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NSWC CRANE
5090.3a



DEPARTMENT OF THE NAVY
NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA 47822-8000

IN REPLY REFER TO:
5090/H11.9
095
19 JUL 1991

Director, Waste Management Division
RCRA Permitting Branch (5HR-13)
U.S. Environmental Protection Agency, Region V,
Attn: Indiana Section (Ms. Carol Witt-Smith)
230 South Dearborn Street
Chicago, IL 60604

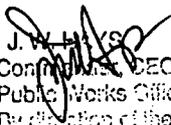
6-1-1991

Dear Ms. Witt-Smith:

Submitted for review is the final report for the Interim Measure Sampling of the Old Burn Pit, Solid Waste Management Unit (SWMU) # 05/03. The requirement for sampling and submittal of this report were set forth in the Interim Measures report submitted by Naval Weapons Support Center (NWSCC) to your office in August 1990.

NWSCC point of contact is Mr. Jim Hunsicker, Code 095, telephone 812-854-3233.

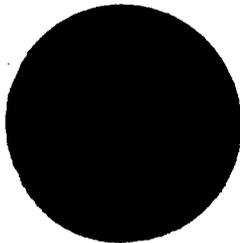
Sincerely,


J. W. HAYS
Commanding Officer, USN
Public Works Officer
By direction of the
Commanding Officer

Encl:

- (1) Interim Measure Sampling of the Old Burn Pit, SWMU #05/03
- (2) Certification Statement

Copy to:
NORTHNAVFACENCOM, Philadelphia (Code 1422) (w/o encl)
COMNAVSEASYSRON (SEA 6541) (w/o encl)
WES (w/o encl)



**INTERIM MEASURE SAMPLING
OF THE OLD BURN PIT, SWMU 05/03
FOR
NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA**

ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
1000 JORIE BOULEVARD, SUITE 250, OAK BROOK, ILLINOIS 60521 | 708/990-7200
OFFICES IN PRINCIPAL CITIES



ENCLOSURE (1)

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



SIGNATURE

PWO

TITLE

19 JUL 1991

DATE

Enclosure (2)

ES**ENGINEERING-SCIENCE**1000 JORIE BOULEVARD, SUITE 250
OAK BROOK, ILLINOIS 60521
(708) 990-7200

C0791CT13-20

July 2, 1991

Mr. Jeff Ciocco
Northern Division
Naval Facilities Engineering Command
U.S. Naval Base Building, 77-L
Philadelphia, Pennsylvania 19112-5094

Re: Final Report Interim Measure Sampling of the
Old Burn Pit, SWMU05103 for Naval Weapons Support
Center, Crane, Indiana

Dear Mr. Ciocco:

Enclosed please find four copies of the Interim Measure Sampling of the Old Burn Pit, SWMU05103 for the Naval Weapons Support Center in Crane, Indiana. As requested, we are also sending three copies to the Naval Weapons Support Center in Crane, Indiana.

The response to the EPA comments is included as Appendix F. The information given in the report was changed in two places. Some additional information has been included with the laboratory results.

Should you have questions or comments regarding this report, please call me at (708) 990-7200.

Very truly yours,
Engineering-Science, Inc.



Rhonda Yoder
Project Manager



Christopher F. Raddell, P.E.
Operations Manager

RY/CFR:ct
Enclosure
cc: File: CH054.01

June 24, 1991

**INTERIM MEASURE SAMPLING
OF THE OLD BURN PIT, SWMU 05/03
FOR
NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA**

JUNE 1991

Prepared By:

**Engineering-Science, Inc.
1000 Jorie Boulevard, Suite 250
Oak Brook, Illinois 60521**

CH054.01

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EXECUTIVE SUMMARY

Engineering-Science, Inc. (ES) was contracted to sample in and around drums at the Old Burn Pit, a solid-waste management unit (SWMU) 05/03 at the Naval Weapon Support Center (NWSC) in Crane, Indiana.

Engineering-Science personnel collected ten soil samples, eight from the surface around the drums and two from inside the drums. The drums were located in the gully to the north of the Old Burn Pit. The samples were submitted for laboratory analysis to determine if the drums contained hazardous material.

The laboratory analysis indicated the concentration of the toxicity characteristic compounds in the samples were all below regulatory limits set by the toxicity characteristic leaching procedure final rule. Federal Register, Volume 55, Number 61, March 29, 1990.

June 24, 1991

SECTION 1.0 INTRODUCTION

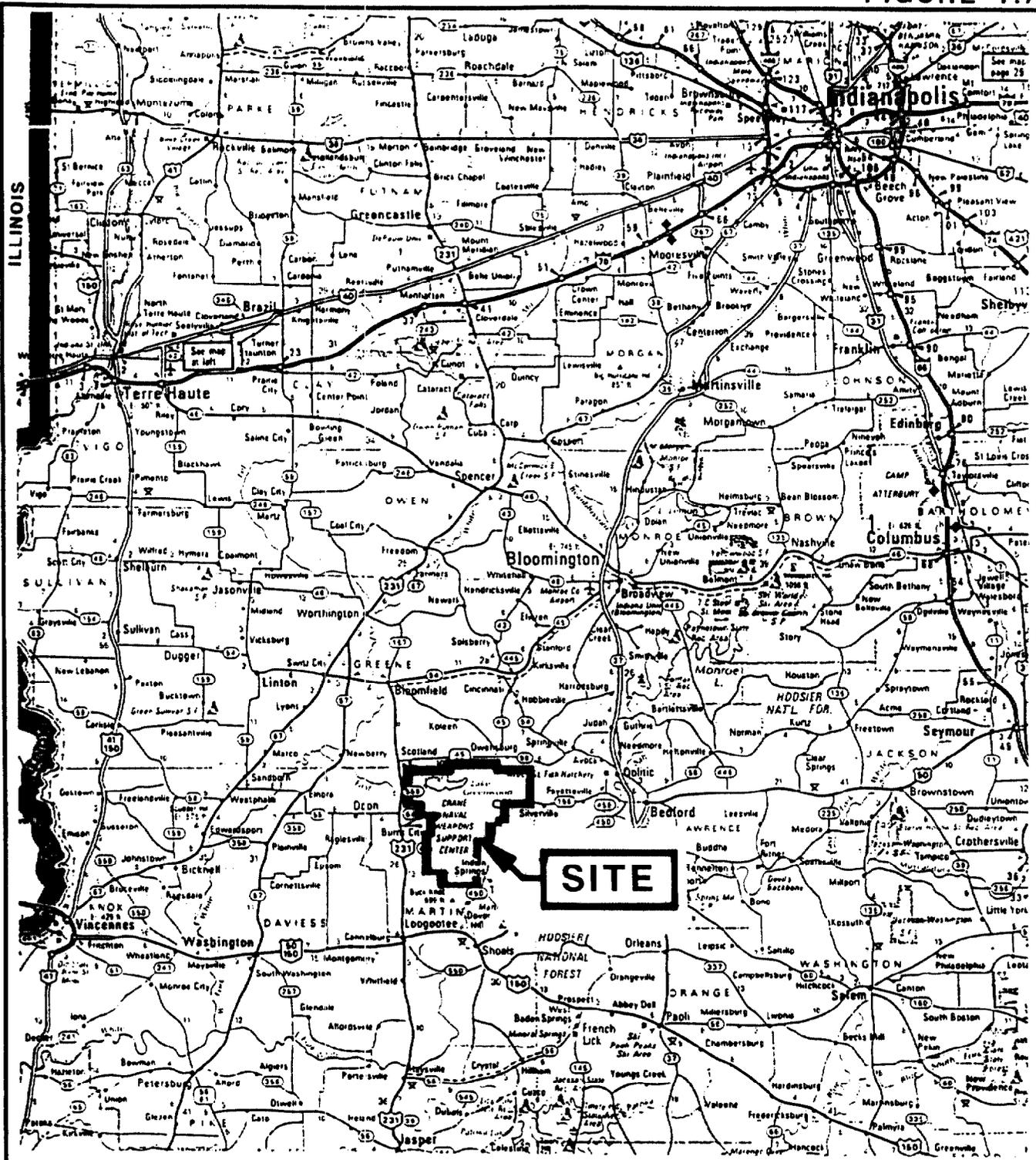
1.1 SITE DESCRIPTION AND HISTORY

Engineering-Science was contracted to provide sampling and analysis of the Old Burn Pit sediments as Amendment Number 7, Project Number 6 to Appendix "A" of Contract Number N62472-88-D-1449 with the Northern Division Naval Facility Command. The Old Burn Pit is a SWMU 05/03 at the facility. Sampling was conducted as an Interim Measure Corrective Action, part of the Resource Conservation and Recovery Act (RCRA) Storage Permit.

The NWSC in Crane, Indiana, is located in Martin County, approximately 75 miles southwest of Indianapolis and 71 miles northwest of Louisville, Kentucky. The location is shown in Figure 1.A, Vicinity Map. NWSC occupies approximately 100 square miles of improved grounds, unimproved grounds, and surface waters. The area is monitored with high security and not accessible to the public.

The site location, the Old Burn Pit valley, is located in the central portion of the facility in the northeast quarter of Section 8, Township 5 North, Range 4 West. The site is accessed using Crane Road H-331 off of Crane Road H-5. The site location is shown in Figure 1.B, Vicinity Map. The Old Burn Pit was active from 1942 to 1972. The pit was used to burn garbage such as wood, paper, building materials, and industrial waste. No ordnance items were disposed of in the Old Burn Pit. After garbage was burned in the pit, the ash, unburned debris, and scrap metal were pushed into the gully just north of the pit. The burn pit has been filled in and leveled off. The area is not covered by Crane Road H-451, and young evergreen trees. The gully to the north of the Old Burn Pit contains old waste drums and unburned debris. The gully is forested with deciduous trees and ground shrubs. The walls of the gully have been eroded and are now steep slopes. Figure 1.C shows the Old Burn Pit and the gully to the north. The gully is two distinct areas: the Main Gully and the East Gully. The Old Burn Pit valley will be referred to by the gullies.

The Old Burn Pit valley is surrounded by a natural network of hills and draws covered with deciduous trees and shrubs. The south and east sides of the gully consist of the artificially filled burn pit. The north and west sides of the gully are rolling hills which have eroded to steep slopes. The gully is southwest trending. The south wall is studded with old waste drums and scrap metal.

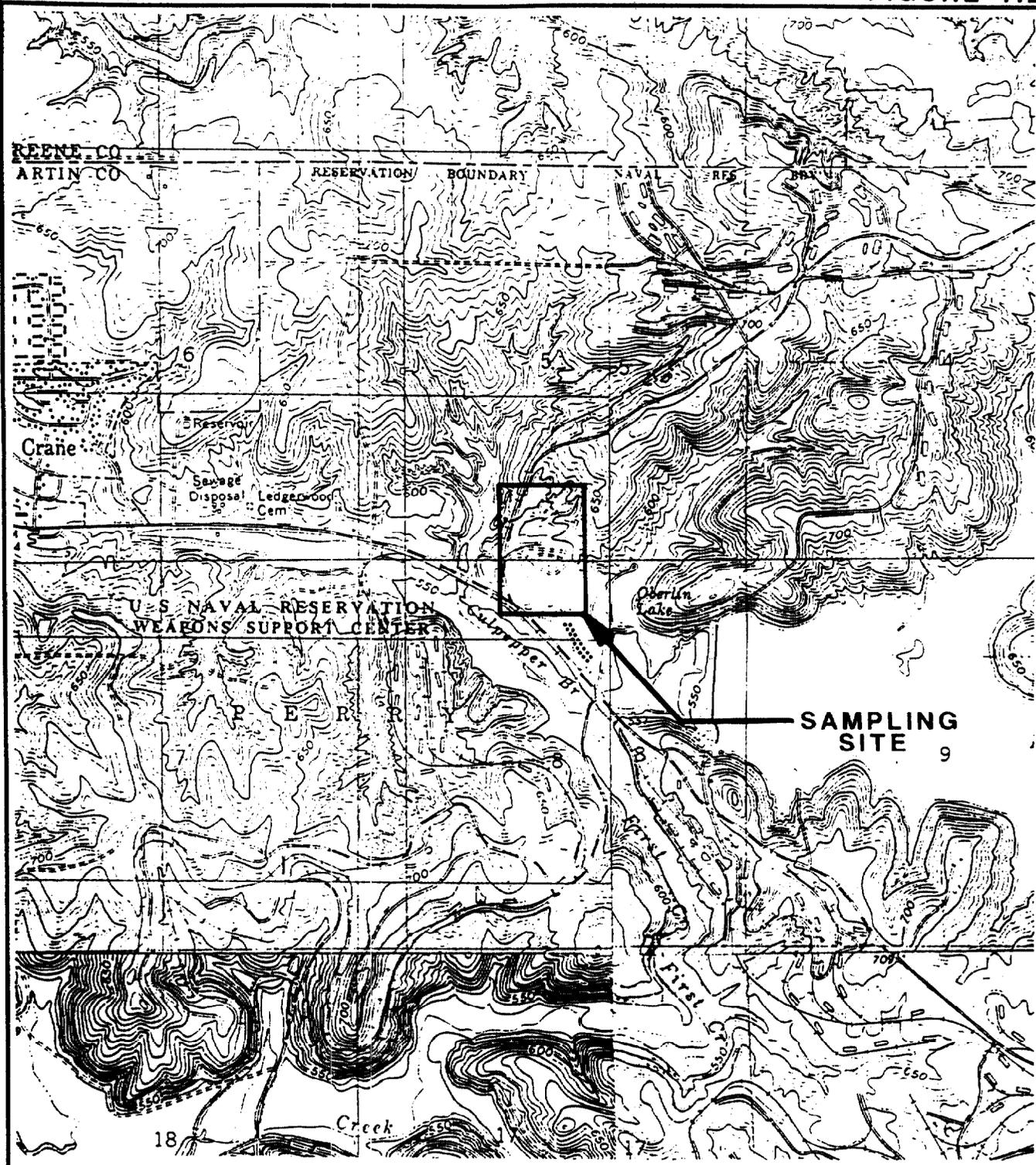


VICINITY PLAN

CRANE NAVAL WEAPONS
 SUPPORT CENTER
 INTERIM MEASURE SAMPLING
 OF THE OLD BURN PIT
 SWMU 05/03



NOT TO SCALE



SITE LOCATION MAP



SCALE 1" = 2000'

CRANE NAVAL WEAPONS
SUPPORT CENTER
INTERIM MEASURE SAMPLING
OF THE OLD BURN PIT
SWMU 05/03

5401SITE

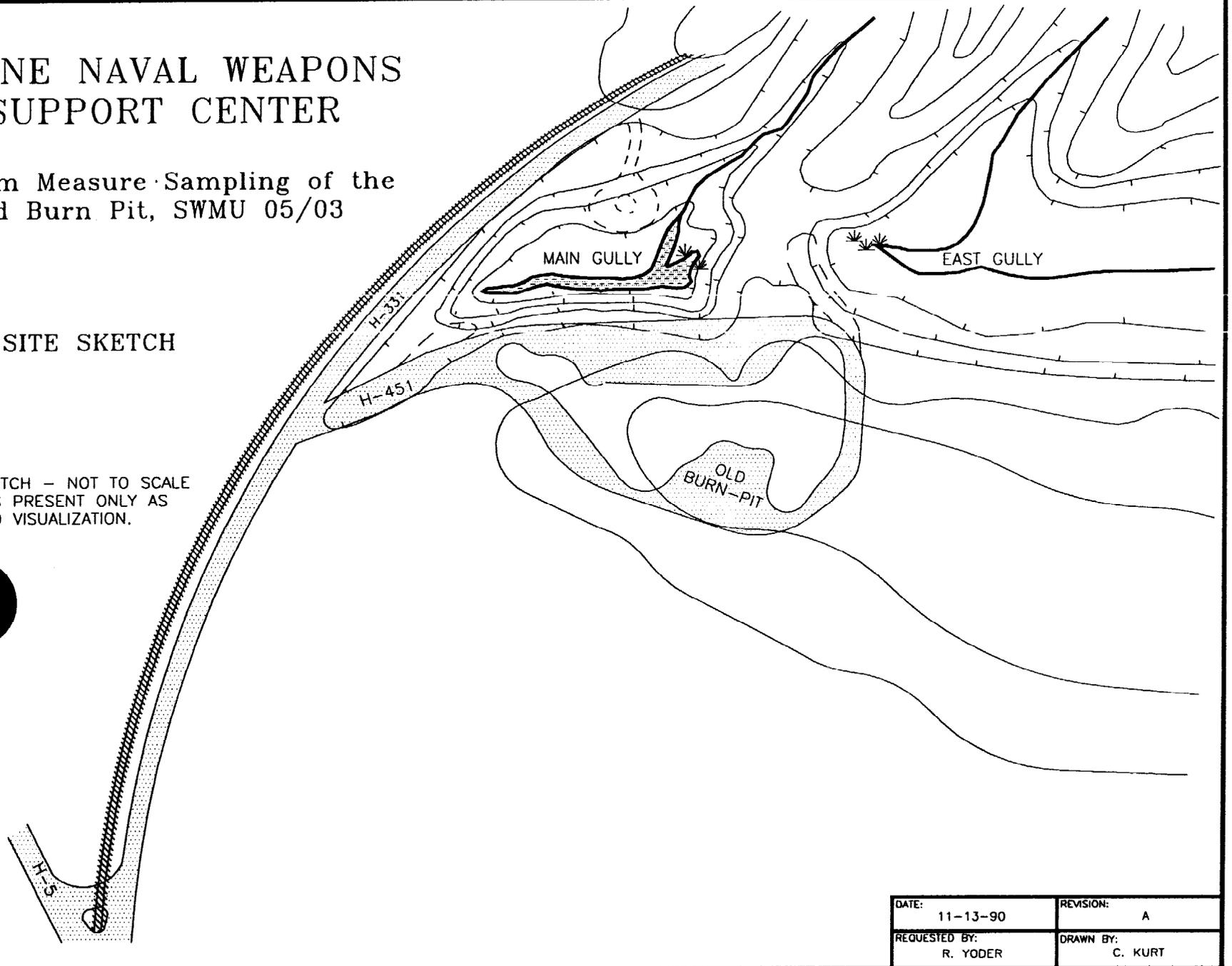
FIGURE 1.C

CRANE NAVAL WEAPONS SUPPORT CENTER

Interim Measure Sampling of the
Old Burn Pit, SWMU 05/03

SITE SKETCH

FIELD SKETCH - NOT TO SCALE
CONTOURS PRESENT ONLY AS
AN AID TO VISUALIZATION.



DATE: 11-13-90	REVISION: A
REQUESTED BY: R. YODER	DRAWN BY: C. KURT

CH054.01

ES ENGINEERING-SCIENCE

June 24, 1991

1.2 OBJECTIVE

The objective of this investigation was to collect data for support of the NWSC determination of the waste classification of the drums and adjacent soil in the Old Burn Pit valley. This was determined by collecting surface soil and drum content samples for the following analysis: Toxicity characteristic (TC), corrosivity, reactivity, explosivity, and polychlorinated biphenyls (PCBs).

The results of these analyses will be used by NWSC to determine if the drums and debris should be classified as a hazardous or a solid waste.

June 24, 1991

SECTION 2.0 FIELD ACTIVITIES

2.1 ARRIVAL ON SITE

Two ES employees arrived at the NWSC in Crane, Indiana, on October 11, 1990. Two representatives from The NWSC Environmental Protection Branch escorted the ES personnel to the Old Burn Pit valley. The sky was sunny and clear; the temperature was 45° Fahrenheit, and there was no wind.

2.2 INITIAL SITE ASSESSMENT

Before entering the gullies, ES personnel discussed the site history with The NWSC environmental representatives. The gullies were observed from above. There was no sign of stressed vegetation; there were no sheens visible on the stream; and there was no apparent discoloration of soil. Ambient air measurements were taken using a photoionization detector (PID). No volatile hydrocarbons were detected in the air from the east gully or the main gully with the PID. ES personnel decided to enter the gullies with Level D personal protection.

Two drums protruding from the east gully were chosen as sampling points 1 and 2. The drums were deteriorating and corroding at the bottoms. The sample points were flagged, numbered, and photographed. Sample points 2 through 10 were selected in the main gully. Locations such as the following were chosen: Downgradient of several drums, directly below a drum, below a wet area showing an oily sheen, and the stream bottom downstream of all the drums. The sample points were all flagged, numbered, and photographed. Figure 2.A shows the locations of the sample points. Table 2.A lists the sample points and gives a description of each point. Photographs of the sample points can be seen in Appendix B.

2.3 SAMPLING AND ANALYSIS

The sample collection was done on October 11, 1990. Samples were collected using long-handled stainless steel spoons. Disposable latex gloves were worn while sampling. The sampling spoon and the latex gloves were changed between each sample point. Before collecting each sample, the surface soil was scraped and removed to an approximate depth of three inches. The samples were collected in pre-cleaned laboratory-supplied bottles. The bottle type, the preservative, and the corresponding analysis are listed in Table 2.B. The sample was collected and firmly packed into each bottle. The bottles were labeled with the following information: Sample ID, project

CRANE NAVAL WEAPONS SUPPORT CENTER

Interim Measure Sampling of the
Old Burn Pit, SWMU 05/03

Soil Sampling Points

FIELD SKETCH - NOT TO SCALE
CONTOURS PRESENT ONLY AS
AN AID TO VISUALIZATION.



	RAILROAD TRACKS
	PAVED/GRAVEL ROADS
	DIRT ROADS
	CONTOUR - TICK IS DOWN-HILL
	STREAM
	STREAM/SWAMP
	SAMPLE POINT

DATE: 11-13-90	REVISION: B
REQUESTED BY: R. YODER	DRAWN BY: C. KURT

CH054.01

2-2

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TABLE 2.A
SAMPLE POINT DESCRIPTION

Sample ID	Description
NWSC SS001 S10/11/90	Material collected from inside drum; appeared to be soil.
NWSC SS002 S10/11/90	Material collected from inside drum; light in color, spongy, lightweight.
NWSC SS003 S10/11/90	Soil collected just below the vegetation covered surface, downgradient of a drum cluster.
NWSC SS004 S10/11/90	Soil collected just below the marshy surface at the base of southeast wall.
NWSC SS005 S10/11/90	Soil collected just below the surface downgradient of a drum cluster.
NWSC SS006 S10/11/90	Soil collected just below the surface, directly below a drum labeled "Dow Chlorothene."
NWSC SS007 S10/11/90	Soil collected just below the surface, beside a drum cluster, from an area exhibiting a sheen.
NWSC SS008 S10/11/90	Soil collected just below the surface, beside a drum cluster, from area exhibiting a sheen.
NWSC SS009 S10/11/90	Soil taken just below the surface, downgradient of a drum cluster.
NWSC SS010 S10/11/90	Sediments taken from the streambed downstream of all the drums.

TABLE 2.B
SAMPLE BOTTLE AND ANALYSIS

Analysis	Preservative	Bottle Type
Reactive cyanide Reactive sulfide pH Polychlorinated biphenyl (PCB)	ice 4° C.	500 ml clear glass, Teflon-lined cap, wide mouth.
Explosives	ice 4° C.	250 ml, amber glass, Teflon-lined cap, small mouth.
TCLP metals	ice 4° C.	500 ml, clear glass, Teflon-lined cap, wide mouth.
TCLP semi-volatiles	ice 4° C.	500 ml, clear glass, Teflon-lined cap, wide mouth.
TCLP pesticides	ice 4° C.	500 ml, clear glass, Teflon-lined cap, wide mouth.
TCLP herbicides	ice 4° C.	500 ml, clear glass, Teflon-lined cap, wide mouth.
TCLP volatiles	ice 4° C.	250 ml, clear glass, Teflon-lined cap, wide mouth.

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number, analysis type, and sampling time. The bottles were immediately capped and wrapped for shipping. Each bottle was individually wrapped and enclosed in a plastic bag. The samples were placed into ice coolers, with ice for preservation. Chain-of-custody documentation was filled out and taped to the lid of each ice cooler. ~~Copies of the chain-of-custody documentation was filled out and taped to the lid of each cooler.~~ Copies of the chain-of-custody papers are shown in Appendix C. along with the laboratory results. Table 2.C lists the analytical methods requested on the chain-of-custodies.

The samples were sent to two analytical laboratories. Wadsworth/ALERT Laboratories, Inc. in North Canton, Ohio, completed the toxicity characteristic leaching procedure (TCLP) analysis, the reactivity analysis, the polychlorinated biphenyl (PCB) analysis, and the corrosivity determination. An aliquot of the sample was also sent to Weston Analytics in Lionville, Pennsylvania, for explosive compound analysis. The analysis was divided between two laboratories in order to obtain a lower analytical cost.

TABLE 2.C
METHODOLOGIES

TITLE⁽¹⁾	ANALYTICAL METHOD
Soil pH	SW846 9045
Reactive cyanide	SW846 Section 7.3.3.2
Reactive sulfide	SW846 Section 7.3.4.1
Polychlorinated biphenyls	SW846 8080
Toxicity characteristic extraction procedure	SW846 1311 (55 FR 26986)
Toxicity characteristic volatile organics	SW846 8240
Toxicity characteristic semi-volatile organics	SW846 8270
Toxicity characteristic pesticides	SW846 8080
Toxicity characteristic herbicides	SW846 8150
Toxicity characteristic metals:	
Silver	SW846 6010
Arsenic	SW846 7060
Barium	SW846 6010
Cadmium	SW846 6010
Chromium	SW846 6010
Mercury	SW846 7470
Lead	SW846 6010
Selenium	SW846 7740
Explosives	LW02 (HPLC)

(1) A list of individual parameters for each Method is given in Table 3.2.

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SECTION 3.0 INTRODUCTION

3.1 ANALYTICAL RESULTS

The analytical results are tabulated in the following section. The results of reactivity, corrosivity, and PCBs are shown in Table 3.1.A. Reactive sulfide was detected in two of the samples collected. Concentrations of all these parameters in the samples collected were below United States Environmental Protection Agency (USEPA) regulatory limits.

Table 3.1.B lists the results for the heavy metal analysis in the TCLP extracts. Barium was detected in six of the samples collected. Cadmium was detected in one of the samples collected. Lead was detected in three of the samples. All of the metal concentrations were below USEPA regulatory limits.

Table 3.1.C lists the results of the pesticide analysis in the TCLP extracts. Pesticides were not detected in any of the samples collected.

Table 3.1.D lists the results of the herbicide analysis in the TCLP extracts. There were no herbicides detected in any of the samples collected. Table 3.1.E lists the results of the volatile organic compound analysis on the TCLP extracts. Methyleneethyl ketone was detected in one of the samples. All of the volatile compounds were below regulatory limits.

Table 3.1.F lists the results of the semi-volatile organic compound analysis on the TCLP extracts. Semi-volatile organic compounds were detected in the samples collected.

Table 3.1.G lists the results of the explosive compound analysis on the soil samples. There were no explosive compounds detected in the soil samples collected.

3.2 USEPA REGULATORY LIMITS

A listing of the parameters analyzed for and their regulatory limits is showing in Table 3.2.

3.3 QUALITY CONTROL

3.3.1 Heavy Metals

All samples were extracted according to the TCLP extraction procedure within the allowed holding times. The shortest holding time is Mercury at 28 days. All samples were then analyzed within the allowed holding times. The shortest holding time is Mercury again at 28 days.

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TABLE 3.1A

REACTIVITY, CORROSIVITY, AND PCB CONCENTRATIONS
IN SOIL⁽¹⁾

COMPOUND	REG LEVEL	BLANK	SS001 (mg/kg) ⁽²⁾	SS002 (mg/kg)	SS003 (mg/kg)	SS004 (mg/kg)	SS005 (mg/kg)	SS006 (mg/kg)	SS007 (mg/kg)	SS008 (mg/kg)	SS009 (mg/kg)	SS010 (mg/kg)
Reactive cyanide	250	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Reactive sulfide	500	<50	<50	<50	<50	<50	<50	76	94	<50	<50	<50
pH	<2 or >12	7	6	7	6	6	6	6	6	7	7	6
Total PCBs	50	<1	2H	<1H								

(1) Sample locations are shown in Figure 2.A.

(2) mg/kg = milligrams per kilogram

H Value biased low due to missed holding time, holding time for soil is undefined, the holding time for water was applied. Please see Quality Control 3.3.

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TABLE 3.1.B
HEAVY METAL CONCENTRATIONS
IN TCLP EXTRACT

COMPOUND COMPOUND	REG LEVEL	BLANK	SS001 (mg/l) ⁽¹⁾	SS002 (mg/l)	SS003 (mg/l)	SS004 (mg/l)	SS005 (mg/l)	SS006 (mg/l)	SS007 (mg/l)	SS008 (mg/l)	SS009 (mg/l)	SS010 (mg/l)
Silver	5.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	100	<0.1	2.6	<0.1	<0.1	<0.1	<0.1	0.3	1.2	1.6	1.2	1.1
Cadmium	1.0	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	5.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury	0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	5.0	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.2
Selenium	1.0	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

(1) mg/l = milligrams per liter

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TABLE 3.1.C

PESTICIDE CONCENTRATIONS
IN TCLP EXTRACT⁽¹⁾

COMPOUND	REG LEVEL	BLANK	SS001 ($\mu\text{g}/\ell$) ⁽²⁾	SS002 ($\mu\text{g}/\ell$)	SS003 ($\mu\text{g}/\ell$)	SS004 ($\mu\text{g}/\ell$)	SS005 ($\mu\text{g}/\ell$)	SS006 ($\mu\text{g}/\ell$)	SS007 ($\mu\text{g}/\ell$)	SS008 ($\mu\text{g}/\ell$)	SS009 ($\mu\text{g}/\ell$)	SS010 ($\mu\text{g}/\ell$)
Lindane	400	<0.05	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlordane	30	<0.5	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Endrin	20	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	8	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	8	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxy- chlor	10,000	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toxaphene	500	<1.0	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

(1) Sample locations are shown in Figure 2.A.

(2) $\mu\text{g}/\ell$ = micrograms per liter.

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TABLE 3.1.D
HERBICIDE CONCENTRATIONS
IN TCLP EXTRACT⁽¹⁾

COMPOUND	REG LEVEL	BLANK	SS001 (mg/l) ⁽²⁾	SS002 (mg/l)	SS003 (mg/l)	SS004 (mg/l)	SS005 (mg/l)	SS006 (mg/l)	SS007 (mg/l)	SS008 (mg/l)	SS009 (mg/l)	SS010 (mg/l)
2,4-D	10	<0.02	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2,4,5-TP	1.0	<0.004	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006

- (1) Sample locations are shown in Figure 2.A.
(2) mg/l = milligrams per liter.

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TABLE 3.1.E
VOLATILE ORGANIC COMPOUND CONCENTRATIONS
IN TCLP EXTRACT⁽¹⁾

COMPOUND	REG LEVEL	BLANK	SS001 (mg/l) ⁽²⁾	SS002 (mg/l)	SS003 (mg/l)	SS004 (mg/l)	SS005 (mg/l)	SS006 (mg/l)	SS007 (mg/l)	SS008 (mg/l)	SS009 (mg/l)	SS010 (mg/l)
Benzene	0.5	<0.005	<0.01	<0.007	<0.006	<0.006	<0.006	<0.028	<0.006	<0.006	<0.006	<0.006
Carbon tetra- chloride	0.5	<0.005	<0.01	<0.007	<0.006	<0.006	<0.006	<0.028	<0.006	<0.006	<0.006	<0.006
Chlorobenzene	100	<0.005	<0.01	<0.006	<0.005	<0.005	<0.005	<0.025	<0.005	<0.006	<0.006	<0.006
Chloroform	6.0	<0.005	<0.01	<0.006	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005
1,2-Dichloro- ethane	0.5	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.023	<0.005	<0.005	<0.005	<0.005
1,1-Dichloro- ethylene	0.7	<0.005	<0.01	<0.007	<0.006	<0.006	<0.006	<0.028	<0.006	<0.006	<0.006	<0.006
Methylethyl ketone	200	<0.05	<0.1	<0.05	<0.04	<0.04	<0.04	0.45	<0.04	<0.04	<0.04	<0.04
Tetrachloro- ethene	0.7	<0.005	<0.01	<0.006	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005
Trichloro- ethene	0.5	<0.005	<0.01	<0.006	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005
Vinyl chloride	0.2	<0.01	<0.02	<0.011	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.005

(1) Sample locations are shown in Figure 2.A.

(2) Mg/l = milligrams per liter.

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TABLE 3.1.F

SEMI-VOLATILE ORGANIC COMPOUND CONCENTRATIONS
IN TCLP EXTRACT⁽¹⁾

COMPOUND	REG LEVEL	BLANK	SS001 (mg/l) ⁽²⁾	SS002 (mg/l)	SS003 (mg/l)	SS004 (mg/l)	SS005 (mg/l)	SS006 (mg/l)	SS007 (mg/l)	SS008 (mg/l)	SS009 (mg/l)	SS010 (mg/l)
Cresol	200.0	<0.004	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichloro- benzene	7.5	<0.004	<0.7H	<0.7	<0.7H	<0.7H	<0.7H	<0.7	<0.7H	<0.7	<0.7	<0.7
2,4-Dinitro- toluene	0.13	<0.004	<0.08H	<0.08	<0.08H	<0.08H	<0.08H	<0.08	<0.08H	0.08	<0.08	<0.08
Hexachloro- benzene	0.13	<0.004	<0.05H	<0.05	<0.05H	<0.05H	<0.05H	<0.05	<0.05H	<0.05	<0.05	<0.05
Hexachloro- 1,3-butadiene	0.5	<0.004	<0.07H	<0.07	<0.07H	<0.07H	<0.07H	<0.07	<0.07H	<0.07	<0.07	<0.07
Hexachloro- ethane	3.0	<0.004	<0.06H	<0.06	<0.06H	<0.06H	<0.06H	<0.06	<0.06H	<0.06	<0.06	<0.06
Nitrobenzene	2.0	<0.004	<0.06H	<0.06	<0.06H	<0.06H	<0.06H	<0.06	<0.06H	<0.06	<0.06	<0.06
Penta-chloro phenol	100	<0.004	<1.2H	<1.2	<1.2H	<1.2H	<1.2H	<1.2	<1.2H	<1.2	<1.2	<1.2
Pyridine	5.0	<0.004	<0.06H	<0.06	<0.06H	<0.06H	<0.06H	<0.06	<0.06H	<0.06	<0.06	<0.06
2,4,5-trichloro- phenol	400.0	<0.004	<0.1H	<0.1	<0.1H	<0.1H	<0.1H	<0.1	<0.1H	<0.1	<0.1	<0.1
2,4,6-trichloro- phenol	2.0	<0.004	<0.1H	<0.1	<0.1H	<0.1H	<0.1H	<0.1	<0.1H	<0.1	<0.1	<0.1

(1) Sample locations are shown in Figure 2.A.

(2) mg/l = milligrams per liter.

H Value biased low due to missed holding time. Please see Quality Control 3.3.

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TABLE 3.1.G
EXPLOSIVE COMPOUNDS
IN SOIL⁽¹⁾

COMPOUND	BLANK	SS001 (mg/kg) ⁽²⁾	SS002 (mg/kg)	SS003 (mg/kg)	SS004 (mg/kg)	SS005 (mg/kg)	SS006 (mg/kg)	SS007 (mg/kg)	SS008 (mg/kg)	SS009 (mg/kg)	SS010 (mg/kg)
HMX	<127	<6.35	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27	<1.27
RDX	<0.98	<4.90	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
1,3,5-TNB	<2.09	<10.40	<2.09	<2.09	<2.09	<2.09	<2.09	<2.09	<2.09	<2.09	<2.09
1,3-DNB	<0.59	<2.05	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59
Nitrobenzene	<0.42	<2.10	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42
Tetryl	<5.00	<25.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
2,4,6-TNT	<1.92	<4.60	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
2,6-DNT	<0.40	<2.00	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-DNT	<0.42	<2.10	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42

(1) Sample locations are shown in Figure 2.A.

(2) mg/kg = milligrams per kilogram.

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TABLE 3.2
USEPA
REGULATORY LIMITS

Parameter	Regulatory Limit	Reference Source
pH	<2 or >12	40 CFR Part 261
Reactive Cyanide	250 ppm	40 CFR Part 261
Reactive Sulfide	500 ppm	40 CFR Part 261
PCBs	50 ppm	TSCA
Heavy Metals		FR, Vol. 55, No. 61, 03/29/90
Arsenic	5.0 ppm	
Barium	100.0 ppm	
Cadmium	1.0 ppm	
Chromium	5.0 ppm	
Mercury	0.2 ppm	
Lead	5.0 ppm	
Silver	5.0 ppm	
Selenium	1.0 ppm	
Pesticides		FR, Vol. 55, No. 61, 03/29/90
Chlordane	0.03 ppm	
Endrin	0.02 ppm	
Heptachlor	0.008 ppm	
Lindane	0.4 ppm	
Methoxychlor	10.0 ppm	
Toxaphene	0.5 ppm	
Herbicides		FR, Vol. 55, No. 61, 03/29/90
2,4-D	10.0 ppm	
2,4, 5-TP	1.0 ppm	
Volatile Compounds		FR, Vol. 55, No. 61, 03/29/90
Benzene	0.5 ppm	
Carbon tetrachloride	0.5 ppm	
Chlorobenzene	100.0 ppm	
Chloroform	6.0 ppm	
1,2-Dichloroethane	0.5 ppm	
1,1-Dichloroethylene	0.7 ppm	
Methylethyl ketone	200.0 ppm	
Tetrachloroethylene	0.7 ppm	
Vinyl chloride	0.2 ppm	

TABLE 3.2
(continued)USEPA
REGULATORY LIMITS

Parameter	Regulatory Limit	Reference Source
Semi-Volatile Compounds		FR, Vol. 55, No. 61, 03/29/90
o-Cresol	200.0 ppm	
m-Cresol	200.0 ppm	
p-Cresol	200.0 ppm	
Cresol	200.0 ppm	
1,4-Dichlorobenzene	7.5 ppm	
2,4-Dinitrotoluene	0.13 ppm	
Hexachlorobenzene	0.13 ppm	
Hexachloro-1,3-butadiene	0.5 ppm	
Hexachloroethane	3.0 ppm	
Nitrobenzene	2.0 ppm	
Pentachlorophenol	100.0 ppm	
Pyridine	5.0 ppm	
2,4,5-Trichlorophenol	400.0 ppm	
2,4,6-Trichlorophenol	2.0 ppm	

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The minimum of one blank using the same extraction fluid as the samples were analyzed. There were no metal concentrations detected in the blank.

A matrix spike was performed on SS007. The bias determined by The matrix spike was used to correct the measured heavy metal values. The percent recoveries from the matrix spike were acceptable. The percent recoveries are shown in Table 3.3, Heavy Metals.

The laboratory control sample and the laboratory control sample duplicate were within acceptable Quality Control (QC) advisory limits. The relative percent difference of the laboratory control sample duplicate is shown in Table 3.3, Heavy Metals.

3.3.2 Volatile Compounds

All samples were extracted according to the TCLP extraction procedure within the allowed holding time of 14 days. All samples were then analyzed within the allowed 14 days.

All samples and the blank were spiked with 1,2-Dichloroethane. Toluene-d8 and Bromofluorobenzene as surrogates. All surrogate percent recoveries were within the given QC advisory limits. The percent recoveries and the corresponding QC advisory limits are shown in Table 3.4, Volatile Compounds.

A matrix spike was performed on SS007. The bias determined by The matrix spike was used to correct the measured volatile compound values. The percent recoveries from The matrix spike were acceptable. The percent recoveries are shown in Table 3.3, Volatile Organic Compounds.

The laboratory control sample and the laboratory control sample duplicate were within acceptable advisory limits. The relative percent difference of the laboratory control sample duplicate is shown in Table 3.3, Volatile Organic Compounds.

3.3.3 Semi-Volatile Herbicides

All samples were extracted according to the TCLP extraction procedure within the allowed holding time of 14 days. All leachate samples were then extracted for herbicide analysis within the allowed seven days.

All samples and the blank were spiked with 2,4-DB as a surrogate. All surrogate present recoveries were within the given QC advisory limits. The percent recoveries and the corresponding QC advisory limits are shown in Table 3.4, Herbicide.

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TABLE 3.3
LABORATORY QUALITY CONTROL

COMPOUND	% RECOVERY	RELATIVE % DIFFERENCE
Heavy Metals		
Arsenic	99	2.1
Barium	90	2.1
Cadmium	82	2.1
Chromium	84	1.0
Lead	82	1.0
Mercury	110	*
Selenium	77	21.3
Silver	84	2.1
Pesticides		
Lindane	63	1.8
Chlordane	74	4.6
Endrin	109	1.7
Heptachlor	85	6.2
Heptachlor epoxide	102	6.2
Methoxychlor	72	2.2
Toxaphene	114	0
Herbicides		
2,4,-D	76	20.4
2,4,5-TP	70	15.4
Volatile Organic Compounds		
Benzene	90	2.0
Carbon Tetrachloride	90	2.2
Chlorobenzene	100	0.9
Chloroform	100	1.9
1,2-Dichloroethane	110	3.4
1,1-Dichloroethylene	90	2.7
Methylethyl ketone	120	2.2
Tetrachloroethene	100	1.0
Trichloroethene	100	2.8
Vinyl chloride	110	7.3
Semi-Volatile Organic Compounds		
Cresol	35	24.6
2,4-Dinitrotoluene	48	13.3
1,4-Dichlorobenzene	55	7.1
Hexachlorobenzene	76	8
Hexachloro-1,3-butadiene	59	5.5
Nitrobenzene	67	5.7
Pentachlorophenol	16	11.3
Pyridine	60	11.3
2,4,5-Trichlorophenol	34	1.4
2,4,6-Trichlorophenol	36	1.4
Explosive Compounds		
HMX	81	6.4
RDX	77	2.6
1,3,5-TNB	74	1.4
1,3-DNB	75	1.3
Nitrobenzene	75	5.5
Tetryl	37	7.8
2,4,6-TNT	109	16.9
2,6-DNT	80	5.1
2,4-DNT	77	2.6
Polychlorinated Biphenyls		
PCB	103	3.9

* Laboratory accident.

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TABLE 3.4
SURROGATE RECOVERIES⁽¹⁾

SURROGATE	SS001	SS002	SS003	SS004	SS005	SS006	SS007	SS008	SS009	SS010	CONTROL LIMITS
<u>Pesticide</u>											
Dibutylchlorodate	30	32	44	42	71	39	34	41	52	35	24-54
<u>Herbicide</u>											
2,4-DB	81	94	95	88	88	93	877	100	96	92	48-131
<u>Volatile Compounds</u>											
1,2-Dichloroethane	109	105	103	105	107	94	104	106	104	106	76-114
Toluene-d8	97	96	94	98	97	96	96	100	98	97	8-110
Bromofluorobenzene	107	100	102	100	100	98	101	100	99	101	86-115
<u>Base Neutral Acids</u>											
Nitrobenzene	23*	66	60	65	66	60	52	50	61	52	35-114
Fluorobiphenyl	70	60	65	71	66	59	67	57	60	62	43-116
Terphenyl-d14	77	90	59	66	73	96	53	90	88	93	33-114
2-Fluorophenol	59	50	47	57	59	48	26	37	37	7*	21-100
Phenol-d5	64	35	49	59	61	34	28	27	27	5*	10-94
2,4,6-Tribromophenol	69	71	37	64	69	75	30	40	57	0*	10-125

* Recovery out of laboratory control limits.

(1) Units are all in Percent Recoveries.

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A matrix spike was performed on SS007. The bias determined by the matrix was used to correct the measured semi-volatile herbicide values. The percent recoveries from the matrix spike were acceptable. The percent recoveries are shown in Table 3.3, Herbicides.

The laboratory control sample and the laboratory control sample duplicate were within acceptable QC advisory limits. The relative percent difference of the laboratory control sample duplicate is shown in Table 3.3, Herbicides.

3.3.4 Semi-Volatile Pesticides

All samples were extracted according to the TCLP extraction procedure within the allowed holding time of 14 days. All leachate samples were then extracted for pesticide analysis within the allowed seven days.

All samples and the blank were spiked with dibutylchlorendate as a surrogate. All surrogate percent recoveries were within the given QC advisory limits. The percent recoveries and the corresponding QC advisory limits are shown in Table 3.4, Pesticide.

A matrix spike was performed on SS001. The bias determined by The matrix was used to correct the measured semi-volatile values. The percent recoveries from the matrix spike were acceptable. The percent recoveries are shown in Table 3.3, Pesticides.

The laboratory control sample and the laboratory control sample duplicate were within acceptable QC advisory limits. The relative percent difference of the laboratory control sample duplicate is shown in Table 3.3, Pesticides.

3.3.5 Semi-Volatile Base/Neutral/Acids

All samples were extracted according to the TCLP extraction procedure within the allowed holding time of 14 days. All leachate samples were then extracted for Base, Neutral, Acid (BNA) spiking compounds. The following samples were inadvertently spiked: SS001, SS003, SS004, SS005, and SS007.

Following and on page 3-14 is a list of the levels the samples were spiked at:

Cresol (o, m, & p)	0.80 milligrams per liter (mg/l)
1,4-Dichlorobenzene	0.40 mg/l
2,4-Dinitrotoluene	0.10 mg/l
Hexachlorobenzene	0.10 mg/l
Hexachlorobutadiene	0.40 mg/l
Hexachloroethane	0.40 mg/l

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Nitrobenzene	0.10 mg/ℓ
Pentachlorophenol	0.40 mg/ℓ
Pyridine	0.20 mg/ℓ
2,4,5-Trichlorophenol	0.40 mg/ℓ
2,4,6-Trichlorophenol	0.40 mg/ℓ

The laboratory results from these spiked samples is included as Appendix D "Supplemental Laboratory Data." The results from these five samples are tabulated in Table 3.5. The quantities detected were all below regulatory limits. The detectable amount of these compounds is explained by The amount of spike added. These five leached samples were then re-extracted for BNA analysis without the added spike. The results from the re-extracted samples are included in Appendix C with the complete laboratory report. These results are biased low due to the missed holding time on the re-extraction, and are appropriately flagged in the data, Table 3.1.F.

All samples and the blank were spiked with the following compounds as surrogates: Nitrobenzene-d5, fluorobiphenyl, terphenyl-d14, 2-fluorophenol, phenol-d5, and 2,4,5-tribromophenol. Two samples showed surrogate recoveries outside of the given QC advisory limits. Samples SS001 showed one surrogate recovery low, and sample SS010 showed three surrogates recovering low. The percent recoveries and the corresponding QC advisory limits are shown in Table 3.4, Base Neutral Acids. The low recoveries are flagged with an asterisk. The results in the complete laboratory report found in Appendix C for sample SS010 represent a re-extraction that was completed after the allowed holding time. The re-extraction was completed due to the three acid surrogates that recovered outside of QC advisory control limits. The original extraction data that was extracted within the allowed holding time is included in Appendix D, "Supplemental Laboratory Data." The data found in Tables 3.1.A through 3.1.G and Table 3.4 represent the original extraction. The surrogates are appropriated flagged in Table 3.4.

A matrix spike was performed on SS007. The bias determined by the matrix was used to correct the measured semi-volatile BNA values. The percent recoveries from the matrix spike were acceptable. The percent recoveries are shown in Table 3.3, Semi-Volatile Organic Compounds.

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The laboratory control sample and the laboratory control sample duplicate were within acceptable QC advisory limits. The relative percent difference of the laboratory control sample duplicate is showing in Table 3.3, Semi-Volatile Organic Compounds. A laboratory blank was analyzed with the batch and no BNA compounds were detected in the blank.

3.3.6 Explosive

All samples were extracted for high pressure liquid chromatography (HPLC) analysis within seven days.

A method blank was analyzed with the sample batch and no explosive compounds were detected in the blank.

A matrix spike/matrix spike duplicate was analyzed on SS008. The percent recoveries and the relative percent differences were acceptable. The percent recoveries and relative percent differences are shown in Table 3.3, Explosive Compounds.

3.3.7 Polychlorinated Biphenyls

All of the samples were extracted for PCB analysis 15 days after collection. There is no specific guidance for a PCB holding time in a non-aqueous matrix. The recommended holding time in an aqueous matrix is 14 days. Following the guidelines for water, all of the PCB results are being flagged as "biased low due to a missed holding time."

A matrix spike/matrix spike duplicate was reported for the batch. The percent recovery and the relative percent difference were within QC advisory limits. The percent recovery and the relative difference are shown in Table 3.3, Polychlorinated.

A laboratory blank was analyzed with the batch of samples. No PCBs were detected in the laboratory blank.

3.3.8 General

There is no specific guidance for the holding time of pH in a non-aqueous matrix. The recommended holding time in an aqueous matrix is 24 hours. The non-aqueous soil samples were analyzed for pH within 48 hours of sample collection.

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**APPENDIX A
DEFINITION OF TERMS**

June 24, 1991

DEFINITION OF TERMS

ATHAMA	Army Toxic and Hazardous Materials Agency
Relative Percent Difference	A duplicate is used during laboratory analysis to monitor precision. A sample is analyzed twice and the difference in the two values is divided by their average and multiplied by 100. This indicates the precision of the method on a specific batch or matrix.
Matrix Spike	An aliquot of a sample is spiked with a known amount of analyte and prepared and analyzed according to the method. The recovery of the spike is used to indicate matrix interference and accuracy for each parameter.
PPM	Parts per million. For most dilute aqueous samples one part per million is equal to one milligram per liter. In soil samples one part per million is equal to one milligram per kilogram.
Surrogate	A surrogate standard is a compound which is chemically similar to those being analyzed for by gas chromatography/mass spectrometry (GC/MS). The surrogate is added to each sample to monitor the efficiency of preparation and analysis. If surrogate criteria are not met, re-preparation and re-analysis are done.
SW846	A series of analytical methods designed to be flexible enough to encompass any sample matrix by a "build a method" approach.
TCLP	Toxicity Characteristic Leaching Procedure taken from the Federal Register, Volume 55, Number 61, March 29, 1990.
TSCA	Toxic Substance Control Act regulates certain polychlorinated biphenyl waste.

June 24, 1991

**APPENDIX B
PHOTOGRAPHS**

June 24, 1991

**APPENDIX C
LABORATORY RESULTS**

C0691CP14-1REV3

MEMORANDUM

June 24, 1991

TO: Project File

FROM: Rhonda L. Yoder

SUBJECT: Naval Weapons Support Center
Crane, Indiana
Amendment to Chain-of-Custody Records
Interim Measure Sampling of the Old Burn Pit

The Solid Waste Management Unit 05/03 should be noted with the following chain-of-custody documents:

Engineering-Science, Inc., Oak Brook, Illinois chain-of-custody forms 1165, 1166, 1167, and 1170.

The aforementioned chain-of-custody forms are filed with ES Project File Number CH054.01.

RLY:cmp

cc: File: CH054.01



WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Dr. N.W.
North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. CH054.01

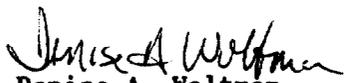
CRANE NWSC

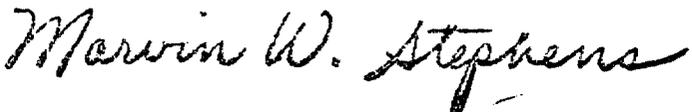
Presented to :

RHONDA YODER

ENGINEERING SCIENCE INC.

WADSWORTH/ALERT LABORATORIES, INC.

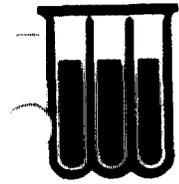

Denise A. Woltman
Project Manager


Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

November 16, 1990



CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Pittsburgh, Pennsylvania (412) 826-5477
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE (216) 497-9338



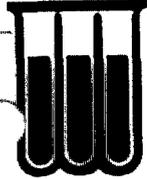
WADSWORTH/ALERT
LABORATORIES, INC.

NARRATIVE

The following report contains the analytical results for ten solid samples submitted to Wadsworth/ALERT Laboratories, Inc. by Engineering Science Inc. from the Crane NWSC Site, project number CH054.01. The samples were received on October 13, 1990, according to documented sample acceptance procedures.

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the rear of the report.

Analytical results for these samples were corrected for analytical bias as required under Section 8.2.5 of Method 1311 (TCLP) which was added by a technical correction to the Toxicity Characteristic (TC) Final Rule June 29, 1990 (55 FR 26986). Samples were divided into analytical batches based on client request and a client-designated sample received a total analyte matrix spike. Results were corrected for analytical bias if the results did not exceed the regulatory levels set forth in 40 CFR part 261.24, Table I: Maximum Concentration of Contaminants for the Toxicity Characteristics. For results that exceeded the regulatory level analytical bias correction need not be applied as per Section 8.2.5.



WADSWORTH/ALERT
LABORATORIES, INC.

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

<u>Parameters</u>	<u>Methods</u>
Volatile Organic Compounds	SW846 8240
Base/Neutral/Acid Compounds	SW846 8270
Pesticides	SW846 8080
Polychlorinated Biphenyls	SW846 8080
Herbicides	SW846 8150
Sulfide Reactivity	Sec. 7.3.4.2
Cyanide Reactivity	Sec. 7.3.3.2
pH - Solid	SW846 9045
Arsenic	SW846 7060
Barium	SW846 6010
Cadmium	SW846 6010
Chromium	SW846 6010
Lead	SW846 6010
Mercury	SW846 7470
Selenium	SW846 7740
Silver	SW846 6010
Extraction Procedure	SW846 1311

Reference:

SW846. "Test methods for Evaluating Solid Waste Physical/Chemical Methods," Third Edition, September, 1986.



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS031-S10/11/90 10-11-90 1130

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.01	0.9	ND/0.01	0.5
Carbon tetrachloride	ND/0.01	0.9	ND/0.01	0.5
Chlorobenzene	ND/0.01	1	ND/0.01	100
Chloroform	ND/0.01	1	ND/0.01	6
1,2-Dichloroethane	ND/0.01	1.1	ND/0.01	0.5
1,1-Dichloroethene	ND/0.01	0.9	ND/0.01	0.7
Methylethyl ketone	ND/0.1	1.2	ND/0.1	200
Tetrachloroethene	ND/0.01	1	ND/0.01	0.7

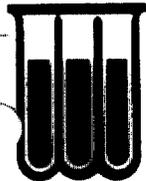
NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.01	1	ND/0.01	0.5
Vinyl chloride	ND/0.02	1.1	ND/0.02	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
		WATER
1,2-Dichloroethane	109	(76-114)
Toluene-d8	97	(88-110)
Bromofluorobenzene	107	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWS-SS001-S10/11/90 10-11-90 1130

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

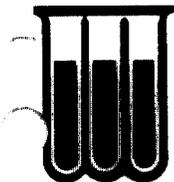
NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	23*	(35-114)
Fluorobiphenyl	70	(43-116)
Terphenyl-d14	77	(33-141)
2-Fluorophenol	59	(21-100)
Phenol-d5	64	(10-94)
2,4,6-Tribromophenol	69	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

Tetrachloro(m)xylene
Dibutylchlorodate
Promofluorobenzene

%
91
30
107

ACCEPTABLE LIMITS

WATER
(60-150)
(24-154)
(96-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

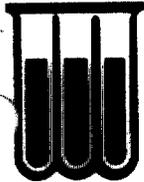
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DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	2
PCB-1260	ND
PCB-1262	--

NOTE: . ND (None Detected, lower detectable limit = 2 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

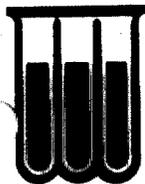
TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
2,4-DB	81	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS001-S10/11/90 10-11-90 1130

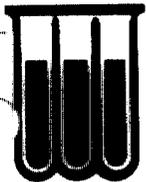
**METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST**

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET.LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	2.3/0.1	0.9	2.6/0.1	100
Cadmium 10/22-10/26/90	0.2/0.1	0.82	0.2/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	0.1/0.1	0.82	0.1/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB # : 5565-23136
MATRIX : SOLID

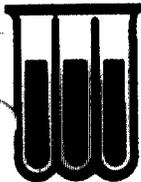
DATE RECEIVED: 10/13/90

SAMPLE ID : NWSC-SS001-S10/11/90 10-11-90 1130

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: . ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS002-S10/11/90 10-11-90 1145

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.006	0.9	ND/0.007	0.5
Carbon tetrachloride	ND/0.006	0.9	ND/0.007	0.5
Chlorobenzene	ND/0.006	1	ND/0.006	100
Chloroform	ND/0.006	1	ND/0.006	6
1,2-Dichloroethane	ND/0.006	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.006	0.9	ND/0.007	0.7
Methylethyl ketone	ND/0.06	1.2	ND/0.05	200
Tetrachloroethene	ND/0.006	1	ND/0.006	0.7

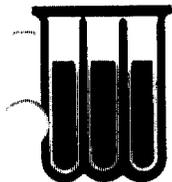
NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS002-S10/11/90 10-11-90 1145

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

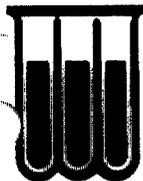
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.006	1	ND/0.006	0.5
Vinyl chloride	ND/0.012	1.1	ND/0.011	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	105	WATER (76-114)
Toluene-d8	96	(88-110)
Bromofluorobenzene	100	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS002-S10/11/90 10-11-90 1145

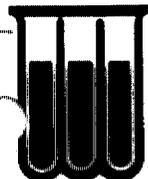
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS002-S10/11/90 10-11-90 1145

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

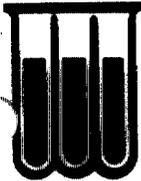
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	66	(35-114)
Fluorobiphenyl	60	(43-116)
Terphenyl-d14	90	(33-141)
2-Fluorophenol	50	(21-100)
Phenol-d5	35	(10-94)
2,4,6-Tribromophenol	71	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSO-SS002-S10/11/90 10-11-90 1145

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Tetrachloro(m)xylyene	88	WATER (60-150)
Dibutylchloroendate	32	(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

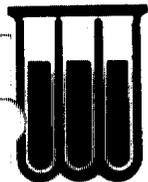
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DATE ANALYZED: 10/29/90

SAMPLE ID: NWS-SS002-S10/11/90 10-11-90 1145

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: - ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS002-S10/11/90 10-11-90 1145

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

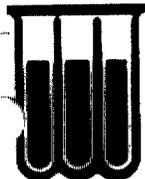
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
2,4-DB	94	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23137
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS002-S10/11/90 10-11-90 1145

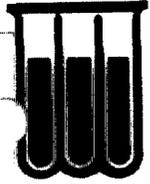
METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET.LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	ND/0.1	0.9	ND/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit.)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB # : 5565-23137
MATRIX : SOLID

DATE RECEIVED: 10/13/90

SAMPLE ID : NWSC-SS002-S10/11/90 10-11-90 1145

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	7	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: . ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS003-S10/11/90 10-11-90 1230

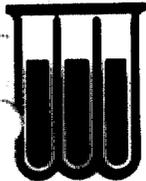
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWS-SS003-S10/11/90 10-11-90 1230

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.005	1	ND/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

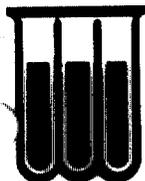
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	103	WATER (76-114)
Toluene-d8	94	(88-110)
Bromofluorobenzene	102	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS003-S10/11/90 10-11-90 1230

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS003-S10/11/90 10-11-90 1230

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	60	(35-114)
Fluorobiphenyl	65	(43-116)
Terphenyl-d14	59	(33-141)
2-Fluorophenol	47	(21-100)
Phenol-d5	49	(10-94)
2,4,6-Tribromophenol	37	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC--SS003-S10/11/90 10-11-90 1230

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

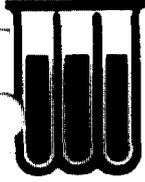
TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
Tetrachloro(m)xylene	86	WATER (60-150)
Dibutylchloroendate	44	(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

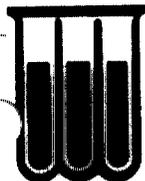
DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSO-SS003-S10/11/90 10-11-90 1230

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: . ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC--SS003-S10/11/90 10-11-90 1230

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
2,4-DB	95	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS003-S10/11/90 10-11-90 1230

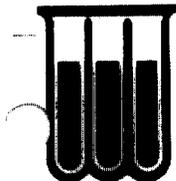
**METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST**

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	1.9/0.1	0.9	2.1/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/26/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX : SOLID

DATE RECEIVED: 10/13/90

SAMPLE ID : NWSO-SS003-S10/11/90 10-11-90 1230

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: · ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC--SS004-S10/11/90 10-11-90 1245

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
.J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS004-S10/11/90 10-11-90 1245

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.005	1	ND/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

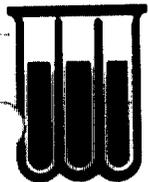
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS WATER
1,2-Dichloroethane	105	(76-114)
Toluene-d8	98	(88-110)
Bromofluorobenzene	100	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS004-S10/11/90 10-11-90 1245

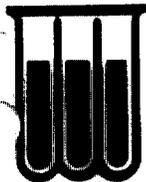
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWS-SS004-S10/11/90 10-11-90 1245

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

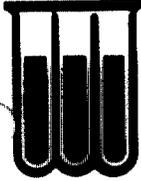
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	65	(35-114)
Fluorobiphenyl	71	(43-116)
Terphenyl-d14	66	(33-141)
2-Fluorophenol	57	(21-100)
Phenol-d5	59	(10-94)
2,4,6-Tribromophenol	64	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS004-S10/11/90 10-11-90 1245

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Tetrachloro(m)xylene	83	WATER (60-150)
Dibutylchloroendate	42	(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

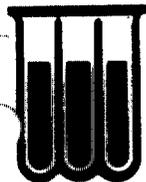
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DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC-SS004-S10/11/90 10-11-90 1245

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWS-C-SS004-S10/11/90 10-11-90 1245

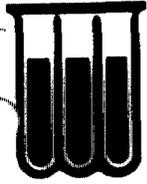
METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION -- ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	0.7/0.1	0.9	0.8/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX : SOLID

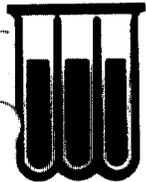
DATE RECEIVED: 10/13/90

SAMPLE ID : NWSO-SS004-S10/11/90 10-11-90 1245

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

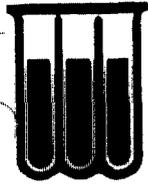
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWS-SS005-S10/11/90 10-11-90 1300

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

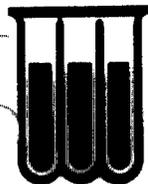
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	0.01/0.005	1	0.01/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
1,2-Dichloroethane	107	(76-114)
Toluene-d8	97	(88-110)
Bromofluorobenzene	100	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC--SS005-S10/11/90 10-11-90 1300

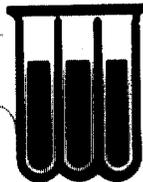
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

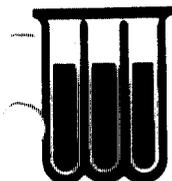
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	66	(35-114)
Fluorobiphenyl	66	(43-116)
Terphenyl-d14	73	(33-141)
2-Fluorophenol	59	(21-100)
Phenol-d5	61	(10-94)
2,4,6-Tribromophenol	69	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

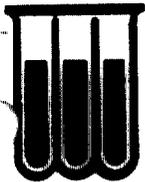
SURROGATE RECOVERY

Tetrachloro(m)xylene
Dibutylchloroendate

%
89
71

ACCEPTABLE LIMITS

WATER
(60-150)
(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

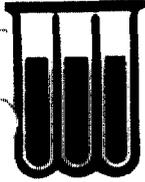
DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: . ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-DB	88	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS005-S10/11/90 10-11-90 1300

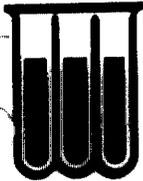
METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET.LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	0.3/0.1	0.9	0.3/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX : SOLID

DATE RECEIVED: 10/13/90

SAMPLE ID : NWSC-SS005-S10/11/90 10-11-90 1300

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/31/90
UNITS: mg/l

SAMPLE ID: NWSC-SS006-S10/11/90 10-11-90 1500

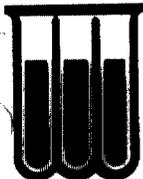
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.025	0.9	ND/0.028	0.5
Carbon tetrachloride	ND/0.025	0.9	ND/0.028	0.5
Chlorobenzene	ND/0.025	1	ND/0.025	100
Chloroform	ND/0.025	1	ND/0.025	6
1,2-Dichloroethane	ND/0.025	1.1	ND/0.023	0.5
1,1-Dichloroethene	ND/0.025	0.9	ND/0.028	0.7
Methylethyl ketone	0.54/0.25	1.2	0.45/0.21	200
Tetrachloroethene	ND/0.025	1	ND/0.025	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/31/90
UNITS: mg/l

SAMPLE ID: NWSC-SS006-S10/11/90 10-11-90 1500

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

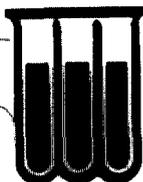
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.025	1	ND/0.025	0.5
Vinyl chloride	ND/0.05	1.1	ND/0.05	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	94	WATER (76-114)
Toluene-d8	96	(88-110)
Bromofluorobenzene	98	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSO-SS006-S10/11/90 10-11-90 1500

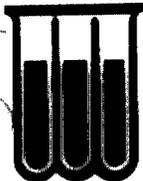
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS006-S10/11/90 10-11-90 1500

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

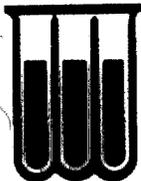
TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	60	(35-114)
Fluorobiphenyl	59	(43-116)
Terphenyl-d14	96	(33-141)
2-Fluorophenol	48	(21-100)
Phenol-d5	34	(10-94)
2,4,6-Tribromophenol	75	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWS-SS006-S10/11/90 10-11-90 1500

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

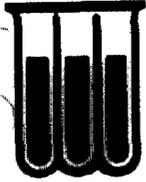
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Tetrachloro(m)xylene	87	WATER (60-150)
Dibutylchloroendate	39	(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC-SS006-S10/11/90 10-11-90 1500

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: . ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS006-S10/11/90 10-11-90 1500

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

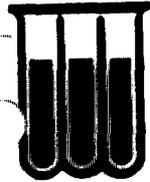
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
2,4-DB	93	WATER (48-131)
Toluene-d8	96	(88-110)
Bromofluorobenzene	98	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS006-S10/11/90 10-11-90 1500

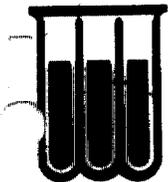
**METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST**

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET.LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	0.3/0.1	0.9	0.3/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23141
MATRIX : SOLID

DATE RECEIVED: 10/13/90

SAMPLE ID : NWSO-SS006-S10/11/90 10-11-90 1500

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: .ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

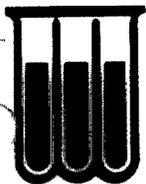
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

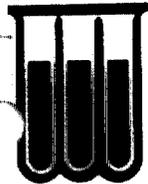
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.005	1	ND/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	104	WATER (76-114)
Toluene-d8	96	(88-110)
Bromofluorobenzene	101	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

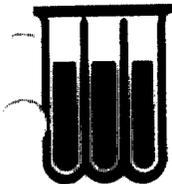
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 8/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

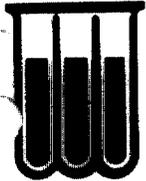
TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	52	(35-114)
Fluorobiphenyl	67	(43-116)
Terphenyl-d14	53	(33-141)
2-Fluorophenol	26	(21-100)
Phenol-d5	28	(10-94)
2,4,6-Tribromophenol	30	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

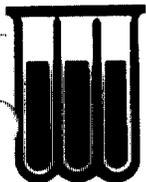
SURROGATE RECOVERY

Tetrachloro(m)xylene
Dibutylchloroendate

%
85
34

ACCEPTABLE LIMITS

WATER
(60-150)
(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWS-SS007-S10/11/90 10-11-90 1515

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

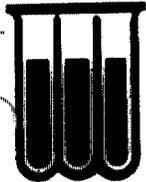
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-DB	87	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS007-S10/11/90 10-11-90 1515

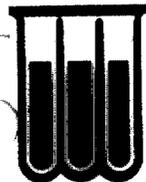
**METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST**

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION -- ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET.LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	1.1/0.1	0.9	1.2/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB # : 5565-23142
MATRIX : SOLID

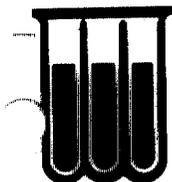
DATE RECEIVED: 10/13/90

SAMPLE ID : NWSO-SS007-S10/11/90 10-11-90 1515

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide Reactivity	10/16-10/17/90	ND	10	mg/kg
pH - Solid	10/13/90	6		su
Sulfide Reactivity	10/16-10/17/90	76	50	mg/kg

NOTE: . ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

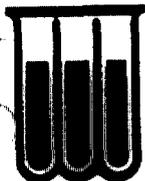
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

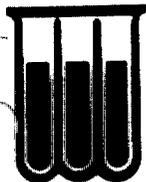
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.005	1	ND/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
		WATER
1,2-Dichloroethane	106	(76-114)
Toluene-d8	100	(88-110)
Bromofluorobenzene	100	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

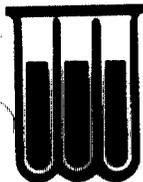
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

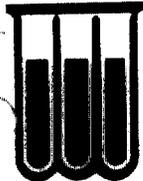
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	50	(35-114)
Fluorobiphenyl	57	(43-116)
Terphenyl-d14	90	(33-141)
2-Fluorophenol	37	(21-100)
Phenol-d5	27	(10-94)
2,4,6-Tribromophenol	40	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

Tetrachloro(m)xylene
Dibutylchlorodate

%
79
41

ACCEPTABLE LIMITS

WATER
(60-150)
(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

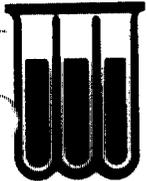
DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC--SS008-S10/11/90 10-11-90 1530

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: - ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS008-S10/11/90 10-11-90 1530

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

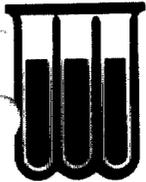
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-DB	100	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSC-SS008-S10/11/90 10-11-90 1530

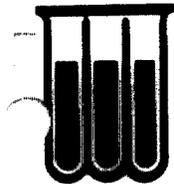
**METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST**

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION -- ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Silver				
10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic				
10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium				
10/22-10/26/90	1.5/0.1	0.9	1.7/0.1	100
Cadmium				
10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium				
10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury				
10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead				
10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium				
10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23143
MATRIX : SOLID

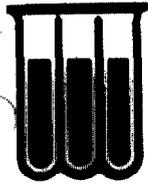
DATE RECEIVED: 10/13/90

SAMPLE ID : NWSC-SS008-S10/11/90 10-11-90 1530

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	7	su
Sulfide Reactivity	10/16-10/17/90	94	50 mg/kg

NOTE: .ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS009-S10/11/90 10-11-90 1545

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS009-S10/11/90 10-11-90 1545

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	0.01/0.005	1	0.01/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

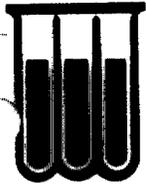
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	104	WATER (76-114)
Toluene-d8	98	(88-110)
Bromofluorobenzene	99	(86-115)
2-Fluorophenol	25	(21-100)
Phenol-d5	1*	(10-94)
2,4,6-Tribromophenol	33	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS009-S10/11/90 10-11-90 1545

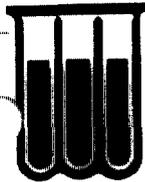
VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
.I (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS009-S10/11/90 10-11-90 1545

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	0.01/0.005	1	0.01/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
		WATER
1,2-Dichloroethane	104	(76-114)
Toluene-d8	98	(88-110)
Bromofluorobenzene	99	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC--SSC09-S10/11/90 10-11-90 1545

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

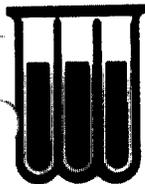
NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS009-S10/11/90 10-11-90 1545

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

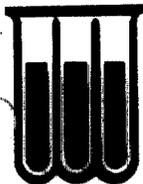
CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY

	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	61	(35-114)
Fluorobiphenyl	60	(43-116)
Terphenyl-d14	88	(33-141)
2-Fluorophenol	37	(21-100)
Phenol-d5	27	(10-94)
2,4,6-Tribromophenol	57	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSO-SS009-S10/11/90 10-11-90 1545

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10
Toxaphene	ND/0.005	1.14	ND/0.004	0.5

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Tetrachloro(m)xylene	88	WATER (60-150)
Dibutylchloroendate	52	(24-154)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

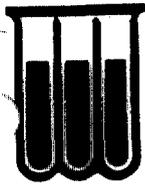
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DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC--SSC09-S10/11/90 10-11-90 1545

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: . ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWS-SSC09-S10/11/90 10-11-90 1545

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
		WATER
2,4-DB	96	(48-131)
Fluorobiphenyl	75	(43-116)
Terphenyl-d14	81	(33-141)
2-Fluorophenol	25	(21-100)
Phenol-d5	1*	(10-94)
2,4,6-Tribromophenol	33	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSC-SS009-S10/11/90 10-11-90 1545

METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION -- ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	1.1/0.1	0.9	1.2/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	ND/0.1	0.82	ND/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23144
MATRIX : SOLID

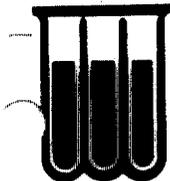
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SAMPLE ID : NWSC-SS009-S10/11/90 10-11-90 1545

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	7	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: .ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Benzene	ND/0.005	0.9	ND/0.006	0.5
Carbon tetrachloride	ND/0.005	0.9	ND/0.006	0.5
Chlorobenzene	ND/0.005	1	ND/0.005	100
Chloroform	ND/0.005	1	ND/0.005	6
1,2-Dichloroethane	ND/0.005	1.1	ND/0.005	0.5
1,1-Dichloroethene	ND/0.005	0.9	ND/0.006	0.7
Methylethyl ketone	ND/0.05	1.2	ND/0.04	200
Tetrachloroethene	ND/0.005	1	ND/0.005	0.7

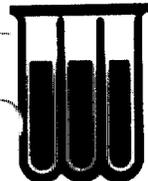
NOTE: Bias Correction Factor determined on sample : 23142

ND (None Detected)

CF (Bias Correction Factor)

** (No Bias Correction performed above Regulatory Limit)

J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 10/30/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

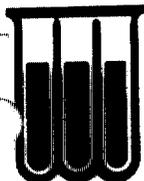
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/25/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Trichloroethene	ND/0.005	1	ND/0.005	0.5
Vinyl chloride	ND/0.01	1.1	ND/0.01	0.2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
1,2-Dichloroethane	106	WATER (76-114)
Toluene-d8	97	(88-110)
Bromofluorobenzene	101	(86-115)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 9/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

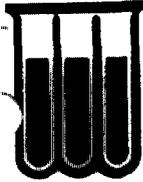
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 11/ 2/90
DATE ANALYZED: 11/ 9/90
UNITS: mg/l

SAMPLE ID: NWSO-SS010-S10/11/90 10-11-90 1545

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

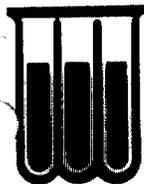
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	ND/0.04	0.605	ND/0.07	5
2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	60	(35-114)
Fluorobiphenyl	63	(43-116)
Terphenyl-d14	85	(33-141)
2-Fluorophenol	17*	(21-100)
Phenol-d5	19	(10-94)
2,4,6-Tribromophenol	19	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/26/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST

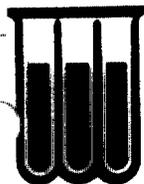
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Toxaphene	ND/0.005	1.14	ND/0.004	0.5
gamma-BHC	ND/0.0001	0.63	ND/0.0002	0.4
Chlordane	ND/0.0005	0.74	ND/0.0007	0.03
Endrin	ND/0.0005	1.09	ND/0.0005	0.02
Heptachlor	ND/0.0001	0.85	ND/0.0001	0.008
Heptachlor epoxide	ND/0.0001	1.02	ND/0.0001	0.008
Methoxychlor	ND/0.001	0.72	ND/0.001	10

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchloroendate	35	WATER (24-154)
Tetrachloro(m)xylene	85	(60-150)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

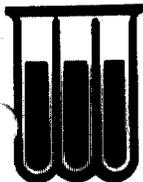
DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 10/29/90

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

POLYCHLORINATED BIPHENYLS
METHOD 8080 LIST - GC

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: - ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 10/29/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST

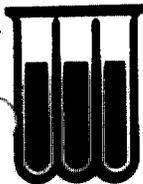
Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
2,4-D	ND/0.002	0.76	ND/0.003	10
2,4,5-TP	ND/0.0004	0.7	ND/0.0006	1.9

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-DB	92	WATER (48-131)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX : SOLID

DATE RECEIVED: 10/13/90
UNITS: mg/l

SAMPLE ID : NWSO-SS010-S10/11/90 10-11-90 1545

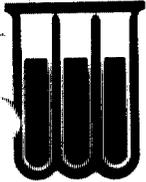
METALS ANALYTICAL REPORT
TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

PREPARATION - ANALYSIS DATE	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Silver 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Arsenic 10/22-10/26/90	ND/0.5	0.99	ND/0.5	5
Barium 10/22-10/26/90	1/0.1	0.9	1.1/0.1	100
Cadmium 10/22-10/26/90	ND/0.1	0.82	ND/0.1	1
Chromium 10/22-10/26/90	ND/0.1	0.84	ND/0.1	5
Mercury 10/22-10/24/90	ND/0.005	1.1	ND/0.005	0.2
Lead 10/22-10/26/90	0.2/0.1	0.82	0.2/0.1	5
Selenium 10/22-10/26/90	ND/0.3	0.77	ND/0.4	1

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
* (No Bias Correction performed)
** (No Bias Correction performed above Regulatory Limit)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ENGINEERING SCIENCE INC.
LAB # : 5565-23145
MATRIX : SOLID

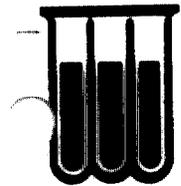
DATE RECEIVED: 10/13/90

SAMPLE ID : NWSC-SS010-S10/11/90 10-11-90 1545

ANALYTICAL REPORT

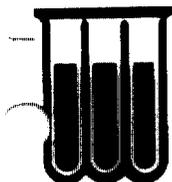
PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
pH - Solid	10/13/90	6	su
Sulfide Reactivity	10/16-10/17/90	ND	50 mg/kg

NOTE: . ND (None Detected)



WADSWORTH/ALERT
LABORATORIES, INC.

QUALITY CONTROL SECTION



WADSWORTH/ALERT
LABORATORIES, INC.

QUALITY CONTROL DEFINITIONS

Wadsworth/ALERT Laboratories, Inc. conducts a quality assurance/quality control (QA/QC) program designed to provide analytically sound and legally defensible data to our clients.

This program provides for the systematic inclusion of method-monitoring samples which are used to indicate acceptable performance. These QC samples, along with their acceptance criteria, are defined below.

Check Sample

A check sample (blank spike) is prepared and analyzed with each batch of samples and is used to monitor the performance of the method. Known amounts of the analytes of interest are added to this blank before it is taken through the analytical process with the samples. The analytes used to spike the check sample are from a different source than those used to calibrate the instrument and serve as both a check on the method and on the standardization process.

Intralaboratory recovery limits are developed for each method and are used to determine the efficiency of the test. When a check sample fails to meet laboratory-established criteria, it is cause to stop the analysis until the source of failure has been determined and subsequent check samples show the method to be in control.

Method Blank

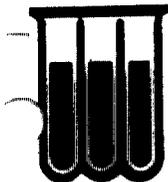
The method blank, an artificial sample containing all the reagents and compounds added to a real sample, measures the background contamination levels associated with each method.

Wet Chemistry

If a wet chemistry method blank contains an analyte concentration which exceeds the detection limit, the test is stopped until the source of contamination is identified. All affected samples are then reanalyzed.

Organics

For organic analyses all analytes must be below the method detection limits except the following compounds:



WADSWORTH/ALERT
LABORATORIES, INC.

Volatiles:

Methylene chloride
Toluene
2-Butanone
Acetone

Semivolatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis(2-ethylhexyl) phthalate
Di-n-octyl phthalate

These commonly-detected laboratory contaminants may be present in the blank at up to five times the method detection limit. All samples prepared on the same day as the blank and also containing these compounds have flagged results to indicate this phenomenon.

Matrix Spike/Matrix Spike Duplicate

For each parameter every twentieth sample is split into the original sample, a matrix spike (MS), and a matrix spike duplicate (MSD) subsample. The MS and MSD are spiked with a known amount of analyte and all three samples are prepared and analyzed according to the method. The results of the MS/MSD samples are used to indicate matrix effects as well as to gather precision and accuracy data for each parameter.

Surrogate Standards

Surrogate standards, compounds which are chemically similar to those being analyzed by GC or GC/MS, are added to each sample, method blank, and matrix spike/matrix spike duplicate to monitor the efficiency of preparation and analysis. The following table summarizes the surrogates by analysis and lists the action criteria for each group of surrogates. If these criteria are not met, re-preparation and reanalysis are used to determine if failed surrogate recoveries are attributable to a sample matrix effect.

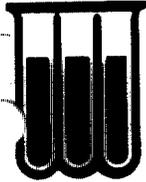
The notation DIL may be found in place of a surrogate recovery result. This indicates that because a dilution was necessary to keep an analyte concentration within the calibration range of the instrument, the surrogate concentrations fell below the quantifiable amount and could not be reported.

SURROGATE STANDARDS

<u>Analysis</u>	<u>Surrogate</u>	<u>Action Criteria</u>	<u>Action Criteria Source</u>
GC/MS Volatiles	1,2-Dichloroethane-d ₄ Toluene-d ₈ Bromofluorobenzene	All surrogates must meet the recovery limits.	US EPA Contract Laboratory Program Statement of Work
GC/MS Base/Neutrals	Nitrobenzene-d ₅ 2-Fluorobiphenyl Terphenyl-d ₁₄	Two of three surrogates must meet recovery limits. The third must have a recovery of 10% or greater.	US EPA Contract Laboratory Program Statement of Work
GC/MS Acid	2-Fluorophenol Phenol-d ₆ 2,4,6-Tribromophenol	Two of three surrogates must meet recovery limits. The third must have a recovery of 10% or greater.	US EPA Contract Laboratory Program Statement of Work
GC/PID Volatiles	Trifluorotoluene	The surrogate must meet the recovery limits.	In-house action limits
GC/HALL Volatiles	Bromochloromethane	The surrogate must meet the recovery limits.	In-house action limits



WADSWORTH/ALERT
LABORATORIES, INC.



November 14, 1990

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The volatile organic toxicity analysis of samples 23136 and 23137 required dilutions. This was not due to high concentrations of the compounds of interest, but was due to the Tentatively Identified Compounds (TICs) native to these samples. These interferences and subsequent dilutions required the elevation of the detection limits normally associated with this method of analysis.

The base neutral acid toxicity (BNA TOXI) analysis of sample 23145 shows three acid surrogates to be out of control. The recommended holding time from TCLP extraction to organic extraction is seven days. By the time the sample was re-extracted, the holding time was expired. The results of the re-analysis met surrogate spike criteria. The analytical report contains the results of the re-analysis. Results of the original analysis are available upon request.

The following samples extracted for BNA TOXI compounds were inadvertently spiked with the BNA spiking compounds.

Laboratory ID

23136
23138
23139
23140
23142

The recommended holding time from TCLP extraction to organic extraction is seven days. By the time the samples were re-extracted, the holding time was expired. The analytical report contains the results of the re-analyses.

The client requested the analysis of polychlorinated biphenyls on solid samples. The recommended holding from sampling to extraction is fourteen days. By the time the samples were extracted, the holding time was expired.

The client also requested the analysis of pH on solid samples. The laboratory established holding time from sampling to analysis is twenty-four hours. By the time the samples were received, the holding time was expired.



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LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
901025	Polychlorinated Biphenyls	103	99	SOLID	(41-125)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/ALERT Laboratories
LAB #: 8490-85025
MATRIX: SOLID

DATE RECEIVED: 10/25/90
DATE EXTRACTED: NA
DATE ANALYZED: 11/ 6/90

SAMPLE ID: ZERO HEAD SPACE EXTRACTION BLANK , 10/25/90

VOLATILE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 10/25/90

Benzene	ND
Carbon tetrachloride	ND
Chlorobenzene	ND
Chloroform	ND
1,2-Dichloroethane	ND
1,1-Dichloroethylene	ND
Methyl ethyl ketone	ND**
Tetrachloroethylene	ND
Trichloroethylene	ND
Vinyl chloride	ND*

NOTE: ND (None Detected, lower detectable limit = 0.005 mg/l)
ND* (None Detected, lower detectable limit = 0.01 mg/l)
ND** (None Detected, lower detectable limit = 0.05 mg/l)
ND*** (None Detected, lower detectable limit = mg/l)
ND**** (None Detected, lower detectable limit = mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
1,2-Dichloroethane	92	(76-114)	(70-121)
Toluene-d8	107	(88-110)	(81-117)
Bromofluorobenzene	102	(86-115)	(74-121)



WADSWORTH/ALERT
LABORATORIES, INC.

CHECK SAMPLE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
85025	Vinyl chloride	127	118	WATER	
	Methylethyl ketone	139	136		
	Benzene	99	97		
	Carbon tetrachloride	93	91		
	Chlorobenzene	110	111		
	Chloroform	109	107		
	1,2-Dichloroethane	119	115		
	1,2-Dichloroethene	109	111		
	Tetrachloroethene	105	104		
	Trichloroethene	108	105		



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CHECK SAMPLE DATA

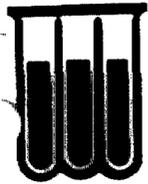
LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX
87018	1,4-Dichlorobenzene	58	54	WATER
	2,4-Dinitrotoluene	32	28	
	Hexachlorobenzene	52	48	
	Hexachlorobutadiene	56	53	
	Hexachloroethane	45	38	
	Nitrobenzene	72	68	
	Pyridine	56	50	
	2-Methylphenol	50	52	
	4-Methylphenol	50	64	
	Pentachlorophenol	75	67	
	2,4,5-Trichlorophenol	70	71	
	2,4,6-Trichlorophenol	70	71	



WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

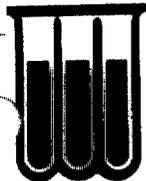
LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
PESTICIDE COMPOUNDS					
901009	Lindane	95	120	WATER	(54-133)
	Heptachlor	90	105		(45-125)
	Aldrin	100	120		(46-123)
	Dieldrin	104	112		(57-134)
	Endrin	96	104		(64-133)
	4,4'-DDT	98	104		(50-141)
PESTICIDE COMPOUNDS					
900913	Lindane	108	110	SOLID	(48-125)
	Heptachlor	94	100		(41-117)
	Aldrin	115	115		(41-118)
	Dieldrin	94	92		(57-129)
	Endrin	116	118		(55-123)
	4,4'-DDT	88	84		(51-130)



WADSWORTH/ALERT
LABORATORIES, INC.

CHECK SAMPLE DATA

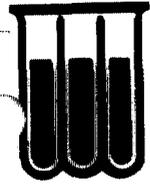
LAB ID	PARAMETER	PERCENT RECOVERY	MATRIX	QC CONTROL LIMITS
87018	Lindane	125	WATER	
	Heptachlor	125		
	Heptachlor epoxide	125		
	Methoxychlor	117		
	Endrin	92		
	Toxaphene	108		
	Chlordane	80		



WADSWORTH/ALERT
LABORATORIES, INC.

CHECK SAMPLE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
87018	2,4-D	97	79	WATER	
	Silvex	45	37		
	2,4,5-T	105	90		
	2,4-DB	110	89		

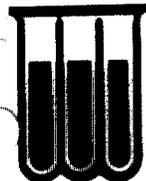


WADSWORTH/ALERT
LABORATORIES, INC.

CHECK SAMPLE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
87018	Silver	95	93	WATER	
87018	Barium	95	93	WATER	
87018	Cadmium	94	92	WATER	
87018	Chromium	96	95	WATER	
87018	Lead	96	95	WATER	
87018	Arsenic	100	90	WATER	
87018	Selenium	109	88	WATER	
87018	Mercury	124	LA	WATER	

LA - Laboratory Accident



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/ALERT Laboratories
LAB #: 8690-87018
MATRIX: SOLID

DATE RECEIVED: 10/18/90
DATE EXTRACTED: 10/24/90
DATE ANALYZED: 11/ 8/90

SAMPLE ID: TCLP BLANK BUFFER #1 , 10/18/90

SEMI-VOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 10/18/90

o-Cresol	ND
m-Cresol	ND
p-Cresol	ND
Cresol	ND
1,4-Dichlorobenzene	ND
2,4-Dinitrotoluene	ND
Hexachlorobenzene	ND
Hexachloro-1,3-butadiene	ND
Hexachloroethane	ND
Nitrobenzene	ND
Pentachlorophenol	ND*
Pyridine	ND
2,4,5-Trichlorophenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 0.04 mg/l)
ND* (None Detected, lower detectable limit = 0.2 mg/l)
ND** (None Detected, lower detectable limit = mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	LIMITS	SURROGATE RECOVERY:	%	LIMITS
		WATER			WATER
Nitrobenzene-d5	69	(35-114)	2-Fluorophenol	63	(21-100)
Fluorobiphenyl	63	(43-116)	Phenol-d5	64	(10-94)
Terphenyl-d14	69	(33-141)	2,4,6-Tribromophenol	72	(10-123)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/ALERT Laboratories
LAB #: 8690-87018
MATRIX: SOLID

DATE RECEIVED: 10/18/90
DATE EXTRACTED: 10/23/90
DATE ANALYZED: 10/25/90

SAMPLE ID: TCLP BLANK BUFFER #1 , 10/18/90

CHLORINATED PESTICIDES
TCLP TOXICITY CHARACTERISTIC LIST - GC

Analysis performed in accordance with USEPA Toxic Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 10/18/90

	RESULT (ug/l)	DETECTION LIMIT
Lindane	ND	0.05
Heptachlor	ND	0.05
Heptachlor Epoxide	ND	0.05
Endrin	ND	0.1
Chlordane	ND	0.5
Methoxychlor	ND	0.5
Toxaphene	ND	1

NOTE: ND (None Detected)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Dibutylchloroendate	90	(24-154)	(20-150)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories
LAB #: 9290-93026
MATRIX: SOLID

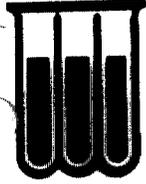
DATE RECEIVED: 10/26/90
DATE EXTRACTED: 10/26/90
DATE ANALYZED: 11/ 1/90

SAMPLE ID: INTRA-LAB BLANK , 10/26/90

POLYCHLORINATED BIPHENYLS
ANALYTICAL BLANK REPORT

PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
PCB-1262	--

NOTE: ND (None Detected, lower detectable limit = 1 mg/kg) as rec'd
ND* (None Detected, lower detectable limit = mg/kg) as rec'd
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/ALERT Laboratories
LAB #: 8690-87018
MATRIX: SOLID

DATE RECEIVED: 10/18/90
DATE EXTRACTED: 10/22/90
DATE ANALYZED: 10/24/90

SAMPLE ID: TCLP BLANK BUFFER #1 , 10/18/90

HERBICIDES
TCLP TOXICITY CHARACTERISTIC LIST - GC

Analysis performed in accordance with USEPA Toxicity Characteristic
Leachate Procedure.

TCLP EXTRACTION DATE: 10/18/90

2,4-D	ND
Silvex	ND*

NOTE: ND (None Detected, lower detectable limit = 0.002 mg/l) as rec'd
ND* (None Detected, lower detectable limit = 0.0004 mg/l) as rec'd
ND** (None Detected, lower detectable limit = mg/l) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2,4-DB	104	(48-131)	(23-110)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories, Inc.
LABORATORY ID : 8690-87018
SAMPLE MATRIX : SOLID

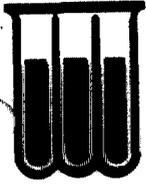
RECEIVING DATE : 10/18/90

SAMPLE ID : TCLP BLANK BUFFER #1 , 10/18/90

METALS ANALYTICAL BLANK REPORT
TOXICITY CHARACTERISTIC LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Silver	10/22-10/23/90	ND	0.1 mg/l
Arsenic	10/22-10/23/90	ND	0.5 mg/l
Barium	10/22-10/23/90	ND	0.1 mg/l
Cadmium	10/22-10/23/90	ND	0.1 mg/l
Chromium	10/22-10/23/90	ND	0.1 mg/l
Mercury	10/22/90	ND	0.005 mg/l
Lead	10/22-10/23/90	ND	0.1 mg/l
Selenium	10/22-10/23/90	ND	0.3 mg/l

ND - NONE DETECTED



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/ALERT Laboratories
LAB #: 9290-93016
MATRIX : SOLID

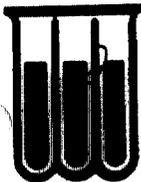
DATE RECEIVED: 10/16/90

SAMPLE ID : INTRA-LAB BLANK , 10/16/90

GENERAL ANALYTICAL BLANK REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Cyanide Reactivity	10/16-10/17/90	ND	10 mg/kg
Sulfide Reactivity	10/17/90	ND	50 mg/kg

NOTE: ND (None Detected)



12. QA/QC requirements

12.1 Specific QA/QC requirements for each method must be performed.

12.2 TCLP Blank

12.2.1 A TCLP blank is prepared and analyzed for each batch of samples extracted using each buffer type. When only TCLP samples are being prepared or analyzed, the TCLP blank may take the place of the method blank.

12.2.2 The TCLP blank should not contain any analyte of interest above the detection limit.

12.2.3 If TCLP blank contaminants exceed the detection limits but are not present in any samples, a sample may serve as the blank. A sample cannot be used as its own blank, however.

12.2.4 If TCLP blank contaminants exceed the detection limits and are present in the samples, the TCLP blank and all associated affected samples must be reprepared and reanalyzed. Since the contamination may have been introduced during the leachate preparation, the samples may have to be re-leached.

12.2.5 The TCLP blank results are not bias corrected

12.3 TCLP Check sample/Check sample duplicate (CS/CSD)

12.3.1 The CS/CSD are prepared and analyzed for each batch of sample leachates extracted using each buffer type. When only TCLP sample leachates are prepared or analyzed, the TCLP CS/CSD may take the place of the method check sample.

12.3.2 The TCLP CS/CSD contain all analytes used to generate correction factors.

12.3.3 The TCLP CS/CSD are used to gather quality control data for the laboratory program. Precision and accuracy criteria for each TCLP buffer will be generated by the laboratory. Until these criteria are developed, the interim criteria listed in Table 2 are used.

Table 2

Interim Recovery Limits

Analyte	Recovery Limits
All Metals	60-125
Semivolatiles	
1,2-Dichlorobenzene	40-120
1,4-Dichlorobenzene	40-120
2,4-Dinitrotoluene	40-120
Hexachlorobenzene	60-130
Hexachlorobutadiene	60-130
Hexachloroethane	50-130
Nitrobenzene	40-120
2-Methylphenol (o-Cresol)	25-120
4-Methylphenol (p-Cresol)	25-120
Pentachlorophenol	10-120
Pyridine	50-120
2,4,5-Trichlorophenol	25-120
2,4,6-Trichlorophenol	25-120

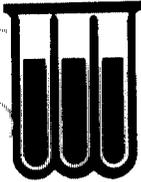
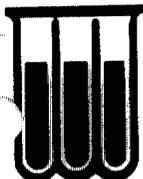


Table 2 (con't.)

Interim Recovery Limits

Analyte	Recovery Limits
Volatiles	
Acetone	50-150
Benzene	75-125
n-Butyl alcohol	50-150
Carbon disulfide	75-125
Carbon tetrachloride	75-125
Chlorobenzene	75-125
Chloroform	75-125
Cyclohexanone	50-150
1,2-Dichloroethane	75-125
1,1-Dichloroethene	75-125
Ethyl acetate	50-150
Ethylbenzene	75-125
Ethyl ether	75-125
Isobutanol	50-150
Methyl ethyl ketone	50-150
Methyl isobutyl ketone	50-150
Methylene chloride	50-150
Tetrachloroethene (Tetrachloroethylene)	75-125
Toluene	75-125
1,1,1-Trichloroethane	75-125
Trichloroethene (Trichloroethylene)	75-125
Trichlorofluoromethane	50-150
1,1,2-Trichloro-1,2,2-trifluoroethane	75-125
Vinyl chloride	50-150
Xylene (total)	75-125
Pesticides	
gamma-BHC (Lindane)	50-130
Chlordane	50-130
Endrin	50-130
Heptachlor	50-130
Heptachlor epoxide	50-130
Methoxychlor	50-130
Toxaphene	50-130
Herbicides	
2,4-D	40-120
2,4,5-TP	40-120
Methanol	70-120



12.4 Consistency Criteria - A spiked leachate must have results consistent with the sample it represents. The following interim criteria are used to judge analytical consistency between the unspiked and spiked leachate.

12.4.1 BNA/VOA

12.4.1.1 The absolute difference of the unspiked and spiked sample leachate surrogate recoveries is calculated using Equation 3.

Equation 3 Calculation of Absolute Difference

$$AD = | \%R_1 - \%R_2 |$$

where

AD = absolute difference

$\%R_1$ = surrogate recovery 1

$\%R_2$ = surrogate recovery 2

12.4.1.2 The surrogate recoveries of the unspiked and spiked sample leachate must have an absolute difference of 20% or less. Where multiple surrogates are used each surrogate must meet the 20% criterion. No other surrogate criteria need be met.

12.4.1.3 If the criterion is not met, the spiked and unspiked samples must be reprepared and reanalyzed.

12.4.2 Methanol and ICP or AA metals analyses do not employ surrogates and, therefore, have no batching checks.

12.5 Batching Criteria - The unspiked sample leachate must be analytically representative of a batch of samples. Interim criteria have been developed to indicate batch appropriateness.

12.5.1 Pesticides and Herbicides

12.5.1.1 A pesticide and herbicide batch consists of all sample leachates extracted on a given day. The batch size is not to exceed 20 samples.

12.5.1.2 All surrogates must meet the interim recovery limits in Table 3.

Table 3

Interim Pesticide and Herbicide Surrogate Recovery Limits

Analysis	Surrogate	Recovery Limit
Pesticides	DBC	20-140
	TCMX	60-150
Herbicides	2,4-DB	40-130

12.5.1.3 For each batch, the highest and the lowest surrogate value must be within 50% of each other.

12.5.2 Mercury analysis uses no batching indicators.

12.6 TAMS Recovery Criteria

12.6.1 The interim TAMS recovery criteria are the same as the CS/CSD recovery limits shown in Table 2.

12.6.2 If these criteria are not met, the data are evaluated as follows.

ENGINEERING-SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • FAX (708) 990-7218

No 11-66

Chain-of-Custody Record

PROJECT NUMBER CH054.01		PROJECT NAME/LOCATION CRANE NWSC				PRESERVATIVES ICE											
SAMPLER(S) NAME (Please Print) Bob Scalamera Rhonda Yoder						ANALYSES REQUESTED											
(Signature) <i>[Signature]</i> <i>[Signature]</i>						<i>[Signature]</i> - Contact for Questions 8240 (TCLP) 8270 (TCLP) 8080 (TCLP Test) 8150 (TCLP Herb) TCLP (Metals) React. Glands React. SuHde 8080 (PCB's) pH											
Station Number	Date MM/DD/YY	Military Time	Comp.	Grab	Matrix	Container	8240 (TCLP)	8270 (TCLP)	8080 (TCLP Test)	8150 (TCLP Herb)	TCLP (Metals)	React. Glands	React. SuHde	8080 (PCB's)	pH	REMARKS	
NWSC	10/11/90	1245		X	NWSC - 55004 - 510/11/90	Solid	1-500 ml					X	X	X	X		
		1300					"					X	X	X	X		
		1500					"					X	X	X	X		
		1245					1-250 ml										
		1300					"										
		1500					"										
		1245					4-500 ml	X	X	X	X						} EACH ANALYSIS } HAS 1-500 ml } CONTAINER
		1300					"	X	X	X	X						
		1500					"	X	X	X	X						
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time 10/12/90 1200		Received by: (Signature) <i>[Signature]</i>		Date/Time		AIRBILL #: 9145297696 pkg. 2/3									
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time		Received by: (Signature)		Date/Time		LABORATORY: Wadsworth									
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature) <i>[Signature]</i>		Date/Time 10/15/90 10:00am		ATTN: Denise Wolfman									
								PLEASE SEND REPORT TO: R. Yoder									
								T.A.T. EXPECTED As previously Arranged									

DISTRIBUTION: Pink Sampling Corrdinator • White and Yellow Accompanies Shipment • White Returned with Report

ENGINEERING-SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • FAX (708) 990-7218

No 1167

Chain-of-Custody Record

PROJECT NUMBER		PROJECT NAME/LOCATION		PRESERVATIVES														
CH054.01		CRANE NWSC		ICE →														
SAMPLER(S) NAME (Please Print)		ANALYSES REQUESTED																
Bob Scalamera <i>[Signature]</i>		<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);"> 8240 (TCLP) 8270 (TCLP) 8080 (TCLP Pot) 8150 (TCLP Herb) TCLP Metals React. Cyanides React. Sulfide 8080 (BFLS) pH </div> <div style="border: 1px solid black; padding: 5px;"> REMARKS </div> </div>																
Rhonda Yoder <i>[Signature]</i> Rhonda Yoder Contact for questions																		
Station Number	Date MM/DD/YY	Military Time	Comp.	Grab	Matrix	Container												
NWSC	10/11/00	1515		X	NWSC - 55007	-S10/11/00	Solid	1-500 ml					X	X	X	X		
		1530						1					X	X	X	X		
		1545						"					X	X	X	X		
		1545						"					X	X	X	X	- SLUDGE -	Solids only
		1515						1-250 ml	X									
		1530						"	X									
		1545						"	X									
		1545						"	X									
		1515						4-500 ml	X	X	X	X						1-500 ml
		1530						"	X	X	X	X						Jar for each
		1545						"	X	X	X	X						analysis
		1545						"	X	X	X	X						10- Solids only
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Date/Time		AIRBILL #: 9145297696 p. 3/3 LABORATORY: Wadsworth ATTN: Denise Woffman PLEASE SEND REPORT TO: R. Yoder T.A.T. EXPECTED As previously Arranged										
<i>[Signature]</i>		10/12/00 1200																
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Date/Time												
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time												
				<i>[Signature]</i>		10/15/00 10:00 am												

DISTRIBUTION: Pink Sampling Corrdinator • White and Yellow Accompanies Shipment • White Returned with Report

ENGINEERING-SCIENCE, INC.

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No 1165

Chain-of-Custody Record

PROJECT NUMBER CH054.01		PROJECT NAME/LOCATION CRANE NWSC			Hartfelder		PRESERVATIVES									
SAMPLER(S) NAME (Please Print) Bob Scalamera Rhonda Yoder <i>Rhonda Yoder</i> Contact for questions							ANALYSES REQUESTED									
							<i>ICE</i> → 8240 (TCLP) 8270 (TCLP) 8080 (TCLP PEST) 8150 (TCLP Herb) TCLP METALS REACT. CYANIDE REACT. SULFIDE 8080 (P.B.S.) PH									
(Signature)																
Station Number	Date MM/DD/YY	Military Time	Comp	Grab	Matrix	Container	8240 (TCLP)	8270 (TCLP)	8080 (TCLP PEST)	8150 (TCLP Herb)	TCLP METALS	REACT. CYANIDE	REACT. SULFIDE	8080 (P.B.S.)	PH	REMARKS
NWSC	10/11/90	1130		X	NWSC-SS001-S10/11/90	Solid						X	X	X	X	
		1145				"						X	X	X	X	
		1230				"						X	X	X	X	
		1130				1-250ml	X									
		1145				"	X									
		1230				"	X									
		1130				4.500ml	X	X	X	X						} EACH ANALYSIS HAS 1-500ml JAR.
		1145				"	X	X	X	X						
		1230				"	X	X	X	X						
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Date/Time		AIRBILL #: 9145297696 Pkg 1/3 LABORATORY: WADSWORTH ATTN: DENISE WOLTMAN PLEASE SEND REPORT TO: R. Yoder T.A.T. EXPECTED As previously arranged								
<i>Bob Scalamera</i>		10/12/90 1200														
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Date/Time										
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time										
				<i>Jena Sloan</i>		10/15/90 10:00am										

DISTRIBUTION: Pink Sampling Corrdinator • White and Yellow Accompanies Shipment • White Returned with Report

WADSWORTH/ALERT LABORATORIES COOLER RECEIPT FORM

Client: Eng. Science Project: Crane NUSC Quote# _____

Cooler received on 10/13/90 and opened on 10/13/90 by Seka Khan

(Signature)

Cooler/Safe/Other

WAL Shipper No. #088, #75, #58

- | | YES | NO |
|--|-------------------------------------|-------------------------------------|
| 1) Were custody seals on the outside of the cooler?..... | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| If YES, how many and where? Quantity _____ Location _____ | | |
| Were signature and date correct?..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Were custody papers included inside the cooler?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3) Were custody papers properly filled out (Ink, signed, match labels)?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4) Did you sign the custody papers in the appropriate place?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5) Shipper's packing slip attached to this form?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6) Was packing material used?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| If YES, what type? <u>bubble</u> | | |
| 7) Were samples chilled?..... <u>6.0°C</u> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8) Were all the bottles sealed in separate plastic bags?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 9) Did all bottles arrive in good condition (unbroken)?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 10) Were all bottle labels complete (No., date, signed, analysis, preservatives)?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 11) Did all bottle labels and tags agree with custody papers?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 12) Were correct bottles used for the tests indicated?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 13) Were all VOA bottles checked for the presence of air bubbles?..... <u>NA</u> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14) Was a sufficient amount of sample sent in each bottle?..... | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 15) Sample received by <u>Fed Ex</u> /UPS/Client drop-off/Other _____ | | |

Explain any discrepancies _____

was contacted on _____ by _____

to resolve discrepancies.

MULTIPLE PACKAGE SHIPMENT LABELS

SHIPMENT DATE: 10-12-90

MASTER AIRBILL NUMBER: 9195297896

OF 3 6733285501

DESCRIPTION: Salt Scrubs

OF 3 6733285517

DESCRIPTION: Salt Scrubs

OF 6733285526

DESCRIPTION:

OF 6733285535

DESCRIPTION:

OF 6733285544

DESCRIPTION:

P. 4/6

JUN 17 '91 03:25PM WADSWORTH ALERT LABS

TERMS AND CONDITIONS

DEFINITIONS
On this Airbill we, our and us refer to Federal Express Corporation, its employees and agents. You and your refer to the sender, its employees and agents.

AGREEMENT TO TERMS
By giving us your package to deliver, you agree to all the terms on this Airbill and in our current Service Guide, which is available on request. If there is a conflict between this Current Service Guide and this Airbill, the Service Guide will control. No one is authorized to alter or modify the terms of our Agreement.

RESPONSIBILITY FOR PACKAGING AND COMPLETING AIRBILL
You are responsible for adequately packaging your goods and for properly filling out this Airbill. Declaration of the number of packages and weight per package from this Airbill will result in a billing based on our best estimate of the number of packages received from you and an estimated default weight per package, as determined and periodically adjusted by us.

AIR TRANSPORTATION TAX INCLUDED
Our rate includes a federal tax required by Internal Revenue Code Section 4211 on the air transportation portion of this service.

LIMITATIONS ON OUR LIABILITY AND LIABILITIES NOT ASSUMED
Our liability for loss or damage to your package is limited to your actual charges or \$100, whichever is less, unless you pay for and declare a higher authorized value. We do not provide third party insurance, but you may pay an additional charge for each additional \$100 of declared value. If you declare a value higher than the actual value of your package, liability will be the lesser of your declared value or the actual value of your package.

In any event we will not be liable for any damages, whether direct, incidental, special or consequential in nature of the purchase price of a shipment, whether or not Federal Express had knowledge that such damages might be incurred, including, but not limited to, loss of income or profits.

We won't be liable for your acts or omissions, including but not limited to improper or insufficient packing, securing, marking or addressing of the package. Also, we won't be liable if you or the recipient waives any of the terms of our agreement. We won't be liable for loss of or damage to shipments of prohibited items.

We won't be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, acts of public enemies, war, strikes, civil commotions, acts of or orders of public authorities (including customs and quarantine officials) or other acts of government authority.

DECLARED VALUE LIMITS
The highest declared value we allow for FedEx Letter and FedEx Pak shipments is \$100. For other shipments the highest declared value we allow is \$25,000 unless your package contains items of extraordinary value. In such case the highest declared value is \$500. Items of extraordinary value are those items that are not readily replaceable.

instruments, and other items listed in our current Service Guide. If you ship items of extraordinary value on an Airbill you may file a total declared value for all packages not to exceed \$100, \$500 or \$25,000, but packages that are shipped in excess of \$500 must be shipped as a letter. If more than one package is shipped, the declared value of each package will be limited to the total declared value of all packages (not to exceed the limit of the total declared value of all packages described above). You have the responsibility of packing and insuring your packages against loss or damage.

FILE A CLAIM
ALL CLAIMS MUST BE MADE BY YOU IN WRITING. You must notify us of your claim within strict time limits. See current Service Guide. We'll consider your claim filed if you call and notify our Customer Service Department at 800-238-5355 and notify us in writing as soon as possible.

Within 90 days after you notify us of your claim, you must send us all relevant information about it. We are not obligated to act on any claim until you have paid all transportation charges, and you may not deduct the amount of your claim from those charges.

If the recipient accepts your package without noting any damage on the delivery receipt, we will assume that the package was delivered in good condition. In order for us to process your claim, you must, to the extent possible, retain the original shipping cartons and packing materials for inspection.

RIGHT TO INSPECT
We may, at our option, open and inspect your packages prior to or after you give them to the carrier.

NO C.O.D. SERVICES ON THIS AIRBILL. C.O.D. SERVICE IS REQUIRED.
If you use C.O.D. SERVICES ON THIS AIRBILL, C.O.D. SERVICE IS REQUIRED. Please use the Federal Express C.O.D. form for this purpose.

RESPONSIBILITY FOR PAYMENT
Even if you use our alternate payment instructions, you will always be primarily responsible for all delivery charges, as well as any costs we may incur in either returning your package to you or warehousing it pending disposition.

RIGHT OF RESJECTION
We reserve the right to reject a shipment at any time. When such shipment would be likely to cause damage or delay to other shipments, equipment or personnel, or if the disposition of which is prohibited by law or is in violation of any rules contained in this Airbill or our current Service Guide.

MONEY-BACK GUARANTEE
In the event of timely delivery, Federal Express will at your request and with some limitations, refund or credit all transportation charges. See current Service Guide for further information.

Part #195004/19501
Rev. 8/98

FEDERAL
 QUESTIONS? CALL 800-238-3333 TOLL FREE.

AIRBILL
 PACKAGE
 TRACKING NUMBER

9145297696

255M **9145297696**

RECIPIENT'S COPY

Date: 10/2/90

From (Your Name) Please Print: **Bob Scialomora** Your Phone Number (Very Important): **708-990-7200**

To (Recipient's Name) Please Print: **Wadsworth/Alert Labs** Recipient's Phone Number (Very Important): **216-497-9396**

Company: **ENGINEERING SCIENCE INC** Department/Floor No: **WADSWORTH/ALERT LABS**

Street Address: **1000 JERIE BLVD STE 250** Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip 0 Codes.): **4101 SHUFFEL RD NW**

City: **CAK BRUCK IL** State: **IL** ZIP Required: **60521** City: **NORTH CANTON OH** State: **OH** ZIP Required: **44720**

YOUR INTERNAL BILLING REFERENCE INFORMATION (First 24 characters will appear on invoice): **CH054 (01)**

IF HOLD FOR PICK-UP, Print FEDEX Address Here

Street Address: _____ State: _____ ZIP Required: _____

City: _____

PAYMENT: Bill Sender Bill Recipient's FedEx Acct No. Bill 3rd Party FedEx Acct No. Bill Credit Card Cash/Check

SERVICES (Check only one box)		DELIVERY AND SPECIAL HANDLING (Check services required)		PACKAGES	WEIGHT in Pounds	YOUR DECLARED VALUE	Emp. No.	Date	FedEx Express Unit Base Charges
<input type="checkbox"/> Priority Overnight Service (Delivery by next business morning)	<input type="checkbox"/> Standard Overnight Service (Delivery by next business afternoon)	<input type="checkbox"/> HOLD FOR PICK-UP (P.O. Box only)	<input type="checkbox"/> DELIVER WEEKDAY	1	3.00	2000	<input type="checkbox"/> Cash Received		
<input checked="" type="checkbox"/> YOUR PACKAGING	<input type="checkbox"/> FEDEX LETTER*	<input type="checkbox"/> DELIVER SATURDAY (Extra charge) (Not available to all destinations)	<input checked="" type="checkbox"/> DANGEROUS GOODS (Extra charge)	1	3.00	2000	<input type="checkbox"/> Return Shipment		
<input type="checkbox"/> FEDEX LETTER*	<input type="checkbox"/> FEDEX PAK*	<input type="checkbox"/> DANGEROUS GOODS (Extra charge)		1	5.00	2000	<input type="checkbox"/> Third Party		
<input type="checkbox"/> FEDEX PAK*	<input type="checkbox"/> FEDEX BOX	<input type="checkbox"/> DRY ICE (Extra charge)		Total		Total	<input type="checkbox"/> Chg To Del.		
<input type="checkbox"/> FEDEX BOX	<input type="checkbox"/> FEDEX TUBE	<input type="checkbox"/> OTHER SPECIAL SERVICE		3.160		6000	<input type="checkbox"/> Chg To Hold		
<input type="checkbox"/> FEDEX TUBE	<input type="checkbox"/> Economy Two-Day Service (Formerly Standard Air) (Delivery by second business day)	<input type="checkbox"/> SATURDAY PICK-UP (Extra charge)		DIM SHIPMENT (Charge and Weight)			Street Address	City	State
<input type="checkbox"/> Economy Two-Day Service	<input type="checkbox"/> Heavyweight Service (For Extra Large or any package over 150 lbs.)	<input type="checkbox"/> NOLADAY DELIVERY (in advance) (Extra charge)		Received At			State	Zip	Other:
<input type="checkbox"/> Heavyweight Service	<input type="checkbox"/> HEAVYWEIGHT**			<input type="checkbox"/> Regular Stop			Received By:		Other-2:
<input type="checkbox"/> HEAVYWEIGHT**	<input type="checkbox"/> SPECIAL HANDLING**			<input type="checkbox"/> Drop Box			Date/Time Received:		Total Charges:
<input type="checkbox"/> SPECIAL HANDLING**	<input type="checkbox"/> SPECIAL HANDLING**			<input type="checkbox"/> On-Call Stop			FedEx Employee Number:		REVISION DATE 8/90
<input type="checkbox"/> SPECIAL HANDLING**	<input type="checkbox"/> SPECIAL HANDLING**			<input type="checkbox"/> Batch			Signature:		PART 8119801 FCEN 8/90
<input type="checkbox"/> SPECIAL HANDLING**	<input type="checkbox"/> SPECIAL HANDLING**			FedEx Emp. No.:			Date/Time:		FORM 4041
<input type="checkbox"/> SPECIAL HANDLING**	<input type="checkbox"/> SPECIAL HANDLING**								041

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208 WELSH POOL ROAD
PICKERING CREEK INDUSTRIAL PARK
LIONVILLE, PA 19341-1313
PHONE: (215) 524-7360
TELEX: 83-5348

16 November 1990

Ms. Rhonda Yoder
Engineering-Science
1000 Jorie Blvd.
Suite 250
Oakbrook, IL 60521

Re: Final Report for Explosives Analysis for Crane NWSC
RFW# 9010L138

Dear Ms. Yoder:

Please find enclosed the final report, including the chain-of-custodies, for explosives analysis on your solid samples from Crane Naval Weapons Support Center received 13 October 1990.

Please contact me at (215) 524-7360, if you have any questions about the report or if you need additional services.

Very truly yours,

ROY F. WESTON, INC.

Gail E. DeRuzzo
Project Manager
Analytics Division

GD101:ES1113



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: ENGINEERING SCIENCE SAMPLES RECEIVED: 10-13-90
RWF #: 9010L138
W.O. #: 6286-01-01

EXPLOSIVE NARRATIVE

Samples have been prepared and analyzed according to USATHAMA Method LW02, Explosives in Soil.

The following QA/QC control samples have been analyzed concurrently with each extraction batch. Abbreviations noted below have been used in the data summary.

Abbreviation

Description

BLK = Reagent blank analyzed to provide an indication of lab contamination and its' effect on reported analytical data.

Samples (soil or water) are spiked with target compounds to provide precision and accuracy data.

MS = Designates sample spiked with target compound.

MSD = Designates sample spiked with target compound in duplicate.

Note: Soil results are reported in a dry weight basis.

Note: Sample NWSC-SS002-S required a five-fold dilution due to polymerization with the extraction solvent.

Note: Tetryl recoveries, although low, will not result in false negatives due to fact that the 5 ppm detection limit is easily obtained instrumentally.

Analysis Summary

Samples Collected: 10-11-90
Samples Prepared: 10-18-90
Samples Analyzed: 11-05,06-90

John Harold
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

11-14-90
Date

/sma

Roy F. Weston, Inc. - Lionville Laboratory
EXPS ANALYTICAL DATA PACKAGE FOR
ENGINEERING SCIENCE

DATE RECEIVED: 10/13/90

RFW LOT # :9010L138

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NWSC-SS001-S	001	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS002-S	002	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS004-S	003	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS005-S	004	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS006-S	005	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS007-S	006	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS008-S	007	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS008-S	007 MS	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS008-S	007 MSD	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS009-S	008	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS010-S	009	SO	90LLC023	10/11/90	10/18/90	11/06/90
NWSC-SS003-S	010	SO	90LLC023	10/11/90	10/18/90	11/06/90

LAB QC:

BLK	MB1	S	90LLC023	N/A	10/18/90	11/05/90
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Roy F. Weston, Inc. - Lionville Laboratory

Explosives in soil by HPLC

Report Date: 11/13/90 11:16

RFW Batch Number: 9010L138

Client: ENGINEERING SCIENCE

Work Order: 6286-01-01-0000

Page: 1

Cust ID: NWSC-SS001-S NWSC-SS002-S NWSC-SS004-S NWSC-SS005-S NWSC-SS006-S NWSC-SS007-S

Sample Information	RFW#:	001	002	003	004	005	006
	Matrix:	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
	D.F.:	1.00	5.00	1.00	1.00	1.00	1.00
	Units:	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g
HMX		1.27 U	6.35 U	1.27 U	1.27 U	1.27 U	1.27 U
RDX		0.98 U	4.90 U	0.98 U	0.98 U	0.98 U	0.98 U
1,3,5-TNB		2.09 U	10.4 U	2.09 U	2.09 U	2.09 U	2.09 U
1,3-DNR		0.59 U	2.95 U	0.59 U	0.59 U	0.59 U	0.59 U
Nitrobenzene		0.42 U	2.10 U	0.42 U	0.42 U	0.42 U	0.42 U
TETRYL		5.00 U	25.0 U	5.00 U	5.00 U	5.00 U	5.00 U
2,4,6-TNT		1.92 U	9.60 U	1.92 U	1.92 U	1.92 U	1.92 U
2,6-DNT		0.40 U	2.00 U	0.40 U	0.40 U	0.40 U	0.40 U
2,4-DNT		0.42 U	2.10 U	0.42 U	0.42 U	0.42 U	0.42 U

Cust ID: NWSC-SS008-S NWSC-SS008-S NWSC-SS008-S NWSC-SS009-S NWSC-SS010-S NWSC-SS003-S

Sample Information	RFW#:	007	007 MS	007 MSD	008	009	010
	Matrix:	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/g	ug/g	ug/g	ug/g	ug/g	ug/g
HMX		1.27 U	81 %	76 %	1.27 U	1.27 U	1.27 U
RDX		0.98 U	77 %	75 %	0.98 U	0.98 U	0.98 U
1,3,5-TNB		2.09 U	74 * %	73 * %	2.09 U	2.09 U	2.09 U
1,3-DNB		0.59 U	75 %	74 * %	0.59 U	0.59 U	0.59 U
Nitrobenzene		0.42 U	75 %	71 * %	0.42 U	0.42 U	0.42 U
TETRYL		5.00 U	37 * %	40 * %	5.00 U	5.00 U	5.00 U
2,4,6-TNT		1.92 U	109 %	92 %	1.92 U	1.92 U	1.92 U
2,6-DNT		0.40 U	80 %	76 %	0.40 U	0.40 U	0.40 U
2,4-DNT		0.42 U	77 %	75 %	0.42 U	0.42 U	0.42 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

June 24, 1991

**APPENDIX D
SUPPLEMENTAL LABORATORY DATA**



WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Dr. N.W.
North Canton, Ohio 44720

SUPPLEMENTAL DATA

PROJECT NO. CH054.01

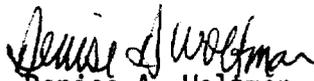
CRANE NWSC

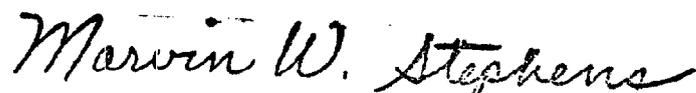
Presented to:

RHONDA YODER

ENGINEERING SCIENCE INC.

WADSWORTH/ALERT LABORATORIES, INC.

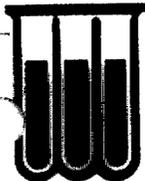

Denise A. Woltman
Project Manager


Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

December 24, 1990



CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Pittsburgh, Pennsylvania (412) 826-5477
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE (216) 497-9338



WADSWORTH/ALERT
LABORATORIES, INC.

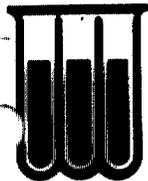
CASE NARRATIVE

This report contains the original uncorrected Base/Neutral and Acid Toxicity analytical results for the following six samples submitted to Wadsworth/ALERT Laboratories, Inc. by Engineering Science Inc. from the Crane NWSC Site, project number CH054.01:

<u>Client ID</u>	<u>Laboratory ID</u>
NWSC-SS001-S10/11/90	5565-23136
NWSC-SS003-S10/11/90	5565-23138
NWSC-SS004-S10/11/90	5565-23139
NWSC-SS005-S10/11/90	5565-23140
NWSC-SS007-S10/11/90	5565-23142
NWSC-SS010-S10/11/90	5565-23145

In all of the above samples, except lab sample ID #5565-23145, the bias correction spike was inadvertently added to the sample during the original extraction. The concentration of analytes recovered after spiking are reported here. By the time of analyses, this error was discovered and the recommended holding time from TCLP extraction to organic extraction of seven days was expired. The original submitted report contains the re-extracted data.

The base neutral acid toxicity analysis of lab sample ID #5565-23145 originally showed three acid surrogates to be out of control. Those results are presented here. The re-extracted, re-analysis for this sample was sent in the original report.



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	0.407/0.04	0	SEE NARRATIVE	200
1,4-Dichlorobenzene	0.158/0.04	0	SEE NARRATIVE	7.5
2,4-Dinitrotoluene	0.046/0.04	0	SEE NARRATIVE	0.13
Hexachlorobenzene	0.078/0.04	0	SEE NARRATIVE	0.13
Hexachlorobutadiene	0.13/0.04	0	SEE NARRATIVE	0.5
Hexachloroethane	0.118/0.04	0	SEE NARRATIVE	3
Nitrobenzene	0.054/0.04	0	SEE NARRATIVE	2
Pentachlorophenol	0.28/0.2	0	SEE NARRATIVE	100

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23136
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS001-S10/11/90 10-11-90 1130

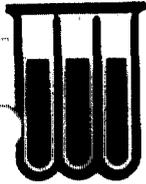
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	0.089/0.04	0	SEE NARRATIVE	5
2,4,5-Trichlorophenol	0.226/0.04	0	SEE NARRATIVE	400
2,4,6-Trichlorophenol	0.263/0.04	0	SEE NARRATIVE	2

NOTE: Bias Correction Factor determined on sample : 23136
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS003-S10/11/90 10-11-90 1230

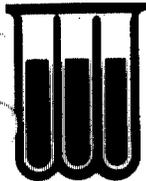
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	0.213/0.04	0	SEE NARRATIVE	200
1,4-Dichlorobenzene	0.26/0.04	0	SEE NARRATIVE	7.5
2,4-Dinitrotoluene	0.047/0.04	0	SEE NARRATIVE	0.13
Hexachlorobenzene	0.072/0.04	0	SEE NARRATIVE	0.13
Hexachlorobutadiene	0.258/0.04	0	SEE NARRATIVE	0.5
Hexachloroethane	0.244/0.04	0	SEE NARRATIVE	3
Nitrobenzene	0.066/0.04	0	SEE NARRATIVE	2
Pentachlorophenol	0.162/0.2	0	SEE NARRATIVE	100

NOTE: Bias Correction Factor determined on sample : 23138
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23138
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSO-SS003-S10/11/90 10-11-90 1230

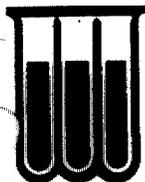
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	0.112/0.04	0	SEE NARRATIVE	5
2,4,5-Trichlorophenol	0.195/0.04	0	SEE NARRATIVE	400
2,4,6-Trichlorophenol	0.192/0.04	0	SEE NARRATIVE	2

NOTE: Bias Correction Factor determined on sample : 23138
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS004-S10/11/90 10-11-90 1245

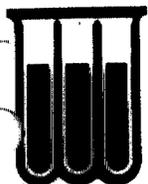
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	0.434/0.04	0	SEE NARRATIVE	200
1,4-Dichlorobenzene	0.246/0.04	0	SEE NARRATIVE	7.5
2,4-Dinitrotoluene	0.04/0.04	0	SEE NARRATIVE	0.13
Hexachlorobenzene	0.075/0.04	0	SEE NARRATIVE	0.13
Hexachlorobutadiene	0.25/0.04	0	SEE NARRATIVE	0.5
Hexachloroethane	0.232/0.04	0	SEE NARRATIVE	3
Nitrobenzene	0.062/0.04	0	SEE NARRATIVE	2
Pentachlorophenol	0.243/0.2	0	SEE NARRATIVE	100

NOTE: Bias Correction Factor determined on sample : 23139
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23139
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWS-SS004-S10/11/90 10-11-90 1245

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	0.106/0.04	0	SEE NARRATIVE	5
2,4,5-Trichlorophenol	0.21/0.04	0	SEE NARRATIVE	400
2,4,6-Trichlorophenol	0.252/0.04	0	SEE NARRATIVE	2

NOTE: Bias Correction Factor determined on sample : 23139
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS005-S10/11/90 10-11-90 1300

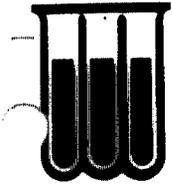
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	0.445/0.04	0	SEE NARRATIVE	200
1,4-Dichlorobenzene	0.248/0.04	0	SEE NARRATIVE	7.5
2,4-Dinitrotoluene	0.042/0.04	0	SEE NARRATIVE	0.13
Hexachlorobenzene	0.073/0.04	0	SEE NARRATIVE	0.13
Hexachlorobutadiene	0.251/0.04	0	SEE NARRATIVE	0.5
Hexachloroethane	0.243/0.04	0	SEE NARRATIVE	3
Nitrobenzene	0.066/0.04	0	SEE NARRATIVE	2
Pentachlorophenol	0.195/0.2	0	SEE NARRATIVE	100

NOTE: Bias Correction Factor determined on sample : 23140
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23140
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SSC05-S10/11/90 10-11-90 1300

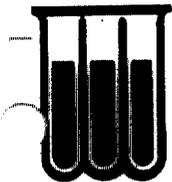
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	0.107/0.04	0	SEE NARRATIVE	5
2,4,5-Trichlorophenol	0.245/0.04	0	SEE NARRATIVE	400
2,4,6-Trichlorophenol	0.275/0.04	0	SEE NARRATIVE	2

NOTE: Bias Correction Factor determined on sample : 23140
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS007-S10/11/90 10-11-90 1515

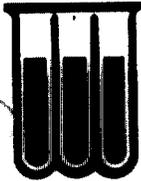
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	0.03/0.04	0	SEE NARRATIVE	200
1,4-Dichlorobenzene	0.222/0.04	0	SEE NARRATIVE	7.5
2,4-Dinitrotoluene	0.052/0.04	0	SEE NARRATIVE	0.13
Hexachlorobenzene	0.07/0.04	0	SEE NARRATIVE	0.13
Hexachlorobutadiene	0.23/0.04	0	SEE NARRATIVE	0.5
Hexachloroethane	0.21/0.04	0	SEE NARRATIVE	3
Nitrobenzene	0.062/0.04	0	SEE NARRATIVE	2
Pentachlorophenol	ND/0.2	0	SEE NARRATIVE	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23142
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC--SS007-S10/11/90 10-11-90 1515

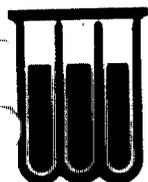
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Pyridine	0.107/0.04	0	SEE NARRATIVE	5
2,4,5-Trichlorophenol	0.096/0.04	0	SEE NARRATIVE	400
2,4,6-Trichlorophenol	0.04/0.04	0	SEE NARRATIVE	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

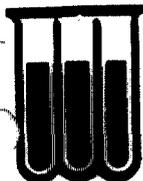
SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
Cresol (o, m & p)	ND/0.04	0.35	ND/0.11	200
1,4-Dichlorobenzene	ND/0.04	0.552	ND/0.07	7.5
2,4-Dinitrotoluene	ND/0.04	0.48	ND/0.08	0.13
Hexachlorobenzene	ND/0.04	0.76	ND/0.05	0.13
Hexachlorobutadiene	ND/0.04	0.595	ND/0.07	0.5
Hexachloroethane	ND/0.04	0.648	ND/0.06	3
Nitrobenzene	ND/0.04	0.67	ND/0.06	2
Pentachlorophenol	ND/0.2	0.165	ND/1.2	100

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit: estimated value)



WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ENGINEERING SCIENCE INC.
LAB #: 5565-23145
MATRIX: SOLID

DATE RECEIVED: 10/13/90
DATE EXTRACTED: 10/25/90
DATE ANALYZED: 11/ 1/90
UNITS: mg/l

SAMPLE ID: NWSC-SS010-S10/11/90 10-11-90 1545

SEMIVOLATILE EXTRACTABLE ORGANICS
TCLP TOXICITY CHARACTERISTIC LIST -2

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching
Procedure Method 1311 (55 FR 26986)

TCLP EXTRACTION DATE: 10/18/90

	RESULT/DET. LIMIT	CF	BIAS CORRECTED RESULT/DET. LIMIT	REGULATORY LIMIT
-Pyridine	ND/0.04	0.605	ND/0.07	5
✓ 2,4,5-Trichlorophenol	ND/0.04	0.345	ND/0.12	400
✓ 2,4,6-Trichlorophenol	ND/0.04	0.362	ND/0.11	2

NOTE: Bias Correction Factor determined on sample : 23142
ND (None Detected)
CF (Bias Correction Factor)
** (No Bias Correction performed above Regulatory Limit)
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
		WATER
Nitrobenzene-d5	52	(35-114)
Fluorobiphenyl	62	(43-116)
Terphenyl-d14	93	(33-141)
2-Fluorophenol	7*	(21-100)
Phenol-d5	5*	(10-94)
2,4,6-Tribromophenol	0*	(10-123)

June 24, 1991

**APPENDIX E
FIELD NOTES**

ENGINEERING-SCIENCE, INC.
1000 JORIE BLVD.; SUITE 200
250

DAK BROOK, IL 60521
(708) 990-7200

CRANE NWSC



CROSS SECTION BOOK

No. 8152-75

Property of ENGINEERING-SCIENCE, INC

1000 Jorie Blvd.

Address

Suite 250

OAK BROOK, IL 60521

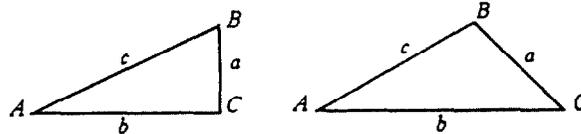
Phone

(708) 990-7200

This Book is manufactured of a High Grade
50% Rag Ledger Paper having a Water Resist-
ant Surface, and is sewed with Nylon Water-
proof Thread.

Made in U. S. A.

FORMULAE FOR SOLVING RIGHT TRIANGLES



$$\sin A = \frac{a}{c} = \cos B \quad \cot A = \frac{b}{a} = \tan B$$

$$\cos A = \frac{b}{c} = \sin B \quad \sec A = \frac{c}{b} = \operatorname{cosec} B$$

$$\tan A = \frac{a}{b} = \cot B \quad \operatorname{cosec} A = \frac{c}{a} = \sec B$$

Given	Required	Solution
A, c	B, a, b	$B = 90^\circ - A, a = C \sin A, b = C \cos A.$
A, b	B, a, c	$B = 90^\circ - A, a = b \tan A, C = \frac{b}{\cos A}.$
A, a	B, b, c	$B = 90^\circ - A, b = a \cot A, C = \frac{a}{\sin A}.$
a, c	A, B, b	$\sin A = \frac{a}{c}, \cos B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}, \cot B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}, c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180^\circ - C, C = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a+b+c}{2}$, area = $\sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area = $\frac{bc \sin A}{2}$
A, B, C, a	Area	area = $\frac{a^2 \sin B \sin C}{2 \sin A}$

~~Sept~~ (24)

10/11/90

①

October 11, 1990

Arrived at Crane Naval Weapons Support Center at 8:30 and received directions to the Environmental division.

Asked for Jim Hunsicker was told he was in a meeting. Tom spoke with Jerry McCrackin and they will both escort us to the old Burn Pit area.

Pit #1

We will sample from 2 drums protruding from the walls of this area. Jerry McCrackin said that the metal scrap was pushed over from the Burn trench.

Pit #2

We will take 3 samples from this area and one will be from the creek bottom as agreed on with Jerry McCrackin. Again this has been pushed over from Burn trench.

* Meteorological Conditions *

Sunny, Clear

temp 45°F

Windless

②

10/11/90

Bob Scalamera, ES

Rhonda Yoder, ES

Tom Brent, USN (812) 854-3114

Jerry McCracken, USN "

~~my fault~~

10/90

10/11/90 (3)

Sampling Area

forested, predominantly young deciduous and evergreen, ground shrubs.

Southern edge Sampling Area former landfill, i.e. Sampling Area gully carved by water with steep slopes.

North of gully rising ground natural network of hills and draws in area.

^{main} Sampling Area is bordered on the East by an artificial fill supporting a road; immediately east of this road is the gully with the two barrels sampled for their contents. There are other barrels and metal scrap in this area.

The main sampling area is a southwest trending gully, with its south wall studded with barrels and metal scrap. The (disused and capped) burn pit to the South has been leveled and planted with evergreen trees. The south wall of the gully appears to have achieved its present condition from the fill and leveling of the burn pit being pushed in this direction.

4

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[Handwritten signature]

9:30

10/11/90

(5)

Bob S is Calibrating the PID ES #12
We will take readings from each of the
two gully areas

The tip seemed sporadic so Bob decided to
change the filter. The tip quieted down

9:50 Gully #1

Read background from PID tip #12
located and photographed 2 sample points
#1 and #2

10:00

Before entering Gully #2 we asked Jerry McCrackin
if another contractor on site could drive his
loader and backhoe through the brush to break
up some of the foliage. We showed them
where we would like to enter the gully at.

10:13 Gully #2

Read background from PID tip #12
located and photographed 8 sample points #3-10.

Saw a Monitoring well (#5/8) on the northern
side of Main Gully

Finished taking photos of Area.

All sampling done IAW ES protocols and the
particulars of this task assignment from the client.

6

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My Aunt

11:15

10/11/90

(7)

prepared bottles and equipment to
sample the East Gulley. SS001 and SS002.

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
TCLP METALS
TIME: 1130

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1130

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1130

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
8240 (TCLP)
TIME: 1130

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
EXPLOSIVES (LW02)
TIME: 1130

SS001
- Barrel Sample
- material inside
barrel was
scoped out.

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
8270 (TCLP)
TIME: 1130

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS001-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1130

(8)

10/11/90

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
TCLP METALS
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
EXPLOSIVES (LW02)
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
8270 (TCLP)
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1145

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS002-S10/11/90
8240 (TCLP)
TIME: 1145

SS002
- Material from inside
barrel

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
TCLP METALS
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
EXPLOSIVES (LW02)
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
8270 (TCLP)
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1230

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS003-S10/11/90
8240 (TCLP)
TIME: 1230

SS003
- Soil from below (down slope)
several barrels

10/11/90 (9)

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
TCLP METALS
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
TCLP METALS
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
EXPLOSIVES (LW02)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
EXPLOSIVES (LW02)
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
8270 (TCLP)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
8270 (TCLP)
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1300

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS004-S10/11/90
8240 (TCLP)
TIME: 1245

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS005-S10/11/90
8240 (TCLP)
TIME: 1300

SS004

(down slope)
- Soil from marshy area at base of slope.

SS005

- Soil from area downslope from several barrels.

10/10/11/90

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
TCLP METALS
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
EXPLOSIVES (LW02)
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
8270 (TCLP)
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1500

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS006-S10/11/90
8240 (TCLP)
TIME: 1500

SS 006

- Soil from underneath the barrel labeled, "POW Chloro there".

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
TCLP METALS
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
EXPLOSIVES (LW02)
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
8270 (TCLP)
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1515

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS007-S10/11/90
8240 (TCLP)
TIME: 1515

SS 007

- Sample from under wet area exhibiting sheen.

CH054.01
10/11/90

CH054.01
10/11/90
8080 (PCB's)

CH054.01
10/11/90

CH054.01
10/11/90

CH054.01
10/11/90
8080 (TCLP PESTICIDES)

CH054.01
10/11/90
8150 (TCLP HERBICIDES)

CH054.01
10/11/90

CH054.01
10/11/90
under wet
sheen.

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
TCLP METALS
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
EXPLOSIVES (LW02)
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
8270 (TCLP)
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1530

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS008-S10/11/90
8240 (TCLP)
TIME: 1530

SS008
- Sample from under
wet area exhibiting
sheen.

10/11/90 (13)

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
TCLP METALS
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
EXPLOSIVES (LW02)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
8270 (TCLP)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS009-S10/11/90
8240 (TCLP)
TIME: 1545

SS009
- Soil from down slope of
several drums.

(12) 10/11/90

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
TCLP METALS
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
REACT. CYANIDE, pH
REACT. SULFIDE, 8080 (PCB's)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
EXPLOSIVES (LW02)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
8270 (TCLP)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
8080 (TCLP PESTICIDES)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
8150 (TCLP HERBICIDES)
TIME: 1545

E-S/CRANE NWSC/CH054.01
ID #: NWSC-SS010-S10/11/90
8240 (TCLP)
TIME: 1545

SS 010

- Sample of stream-bottom
sediments from a point
downstream of all bays.

All samples were
immediately placed on
ice

bottom
print
level.

11:30

(13)

Samples were also taken back to Hotel Room for proper packaging

The samples were all wrapped in bubble wrap. Each bottle was sealed individually in a Ziploc baggie

Three coolers were prepared for Wadsworth Alert Laboratories North Canton Ohio

ES chain of Custody 1165, 1166, and 1167
All Analysis except explosive

12:00

one cooler was prepared for Weston Analytix Lionville, Pennsylvania

ES chain of Custody 1170 (COC 1170)

only the explosive analysis sent to Weston
The COCs were taped inside the cooler lids. The following Fed Ex Air bill numbers were used

Wadsworth
Fed Ex
9145277696
Priority overnight

Weston
Fed Ex
8073653012
Priority overnight

Samples kept on ice

(14) 10/12/90

1200 Dropped 4 sample coolers off
at Federal Express

drove back to Oak Brook

June 24, 1991

**APPENDIX F
RESPONSE TO USEPA COMMENTS**

June 24, 1991

The following comments are made in response to a letter from Mr. Karl E. Bremer, Chief RCRA Permitting Branch, received by Commander J. Hayes, Public Works officer, NWSC on May 31, 1991, a copy of which is attached. We have addressed the issues and problems the USEPA has raised in the letter in numerical order as follows:

1. Section 1.2 in the report has been modified to more clearly state the objective of this project.
2. The references used to prepare Table 3.2 have been added to the table in Section 3.0 of the report.
3. The contractor was made aware of the safety procedures and risks involved in the sampling activity. The sampling work did not include handling any liquids or chemicals, and dust was not created. Safety glasses would not have provided additional protection to the samplers. The ES employee has been informed of the situation and reported to the ES Health and Safety Officer.
4. The sample coolers were sealed with reinforced tape and hand delivered to Federal Express where they were delivered priority overnight service to the laboratories. There was minimal handling of the coolers between the time ES relinquished the samples and the time the laboratory received the samples. The laboratory receipt documentation does not indicate obvious tampering with samples.
5. When the samples were shipped to the laboratories the explosive analysis was sent to Weston Analytics (Weston), and the remaining work went to Wadsworth/ALERT Laboratories, Inc. (Wadsworth). Wadsworth received the extra aliquot not identified on their chain-of-custody papers and contacted ES. ES gave the instruction to package the sample as it was received and to send it to Weston. This was done and Weston received the aliquot on October 16, 1990, adding it to the batch received on October 13, 1990.
6. The SWMU 05/03 was not identified on the chain-of-custody records. A memorandum titled, "Amendment to Chain-of-Custody Records," was issued on June 24, 1991. This memorandum states the SWMU 05/03 should be identified with each chain-of-custody. A copy of the memorandum is included in Appendix C, along with the laboratory results.
7. A copy of the field notes has been added to the report as Appendix E.

June 24, 1991

8. The sample collection work was completed at the Old Burn Pit on October 11, 1990. Samples were collected until 3:45 P.M. The overnight shipping service picked up at 5:00 P.M. ES personnel had collected the samples and labeled the bottles appropriately by 3:45 P.M. The bottles still needed to be individually wrapped in packing material sealed in ziploc bags and the coolers labeled for shipping. This was not completed in time for overnight delivery. Samples were kept in a locked area within eye site of ES personnel until delivered to Federal Express on October 12, 1990. The samples were delivered priority overnight and received at both laboratories at 10:00 A.M. on October 13, 1990. There is a discrepancy on two chain-of-custodies received by Wadsworth. Ms. Tera Sloan wrote the receiving date on two of the forms as October 15, 1991, but the "log in" date for all samples was October 13, 1991. The date was correctly written on the first chain-of-custody and on the Wadsworth cooler receipt form.

MAY 31 1991

5HR-13

CERTIFIED MAIL P 768 550 379
RETURN RECEIPT REQUESTED

Commander J. Hays
Public Works Officer
Building 2516
Naval Weapons Support Center
Crane, Indiana 47522

RE: Interim Measure Sampling
Old Burn Pit
Naval Weapons Support Center
Crane, Indiana
IN5 170 023 498

Dear Commander Hays:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the draft Interim Measure Sampling Report for the Old Burn Pit, Solid Waste Management Unit (SWMU) 05/03, dated November 19, 1990. The U.S. EPA hereby provides modifications of the draft report as follows:

1. It should be made clear in the report that the purpose of the sampling was to determine if the drums and debris could be removed, and their classification as a hazardous or a solid waste. Based on the available data for the unit, there appears to be no documentation to show that the waste was characteristic or not (by doing the TCLP and reactivity tests). The data shows that the waste is not characteristic, and may be handled as a solid waste. The management of the debris should be consistent with solid waste requirements.
2. Table 3.2 should explain what references were used for the regulatory limits.

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3. It should be made clear to all contractors that the workplans have safety procedures that must be followed. The plan stated that safety glasses would be worn, and the female sampler from Engineering-Science was not wearing any glasses. Contractors must follow safety procedures or they should not be sampling.
4. Sample custody seals on the bottles and the cooler must be used. The Custody Transfer Record indicates that seals were not used. All the samples could be considered questionable based on the lack of custody seals. An explanation clarifying the integrity of the samples must be included.
5. An explanation must be given in the report as to why sample SS003-S was received by the lab three days after the sampling in a separate shipping package, without any chain-of-custody paperwork, and no explanation as to why it was not sent with the other samples. This sample result is questionable based on the lack of chain-of-custody and proper sample handling. An explanation clarifying the integrity of the samples must be included.
6. All chain-of-custody records must identify the SWMU being sampled.
7. Field notes from the sampling must be attached as an appendix to the report.
8. If samples are taken during the day, they should be shipped that night, if the crew is able to get to an overnight shipping service before it closes, instead of waiting until the next day. At the Old Burn Pit sampling, the samples were taken on Thursday 10/11 until 3:45 PM, and were not shipped until Friday 10/12 at 12:00 PM, and were received by the lab on Monday 10/15 at 10:00 AM.

A finalized sampling report, addressing these modifications, must be submitted to this office within 60 days of the date of this letter.

If you have any questions regarding this matter, please contact Ms. Carol Witt-Smith of my staff, at (312) 886-6146, for assistance.

Sincerely,

ORIGINAL SIGNED BY/
HAK K. CHO

Karl E. Bremer, Chief
RCRA Permitting Branch