed 1	Sed 2	Sed 3	Sed 103
HAS Sample #30-618		007	008	009	010	011	012
Date Sampled:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Received:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Prepared:		9/13/88	9/13/88	9/13/88	9/13/88	9/13/88	9/13/88
Date Analyzed:		9/15/88	9/15/88	9/15/88	9/15/88	9/15/88	9/15/88
Dilution Factor:		1	1	1	1	1	1
COMPOUND	Detection Limit µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g
AC-1254	0.20	ND	ND	ND	ND	ND	ND
Hexabromobenzene (Surrogate) % Rec.		57	75	50	54	48	76

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8080
POLYCHLORINATED BIPHENYLS

Sample Identification:		Sed 4	Sed 5	Method Blank			
HAS Sample #30-618		013	014	--			
Date Sampled:		9/13/88	9/13/88	--			
Date Received:		9/13/88	9/13/88	--			
Date Prepared:		9/13/88	9/13/88	9/13/88			
Date Analyzed:		9/15/88	9/15/88	9/15/88			
Dilution Factor:		1	1	1			
COMPOUND	Detection Limit µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g	Result µg/g
AC-1254	0.20	ND	ND	ND			
Hexabromobenzene (Surrogate) % Rec.		41	67	78			

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: TOTAL LEAD

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT ppm	QC %SPKR/RPD
OW3-88	616-001	7421	9-13-88	9-15-88	0.002	<DL	*95
OW103-88	616-002	7421	9-13-88	9-15-88	0.002	<DL	104/24.8
SS1-88	616-003	6010	9-13-88	9-15-88	2.27	219	*95
SS2-88	616-004	6010	9-13-88	9-15-88	1.47	507	*95
SS3-88	616-005	6010	9-13-88	9-15-88	1.99	181	170/6.1
SS-4	618-001	6010	9-13-88	9-14-88	2.29	29600	*95
SS-5	618-002	6010	9-13-88	9-14-88	2.05	8980	*95
SS-6	618-003	6010	9-13-88	9-14-88	1.6	5570	*95
SS-7	618-004	6010	9-13-88	9-14-88	2.15	14200	*95
SS-107	618-005	6010	9-13-88	9-14-88	2.28	14200	*95
SS-8	618-006	6010	9-13-88	9-14-88	2.19	563	*95
SS-9	618-007	6010	9-13-88	9-14-88	2.24	312	*95
SS-10	618-008	6010	9-13-88	9-14-88	2.06	4370	*95
SED 1	618-009	6010	9-13-88	9-14-88	2.14	286	*95
SED 2	618-010	6010	9-13-88	9-14-88	1.57	118	*95
SED 3	618-011	6010	9-13-88	9-14-88	1.99	38.1	*95
SED 103	618-012	6010	9-13-88	9-14-88	1.51	31.5	*95
SED 4	618-013	6010	9-13-88	9-14-88	2.04	255	*95
SED 5	618-014	6010	9-13-88	9-14-88	2.34	35	*95
SW-1	618-015	7421	9-13-88	9-15-88	0.002	<DL	*95
SW-2	618-016	7421	9-13-88	9-15-88	0.002	<DL	*95
SW-102	618-017	7421	9-13-88	9-15-88	0.002	0.002	*95
SW-3	618-018	7421	9-13-88	9-15-88	0.002	<DL	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT.

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: TOTAL LEAD

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT ppm	QC %SPKR/RPD
OW1-88	622-001	7421	9-15-88	9-15-88	0.002	0.003	*95
OW2-88	622-002	7421	9-15-88	9-15-88	0.002	<DL	108/1.8
TRIP BLK	622-003	7421	9-15-88	9-15-88	0.002	0.024	*95
OW-3A	629-001	7421	9-21-88	9-22-88	0.002	<DL	*95
OW-2A	629-002	7421	9-21-88	9-22-88	0.002	<DL	*95
OW-1A	629-003	7421	9-21-88	9-22-88	0.002	<DL	*95
OW-4A	629-004	7421	9-21-88	9-22-88	0.002	<DL	*95
SW-3A	629-005	7421	9-21-88	9-22-88	0.002	0.002	*95
SW-1A	629-006	7421	9-21-88	9-22-88	0.002	0.007	113/<1.0
SW-2A	629-007	7421	9-21-88	9-22-88	0.002	0.008	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT.

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: TOTAL CHROMIUM

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT ppm	QC %SPKR/RPD
OW3-88	616-001	7191	9-13-88	9-15-88	0.003	<DL	*95
OW103-88	616-002	7191	9-13-88	9-15-88	0.003	<DL	126/<1.0
SS1-88	616-003	6010	9-13-88	9-15-88	2.27	16	*95
SS2-88	616-004	6010	9-13-88	9-15-88	1.47	19.3	*95
SS3-88	616-005	6010	9-13-88	9-15-88	1.99	22.5	85/1.3
SS-4	618-001	6010	9-13-88	9-14-88	2.29	188	*95
SS-5	618-002	6010	9-13-88	9-14-88	2.05	189	*95
SS-6	618-003	6010	9-13-88	9-14-88	1.6	479	*95
SS-7	618-004	6010	9-13-88	9-29-88	2.15	165	*95
SS-107	618-005	6010	9-13-88	9-29-88	2.28	134	*95
SS-8	618-006	6010	9-13-88	9-14-88	2.19	30.1	*95
SS-9	618-007	6010	9-13-88	9-14-88	2.24	19.2	*95
SS-10	618-008	6010	9-13-88	9-14-88	2.06	27.8	*95
SED 1	618-009	6010	9-13-88	9-14-88	2.14	25.1	*95
SED 2	618-010	6010	9-13-88	9-14-88	1.57	19.8	*95
SED 3	618-011	6010	9-13-88	9-14-88	1.99	18.8	*95
SED 103	618-012	6010	9-13-88	9-14-88	1.51	19.1	*95
SED-4	618-013	6010	9-13-88	9-14-88	2.04	21.2	*95
SED-5	618-014	6010	9-13-88	9-14-88	2.34	16.7	*95
SW-1	618-015	7191	9-13-88	9-15-88	0.003	0.005	*95
SW-2	618-016	7191	9-13-88	9-15-88	0.003	<DL	*95
SW-102	618-017	7191	9-13-88	9-15-88	0.003	<DL	*95
SW-3	618-018	7191	9-13-88	9-15-88	0.003	<DL	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT.

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: TOTAL CHROMIUM

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT ppm	QC %SPKR/RPD
OW1-88	622-001	7191	9-15-88	9-15-88	0.003	0.013	*95
OW2-88	622-002	7191	9-15-88	9-15-88	0.003	0.006	124/<1.0
TRIP BLK	622-003	7191	9-15-88	9-15-88	0.003	0.009	*95
OW-3A	629-001	7191	9-21-88	9-22-88	0.003	<DL	*95
OW-2A	629-002	7191	9-21-88	9-22-88	0.003	0.003	*95
OW-1A	629-003	7191	9-21-88	9-22-88	0.003	0.007	*95
OW-4A	629-004	7191	9-21-88	9-22-88	0.003	<DL	*95
SW-3A	629-005	7191	9-21-88	9-22-88	0.003	<DL	*95
SW-1A	629-006	7191	9-21-88	9-22-88	0.003	<DL	100/12.7
SW-2A	629-007	7191	9-21-88	9-22-88	0.003	0.003	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT.

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: EP TOX LEAD

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/L	QC *
SS1-88	616-003	6010	9-15-88	9-15-88	0.02	0.049	95
SS2-88	616-004	6010	9-15-88	9-15-88	0.02	0.048	95
SS3-88	616-005	6010	9-15-88	9-15-88	0.02	0.054	95
SS-4	618-001	6010	9-15-88	9-15-88	0.02	49.9	*95
SS-5	618-002	6010	9-15-88	9-15-88	0.02	15.6	*95
SS-6	618-003	6010	9-15-88	9-15-88	0.02	35.6	**<1.0
SS-7	618-004	6010	9-15-88	9-15-88	0.02	132	*95
SS-107	618-005	6010	9-15-88	9-15-88	0.02	229	*95
SS-8	618-006	6010	9-15-88	9-15-88	0.02	0.23	*95
SS-9	618-007	6010	9-15-88	9-15-88	0.02	0.066	*95
SS-10	618-008	6010	9-15-88	9-15-88	0.02	50.4	*95
SED 1	618-009	6010	9-15-88	9-15-88	0.02	0.12	*95
SED 2	618-010	6010	9-15-88	9-15-88	0.02	0.057	*95
SED 3	618-011	6010	9-15-88	9-15-88	0.02	0.035	*95
SED 103	618-012	6010	9-15-88	9-15-88	0.02	0.02	*95
SED 4	618-013	6010	9-15-88	9-15-88	0.02	0.043	*95
SED 5	618-014	6010	9-15-88	9-15-88	0.02	<DL	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

**THIS SAMPLE WAS ANALYZED IN DUPLICATE WITH THE RPD INDICATED ABOVE.

THESE SAMPLES WERE EXTRACTED AND ANALYZED ACCORDING TO METHOD:
CONTAINED IN "TEST METHODS FOR EVALUATING SOLID WASTE:
"PHYSICAL/CHEMICAL METHODS" SW-846, 3RD EDITION.

PREPARED FOR: CONESTOGA ROVERS

Metals Analysis for: EP TOX CHROMIUM

SAMPLE ID CUST.	HAS #	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/L	QC *
SS1-88	616-003	6010	9-15-88	9-15-88	0.02	<DL	95
SS2-88	616-004	6010	9-15-88	9-15-88	0.02	<DL	95
SS3-88	616-005	6010	9-15-88	9-15-88	0.02	<DL	95
SS-4	618-001	6010	9-15-88	9-15-88	0.02	<DL	*95
SS-5	618-002	6010	9-15-88	9-15-88	0.02	0.12	*95
SS-6	618-003	6010	9-15-88	9-15-88	0.02	0.38	94.0/1.3
SS-7	618-004	6010	9-15-88	9-15-88	0.02	0.038	*95
SS-107	618-005	6010	9-15-88	9-15-88	0.02	0.024	*95
SS-8	618-006	6010	9-15-88	9-15-88	0.02	<DL	*95
SS-9	618-007	6010	9-15-88	9-15-88	0.02	<DL	*95
SS-10	618-008	6010	9-15-88	9-15-88	0.02	<DL	*95
SED 1	618-009	6010	9-15-88	9-15-88	0.02	<DL	*95
SED 2	618-010	6010	9-15-88	9-15-88	0.02	0.024	*95
SED 3	618-011	6010	9-15-88	9-15-88	0.02	<DL	*95
SED 103	618-012	6010	9-15-88	9-15-88	0.02	<DL	*95
SED 4	618-013	6010	9-15-88	9-15-88	0.02	<DL	*95
SED 5	618-014	6010	9-15-88	9-15-88	0.02	<DL	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

THESE SAMPLES WERE EXTRACTED AND ANALYZED ACCORDING TO METHODS CONTAINED IN "TEST METHODS FOR EVALUATING SOLID WASTE: PHYSICAL/CHEMICAL METHODS" SW-846, 3RD EDITION.

HUNTINGDON ANALYTICAL SERVICES, INC.
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: TOX and *EOX

EPA Method No.: **9020

Date Received: 9/13/88 - 9/15/88

Sample I.D.	Client I.D.	Date Sampled	Date Analyzed	Detection Limit	Concentration	Units
30-616-001	OW3-88	9/12/88	9/15/88	10.0	<DL	µg/l
30-616-002	OW103-88	9/12/88	9/15/88	10.0	18.6	µg/l
30-616-003	SS1-88	9/12/88	9/13/88	10	44	mg/kg
30-616-004	SS2-88	9/12/88	9/13/88	10	34	mg/kg
30-616-005	SS3-88	9/12/88	9/13/88	10	15	mg/kg
30-618-001	SS-4	9/13/88	9/14/88	10	34	mg/kg
30-618-002	SS-5	9/13/88	9/14/88	10	75	mg/kg
30-618-003	SS-6	9/13/88	9/14/88	10	60	mg/kg
30-618-004	SS-7	9/13/88	9/14/88	10	26	mg/kg
30-618-005	SS-107	9/13/88	9/14/88	10	34	mg/kg
30-618-006	SS-8	9/13/88	9/14/88	10	35	mg/kg
30-618-007	SS-9	9/13/88	9/14/88	10	25	mg/kg
30-618-008	SS-10	9/13/88	9/14/88	10	17	mg/kg
30-618-009	Sed 1	9/13/88	9/14/88	10	<DL	mg/kg
30-618-010	Sed 2	9/13/88	9/14/88	10	<DL	mg/kg
30-618-011	Sed 3	9/13/88	9/14/88	10	<DL	mg/kg
30-618-012	Sed 103	9/13/88	9/14/88	10	<DL	mg/kg
30-618-013	Sed 4	9/13/88	9/14/88	10	111	mg/kg
30-618-014	Sed 5	9/13/88	9/14/88	10	13	mg/kg
30-618-015	SW1-88	9/13/88	9/15/88	10.0	15.4	µg/l

*Extractable organic halides, modified EPA method 9020 for solids as received.

**Subcontracted

HUNTINGDON ANALYTICAL SERVICES, INC.
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: TOX and *EOX

EPA Method No.: **9020

Date Received: 9/13/88 - 9/15/88

Sample I.D.	Client I.D.	Date Sampled	Date Analyzed	Detection Limit	Concentration	Units
30-618-016	SW-2	9/13/88	9/15/88	10.0	60.4	µg/l
30-618-017	SW-102	9/13/88	9/15/88	10.0	35.4	µg/l
30-618-018	SW-3	9/13/88	9/15/88	10.0	49.0	µg/l
30-622-001	OW1-88	9/15/88	9/19/88	10.0	28.6	µg/l
30-622-002	OW2-88	9/15/88	9/19/88	10.0	<DL	µg/l
30-622-004	Trip Blank	9/15/88	9/19/88	10.0	<DL	µg/l

*Extractable organic halides, modified EPA method 9020 for solids as received.

**Subcontracted

HUNTINGDON ANALYTICAL SERVICES

SAMPLE CUSTODIAN REPORT

ELAP #10833

Analysis for: Conestoga-Rovers & Associates

Date: 9/13/88

7703 Niagara Falls Boulevard

P.O. #: 2366

Niagara Falls, NY 14304

Client #: E046.029

HAS Job #: 30-616

Sample Identification and Information

Seq. No.	Bottle #	Customer I.D.	Sample Type	Analysis Requested	pH Upon Arrival	HAS Preservation/ Comments
001	01	OW3-88	Ground Water	8080	≈7	1
	02 & 03	"	"	TOX	"	1
	04 & 05	"	"	8020	-	1
	06	"	"	Total Cr and Pb	≈7	2-filtered at HAS with .45μ filter
002	01	OW103-88	"	8080	≈7	1
	02 & 03	"	"	TOX	"	1
	04 & 05	"	"	8020	-	1
	06	"	"	Total Cr and Pb	≈7	2-filtered at HAS with .45μ filter
003	01	SS1-88	Soil	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
004	01	SS2-88	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
005	01	SS3-88	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1

PRESERVATION CODE:

1 - Cool 4°C
2 - Nitric Acid to pH<2
3 - Sulfuric Acid to pH<2
4 - Sodium Thiosulfate added for Residual Chlorine
5 - Phosphoric Acid to pH<2
6 - Sodium Hydroxide to pH>12
7 - Phosphoric Acid to pH 4.0, 1 g/l of Copper Sulfate
8 - pH 6-8 with Sodium Hydroxide or Sulfuric Acid
9 - Hydrochloric Acid to pH<2

HUNTINGDON ANALYTICAL SERVICES

SAMPLE CUSTODIAN REPORT

ELAP #10833

Analysis for: Conestoga-Rovers & Associates

Date: 9/13/88

7703 Niagara Falls Boulevard

P.O. #: 2366

Niagara Falls, NY 14304

Client #: E046.030

HAS Job #: 30-618

Sample Identification and Information

Seq. No.	Bottle #	Customer I.D.	Sample Type	Analysis Requested	pH Upon Arrival	HAS Preservation Comments
001	01	SS-4	Soil	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
002	01	SS-5	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
003	01	SS-6	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
004	01	SS-7	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
005	01	SS-107	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
006	01	SS-8	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
007	01	SS-9	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
008	01	SS-10	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
009	01	Sed 1	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1

PRESERVATION CODE:

1 = Cool 4°C
2 = Nitric Acid to pH<2
3 = Sulfuric Acid to pH<2
4 = Sodium Thiosulfate added for Residual Chlorine
5 = Phosphoric Acid to pH<2
6 = Sodium Hydroxide to pH>12
7 = Phosphoric Acid to pH 4.0, 1 g/l of Copper Sulfate
8 = pH 6-8 with Sodium Hydroxide or Sulfuric Acid
9 = Hydrochloric Acid to pH<2

HUNTINGDON ANALYTICAL SERVICES

SAMPLE CUSTODIAN REPORT

ELAP #10833

Analysis for: Conestoga-Rovers & Associates

Date: 9/13/88

7703 Niagara Falls Boulevard

P.O. #: 2366

Niagara Falls, NY 14304

Client #: E046.030

HAS Job #: 30-618

Sample Identification and Information

Seq. No.	Bottle #	Customer I.D.	Sample Type	Analysis Requested	pH Upon Arrival	HAS Preservation/ Comments
010	01	Sed 2	Soil	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
011	01	Sed 3	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
012	01	Sed 103	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
013	01	Sed 4	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
014	01	Sed 5	"	EP Tox, Total Cr and Pb, 8080	-	1
	02 & 03	"	"	TOX	-	1
015	01	SW-1	Ground Water	8080	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	TOX	≈6	1
	05 & 06	"	"	8020	-	1
016	01	SW-2	"	8080	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	TOX	≈6	1
	05 & 06	"	"	8020	-	1

PRESERVATION CODE:

1 - Cool 4°C
2 - Nitric Acid to pH<2
3 - Sulfuric Acid to pH<2
4 - Sodium Thiosulfate added for Residual Chlorine
5 - Phosphoric Acid to pH<2
6 - Sodium Hydroxide to pH>12
7 - Phosphoric Acid to pH 4.0, 1 g/l of Copper Sulfate
8 - pH 6-8 with Sodium Hydroxide or Sulfuric Acid
9 - Hydrochloric Acid to pH<2

HUNTINGDON ANALYTICAL SERVICES

SAMPLE CUSTODIAN REPORT

ELAP #10833

Analysis for: Conestoga-Rovers & Associates

7703 Niagara Falls Boulevard

Niagara Falls, NY 14304

Date: 9/13/88

P.O. #: 2366

Client #: E046.030

HAS Job #: 30-618

Sample Identification and Information

Seq. No.	Bottle #	Customer I.D.	Sample Type	Analysis Requested	pH Upon Arrival	HAS Preservation/ Comments
017	01	SW-102	Ground Water	8080	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	TOX	≈6	1
	05 & 06	"	"	8020	-	1
018	01	SW-3	"	8080	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	TOX	≈6	1
	05 & 06	"	"	8020	-	1

PRESERVATION CODE:

1 - Cool 4°C
2 - Nitric Acid to pH<2
3 - Sulfuric Acid to pH<2
4 - Sodium Thiosulfate added for Residual Chlorine
5 - Phosphoric Acid to pH<2
6 - Sodium Hydroxide to pH>12
7 - Phosphoric Acid to pH 4.0, 1 g/l of Copper Sulfate
8 - pH 6-8 with Sodium Hydroxide or Sulfuric Acid
9 - Hydrochloric Acid to pH<2

HUNTINGDON ANALYTICAL SERVICES

SAMPLE CUSTODIAN REPORT

ELAP #10833

Analysis for: Conestoga-Rovers & Associates

7703 Niagara Falls Boulevard

Niagara Falls, NY 14304

Date: 9/15/88

P.O. #: 2366

Client #: E046.031

HAS Job #: 30-622

Sample Identification and Information

Seq. No.	Bottle #	Customer I.D.	Sample Type	Analysis Requested	pH Upon Arrival	HAS Preservation/ Comments
001	01	OW1-88	Ground Water	8080 PCB	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	8020 (Toluene)	-	1
	05 & 06	"	"	TOX	≈6	1
002	01	OW2-88	"	8080 PCB	≈6	1
	02	"	"	Total Cr and Pb	<2	2
	03 & 04	"	"	8020 (Toluene)	-	1
	05 & 06	"	"	TOX	≈6	1
003		Trip Blank	"	Total Cr and Pb	<2	2
004		Trip Blank	"	TOX	≈7	1

PRESERVATION CODE:

1 - Cool 4°C
2 - Nitric Acid to pH<2
3 - Sulfuric Acid to pH<2
4 - Sodium Thiosulfate added for Residual Chlorine
5 - Phosphoric Acid to pH<2
6 - Sodium Hydroxide to pH>12
7 - Phosphoric Acid to pH 4.0, 1 g/l of Copper Sulfate
8 - pH 6-8 with Sodium Hydroxide or Sulfuric Acid
9 - Hydrochloric Acid to pH<2

CLIENT: CRA
DEPARTMENT: ENVIRONMENTAL
BATCH: 30-629
PROJECT:
DATE: 9-20-88
CUSTODIAN: KAS

1=COOL 4 C
2=NITRIC ACID TO pH<2
3=SULFURIC ACID TO pH<2
4=SODIUM THIOSULFATE ADDED FOR RESIDUAL CHLORINE
5=PHOSPHORIC ACID TO pH<2

6=SODIUM HYDROXIDE TO pH>12
7=PHOSPHORIC ACID TO pH 4, 1g/l OF COPPER SULFATE
8=LAB PACK
9=SANITARY SEWER
10=APPROVED DISPOSAL FACILITY
11=STERILIZED FOR STERILE LAND FILL

SAMPLE RECEIPT

HAS NO.	BOTTLE NO.	CLIENT I.D.	DATE SAMPLED	DATE RECEIVED	DESCRIPTION	ANALYSIS REQUESTED	pH UPON ARRIVAL	PRESERVATION/ PROCESS	SAMPLE CONDITION/ COMMENTS
30-629-001		OW-3A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-002		OW-2A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-003		OW-1A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-004		OW-4A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-005		SW-3A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-006		SW-1A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD
30-629-007		SW-2A	9-20-88	9-20-88	WATER	Cr, Pb	<2	#2	GOOD

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Page 1 of 1

Tracking
Date Init.
9-14 TS

CRA
Customer Name
7703 NIAGARA FALLS BLVD
Address
NF, NY

TONY MISERCOLA 283-6720
Contact Name Phone #

P.O. # 23660 Quote # 9-12 HAS Ref. # 30-616

Billing Address

WRITTEN - 9-22
Date Submitted 9/13/88 Date Due VERBALS - 9-15 AM

Sampler(s) Signature

Total # of Samples 5 Client No. E046.029

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
OW3-88	9/12/88	3:25	water	Pyramid	5	8080, TOX, 8020, Cr+Pb		001	825
OW103-88	"	3.25	"	"	5	" " " " "		002	↓
SS1-88	"	Trip	Soil	"	3	8080 TOX EP TOX + Pb Cr+Pb		003	1050
SS2-88	"	Trip	"	"	3	" " " " "		004	↓
SS3-88	"	Trip	"	"	3	" " " " "		005	↓

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
See Client Chain of Custody					
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments:

Initial Total	Met.	Wet Chem.	QC Org.	Trip Blanks	TOX Other	Final Total
11800	4	—	2	—	2	

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Page of

Tracking Date Init.

HAS to AES
Customer Name

Address

Contact Name Phone #

P.O. # Quote # HAS Ref. #

Billing Address

Date Submitted 9/13/88 Date Due

Sampler(s) Signature

Total # of Samples Client No.

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
30-616-001	.02					TOX VERBALS 9-15	210 ppb		
30-616-002	.02					" ✓	18.6 ppb		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
James Wiegen	9/13/88 1:32 pm	Barry Jaeby	Barry Jaeby	9/13/88 2:30 p.m.	Judy Albrecht
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments: Additional Sample

Initial Total	Met.	Wet Chem.	Org.	Trip Blanks	Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Page of

Tracking Date Init.

HAS to AES
Customer Name

Address

Contact Name Phone #

P.O. # Quote # HAS Ref. #

Billing Address

Date Submitted 9/13/88 Date Due

Sampler(s) Signature

Total # of Samples Client No.

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
30-616-001	02					TOX VERBALS 9-15	<10 ug/l		
30-616-002	02					"	18.6 mg/l		
30-616-003	02					"	44 mg/kg		
30-616-004	02					"	34 mg/kg		
30-616-005	02					"	15 mg/kg		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Laura Wyse	9/13/88 9:58	Barry Darby	Barry Darby	9/13/88 11:20 a.m.	Jeri Detrowski
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments: 616-001 leaked in transit BH.

Initial Total	Met.	Wet Chem.	Org.	Trip Blanks	Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Tracking
Date Init.
9-14 TJ

CRA
Customer Name
7703 NIAGARA FALLS BLVD
Address
NF NY

TONY MISERCOLA 2836720
Contact Name Phone #

P.O. # 23166 Quote # _____ HAS Ref. # 30-618

Billing Address _____

WRITTEN - 9-22
VERBALS

Date Submitted 9/13/88 Date Due 9-15 PM or 9-16 AM

Sampler(s) Signature

Total # of Samples 18 Client No. E0416.030

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
SS 4	9/13/88	9:50	Soil	Pyramid	3	8080, TOX EP TOX + TOX Cr + Pb		001	1050
SS 5	"	10:10	"	"	3	" " " " "		002	
SS 6	"	10:20	"	"	3	" " " " "		003	
SS 7	"	10:40	"	"	3	" " " " "		004	
SS 107	"	10:40	"	"	3	" " " " "		005	
SS 8	"	10:55	"	"	3	" " " " "		006	
SS 9	"	11:05	"	"	3	" " " " "		007	
SS 10	"	14:55	"	"	3	" " " " "		008	
Seed 1	"	14:00	"	"	3	" " " " "		009	
Seed 2	"	14:40	"	"	3	" " " " "		010	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
See Client Chain of Custody					
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments:

Initial To	Wet Che	Trip Blanks	TOX Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Tracking Date Init.

CRA
Customer Name

Address

Contact Name Phone #

P.O. # 23166 Quote # HAS Ref. # 30-618

Billing Address

Date Submitted 9/13/88 Date Due

Sampler(s) Signature

Total # of Samples Client No.

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
Sed 3	9/13/88	12:15	Soil	Pyramid	3	8080, TOX, EPTOX + Pb, Cr+Pb		011	1050
Sed 103	"	12:15	"	"	3	" " " " "		012	
Sed 4	"	11:20	"	"	3	" " " " "		013	
Sed 5	"	11:50	"	"	3	" " " " "		014	
Sw 1	"	13:45	Ground water	"	6	8080, TOX, TOX, Cr+Pb, 8020		015	825
Sw 2	"	14:20	"	"	6	" " " " "		016	
Sw 102	"	14:20	"	"	6	" " " " "		017	
Sw 3	"	12:05	"	"	6	" " " " "		018	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
See Chain of Custody					
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments:

Initial Total	Met.	Wet Chem.	Org.	Trip Blanks	Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Page 1 of 1

Tracking
Date Init.
9-14 TSI

CRA
Customer Name
7703 NIAGARA FALLS BLVD
Address
NF, NY

TONY MISTRETTA 283-6720
Contact Name Phone #

P.O. # 2306 Quote # 9-12 HAS Ref. # 622

Billing Address

Date Submitted 9/15/88 Date Due WRITTEN 9-22 VERBALS 9-19

Sampler(s) Signature

Total # of Samples 3 Client No. E046.031

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
	9/15/88	0830	H_2O	OW1	2	TOX (9020)		001	825
					2	/ Toluene (8020)			
					1	/ Aroclor 1254 (8080)			
					1	/ metals T (Cr + Pb)	Filt/HNO3		
	9/15/88	0930	H_2O	OW2	2	TOX (9020)		002	825
					2	/ Toluene (8020)			
					1	/ Aroclor 1254 (8080)			
					1	/ metals T (Cr + Pb)	Filt/HNO3		
			H_2O	TRIP BLANK	1	TOX (9020)		~~003~~ 004	312.50
					1	/ metals T (Cr + Pb)	Filt/HNO3	003	125

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
w.c client	CAC				
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments:

Initial Total	Met.	Wet Chem.	GC Org.	Trip Blanks	TOX Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Page of

Tracking Date Init.

Customer Name: L-S to HAS

Address:

Contact Name Phone #

P.O. # Quote # HAS Ref. #

Billing Address

Date Submitted 9/16/88 Date Due

Sampler(s) Signature

Total # of Samples 3 Client No.

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
L-622-001		1100				TOX			
L-622-002		1100				TOX			
L-622-003						TOX (TRIP Blank)	Small sample volume		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Thomas Lange	9/16/88 10:00	Barry Deeley	Barry Deeley	9/16/88 11:15 A.M.	Judy Dittrunsh
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments:

Initial Total	Met.	Wet Chem.	Org.	Trip Blanks	Other	Final Total

HUNTINGDON ANALYTICAL SERVICES - ANALYTICAL REQUEST FORM

Tracking Date 9/22 Init. TSJ

CKA - 48 hr. TA
Customer Name
7703 Niagara Falls Blvd
Address
N.F, NY 14304

Tony Misercola 283-6720
Contact Name Phone #

P.O. # 23666 Quote # 9-12 HAS Ref. # 30-609

Billing Address

VERBALS - 9-22
Date Submitted 9/20/88 Date Due WRITTEN - 9-23

Sampler(s) Signature

Total # of Samples 7 Client No. E0446.033

Customer I.D.	Date	Time	Sample Type	Sample Location	No. of Cont.	Analysis Requested	Comments	HAS No.	Billing
OW-3A	9/20/88	1045	H_2O		1	Cr, Pb	HNO_3 pH<2	001	75
OW-2A	"	1115	"		1	"	"	002	
OW-1A	"	1100	"		1	"	"	003	
OW-4A	"	1200	"		1	"	"	004	
SW-3A	"	1130	"		1	"	"	005	
SW-1A	"	1145	"		1	"	"	006	
SW-2A	"	1200	"		1	"	"	007	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
DEC	Client	COC			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by

Comments: PYRAMID - 48 hr. verbals

Initial Total	Met.	Wet Chem.	Org.	Trip Blanks	Other	Final Total