



ecology and environment, inc.

International Specialists in the Environment

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Tallahassee, Florida 32303
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October 4, 1996

Department of the Army
Jacksonville Army Corps of Engineers
CESAJ-PD-EE
Attn: Ivan Acosta, Planning Division
400 West Bay Street
Jacksonville, Florida 32232-0019

**Re: Site Investigation Report for the Culebra Island National Wildlife Refuge Site,
Culebra Island, Puerto Rico (DERP-FUDS Site No. IO2PR006800; Contract No.
DACW17-95-D-0010; Delivery Order No. 2)**

Dear Mr. Acosta:

On July 19, 1996, Ecology and Environment, Inc., (E & E) conducted investigation activities at the above-referenced site to determine whether soil and/or groundwater contamination is present in the vicinity of a wetland area apparently used for disposal of debris between 1940 and 1975. This report provides a brief summary of the facility history, the hydrogeologic setting, and a discussion of the results of the investigation.

Site Description

The Culebra Island National Wildlife Refuge site consists of an approximately 100 by 400 foot section of marine wetland along the eastern shoreline of Ensenada del Cementerio adjacent to the Department of Conservation auto shop facility. The property is currently under the jurisdiction of Puerto Rico Department of Natural Resources and is part of the Culebra Island National Wildlife Refuge (see Figure 2).

Debris is scattered along approximately 400 feet of the shoreline and extends from 20 to 100 feet into the wetland. The largest concentration of debris occupies an area approximately 120 by 40 feet (see Figure 2). The debris consists primarily of highly-rusted metal building materials such as steel beams and rods, corrugated steel sheeting and bolts. Other material observed in the wetland area includes broken glass and automobile parts. The eastern edge of the wetland area is approximately 180 feet west (downslope) of a 35 by 160-foot concrete foundation. The foundation was formerly a bathroom facility and is currently used as the Department of Conservation Automotive Maintenance facility. The hillside between the automotive maintenance facility and the wetland area is scattered with auto body parts and corrugated steel sheeting that appears relatively new (within 10 to 15 years). Figure 2 shows the site layout; photographs of the site are included as Attachment A.

There are no fresh-water bodies, streams, or supply wells in the immediate vicinity of the site. However, the intake for the desalinization plant, the only source of municipal supply

water for the island, is located in the Ensenada Honda Bay, 50 to 100 feet offshore and approximately 700 feet south of the debris area.

Site History

From the early 1940s until 1980, the area to the east of the wetland was used as a housing facility by the U.S. Navy. The concrete foundation, currently occupied by the Department of Conservation auto shop, was previously a bathroom facility. Between the early 1940s and 1980, various materials were apparently discarded into the wetland area west of the bathroom facility. In September 1980, the Navy transferred the property to the U.S. Department of Interior, Fish and Wildlife Service, and it is now the Culebra Island National Wildlife Refuge under the control of the Puerto Rico Department of Natural Resources.

Hydrogeology

The island of Culebra is located approximately 17 miles east of Puerto Rico and 9 miles north of the Island of Vieques. Culebra Island has an area of approximately 10 square miles. The dominant features of the island are two ridges: one trending northwest-southeast and the other trending east-west. The highest elevation on the island is 650 feet above mean sea level.

Culebra Island is composed of volcanic and intrusive rocks, primarily andesite lava and tuff, of the late Cretaceous Age. The lava and tuff have been intruded by diorite in the north-central portion of the island. Alluvial deposits of silt, clay, sand, and gravel are located primarily in the larger stream valleys near the coast and interfinger with coral beach sand and organic silt and clay deposited in mangrove areas.

The principal aquifer on Culebra Island is the fractured andesite and tuff. The estimated storage capacity is less than 1 percent by volume. Roof top catchments and desalinization are the primary sources of fresh water supply. Before the construction of the desalinization plant in 1971, the principal source of municipal water supply for Culebra was a municipal well field located in the central portion of the island. The well field consists of five wells, 55 to 70 feet deep, constructed during the mid-1960s. The wells yield approximately 20 gallons per minute each; however, the water is very high in mineral concentrations and no longer used for potable supply.

The site is a mangrove area with organic silts and clays underlain by andesite lava. The andesite lava outcrops in several areas along the hillside immediately east of the mangrove wetland. The water desalinization plant is located approximately 1,000 feet northeast of the site.

Sediment/Soil Samples

A total of three borings were completed within the wetland in the area of most concentrated debris (see Figure 2). The depth to water was approximately 0.3 foot below ground surface (BGS). Boring B-1 was completed to 4 feet BGS and borings B-2 and B-3 were completed to 2 feet BGS. The lithology at each boring location from ground surface to the completion depth was characterized as black organic silt and peat. Composite samples were collected at 2 foot intervals from the surface to the completion depth of each boring (see Table 1).

Mr. Ivan Acosta
October 4, 1996
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An organic vapor analyzer (OVA) was used to measure the headspace vapors for each 2-foot composite sample. Headspace readings ranged between 30 and 68 ppm with some methane contribution to the total readings (see Table 1). No petroleum odor or visible evidence of petroleum contamination was detected in any of the samples.

Soil samples from the 0 to 2 foot intervals of soil borings B-1 and B-2 were collected and analyzed for purgeable aromatic hydrocarbons (EPA Method 8020), purgeable aromatic halocarbons (EPA Method 8011), ethylene dibromide (EDB; EPA Method 8010 modified), polynuclear aromatic hydrocarbons (PAHs; EPA Method 8310), total recoverable petroleum hydrocarbons (TRPHs; EPA Method 418.1), and eight metals (EPA Methods 6010 and 7471). The results are summarized on Table 3; the complete analytical report is presented as Attachment B.

As shown on Table 2, elevated concentrations of various metals and benzo(k)fluoranthene were present in samples from both soil borings. The highest concentrations were detected in boring B1. The sample from B1 also contained an elevated TRPH concentration.

Groundwater Sample

A single 2-inch diameter, temporary monitoring well, screened from 0.5 foot to 5 feet BGS was installed in the wetland area immediately adjacent to the location of soil boring B-1. A groundwater sample was collected from the well using a teflon bailer and analyzed for purgeable aromatic hydrocarbons (EPA Method 8020), purgeable aromatic halocarbons (EPA Method 8020), EDB (EPA Method 8011), PAHs (EPA Method 8310), TRPHs (EPA Method 418.1), total and dissolved lead, arsenic, cadmium, chromium, barium, selenium, silver, and mercury (EPA Methods 7421, 7470, and 6010). As shown on Table 2, the water sample contained elevated concentrations of several total metals; however, only low concentrations of dissolved barium and lead were detected. No organics were detected in the water sample.

Conclusions

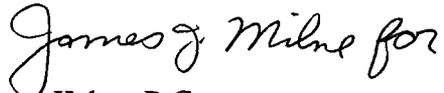
The results of this limited investigation revealed that the soil/sediments have been impacted by metals and to a lesser extent by benzo(k)fluoranthene in the vicinity of B1 and B2. Although these sample locations were selected based on their proximity to abundant metal debris and were intended to represent "worst case" conditions, it is not known to what extent that soils/sediments have been impacted in other areas of the site. With regard to the single groundwater sample, elevated levels of several metals were present in the total-unfiltered sample; however, only lead and barium were detected at much lower concentrations in the dissolved samples. This indicates that the metals are primarily associated with sediments in the groundwater. No organics were detected in the groundwater sample.

Mr. Ivan Acosta
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If you have any questions or comments regarding these results, please call me or Jim Milne at (904) 574-1400.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.



Perry Kelso, P.G.
Project Geologist

PK/ddb

Attachments

cc: J. Milne; E & E—Tallahassee
D. Bowman; E & E—Tallahassee

Table 1				
OVA HEADSPACE DATA CULEBRA ISLAND NWR SITE (July 19, 1996)				
Soil Boring Number	Sampling Interval (feet BGS)	OVA Headspace Reading (ppm)		
		Total	Methane Filtered	Corrected for Methane
B-1	(0-2)	30	16	14
B-1	(2-4)	39	33	6
B-2	(0-2)	68	45	23
B-3	(0-2)	0	0	0

Key:

OVA = Organic vapor analyzer.

ppm = Parts per million.

Table 2				
SUMMARY ANALYTICAL RESULTS—SEDIMENT/SOIL AND GROUNDWATER SAMPLES CULEBRA ISLAND NWR SITE (July 19, 1996)				
Parameter	Soil Samples (mg/kg)		Groundwater Sample ($\mu\text{g/L}$)	
	B-1 (0-2)	B-2 (0-2)	MW1	
TRPHs	660	ND	ND	
Benzo(k)fluoranthene	16	0.24	ND	
Metals			Total ^a	Dissolved ^b
Arsenic	17	8.6	220	(ND)
Barium	540	120	2,300	(54)
Chromium	38	7.6	750	(ND)
Lead	460	52	4,700	(9.8)
Selenium	ND	0.94	29	(ND)
Mercury	0.17	0.049	0.82	(ND)

^a Total (unfiltered) metals concentration.

^b Filtered (0.45 micron) metals concentration.

Key:

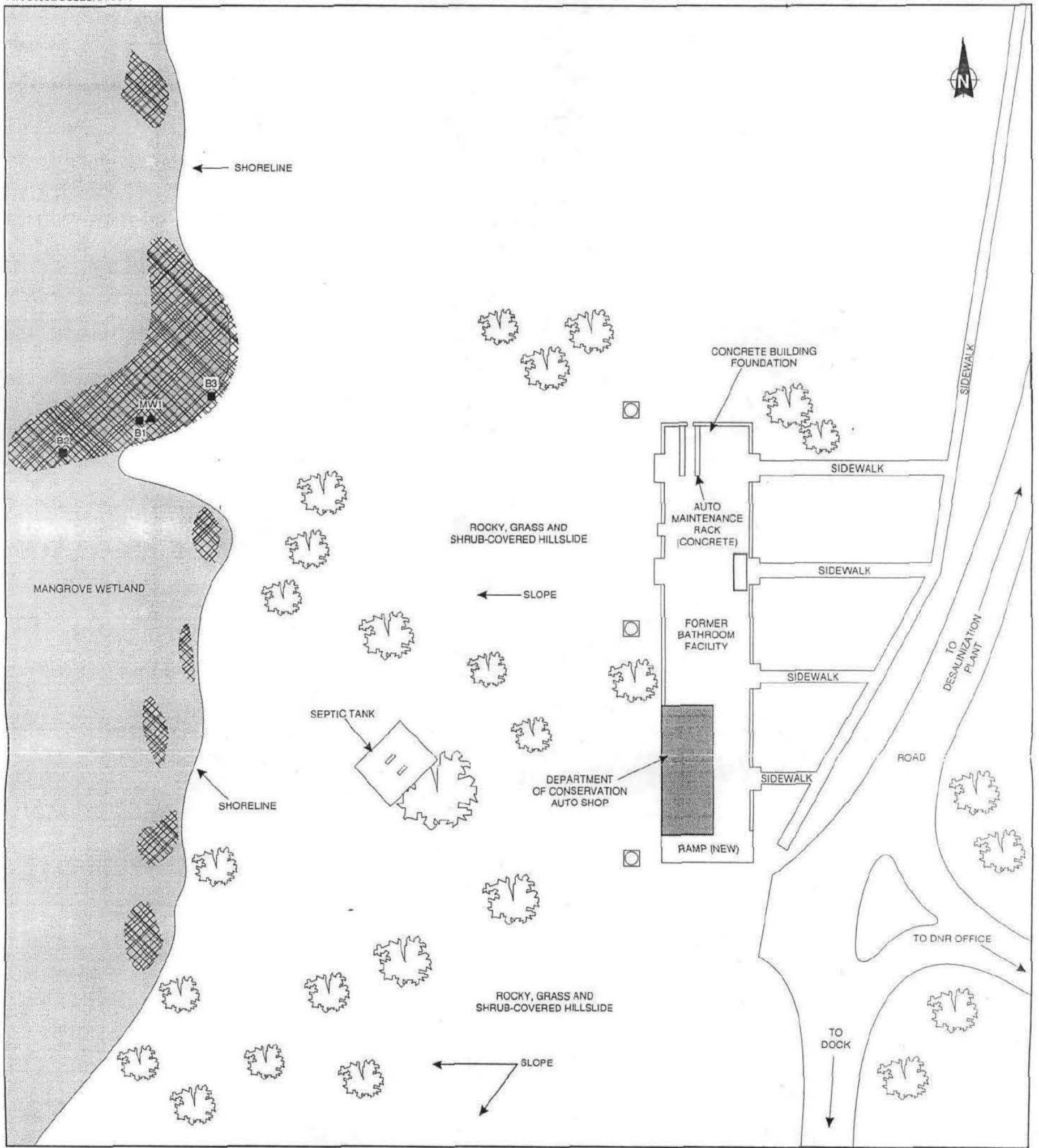
$\mu\text{g/kg}$ = Micrograms per kilogram.

$\mu\text{g/L}$ = Micrograms per liter.

NA = Not applicable.

ND = Not detected.

TRPHs = Total recoverable petroleum hydrocarbons.



SOURCE: Ecology and Environment, Inc., 1996

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KEY:

-  Tree
-  Building
-  Septic System Manway
-  Sediment Sampling Location
-  Visible Areas of Metal Debris
-  Monitoring Well

Figure 2 SITE MAP -- CULEBRA ISLAND NATIONAL WILDLIFE REFUGE, CULEBRA ISLAND, PUERTO RICO

ATTACHMENT A
SITE PHOTOGRAPHS

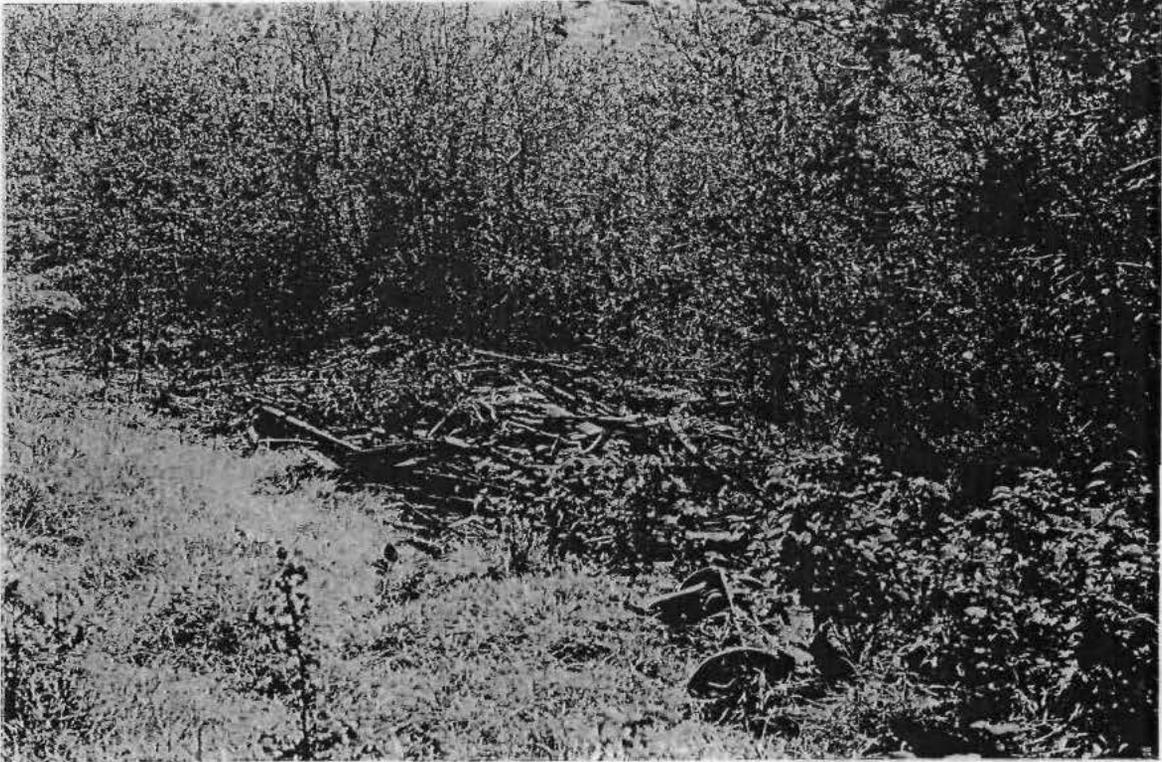
PHOTOGRAPH DOCUMENTATION LOG

Site Culebra Island National Wildlife Refuge

Camera/Lens Minolta X-370 SLR/50mm Serial No. NA

Photo Number	Date	Subject	Direction	Photographer
1	7-19-96	View from airplane.	Northeast	P. Kelso
2	7-19-96	Former bathroom facility concrete foundation and Department of Conservation auto shop.	South	P. Kelso
3	7-19-96	Metal debris in wetland area.	West	P. Kelso
4	7-19-96	Metal debris in wetland area.	North	P. Kelso

PHOTOS



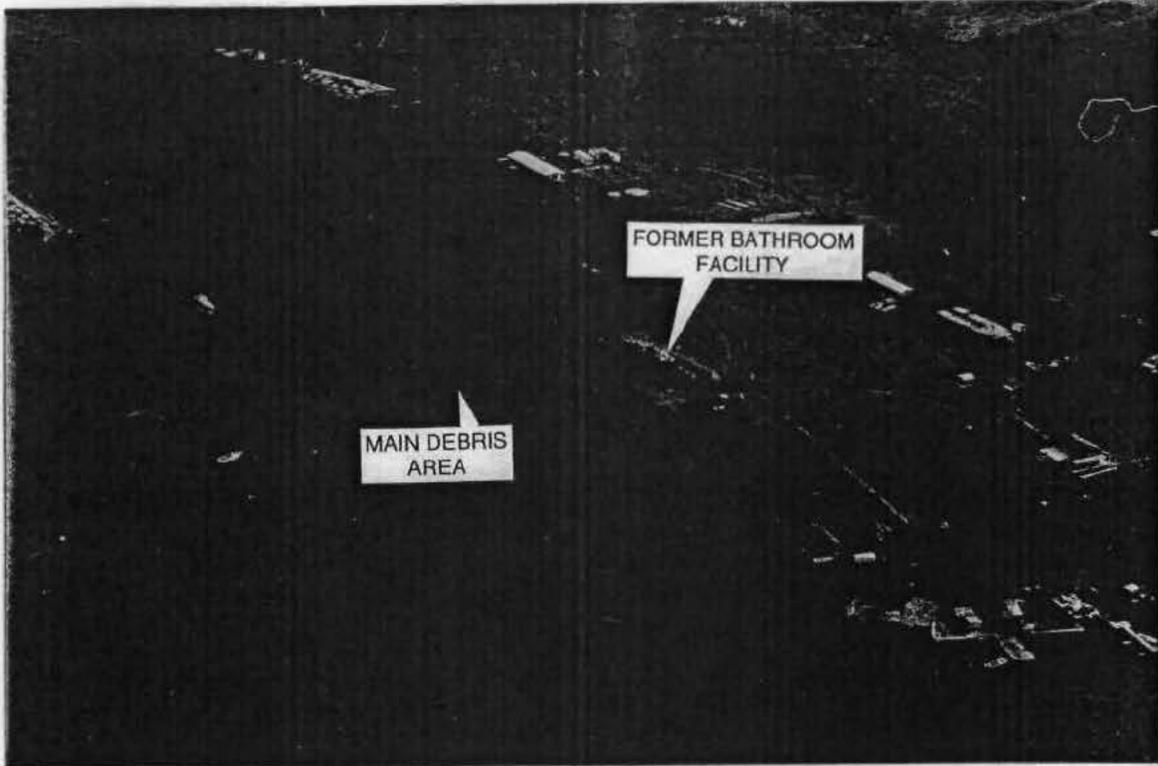
3. Culebra Island NWR (metal debris in wetland area)



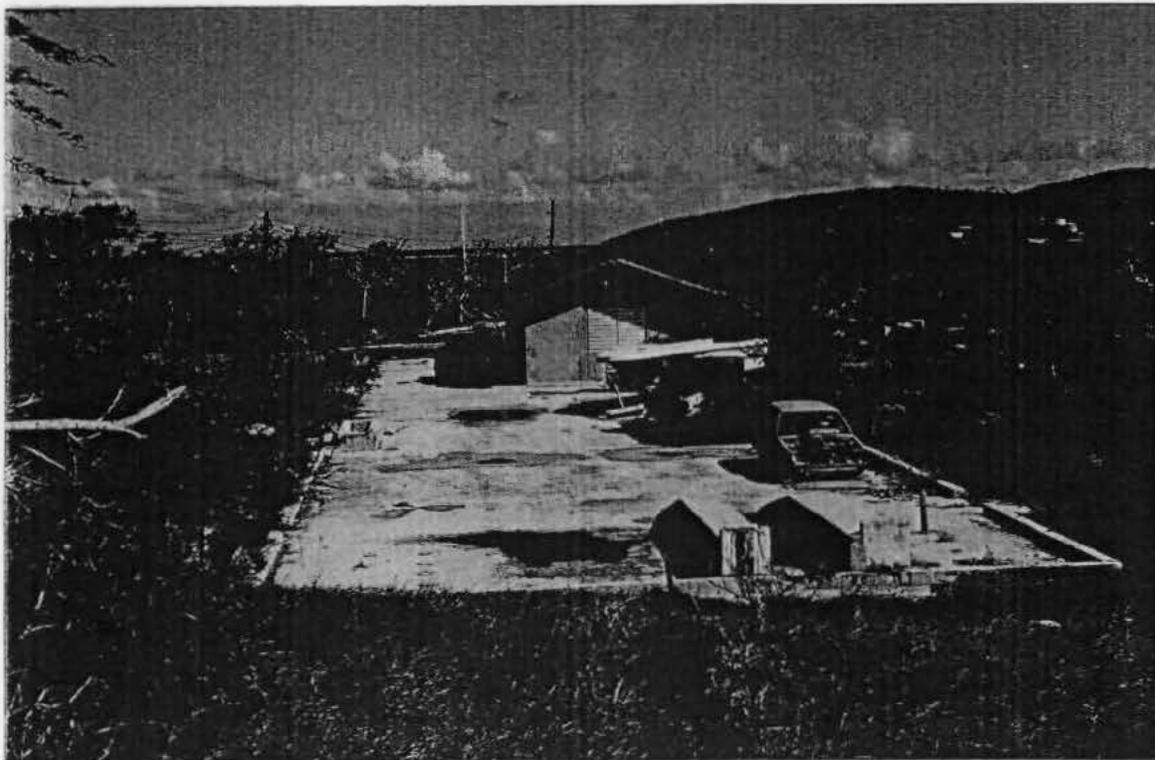
4. Culebra Island NWR (metal debris in wetland area)

Source: Ecology and Environment, Inc., 1996.

PHOTOS



1. Culebra Island NWR (view from airplane)



2. Culebra Island NWR (former bathroom foundation and auto shop)

Source: Ecology and Environment, Inc., 1996.

ATTACHMENT B
ANALYTICAL REPORT
July 19, 1996

MEMORANDUM

TO: Debra Bowman
FROM: Gary Hahn *Gary Hahn kr*
DATE: August 7, 1996
SUBJECT: JC-6000 INPRS and Site Investigations
Culebra NWR
U.S.A.C.E. Jacksonville Report
RE: 9601.532
CC: Lab File

Attached is the laboratory report of the analysis conducted on four samples received at the Analytical Services Center on July 23, 1996. Analysis was performed according to the procedures set forth in "Methods for the Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983 and "Test Methods for Evaluating Solid Waste; Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.

The chain of custody form provided herein is integral to this report and must be included with the analytical results forms upon transferral to another data user.

All samples on which this report is based will be retained by E & E for a period of 30 days from the date of this report, unless otherwise instructed by the client. If additional storage of samples is requested by the client, a storage fee of \$1.00 per sample container per month will be charged for each sample, with such charges accruing until destruction of the samples is authorized by the client.

GH/kr
Enclosure

Ecology and Environment, Inc.
Analytical Services Center
Cooler Receipt Form

PACKAGE RECEIPT #: 1318 NUMBER OF COOLERS: 1 DATE RECEIVED: 7.23.96
 E&E Project #: JC-7000 Project or Site Name: Calebra

A: Preliminary Examination Phase

(CIRCLE ONE)

- 1 Did coolers come with airbill or packing slip? YES NO
 if YES, enter carrier here and print airbill # below: FedEx
- 2 Did cooler(s) have custody seals? YES NO
 if YES, how many and where: 2 @ seam
- 3 Were custody seals unbroken and intact on receipt? YES NO
- 4 Where custody seals dated and signed? YES NO
 if YES, enter Date: 7.22.96 Name: _____
- 5 Initial here to acknowledge receipt of cooler(s): JH

B Unpacking Phase:

- Date Cooler(s) Opened: 7.23.96 C-O-C Numbers: _____
 Coolers Opened By(print): J. Hendricks (sign): [Signature]
- 6 Where C-O-C forms received and sealed in plastic bag? YES NO
 - 7 Was the project identifiable from the C-O-C form? YES NO
 if YES, enter the project number and name in the heading above.
 - 8 Was enough packing material used in cooler(s)? YES NO
 Circle type of material: Vermiculite Bubble Wrap Other
 - 9 If required, was enough ice used?: YES NO
 if YES, circle type of ice: WET DRY BLUE Other
 - 10 Was a temperature blank included inside cooler(s)? YES NO
 - if Yes, indicate temperature in table below.
 If No, indicate Cooler temperature in table below.
 - 11 Were all containers sealed in separate plastic bags?: YES NO
 - 12 Did all containers arrive unbroken and in good condition? YES NO

C Login Phase:

- Date Samples Logged in: 7.23.96
 Samples logged in By(print): J. Hendricks (sign): [Signature]
- 13 Were all container labels complete(eg.date,time,preserv.)? YES NO
 - 14 Were all C-O-C forms filled out properly in ink and signed? YES NO
 - 15 Did the C-O-C form agree with containers received? YES NO
 - 16 Were the correct containers used for the tests requested? YES NO
 - 17 Were the correct preservatives listed on the sample labels? YES NO
 - 18 Was a sufficient sample volume sent for the tests requested? YES NO
 - 19 Were all volatile samples received without head space? YES NO

Please record Temp. Blank or Cooler Temp. for each cooler, range (2 - 5 C°)*

AIRBILL #	TEMP.C°	AIRBILL #	TEMP.C°	AIRBILL #	TEMP.C°
7014776451	3.5				

If NO or Temp. outside of acceptable range a Discrepancy form must be filed.

ANALYTICAL REFERENCE SUMMARY

9601.532

PARAMETER	METHOD
Total Recoverable Petroleum Hydrocarbons	Method 418.1 "Methods for the Chemical Analysis of Water and Wastes", USEPA-600/ 4-79-020, March 1983.
Arsenic Barium Cadmium Chromium Total Lead Selenium Silver	Method 6010 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
Mercury (Water)	Method 7470 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
Mercury (Soil)	Method 7471 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
Ethylene Dibromide (Microextractables)	Method 8011 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
8310 PAH/LC	Method 8310 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
8010 VOA Single Column	Method 8010 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.
8020 VOA Single Column	Method 8020 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, USEPA, 1986.

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

-	SAMPLE NUMBER	CLIENT	DATE	DATE	DATE
		SAMPLE ID	SAMPLED	EXTRACTED	ANALYZED

	TRPH				-S
	48214.02	B1 (0-2)	07/19/96		08/02/96
	48215.02	B2 (0-2)	07/19/96		08/02/96
	TRPH				-W
	48212.08	MW 1	07/19/96		07/27/96
	ARSENIC	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	ARSENIC	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96
	BARIUM	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	BARIUM	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96
	CADMIUM	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	CADMIUM	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96
	CHROMIUM TOTAL	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	CHROMIUM TOTAL	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96
	LEAD	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	LEAD	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96
	MERCURY	(CVAP) -S			
	48214.02	B1 (0-2)	07/19/96		07/24/96
	48215.02	B2 (0-2)	07/19/96		07/24/96
	MERCURY	(CVAP) -W			
	48212.09	MW 1	07/19/96		07/24/96
	48213.01	MW 1- DISS	07/19/96		07/24/96
	SELENIUM	(ICP) -S			
	48214.02	B1 (0-2)	07/19/96	07/24/96	07/26/96
	48215.02	B2 (0-2)	07/19/96	07/24/96	07/26/96
	SELENIUM	(ICP) -W			
	48212.09	MW 1	07/19/96	07/24/96	07/26/96
	48213.01	MW 1- DISS	07/19/96	07/24/96	07/26/96

Ecology and Environment, Inc.
SAMPLE TRACKING REPORT

	CLIENT			
-	SAMPLE	SAMPLE	DATE	DATE
	NUMBER	ID	SAMPLED	EXTRACTED
	-----	-----	-----	-----
SILVER		(ICP) -S		
48214.02	B1	(0-2)	07/19/96	07/24/96
48215.02	B2	(0-2)	07/19/96	07/24/96
SILVER		(ICP) -W		
48212.09	MW 1		07/19/96	07/24/96
48213.01	MW 1-	DISS	07/19/96	07/24/96
8010 VOA		-S		
48214.01	B1	(0-2)	07/19/96	07/29/96
48215.01	B2	(0-2)	07/19/96	07/29/96
8010 VOA		-W		
48212.03	MW 1		07/19/96	07/26/96
8020 VOA		-S		
48214.01	B1	(0-2)	07/19/96	07/29/96
48215.01	B2	(0-2)	07/19/96	07/29/96
8020 VOA		-W		
48212.01	MW 1		07/19/96	07/26/96
ETHYLENE DIBROMIDE		-W		
48212.05	MW 1		07/19/96	07/25/96
ETHYLENE DIBROMIDE-SOLID				
48214.01	B1	(0-2)	07/19/96	07/26/96
48215.01	B2	(0-2)	07/19/96	07/26/96
8310 PAH/LC		-S		
48214.02	B1	(0-2)	07/19/96	07/24/96
48215.02	B2	(0-2)	07/19/96	07/24/96
8310 PAH/LC		-W		
48212.07	MW 1		07/19/96	07/25/96
CLP SOLIDS-TOTAL		-S		
48214.02	B1	(0-2)	07/19/96	07/24/96
48215.02	B2	(0-2)	07/19/96	07/24/96

TEST CODE :STSCLP1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : CLP SOLIDS-TOTAL UNITS : %

PARAMETER : SOLIDS - TOTAL

SAMPLE ID	RESULTS	Q
EE-96-48214		
B1 (0-2)	29	
EE-96-48215		
B2 (0-2)	61	

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9601.532

(%)

Parameter	E & E Laboratory No. 96-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Solids-Total	48215	60.9	57.8	5.2

THIS RPD IS WITHIN E & E, INC. QC TARGETS.

TEST CODE :WPETHY1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : TRPH UNITS : MG/L

PARAMETER : Petroleum Hydrocarbons

SAMPLE ID RESULTS Q QNT. LIMIT

EE-96-48212
MW 1 ND 1.0

METHOD BLANK (07/27) ND 1.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

LABORATORY CONTROL SAMPLE (07/27)

9601.532

(mg/L)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Total Recoverable Petroleum Hydrocarbons	15.0	16.6	90.6

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

TEST CODE : SPETHY1

JOB NUMBER : 9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT

TEST NAME : TRPH

UNITS : MG/KG

PARAMETER : Petroleum Hydrocarbons

SAMPLE ID	RESULTS	Q	QNT. LIMIT
EE-96-48214			
B1 (0-2)	660		69
EE-96-48215			
B2 (0-2)	ND		33

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

NA = NOT APPLICABLE

QUALITY CONTROL FOR PRECISION
RESULTS OF ANALYSIS OF DUPLICATE
ANALYSES OF SOLID SAMPLES

9601.532

(mg/kg as received)

Parameter	E & E Laboratory No. 96-	Sample Result	Duplicate Result	Relative Percent Difference (RPD)
Total Recoverable Petroleum Hydrocarbons	Batch QC	ND	ND	NC

ND = NOT DETECTED

NC = NOT CALCULABLE

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOLID SAMPLES

9601.532

(mg/kg as received)

Parameter	E & E Laboratory No. 96-	Sample Result	Spiked Sample Result	Spike Amount	Percent Recovery
Total Recoverable Petroleum Hydrocarbons	Batch QC	ND	162	178	90.5

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

LABORATORY CONTROL SAMPLE (08/02)

9601.532

(mg/kg)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Total Recoverable Petroleum Hydrocarbons	168	166	101

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

TEST CODE :SPETHY1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : TRPH UNITS : MG/KG

PARAMETER : Petroleum Hydrocarbons

SAMPLE ID	RESULTS	Q	QNT. LIMIT
METHOD BLANK (08/02)	ND	-	20

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE
NA = NOT APPLICABLE

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

SAMPLE ID LAB :EE-96-48212

MATRIX: WATER

SAMPLE ID CLIENT: MW 1

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND	-	50	UG/L
Arsenic	220		5.0	UG/L
Barium	2300		20	UG/L
Cadmium	ND		50	UG/L
Chromium Total	750		10	UG/L
Lead	4700		5.0	UG/L
Selenium	29		5.0	UG/L
Mercury	0.82		0.10	UG/L

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

SAMPLE ID LAB :EE-96-48213

MATRIX: WATER

SAMPLE ID CLIENT: MW 1- DISS

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND	-	10	UG/L
Arsenic	ND	-	5.0	UG/L
Barium	54	-	20	UG/L
Cadmium	ND	-	5.0	UG/L
Chromium Total	ND	-	10	UG/L
Lead	9.8	-	5.0	UG/L
Selenium	ND	-	5.0	UG/L
Mercury	ND	-	0.10	UG/L

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

LABORATORY CONTROL SAMPLE (773)

9601.532

(ug/L)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Arsenic	1050	1000	105
Barium	1070	1000	107
Cadmium	1050	1000	105
Chromium Total	1010	1000	101
Lead	1050	1000	105
Selenium	1010	1000	101
Silver	98.5	100	98.5

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

INITIAL CALIBRATION VERIFICATION (07/24)

9601.532

(ug/L)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Mercury	4.89	5.0	97.8

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION
SAMPLE ID LAB : METHOD BLANK (773) MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND	-	10	UG/L
Arsenic	ND	-	5.0	UG/L
Barium	ND	-	20	UG/L
Cadmium	ND	-	5.0	UG/L
Chromium Total	ND	-	10	UG/L
Lead	ND	-	5.0	UG/L
Selenium	ND	-	5.0	UG/L

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION
SAMPLE ID LAB : METHOD BLANK (07/24) MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Mercury	ND	-	0.10	UG/L

QUALIFIERS: C = COMMENT ND = NOT DETECTED
 J = ESTIMATED VALUE

METALS SECTION

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 29 %

SAMPLE ID LAB : EE-96-48214 MATRIX: SOLID

SAMPLE ID CLIENT: B1 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND		3.4	MG/KG
Arsenic	17		1.7	MG/KG
Barium	540		6.9	MG/KG
Cadmium	ND		1.7	MG/KG
Chromium Total	38		3.4	MG/KG
Lead	460		1.7	MG/KG
Selenium	ND		1.7	MG/KG
Mercury	0.17		0.069	MG/KG

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE

METALS SECTION

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT

%SOLIDS : 61 %

SAMPLE ID LAB : EE-96-48215

MATRIX: SOLID

SAMPLE ID CLIENT: B2 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND		1.6	MG/KG
Arsenic	8.6		0.82	MG/KG
Barium	120		3.3	MG/KG
Cadmium	ND		0.82	MG/KG
Chromium Total	7.6		1.6	MG/KG
Lead	52		0.82	MG/KG
Selenium	0.94		0.82	MG/KG
Mercury	0.049		0.033	MG/KG

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

LABORATORY CONTROL SAMPLE (774)

9601.532

(ug/L)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Arsenic	1040	1000	104
Barium	1070	1000	107
Cadmium	1050	1000	105
Chromium Total	1010	1000	101
Lead	1050	1000	105
Selenium	1000	1000	100
Silver	99.5	100	99.5

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

INITIAL CALIBRATION VERIFICATION (07/24)

9601.532

(ug/L)

ANALYTE	FOUND VALUE	TRUE VALUE	PERCENT RECOVERY
Mercury	4.89	5.0	97.8

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

METALS SECTION

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

SAMPLE ID LAB : METHOD BLANK (774) MATRIX: SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Silver	ND		1.0	MG/KG
Arsenic	ND		0.50	MG/KG
Barium	ND		2.0	MG/KG
Cadmium	ND		0.50	MG/KG
Chromium Total	ND		1.0	MG/KG
Lead	ND		0.50	MG/KG
Selenium	ND		0.50	MG/KG

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

METALS SECTION

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

SAMPLE ID LAB : METHOD BLANK (07/24) MATRIX: SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT	UNITS
Mercury	ND		0.050	MG/KG

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

TEST CODE :WEDB 1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : ETHYLENE DIBROMIDE UNITS : UG/L

SAMPLE ID LAB : EE-96-48212 MATRIX: WATER

SAMPLE ID CLIENT: MW 1

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
1,2-Dibromoethane	ND		0.020

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
MDL CHECK SAMPLE

9601.532

(ug/L)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.020	0.0146	73.0

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
REFERENCE SAMPLE CHECK

9601.532

(ug/L)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.10	0.0888	88.8

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
LFB CHECK SAMPLE

9601.532

(ug/L)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.25	0.225	90.0

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

TEST CODE :WEDB 1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : ETHYLENE DIBROMIDE UNITS : UG/L

SAMPLE ID LAB : METHOD BLANK MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
1,2-Dibromoethane	ND		0.020

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SEDB 1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 29 %

TEST NAME : ETHYLENE DIBROMIDE UNITS : UG/G

SAMPLE ID LAB : EE-96-48214 MATRIX : SOLID

SAMPLE ID CLIENT: B1 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
1,2-Dibromoethane	ND		0.003

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SEDB 1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 61 %

TEST NAME : ETHYLENE DIBROMIDE UNITS : UG/G

SAMPLE ID LAB : EE-96-48215 MATRIX : SOLID

SAMPLE ID CLIENT: B2 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
1,2-Dibromoethane	ND		0.001

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
MDL CHECK SAMPLE

9601.532

(ug/g)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.000673	0.000435	64.6

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
REFERENCE SAMPLE CHECK

9601.532

(ug/g)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.00321	0.00279	86.9

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

1,2-DIBROMOETHANE (EDB) IN WATER
BY MICROEXTRACTION AND GAS CHROMATOGRAPHY
LFB CHECK SAMPLE

9601.532

(ug/g)

Compound	Original Value	Amount Added	Amount Determined	Percent Recovery
Ethylene dibromide	ND	0.00833	0.00704	84.5

THIS RECOVERY IS WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

TEST CODE :SEDB 1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : ETHYLENE DIBROMIDE UNITS : UG/G

SAMPLE ID LAB : METHOD BLANK MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
1,2-Dibromoethane	ND		0.001

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :WPAH0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8310 PAH/LC

UNITS : UG/L

SAMPLE ID LAB : EE-96-48212

MATRIX: WATER

SAMPLE ID CLIENT: MW 1

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		5.0
Acenaphthylene	ND		5.0
1-methylnaphthalene	ND		5.0
2-Methylnaphthalene	ND		5.0
Acenaphthene	ND		5.0
Fluorene	ND		1.0
Phenanthrene	ND		1.0
Anthracene	ND		1.0
Fluoranthene	ND		2.5
Pyrene	ND		2.5
Benzo (a) anthracene	ND		1.0
Chrysene	ND		1.0
Benzo (b) fluoranthene	ND		1.0
Benzo (k) fluoranthene	ND		1.0
Benzo (a) pyrene	ND		1.0
Dibenzo (a, h) anthracene	ND		2.5
Benzo (ghi) perylene	ND		2.5
Indeno (1, 2, 3-cd) pyrene	ND		1.0

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF WATER MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48212)

9601.532

Parameter	Original Value	Amount Added	(ug/L)		Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD			
Naphthalene	ND	20	11.5	12.0	57.6	60.2	4.4		
Acenaphthylene	ND	20	16.3	19.2	82.0	96.0	16.1		
Acenaphthene	ND	20	14.9	14.7	75.0	73.0	1.6		
Fluorene	ND	20	13.4	13.6	66.8	67.8	1.5		
Phenanthrene	ND	20	14.2	14.0	70.9	70.2	1.0		
Anthracene	ND	20	14.4	14.3	72.1	71.4	1.0		
Fluoranthene	ND	20	14.4	13.6	72.0	68.0	5.6		
Pyrene	ND	20	15.2	15.4	76.0	77.0	1.3		
Benzo (a) anthracene	ND	20	13.7	13.6	68.4	68.3	0.2		
Chrysene	ND	20	12.8	11.9	64.0	59.7	7.0		
Benzo (b) fluoranthene	ND	20	19.5	20.4	97.7	102	4.4		
Benzo (k) fluoranthene	ND	20	11.7	13.9	58.5	69.3	17.0		
Benzo (a) pyrene	ND	20	9.66	8.98	48.3	44.9	7.3		
Dibenzo (a, h) anthracene	ND	20	11.8	12.2	59.2	61.1	3.2		
Benzo (ghi) perylene	ND	20	9.48	8.79	47.4	44.0	7.6		
Indeno (1, 2, 3-cd) pyrene	ND	20	8.95	8.41	44.8	42.1	6.2		

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED WATER SAMPLES
Laboratory Control Sample (8604)

9601.532

(ug/L)

Parameter	Amount Added	Amount Determined	Percent Recovery
Naphthalene	10	7.19	71.9
Acenaphthylene	10	7.22	72.2
Acenaphthene	10	7.42	74.2
Fluorene	10	7.44	74.4
Phenanthrene	10	7.97	79.7
Anthracene	10	7.68	76.8
Fluoranthene	10	8.56	85.6
Pyrene	10	8.47	84.7
Benzo (a) anthracene	10	8.62	86.2
Chrysene	10	8.42	84.2
Benzo (b) fluoranthene	10	8.18	81.8
Benzo (k) fluoranthene	10	8.14	81.4
Benzo (a) pyrene	10	7.58	75.8
Dibenzo (a, h) anthracene	10	7.94	79.4
Benzo (ghi) perylene	10	7.23	72.3
Indeno (1, 2, 3-cd) pyrene	10	7.26	72.6

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9601.532

(ug)

Parameter	E & E Laboratory No. 96-	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14	48212	27.3	20.0	73.3
	48212 MS	54.6	41.3	75.6
	48212 MSD	54.6	37.5	68.9
	Method Blank (8602)	27.3	17.0	62.3
	LCS (8604)	27.3	27.7	101

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

LCS = LABORATORY CONTROL SAMPLE

TEST CODE :WPAH0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8310 PAH/LC

UNITS : UG/L

SAMPLE ID LAB : METHOD BLANK (8602)

MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
-----	-----	-	-----
Naphthalene	ND		5.0
Acenaphthylene	ND		5.0
1-methylnaphthalene	ND		5.0
2-Methylnaphthalene	ND		5.0
Acenaphthene	ND		5.0
Fluorene	ND		1.0
Phenanthrene	ND		1.0
Anthracene	ND		1.0
Fluoranthene	ND		2.5
Pyrene	ND		2.5
Benzo (a) anthracene	ND		1.0
Chrysene	ND		1.0
Benzo (b) fluoranthene	ND		1.0
Benzo (k) fluoranthene	ND		1.0
Benzo (a) pyrene	ND		1.0
Dibenzo (a, h) anthracene	ND		2.5
Benzo (ghi) perylene	ND		2.5
Indeno (1,2,3-cd) pyrene	ND		1.0

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE : SPAH0A1

JOB NUMBER : 9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT

%SOLIDS : 29 %

TEST NAME : 8310 PAH/LC

UNITS : UG/KG

SAMPLE ID LAB : EE-96-48214

MATRIX : SOLID

SAMPLE ID CLIENT: B1 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		6900
Acenaphthylene	ND		6900
1-methylnaphthalene	ND		6900
2-Methylnaphthalene	ND		6900
Acenaphthene	ND		6900
Fluorene	ND		690
Phenanthrene	ND		690
Anthracene	ND		690
Fluoranthene	ND		1700
Pyrene	ND		1700
Benzo(a)anthracene	ND		690
Chrysene	ND		690
Benzo(b)fluoranthene	ND		690
Benzo(k)fluoranthene	16000		690
Benzo(a)pyrene	ND		690
Dibenzo(a,h)anthracene	ND		1700
Benzo(ghi)perylene	ND		1700
Indeno(1,2,3-cd)pyrene	ND		690

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE : SPAH0A1

JOB NUMBER : 9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 61 %

TEST NAME : 8310 PAH/LC UNITS : UG/KG

SAMPLE ID LAB : EE-96-48215 MATRIX : SOLID

SAMPLE ID CLIENT: B2 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		330
Acenaphthylene	ND		330
1-methylnaphthalene	ND		330
2-Methylnaphthalene	ND		330
Acenaphthene	ND		330
Fluorene	ND		33
Phenanthrene	ND		33
Anthracene	ND		33
Fluoranthene	ND		82
Pyrene	ND		82
Benzo (a) anthracene	ND		33
Chrysene	ND		33
Benzo (b) fluoranthene	ND		33
Benzo (k) fluoranthene	240		33
Benzo (a) pyrene	ND		33
Dibenzo (a, h) anthracene	ND		82
Benzo (ghi) perylene	ND		82
Indeno (1, 2, 3-cd) pyrene	ND		33

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF SOIL MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48215)

9601.532

(ug/kg as received)

Parameter	Original Value	Amount Added	Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD	
Naphthalene	ND	330	350	360	106	109	2.8
Acenaphthylene	ND	330	410	400	124	121	2.5
Acenaphthene	ND	330	370	370	112	112	0.0
Fluorene	ND	330	340	350	103	106	2.9
Phenanthrene	ND	330	300	340	90.9	103	12.5
Anthracene	ND	330	280	310	84.8	93.9	10.2
Fluoranthene	ND	330	320	370	97.0	112	14.5
Pyrene	ND	330	310	360	93.9	109	14.9
Benzo (a) anthracene	ND	330	310	350	93.9	106	12.1
Chrysene	ND	330	310	350	93.9	106	12.1
Benzo (b) fluoranthene	ND	330	420	390	127	118	7.4
Benzo (k) fluoranthene	150	330	420	430	81.8	84.8	3.6
Benzo (a) pyrene	ND	330	310	350	93.9	106	12.1
Dibenzo (a, h) anthracene	ND	330	350	390	106	118	10.8
Benzo (ghi) perylene	ND	330	300	330	90.9	100	9.5
Indeno (1, 2, 3-cd) pyrene	ND	330	300	330	90.9	100	9.5

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOIL SAMPLES
Laboratory Control Sample (8547)

9601.532

(ug/kg)

Parameter	Amount Added	Amount Determined	Percent Recovery
Naphthalene	330	330	100
Acenaphthylene	330	300	90.9
Acenaphthene	330	300	90.9
Fluorene	330	280	84.1
Phenanthrene	330	290	87.1
Anthracene	330	260	78.1
Fluoranthene	330	310	93.1
Pyrene	330	300	90.9
Benzo (a) anthracene	330	300	90.9
Chrysene	330	290	87.1
Benzo (b) fluoranthene	330	280	84.1
Benzo (k) fluoranthene	330	280	84.1
Benzo (a) pyrene	330	250	75.1
Dibenzo (a, h) anthracene	330	280	84.1
Benzo (ghi) perylene	330	230	69.1
Indeno (1, 2, 3-cd) pyrene	330	240	72.1

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
OF SURROGATE SPIKES

9601.532

(ug)

Parameter	E & E Laboratory No. 96-	Amount Added	Amount Determined	Percent Recovery
Terphenyl-d14	48214	910	1060	116
	48215	910	1240	135
	48215 MS	910	990	109
	48215 MSD	910	1090	120
	Method Blank (8548)	910	988	109
	LCS (8547)	910	918	101

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

LCS = LABORATORY CONTROL SAMPLE

TEST CODE : SPAH0A1

JOB NUMBER : 9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8310 PAH/LC UNITS : UG/KG

SAMPLE ID LAB : METHOD BLANK (8548) MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Naphthalene	ND		200
Acenaphthylene	ND		200
1-methylnaphthalene	ND		200
2-Methylnaphthalene	ND		200
Acenaphthene	ND		200
Fluorene	ND		20
Phenanthrene	ND		20
Anthracene	ND		20
Fluoranthene	ND		50
Pyrene	ND		50
Benzo (a) anthracene	ND		20
Chrysene	ND		20
Benzo (b) fluoranthene	ND		20
Benzo (k) fluoranthene	ND		20
Benzo (a) pyrene	ND		20
Dibenzo (a, h) anthracene	ND		50
Benzo (ghi) perylene	ND		50
Indeno (1, 2, 3-cd) pyrene	ND		20

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :WPH_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8010 VOA

UNITS : UG/L

SAMPLE ID LAB : EE-96-48212

MATRIX: WATER

SAMPLE ID CLIENT: MW 1

PARAMETER	RESULTS	Q	QNT. LIMIT
Dichlorodifluoromethane	ND		5.0
Chloromethane	ND		5.0
Vinyl chloride	ND		1.0
Bromomethane	ND		0.50
Chloroethane	ND		0.80
Trichlorofluoromethane	ND		0.60
1,1-Dichloroethene	ND		0.50
Methylene chloride	ND		2.5
trans-1,2-Dichloroethene	ND		0.50
1,1-Dichloroethane	ND		0.50
cis-1,2-Dichloroethene	ND		0.50
Chloroform	ND		0.50
1,1,1-Trichloroethane	ND		0.50
Carbon tetrachloride	ND		0.50
1,2-Dichloroethane	ND		0.50
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		3.0
Bromodichloromethane	ND		2.0
2-Chloroethylvinylether	ND		2.0
cis-1,3-Dichloropropene	ND		0.70
trans-1,3-Dichloropropene	ND		1.5
1,1,2-Trichloroethane	ND		0.50
Tetrachloroethene	ND		0.50
Dibromochloromethane	ND		0.50
Chlorobenzene	ND		0.80
Bromoform	ND		0.50
1,1,2,2-Tetrachloroethane	ND		0.50
1,3-Dichlorobenzene	ND		0.80
1,4-Dichlorobenzene	ND		0.80
1,2-Dichlorobenzene	ND		0.80

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF WATER MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48212)

9601.532

Compound	Original Value	Amount Added	Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD	
			(ug/L)				
Dichlorodifluoromethane	ND	20	19.9	20.6	99.5	103	3.3
Chloromethane	ND	20	20.2	24.3	101	122	18.5
Vinyl chloride	ND	20	20.8	20.4	104	102	2.0
Bromomethane	ND	20	17.7	16.7	88.5	83.6	5.7
Chloroethane	ND	20	26.0	26.3	130	131	1.2
Fluorotrichloromethane	ND	20	21.4	21.5	107	108	0.5
1,1-Dichloroethene	ND	20	22.5	22.6	112	113	0.5
Methylene chloride	ND	20	20.8	23.0	104	115	10.2
trans-1,2-Dichloroethene	ND	20	21.5	20.1	107	100	6.8
1,1-Dichloroethane	ND	20	20.0	20.4	99.9	102	2.0
cis-1,2-Dichloroethene	ND	20	20.6	19.8	103	99.2	3.6
Chloroform	ND	20	21.5	21.3	108	106	1.3
1,1,1-Trichloroethane	ND	20	19.4	19.7	96.8	98.3	1.6
Carbon tetrachloride	ND	20	18.6	20.2	93.2	101	8.3
1,2-Dichloroethane	ND	20	21.6	20.9	108	104	3.6
Trichloroethene	ND	20	19.6	19.3	98.2	96.4	1.8
1,2-Dichloropropane	ND	20	19.0	18.5	95.0	92.7	2.5
Bromodichloromethane	ND	20	18.3	18.8	91.6	94.2	2.8
cis-1,3-Dichloropropene	ND	20	18.7	18.5	93.3	92.3	1.0
trans-1,3-Dichloropropene	ND	20	14.9	17.7	74.5	88.7	17.4
1,1,2-Trichloroethane	ND	20	19.6	24.5	98.0	123	22.2
Tetrachloroethene	ND	20	18.7	20.9	93.7	105	11.0
Chlorodibromomethane	ND	20	21.9	23.6	110	118	7.1
Chlorobenzene	ND	20	20.8	20.9	104	105	0.7
Bromoform	ND	20	23.8	23.0	119	115	3.2
1,1,2,2-Tetrachloroethane	ND	20	28.8	27.4	144	137	4.8
1,3-Dichlorobenzene	ND	20	21.5	20.5	108	102	5.0
1,4-Dichlorobenzene	ND	20	21.8	21.1	109	106	3.0
1,2-Dichlorobenzene	ND	20	23.7	20.7	118	104	13.3

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES

9601.532

Compound	E & E Laboratory No. 96-	Percent Recovery
Bromochloromethane	48212	87.3
	48212 MS	90.9
	48212 MSD	89.0
	Method Blank	100
1-Chloro-2-bromopropane	48212	94.1
	48212 MS	12.7*
	48212 MSD	27.7*
	Method Blank	100
1,4-Dichlorobutane	48212	102
	48212 MS	118
	48212 MSD	116
	Method Blank	100

WITH THE EXCEPTION OF THOSE RECOVERIES FLAGGED "*" (DUE TO COELUTION),
THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

TEST CODE :WPH_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8010 VOA UNITS : UG/L

SAMPLE ID LAB : METHOD BLANK MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
Dichlorodifluoromethane	ND		5.0
Chloromethane	ND		5.0
Vinyl chloride	ND		1.0
Bromomethane	ND		0.50
Chloroethane	ND		0.80
Trichlorofluoromethane	ND		0.60
1,1-Dichloroethene	ND		0.50
Methylene chloride	ND		2.5
trans-1,2-Dichloroethene	ND		0.50
1,1-Dichloroethane	ND		0.50
cis-1,2-Dichloroethene	ND		0.50
Chloroform	ND		0.50
1,1,1-Trichloroethane	ND		0.50
Carbon tetrachloride	ND		0.50
1,2-Dichloroethane	ND		0.50
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		3.0
Bromodichloromethane	ND		2.0
2-Chloroethylvinylether	ND		2.0
cis-1,3-Dichloropropene	ND		0.70
trans-1,3-Dichloropropene	ND		1.5
1,1,2-Trichloroethane	ND		0.50
Tetrachloroethene	ND		0.50
Dibromochloromethane	ND		0.50
Chlorobenzene	ND		0.80
Bromoform	ND		0.50
1,1,2,2-Tetrachloroethane	ND		0.50
1,3-Dichlorobenzene	ND		0.80
1,4-Dichlorobenzene	ND		0.80
1,2-Dichlorobenzene	ND		0.80

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :WPA_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8020 VOA UNITS : UG/L

SAMPLE ID LAB : EE-96-48212 MATRIX: WATER

SAMPLE ID CLIENT: MW 1

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.60
Toluene	ND		0.90
Ethylbenzene	ND		0.70
Total Xylenes	ND		2.0
Chlorobenzene	ND		1.4
1,2-Dichlorobenzene	ND		1.2
1,3-Dichlorobenzene	ND		1.4
1,4-Dichlorobenzene	ND		1.2
MTBE	ND		1.5

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF WATER MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48212)

9601.532

(ug/L)

Compound	Original Result	Amount Added	Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD	
Benzene	ND	20	17.9	17.5	89.6	87.4	2.6
Toluene	ND	20	18.1	17.5	90.6	87.7	3.2
Ethylbenzene	ND	20	18.2	17.7	91.1	88.4	3.0
Total xylenes	ND	60	54.9	53.3	91.5	88.8	3.0
Chlorobenzene	ND	20	18.4	17.8	91.8	88.9	3.2
1,2-Dichlorobenzene	ND	20	19.1	18.5	95.4	92.6	3.0
1,3-Dichlorobenzene	ND	20	18.7	18.2	93.4	91.2	2.4
1,4-Dichlorobenzene	ND	20	18.6	18.1	92.9	90.7	2.4
MTBE	ND	40	44.5	42.1	111	105	5.6

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES

9601.532

Compound	E & E Laboratory No. 96-	Percent Recovery
Trifluorotoluene	48212	83.9
	48212 MS	83.8
	48212 MSD	84.4
	Method Blank	100

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

TEST CODE :WPA_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8020 VOA

UNITS : UG/L

SAMPLE ID LAB : METHOD BLANK

MATRIX: WATER

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.60
Toluene	ND		0.90
Ethylbenzene	ND		0.70
Total Xylenes	ND		2.0
Chlorobenzene	ND		1.4
1,2-Dichlorobenzene	ND		1.2
1,3-Dichlorobenzene	ND		1.4
1,4-Dichlorobenzene	ND		1.2
MTBE	ND		1.5

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPH_OA1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT

%SOLIDS : 29 %

TEST NAME : 8010 VOA

UNITS : UG/KG

SAMPLE ID LAB : EE-96-48214

MATRIX : SOLID

SAMPLE ID CLIENT: B1 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Dichlorodifluoromethane	ND		17
Chloromethane	ND		17
Vinyl chloride	ND		3.4
Bromomethane	ND		1.7
Chloroethane	ND		2.8
Trichlorofluoromethane	ND		2.1
1,1-Dichloroethene	ND		1.7
Methylene chloride	ND		8.6
trans-1,2-Dichloroethene	ND		1.7
1,1-Dichloroethane	ND		1.7
cis-1,2-Dichloroethene	ND		1.7
Chloroform	ND		1.7
1,1,1-Trichloroethane	ND		1.7
Carbon tetrachloride	ND		1.7
1,2-Dichloroethane	ND		1.7
Trichloroethene	ND		3.4
1,2-Dichloropropane	ND		10
Bromodichloromethane	ND		6.9
2-Chloroethylvinylether	ND		6.9
cis-1,3-Dichloropropene	ND		2.4
trans-1,3-Dichloropropene	ND		5.2
1,1,2-Trichloroethane	ND		1.7
Tetrachloroethene	ND		1.7
Dibromochloromethane	ND		1.7
Chlorobenzene	ND		2.8
Bromoform	ND		1.7
1,1,2,2-Tetrachloroethane	ND		1.7
1,3-Dichlorobenzene	ND		2.8
1,4-Dichlorobenzene	ND		2.8
1,2-Dichlorobenzene	ND		2.8

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPH_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 61 %

TEST NAME : 8010 VOA UNITS : UG/KG

SAMPLE ID LAB : EE-96-48215 MATRIX : SOLID

SAMPLE ID CLIENT: B2 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Dichlorodifluoromethane	ND		8.2
Chloromethane	ND		8.2
Vinyl chloride	ND		1.6
Bromomethane	ND		0.82
Chloroethane	ND		1.3
Trichlorofluoromethane	ND		0.98
1,1-Dichloroethene	ND		0.82
Methylene chloride	ND		4.1
trans-1,2-Dichloroethene	ND		0.82
1,1-Dichloroethane	ND		0.82
cis-1,2-Dichloroethene	ND		0.82
Chloroform	ND		0.82
1,1,1-Trichloroethane	ND		0.82
Carbon tetrachloride	ND		0.82
1,2-Dichloroethane	ND		0.82
Trichloroethene	ND		1.6
1,2-Dichloropropane	ND		4.9
Bromodichloromethane	ND		3.3
2-Chloroethylvinylether	ND		3.3
cis-1,3-Dichloropropene	ND		1.1
trans-1,3-Dichloropropene	ND		2.4
1,1,2-Trichloroethane	ND		0.82
Tetrachloroethene	ND		0.82
Dibromochloromethane	ND		0.82
Chlorobenzene	ND		1.3
Bromoform	ND		0.82
1,1,2,2-Tetrachloroethane	ND		0.82
1,3-Dichlorobenzene	ND		1.3
1,4-Dichlorobenzene	ND		1.3
1,2-Dichlorobenzene	ND		1.3

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
X = EXCEEDS CALIBRATION LIMIT
N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE
A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF SOIL MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48215)

9601.532

(ug/kg as received)

Compound	Original Value	Amount Added	Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD	
Dichlorodifluoromethane	ND	20	13.7	17.1	68.6	85.6	22.1
Chloromethane	ND	20	15.7	21.4	78.6	107	30.8
Vinyl chloride	ND	20	16.0	19.1	80.1	95.4	17.4
Bromomethane	ND	20	6.00	11.7	30.0	58.4	64.2
Chloroethane	ND	20	18.0	22.4	90.2	112	21.6
Fluorotrichloromethane	ND	20	17.2	19.5	85.9	97.3	12.5
1,1-Dichloroethene	ND	20	18.8	22.5	94.0	113	18.0
Methylene chloride	ND	20	24.9	30.7	124	153	20.8
trans-1,2-Dichloroethene	ND	20	16.0	20.0	80.0	100	22.2
1,1-Dichloroethane	ND	20	14.2	16.9	71.1	84.7	17.5
cis-1,2-Dichloroethene	ND	20	15.4	19.7	77.1	98.6	24.5
Chloroform	ND	20	15.5	18.7	77.4	93.5	18.9
1,1,1-Trichloroethane	ND	20	13.5	17.4	67.4	86.8	25.2
Carbon tetrachloride	ND	20	11.6	15.9	57.9	79.3	31.2
1,2-Dichloroethane	ND	20	14.7	19.7	73.7	98.5	28.9
Trichloroethene	ND	20	13.3	17.7	66.3	88.4	28.6
1,2-Dichloropropane	ND	20	12.8	18.8	63.8	94.1	38.5
Bromodichloromethane	ND	20	9.15	14.0	45.8	70.2	42.1
2-Chloroethylvinyl ether	ND	20	14.4	17.0	28.9	34.1	16.6
cis-1,3-Dichloropropene	ND	20	4.15	10.3	20.8	51.7	85.4
trans-1,3-Dichloropropene	ND	20	3.90	11.2	19.5	55.8	96.4
1,1,2-Trichloroethane	ND	20	13.1	17.2	65.3	86.0	27.3
Tetrachloroethene	ND	20	11.9	14.8	59.3	74.2	22.4
Chlorodibromomethane	ND	20	8.20	13.4	41.0	67.2	48.4
Chlorobenzene	ND	20	12.0	17.5	60.1	87.6	37.2
Bromoform	ND	20	6.50	12.7	32.5	63.4	64.4
1,1,2,2-Tetrachloroethane	ND	20	10.4	17.3	51.9	86.4	49.8
1,3-Dichlorobenzene	ND	20	8.49	13.6	42.5	67.8	46.0
1,4-Dichlorobenzene	ND	20	9.44	14.9	47.2	74.4	44.8
1,2-Dichlorobenzene	ND	20	7.03	11.8	35.1	59.2	51.0

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOIL SAMPLES
(Laboratory Control Sample)

9601.532

(ug/kg)			
Compound	Amount Added	Amount Determined	Percent Recovery
Dichlorodifluoromethane	20	18.0	89.9
Chloromethane	20	26.2	131
Vinyl chloride	20	19.7	98.5
Bromomethane	20	18.1	90.4
Chloroethane	20	23.1	115
Fluorotrichloromethane	20	20.0	99.9
1,1-Dichloroethene	20	23.8	119
Methylene chloride	20	29.1	145
trans-1,2-Dichloroethene	20	22.5	113
1,1-Dichloroethane	20	17.9	89.7
cis-1,2-Dichloroethene	20	18.6	93.1
Chloroform	20	20.7	104
1,1,1-Trichloroethane	20	18.7	93.4
Carbon tetrachloride	20	19.8	98.8
1,2-Dichloroethane	20	20.3	101
Trichloroethene	20	19.6	97.9
1,2-Dichloropropane	20	18.5	92.6
Bromodichloromethane	20	16.7	83.4
2-Chloroethylvinyl ether	50	5.07	10.1
cis-1,3-Dichloropropene	20	17.5	87.7
trans-1,3-Dichloropropene	20	21.6	108
1,1,2-Trichloroethane	20	19.2	96.1
Tetrachloroethene	20	17.6	87.9
Chlorodibromomethane	20	18.2	91.1
Chlorobenzene	20	20.7	103
Bromoform	20	18.8	94.2
1,1,2,2-Tetrachloroethane	20	20.5	102
1,3-Dichlorobenzene	20	20.7	103
1,4-Dichlorobenzene	20	21.9	109
1,2-Dichlorobenzene	20	19.9	99.4
Ethylene dibromide	20	18.4	92.2

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES

9601.532

Compound	E & E Laboratory No. 96-	Percent Recovery
Bromochloromethane	48214	76.8
	48215	58.7
	48215 MS	72.0
	48215 MSD	92.9
	Method Blank	100
	LCS	91.8
1-Chloro-2-bromopropane	48214	72.1
	48215	46.8
	48215 MS	71.2
	48215 MSD	94.7
	Method Blank	100
	LCS	97.9
1,4-Dichlorobutane	48214	75.2
	48215	49.4
	48215 MS	59.4
	48215 MSD	76.2
	Method Blank	100
	LCS	101

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

LCS = LABORATORY CONTROL SAMPLE

TEST CODE :SPH_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8010 VOA

UNITS : UG/KG

SAMPLE ID LAB : METHOD BLANK

MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Dichlorodifluoromethane	ND		5.0
Chloromethane	ND		5.0
Vinyl chloride	ND		1.0
Bromomethane	ND		0.50
Chloroethane	ND		0.80
Trichlorofluoromethane	ND		0.60
1,1-Dichloroethene	ND		0.50
Methylene chloride	ND		2.5
trans-1,2-Dichloroethene	ND		0.50
1,1-Dichloroethane	ND		0.50
cis-1,2-Dichloroethene	ND		0.50
Chloroform	ND		0.50
1,1,1-Trichloroethane	0.54		0.50
Carbon tetrachloride	ND		0.50
1,2-Dichloroethane	ND		0.50
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		3.0
Bromodichloromethane	ND		2.0
2-Chloroethylvinylether	ND		2.0
cis-1,3-Dichloropropene	ND		0.70
trans-1,3-Dichloropropene	ND		1.5
1,1,2-Trichloroethane	ND		0.50
Tetrachloroethene	ND		0.50
Dibromochloromethane	ND		0.50
Chlorobenzene	ND		0.80
Bromoform	ND		0.50
1,1,2,2-Tetrachloroethane	ND		0.50
1,3-Dichlorobenzene	ND		0.80
1,4-Dichlorobenzene	ND		0.80
1,2-Dichlorobenzene	ND		0.80

QUALIFIERS: C = COMMENT

ND = NOT DETECTED

J = ESTIMATED VALUE

B = ALSO PRESENT IN BLANK

X = EXCEEDS CALIBRATION LIMIT

N = ANALYTE WAS NOT CONFIRMED BY ALTERNATE PROCEDURE

A = PHENOMENON OF METHODOLOGY WITH ACID PRESERVATION

TEST CODE :SPA_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 29 %

TEST NAME : 8020 VOA UNITS : UG/KG

SAMPLE ID LAB : EE-96-48214 MATRIX : SOLID

SAMPLE ID CLIENT: B1 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		2.1
Toluene	ND		3.1
Ethylbenzene	ND		2.4
Total Xylenes	ND		6.9
Chlorobenzene	ND		4.8
1,2-Dichlorobenzene	ND		4.1
1,3-Dichlorobenzene	ND		4.8
1,4-Dichlorobenzene	ND		4.1
MTBE	ND		5.2

QUALIFIERS: C = COMMENT

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TEST CODE :SPA_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

RESULTS IN DRY WEIGHT %SOLIDS : 61 %

TEST NAME : 8020 VOA UNITS : UG/KG

SAMPLE ID LAB : EE-96-48215 MATRIX : SOLID

SAMPLE ID CLIENT: B2 (0-2)

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.98
Toluene	ND		1.5
Ethylbenzene	ND		1.1
Total Xylenes	ND		3.3
Chlorobenzene	ND		2.3
1,2-Dichlorobenzene	ND		2.0
1,3-Dichlorobenzene	ND		2.3
1,4-Dichlorobenzene	ND		2.0
MTBE	ND		2.4

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QUALITY CONTROL FOR ACCURACY AND PRECISION:
 PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)
 OF SOIL MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD)
 (Sample # 48215)

9601.532

(ug/kg as received)

Compound	Original Result	Amount Added	Amount Determined		Percent Recovery		RPD
			MS	MSD	MS	MSD	
Benzene	ND	20	13.0	17.3	65.2	86.3	27.8
Toluene	ND	20	11.6	16.4	58.0	82.2	34.6
Ethylbenzene	ND	20	10.4	15.6	51.9	77.9	40.1
Total xylenes	ND	60	30.4	45.7	50.7	76.2	40.2
Chlorobenzene	ND	20	10.1	15.2	50.4	76.2	40.8
1,2-Dichlorobenzene	ND	20	6.96	12.1	34.8	60.5	53.9
1,3-Dichlorobenzene	ND	20	7.21	12.3	36.1	61.6	52.3
1,4-Dichlorobenzene	ND	20	7.30	12.4	36.5	61.9	51.6
MTBE	ND	40	28.5	36.0	71.2	89.9	23.2

THESE RECOVERIES AND RPDs ARE WITHIN E & E, INC. QC TARGETS.

ND = NOT DETECTED

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOLID SAMPLES
(Laboratory Control Sample)

9601.532

(ug/kg)

Compound	Amount Added	Amount Determined	Percent Recovery
Benzene	20	18.7	93.5
Toluene	20	18.5	92.6
Ethylbenzene	20	18.8	94.2
Total xylenes	60	55.7	92.9
Chlorobenzene	20	18.5	92.7
1,2-Dichlorobenzene	20	19.3	96.7
1,3-Dichlorobenzene	20	19.2	95.9
1,4-Dichlorobenzene	20	19.4	96.8
MTBE	40	37.9	94.8

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

QUALITY CONTROL FOR ACCURACY: PERCENT
RECOVERY OF SURROGATE SPIKES

9601.532

Compound	E & E Laboratory No. 96-	Percent Recovery
Trifluorotoluene	48214	80.4
	48215	49.3
	48215 MS	64.1
	48215 MSD	86.4
	Method Blank	100
	LCS	96.0

THESE RECOVERIES ARE WITHIN E & E, INC. QC TARGETS.

MS = MATRIX SPIKE

MSD = MATRIX SPIKE DUPLICATE

LCS = LABORATORY CONTROL SAMPLE

TEST CODE :SPA_0A1

JOB NUMBER :9601.532

ELAP ID : 10486

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : JC-7000 RELATIVE RISK EVALUATION

TEST NAME : 8020 VOA

UNITS : UG/KG

SAMPLE ID LAB : METHOD BLANK

MATRIX : SOLID

PARAMETER	RESULTS	Q	QNT. LIMIT
Benzene	ND		0.60
Toluene	ND		0.90
Ethylbenzene	ND		0.70
Total Xylenes	ND		2.0
Chlorobenzene	ND		1.4
1,2-Dichlorobenzene	ND		1.2
1,3-Dichlorobenzene	ND		1.4
1,4-Dichlorobenzene	ND		1.2
MTBE	ND		1.5

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