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REPORT ON ADDITIONAL CLOSURE SAMPLING DEMILITARIZATION FURNACE AREA
NWS EARLE NJ
4/1/1992
IT CORPORATION

**REPORT ON ADDITIONAL CLOSURE SAMPLING
DEMILITARIZATION FURNACE AREA
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

**REPORT ON ADDITIONAL CLOSURE SAMPLING
DEMILITARIZATION FURNACE AREA
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY**

SUBMITTED TO:

**DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
U.S. NAVAL BASE
PHILADELPHIA, PENNSYLVANIA**

PREPARED BY:

**IT CORPORATION
165 FIELDCREST AVENUE
EDISON, NEW JERSEY 08837**

APRIL 1992

PROJECT NO. 529358

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1.0 INTRODUCTION

This report contains the results of additional surface and depth soil sampling, and also first time sediment sampling activities conducted at the Naval Weapons Station (NWS) Earle facility, Colts Neck, Monmouth County, New Jersey (Figure 1). The sampling was done as per the requirements of the New Jersey Department of Environmental Protection and Energy (NJDEPE) regulations N.J.A.C. 7:26-9.8, which identify the procedures to perform a Resource Conservation and Recovery Act (RCRA) closure of a facility. The field work was conducted according to the procedures outlined in the approved Closure Plan submitted by the Navy to NJDEPE in May 1990. Presently undergoing closure at the Earle facility is the land adjacent to and surrounding the demilitarization furnace which was used for the thermal processing of munitions and munition components. Closure activities were conducted on the furnace itself in June 1990.

Soil sampling was conducted in July 1990 to identify levels of metals in the site soil. Thirteen surface soil samples were collected at a depth of 0-6 inches and analyzed for Target Analyte List (TAL) metals. Samples I-5 to I-7 and I-9 to I-13 exhibited high concentrations of action level metals. These samples are located in the pollution equipment area and metal scrap discharge area. Based on these findings, it was proposed in the December 1990 Draft Closure Report for the demilitarization furnace, that an additional round of soil sampling be conducted from the 2.5 to 3-foot depth interval at the previously sampled locations and four new sample locations from the 0 to 6-inch depth interval.

The NJDEPE responded to the Draft Closure Report in a letter dated October 1, 1991 requesting that, in addition to the proposed sampling locations, a minimum of two additional surface samples (0-6") were to be collected outside of the area fence, north of the furnace facility and two sediment samples be collected from the drainage swale also north of the fenced in facility. As a result, nineteen surface soil samples and two sediment samples from the drainage swale north of the fenced furnace area were collected and analyzed for the Target Analyte List (TAL) metals and cyanide.

1.1 PURPOSE

The objective of this investigation is to successfully define the extent of soil contamination in the area surrounding the furnace facility. The data generated from this closure activity will be utilized as the basis for proposed remedial actions.

Upon completion of closure requirements, NWS Earle will submit a Final Closure Report to the NJDEPE that has been certified by a New Jersey registered professional engineer as proof that the facility has been closed in accordance with the Department's requirements.

1.2 RCRA FACILITY INFORMATION

Hazardous waste treatment, storage and disposal at the NWS Earle facility is conducted under RCRA EPA I.D. No. NJ0170022172. The point of contact at the facility is Mr. William Matthaey, Environmental Engineer.

2.0 DISCUSSION OF CLOSURE ACTIVITIES

Closure activities performed at the demilitarization furnace began on June 25, 1990 with decontamination of the furnace. This process was completed on June 27, 1990. A Closure Certification for the furnace was submitted to NJDEPE in April 1991.

Surface soil sampling around the furnace was conducted on July 16, 1990 in accordance with the Closure Plan. A report on the results of the sampling program was submitted to NAVFAC Northern Division on December 18, 1990. As a follow-up to this initial sampling program, a total of nineteen soil samples and two sediment samples were collected from the locations shown on Figure 2 on January 14, 1992. The samples were analyzed for TAL metals and cyanide. The sampling event was observed by Mr. Freudenberg of the NJDEPE. The sampling procedures for this latest closure investigation are discussed below.

2.1 SURFACE SOIL SAMPLING

2.1.1 Sampling Methodology

The soil sampling was conducted according to the protocol contained in the NJDEPE Field Sampling Procedures Manual, February 1988 Edition. Samples were taken by trained IT Corporation sampling personnel. Sampling personnel wore disposable gloves during sampling, which were changed between samples.

Surface soil and sediment samples were obtained using decontaminated sampling equipment. All required sample containers were prepared and supplied by the IT Analytical Services Laboratory located in Edison, New Jersey. The sampling procedure consisted of the following steps:

- a. Using a decontaminated (see Section 2.2.2) stainless steel hand auger, soil samples were retrieved from the 2.5 to 3 foot depth interval, for samples I-1 to I-17. Samples I-18, I-19, SD-1, SD-2 and I-20 were retrieved from the 0-6 inch depth using a decontaminated stainless steel trowel. The samples were mixed to achieve a representative sample, and were placed in 4-oz (120-ml) widemouth glass jars with Teflon liners.
- b. After placing the sample into the bottle, soil particles were removed from the lip of the jar and the cap was replaced firmly with the Teflon liner towards the sample.
- c. The samples were then stored in a cooler containing blue ice and maintained at 4°C until transportation to the laboratory the same day.
- d. Proper sample documentation was maintained by filling out chain-of-custody forms in the field for all samples.

2.2.2 Decontamination Procedures

The sampling equipment was laboratory-cleaned and wrapped in aluminum foil for transportation to the sampling site. After the equipment was used once and before used again, it was decontaminated in the field with the following procedure:

- a. Initially, wash with an Alconox solution.
- b. Rinse with tap water.
- c. Rinse with distilled/deionized water.
- d. Rinse with 10% nitric acid (HN03).
- e. Rinse with distilled/deionized water.
- f. Final rinse with distilled/deionized water.

2.2.3 Analytical Parameters and Methods

The soil samples were analyzed for Target Analyte List (TAL) metals and cyanide. The analytical methods by which the samples were analyzed include Method 9010 from Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition) for cyanide and Method 200.7 from 40 CFR, Part 136, by flame AA or ICP for metals.

3.0 RESULTS OF CLOSURE ACTIVITIES

3.1 DISCUSSION OF SOIL SAMPLE RESULTS

A total of 19 soil samples and 2 sediment samples were collected from locations around the rotary furnace demilitarization facility (Figure 2). Seventeen of the soil samples were obtained from a depth of 2.5 to 3 feet while two soil samples and both sediment samples were obtained from 0 to 6 inches. All samples were analyzed for TAL metals and cyanide. Sample results were compared to Table 7.1 "Non-Residential Surface Soil Cleanup Standards" found in the February 3, 1992 New Jersey Register. The only exception to this being chromium for which a proposed standard was not included in Table 7.1, and therefore NJDEPE advised using the existing soil action level of 100 ppm. It should be noted that although proposed standards only exist for surface soils in non-residential areas, NJDEPE has advised that these standards be utilized to prepare this report on depth samples also. The sample results are summarized in Table 1 and also discussed below.

One background soil sample (I-1) was collected from outside the fence east of the furnace. All results were below NJDEPE action levels, except chromium (110 ppm). This sample, which is considered to be natural soil also showed notable levels of aluminum, iron, magnesium and potassium. These levels are probably indicative of naturally occurring concentrations of these metals. Since there are no action levels established for these metals and also calcium, cobalt, manganese and sodium, the background sample results will be used as baseline levels to which the other sample results will be compared.

Cyanide levels for all samples collected were non-detectable, with the detection limit ranging from 0.26 to 0.36 ppm.

Sample I-2 was collected from south of the Prefab Metal Building in an area overlain by gravel. This location is the farthest sampling point from the furnace. Sample results for all metals and cyanide were found to be below NJDEPE cleanup standards.

Sample I-3 was collected approximately 60 feet southeast of the furnace. I-3 exceeded NJDEPE's soil action level for chromium (100 ppm) with a level of 120-180 ppm. Samples I-4 and I-5 were collected approximately 100 feet north of the furnace with sample I-5 being the closer of the two samples to the furnace. As shown in Table 1, I-4 and I-5 have chromium levels which exceed cleanup standards. Sample I-4 has a chromium concentration of 170 ppm and I-5 has a chromium level of 120 ppm. In addition, the concentration of aluminum, calcium and iron in I-4 are higher than the background sample results. Also, the calcium concentration in I-5 is higher than the background sample results.

Samples I-6 and I-7 were collected northwest of and adjacent to the north side of the furnace pad, respectively. No metals were found to be above cleanup standards. Calcium, manganese and sodium were found to be slightly higher than the background sample.

Sample I-8 was collected in the pollution equipment area near the cyclone separator. The analytical results indicate that chromium (140 ppm) was the only metal above cleanup standards. Calcium, iron and manganese which have no set action levels, were found in higher concentrations than the background sample.

Sample I-9 was collected closer to the cyclone separator than sample I-8. The concentrations of antimony, arsenic, barium, cadmium, chromium, copper, lead, silver and zinc in the July 1990 sample exceeded the action levels. In the samples taken at the 2.5' to 3' depth, no metals were detected above NJDEPE cleanup standards. Calcium and manganese were found to be higher than the background sample.

Samples I-10 and I-11 were collected within or near the pollution equipment area. Sample I-10 had no metals above cleanup standards. Sample I-11 had one metal above soil cleanup action levels; chromium at 160 ppm. Calcium and manganese were above background levels in samples I-10 and I-11. Sample I-11, also had a higher concentration of iron than the background sample.

Samples I-12 and I-13 were collected at the metal scrap discharge area. Sample I-12 had five metals above cleanup standards: cadmium (200 ppm), chromium (110 ppm), copper (660 ppm), lead (5100 ppm), and zinc (2000 ppm). However, these values are less than those from sampling performed in July of 1990. Sample I-13 had no metals above action levels compared to Phase I sampling which had eleven samples above cleanup standards. Both samples had higher concentrations of calcium and manganese than sample I-1. Sample I-12 also had slightly higher concentrations of iron and magnesium than I-1.

Sample I-15 was collected approximately 35 feet north of Building S-464. Concentrations of chromium (130 ppm) was the only metal to exceed NJDEPE soil action level and calcium, iron and manganese levels were slightly higher than levels found in the background sample.

Sample I-16 was collected approximately 30 feet northeast of the pollution equipment area. No metals were found to be above NJDEPE cleanup standards. Calcium, cobalt and manganese levels were slightly higher than levels found in the background sample.

Sample I-17 is located 18 feet south of the furnace pad. Sample results for all metals and cyanide were found to be under NJDEPE cleanup standards. Compared to the background sample, (I-1), manganese was the only metal with a higher concentration than the representative sample.

Samples I-18 and I-19 were collected north of the fenced in area and at a depth of 0-6". Both samples were below NJDEPE cleanup standards. Both I-18 and I-19 had higher levels of calcium and manganese than Sample I-1.

A duplicate sample, I-20, was also collected at location I-19. A comparison of sample I-19 results to the duplicate sample, I-20, reveals different results. The reason for this may be the non-homogeneity of the 0 to 6 inch sampled material which made duplication of the sample more difficult. However, it should be noted that neither of the samples exhibited metal concentrations above the NJDEPE proposed cleanup standards.

Sample SD-1 and SD-2 were taken in the drainage swale north of the fenced furnace area on the west side of the site. Both of these samples were collected at a depth of 0-6". SD-1 and SD-2 had no metals above NJDEPE cleanup standards. All other metals with no cleanup standards fell below those found in the background sample (I-1).

4.0 CONCLUSIONS AND RECOMMENDATIONS

Due to the fact that NJDEPE has proposed new cleanup standards which are different than those in existence at the time of the December 1990 closure report, IT has reviewed the initial sampling results with respect to these new standards. Based on the new proposed standards, sample locations I-1, I-3 and I-4 would no longer contain concentrations of metals in excess of the cleanup levels. Sample locations I-5, I-6, I-7 and I-9 to I-13 would still be in exceedance of the new standards. Samples I-2 and I-8 would remain "clean".

In the second round of sampling, chromium was the only metal to be detected above cleanup standards (10 out of 21 locations), with the exception of sample I-12, which had four other metals above cleanup standards. Sample I-12 appears to be an isolated spot as samples around it had metal levels below cleanup standards.

Since cleanup levels for chromium have not yet been proposed and the levels found at depth are not significantly higher (maximum 160 ppm) than the existing standard (100 ppm). IT does not believe excavation is warranted for this level of chromium. In addition, if background levels (110 ppm) were subtracted, the existing levels would be below the standard.

Both rounds of sampling indicate that soil contamination is primarily isolated to surface soils and IT recommends that no further delineation be performed. A cleanup plan should be prepared, within which, clean closure will be demonstrated through post-excavation sampling.

TABLE 1
Soil Samples Analytical Data
Naval Weapons Station Earle
Demilitarization Furnace

Sample Point	I-1	I-2	I-3	I-4	I-5	I-6	I-7	Non-residential Cleanup Standards	Residential Cleanup Standards
Sample Depth	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'		
Sample Date	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92		
TAL METALS(ppm)									
Aluminum	7500	1,800	4,700-8,600	8,100	6,000	5,100	5,200		
Antimony	ND	ND	ND	ND	ND	ND	ND	340	14
Arsenic	ND	ND	1.4	ND	2.9	1.4	1.4	20	20
Barium	1.9	2.3	2.8-4.2	4.1	2.5	6.9	13	26,000	600
Beryllium	0.72	ND	0.78	1.5	1.2	1.1	1.2	2	2
Cadmium	ND	ND	ND	ND	ND	0.63	ND	100	1
Calcium	65	100	100-220	180	180	360	1,200		
Chromium	110*	15	120-180*	170*	120*	140*	120*	100	100
Cobalt	ND	ND	ND	ND	ND	ND	ND		
Copper	ND	ND	ND	ND	ND	3.6	3.1	600	600
Iron	20,000	4,300	11,000-26,000	22,000	17,000	16,000	17,000		
Lead	2.7	5.0	2.0	5.8	2.1	8.6	26	600	100
Magnesium	550-2,400	180	640-2,700	1,600	1,800	1,000	1,800		
Manganese	2.8	8.6	3.1	5.2	4.9	12	26		
Mercury	ND	ND	ND	ND	ND	ND	ND	260	14
Nickel	ND	ND	ND	ND	ND	ND	ND	2,400	250
Potassium	1,700-7,500	430	2,000-8,600	4,800	5,600	2,900	4,200		
Selenium	ND	ND	ND	ND	ND	ND	ND	1,000	1
Silver	ND	ND	ND	ND	ND	ND	ND	2,000	40
Sodium	ND	ND	ND	ND	ND	ND	37		
Thallium	ND	ND	ND	ND	ND	ND	ND	2	2
Vanadium	96	14	110-140	130	110	110	95	7,000	380
Zinc	24	19	17-30	18	16	21	20	1,500	1,500
Cyanide	ND	ND	ND	ND	ND	ND	ND	5,200	280

NAVYSL2.WK3

NOTES:

(ppm) - parts per million

TAL - Target Analyte List

ND - Non detectable

* - Indicates sample concentration exceeds NJDEPE non-residential surface soil cleanup standards.

SD - Sediment sample

@ - Sample I-20 is a duplicate of sample I-19

TABLE 1 (continued)
Soil Samples Analytical Data
Naval Weapons Station Earle
Demilitarization Furnace

Sample Point	I-8	I-9	I-10	I-11	I-12	I-13	I-15	Non-residential	Residential
Sample Depth	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	2.5-3.0'	Cleanup	Cleanup
Sample Date	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	Standards	Standards
TAL METALS(ppm)									
Aluminum	6,200	3,400	4,600	6,100	10,000	4,400	6,500		
Antimony	ND	ND	ND	ND	22	ND	ND	340	14
Arsenic	2.0	ND	2.1	2.2	ND	3.2	3.3	20	20
Barium	5.1	10	17	4.0	230	3.3	3.2	26,000	600
Beryllium	1.2	0.63	0.96	1.2	1.2	0.93	1.2	2	2
Cadmium	0.80	0.60	11	ND	200*	ND	0.58	100	1
Calcium	690	940	590	400	420	140	420		
Chromium	140*	74	74	160*	110*	90	130*	100	100
Cobalt	ND								
Copper	ND	3.6	7.3	ND	660*	ND	ND	600	600
Iron	23,000	11,000	14,000	23,000	22,000	14,000	21,000		
Lead	19	24	130	6.3	5,100*	2.6	2.8	600	100
Magnesium	2,200	1,000	1,300	1,900	2,500	1,200	1,900		
Manganese	5.4	19	22	9.5	34	4.0	8.6		
Mercury	ND	ND	0.16	ND	ND	ND	ND	260	14
Nickel	ND	ND	ND	ND	6.9	ND	ND	2,400	250
Potassium	5,800	2,200	3,300	6,000	3,800	3,700	5,800		
Selenium	ND	ND	ND	ND	1.4	ND	ND	1,000	1
Silver	ND	ND	ND	ND	57	ND	ND	2,000	40
Sodium	ND								
Thallium	ND	2	2						
Vanadium	110	66	69	120	110	63	120	7,000	380
Zinc	22	14	69	21	2,000*	17	23	1,500	1,500
Cyanide	ND	5,200	280						

NAVYSL2.WK3

NOTES:

(ppm) – parts per million

TAL – Target Analyte List

ND – Non detectable

* – Indicates sample concentration exceeds NJDEPE non-residential surface soil cleanup standards.

SD – Sediment sample

@ – Sample I-20 is a duplicate of sample I-19

TABLE 1 (continued)
 Soil Samples Analytical Data
 Naval Weapons Station Earle
 Demilitarization Furnace

Sample Point	I-16	I-17	I-18	I-19	SD-1	SD-2	@ I-20	FIELD	Non-residential	Residential
Sample Depth	2.5-3.0'	2.5-3.0'	0-6'	0-6'	0-6'	0-6'	0-6'	BLANK	Cleanup	Cleanup
Sample Date	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92	Standards	Standards
TAL METALS(ppm)										
Aluminum	4,700	580	2,800	3,500	1,300	2,600	1,700	ND		
Antimony	ND	340	14							
Arsenic	4.4	ND	1.4	1.1	ND	ND	ND	ND	20	20
Barium	6.8	2.4	20	14	20	43	7.9	ND	26,000	600
Beryllium	1.1	ND	ND	0.58	ND	ND	ND	ND	2	2
Cadmium	6.4	ND	4.1	1.3	5.6	7.1	0.61	ND	100	1
Calcium	270	27	980	400	280	560	210	ND		
Chromium	99	9.6	34	62	34	42	19	ND	100	100
Cobalt	5.5	ND								
Copper	2.0	ND	10	5.4	13	22	7.8	ND	600	600
Iron	20,000	2,700	7,600	11,000	4,400	8,600	3,900	ND		
Lead	24	2.6	78	59	28	180	5.5	ND	600	100
Magnesium	1,700	110	600	700	240	380	160	ND		
Manganese	4.2	3.6	22	21	12	28	10	ND		
Mercury	ND	260	14							
Nickel	ND	2,400	250							
Potassium	5,500	230	990	1,600	310	480	170	ND		
Selenium	ND	1,000	1							
Silver	ND	2,000	40							
Sodium	ND									
Thallium	ND	2	2							
Vanadium	110	9.9	30	52	35	44	16	ND	7,000	380
Zinc	28	4.5	90	56	100	170	24	ND	1,500	1,500
Cyanide	ND	5,200	280							

NAVYSL2.WK3

NOTES:

(ppm) – parts per million

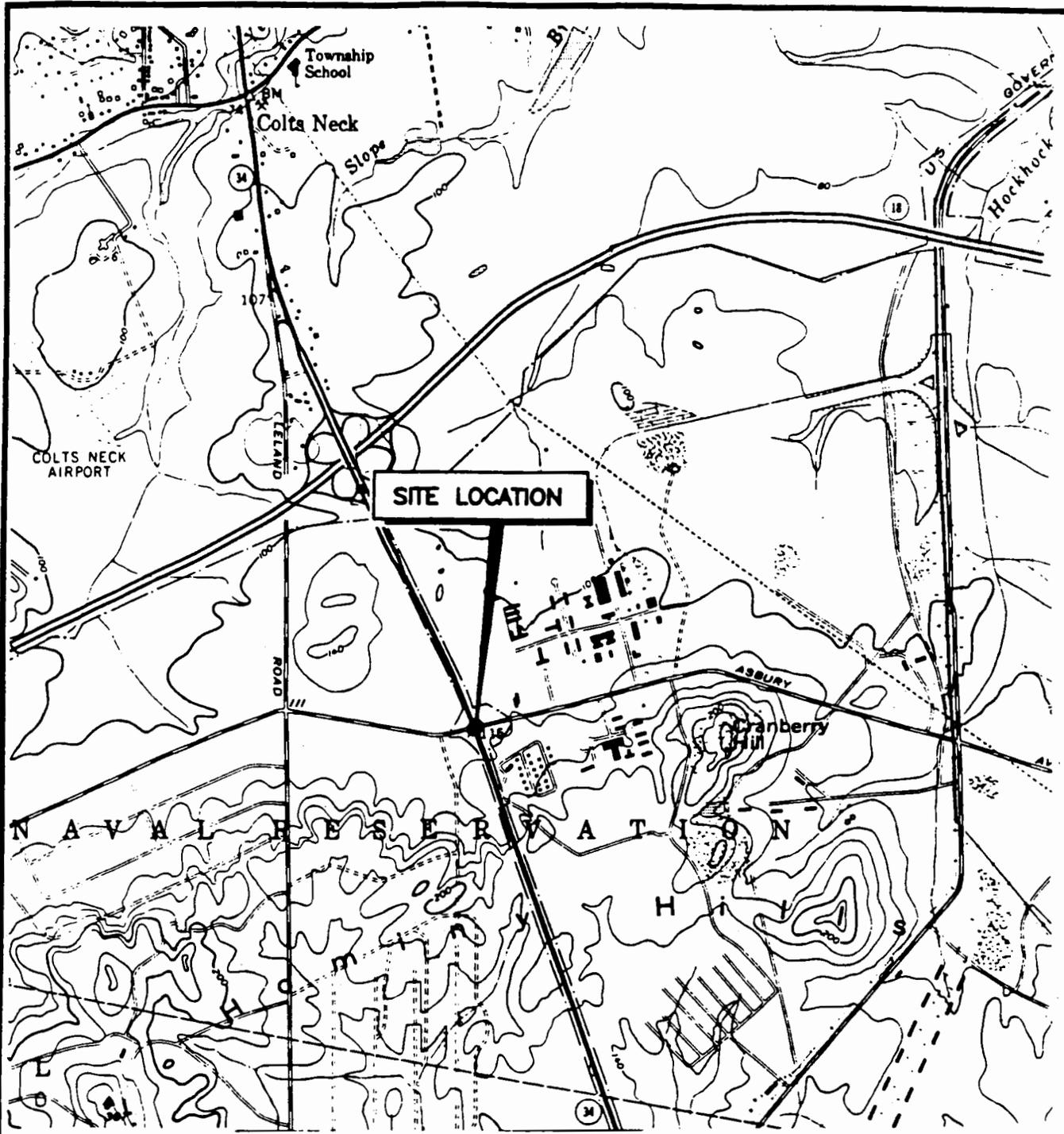
TAL – Target Analyte List

ND – Non detectable

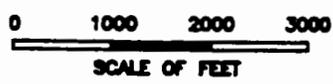
* – Indicates sample concentration exceeds NJDEPE non-residential surface soil cleanup standards.

SD – Sediment sample

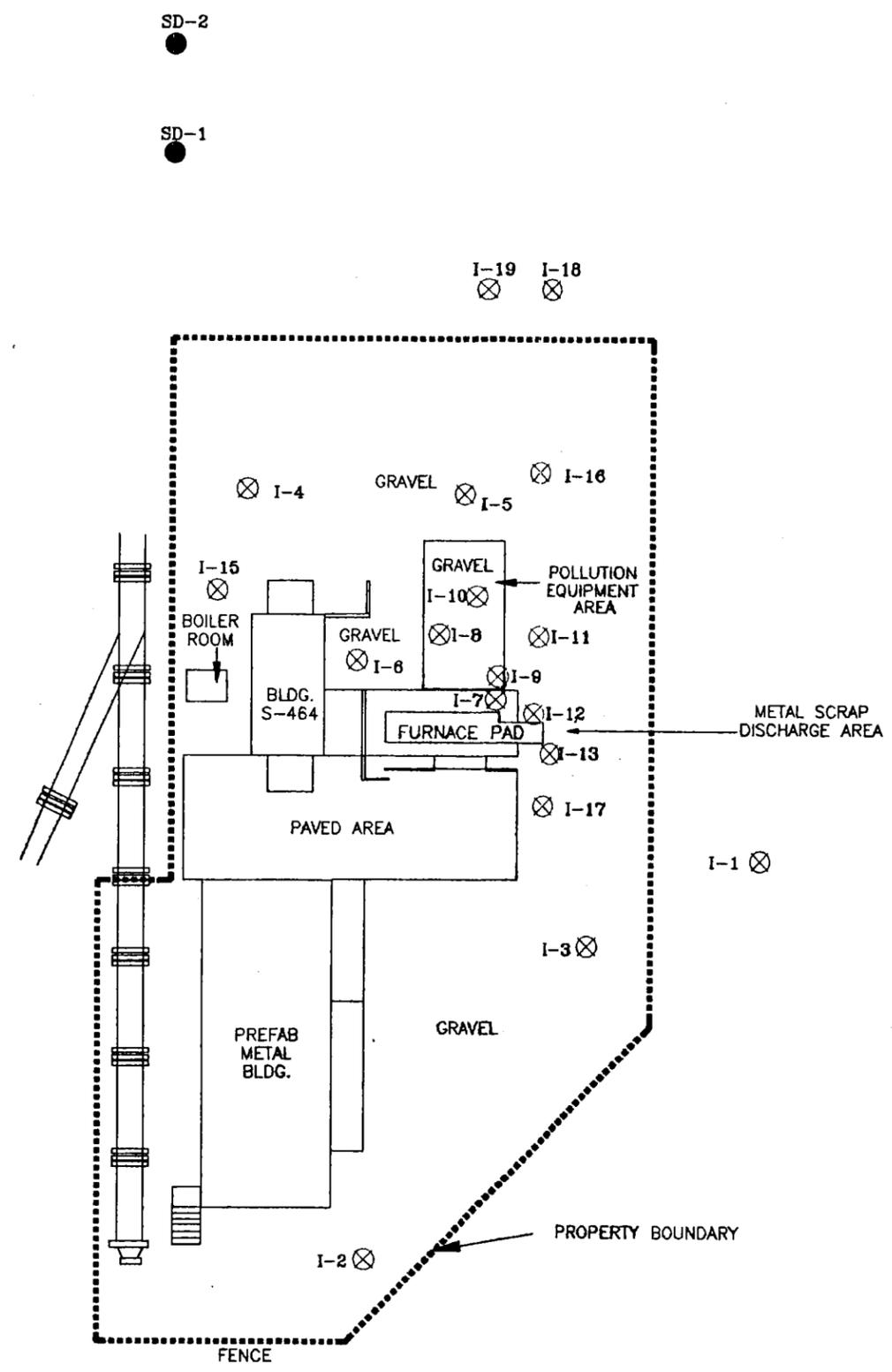
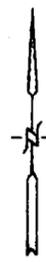
@ – Sample I-20 is a duplicate of sample I-19



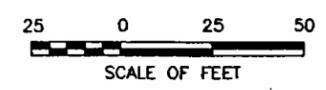
USGS 7.5 MINUTE TOPOGRAPHIC SERIES
 MARLBORO, NJ - PHOTOREVISED 1981



8	11/17/88	DEVELOPED DRAWING	Jan	10112
<p>INTERNATIONAL TECHNOLOGY CORPORATION</p> <p>FIGURE 1 SITE LOCATION MAP NWS EARLE COLTS NECK, NEW JERSEY PROJECT No. 529358 APRIL 1992</p>				
LABORER	DATE DRAWN	DRAWING NUMBER		
0	12/17/88	529358-1		



- LEGEND**
- ⊗ I-1 SOIL SAMPLE LOCATION
SAMPLE DATE: 1/14/92
 - SD-1 SEDIMENT SAMPLE LOCATION
SAMPLE DATE: 1/14/92



0	2/28/92	DEVELOPED DRAWING	M.S.M.		
REV. #	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY/APPVD BY
PROJECT MANAGER:		D. BOYADJIAN		DRAWN BY: J.M. / J.R.D.	
FIGURE 2 SAMPLE LOCATION MAP Prepared For: NWS EARLE COLTS NECK, NEW JERSEY PROJECT No. 529358 MARCH 1992					
LAYER(S)	DATE INITIATED	DRAWING NUMBER			
0	2/25/92	529358-A			

APPENDIX A

SOIL SAMPLE ANALYTICAL DATA



INTERNATIONAL
TECHNOLOGY
CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

NAVY-Earl Facility
c/o IT Corporation
165 Fieldcrest Ave.
Edison, NJ 08837
Attn: Mr. Rick Lorfing

Date: February 10, 1992

NJ Lab Certification ID#: 12064

Job No.: 529358

P.O. Number: 529358

This is the Certificate of Analysis for the following samples:

Client Project ID: Navy - Earl Facility
Date Received: 01/15/92
Number of Samples: 21
Sample Type: SOIL

I Samples were labeled as follows:

<u>SAMPLE IDENTIFICATION</u>	<u>LABORATORY #</u>
I-1 (2.5-3')	F2-01-171-01
I-2 (2.5-3')	F2-01-171-02
I-3 (2.5-3')	F2-01-171-03
I-4 (2.5-3')	F2-01-171-04
I-5 (2.5-3')	F2-01-171-05
I-6 (2.5-3')	F2-01-171-06
I-7 (2.5-3')	F2-01-171-07
I-8 (2.5-3')	F2-01-171-08
I-9 (2.5-3')	F2-01-171-09
I-10 (2.5-3')	F2-01-171-10
I-11 (2.5-3')	F2-01-171-11
I-12 (2.5-3')	F2-01-171-12
I-13 (2.5-3')	F2-01-171-13
I-15 (2.5-3')	F2-01-171-14
I-16 (2.5-3')	F2-01-171-15
I-17 (2.5-3')	F2-01-171-16

Reviewed and Approved:



Ralph A. Kocsis
Project Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

Samples, continued from above:

<u>SAMPLE IDENTIFICATION</u>	<u>LABORATORY #</u>
I-18 (0-6")	F2-01-171-17
I-19 (0-6")	F2-01-171-18
SD-1 (0-6")	F2-01-171-19
SD-2 (0-6")	F2-01-171-20
I-20 (0-6")	F2-01-171-21

IT ANALYTICAL SERVICES
EDISON, NJ

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

(908) 225-2000

Work Order: F2-01-171

SAMPLE ID	I-1 (2.5-3')	I-2 (2.5-3')	I-3 (2.5-3')	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.29]	ND [0.26]	ND [0.28]	mg/Kg Dry Wt.
Total Solids	86 [0.01]	94 [0.01]	88 [0.01]	Percent

ND indicates the parameter was not detected.
Detection limits are specified in [].

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

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 EDISON, NJ
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SAMPLE ID	I-4 (2.5-3')	I-5 (2.5-3')	I-6 (2.5-3')	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.29]	ND [0.28]	ND [0.29]	mg/Kg Dry Wt.
Total Solids	86 [0.01]	90 [0.01]	87 [0.01]	Percent

ND indicates the parameter was not detected.
 Detection limits are specified in [].

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Work Order: F2-01-171

SAMPLE ID	I-7 (2.5-3')	I-8 (2.5-3')	I-9 (2.5-3')	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.28]	ND [0.28]	ND [0.29]	mg/Kg Dry Wt.
Total Solids	88 [0.01]	88 [0.01]	86 [0.01]	Percent

ND indicates the parameter was not detected.
Detection limits are specified in [].

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

IT ANALYTICAL SERVICES
 EDISON, NJ

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Work Order: F2-01-171

SAMPLE ID	I-10 (2.5-3')	I-11 (2.5-3')	I-12 (2.5-3')	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.29]	ND [0.29]	ND [0.29]	mg/Kg Dry Wt.
Total Solids	85 [0.01]	86 [0.01]	85 [0.01]	Percent

ND indicates the parameter was not detected.
 Detection limits are specified in [].

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SAMPLE ID	I-13 (2.5-3')	I-15 (2.5-3')	I-16 (2.5-3')	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.28]	ND [0.29]	ND [0.27]	mg/Kg Dry Wt.
Total Solids	89 [0.01]	86 [0.01]	91 [0.01]	Percent

ND indicates the parameter was not detected.
Detection limits are specified in [].

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Company: NAVY-Earl Facility
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SAMPLE ID	I-17 (2.5-3')	I-18 (0-6")	I-19 (0-6")	UNITS
SAMPLED	01/15/92	01/15/92	01/15/92	
TEST				
Total Cyanide	ND [0.28]	ND [0.28]	ND [0.28]	mg/Kg Dry Wt.
Total Solids	94 [0.01]	90 [0.01]	90 [0.01]	Percent

ND indicates the parameter was not detected.
 Detection limits are specified in [].

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

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SAMPLE ID	SD-1 (0-6")	SD-2 (0-6")	I-20 (0-6")	
SAMPLED	01/15/92	01/15/92	01/15/92	UNITS
TEST				
Total Cyanide	ND [0.29]	ND [0.36]	ND [0.28]	mg/Kg Dry Wt.
Total Solids	85 [0.01]	70 [0.01]	90 [0.01]	Percent

ND indicates the parameter was not detected.
 Detection limits are specified in [].

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

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TEST NAME: **Metals**

SAMPLE ID: I-1 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/29/92

	Results in	mg/Kg Dry Wt.	Detection Limit
Antimony		ND	2.3
Aluminum		7500	120
Arsenic		ND	1.2
Barium		1.9	0.58
Beryllium		0.72	0.58
Cadmium		ND	0.58
Calcium		65	23
Chromium		110	1.2
Cobalt		ND	5.8
Copper		ND	2.3
Iron		20000	170
Lead		2.7	0.58
Magnesium		550-2400	5.8
Manganese		2.8	1.2
Mercury		ND	0.12
Nickel		ND	4.6
Potassium		1700-7500	120
Selenium		ND	0.58
Silver		ND	1.2
Sodium		ND	29
Thallium		ND	1.2
Vanadium		96	2.3
Zinc		24	2.3

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

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Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-2 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/29/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.1
Aluminum		1800	11
Arsenic		ND	1.1
Barium		2.3	0.53
Beryllium		ND	0.53
Cadmium		ND	0.53
Calcium		100	21
Chromium		15	1.1
Cobalt		ND	5.3
Copper		ND	2.1
Iron		4300	160
Lead		5.0	0.53
Magnesium		180	5.3
Manganese		8.6	1.1
Mercury		ND	0.11
Nickel		ND	4.2
Potassium		430	110
Selenium		ND	0.53
Silver		ND	1.1
Sodium		ND	26
Thallium		ND	1.1
Vanadium		14	2.1
Zinc		19	2.1

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
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TEST NAME: Metals

SAMPLE ID: I-3 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/28/92

	Results in <u>mg/Kg</u> Dry Wt.	Detection Limit
Antimony	<u>ND</u>	<u>2.3</u>
Aluminum	<u>4700-8600</u>	<u>110</u>
Arsenic	<u>1.4</u>	<u>1.1</u>
Barium	<u>2.8-4.2</u>	<u>0.57</u>
Beryllium	<u>0.78</u>	<u>0.57</u>
Cadmium	<u>ND</u>	<u>0.57</u>
Calcium	<u>100-220</u>	<u>23</u>
Chromium	<u>120-180</u>	<u>1.1</u>
Cobalt	<u>ND</u>	<u>5.7</u>
Copper	<u>ND</u>	<u>2.3</u>
Iron	<u>11000-26000</u>	<u>430</u>
Lead	<u>2.0</u>	<u>0.57</u>
Magnesium	<u>640-2700</u>	<u>5.7</u>
Manganese	<u>3.1</u>	<u>1.1</u>
Mercury	<u>ND</u>	<u>0.11</u>
Nickel	<u>ND</u>	<u>4.5</u>
Potassium	<u>2000-8600</u>	<u>110</u>
Selenium	<u>ND</u>	<u>0.57</u>
Silver	<u>ND</u>	<u>1.1</u>
Sodium	<u>ND</u>	<u>28</u>
Thallium	<u>ND</u>	<u>1.1</u>
Vanadium	<u>110-140</u>	<u>2.3</u>
Zinc	<u>17-30</u>	<u>2.3</u>

Comments: ND indicates the compound is not detected at the level indicated.

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Company: NAVY-Earl Facility
Date: February 10, 1992
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TEST NAME: Metals

SAMPLE ID: I-4 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/29/92

	Results in <u>mg/Kg</u> Dry Wt.	Detection Limit
Antimony	<u>ND</u>	<u>2.3</u>
Aluminum	<u>8100</u>	<u>290</u>
Arsenic	<u>ND</u>	<u>1.2</u>
Barium	<u>4.1</u>	<u>0.58</u>
Beryllium	<u>1.5</u>	<u>0.58</u>
Cadmium	<u>ND</u>	<u>0.58</u>
Calcium	<u>180</u>	<u>23</u>
Chromium	<u>170</u>	<u>1.2</u>
Cobalt	<u>ND</u>	<u>5.8</u>
Copper	<u>ND</u>	<u>2.3</u>
Iron	<u>22000</u>	<u>440</u>
Lead	<u>5.8</u>	<u>0.58</u>
Magnesium	<u>1600</u>	<u>5.8</u>
Manganese	<u>5.2</u>	<u>1.2</u>
Mercury	<u>ND</u>	<u>0.12</u>
Nickel	<u>ND</u>	<u>4.6</u>
Potassium	<u>4800</u>	<u>120</u>
Selenium	<u>ND</u>	<u>0.58</u>
Silver	<u>ND</u>	<u>1.2</u>
Sodium	<u>ND</u>	<u>29</u>
Thallium	<u>ND</u>	<u>1.2</u>
Vanadium	<u>130</u>	<u>2.3</u>
Zinc	<u>18</u>	<u>2.3</u>

Comments: ND indicates the compound is not detected at the level indicated.

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Date: February 10, 1992
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TEST NAME: Metals

SAMPLE ID: I-5 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/29/92

	Results in	mg/Kg	Detection
	Dry Wt.		Limit
Antimony		ND	2.2
Aluminum		6000	280
Arsenic		2.9	1.1
Barium		2.5	0.56
Beryllium		1.2	0.56
Cadmium		ND	0.56
Calcium		180	22
Chromium		120	1.1
Cobalt		ND	5.6
Copper		ND	2.2
Iron		17000	420
Lead		2.1	0.56
Magnesium		1800	5.6
Manganese		4.9	1.1
Mercury		ND	0.11
Nickel		ND	4.4
Potassium		5600	110
Selenium		ND	0.56
Silver		ND	1.1
Sodium		ND	28
Thallium		ND	1.1
Vanadium		110	2.2
Zinc		16	2.2

Comments: ND indicates the compound is not detected at the level indicated.

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TEST NAME: **Metals**

SAMPLE ID: I-6 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/29/92

	Results in <u>mg/Kg</u> Dry Wt.	Detection Limit
Antimony	<u>ND</u>	<u>2.3</u>
Aluminum	<u>5100</u>	<u>290</u>
Arsenic	<u>1.4</u>	<u>1.1</u>
Barium	<u>6.9</u>	<u>0.57</u>
Beryllium	<u>1.1</u>	<u>0.57</u>
Cadmium	<u>0.63</u>	<u>0.57</u>
Calcium	<u>360</u>	<u>23</u>
Chromium	<u>140</u>	<u>1.1</u>
Cobalt	<u>ND</u>	<u>5.7</u>
Copper	<u>3.6</u>	<u>2.3</u>
Iron	<u>16000</u>	<u>430</u>
Lead	<u>8.6</u>	<u>0.57</u>
Magnesium	<u>1000</u>	<u>5.7</u>
Manganese	<u>12</u>	<u>1.1</u>
Mercury	<u>ND</u>	<u>0.11</u>
Nickel	<u>ND</u>	<u>4.6</u>
Potassium	<u>2900</u>	<u>110</u>
Selenium	<u>ND</u>	<u>0.57</u>
Silver	<u>ND</u>	<u>1.1</u>
Sodium	<u>ND</u>	<u>29</u>
Thallium	<u>ND</u>	<u>1.1</u>
Vanadium	<u>110</u>	<u>2.3</u>
Zinc	<u>21</u>	<u>2.3</u>

Comments: ND indicates the compound is not detected at the level indicated.

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Date: February 10, 1992
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TEST NAME: Metals

SAMPLE ID: I-7 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/29/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.3
Aluminum		5200	280
Arsenic		1.4	1.1
Barium		13	0.57
Beryllium		1.2	0.57
Cadmium		ND	0.57
Calcium		1200	23
Chromium		120	1.1
Cobalt		ND	5.7
Copper		3.1	2.3
Iron		17000	430
Lead		26	2.3
Magnesium		1800	5.7
Manganese		26	1.1
Mercury		ND	0.11
Nickel		ND	4.5
Potassium		4200	110
Selenium		ND	0.57
Silver		ND	1.1
Sodium		37	28
Thallium		ND	1.1
Vanadium		95	2.3
Zinc		20	2.3

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
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TEST NAME: Metals

SAMPLE ID: I-8 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in <u>mg/Kg</u> Dry Wt.	Detection Limit
Antimony	ND	2.3
Aluminum	6200	280
Arsenic	2.0	1.1
Barium	5.1	0.57
Beryllium	1.2	0.57
Cadmium	0.80	0.57
Calcium	690	23
Chromium	140	1.1
Cobalt	ND	5.7
Copper	ND	2.3
Iron	23000	430
Lead	19	2.3
Magnesium	2200	5.7
Manganese	5.4	1.1
Mercury	ND	0.11
Nickel	ND	4.5
Potassium	5800	1100
Selenium	ND	0.57
Silver	ND	1.1
Sodium	ND	28
Thallium	ND	1.1
Vanadium	110	2.3
Zinc	22	2.3

Comments: ND indicates the compound is not detected at the level indicated.

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TEST NAME: Metals

SAMPLE ID: I-9 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.3
Aluminum		3400	120
Arsenic		ND	1.2
Barium		10	0.58
Beryllium		0.63	0.58
Cadmium		0.60	0.58
Calcium		940	23
Chromium		74	1.2
Cobalt		ND	5.8
Copper		3.6	2.3
Iron		11000	170
Lead		24	2.3
Magnesium		1000	5.8
Manganese		19	1.2
Mercury		ND	0.12
Nickel		ND	4.6
Potassium		2200	120
Selenium		ND	0.58
Silver		ND	1.2
Sodium		ND	29
Thallium		ND	1.2
Vanadium		66	2.3
Zinc		14	2.3

Comments: ND indicates the compound is not detected at the level indicated.

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 Date: February 10, 1992
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TEST NAME: **Metals**

SAMPLE ID: I-10 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in <u>mg/Kg</u> Dry Wt.	Detection Limit
Antimony	<u>ND</u>	<u>2.4</u>
Aluminum	<u>4600</u>	<u>290</u>
Arsenic	<u>2.1</u>	<u>1.2</u>
Barium	<u>17</u>	<u>0.59</u>
Beryllium	<u>0.96</u>	<u>0.59</u>
Cadmium	<u>11</u>	<u>0.59</u>
Calcium	<u>590</u>	<u>24</u>
Chromium	<u>74</u>	<u>1.2</u>
Cobalt	<u>ND</u>	<u>5.9</u>
Copper	<u>7.3</u>	<u>2.4</u>
Iron	<u>14000</u>	<u>440</u>
Lead	<u>130</u>	<u>0.59</u>
Magnesium	<u>1300</u>	<u>5.9</u>
Manganese	<u>22</u>	<u>1.2</u>
Mercury	<u>0.16</u>	<u>0.12</u>
Nickel	<u>ND</u>	<u>4.7</u>
Potassium	<u>3300</u>	<u>120</u>
Selenium	<u>ND</u>	<u>0.59</u>
Silver	<u>ND</u>	<u>1.2</u>
Sodium	<u>ND</u>	<u>29</u>
Thallium	<u>ND</u>	<u>1.2</u>
Vanadium	<u>69</u>	<u>2.4</u>
Zinc	<u>69</u>	<u>2.4</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
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Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-11 (2.5-3')

SAMPLE DATE: 01/15/92

ANALYSIS DATE: 01/27/92

	Results in	<u>mg/Kg</u>	Detection
		Dry Wt.	Limit
Antimony		ND	<u>2.3</u>
Aluminum		6100	<u>290</u>
Arsenic		2.2	<u>1.2</u>
Barium		4.0	<u>0.58</u>
Beryllium		1.2	<u>0.58</u>
Cadmium		ND	<u>0.58</u>
Calcium		400	<u>23</u>
Chromium		160	<u>1.2</u>
Cobalt		ND	<u>5.8</u>
Copper		ND	<u>2.3</u>
Iron		23000	<u>440</u>
Lead		6.3	<u>0.58</u>
Magnesium		1900	<u>5.8</u>
Manganese		9.5	<u>1.2</u>
Mercury		ND	<u>0.12</u>
Nickel		ND	<u>4.6</u>
Potassium		6000	<u>120</u>
Selenium		ND	<u>0.58</u>
Silver		ND	<u>1.2</u>
Sodium		ND	<u>29</u>
Thallium		ND	<u>1.2</u>
Vanadium		120	<u>2.3</u>
Zinc		21	<u>2.3</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

IT ANALYTICAL SERVICES
 EDISON, NJ
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 Work Order: F2-01-171

TEST NAME: **Metals**

SAMPLE ID: **I-12 (2.5-3')**

SAMPLE DATE: **01/15/92**

ANALYSIS DATE: **01/27/92**

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		<u>22</u>	<u>9.4</u>
Aluminum		<u>10000</u>	<u>290</u>
Arsenic		<u>ND</u>	<u>1.2</u>
Barium		<u>230</u>	<u>0.59</u>
Beryllium		<u>1.2</u>	<u>0.59</u>
Cadmium		<u>200</u>	<u>0.59</u>
Calcium		<u>420</u>	<u>24</u>
Chromium		<u>110</u>	<u>1.2</u>
Cobalt		<u>ND</u>	<u>5.9</u>
Copper		<u>660</u>	<u>2.4</u>
Iron		<u>22000</u>	<u>440</u>
Lead		<u>5100</u>	<u>470</u>
Magnesium		<u>2500</u>	<u>5.9</u>
Manganese		<u>34</u>	<u>1.2</u>
Mercury		<u>ND</u>	<u>0.12</u>
Nickel		<u>6.9</u>	<u>4.7</u>
Potassium		<u>3800</u>	<u>120</u>
Selenium		<u>1.4</u>	<u>0.59</u>
Silver		<u>57</u>	<u>1.2</u>
Sodium		<u>ND</u>	<u>29</u>
Thallium		<u>ND</u>	<u>1.2</u>
Vanadium		<u>110</u>	<u>2.4</u>
Zinc		<u>2000</u>	<u>59</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
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 EDISON, NJ
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TEST NAME: **Metals**

SAMPLE ID: I-13 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in	<u>mg/Kg</u>	Detection
		Dry Wt.	Limit
Antimony		<u>ND</u>	<u>2.2</u>
Aluminum		<u>4400</u>	<u>280</u>
Arsenic		<u>3.2</u>	<u>1.1</u>
Barium		<u>3.3</u>	<u>0.56</u>
Beryllium		<u>0.93</u>	<u>0.56</u>
Cadmium		<u>ND</u>	<u>0.56</u>
Calcium		<u>140</u>	<u>22</u>
Chromium		<u>90</u>	<u>1.1</u>
Cobalt		<u>ND</u>	<u>5.6</u>
Copper		<u>ND</u>	<u>2.2</u>
Iron		<u>14000</u>	<u>420</u>
Lead		<u>2.6</u>	<u>0.56</u>
Magnesium		<u>1200</u>	<u>5.6</u>
Manganese		<u>4.0</u>	<u>1.1</u>
Mercury		<u>ND</u>	<u>0.11</u>
Nickel		<u>ND</u>	<u>4.5</u>
Potassium		<u>3700</u>	<u>4.5</u>
Selenium		<u>ND</u>	<u>0.56</u>
Silver		<u>ND</u>	<u>1.1</u>
Sodium		<u>ND</u>	<u>28</u>
Thallium		<u>ND</u>	<u>1.1</u>
Vanadium		<u>63</u>	<u>2.2</u>
Zinc		<u>17</u>	<u>2.2</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-15 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.3
Aluminum		6500	290
Arsenic		3.3	1.2
Barium		3.2	0.58
Beryllium		1.2	0.58
Cadmium		0.58	0.58
Calcium		420	23
Chromium		130	1.2
Cobalt		ND	5.8
Copper		ND	2.3
Iron		21000	4400
Lead		2.8	0.58
Magnesium		1900	5.8
Manganese		8.6	1.2
Mercury		ND	0.12
Nickel		ND	4.6
Potassium		5800	120
Selenium		ND	0.58
Silver		ND	1.2
Sodium		ND	29
Thallium		ND	1.2
Vanadium		120	2.3
Zinc		23	2.3

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

IT ANALYTICAL SERVICES
 EDISON, NJ
 (908) 225-2000
 Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-16 (2.5-3')
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in	<u>mg/Kg</u>	Detection
		Dry Wt.	Limit
Antimony		ND	2.2
Aluminum		4700	270
Arsenic		4.4	1.1
Barium		6.8	0.55
Beryllium		1.1	0.55
Cadmium		6.4	0.55
Calcium		270	22
Chromium		99	1.1
Cobalt		5.5	5.5
Copper		2.0	2.2
Iron		20000	410
Lead		24	2.2
Magnesium		1700	5.5
Manganese		4.2	1.1
Mercury		ND	0.11
Nickel		ND	4.4
Potassium		5500	110
Selenium		ND	0.55
Silver		ND	1.1
Sodium		ND	27
Thallium		ND	1.1
Vanadium		110	2.2
Zinc		28	2.2

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-17 (2.5-3')
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.1
Aluminum		580	11
Arsenic		ND	1.1
Barium		2.4	0.53
Beryllium		ND	0.53
Cadmium		ND	0.53
Calcium		27	21
Chromium		9.6	1.1
Cobalt		ND	5.3
Copper		ND	2.1
Iron		2700	160
Lead		2.6	0.53
Magnesium		110	5.3
Manganese		3.6	1.1
Mercury		ND	0.11
Nickel		ND	4.2
Potassium		230	110
Selenium		ND	0.53
Silver		ND	1.1
Sodium		ND	26
Thallium		ND	1.1
Vanadium		9.9	2.1
Zinc		4.5	2.1

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: I-18 (0-6")
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/27/92

	Results in	<u>mg/Kg</u>	Detection
		Dry Wt.	Limit
Antimony		ND	2.2
Aluminum		2800	110
Arsenic		1.4	1.1
Barium		20	0.56
Beryllium		ND	0.56
Cadmium		4.1	0.56
Calcium		980	22
Chromium		34	1.1
Cobalt		ND	5.6
Copper		10	2.2
Iron		7600	170
Lead		78	14
Magnesium		600	5.6
Manganese		22	1.1
Mercury		ND	0.11
Nickel		ND	4.4
Potassium		990	110
Selenium		ND	0.56
Silver		ND	1.1
Sodium		ND	28
Thallium		ND	1.1
Vanadium		30	2.2
Zinc		90	2.2

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

IT ANALYTICAL SERVICES
 EDISON, NJ
 (908) 225-2000
 Work Order: F2-01-171

TEST NAME: **Metals**

SAMPLE ID: I-19 (0-6")
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.2
Aluminum		3500	280
Arsenic		1.1	1.1
Barium		14	0.56
Beryllium		0.58	0.56
Cadmium		1.3	0.56
Calcium		400	22
Chromium		62	1.1
Cobalt		ND	5.6
Copper		5.4	2.2
Iron		11000	420
Lead		59	14
Magnesium		700	5.6
Manganese		21	1.1
Mercury		ND	0.11
Nickel		ND	4.4
Potassium		1600	110
Selenium		ND	0.56
Silver		ND	1.1
Sodium		ND	28
Thallium		ND	1.1
Vanadium		52	2.2
Zinc		56	2.2

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ

(908) 225-2000
Work Order: F2-01-171

TEST NAME: **Metals**

SAMPLE ID: **SD-1 (0-6")**

SAMPLE DATE: **01/15/92**

ANALYSIS DATE: 01/27/92

	Results in	<u>mg/Kg</u>	Detection
		Dry Wt.	Limit
Antimony		<u>ND</u>	<u>2.4</u>
Aluminum		<u>1300</u>	<u>12</u>
Arsenic		<u>ND</u>	<u>1.2</u>
Barium		<u>20</u>	<u>0.59</u>
Beryllium		<u>ND</u>	<u>0.59</u>
Cadmium		<u>5.6</u>	<u>0.59</u>
Calcium		<u>280</u>	<u>24</u>
Chromium		<u>34</u>	<u>1.2</u>
Cobalt		<u>ND</u>	<u>5.9</u>
Copper		<u>13</u>	<u>2.4</u>
Iron		<u>4400</u>	<u>180</u>
Lead		<u>28</u>	<u>5.9</u>
Magnesium		<u>240</u>	<u>5.9</u>
Manganese		<u>12</u>	<u>1.2</u>
Mercury		<u>ND</u>	<u>0.12</u>
Nickel		<u>ND</u>	<u>4.7</u>
Potassium		<u>310</u>	<u>120</u>
Selenium		<u>ND</u>	<u>0.59</u>
Silver		<u>ND</u>	<u>1.2</u>
Sodium		<u>ND</u>	<u>29</u>
Thallium		<u>ND</u>	<u>1.2</u>
Vanadium		<u>35</u>	<u>2.4</u>
Zinc		<u>100</u>	<u>2.4</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

TEST NAME: Metals

SAMPLE ID: SD-2 (0-6")
SAMPLE DATE: 01/15/92
ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.8
Aluminum		2600	14
Arsenic		ND	1.4
Barium		43	0.71
Beryllium		ND	0.71
Cadmium		7.1	0.71
Calcium		560	28
Chromium		42	1.4
Cobalt		ND	7.1
Copper		22	2.8
Iron		8600	210
Lead		180	18
Magnesium		380	7.1
Manganese		28	1.4
Mercury		ND	0.14
Nickel		ND	5.7
Potassium		480	140
Selenium		ND	0.71
Silver		ND	1.4
Sodium		ND	36
Thallium		ND	1.4
Vanadium		44	2.8
Zinc		170	2.8

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
 Date: February 10, 1992
 Client Job No.: 529358

IT ANALYTICAL SERVICES
 EDISON, NJ
 (908) 225-2000
 Work Order: F2-01-171

TEST NAME: **Metals**

SAMPLE ID: I-20 (0-6")
 SAMPLE DATE: 01/15/92
 ANALYSIS DATE: 01/27/92

	Results in	mg/Kg	Detection
		Dry Wt.	Limit
Antimony		ND	2.2
Aluminum		1700	11
Arsenic		ND	1.1
Barium		7.9	0.56
Beryllium		ND	0.56
Cadmium		0.61	0.56
Calcium		210	22
Chromium		19	1.1
Cobalt		ND	5.6
Copper		7.8	2.2
Iron		3900	170
Lead		5.5	5.6
Magnesium		160	5.6
Manganese		10	1.1
Mercury		ND	0.11
Nickel		ND	4.4
Potassium		170	110
Selenium		ND	0.56
Silver		ND	1.1
Sodium		ND	28
Thallium		ND	1.1
Vanadium		16	2.2
Zinc		24	2.2

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

IA COMMENTARY

RPD's for barium, copper, calcium and manganese for I-1 (2.5-3') (F201171-01) did not meet QC acceptance criteria. Data was accepted since the difference between the results was less than five times the detection limit.

Matrix spike recoveries for aluminum and iron for I-1 (2.5-3') (F201171-01), I-2 (2.5-3') (F201171-02) and I-3 (2.5-3') (F201171-03) did not meet QC acceptance criteria due to high analyte concentrations in the spiked sample. Results were accepted on the basis of blank spike recoveries.

Matrix spike / duplicate recoveries did not meet QC acceptance criteria for I-1 (2.5-3') (F201171-01), I-2 (2.5-3') (F201171-02) and I-3 (2.5-3') (F201171-03) for arsenic, selenium and antimony due to matrix effects. Results were accepted on the basis of blank spike recoveries.

Samples I-1 (2.5-3') (F201171-01), I-3 (2.5-3') (F201171-03), I-4 (2.5-3') (F201171-04), I-5 (2.5-3') (F201171-05), I-6 (2.5-3') (F201171-06), I-11 (2.5-3') (F201171-11), I-13 (2.5-3') (F201171-13) and I-15 (2.5-3') (F201171-14) required dilutions to bring aluminum and iron concentrations within their calibrated range. Detection limits are increased accordingly.

RPD's for potassium for I-2 (2.5-3') (F201171-02) did not meet QC acceptance criteria. Data was accepted since the difference between the results was less than five times the detection limit.

RPD's for beryllium and manganese for I-3 (2.5-3') (F201171-03) did not meet QC acceptance criteria. Data was accepted since the difference between the results was less than five times the detection limit.

Samples I-2 (2.5-3') (F201171-02) and I-17 (2.5-3') (F201171-16) required dilutions to bring iron concentrations within their calibrated range. Detection limits are increased accordingly.

Samples I-7 (2.5-3') (F21171-07), I-8 (2.5-3') (F201171-08), I-9 (2.5-3') (F201171-09), I-10 (2.5-3') (F201171-10), I-16 (2.5-3') (F201171-15), I-18 (0-6") (F201171-17) and I-19 (0-6") (F201171-18) required dilutions to bring aluminum, iron and lead concentrations within their calibrated range. Detection limits are increased accordingly.

Sample I-12 (2.5-3') (F201171-12) required dilutions to bring aluminum, antimony, iron, lead and zinc concentrations within their calibrated range. Detection limits are increased accordingly.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

Samples SD-1 (0-6") (F201171-19), SD-2 (0-6") (F201171-20) and I-20 (0-6") (F201171-21) required dilutions to bring iron and lead concentrations within their calibrated range. Detection limits are increased accordingly.

RPD's for I-1 (2.5-3') (F201171-01) for magnesium and potassium did not meet acceptance criteria due to nonhomogeneity of sample.

Matix spike recoveries for magnesium and potassium for I-1 (2.5-3') (F201171-01) did not meet acceptance criteria due to nonhomogeneity of sample.

RPD's for I-3 (2.5-3') (F201171-03) for aluminum, barium, calcium, chromium, iron, magnesium, potassium, vanadium and zinc did not acceptance criteria due to nonhomogeneity of sample. A range was reported for these analytes.

Matix spike recoveries for magnesium and potassium for I-3 (2.5-3') (F201171-03) did not meet acceptance criteria due to nonhomogeneity of sample.

Matrix spike / duplicated recoveries did not meet QC acceptance criteria for I-2 (2.5-3') (F201171-02) for arsenic, selenium and antimony due to matrix effects. Results were accepted on the basis of blank spike recoveries.

Samples I-2 (2.5-3') (F201171-02) and I-17 (2.5-3') (F201171-16) required dilutions to bring lead concentrations within their calibrated range. Detection limits are increased accordingly.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-171

II ANALYTICAL RESULTS/METHODOLOGY

The analytical results for this report are presented by Analytical test. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits. Detection limits may vary due to factors arising from concentration/dilution of the sample and sample matrix. ND denotes that the compound is not detected at or above the indicated detection limit. The methodologies for the analytical results requested are described below.

Metals

The analysis of metals is based on Method 200.7 from 40CFR, Part 136. Samples to be analyzed by flame AA or ICP are digested with hydrochloric and nitric acid. Furnace analysis requires nitric acid digestion and mercury samples are digested with nitric and sulfuric acid.

Lead, Arsenic, Selenium, Antimony and Thallium are analyzed by graphite furnace, Mercury by cold vapor AA and all other metals by flame AA or ICP.

Cyanide-Auto Analyzer Method

The analysis of cyanide is based on Lachet Method 10-204-00-1-A and Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition) Method 9010. The cyanide, as hydrocyanic acid (HCN) is released by refluxing the sample with strong acid. The hydrocyanic acid is then distilled into an absorber-scurbber containing sodium hydroxide solution. The cyanide concentration in the absorbing solution is determined colorimetrically.

Total Solids

The analysis of total solids is based on Standard Methods, 16th Edition - (209F). A well mixed sample is evaporated in a weighed dish and dried to constant weight. The increase in weight over that of the empty dish represents the total solids. In other words a sample is first weighed then subjected to temperatures of 103 degrees celsius for four hours after which the sample is re-weighed; the difference in the two weights being the % total solids.

III QUALITY CONTROL

The Determinations were performed in accordance with EPA/NJDEP approved methodology.



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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

NAVY-Earl Facility
c/o IT Corporation
165 Fieldcrest Ave.
Edison, NJ 08837

Date: February 10, 1992

Attn: Mr. Rick Lorfing

NJ Lab Certification ID#: 12064

Job No.: 529358

P.O. Number: 529358

This is the Certificate of Analysis for the following samples:

Client Project ID: Navy - Earl Facility
Date Received: 01/15/92
Number of Samples: 1
Sample Type: SOIL

I Samples were labeled as follows:

SAMPLE IDENTIFICATION
FIELD BLANK

LABORATORY #
F2-01-172-01

Reviewed and Approved:


Ralph A. Kocsis
Project Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ

(908) 225-2000
Work Order: F2-01-172

TEST NAME: **Metals**

SAMPLE ID: **FIELD BLANK**

SAMPLE DATE: **01/14/92**

ANALYSIS DATE: **01/27/92**

	Results in	<u>mg/L</u>	Detection Limit
Antimony		<u>ND</u>	<u>0.020</u>
Aluminum		<u>ND</u>	<u>0.10</u>
Arsenic		<u>ND</u>	<u>0.010</u>
Barium		<u>ND</u>	<u>0.005</u>
Beryllium		<u>ND</u>	<u>0.005</u>
Cadmium		<u>ND</u>	<u>0.005</u>
Calcium		<u>ND</u>	<u>0.20</u>
Chromium		<u>ND</u>	<u>0.010</u>
Cobalt		<u>ND</u>	<u>0.050</u>
Copper		<u>ND</u>	<u>0.020</u>
Iron		<u>ND</u>	<u>0.15</u>
Lead		<u>ND</u>	<u>0.005</u>
Magnesium		<u>ND</u>	<u>0.050</u>
Manganese		<u>ND</u>	<u>0.010</u>
Mercury		<u>ND</u>	<u>0.0002</u>
Nickel		<u>ND</u>	<u>0.040</u>
Potassium		<u>ND</u>	<u>1.0</u>
Selenium		<u>ND</u>	<u>0.005</u>
Silver		<u>ND</u>	<u>0.010</u>
Sodium		<u>ND</u>	<u>0.25</u>
Thallium		<u>ND</u>	<u>0.010</u>
Vanadium		<u>ND</u>	<u>0.020</u>
Zinc		<u>ND</u>	<u>0.020</u>

Comments: ND indicates the compound is not detected at the level indicated.

Company: NAVY-Earl Facility
Date: February 10, 1992
Client Job No.: 529358

IT ANALYTICAL SERVICES
EDISON, NJ
(908) 225-2000
Work Order: F2-01-172

II ANALYTICAL RESULTS/METHODOLOGY

The analytical results for this report are presented by Analytical test. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits. Detection limits may vary due to factors arising from concentration/dilution of the sample and sample matrix. ND denotes that the compound is not detected at or above the indicated detection limit. The methodologies for the analytical results requested are described below.

Metals

The analysis of metals is based on Method 200.7 from 40CFR, Part 136. Samples to be analyzed by flame AA or ICP are digested with hydrochloric and nitric acid. Furnace analysis requires nitric acid digestion and mercury samples are digested with nitric and sulfuric acid.

Lead, Arsenic, Selenium, Antimony and Thallium are analyzed by graphite furnace, Mercury by cold vapor AA and all other metals by flame AA or ICP.

Cyanide

The analysis of cyanide is based on Standard Methods, 16th Edition (412) and Test Methods for Evaluating Solid Waste (9010). The cyanide, as hydrocyanic acid (HCN) is released by refluxing the sample with strong acid. The hydrocyanic acid is then distilled into an absorber-scrubber containing sodium hydroxide solution. The cyanide ion concentration in the absorbing solution is then manually determined colorimetrically.

III QUALITY CONTROL

The Determinations were performed in accordance with EPA/NJDEP approved methodology.

DEFINITIONS

- ND(U) - Analyte was analyzed for, but not detected. The value given after the ND or U is the detection limit for that compound.
- A - The compound denoted with an "A" indicates a suspected aldol condensation product.
- B - Indicates the compound was also detected in the blank, but at levels less than 5X the detection limit. Values for this compound may be suspect
- J - Indicates the compound was detected in the sample, but at levels less than the detection limit. Results should be regarded as estimated.
- MS - Matrix Spike ug/L - Micrograms/Liter %Rec - Percent Recovery
- MSD - Matrix Spike Duplicate ug/Kg - Micrograms/Kilogram mg/L - Milligrams/Liter
- RPD - Relative Percent Difference mg/Kg - Milligrams/Kilogram DL - Detection Limit

QUALITY CONTROL WINDOWS

Surrogate Recoveries		
GC/MS Volatiles (624, 8240)	Water	Soil
D4-1,2-dichloroethane	76-114	70-121
D8-toluene	88-110	81-117
4-Bromofluorobenzene	86-115	74-121

Surrogate Recoveries		
GC/MS SemiVolatiles (625, 8270)	Water	Soil
D5-Nitrobenzene	35-114	23-120
2-Fluorobiphenyl	43-116	30-115
D14-Terphenyl	33-141	18-137
D5-Phenol	10-94	24-113
2-Fluorophenol	21-100	25-121
2,4,6-Tribromophenol	10-123	19-122

Surrogate Recoveries		
Pesticides* (608, 8080)	Water	Soil
Tetrachloro-m-xylene	60-150	60-150
Dibutyl chlorendate	24-154	20-150

Surrogate Recoveries		
Method 602, BTEX, 8020	Water	Soil
4-Bromofluorobenzene	62-139	62-138

* S-846 allows one surrogate to be outside recovery windows.

Surrogate Recoveries		
Method 601 (8010)	Water	Soil
Bromochloromethane	74-121	74-121

Surrogate Recoveries		
Method 8015	Water	Soil
Acetone	68-132	68-132

Surrogate Recoveries		
Method 8060**	Water	Soil
Tetrachloro-m-xylene	60-150	60-150
Decachlorobiphenyl	60-150	60-150

Surrogate Recoveries		
Herbicides**	Water	Soil
2,4-DB	60-150	60-150

** Advisory Limits

METALS / WET CHEMISTRY

	Recovery	RPD
Blank Spike	75-125	
Blank Spike Duplicate	75-125	<20%
Matrix Spike	75-125	
Matrix Spike Duplicate	75-125	<20%

	Recovery	RPD
Replicate		<20%
Check Standard	90-110	



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**ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD***

Reference Document No. 36376
Page 1 of 2

Project Name/No. 1 NAVY-EARLE Facility Colts Neck, N.J.
 Sample Team Members 2 B. Kuba
 Profit Center No. 3 3514
 Project Manager 4 Vanessa Devillez
 Purchase Order No. 6 _____
 Required Report Date 11 _____

Bill to: 5 ITES - Edison, NJ

Samples Shipment Date 7 1-15-92
 Lab Destination 8 ITAS - Edison, NJ
 Lab Contact 9 S. Voehl
 Project Contact/Phone 12 _____
 Carrier/Waybill No. 13 _____

Report to: 10 Vanessa Devillez

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
109171-A	I-1 (2.5-3') Soil	1-14-92	90cc dargl	902	N/P	TAL Metals + Cyanide	Good copy	
109170-A	I-2 (2.5-3')					(Al, Sb, As, Ba, Be, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Se, Sr, Tl, V, Zn)	FOR LAB USE ONLY	
109168-A	I-3 (2.5-3')							
109155-A	I-4 (2.5-3')							
109158-A	I-5 (2.5-3')							
109164-A	I-6 (2.5-3')							
109162-A	I-7 (2.5-3')							
109161-A	I-8 (2.5-3')							

Special Instructions: 23 Lot # 9869

Possible Hazard Identification: 24
 Non-hazard Flammable Skin Irritant Poison B Unknown
 Sample Disposal: 25
 Return to Client Disposal by Lab Archive _____ (mos.)

Turnaround Time Required: 26
 Normal Rush
 QC Level: 27
 I II III Project Specific (specify) TIER I

1. Relinquished by 28 <u>Beek R (ITC)</u> (Signature/Affiliation) Date: <u>1-15-92</u> Time: _____	1. Received by 28 <u>Peta Young ITASE</u> (Signature/Affiliation) Date: <u>1-15-92</u> Time: <u>1520</u>
2. Relinquished by (Signature/Affiliation) Date: _____ Time: _____	2. Received by (Signature/Affiliation) Date: _____ Time: _____
3. Relinquished by (Signature/Affiliation) Date: _____ Time: _____	3. Received by (Signature/Affiliation) Date: _____ Time: _____

Comments: 29 Lot # 9880



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No. ³⁰ 363768
Page 2 of 2

Project Name NAVY - EARLE Facility
Colts Neck, NJ

Project No. 529358

Samples Shipment Date 1-15-92

ONE CONTAINER PER LINE

Sample 14 Number	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre-19 servative	Requested Testing 20 Program	Condition on 21 Receipt	Disposal 22 Record No.
109160-A	I-9(2.5-3') Soil	1-14-92	clear gl.	9oz.	N/P	TAL Metals + Cyanide	Good 80 P.Y.	
109165-A	I-10(2.5-3')	}	}	}	}	}	}	}
109159-A	I-11(2.5-3')							
109166-A	I-12(2.5-3')							
109167-A	I-13(2.5-3')							
109156-A	I-15(2.5-3')							
109163-A	I-16(2.5-3')							
109169-A	I-17(2.5-3')							
109172-A	I-18 (2.5-3') 0.6"							
109181-A	I-19(0.6")							
109173-A	SD-1(0.6")							
109174-A	SD-2(0.6")							
109176-A	I-20(0.6")							
125688-A	F.B. - Water							
125688-B	F.B. - Water	}	Qt. pl.	Qt.	NaOH	Cyanide		
125688-C	F.B. - Water	}	Qt. pl.	Qt.	HNO ₃	Hg		
							}	}
							}	}
							}	}
							}	}