## FINAL

# CORRECTIVE ACTION PLAN - PART A REPORT FOR UNDERGROUND STORAGE TANK 56 FACILITY ID #9-089116 BUILDING 1056 FORT STEWART, GEORGIA

**Prepared for:** 

U.S. Army Corps of Engineers - Savannah District and Fort Stewart Directorate of Public Works Under Contract Number DACA21-95-D-0022 Delivery Order 0024

Prepared by:

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December 1998

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# List of Abbreviations and Acronyms

ACE ACL AMSL ASTM	Anderson Columbia Environmental, Inc. alternate concentration limit above mean sea level American Society for Testing and Materials
ATL	alternate threshold level
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
BTOC	below top of casing
CAP	Corrective Action Plan
DPW	Directorate of Public Works
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
GA EPD	Georgia Environmental Protection Division
GRO	gasoline-range organics
ID	inside diameter
IDW	investigation-derived waste
MSL	mean sea level
ND	not detected
NRC	no regulatory criteria
OVA	organic vapor analyzer

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OVM	organic vapor meter
PAH	polynuclear aromatic hydrocarbon
PVC	polyvinyl chloride
SAIC	Science Applications International Corporation
TPH	total petroleum hydrocarbon
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
USTMP	Underground Storage Tank Management Program

# **CORRECTIVE ACTION PLAN PART A**

ddress: Tilman Avenue north of Utility Street
County: Liberty Zip Code: 31314
3".
• ,
Prepared by Consultant/Contractor:
Name: Patricia A. Stoll
Company: SAIC
Address: P.O. Box 2502
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Zip Code: 37831
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#### I. PLAN CERTIFICATION:

#### A. UST Owner/Operator Certification

I hereby certify that the information contained in this plan and in all the attachments is true, accurate, and the plan satisfies all criteria and requirements of rule 391-3-15-09 of the Georgia Rules for Underground Storage Tank Management.

Name: <u>THOMAS C. FRY</u>					
Signature: Thomas	C.	Fry	Date:	08/19/99	
/				·····	

# B. Registered Professional Engineer or Professional Geologist Certification

I hereby certify that I have directed and supervised the field work and preparation of this plan, in accordance with State Rules and Regulations. As a registered professional geologist and/or professional engineer, I certify that I am a qualified groundwater professional, as defined by the Georgia State Board of Professional Geologists. All of the information and laboratory data in this plan and in all of the attachments are true, accurate, complete, and in accordance with applicable State Rules and Regulations.

Name: Patricia A. Stoll Signature: Date:



YES

NO

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General: READ THE GUIDANCE DOCUMENT FOR CAP PART-A BEFORE COMPLETING THIS FORM. FAILURE TO READ THE GUIDANCE DOCUMENT WILL MOST LIKELY RESULT IN PREPARATION OF AN UNACCEPTABLE REPORT. All text, figures, and tables requested in their respective sections should be prepared strictly in accordance with the Georgia EPD CAP-A guidance document. Please fill out this form as provided. Do not change the size of the fields or alter the placement of each section on each page.

(Appendix I; All Report Figures) (Appendix II: All Report Tables)

#### II. INITIAL RESPONSE REPORT

#### A. Initial Abatement

Were initial abatement actions initiated? If Yes, please summarize. If No, please explain why not.

If yes, please indicate the method and frequency of removal.

Actions were not required to abate imminent hazards and/or emergency conditions at the UST 56 site. Therefore, contaminant migration and release prevention, fire and vapor migration, or emergency free product removal was not performed prior to, or during, the removal of UST 56.

#### **B.** Free Product Removal

(Table 1: Summary of Free Product Removal – must include Free Product thickness in each well in which it was detected, and volume of product removed)

Free Product Detected? If Yes, please summarize free product recovery efforts.	YES	NO
	۰.	
Continuing free product recovery proposed?	YES	NO X

#### C. Tank History

List current and former UST's operated at site based on owner/operator knowledge consistent with EPA 7530-1 Form). Systems must be illustrated on Figure 2 (Site Plan), as described in section D below.

#### CURRENT UST SYSTEMS (if applicable)

<u>Tank ID Number</u> N/A	<u>Capacity (gal)</u> N/A	<u>Substance</u> <u>Stored</u> N/A	<u>Age (yrs)</u> N/A	<u>Meets 1998 Upgrade</u> <u>Standards (Yes/No)</u> N/A
	FORMER UST	<u>SYSTEMS (if a</u>	applicable)	
<u>Tank ID Number</u> 56	<u>Capacity (gal)</u> 2000	<u>Substance S</u> waste o		Date Removed 8/12/96 Closed in-Place

**D.** Initial Site Characterization

(Figure 1: Vicinity/Location Map) (Figure 2: Site Plan)

1. Regulated Substance Released (gasoline, diesel, used oil, etc.): waste oil Discuss how this determination was made and circumstances of discovery.

Characterization of petroleum-related contamination at the site was initiated during UST system closure activities on August 12, 1996, by Anderson Columbia Environmental, Inc (ACE). The tank was closed in-place and two soil samples were collected from the vicinity of the tank pit (Figure 7). Benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminants were not detected, however the total petroleum hydrocarbons (TPH) concentrations were 4,600 mg/kg and 39,300 mg/kg in samples TK56-S1 and TK56-S2, respectively.

2. Source(s) of Contamination: <u>Unknown</u> Discuss how this determination was made.

A detailed schematic diagram illustrating the former UST 56 and ancillary piping as configured during operation is not available. The tank was left in place, so the integrity of the tank is unknown; therefore, releases may have occurred as a result of tank and/or piping "failure."

3. Local Water Resources

(Figure 3: Quadrangle Map – Public and Private drinking water and surface water) (Appendix III: Water resources survey documentation, including, but not limited to: USGS database search, interview forms, and documentation of field survey)

	Site located in high/average X OR low grou susceptibility area?	ındw	ater po	ollution
b.	Water Supplies within applicable radii? YE	s	X	NO
	If yes,			
	<i>i.</i> Nearest public water supply located within:		900	feet
	ii. Nearest down-gradient public water supply locate within:	d	7700	feet
	iii. Nearest non-public water supply located within:			
			>2,64	0 feet
	iv. Nearest down-gradient non-public water supply locate within:	d	>2,64	40 <i>feet</i>
	Surface Water Bodies and sewers:			
	i. Nearest surface water located within		1500	feet
	ii. Nearest down-gradient surface water located within	~	4200	feet
	iii. Nearest storm or sanitary sewer located within:		90	feet
	iv. Depth to bottom of sewer at a point nearest the plume		est. 4-	~ ~

#### 4. Impacted Environmental Media

#### a. Soil Impacted

(Table 2: Soil Analysis Results) (Figure 4: Soil Quality Map) (Appendix IV: Soil Boring Logs) (Appendix V: Soil Laboratory Reports) (Appendix VI: ATL Calculations, if applicable)

#### Provide a brief discussion of soil sampling.

Continuous soil cores were collected at 2.0-foot intervals during the installation of four boreholes. Field headspace gas analyses were performed on each sample to determine the organic vapor concentration. Two soil samples were selected from each borehole for laboratory chemical analysis of BTEX; TPH; and polynuclear aromatic hydrocarbons (PAH). In boreholes where organic vapors were detected, one sample was collected from the 2.0-foot interval where the highest vapor concentration was recorded, and the other from the deepest 2.0-foot interval with the lowest concentration. If organic vapors were not detected, one sample was collected from the 2.0-foot interval nearest the midpoint of the boring, and the other from the 2.0-foot interval located immediately above the water table. Refer to Attachment A for complete documentation of the technical approach implemented during this investigation.

YES NO N/A X

YES

i. Soil contamination above applicable threshold levels?

NO X

If yes, indicate highest concentrations in soil along with locations and depths detected.

- ii. ATLs calculated? YES NO X If yes, present ATLs.
- *iii. If ATL's calculated, is soil contamination above ATL's?*

b. Groundwater Impacted (Table 3: Groundwater Analysis Results) (Figure 5: Groundwater Quality Map) (Appendix VII: Monitoring Well Details) (Appendix VIII: Groundwater Laboratory Results)

#### Provide a brief discussion of groundwater sampling.

At each borehole location, except the vertical profile boring, one groundwater sample was collected from the water table to approximately 5.0 feet below the water table using a direct-push sampling device. At the vertical profile location (82-05), water samples were collected every 5 feet below the water table until several groundwater sample intervals indicated a headspace gas measurement of zero. Chemical parameters for groundwater samples submitted for laboratory analysis included BTEX and PAH. Refer to Attachment A for complete documentation of the technical approach used to collect groundwater samples.

i. Groundwater contamination above MCLs? YES NO X ii. Groundwater contamination above In-Stream Water Quality Standards? YES NO X

If yes, indicate highest concentrations in groundwater along with the locations.

- c. Surface Water Impacted? YES NO X If Yes, indicate concentration(s) of surface water sample(s) taken from the surface water body/bodies impacted.
- d. Point of Withdrawal Impacted? YES NO N/A X If Yes, indicate concentration(s) of water sample(s) taken from withdrawal point(s).

#### 5. <u>Other Geologic/Hydrogeologic Data</u>

- a. Depth to Groundwater 6.84 8.72 (Table 4: Groundwater Elevations) (ft BTOC):
- b. Groundwater Flow Direction: west (Figure 6: Potentiometric Surface Map)
- c. Hydraulic Gradient 0.0133 ft/ft
- d. Geophysical Province: coastal plain
- e. Unique geologic/hydrological conditions: The Hawthorn Formation acts as a confining unit between the surficial and Floridan aquifers

6. <u>Corrective Action Completed or In-Progress</u> (if applicable) (Table 5: UST System Closure Sampling) (Figure 7: UST System Closure Sampling) (Appendix IX: Contaminated Soil Disposal Manifests)

> a. Underground Storage Tank (UST) System Closure: N/A If applicable, summarize UST system closure activities conducted.

ACE closed UST 56 in place on August 12, 1996. The UST piping was drained into the tank, and all gasoline and diesel were subsequently removed using a vacuum truck and/or compressor-driven barrel vacuum device. A backhoe was used to excavate down to the tank top. All lines were capped except the fill and vent. After the tank atmosphere was tested with a combustible gas indicator, all accessible tank openings were capped and the tank was filled with inert material (i.e., slurry cement). The ancillary piping was closed in-place, which consisted of purging the line and grouting the end of the tank.

b. Excavation and Treatment/Disposal of Backfill Materials and Native Soils Check one: No UST removal performed Returned to UST excavation Excavated soils treated or disposal off site X If soils were excavated, summarize excavation and treatment/disposal activities:

A minimal amount of petroleum contaminated soil was removed from the UST 56 tank pit. It should be noted that all contaminated soil removed during the entire project (i.e., all USTs removed under contract with ACE, to include clean and non-clean closures) was tested in accordance with the disposal facility requirements and transported to Kedesh, Inc., Highway 84, Ludowici, GA, 31316. The Installation has records of all manifests and weight tickets for this project and submitted copies to GA EPD in September 1998.

- 7. <u>Site Ranking:</u> Environmental Site Sensitivity Score: 250 (Appendix X: Site Ranking Form)
  8. <u>Conclusions and Recommendations</u> Complete applicable section below, one section only
  a. No Further Action Required (if applicable) N/A (provide justification) Concentrations of contaminants in soil and groundwater do not exceed applicable soil threshold levels (Table A, Column 2) and/or MCLs.
  - b. Monitoring Only (if applicable) (provide justification)

N/A <u>X</u>

c. CAP-B (if applicable) N/A X (provide justification)

## **III.** MONITORING ONLY PLAN (if applicable):

N/A. X.

A. Monitoring points

B. Period/Frequency of monitoring and reporting

- C. Monitoring Parameters
- D. Milestone Schedule
- E. Scenarios for site closure or CAP-Part B
- IV.
   SITE INVESTIGATION PLAN (if applicable):
   N/A
   X

   (Figure 8: Proposed additional boring/monitoring well location)
   N/A
   X
- A. Proposed Investigation of Horizontal and Vertical Extent of Contamination In:
  - 1. Soil N/A X

# 2. Groundwater a. Free Product b. Dissolved phase NA X 3. Surface Water N/A X

B. Proposed Investigation of Vadose Zone And Aquifer Characteristics:
 Additional vadose zone and aquifer characterization is not required.

#### V. PUBLIC NOTICE

(Figure 9. Tax Map) (Appendix XI: Copies of public notification letters & certified return receipts or newspaper notice if approved)

UST 56, Building 1056 is located within the confines of Fort Stewart Military Reservation, a federal facility. The U.S. Government owns all of the property contiguous to the site. The Fort Stewart Directorate of Public Works (DPW) has complied with the public notice requirements defined by Georgia Environmental Protection Division (GA EPD) guidance by publishing an announcement in the *Savannah Morning News* on October 18 and 25, 1999.

#### VI. CLAIM FOR REIMBURSEMENT (for GUST Trust Fund sites only): N/A X (Appendix XII: GUST Trust Fund Reimbursement Application and Claim for reimbursement)

Fort Stewart is a federally owned facility and has funded the investigation of the UST 56 site, Building 1056, Facility ID #9-089116, using Environmental Restoration Account Funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.



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# **APPENDIX I**

# **REPORT FIGURES**

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#### Fort Stewart UST CAP-A Report UST 56, Building 1056, Facility ID #9-089116

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Figure 1. Location Map of Fort Stewart, Liberty County, Georgia

Fort Stewart UST CAP-A Report UST 56, Building 1056, Facility ID #9-089116



Figure 2. Site Plan for the UST 56, Building 1056 Site Investigation



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Figure 6. Potentiometric Surface Map of the UST 56, Building 1056 Site



Figure 7. UST System Closure Sampling Locations at the UST 56, Building 1056 Site

No additional borings or monitoring well locations are proposed for this site.

Figure 8. Proposed Additional Boring/Monitoring Well Locations

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No tax map is available for Fort Stewart Military Reservation, which is a government owned facility.

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# **APPENDIX II**

# **REPORT TABLES**

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	Monitoring Well Number: N/A										
Date of Measurement											
			····-								
	No Free Product Detected										
			TOTAL	NONE							

### TABLE 1: FREE PRODUCT REMOVAL

	Monitoring Well Number: N/A										
Date of	Groundwater	Product Thickness	Corrected Water Elev.	Product Removed							
Measurement	Measurement Elev. (ft AMSL) (ft) (ft AMSL)										
	No Free Product Detected										
			TOTAL	NONE							

NOTE:

AMSL Above mean sea level.

C	(VOLATILE ORGANIC COMPOUNDS)											
Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl- benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH (mg/kg)			
82-01	820111	6.0 - 8.0	6/29/98	0.0025 U	0.0043 =	0.0025 U	0.0076 U	0.0043	6.41 U			
82-01	820121	0.0 - 2.0	6/29/98	0.0020 UJ	0.0101 J	0.002 UJ	0.0061 UJ	0.0101	55.7 =			
82-02	820211	2.0 - 4.0	6/29/98	0.0021 U	0.0116 =	0.0021 UJ	0.0064 UJ	0.0116	104 =			
82-02	820221	10.0 - 12.0	6/29/98	0.0024 U	0.0378 =	0.0024 U	0.0125 J	0.0503	24.2 =			
82-03	820311	6.0 - 8.0	6/29/98	0.0025 U	0.0341 =	0.0025 U	0.0074 U	0.0341	5.82 U			
82-03	820321	4.0 - 6.0	6/29/98	0.0025 U	0.0194 =	0.0025 UJ	0,0074 UJ	0.0194	13.7 =			
82-04	820411	2.0 - 4.0	6/29/98	0.0022 U	0.0092 =	0.0022 UJ	0.0064 UJ	0.0092	48.9 =			
82-04	820421	4.0 - 6.0	6/29/98	0.0025 U	0.015 =	0.0025 U	0.0074 U	0.015	39.5 =			
	Applicable Standards <sup>1</sup>			0.008	6.0	10	700	NRC	NRC			

# **TABLE 2a: SOIL ANALYTICAL RESULTS**

(VOLATILE ORGANIC COMPOUNDS)

#### NOTES:

Field work was conducted prior to the new CAP-A guidance published in May 1998, thus the new SW-846 analytical methods were not used. 1

- Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)
- BGS Below ground surface
- BTEX Benzene, toluene, ethylbenzene, and xylene
- DRO **Diesel Range Organics**
- GRO Gasoline Range Organics
- NRC No regulatory criteria
- TPH Total petroleum hydrocarbon

#### Laboratory Qualifiers

- Indicates that the compound was not detected above the reported sample quantitation limit U
- UJ Indicates that the compound was not detected above an approximated sample quantitation limit
- J Indicates that the value for the compound was an estimated value.
- = Indicates that the compound was detected at the concentration reported.

Total PAHs (mg/kg)	Q	QN	8.626	9.451	QN	Q	QN	Q	NRC
Pyrene			1.66 =	2.77 =					NRC
Indeno (1,2,3)pyrene			0.601 J						NRC
Fluroanthene			1.06 =	1.41 J					NRC
Сһтузеле			1.21 J	1.24 J					NRC
Benzo(g,h,l)perylene			0.551 J						NRC
Benzo(b)fluoranthene			1.75 =	2.11 =					NRC
Benzo(a) pyrène			1.01 =	1.07 J					NRC
Benzo(a)ລາເກເອເອກe			0.784 =	0.851 J					NRC
Date Sampled	6/29/98	6/29/98	6/29/98	6/29/98	6/29/98	6/29/98	6/29/98	6/29/98	
 Depth (ft BGS)	6.0 - 8.0	0.0 - 2.0	2.0 - 4.0	0.0 - 12.0	6.0 - 8.0	4.0 - 6.0	2.0 - 4.0	4.0 - 6.0	e Standards <sup>1</sup>
 Sample ID		820121	82-02 820211 2.0 -	820221	820311	820321			Applicable St
Sample Sample Location ID	82-01 820111	82-01 820121	82-02	82-02	82-03	82-03	82-04 820411	82-04 820421	, ,

NOTES:

II-5

Field work was conducted prior to the new CAP-A guidance published in May 1998, thus the new SW-846 analytical methods were not used. Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)

Not detected; refer to Appendix V, Table V-A, for complete list of PAH results

Below ground surface ND BGS

PAH

Not applicable Polynuclear aromatic hydrocarbon

Laboratory Qualifiers

Indicates that the compound was not detected above the reported sample quantitation limit

Indicates that the compound was not detected above an approximated sample quantitation limit Indicates that the value for the compound was an estimated value ъS

- II

indicates that the compound was detected at the concentration reported

Sample ID	Depth (ft BGS)	Date Sampled	Benzene (ug/l)	Toluene (ug/l)	Ethyl - benzene (ug/l)	Xylenes (ug/l)	Total BTEX (ug/l)
820112	6.5	6/29/98	2 U	2 U	2 U	6 UJ	
820212	6	6/29/98	2 U	2 U	2 U	6 U	ND
820312	6.5	6/29/98	2 U	2 U	2 U	6 U	ND
820412		6/29/98	2 U	2 U	2 U	6 UJ	ND
820512	12	6/29/98	2 U	2 U	2 U	6 U	ND
820522	13.5	6/29/98	2 U	2 U	2 U	6 U	ND
Applicable Standards <sup>1</sup>		5	700	1000	10000	NRC	

#### **TABLE 3a: GROUNDWATER ANALYTICAL RESULTS** (VOLATILE ORGANIC COMPOUNDS)

#### **TABLE 3b: GROUNDWATER ANALYTICAL RESULTS** (POLYNUCLEAR AROMATIC HYDROCARBONS)

			De	Detected PAH Compounds (ug/l)				
Sample ID	Depth (ft BGS)	Date Sampled					Total PAH (ug/l)	
820112	6.5	6/29/98			1		ND	
820212	6	6/29/98					ND	
820312	6.5	6/29/98					ND	
820412	7.0	6/29/98					ND	
820512	12	6/29/98					ND	
820522	13.5	6/29/98					ND	
Appl	icable Stan	dards <sup>1</sup>	NRC	NRC	NRC	NRC	NRC	

NOTE:

Field work was conducted prior to the new CAP-A guidance published in May 1998, thus the new SW-846 analytical methods were not used. 1

- U.S. Environmental Protection Agency maximum contaminant level
- ND Not detected; refer to Appendix VIII, Table VIII-A, for complete list of PAH results
- BTEX Benzene, toluene, ethylbenzene, and xylene
- BGS Below ground surface
- N/A Not applicable
- NRC No regulatory criteria
- PAH Polynuclear aromatic hydrocarbon

Laboratory Qualifiers

- Indicates the compound was not detected at the concentration reported U
- UJ Indicates that the compound was not detected above an approximated sample quantitation limit
- J Indicates the value for the compound is an estimated value
- = Indicates the compound was detected at the concentration reported

Well Number	Date Measured	Ground Surface Elev. (ft MSL)	Top of Casing Elev. (ft MSL)	Interval	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Specific Gravity Adjustment	Corrected Groundwater Elev. (ft MSL)			
82-01	6/27/98	87.65	88.03	0.0 - 10.0	N/A	6.84	N/A	N/A	81.19			
82-02	6/27/98	87.24	89.58	2.0 - 12.0	N/A	7.98	N/A	N/A	81.60			
82-03	6/27/98	87.60	89.75	2.0 - 12.0	N/A	8.13	N/A	N/A	81.62			
82-04	6/27/98	87.67	90.10	0.0 - 8.0	N/A.	8.72	N/A	N/A	81.38			

#### **TABLE 4: GROUNDWATER ELEVATIONS**

NOTE:

MSL	Mean sea	level

Below ground surface Below top of casing Not applicable BGS

BTOC

N/A

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#### TABLE 5a: UST SYSTEM CLOSURE - SOIL ANALYTICAL RESULTS (VOLATILE ORGANIC COMPOUNDS)

	hin in the second se	Date Sampled		Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH (mg/kg)
TK56-S1	N/R	8/12/98	0.230 U	0.230 U	0.23 U	0.230 U	ND	4600 =
TK56-S2	N/R	8/12/98	0.230 U	0.230 U	0.23 U	0.230 U	ND	39300 =
Applic	able Stand	lards <sup>2</sup>	0.008	6	10	700	NRC	NRC

# TABLE 5b: UST SYSTEM CLOSURE<sup>1</sup> - SOIL ANALYTICAL RESULTS (POLYNUCLEAR AROMATIC HYDROCARBONS)

			Detecte	Detected PAH Compounds (mg/kg)				
Sample	Depth	Date					Total PAHs	
Location	(ft BGS)					1	(mg/kg)	
TK56-S1	N/R	8/12/98					ND	
TK56-S2	N/R	8/12/98					ND	
							ļ	
					·			
Applicable Standards <sup>2</sup>		NRC	NRC	NRC	NRC	NRC		

NOTE:

<sup>1</sup> Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996)
 <sup>2</sup> Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)
 BDL Below detection limit

BGS Below ground surface

BTEX Benzene, toluene, ethylbenzene, and xylene

NRC No regulatory criteria.

PAH Polynuclear aromatic hydrocarbon.

Laboratory Qualifiers

U Indicates the compound was not detected at the concentration reported

UJ Indicates that the compound was not detected above an approximated sample quantitation limit

J Indicates the value for the compound is an estimated value

= Indicates the compound was detected at the concentration reported

#### TABLE 6a: UST SYSTEM CLOSURE<sup>1</sup> - GROUNDWATER ANALYTICAL RESULTS (VOLATILE ORGANIC COMPOUNDS)

Sample Location	Depth (ft BGS)	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethyl - benzene (ug/L)	Xylenes (ug/L)	Total BTEX (ug/L)			
	NO GROUNDWATER WAS COLLECTED									
Applic	Applicable Standards <sup>2</sup>		5.	700	1,000	10,000	NRC			

# TABLE 6b: UST SYSTEM CLOSURE1 - GROUNDWATER ANALYTICAL RESULTS(POLYNUCLEAR ANALYTICAL RESULTS)

			D	etected PAH C	ompounds (ug/	L)	
Sample	Depth	Date					Total PAHs
Location	(ft BGS)	Sampled					(µg/L)
				······································			
		NO	GROUNDWA	TER WAS CO	OLLECTED		
Applica	able Stand	ards <sup>2</sup>	NRC	NRC	NRC	NRC	NRC

NOTE:

2

Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996)

U.S. Environmental Protection Agency maximum contaminant levels

BGS Below ground surface

BTEX Benzene, toluene, ethylbenzene, and xylene

N/A Not applicable

ND Not detected

NR Not required; PAH analysis was not requested for these samples

NRC No regulatory criteria.

#### Laboratory Qualifiers

U Indicates the compound was not detected at the concentration reported

UI Indicates that the compound was not detected above an approximated sample quantitation limit

J Indicates the value for the compound is an estimated value

= Indicates the compound was detected at the concentration reported

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# **APPENDIX III**

# WATER RESOURCES SURVEY DOCUMENTATION

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#### WATER RESOURCES SURVEY DOCUMENTATION

#### 1.0 LOCAL WATER RESOURCES

As required by the GA EPD UST CAP-Part A guidance, a water resource survey documenting information for public and non-public water supply wells, surface water bodies, underground utilities, and potential receptors was conducted for the Fort Stewart UST investigation sites. The information presented in this appendix provides the supporting documentation for Section II.D.3 of the CAP-Part A Form.

#### 1.1 WATER SUPPLY WELL SURVEY

The water supply well survey was conducted using the following GA EPD guidelines/requirements:

- Fort Stewart is located in an area of average or higher groundwater pollution susceptibility.
- Locate all public supply wells as defined by GA EPD that exist within 2 miles of the investigation sites.
- Locate all non-public supply wells that exist within 0.5 miles of the investigation sites.
- Locate all supply wells nearest the investigation sites.
- Locate all wells downgradient of the investigation sites.

A total of seven groundwater supply wells are located within a 2-mile radius of the Fort Stewart garrison area. Six of these wells are located within the confines of the garrison area. The other well is located at Wright Army Airfield, approximately 1.2 miles northeast of the garrison area. All of the groundwater supply wells are classified as public wells that supply water to Fort Stewart for drinking and nondrinking purposes. These wells are approximately 450 feet deep and draw groundwater from the Principal Artesian (also known as the Florida) aquifer. Chlorine and fluoride are added into the groundwater at the well heads prior to being pumped into storage tanks and/or water towers, according to Fort Stewart DPW personnel. The location of these wells, along with a 500-foot radius drawn around each well, is shown in Figure 3.

#### **1.2 SURFACE WATER BODIES**

Surface water(s) in the State of Georgia, as defined by Rules and Regulations for Water Quality Control, Chapter 391-3-6, shall mean any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs producing 100,000 gallons per day, and all other bodies of surface water, natural or artificial, lying within or forming part of the boundaries of the state, which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation. The surface water body survey was conducted using the following GA EPD guidelines/requirements:

- surface water bodies that exist within 1 mile of the investigation sites,
- all surface water bodies nearest the investigation sites if these bodies lie outside the 1-mile radius of concern,

- all surface water bodies downgradient of the investigation sites, and
- the storm and sanitary sewers adjacent to the investigation sites.

Several surface water bodies are located within a 1-mile radius of the Fort Stewart garrison area. These are shown in Figure 3 and include Mill Creek, Taylors Creek, Peacock Creek, Childpen's Pond, and two unnamed ponds. Mill Creek extends along the western side of the garrison area and flows into Taylors Creek located approximately 0.75 miles northwest of the garrison area. Taylors Creek then flows northward approximately 3.5 miles to its confluence with Canoochee Creek. Peacock Creek originates near the east corner of the garrison area and flows southward from the garrison. Mill Creek, Taylors Creek, and Peacock Creek all have natural streambeds and exhibit perennial flow.

Childpen's Pond is located at the northwest end of the garrison area. The two unnamed ponds are located at the northwest end of the facility golf course in the vicinity of Childpen's Pond. All of the ponds are isolated water bodies that are relatively small in size, measuring less than 500 feet in diameter.

Surface water run-off, if any due to proximity of building and overhang, from the UST site moves over the existing concrete cover to the Fort Stewart storm water drainage system. Since petroleum contamination at the sites primarily impacts surficial groundwater, the surface water run-off pathway is not a viable contaminant transport mechanism because of the concrete acting as a barrier and the location of the nearest surface water body.

### 2.0 POTENTIAL RECEPTOR SURVEY SUMMARY OF THE UST 56 SITE

A field potential receptor survey was conducted for the UST 56 site in June 1998. The site and adjacent areas were surveyed for locations of surface water bodies, utility lines, and basements. Basements do not exist in the buildings adjacent to the site. Additional information, provided by DPW, was used to determine the location of the nearest public and non-public water supply wells and downgradient surface water bodies not located during the field survey.

#### 2.1 Water Supply Wells Near the UST 56

The UST 56 site is located approximately 900 feet southwest (side gradient) of Well #1. Therefore, the UST 56 site is classified as being located greater than 500 feet to a withdrawal point. The nearest downgradient water supply well is Well #8. This well is located 7700 feet west (downgradient) of the UST 56 site.

### 2.2 Surface Water Bodies Near the UST 56 Site

At the closest point, an unnamed tributary that flows into Mill Creek is located approximately 1500 feet southwest of the UST 56 site. In the direction of groundwater flow, this tributary is located approximately 4200 feet west of the UST 56 site. Based on the distances between the UST and the nearest surface water body, the site is classified as being located greater than 500 feet to a downgradient surface water body.

#### 2.3 Underground Utilities Near the UST 56 Site

The nearest sanitary sewer line is located 90 feet to the northeast (side gradient) of the site and runs parallel to Crisp Avenue. The depth of this line is estimated to be approximately 4 to 6 ft BGS.

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# APPENDIX IV

# SOIL BORING LOGS

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		HTRW DRILL	ING LOG			HOLE NUMBER 82-0
PROJEC	T: Fort S	tewart USTs II	NSPECTOR M	1. Vest		SHEET 1 OF 1
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		Fill Materials (mixed soils) SILT, fine grained, loose, non-plastic, dry, loyR 9/1 very dark gray Sandy SILT, fine grained, loose, non-plastic, dry loyR 7/1, light gray	14.0ppm		Soil Sample 820121	Ran 4.0, Rec. 4.0
		SILT, fine grained,		· ·		-
	, , , , , , , , , , , , , , , , , , ,	loose, non-plastic, dry, IDYR9/, very darkgray Sandy SILT, fine	6.2 ppm			
	5	SILT, with some sand, fine grained, loose to low density,	Z.9 ppm			Ran 4.0, Rec. 4.0
		wet, non-plastic, 10YRZ/1, black Silty SAND, fine grained, loose to low density, wet, non-plastic, 10YR5/1, gray	2.4ppm		Soil Sample 820111	wet below €.5FT Bes
	, , , , , , , , , , , , , , , , , , ,	Shelby Tube	N/A	Soil Sample 820131		Pushed Shelby Tube 8.0 FTTO 10.0 FT BGS.
<u> </u>	10		IV-	V		End of Orilling set piezometer

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at 10FT BGS

		HTRW DRILL	ING LOG	·····		HOLE NUMBER 82.02	
PROJEC'	T: Fort S			. Vest		SHEET 1 OF Z	[
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)	
		SILT, fine grained, loose, dry, non-plastic, lDYR4/, dark gray SILT, fine grained, loose, dry, non-plastic, lOYR4/, dark gray SILT, medium density SYR3/, SILT, medium density SYR3/,	32.8 <sub>ppm</sub>			Ran 4.0, Rec. 4.0	
		Silty SAND, fine grained, Loose to low density idamp. Non-plastic, 54R713 pale Yellow Silty SAND, fine grained, loose to low density, dry, 54R8/1, white Silty SAND, fine grained, loose to low density, dry,	36.3ppm		Soil Sample & 20211		
		IDVR4/2, dark grayish brown SILT, fine grained, loose to low density, dry, SY4/1 dark gray Silty SAND, fine grained, medium to low density, moist to wet, non-plastic,	12.22ppm			Ran 4.0, Rec. 4.0	
		SY2.5/1, black Gradual contact to wet at 6.5FT B65	15.5ppm			₩ Wet below 6.5FT B&S	
	°		Dppm			Ran 4.0, Rec. 4.0	

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			HTRW DRIL				HOLE NUMBER SZ-OZ
	PROJECT: ELEV. (A)	Fort St DEPTH (B)	ewart USTs DESCRIPTION OF MATERIALS (C)	INSPECTOR M FIELD SCREENING	GEOTECH SAMPLE	ANALYTICAL SAMPLE NO.	SHEET 2 OF Z REMARKS (G)
(			Silty SAND, fine grained medium to low density, wet, non-plastic, 572.5% black	RESULTS	OR CORE BOX	Soil Sample 3 820221	
	1						End of drilling Set piezometer at 12.0FT BGS
Ć		5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
Ć	]; ]; 24						

		HTRW DRILL	ING LOG			HOLE NUMBER 82.0	3
PROJECT	I: Fort St	lewart USTs I	SPECTOR N	1. Vest		SHEET 1 OF V	
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (Ġ)	
		SILT, fine grained, dry, non-plastic, 5 YR4/1 dack gray SILT, fine grained, dry, non-plastic, 10 YR81, white	Oppm			Ran 4.0 Rec 4.0	
		SILT, fine grained, dry, non. plastic, 546/4 pale olive					
	3	SILT, fine grained, dry, non-plastic, 104R4/6 Yellowish brown	~				
	•	SILT. fine grained, dry, non-plastic, 104R5/2 grayish brown	Obbin				hulu
		SILT with sand, fine grained, loose to low density, moist, non-plastic			Sample	Ran 4.0, Rec. 4.0	
	۰ ۱۱۱۱	Aradual crater	38.2 <sub>ppm</sub>		Seil S 9203		
		gradual contact to wet at 6.3 FT Bes			iple	Wet below 6.3FT B65	
			0 ppm		Soil Sounple 820311		
	*				V 1	Endofdrilling at SDFT BGS	
	9					Set piezometer	
	10					at 12.0FT BES	E

PROJEC	T: Fort S	HTRW DRILI		1.Vest		HOLE NUMBER &Z - C
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO.	REMARKS (G)
	1	Silly SAND, fine grained, loose to low density, dry, non-plastic, 104R3/2, very dark grayish brown Sandy SILT, fine grained, loose to low density, moist, non-plastic, 547/2 light gray	Dppm		(F)	Ran 4.0 Rec. 3.7
	3		Dppm		Soil Sample &ZO411	
	* * 5	sandy SILT, fine grained, loose to low density, moist, 104R5/3 brown	Oppm		nple	Ran 4.0 Rec. 4.0
	•	Sandy SILT, fine grained, loose to low density, wet, 104R2/1 black	-		50:1 Sav 820421	
- - - -						▼ Wet belows = 7.0FT BGS
	8 8	Color grading to 104R 7/2 light gray				End of drilling Set piezometer at 8.0FT BGS
	, , , , , , , , , , , , , , , , , , ,		-			at -6.0FT 1523

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# APPENDIX V

# SOIL LABORATORY REPORTS

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Station:	TABI Georgia UST	LE V-A. SU 82-01	MMARY (82-01	<b>DF SOIL A</b> 82-02	ABLE V-A. SUMMARY OF SOIL ANALYTICAL RESULTS           T         82-01         82-01         82-02         82-03	VL RESUL	IS 82-03	82-04	82-04	
Sample ID:	Corrective	820111	820121	820211	820221	820311	820321	820411	820421	
Sample Interval:	Action	6.0' - 8.0'	0.0' - 2.0'	2.0' - 4.0'	10.0' - 12.0'	6.0' - 8.0'	4.0' - 6.0'	2.0' - 4.0'	4.0' - 6.0'	
Collection Date:	Levels for Soil <sup>1</sup>	29-Jun-98	29-Jun-98	29-Jun-98	29-Jun-98	29-Jun-98	29-Jun-98	29-Jun-98	29-Jun-98	
Units:	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mø/ka)	
VOLATILE ORGANIC COMPOUNDS				ò	ò	0 0		19-19-1	(A., A., Y	
Benzene	0.008	0.0025 U	0.002 UJ	0.0021 U	0.0024 U	0.0025 U	0.0025 U	0.0022 U	0.0025 U	
Toluene	6	0.0043 =	0.0101 J	0.0116 =	0.0378 =			0.0092 =		
Ethylbenzene	10	0.0025 U	0.002 UJ	0.0021 UJ	0.0024 U	0.0025 U	0.0025 UJ	0.0022 UJ	0.0025 11	
Xylenes, Total	700	0.0076 U	0.0061 UJ	0.0064 UJ	0.0125 J					
POLYNUCLEAR AROMATIC HYDROCARBONS	DROCARBONS									
2-Chloronaphthalene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	0.406 11	
Acenaphthene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U		0.406 U	
Acenaphthylene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	0.406 U	
Anthracene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	0.406 U	
Benzo(a)anthracene	NRC	0.418 U	0.671 U	0.784 =	0.851 J	0.412 U	0.406 U	0.352 U		
Benzo(a)pyrene	NRC	0.418 U	0.671 U	1.01 =	1.07 J	0.412 U	0.406 U	0.352 U	0.406 U	
Benzo(b)fluoranthene	NRC	0.418 U	0.671 U	1.75 =	2.11 =	0.412 U	0.406 U	0.352 U	0.406 U	
Benzo(g,h,i)perylene	NRC			0.551 J	1.62 U	0.412 U	0.406 U	0.352 U	0.406 U	
Benzo(k)fluoranthene	NRC		0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	0.406 U	
Chrysene	NRC		0.671 U	1.21 J	1.24 J	0.412 U	0.406 U	0.352 U	0.406 U	
Dibenzo(a,h)anthracene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	0.406 U	
Fluoranthene	NRC	0.418 U	0.671 U	1.06 =	1.41 J	0.412 U	0.406 U	0.352 U	0.406 U	
Fluorene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	D	05
Indeno(1,2,3-cd)pyrene	NRC	0.418 U	0.671 U	0.601 J	1.62 U	0.412 U	0.406 U	0.352 U	D	
Naphthalene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	n	00.
Phenanthrene	NRC	0.418 U	0.671 U	0.707 U	1.62 U	0.412 U	0.406 U	0.352 U	D	ып
Pyrene	NRC	0.418 U	0.671 U	1.66 =	2.77 =	0.412 U	0.406 U	0.352 U	n	ua
OTHER ANALYTES						-			•	ınø
Lead	NRC		1.3 =	۳ 2			2.1 =		3.7 =	11
Total Organic Carbon	NRC						12200 =			136
Total Petroleum Hydrocarbons	NRC	6.41 U	55.7 =	104 =	24.2 =	5.82 U	13.7 =	48.9 =	39.5 =	. га
Contract for field work was issued prior to the new CAP-A guidance published in May 1998, thus the new SW-846 analytical methods were not used.	rior to the new CAP-A g ural Resources Applicable	guidance publis e Soil Threshold	hed in May 199 Levels (Table ,	8, thus the new A, Column 2)	' SW-846 analyt	ical methods we	sre not used.			cility II

10 Bold values exceed soli threshold levels NRC No regulatory criteria QA/QC samples were collected. The laboratory data sheets have been included in this appendix, but the results are not summarized Laboratory Qualifiers

Indicates that the compound was not detected above the reported sample quantitation limit Indicates that the compound was not detected above an approximated sample quantitation limit Indicates that the value for the compound was an estimated value. Indicates that the compound was detected at the concentration reported.

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98-160P(doc-56-4si) 111098

# Fort Stewart UST CAP A Report UST 56, Building 1056, Facility ID #9-089116

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VOLATILE ORGANICS ANALY	SIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW % Moisture: not dec. 21 GC Column: J&W DB-624 (PID) ID: 0.53 Soil Extract Volume:(mL)	Contract: NA SAS No.: NA SDG Lab Sample ID: Lab File ID: Date Received: Date Analyzed:	820111 No.: FS4A20S 9807050-12 2Q5021 07/01/98
CAS NO. COMPOUND	Soil Aliquot Vo CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	lume:(uL)
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)		2.5 U 4.3 2.5 U 7.6 U U

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#### 1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: GENERAL EN	GINEERING LABOR Contract	: NA	820111
Lab Code: NA	Case No.: NA SAS No.	: NA SDG	No.: FS4A20S
Matrix: (soil/water)	SOIL	Lab Sample ID:	9807050-12
Sample wt/vol:	30.3 (g/mL) G	Lab File ID:	28721
Level: (low/med)	LOW	Date Received:	07/01/98
<pre>% Moisture: 21</pre>	decanted: (Y/N) N	Date Extracted	l:07/07/98
Concentrated Extract	Volume: 1.00(mL)	Date Analyzed:	07/12/98
Injection Volume:	1.0(uL)	Dilution Facto	r: 1.0
GPC Cleanup: (Y/N)	N pH: 7.0		

CAS NO. COM

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

Q

91-20-3naphthalene         91-58-72-chloronaphthalene         209-96-8acenaphthylene         83-32-9acenaphthene         86-73-7fluorene         85-01-8	418 418 418 418 418 418 418 418 418 418	ממממממממממ	
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DATA VALIDATION COPY

LW 8-11-98

FORM I SV-1

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	Client:	Science Applic P.O. Box 2502 800 Oak Ridge Oak Ridge, Ter	Tumpike	шp.					·	
Project	Contact: Description:	Ms. Lorene Rol	lling							
		CAP-Part A for	UST Sites (Task Orde	a No. 8)						
cc: SAIC00598			Report Date: July 23,	1998						Dere 1 C
	Sample	D	: 820111					······		Page 1 of
	Lab ID		:9807050-12			4				
	Matrix		: Soil							
	Date Co		: 06/29/98							
	Date Re	ceived	: 07/01/98							
	Priority		: Rontine							
	Collector	r	: Client							
Parameter	Qualifier		, 							
· · · · · · · · · · · · · · · · · · ·		Result	DL	RL	Units	חד	Anab			
General Chemistry Total Rec. Petro. H	y Iydrocarbons J	6.41 [/	FOL FO/ 251					yst Date	Time	Batch A
Jeneral Chemistry Total Rec. Petro. H M = Method	y Iydrocarbons J	6.41 U	FP1,FD6 251	12.7	mg/kg		ЛР		,	
Total Rec. Petro, H	y Iydrocarbons J	6.41 U	FPI,FDC 2.51 Method-Descriptio	12.7	mg/kg				,	<u> </u>
Total Rec. Petro. H M = Method	y Iydrocarbons J	6.41 U		12.7	mg/kg				,	<u> </u>
Total Rec. Petro. H M = Method M 1	y Iydrocarbons J	6.41 U	Method-Descriptio	12.7	mg/kg				,	
Total Rec. Petro. H M = Method M 1	lydrocarbons J		Method-Descriptio	12.7	mg/kg				,	
Total Rec. Petro. H M = Method M 1 Le qualifiers in this : D indicates that the	lydrocarbons J	as follows:	Method-Descriptio EPA 418,1 Modifi	12.7 n ed		1.0	Л.Р	07/17/98	,	
M = Method M = Method M 1 Direst Le quélifiers in this : D'indicates that the indicates presence of	lydrocarbons J report are defined analyte was not de	as follows:	Method-Descriptio EPA 418.1 Modify	12.7	limit	1.0	Л.Р	07/17/98	,	
M = Method M = Method M 1 Drest c qualifiers in this : D indicates that the indicates presence of indicates that the an	lydrocarbons J report are defined analyte was not de f analyte at a concu-	as follows: stocted at a concest entration less that	Method-Descriptio EPA 418.1 Modifi intration greater than th a the reporting limit (R	12.7 ed ed L) and grea	limit.	1.0	Л.Р	07/17/98	,	
M = Method M = Method M 1 Drest c qualifiers in this : D indicates that the indicates presence of indicates that the an	lydrocarbons J report are defined analyte was not de f analyte at a concu-	as follows: stocted at a concest entration less that	Method-Descriptio EPA 418.1 Modifi intration greater than th a the reporting limit (R	12.7 ed ed L) and grea	limit.	1.0	Л.Р	07/17/98	,	
Total Rec. Petro. H M = Method M 1 M 1 Diest c qualifiers in this : D indicates that the indicates presence of indicates that the an indicates that a quali	lydrocarbons J report are defined analyte was not de f analyte at a concu talyte was not dete ity control analyte	as follows: elected at a concess entration less that cied at a concentr recovery is outsic	Method-Descriptio EPA 418,1 Modifi	12.7 ed ed L) and grea	limit.	1.0	Л.Р	07/17/98	,	
Total Rec. Petro. H M = Method M 1 M 1 Dens: e qualifiers in this : D indicates that the indicates presence of indicates that the an indicates that a quali s data report has be	lydrocarbons J report are defined analyte was not de f analyte was not dete- ity control analyte	as follows: exected at a concest entration less that cted at a concentr recovery is outsic	Method-Descriptio EPA 418.1 Modifi intration greater than th a the reporting limit (R	12.7 ed ed L) and grea	limit.	1.0	Л.Р	07/17/98	,	
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Total Rec. Petro. H M = Method M 1 Dies: te qualifiers in this i D indicates that the indicates presence of indicates that the an indicates that a quali is data report has be coordance with Gard dard operating proc	lydrocarbons J report are defined analyte was not defined analyte was not dete- ity control analyte the prepared and re- meral Engineering 1	as follows: etected at a concess entration less than cted at a concentr recovery is outsic eviewed Laboratories	Method-Descriptio EPA 418.1 Modifient intration greater than the a the reporting limit (R ration greater than the de of specified acceptant	12.7 ed ed L) and grea	limit. ter than the de nit.	1.0	JLP	07/17/98	1300	126389 1
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LA VOLATILE ORGANICS ANALY	SIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA		820113
Matrix: (soil/water) SOIL	SAS No.: NA SDG Lab Sample ID:	No.: FS4A205
Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW	Lab File ID:	2Q5022
<pre>% Moisture: not dec. 21 GC Column: J&amp;W DB-624(PID) ID: 0.53</pre>	Date Received: Date Analyzed:	
Soil Extract Volume:(ml)	(mm) Dilution	Factor: 1.0
CAS NO. COMPOUND	Soil Aliquot Vo CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	4	2.5 U U 47.5

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FORM I VOA

V-8

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1

Lab Name: GENERAL EN	GINEERING LABOR Contract	: NA 820113
Lab Code: NA	Case No.: NA SAS No.	: NA SDG No.: FS4A20S
Matrix: (soil/water)	SOIL	Lab Sample ID: 9807050-13
Sample wt/vol:	30.4 (g/mL) G	Lab File ID: 2B722
Level: (low/med)	LOW	Date Received: 07/01/98
<pre>% Moisture: 21</pre>	decanted: (Y/N) N	Date Extracted:07/07/98
Concentrated Extract	Volume: 1.00(mL)	Date Analyzed: 07/12/98
Injection Volume:	1.0(uL)	Dilution Factor: 1.0
GPC Cleanup: (Y/N)	N pH: 7.0	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/K	G Q
91-58-7 209-96-8 83-32-9 86-73-7 206-44-0 129-00-0 206-44-0 129-00-0 205-99-2 205-99-2 207-08-9 50-32-8	naphthalene 2-chloronapht acenaphthylen acenaphthene fluorene phenanthrene phenanthrene fluoranthene fluoranthene pyrene benzo(a)anthr benzo(b)fluor benzo(b)fluor benzo(a)pyrene indeno(1,2,3-) dibenz(a,h)ant benzo(g,h,i)pe	acene	416 U 416 U

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FORM I SV-1

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Total Rec. Petro. Hydrocarbons J       7.87 UFP), FP62.51       12.7 mg/kg       1.0 JLP 07/17/98 1300 126389 1         M = Method       Method-Description -         M1       EPA 418.1 Modified         Notes:       Diadicates that the analyte was not detected at a concentration greater than the detection limit.         indicates presence of analyte at a concentration greater than the detection limit.         indicates that the analyte was not detected at a concentration greater than the detection limit.         indicates that a quality control analyte recovery is outside of specified acceptance criteria.         his data report has been prepared and reviewed         accordance with General Engineering Laboratories andard operating procedures. Please direct at (803) 769-7391.         DATA VALUDATION;		Client:			ications International Corp	).						
Owk Ridge, Temesses 37831         Project Description:       Ms. Lonne Rollins:         Project Description:       CAP-Part A for UST Size (Task Order No. 8)         cc: SAIC00593       Report Date: July 23, 1998         Page 1 of 1       Sample ID         Lab ID       : S20113         Lab ID       : S20113         Date Received       : 050/938         Parameter       Outline         Collector       : Client         Parameter       Qualifier         Parameter       Qualifier         Result       DL       RL         Units       DF       Analyst Date         Parameter       Qualifier       Result       DL         Parameter       Qualifier       Result       DL       RL         Units       DF       Analyst Date       Time       Batch M         Recerved       Collector       : Client       Time       Batch M         Parameter       Qualifier       Result       DL       RL       Units       DF       Analyst Date       Time       Batch M         Parameter       Qualifier       Time Result       DL       RL       Units       DF       Analyst Date       Dinterto M       Time					•••							
Contact:       Mc: Lorente Rollins CAP-Part A for UST Sizes (Task Order No. 8)         cr: SALC00598       Report Date: July 23, 1998       Page 1 of 1         Sample ID       : \$20113       1         Lab ID       : \$20013       1         Data Collected       : 06/29/98       Page 1 of 1         Printip       : \$000       1       10/29/98         Data Collected       : 06/29/98       10       1         Parameter       Qualifler       Result       DL       RL       Units       DF       Analyst Date       Time       Barch M         Reneral Chemistry       Total Rec. Parco. Hydrocarbons       J       1.87       U/FØ/, FØ 52.51       12.7       mg/kg       1.0       TLP       07/17/98       1300       126389       1         M = Method       Method-Description	*				-							
Project Description:       CAP-Part A for UST Sizes (Task Order No. 8)         cc:: SAIC00598       Report Date: July 23, 1998       Page 1 of 1         Sample ID       : \$20113		<b>.</b>		-								
Report Date: July 23, 1998         Page 1 of 1         Sample ID       : 820113         Lab ID       : 9907050-13         Matrix       : Soil         Date Collected       : 06/29/98         Date Collector       : Client         Parameter       Qualifler       Result       DL       RL       Units       DF       Analyst Date       Time Batch M         General Chemistry       Total Rec. Pero. Hydrocerbons       J       7.87       U FØ J, FØ 2.51       12.7       mg/kg       1.0       ILP       07/17/98 1300       126389 1         M = Method       Method-Description ~												
Sample ID       : 20113         Lab ID       : 9807050-13         Matix       : 5cil         Data Roccived       : 06(29)98         Data Roccived       : 06(29)98         Data Roccived       : 0701/98         Priority       : Routine         Collector       : Client         Parameter       Qualifler         Result       DL       RL       Units         DF Analyst Date Time Batch M         General Chemistry         Total Rec. Petro. Hydrocarbons       I       7.87       U FØ <sup>1</sup> , FØ <sup>6</sup> , 251       12.7       mg/kg       1.0       JLP       07/17/98       1300       126389       1         M = Method       Method-Description -	Project Desc	mpuon:	CAP-Pa	rt A I	or UST Siles (Task Order)	No. 8)						
Lab ID       : 9807050-13         Matrix       : Soil         Data Collected       : 06/29/98         Data Received       : 07/01/98         Priority       : Routine         Collector       : Client         Parameter       Qualifier         Result       DL       RL       Units       DF       Analyst Date       Time Batch M         General Chemistry       Total Rec. Petro. Hydrocarbons       J       7.87       U FØ J, FØ 62.51       12.7       mg/kg       1.0       T.P       07/17/98       1300       126389       1         M = Method       Method-Description -            1300       126389       1         M = Method       Method-Description -             126389       1          1300       126389       1          1300       126389       1          1300       126389       1         10       126389       1         10       10       126389       1        10       126389       1       126389 <td< th=""><th>cc: SAIC00598</th><th></th><th></th><th></th><th>Report Date: July 23, 19</th><th>98</th><th></th><th></th><th></th><th></th><th>ļ</th><th>Page 1 of 1</th></td<>	cc: SAIC00598				Report Date: July 23, 19	98					ļ	Page 1 of 1
Lab ID       : 9807050-13         Matrix       : Soil         Data Collected       : 06/29/98         Data Received       : 07/01/98         Priority       : Routine         Collector       : Client         Parameter       Qualifier         Result       DL       RL       Units       DF       Analyst Date       Time Batch M         General Chemistry       Total Rec. Petro. Hydrocarbons       J       7.87       U FØ J, FØ 62.51       12.7       mg/kg       1.0       T.P       07/17/98       1300       126389       1         M = Method       Method-Description -            1300       126389       1         M = Method       Method-Description -             126389       1          1300       126389       1          1300       126389       1          1300       126389       1         10       126389       1         10       10       126389       1        10       126389       1       126389 <td< td=""><td></td><td>Sampl</td><td>z ID</td><td></td><td>: 820113</td><td></td><td></td><td></td><td></td><td></td><td></td><td><b>-</b></td></td<>		Sampl	z ID		: 820113							<b>-</b>
Matrix : Soil Data Collected : $(b/29)$ ? Data Received : $(07)$ ? Priority : Routine Collector : Client Parameter Qualifler Result DL RL Units DF Analyst Date Time Batch M General Chemistry Total Rec. Petro. Hydrocarbons J 7.87 $U \not f \not p$ , $f \not p$ , $f \not p$ , $f g$ , $f_{2,51}$ 12.7 mg/kg 1.0 JLP 07/17/98 1300 126389 1 M = Method Method-Description - M 1 EPA 418.1 Modified Notes: The qualifiers in this report are defined as follows: Di indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that a quality control subjet recovery is outside of specified acceptance criteria. This data around has been prepared and reviewed accordance with General Engineering Laboranories anderd operating procedures. Please direct y questions to your Project Manager, Valerie Davis at (803) 769-7391. Distance that prove the manager of the parts at (803) 769-7391.		Lab II	<u>ر</u> (									
Date Received : $07/01/98$ Priority : Routine Collector : Client Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch M General Chemistry Total Rec. Petro. Hydrocarbons J 7.87 $U \not f \not p l_j \not f \not p \ell_{2.51}$ 12.7 mg/kg 1.0 JLP 07/17/98 1300 126389 1 M = Method Method-Description - M 1 EPA 418.1 Modified Notes: The qualifiers in this report are defined as follows: D0 indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that a quality control stabute recovery is outside of specified acceptance criteria. This data report has been prepared and reviewed accordance with General Engineering Laborancies anderd operating procedures. Please direct y questions to your Project Manager, Valerie Davis at (803) 769-7391. DATA VALIDATION		Manix	C									
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Collector       : Client         Parameter       Qualifier       Result       DL       RL       Units       DF       Analyst Date       Time       Batch       M         General Chemistry       Total Rec. Petro. Hydrocarbons       J       7.87 $U \not\in pl_j \not\in b_{2.51}^{6}$ 12.7       mg/kg       1.0       JLP       07/17/98       1300       126389       1         M = Method       Method-Description -		Date R	leccived		: 07/01/98							
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General Chemistry         Total Rec. Petro. Hydrocarbons J         7.87       UFP1, FP62.51         12.7       mg/kg       1.0         M = Method       Method-Description -         M 1       EPA 418.1 Modified         Notes:       The qualifiers in this report are defined as follows:         Discinces that the analyte was not detected at a concentration greater than the detection limit.         indicates presence of analyte as a concentration less than the reporting limit (RL) and greater than the detection limit.         indicates that the analyte was not detected at a concentration greater than the detection limit.         indicates that a quality control analyte recovery is outside of specified acceptance criteria.         his data report has been prepared and reviewed         a accordance with General Engineering Laboratories andard operating procedures. Please direct         ty questions to your Project Manager, Valerie Davis at (803) 769-7391.	Parameter	Qualifier	Re	suit	DL	RL	Units	DF	Anal	vst Date	Time	Batch M
Total Rec. Petro. Hydrocarbons J       7.87 UF\$, 50, 50, 2.51       12.7 mg/kg       1.0 JLP       07/17/98 1300       126389 1         M = Method       Method-Description -         M 1       EPA 418.1 Modified         Notes:       Disdicates that the analyte was not detected at a concentration greater than the detection limit.         indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit.         indicates presence of analyte was not detected at a concentration greater than the detection limit.         indicates that the analyte was not detected at a concentration greater than the detection limit.         indicates that a analyte was not detected at a concentration greater than the detection limit.         indicates that a quality control analyte recovery is outside of specified acceptance criteria.         his data report has been prepared and reviewed         a accordance with General Engineering Laboramries         andard operating procedures. Please direct         ny questions to your Project Manager, Valerie Davis at (803) 769-7391.         DATA VALIDATION	General Chemistry		·									
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M 1 EPA 418.1 Modified Notes: The qualifiers in this report are defined as follows: UD indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL). J indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that the analyte was not detected at a concentration greater than the detection limit. Indicates that a analyte was not detected at a concentration greater than the detection limit. Indicates that a quality control analyte recovery is outside of specified acceptance criteria. This data report has been prepared and reviewed a accordance with General Engineering Laboratories tandard operating procedures. Please direct my questions to your Project Manager, Valerie Davis at (803) 769-7391. DATA VALIDATION		<u></u>										
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Tandard operating procedures. Please direct ny questions to your Project Manager, Valerie Davis at (803) 769-7391. DATA VALIDATION	nus una report nas Dee	n prepared at	1d reviewe	d						•		
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DATA VALIDATION	W missions to your b	coures. Pleas	e dinect	<b>.</b> .								
EVICEWED BY	A domenting the April 1.	oject Manag	er, valerie	Davis	rat (803) 769-7391.							
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"Company"
1A VOLATILE ORGANICS ANALYS	SIS DATA SHEET EPA SAMPLE NC.	
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW % Moisture: not dec. 2 GC Column: J&W DB-624(PID) ID: 0.53 Soil Extract Volume:(ml)		
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG Q	Ŀ,
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	2.0 U UJ KO	1

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FORM I VOA

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

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Lab Name: GENERAL EN	GINEERING LABOR COL	tract: NA	820121
Lab Code: NA	Case No.: NA SA	S No.: NA SDG	No.: FS4A20S
Matrix: (soil/water)	SOIL	Lab Sample ID:	9807050-17
Sample wt/vol:	30.4 (g/mL) G	Lab File ID:	2C512
Level: (low/med)	LOW	Date Received:	07/01/98
% Moisture: 2	decanted: (Y/N) N	Date Extracted	:07/07/98
Concentrated Extract	Volume: 1.00(mL)		
Injection Volume:	1.0(uL)	Dilution Facto	r: 2.0
GPC Cleanup: (Y/N)	N pH: 7.0		
CAS NO.		CONCENTRATION UNITS: (ug/L or ug/Kg) UG/K	G Q
91-20-3 91-58-7 209-96-8	naphthalene 2-chloronaphthaler	1e	671 U 671 U

85-01-8phenanthrene       671 U         120-12-7anthracene       671 U         206-44-0fluoranthene       671 U         129-00-0pyrene       671 U         56-55-3benzo (a) anthracene       671 U         218-01-9benzo (a) anthracene       671 U         205-99-2benzo (b) fluoranthene       671 U         207-08-9benzo (k) fluoranthene       671 U         50-32-8benzo (a) pyrene       671 U         193-39-5indeno (1, 2, 3-cd) pyrene       671 U         53-70-3dibenz (a) h) anthracene       671 U	209-95-8acenaphthylene 83-32-9acenaphthene 86-73-7fluorene	- 671 671 671	. บ บ	
56-55-3benzo (a) anthracene       671 U         218-01-9chrysene       671 U         205-99-2benzo (b) fluoranthene       671 U         207-08-9benzo (k) fluoranthene       671 U         50-32-8benzo (a) pyrene       671 U         193-39-5indeno (1, 2, 3-cd) pyrene       671 U         53-70-3dibenz (a, b) anthracene       671 U	85-01-8phenanthrene 120-12-7anthracene 206-44-0fluoranthene 129-00-0pyrene	671 671 671	U U U	
193-39-5indeno(1,2,3-cd) pyrene     671 U       53-70-3dibenz(a, b) anthracene     671 U	218-01-9benzo (a) anthracene 205-99-2benzo (b) fluoranthene 207-08-9benzo (k) fluoranthene 50-32-8benzo (a) purene	671 671 671 671 671	บ บ บ บ	
671 U	193-39-5indeno(1,2,3-cd)pyrono	671 671	ប ប	

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FORM I SV-1

OLM03.0

Client: Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Tumpike Oak Ridge, Tennessee 37831 Ms. Lorene Rollins Contact:

Project Description:

cc; SAIC00598

# CAP-Part A for UST Sites (Task Order No. 8)

Report Date: July 23, 1998

: 820121

: 9807050-17

Sample ID LabID Marrix

: Soil Date Collected : 06/29/98 Date Received : 07/01/98 Priority : Routine Collector : Client Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch M **General** Chemistry Total Rec. Petro, Hydrocarbons 55.7 = F28 2.02 10.2 mg/rg 1.0 Л.Р 07/17/98 1300 126389 1 M = Method Method-Description

M1

EPA 418.1 Modified

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed

in accordance with General Engineering Laboratories

standard operating procedures. Please direct

any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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> \*9807050-17\*

Page 1 of 1

DG No.: FS	47205		Form	1: Inor	ganic Analy			et pe: Total Metals		
Sample	ID: 9807050-	17			- <u></u>	CI	ient ID: 8	20121	· · · ·	<u> </u>
Contrac	t: SAÌC00598	5	Lab C	ode:	GEL	Ca	ase No.:	SAS	5 No.:	
Matrix:	SOIL		Date R	eceived:	7/1/98	Le	vel: LOV	v	·	
% Solids	1: 98.00		-							
CAS No.	Analyte	Сопсен	tration	Units	C Qual	M	DL	Instrument ID	Analytical Run	
7439-92-1 I	Lead		1.3	mg/kg		P	0.15	TJA61 Trace2 ICPAES		
Color Befe	ore:				ty Before:			Texture:	·	
Color Afte	: <b>r</b> :				y After:	,		Artifacts:		
Comments;					₹.					
	<u> </u>								<u></u>	
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VOLATILE ORGANICS ANALY	YSIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW % Moisture: not dec. 6 GC Column: J&W DB-624 (PID) ID: 0.53	R Contract: NA SAS No.: NA SDG Lab Sample ID: Lab File ID: Date Received: Date Analyzed:	2Q5026 07/01/98 07/10/98
Soil Extract Volume:(ml) CAS NO. COMPOUND	Soil Aliquot Vo CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	(0,1)
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total	.)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

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FORM I VOA

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: GENERAL ENGINEER	ING LABOR Contra	ata NA	820211
• • _ •		٩	.: FS4A205
Matrix: (soil/water) SOIL		Lab Sample ID:	9807050-16
Sample wt/vol: 30.1	(g/mL) G	Lab File ID:	20511
Level: (low/med) LOW		Date Received:	07/01/98
<pre>% Moisture: 6 decan</pre>	ted: $(Y/N)$ N	Date Extracted:	07/07/98
Concentrated Extract Volume	≥: 1.00(mL)	Date Analyzed:	07/17/98
Injection Volume: 1.0(	1L)	Dilution Factor	: 2.0
GPC Cleanup: (Y/N) N	pH: 7.0		
CAS NO. COMI		ENTRATION UNITS: L or ug/Kg) UG/KG	÷ Q
91-20-3napt	thalene		

	· · · · · · · · · · · · · · · · · · ·		4	
91-20-3naphthalene         91-58-72-chloronaphthalene         209-96-8acenaphthylene         83-32-9acenaphthylene         83-32-9acenaphthylene         85-01-8acenaphthene         85-01-8	707		c H n c n H ← h ← − C	C 0 5
53-70-3dibenz (a, h) anthracene 191-24-2benzo (g, h, i) perylene		Ū	. —	
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DATA VALIDATION COPY LW 8-11-98

FORM I SV-1

OLM03.0

(	Client:	Science App	licati	ons Intern	ational Co	rp.							
		P.O. Box 25				•							
1	*	800 Oak Rid	lge T	umpike									
		Oak Ridge, '			1						•		
Co	miact:	Ms. Lorene	Rollin	15									
Project Descri	iption:	CAP-Part A	for L	IST Sites (	Task Orde	TNo. 8)							
cc: SAIC00598			Re	port Date:	July 23, 1	1 <b>998</b>					1	Page 10	f 1
-	Sample	ID		: 82	1211								r
	Lab ID			: 980	07050-16								
	Marrix			: Soi	1								
	Date Co			: 06/	29/98								
×	Date Re	ceived		: 07/	01/98								
	Priority			: Ro	utine								
	Collecto	e e		: Cli	ent								
Parameter	Qualifier	Result			DL	RL	Units	DF	Anal	yst Date	Time	Batch	М
General Chemistry									<u> </u>				
Total Rec. Petro. Hydri	carbons	104	=	FD8	2.10	10.6	mg/kg	1.0	ЛР	07/17/98	1300	126389	1
M = Method					. <u></u>	-			•				
WI = Method				Method	l-Descript	ion							
M 1				EPA 4	18.1 Mod	ified							
lotes:													
he qualifiers in this rep	ort are define	d as follows:											

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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Reviewed By

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	Form 1	: Inorg	ganic Anal	yses D	ata She	et			
DG No.: FS4A20S				Μ	lethod Ty	pe: Total Metals			
Sample ID: 9807050-16				C	lient ID:	820211			
Contract: SAIC00598	Lab Co	de:	GEL.			SAS			
Matrix: SOIL % Solids: 94.00	Date Re	ccived:	7/1/98	Le	evel: LO	₩			
	Concentration	Units	C Qual	м	DL.	Instrument ID	Analytical Run		
439-92-1 Lead	2.0	mg/kg		P	0.15	TJA61 Trace2 ICPAES	980710-5		
Color Before:	····	Clarity	y Before:			Texture:			
Color After:		Clarity After:			Artifacts:				
Comments:									

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VOLATILE	ORGANICS	ANALYSIS	DATA	SHEET

CAS NO.

Lab Name: GENERAL ENGINEERING LABOR	Contract: NA 820221
Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL	SAS NO.: NA SDG NO.: FS4A20S
Sample wt/vol: 10.0 (g/mL) G	Lab Sample ID: 9807050-11 Lab File ID: 205020
Level: (low/med) LOW % Moisture: not dec. 18	Date Received: 07/01/98
GC Column: J&W DB-624 (PID) ID: 0.53	Date Analyzed: 07/10/98 (mm) Dilution Factor: 1.0
Soil Extract Volume:(ml)	Soil Aliquot Volume:(uL)





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FORM I VOA

ĺВ SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

129-00-0-----pyrene 56-55-3-----benzo(a)anthracene

218-01-9-----chrysene 205-99-2-----benzo(b) fluoranthene 207-08-9-----benzo(k) fluoranthene 50-32-8-----benzo(a) pyrene 193-39-5-----indeno(1,2,3-cd) pyrene 53-70-2------indeno(1,2,3-cd) pyrene

53-70-3-----dibenz (a, h) anthracene\_

191-24-2----benzo(g,h,i)perylene

EPA SAMPLE NO.

1

Lab Name: GENERAL ENGINEERING LABOR Contract	820221
Lab Code: NA Case No.: NA SAS No.	.: NA SDG No.: FS4A20S
Matrix: (soil/water) SOIL	Lab Sample ID: 9807050-11
Sample wt/vol: 30.1 (g/mL) G	Lab File ID: 2B720
Level: (low/med) LOW	Date Received: 07/01/98
% Moisture: 18 decarted: (Y/N) N	Date Extracted:07/07/98
Concentrated Extract Volume: 1.00(mL)	Date Analyzed: 07/12/98
Injection Volume: 1.0 (uL)	Dilution Factor: 4.0
GPC Cleanup: (Y/N) N pH: 7.0	· · · · · · · · · · · · · · · · · · ·
	NTRATION UNITS: or ug/Kg) UG/KG Q
91-20-3naphthalene 91-58-72-chloronaphthalene 209-96-8acenaphthylene 83-32-9acenaphthene 86-73-7fluorene 85-01-8fluorene 120-12-7anthracene 206-44-0fluoranthene	1620 U U 1620 J 1620

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1620 U

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1620 0

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FORM I SV-1

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<u>~</u>	Client;	Science App	lications Inter	national Co								
		P.O. Box 25	02		- p.							
		800 Oak Rid	ge Tumpike									
			Connessoe 378	31								
	Contact:	Ms. Lorene F	Rollins									
Project Des	cription:	CAP-Part A	for UST Sines	(Task Orde	r No. 8)							
cc: SAIC00598		•	Report Date:	: July 23, :	1998						Page 1 of	1
	Sample	D	: 82	0221				······································		<u> </u>		
	Lab ID		: 98	07050-11								
	Manix	e	: So	il								
	Date Co		: 06,	/29/98								
	Date Re		: 07	/01/98								
	Priority		: Ro	utine								
·	Collecto	a	: Cli	ent	4							
Parameter	Qualifier	Result		DL.	RL	Units	DF	Ала	lyst Date	Time	Batch 3	
General Chemistry			···· <u>-</u>	· <u> </u>						A 5141C	Daten y	
Total Rec. Petro, Hyd	rocarbons	24.2	= FP8	2.42	12.2	mg/kg	1.0	Л.Р	07/17/98	3 1300	126389	ł
M = Method		<u> </u>	Method	l-Descripti								<u></u>
M1				18.1 Modif				<u> </u>				
Ŧ												
Notes:												
The qualifiers in this rep ND indicates that the an J indicates presence of a U indicates that the anal indicates that a quality	alyte was not o nalyte at a con vic was not de	letected at a co centration less fected at a con-	than the report	ting limit (	RL) and gre	ater than the c	letection	ı limit	(DL).	•		
This data and an 1			• • • •	P.		-						

This data report has been prepared and reviewed

in accordance with General Engineering Laboratories

standard operating procedures. Please direct

any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

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DATA VALIDATION

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1A VOLATILE ORGANICS ANALYS	SIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA	Contract: NA SAS No.: NA SDG Lab Sample ID: Lab File ID:	20707
<pre>% Moisture: not dec. 19 GC Column: J&amp;W DB-624(PID) ID: 0.53 Soil Extract Volume:(ml) CAS NO. COMPOUND</pre>	Soil Aliquot Vo	07/12/98 Factor: 1.0 plume:(uL)
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	(ug/L or ug/Kg) UG/KG	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

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FORM I VOA

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: GENERAL EN	GINEERING LABOR Contract	E: NA 820311
	Case No.: NA SAS No.	.: NA SDG No.: FS4A20S
Matrix: (soil/water)	SOIL	Lab Sample ID: 9807050-14
Sample wt/vol:	30.0.(-(-7))	
-	30.0 (g/mL) G	Lab File ID: 2B723
Level: (low/med)	LOW	Date Received: 07/01/98
% Moisture: 19	decanted: $(Y/N)$ N	
		Date Extracted:07/07/98
Concentrated Extract	Volume: 1.00(mL)	Date Analyzed: 07/12/98
Injection Volume:		
	1.0(uL)	Dilution Factor: 1.0
GPC Cleanup: (Y/N)	N pH: 7.0	

CAS NO.	COMPOUND	CONCENTRATION UNI (ug/L or ug/Kg) U	TS: IG/KG	Q	
209-96-8 83-32-9 86-73-7 85-01-8 120-12-7 206-44-0 129-00-0 56-55-3 218-01-9 205-99-2 207-08-9 50-32-8 193-39-5 53-70-3	naphthalene 2-chloronaphtha acenaphthylene acenaphthene fluorene phenanthrene phenanthrene pyrene fluoranthene pyrene benzo (a) anthrac chrysene benzo (b) fluorant benzo (b) fluorant benzo (c) fluorant benzo (c) fluorant 	ene	412 412 412 412 412 412 412 412 412 412	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	

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FORM I SV-1

	Client:	Salara A						
		P.O. Box 2502	ations International Co	<b>гр.</b>				
			M					
		800 Oak Ridge Oak Ridge, Ten	Tumpike					
(	Contact:	Ms. Lorene Rol	line					
Project Desc	ription:		UST Siles (Task Order	- NT 01				
∝: SAIC00598								
		F	leport Date: July 23, 1	998				Page 1 of 1
	Sample	D	: 820311		····-			
	Lab ID		: 9807050-14			v		
	Matrix		: Soil					
	Date Co		: 06/29/98					
	Date Re		: 07/01/98					
	Priority		: Routine					
	Collecto	T	: Client					
Parameter	Qualifier	Result	DL	RL	Units	DP		
General Chemistry							Analyst Date	Time Batch M
		• • • •	F01, F06 244	12.3	mg/kg	1.0	JLP 07/17/9	8 1300 126389 1
M = Method							:	
M = Method M 1			Method-Descriptic				: 	
			Method-Description EPA 418.1 Modifi				:	
M 1							: 	
M 1							•	
M 1 otes: he qualifiers in this rem	ort are defined	l as follows:	EPA 418.1 Modifi	ied .			·	
M 1 otes: he qualifiers in this repu D indicates that the ana	INTA TRAC MAR A	lan	EPA 418.1 Modifi	ied	limir.			
M 1 otes: he qualifiers in this repu D indicates that the analy indicates presence of an indicates that the analy	ilyte was not d talyte at a cons te was not det	letected at a conce centration less the	EPA 418.1 Modifi entration greater than the in the reporting limit (J	ne detection RL) and great	ater than the d	stection	Limit (DI.)	
M 1 otes: he qualifiers in this repu D indicates that the analy indicates presence of an indicates that the analy	ilyte was not d talyte at a cons te was not det	letected at a conce centration less the	EPA 418.1 Modifi entration greater than the in the reporting limit (J	ne detection RL) and great	ater than the d	etection	limit (DL).	
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M 1 otes: he qualifiers in this repu D indicates that the ana ndicates presence of an indicates that the analy ndicates that a quality of is data report has been accordance with General adard operating proceed	llyte was not d allyte at a com te was not det control analyte prepared and p al Engineering itres Plesse d	letected at a conce centration less the ected at a concen a recovery is outs reviewed a Laboratories	EPA 418.1 Modifient entration greater than the in the reporting limit (1) tration greater than the ide of specified accepts	ne detection RL) and great	ater than the d mit. I.			
M 1 otes: he qualifiers in this repu D indicates that the ana ndicates presence of an indicates that the analy ndicates that a quality of is data report has been accordance with General adard operating proceed	llyte was not d allyte at a com te was not det control analyte prepared and p al Engineering itres Plesse d	letected at a conce centration less the ected at a concen a recovery is outs reviewed a Laboratories	EPA 418.1 Modifient entration greater than the in the reporting limit (1) tration greater than the ide of specified accepts	ne detection RL) and great	ater than the d mit. I.		ulimit (DL).	
M 1 otes: he qualifiers in this repu D indicates that the analy ndicates presence of an indicates that the analy ndicates that a quality of is data report has been accordance with General	llyte was not d allyte at a com te was not det control analyte prepared and p al Engineering itres Plesse d	letected at a conce centration less the ected at a concen a recovery is outs reviewed a Laboratories	EPA 418.1 Modifient entration greater than the in the reporting limit (1) tration greater than the ide of specified accepts	ne detection RL) and great	ater than the d mit. I.		ALIDAT	TION
M 1 otes: he qualifiers in this repu D indicates that the ana ndicates presence of an indicates that the analy ndicates that a quality of is data report has been accordance with General adard operating proceed	llyte was not d allyte at a com te was not det control analyte prepared and p al Engineering itres Plesse d	letected at a conce centration less the ected at a concen a recovery is outs reviewed a Laboratories	EPA 418.1 Modifient entration greater than the in the reporting limit (1) tration greater than the ide of specified accepts	ne detection RL) and great	ater than the d mit. I.			TON
M 1 otes: he qualifiers in this repu D indicates that the ana ndicates presence of an indicates that the analy ndicates that a quality of is data report has been accordance with General adard operating proceed	llyte was not d allyte at a com te was not det control analyte prepared and p al Engineering itres Plesse d	letected at a conce centration less the ected at a concen a recovery is outs reviewed a Laboratories	EPA 418.1 Modifient entration greater than the in the reporting limit (1) tration greater than the ide of specified accepts	ne detection RL) and great	ater than the d mit. I.		ALIDAT	FION



VOLATILE ORGANICS AN	ALYSIS DATA SHEFT	EPA SAMPLE NO
Lab Name: GENERAL ENGINEERING LAE Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL Sample wt/vol: 10.0 (g/mL) Level: (low/med) LOW % Moisture: not dec. 19	BOR Contract: NA SAS NO.: NA SDG Lab Sample ID: G Lab File ID: Date Received:	2Q607 07/01/98
GC Column: J&W DB-624(PID) ID: 0.5 Soil Extract Volume:(ml) CAS NO. COMPAR	Dilution Soil Aliquot Vo	Factor: 1.0
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (tota	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q 2.5 U U 9.4 =

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FORM I VOA

E NO.

SEMIVOLATILE ORGA	1B NICS ANALYSIS DATA	SHEET	EPA SAMPLE
Lab Name: GENERAL ENGINEERIN	NG LABOR Contract	: NA	820321
Lab Code: NA Case No	.: NA SAS No.	: NA SDG	No.: FS4A20S
Matrix: (soil/water) SOIL		Lab Sample ID:	9807050-19
Sample wt/vol: 30.4	(g/mL) G	Lab File ID:	2C514
Level: (low/med) LOW		Date Received:	07/01/98
% Moisture: 19 decante	ed: $(Y/N)$ N	Date Extracted	1:07/07/98
Concentrated Extract Volume:	1.00(mL)	Date Analyzed:	07/17/98
Injection Volume: 1.0(ul	i)	Dilution Facto	r: 1.0
GPC Cleanup: (Y/N) N	pH: 7.0		

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

Q

91-20-3naphthalene       406         91-58-72-chloronaphthalene       406         209-96-8acenaphthylene       406         83-32-9acenaphthene       406         86-73-7fluorene       406         85-01-8	ם מ מ מ מ מ מ מ מ מ מ מ מ מ מ מ מ מ מ מ	
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LW 8-11-98

DATA VALIDATION СОРУ

#### FORM I SV-1 V-26

Client:	Science Applications International Corp.
	P.O. Box 2502
	800 Oak Ridge Tumpike
	Oak Ridge, Tennesses 37831
Contact:	Ms. Lorene Rollins
Project Description:	CAP-Part A for UST Sites (Task Order No. 8)

#### ∞: SAIC00598 Report Date: July 23, 1998 Page 1 of 1 Sample ID : 820321 Lab ID : 9807050-19 Matrix : Soil Date Collected : 06/29/98 Date Received : 07/01/98 Priority : Routine Collector : Client Parameter Qualifier Result DL RL Units DF Analyst Date Time Batch M General Chemistry Total Rec. Petro. Hydrocarbons 13.7 = F082.44 12.3 mg/kg 1.0 JLP 07/17/98 1300 126389 1 TOTAL ORGANIC CARBON (TOC) 12200 - F28 24.1 100 mg/kg 1.0 LS 07/17/98 1204 125631 2

M = Method	Method-Description	
M 1 M 2	EPA 418.1 Modified SW846 9060 modified	·

#### Notes:

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ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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\*9807050-19\*

	SDG	No.:	FS4A215	
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Contract: SAIC00598       Lab Code:       GEL       Case No.:       SAS No.:         Matrix:       SOR       Date Received:       7/1/98       Level:       LOW         *6 Solids:       81.00       Analyte       Concentration       Units       C       Qual       M       DL       Instrument ID       Run         439-92-1       Lead       2.1       mg/kg       P       0.17       TJA61 Trace ICPAES       980710-5         Color Before:       Clarity Before:       Texture:       Clarity After:       Artifacts:         Comments:	Sample ID: 9807050-19		1		lient ID: 8	20321		
Matrix:       SOR       Date Received:       7/1/98       Level:       LOW         *6 Solids:       81.00       ************************************	Contract: SAIC00598	Lab Code:	GEL	· ·			No	]
439-92-1     Lead     Concentration     Units     C     Qual     M     DL     Instrument ID     Run       439-92-1     Lead     2.1     mg/kg     P     0.17     TJA61 Trace ICPAES     980710-5       Color Before:     Clarity Before:     Texture:       Color After:     Clarity After:     Artifacts:		Date Received	1: 7/1/98	L	evel: LOV			
Color Before:     Clarity Before:     Texture:       Color After:     Clarity After:     Artifacts:	Conce				DL	Instrument ID	-	
Color After: Clarity After: Texture: Color After: Artifacts:		III III III III III III III III I		P	0.17	TJA61 Trace ICPAES	980710-5	
	Comments:							

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VOLATILE ORGANICS ANALY	SIS DATA SHEFT	EPA SAMPLE N	'n
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW % Moisture: not dec. 7	Contract: NA SAS NO.: NA SDG Lab Sample ID: Lab File ID: Date Received:	820411 No.: FS4A20S 9807050-15 2Q5025 07/01/98	
GC Column: J&W DB-624(PID) ID: 0.53 Soil Extract Volume:(ml)	(mm) Date Analyzed: (mm) Dilution	Factor: 1.0	
CAS NO. COMPOUND	Soil Aliquot Vo CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		(uL)
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)			C14
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1B EPA SAMPLE NO. SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET Lab Name: GENERAL ENGINEERING LABOR Contract: NA 820411 Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4A20S Matrix: (soil/water) SOIL Lab Sample ID: 9807050-15 Sample wt/vol: 30.5 (g/mL) G Lab File ID: 2C510 Level: (low/med) LOW Date Received: 07/01/98 % Moisture: 7 decanted: (Y/N) N Date Extracted:07/07/98 Concentrated Extract Volume: 1.00(mL) Date Analyzed: 07/17/98 Injection Volume: 1.0(uL) Dilution Factor: 1.0 GPC Cleanup: (Y/N) N pH: 7.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q 91-20-3----naphthalene 91-58-7-----2-chloronaphthalene\_ U 352 U 209-96-8----acenaphthylene\_ 352 U 83-32-9----acenaphthene\_ 352 0 352 U 86-73-7----fluorene 85-01-8-----phenanthrene 352 U 120-12-7-----anthracene 352 U 352 U 206-44-0-----fluoranthene 129-00-0-----pyrene\_\_\_\_\_\_ 56-55-3-----benzo(a)anthracene\_\_ 352 U 352 U 218-01-9-----chrysene

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205-99-2-----benzo (b) fluoranthene

207-08-9-----benzo(k)fluoranthene

193-39-5-----indeno (1,2,3-cd) pyrene 53-70-3-----dibenz (a,h) anthracene 191-24-2----benzo (g,h,i) perylene

50-32-8-----benzo (a) pyrene

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Science Applications International Corp. Client: P.O. Box 2502 800 Oak Ridge Tumpike Oak Ridge, Tennessee 37831 Ms. Lorene Rollins Contact: CAP-Part A for UST Sites (Task Order No. 8) Project Description: Page 1 of 1 Report Date: July 23, 1998 cc: SAIC00598 : 820411 Sample ID ; 9807050-15 Lab ID Matrix : Soil Date Collected : 06/29/98 : 07/01/98 Date Received Priority : Routine : Client Collector DF Analyst Date Time Batch M DL RL Units Parameter Qualifier Result General Chemistry 1.0 Л.Р 07/17/98 1300 126389 1 489 = F0810.8 mg/kg 2.14 Total Rec. Petro. Hydrocarbons Method-Description M = MethodEPA 418.1 Modified M 1 Notes: The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

\* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed

in accordance with General Engineering Laboratorics

standard operating procedures. Please direct

any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By



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VOLATILE ORGANICS ANALY	SIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Lab Code: NA Case No.: NA Matrix: (soil/water) SOIL	Contract: NA	820421 No.: FS4A20S
Sample wt/vol: 10.0 (g/mL) G Level: (low/med) LOW % Moisture: not dec. 19	Lab Sample ID: Lab File ID: Date Received:	9807050-18 207012
GC Column: J&W DB-624(PID) ID: 0.53 Soil Extract Volume:(ml)	Date Analyzed:	07/13/98 Factor: 1.0
CAS NO. COMPOUND 71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q 2.5 U 5.0 U 2.5 U
		2.4 U U 2.4 8-11-98

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1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

COMPOUND

CAS NO.

EPA SAMPLE NO.

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Lab Name: GENERAL EN	GINEERING LABOR Contract	: NA	820421
Lab Code: NA	Case No.: NA SAS No.	: NA SDG	No.: FS4A20S
Matrix: (soil/water)	SOIL	Lab Sample ID:	9807050-18
Sample wt/vol:	30.4 (g/mL) G	Lab File ID:	2C513
Level: (low/med)	LOW	Date Received:	07/01/98
% Moisture: 19	decanted: (Y/N) N	Date Extracted	1:07/07/98
Concentrated Extract	Volume: 1.00(mL)	Date Analyzed:	07/17/98
Injection Volume:	1.0 (uL)	Dilution Facto	or: 1.0
GPC Cleanup: (Y/N)	N pH: 7.0		

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

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1-20-3naphthalene	406		
1-58-72-chloronaphthalene	406		
09-96-8acenaphthylene	406	U	
3-32-9acenaphthene	406	U	ł
6-73-7fluorene	406	υ	
5-01-8phenanthrene	406	U	
20-12-7anthracene	406	U	
06-44-0fluoranthene	406	U	ļ
29-00-0pyrene	406	U	1
6-55-3benzo (a) anthracene	406	υ	1
18-01-9chrysene	406	υ	
05-99-2benzo(b) fluoranthene	406	υ	
07-08-9benzo(k) fluoranthene	406	Ŭ	
0-32-8benzo(a)pyrene	406	υ	
93-39-5indeno(1,2,3-cd)pyrene	406	υ	
3-70-3dibenz (a, h) anthracene	406	U	1
91-24-2benzo(g,h,i)perylene	406	U	

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,		P.O. Box 2502	_					
		800 Oak Ridge Tu						
	<b>C</b>	Oak Ridge, Tenne						
Beatast D	Contact:	Ms. Lorene Rollin						
Project De	scription:	CAP-Part A for U	ST Sites (Task Orde	ar No. 8)				
cc: SAIC00598		Rq	port Date: July 23,	1998				Page 1 of 1
	Sample	Ð	: 820421					
	Lab ID		:9807050-18					
	Matrix		: Soil					
	Data Co		: 06/29/98					
	Date R		: 07/01/98	,				
	Priority		: Routine					
	Collect	æ	: Client					
Parameter	Qualifier	Result	DL	RL	Units	DF An	alyst Date Tir	ne Batch M
M = Method	<u>.</u>		Method-Descrip					
M1	·		EPA 418.1 Mod	·····			·····	
Noms:	1			*				
The qualifiers in this	report are defin	ed as follows:						
ND indicates that the	analyte was not	detected at a conce	nutsion greater that	n the detection	1 limit.			
indicates presence o	f analyte at a co	incentration less the	in the reporting limi	t (RL) and ere	ater than the	detection lin	uit (DL).	
Indicates that the at	nalyte was not c	etected at a concent	tration greater than	the detection l	imit			
indicates that a qual	ity control anal	yte recovery is outs	ide of specified acco	eptance criteri	a.		+	
his data report has b	cen prepared an	d reviewed						
accordance with G	eneral Engineer	ing Laboratories		DA	TA M		TION	
undard operating pro	ocedures. Please	direct		UA	IM W	<i>الس</i> ة اسلام	لاقبة الا	
ny questions to your	Project Manage	r, Valerie Davis at	(803) 769-7391.		$\cap$	OPY		
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	····							
leviewed By								

Sample ID: 9807050-18					C	lient ID: 8	20421		
Contract: SAIC00598	Lab Coc	le:	GEL		C	ase No.:	SAS	No.:	
Matrix: SOIL % Solids: 81.00	Date Rec	eived:	7/1/98		Le	vel: LOW	1		•
S No. Analyte Con 39-92-1 Lead		Units	с	Qual	M	DL	Instrument ID	Analyticai Run	
	3.2 1	mg/kg			P	0.18	TJA61 Trace2 ICPAES	980710-5	
Color Before: Color After:		Clarity Clarity					Texture:		
		-intity	ALLC				Artifacts:		

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800 Ost Ridge Turnpite. Ost Ridge, IN 37831 (422) 481-4600	CHAIN OF CUSTODY RECORD	COC	COC NO.: CADJO	9
PROJECT NAME:Fort Stewart CAP Part A UST Investigations (Options)	REQUESTED PARAMETERS	LABORA	LABORATORY NAME:	<b></b>
PROJECT NUMBER: 01-0331-04-9805-210		Ceneral	General Engineering Laboratory	
DDO LECT MANAGED. D		LABORA	LABORATORY ADDRESS: 2040 Savane Band	
TROUCED MANAGER: PAILY STOR	201.		Charleston, SC 29417	
Sectofice (Signature) (Printed Name)	beaJ Lead			,
Chine Content Line levi	тен, сяо ояо ояо		PHUNE NO: (803) 556-8171	_
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520221 4/29/98/ 455 Si		(186)	1043 -11	<u>.</u>
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Level 1/1/42	10 1/1/78 Cooler ID: 1	FEDEX N	FEDEX NUMBER:	
SPIC, 1200 WWW	(1/130) # (04)			
- HA-	Date/Time			
COMPANY NAME				
RELINGUISHED BY: Date/Time RECEIVED BY:	Date/Time			
COMPANY NAME.				



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# APPENDIX VI

# ALTERNATE THRESHOLD LEVEL (ATL) CALCULATIONS

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Calculations of alternate threshold levels are not required at this time for the UST 56 site. However, the geotechnical data collected during the CAP-Part A investigation are presented in Table VI-A.

	82-01
Sample ID	820131
Depth Interval (ft BGS)	8.0-10.0
Grain size analysis - % Fines	8
Grain size analysis - % Sand	89
Grain size analysis - % Gravel	3
Liquid Limit	NP
Plastic Limit	NP
Plasticity Index	NP
Natural Moisture Content (%)	23.4
Permeability (cm/sec)	2.40×10 <sup>-4</sup>
Porosity	0.37
Specific Gravity	2.59

VI-A. Geotechnical Results for Soil Samples Collected at the UST 56 Site

NP = Nonplastic.

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# APPENDIX VII

# MONITORING WELL DETAILS

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Monitoring wells were not installed as part of the CAP-Part A investigation. Temporary piezometers were installed at the UST 56 site. Refer to Figures 4 and 5 (Appendix I) for locations.

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# **APPENDIX VIII**

## **GROUNDWATER LABORATORY RESULTS**

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TABLE VIII-									
Station:	<b>1</b> 75 - 1 1	In Stream	82-01	82-02	82-03	82-04	82-05	82-05	
Sample ID:	Federal	Water	820112	820212	820312	820412	820512	820522	
Sample Interval:	SDWA	Quality		<b>70 7 00</b>	<b>A</b> A <b>X</b> AA				
Collection Date:	MCLs <sup>1</sup>	Standards <sup>2</sup>	1 ···	29-Jun-98			25-Jun-98	25-Jun-98	
Units:	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	
VOLATILE ORGANIC COM		-1-0				5			
Benzene	.5	71.28	2 U	2 U	2 U	2 U	2 U	2 U	
Toluene	1000	200,000	2 U	2 U	2 U	2 U	2 U	2 U	
Ethylbenzene	700	28,718	2 U	2 U	2 U	2 U	2 U	2 U	
Xylenes, Total	10000	-	6 U	<u>6</u> U	6 U	6 U	6 U	6 U	
			J			J			
POLYNUCLEAR AROMATI	C HYDROC	CARBONS							
2-Chloronaphthalene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Acenaphthene			10 U	10 U	10 U	10 U	10 U	10 U	
Acenaphthylene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Anthracene		110,000	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(a)anthracene		0.0311	10 Ŭ	10 U	10 U	10 U	10 U	10 U	
Benzo(a)pyrene	0.2	0.0311	10 U	10 U	10 U	10 Ü	10 U	10 U	
Benzo(b)fluoranthene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(g,h,i)perylene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(k)fluoranthene		0.0311	10 U	10 U	10 U	10 U	10 U	10 U	
Chrysene		0.0311	10 U	10 U	10 U	10 U	10 U	10 U	
Dibenzo(a,h)anthracene		0.0311	10 U	10 U	10 U	10 U	10 U	10 U	
Fluoranthene		370	10 U	10 U	10 U	10 U	10 U	10 U	
Fluorene		14,000	10 U	10 U	10 U	10 U	10 U	10 U	
Indeno(1,2,3-cd)pyrene		0.0311	10 U	10 U	10 U	10 U	10 U	10 U	
Naphthalene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Phenanthrene		-	10 U	10 U	10 U	10 U	10 U	10 U	
Pyrene		11,000	10 U	10 U	10 U	10 U	10 U	10 U	

#### TABLE VIII-A. SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

NOTES:

Contract for field work was issued prior to the new CAP-A guidance published in May 1998, thus the new SW-846 analytical methods were not used.

U.S. Environmental Protection Agency maximum contaminant level

<sup>2</sup> GA EPD water quality standards (Chapter 391-3-6.03)

Bold values exceed MCLs

QA/AC samples were collected. The laboratory data sheets have been included in this appendix, but the results are not summarized. Laboratory Qualifiers

U Indicates the compound was not detected at the concentration reported

UJ Indicates that the compound was not detected above an approximated sample quantitation limit

J Indicates the value for the compound is an estimated value

= Indicates the compound was detected at the concentration reported

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VOLATII Lab Name: GENERAL E Lab Code: NA Matrix: (soil/water) Sample wt/vol: Level: (low/med) % Moisture: not dec. GC Column: J&W DB-624 Soil Extract Volume:	Case_No : NA WATER 10.00 (g/ml) ML LOW	Contract: NA SAS No.: NA SDG Lab Sample ID Lab File ID: Date Received: Date Analyzed:	2Q4017 07/01/98 07/09/98
CAS NO. 71-43-2 108-88-3 100-41-4 1330-20-7	COMPOUND Benzene	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Factor: 1.0 Plume:(uL) Q 2.0 U 2.0 U 2.0 U 2.0 U 2.0 U 4 5.0 U 0 U 0 U 0 U 0 U 0 U 0 U 0 U

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EPA SAMPLE NO.



91-20-3naphthalene         91-58-72-chloronaphthalene         209-96-8acenaphthylene         83-32-9acenaphthylene         83-32-9acenaphthene         86-73-7acenaphthene         86-73-7acenaphthene         85-01-8acenaphthene         120-12-7	10.0 U 10.0 U
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Lab Code: NA Matrix: (soil/water) Sample wt/vol: Level: (low/med) * Moisture: not dec. GC Column: J&W DB-624 Soil Extract Volume: CAS NO. 71-43-2 108-88-3	Case_No.: NA WATER 10.00 (g/ml) ML LOW (PID) ID: 0.53 (r (uL) COMPOUND	Contract: NA SAS NO.: NA SDO Lab Sample ID Lab File ID: Date Received: Date Analyzed:	2Q4016 07/01/98 07/09/98 Factor -
71-43-2 108-88-3 100-41-4 1330-20-7	Benzene		

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1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET EPA SAMPLE NO. Lab Name: GENERAL ENGINEERING LABOR Contract: NA 820114 Lab Code: NA Case No.: NA SAS NO. NA SDG No.: FS4A15W Matrix: (soil/water) GROUNDH20 Lab Sample ID: 9807044-13 Sample wt/vol: 500.0 (g/mL) ML Lab File ID: 2B619 Level: (low/med) LOW Date Received: 07/01/98 \* Moisture: \_\_\_\_\_ decanted: (Y/N)\_\_\_\_ Date Extracted:07/02/98 Concentrated Extract Volume: 0.50(mL) Date Analyzed: 07/12/98 Injection Volume: 1.0(uL) Dilution Factor: 1.0 GPC Cleanup: (Y/N) N pH: 7.0 CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q. 91-20-3-----naphthalene 91-58-7-----2-chloronaphthalene 10.00 71 209-96-8-----acenaphthylene 83-32-9-----acenaphthene 86-73-7----fluorene 10.0 0 10.0 U 10.0 U 85-01-8-----phenanthrene 120-12-7----anthracene 10.0 U 10.0 U 206-44-0----fluoranthene 10.010 129-00-0----pyrene 10.0 U 56-55-3-----benzo(a) anthracene \_\_\_\_ 10.0 U

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218-01-9----chrysene

205-99-2----benzo(b) fluoranthene\_

207-08-9-----benzo(k)fluoranthene

50-32-8-----benzo (a) pyrene 193-39-5-----indeno(1,2,3-cd)pyrene 10.0 U 53-70-3-----dibenz (a, h) anthracene 10.0 U 191-24-2----benzo(g,h,i)perylene 10.0 U 10.0 U DATA VALIDATION

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10.0 U 10.0 U 10.0 U

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Lab Name: GENERAL	STC DI		
Lab Name: GENERAL ENGINEERING LABOR	DATA SHEET	EPA SAMPLE NO	•
Matrix: (soil/water) WATER Sample wt/vol: 10.00 (g/ml) ML Level: (low/med) LOW % Moisture: not dec	SAS NO.: NA SDG Lab Sample ID: Lab File ID: Date Received:	820212 No.: FS4A18W 9807047-04 2Q3020 07/01/98	
GC Column: J&W DB-624(PID) ID: 0.53 Soil Extract Volume:(uL)	(mm) Date Analyzed:	07/08/98	
CAS NO. COMPOUND	CONCENTRATION	Factor: 1.0	L)
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)			

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1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

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EPA SAMPLE NO.

Lab Name: GENERAL EN	GINEERING LABOR Contract	: NA	820212
Lab Code: NA	Case No.: NA SAS No.		NO.: FS4A15W
Matrix: (soil/water)	GROUNDH20	Lab Sample ID:	
Sample wt/vol:	500.0 (g/mL) ML	Lab File ID:	
Level: (low/med)	LOW	Date Received:	07/01/98
% Moisture:		Date Extracted	
	Volume: 0.50(mL)	Date Analyzed:	
Injection Volume:	1.0(uL)	Dilution Facto	
GPC Cleanup: (Y/N)	N pH: 7.0		7
CAS NO.	CONCEN (ug/L	VTRATION UNITS: or ug/Kg) UG/L	Q
L L			

91-20-3naphthalene         91-58-72-chloronaphthalene         209-96-8acenaphthylene         83-32-9acenaphthene         85-01-8fluorene         85-01-8phenanthrene         120-12-7	10.0 U 10.0 U	J
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VOLATILE	ORGANICS ANALYS	IS DATA SHELT	FDA GAL
	INEEDTATO	our ourel.	EPA SAMPLE NO.
	_	Contract: NA	820312
Matrix: (soil/water) W Sample wt/vol:		SAS NO.: NA SE	G No.: FS4A18W
	0.00 (g/ml) ML	Lab File ID:	D: 9807047-02
* Moisture: not dec	CW	Date Received	
GC Column: J&W DB-624(P Soil Extract Volume:	PID) ID: 0.53 (1	Date Analyzed	: 07/08/98
- • • • • • • • • • • • • • • • • • • •	(uL)	Dilution	Factor: 1.0
	COMPOUND	Soil Aliquot V CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	olume: (ut.)
71-43-2B 108-88-3B 100-41-4			Q 2.0 U 2.0 U 2.0 U 2.0 U 5.0 U
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VOLATILE ORGANICS ANALYSIS DATA SHEET Lab Name: GENERAL ENGINEERING LABOR Contract: NA EPA SAMPLE NO. Lab Code: NA Case No : NA 820412 Matrix: (scil/water) WATER SAS NO.: NA SDG No.: FS4A18W Sample wt/vol: Lab Sample ID: 9807047-18 10.00 (g/ml) ML Level: (low/med) Lab File ID: LOW % Moisture: not dec. 2Q4015 Date Received: 07/01/98 GC Column: J&W DB-624 (PID) ID: 0.53 Date Analyzed: 07/09/98 Soil Extract Volume:\_\_\_\_\_(uL) (mm)Dilution Factor: 1.0 Soil Aliquot Volume: \_\_\_\_\_(uL) CAS NO COMPOUND CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L 71-43-2----Benzene 108-88-3-----Toluene Q 100-41-4-----Ethylbenzene 1330-20-7-----Xylenes (total) 2.0/0 2.0 0 2.0 0 6.010 UT C14

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EPA SAMPLE NO.



LW 8-21-98

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DATA VALIDATION COPY

#### FORM I SV-1

OLM03.0

DATA VALIOATIG	LA E ORGANICS ANALYS	SIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL E	NGINEERING LABOR Case No.: NA GROUNDH20 10.00 (g/ml) ML LOW	Contract: NA	820512 F No.: FS4A04W D: 9806806-11 206018
GC Column: J&W DB-624 Soil Extract Volume:	(PID) TD: 0 55	Date Analyzed:	6/27/98 Factor: 1.0
CAS NO. 71-43-2 108-88-3 100-41-4 1330-20-7	COMPOUND -Benzene -Toluene -Ethylbenzene -Xylenes (total)	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	

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LW 7-22-98

FORM I VOA

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DATA VALIDATION Semivolatile organics analysis data COPY	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Contract	: NA 820512
Lab Code: NA Case No.: NA SAS No. Matrix: (soil/water) GROUNDH2O Sample wt/vol: 500.0 (g/mL) ML Level: (low/med) LOW	: NA SDG No.: FS4A01W Lab Sample ID: 9806802-17 Lab File ID: 1B412 , Date Received: 06/26/98
Trianting Tra	Date Extracted:06/29/98 Date Analyzed: 07/09/98 Dilution Factor: 1.0
CAS NO. COMPOUND CONCEN 91-20-3naphthalene 91-58-72-chloronaphthalene 209-96-8acenaphthylene 83-32-9acenaphthene 86-73-7fluorene 85-01-8phenanthrene 120-12-7anthracene 206-44-0fluoranthene 129-00-0pyrene 56-55-3benzo (a) anthracene 218-01-9chrysene 205-99-2benzo (b) fluoranthene 207-08-9benzo (c) fluoranthene 50-32-8benzo (a) pyrene 193-39-5	NTRATION UNITS:     Q       10.0 U     U       10.0 U     U       10.0 U     10.0 U

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OLM03.0

FORM I SV-1

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LW 7.22-98

FORM I VOA

DATA VA SEMIVOLATILE ORGANICS	ANALYSIS DATA SHEET	EPA SAMPLE NO.
COPY Lab Name: GENERAL ENGINEERING LA		820522
Lab Code: NA Case No.: NA Matrix: (soil/water) GROUNDH2O		
Sample wt/vol: 500.0 (g/mL		
Level: (low/med) LOW		= ID: 1B413 ceived: 06/26/98
% Moisture: decanted: (		· ·
Concentrated Extract Volume:		
Injection Volume: 1.0(uL) GPC Cleanup: (Y/N) N pH		Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION (ug/L or ug/Kg	UNITS: J) UG/L Q
91-20-3naphthale 91-58-72-chloron 209-96-8acenaphth 83-32-9acenaphth 86-73-7fluorene 85-01-8phenanthr 120-12-7anthracen 206-44-0fluoranth 129-00-0pyrene 56-55-3benzo (a) and 218-01-9benzo (b) fl 207-08-9benzo (k) fl 50-32-8benzo (a) pr 193-39-5indeno (1, 53-70-3benzo (g, h)	aphthalene ylene ene ene anthracene luoranthene yrene 2,3-cd) pyrene	10.0 U 10.0 U

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FORM I SV-1

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(	COC NO.: GAD 03	LABORATORY NAME:	General Engineering Laboratory	LABORATORY ADDRESS: 2040 Savage Raod Cliarleston. SC 29417		OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS	9806802 - 1			N 81-	-19 -2				Cooler Temperature: 7°C			 		
	CHAIN OF CUSTODY RECORD	REQUESTED PARAMETERS		200	тен, Lead грн, Lead, Сяо	, НАЧ , НАЧ								Datefrime TOTAL NIMBED OF CONTINUES	6/20/08-	$ (b40) ^{+}$ (034)	Date/Time	Date/Time		
Serve Applications to the Republic Company Serve Applications to termination	800 Dat Ridge Tumpita, Oak Ridge, TN 37831 (423) 461-4600	rnuged I NAME: Fort Stewart CAP Part A UST Investigations (Options)	PROJECT NUMBER: 01-0331-04-9805-210	PROJECT MANAGER: Patty Stall	Fourther (Signature) [Printed Name)	D Date Collocied Time Collected Matrix		10%	220533 12/22	10/22/04				BELINOUISHED BY: Date/Time RETEIVED BY:	COMPANY NAME: 6/26/9~ 100412 HUNCH	xc 12:55 00	RECEIVED BY Date Time RELINDUISHED BY:	er	COMPANY NAME: COMPANY NAME:	

Ref. Ook Hoge. TN 37831         (423) 433 431 460           Ref. Ot BER: 01-0331.04-9805-210         BER: 01-0331.04-9805-210           BER: 01-0331.04-9805-210         Investigations (op           AGER: Patty Stoll         IPInited Name)           Investigations         IPInited Name)           Investigations         IPInited Name)           Investigations         Investigations           Investinterves         Investigatin <th>X J L L L L L L L L L L L L L L L L L L</th> <th>О П О С С С С С С С С С С С С С С С С С</th> <th>СТОСК СССКО СССК ССССК СССК СССК СССК ССССК СССК СССК СССК СССК СССК С</th> <th>コンフレン 20 No. of Bottles/ Vials:</th> <th>COC NO.: LABORATORY N General Engineer LABORATORY A 2040 Savage Ra Charleston, S.C PHONE NO: (B03 SPECIV SPECIV</th>	X J L L L L L L L L L L L L L L L L L L	О П О С С С С С С С С С С С С С С С С С	СТОСК СССКО СССК ССССК СССК СССК СССК ССССК СССК СССК СССК СССК СССК С	コンフレン 20 No. of Bottles/ Vials:	COC NO.: LABORATORY N General Engineer LABORATORY A 2040 Savage Ra Charleston, S.C PHONE NO: (B03 SPECIV SPECIV
PROJECT NAME: Fort Stewent CAP Part A UST Investigations (Options)       PROJECT NUMBER: 01-0331-04-9805-210       PROJECT NUMBER: 01-0331-04-9805-210       PROJECT NUMBER: 01-0331-04-9805-210       PROJECT MANAGER: Patty Stoll       PROJECT MANAGER: Patty Stoll       Sempler (Signature)       Semple ID       Semple ID       Date Eblected       Time Collected       Matrix       Semple ID       Date Eblected       Time Collected       Matrix       Scol 11 2       Louro Lum Leu       Semple ID       Date Eblected       Time Collected       Matrix       Scol 11 2       Louro Lum Leu       Semple ID       Date Eblected       Time Collected       Matrix       Scol 11 2       Louro Lum Leu       Scol 11 2       Louro Lum Leu       Scol 11 2       Louro Lum Collected       Matrix       Scol 11 2       Louro Lum Leu       Scol 11 2       Louro Lum Collected       Matrix       Scol 12 2       Louro Lum Leu       Scol 12 2       Louro Lum Leu       Scol 12 2       Scol 23 2       Scol 21 2	2000 2000 81EX РАН РАН. ТРН	PAH, TPH, Lead, TOC           BTEX, GRO	ED PARAMETERS		
01-0331-04-9805-210         R: Patty Stoll         IPhinted Name	5 77 77 77 87 67 РАН, ТРН	PAH, TPH, Lead, TOC           PAH, DRO           PAH, DRO           PAH, DRO			General Engineering Laboratory LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417 PHONE NO: (803) 556-8171 PHONE NO: (803) 556-8171 OBSERVATIONS, COMMENTS, SFECIAL INSTRUCTIONS PRODE-08 10
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	COC NO.: GA ()2()	LABORATORY NAME:	General Engineering Laboratory	LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417			080	- 08			21- 12				Cooler Temperature: HOC	FEDEX NUMBER:					
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Science Applications Landon Converted Converting Science Applications Leoponsion 800 Oak Ridge Turmphe, Oak Ridge, TW, 37831 (4231,4500	CHAIN OF CUSTODY RECORD	COC NO.: GARJ
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PROJECT NUMBER: 01-0331-04-9805-210		General Engineering Laboratory
PROJECT MANAGER: Patty Stoll		LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417
Iurel IPrinted Name)	PH, Lead, PH, Lead, SRO	PHONE NO: (803) 556-8171
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ALO OAA RAUGE TURNAME DAA RAUGE, TN' 37831 (423) 481-4600	CHAI		CHAIN OF CUSTODY RECORD			COC NO .: GADJ	
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PROJECT NUMBER: 01-0331-04-9805-210					<u> </u>	General Engineering Laboratory	
PROJECT MANAGER: Patty Stoll		10¢	705		_	LABORATORY ADDRESS: 2040 Savage Raod Chaileston, SC 29417	F
Bampter (Signature) (Printed Name)	2		, Lesd, JORG	· 	isiV \esimot	PHONE NO: (803) 556-8171	
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Instruction         CHAN OF CUSTODY RECORD         COC NO:: GA 0.3           Instruction         Instruction         Instruction         Instruction           Instruction         Instruction         Instruction         Instruction         Instruction           Instruction         Instruction         Instruction         Instruction         Instruction         Instruction         Instruction           Instruction	Charlies in ratis	Serves Applications Landon Conversion Serves Applications Lancations Conversion			- 0	ZQ,	$\int O$				ĩ
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## **APPENDIX IX**

# EXCAVATION OF CONTAMINATED SOIL AND SUPPORTING MANIFESTS

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All contaminated soil removed during the entire project (i.e., all USTs removed under contract with ACE, to include clean and non-clean closures) was tested and transported to Kedesh, Inc., Highway 84, Ludowici, GA, 31316. The Installation has records of all manifests and weight tickets for this project and provided copies to GA EPD in September 1998. However, site/UST-specific information is not available.

I certify that the above information is true and accurate.

Name: Thomas C. Fry

Title: Chief, Environmental Branch

Signatu	re: Aliomas	С.	fry	
Date:	83/19/99		. /	

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Fort Stewart UST CAP A Report UST 56, Building 1056, Facility ID #9-089116

# **APPENDIX X**

# SITE RANKING FORM

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## SITE RANKING FORM

Facility Name: UST 56					Ranked by:		L. Lumley		
County: Liberty Facility ID #: 9-089116			Date Ranked:		9/11/98				
SOIL (	CONTA	MINATION							
A.	Maximum Concentration found on the site (Assume <0.660 mg/kg if only gasoline			В.	Total Benzene - Maximum Concentration found on the site				n the⊸site
	was si	tored on site)			$\boxtimes$	<u>&lt;</u> 0.005 m	g/kg	=	0
		<u>≺</u> 0.660 mg/kg	= 0			>0.005	.05 mg/kg	=	1
		>0.66 - 1 mg/kg	= 10			>0.05 - 1	mg/kg	=	10
	$\boxtimes$	>1 - 10 mg/kg	= 25			>1 - 10 m	ig/kg	=	25
		>10 mg/kg	= 50			>10 - 50	mg/kg	≒	40
						>50 mg/k	g	=	50
C.		to Groundwater below land surface)							
		>50' bls =	1						
		>25' - 50' bls =	2						
		>10' - 25' bls =	5						
	$\boxtimes$	$\leq 10^{\circ}$ bls =	10						
Fill in	the bla	nks: (A. <u>25</u> ) + (I	B. <u>0</u> ) = ( <u>25</u> )	x (C	<u>10_)</u> =	(D. <u>250</u> )			
<u>GROU</u>	<u>JNDWA</u>	TER CONTAMINATIC	<u>DN</u>						
E.	Free Product (Nonaqueous-phase F. liquid hydrocarbons; See Guidelines For definition of "sheen").			Dissolved Benzene - Maximum Concentration at the site (One well must be located at the source of the release.)					
	$\boxtimes$	No free product = 0	0		$\boxtimes$	<u>≤</u> 5 μg/L			= 0
		Sheen - 1/8" = 2	250			>5 - 100	µg/L		= 5
		>1/8" - 6" = \$	500			>100 - 1,0	000 µg/L		= 50
		>6" - 1ft. =	1,000				10,000 µg/L		= 100
		For every additional 100 points = <u>1,000 -</u>				>10,000	ug/L		= 250
Fill in	the bla	nks: (E. <u>0</u> )+(	(F. <u>0</u> ) = ( <u>G.</u>	_)					

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#### POTENTIAL RECEPTORS (MUST BE FIELD-VERIFIED)

Distance from nearest contaminant plume boundary to the nearest downgradient and hydraulically connected Point of Withdrawal for water supply. If the point of withdrawal is not hydraulically connected, evidence as outlined in the CAP-A guidance document MUST be presented to substantiate this claim.

Н.	Public Water Supply	L.	Non-Public Water Supply			
*	$ \begin{array}{ c c c c } & Impacted & = 2000 \\ \hline \leq 500' & = 500 \\ \hline > 500' - \frac{1}{4} & mi & = 25 \\ \hline \frac{1}{4} & mi - 1 & mi & = 10 \\ \hline > 1 & mi - 2 & mi & = 2 \\ \hline > 2 & mi & = 0 \\ \hline For lower susceptibility areas only: \\ \hline > 1 & mi & = 0 \\ \hline Note: If site is in lower susceptibility areas \\ * For justification that withdrawal point is \\ \end{array} $					
J.	Distance from nearest Contaminant Plume boundary to downgradient Surface Waters <b>OR UTILITY TRENCHES &amp; VAULTS</b> (a u trench may be omitted from ranking if its in elevation is more than 5 feet above the wa	s utility nvert	Distance from any Free Product to basements and crawl spaces			
	$ \begin{array}{ c c c c c } & Impacted & = 500 \\ \hline & \leq 500' & = 50 \\ \hline & >500' - 1,000' & = 5 \\ \hline & >1,000' & = 1 \end{array} $		$ \begin{array}{ c c c c c } & \text{Impacted} & = & 500 \\ \hline & <500' & = & 50 \\ \hline & >500' - 1,000' & = & 5 \\ \hline & >1,000' \text{ or } & = & 0 \\ \hline & \text{no free product.} \end{array} $			
Fill in t	he blanks: (H. <u>0</u> ) + (I. <u>0</u> ) + (J.	<u>50</u> ) + (	K. <u>0</u> ) = L. <u>50</u>			
	(G.	<u>0</u> ) x (	L. <u>50</u> ) = M. <u>0</u>			
	(M.	) + (	D. <u>250</u> ) = N. <u>250</u>			
P.	SUSCEPTIBILITY AREA MULTIPLIER					
	If site is located in a Low Ground-	Water Pollut	ion Susceptibility Area = 0.5			
	All other sites = 1					
Q.	EXPLOSION HAZARD					
	Have any explosive petroleum vapors, possibly originating from this release, been detected in a subsurface structure (e.g., utility trenches, basements, vaults, crawl spaces, etc.)?					
	Yes = 200,000					
	No = 0					
Fill in t	Fill in the blanks: (N250_) x (P1_) = (_250_) + (Q0_)					

= 250

#### ENVIRONMENTAL SENSITIVITY SCORE

#### OTHER GEOLOGIC AND HYDROLOGIC DATA

The following information is presented to provide supplemental information to Section II.D.5 of the CAP-Part A form and provides detailed information relating to the geologic and hydrogeologic conditions at Fort Stewart to support determinations of groundwater flow pathway(s) or direction(s) and contaminant transport.

#### 1.0 REGIONAL AND LOCAL GEOLOGY

Fort Stewart is located within the coastal plain physiographic province. This province is typified by nine southeastward dipping strata that increase in thickness from 0 feet at the fall line located approximately 350 miles inland from the Atlantic coast, to approximately 4,200 feet at the coast. State geologic records describe a probable petroleum exploration well (the No. 1 Jelks-Rogers) located in the region as encountering crystalline basement rocks at a depth of 4254 feet BGS. This well provides the most complete record for Cretaceous, Tertiary, and Quaternary sedimentary strata in the region.

The Cretaceous section was found to be approximately 1,970 feet thick and dominated by clastics. The Tertiary section was found to be approximately 2,170 feet thick and dominated by limestone with a 175-foot thick cap of dark green phosphatic clay. This clay is regionally extensive and is known as the Hawthorn Group. The interval from approximately 110 feet to the surface is Quaternary in age and composed primarily of sand with interbeds of clay or silt. This section is undifferentiated into separate formations (Metcalf & Eddy 1996).

State geologic records contain information regarding a well drilled in October 1942, 1.8 miles north of Flemington at Liberty Field of Camp Stewart (now known as Fort Stewart). This well is believed to be an artesian well located approximately one-quarter mile north of the runway at Wright Army Airfield within the Fort Stewart Military Reservation. The log for this well describes a 410-foot section, the lowermost 110 feet of which consisted predominantly of limestone sediments, above which 245 feet of dark green phosphatic clay typical of the Hawthorn Group was encountered. The uppermost portion of the section was found to be Quaternary age interbedded sands and clays. The top 15 feet of these sediments were described as sandy clay (Metcalf & Eddy 1996).

The surface soil located throughout the Fort Stewart garrison area consists of Stilson loamy sand. The surface layer of this soil is typically dark grayish brown loamy sand measuring approximately 6 inches in depth. The surface layer is underlain by material consisting of pale yellow loamy sand and extends to a depth of approximately 29 inches. The subsoil is dominantly sandy clay loam and extends to a depth of 72 inches or more (Metcalf & Eddy 1996).

#### 2.0 REGIONAL AND LOCAL HYDROGEOLOGY

The hydrogeology in the vicinity of Fort Stewart is dominated by two aquifers referred to as the Principal Artesian and the surficial aquifers. The Principal Artesian aquifer is the lowermost hydrologic unit and is regionally extensive from South Carolina through Georgia, Alabama, and most of Florida. Known elsewhere as the Florida, this aquifer is composed primarily of Tertiary age limestone, including the Bug Island Formation, the Ocala Group, and the Suwannee Limestone. These formations are approximately 800 feet thick, and groundwater from this aquifer is used primarily for drinking water (Arora 1984).

The uppermost hydrologic unit is the surficial aquifer, which consists of widely varying amounts of sand and clay ranging from 55 to 150 feet in thickness. This aquifer is primarily used for domestic lawn and agricultural irrigation. The top of the water table ranges from approximately 2 to 10 feet BGS (Geraghty and Miller 1993). The base of the aquifer corresponds to the top of the underlying dense clay of the Hawthorn Group. The Hawthorn Group was not encountered during drilling at this site, but is believed to be located at 40 to 50 feet BGS, thus the effective aquifer thickness would be approximately 35 to 45 feet. Soil surveys for Liberty and Long Counties describe the occurrence of a perched water table within the Stilson loamy sands present within Fort Stewart (Looper 1980).

The confining layer for the Principal Artesian aquifer is the phosphatic clay of the Hawthorn Group and ranges in thickness from 15 to 90 feet. The vertical hydraulic conductivity of this confining unit is on the order of  $10^{-8}$  cm/sec. There are minor occurrences of aquifer material within the Hawthorn Group; however, they have limited utilization (Miller 1990). The Hawthorn Group has been divided into three formations: Cooswhatchie Formation, Markshead Formation, and the Parachula Formation, which are listed from youngest to oldest.

The Coosawhatchie Formation is composed predominantly of clay, but also has sandy clay, argillaceous sand, and phosphorite units. The formation is approximately 170 feet thick in the Savannah Georgia area. This unit disconformably overlies the Markshead Formation and is distinguished from the underlying unit by dark phosphatic clays or phosphorite in the lower part and fine-grained sand in the upper part.

The Marshead Formation is approximately 70 feet thick in the Savannah Georgia area and consists of light colored phosphatic, slightly dolomitic, argillaceous sand to fine-grained sandy clay with scattered beds of dolostone, limestone, and siliceous, and dolomitic and less calcareous.

The Parachula Formation consists of sand, clay, limestone, and dolomite, and is approximately 10 feet thick in the Savannah Georgia area. The Parachula Formation generally overlies the Suwannee Limestone in Georgia.

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# APPENDIX XI

# **PUBLIC NOTIFICATION**

STATE OF GEORGIA CHATHAM COUNTY Affidavit of Publication Savannah Morning News Savannah Evening Press

That he is the <u>Classified Adv Supv</u> of Southeastern Newspapers Corporation, a Georgia corporation, doing business in Chatham County, Georgia, under the trade name of Savannah Morning News/Savannah Evening Press, a daily newspaper published in said county;

That he is authorized to make affidavits of publication on behalf of said published corporation;

That said newspaper is of general circulation in said county and in the area adjacent thereto;

That he has reviewed the regular editions of the Savannah Morning News/Savannah Evening Press, published on 10-18, 1998, 10-25, 1998, \_\_\_\_\_,  $19_2$ , \_\_\_\_\_,  $19_2$ , \_\_\_\_\_,  $19_2$ , \_\_\_\_\_, and finds

that the following Advertisement, to-wit:

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Miscellaneous Notices	PUBLIC NOTICE Notification of corrective Action Plan, Understround Storage Tork Refeases, Fort Stewart Garrison The United States Army Carsa of Engineers and Farri Stewart Displaces of Partial Army Carsa of Engineers and Farri Stewart Displaces of the Carsa of Part B and Part B reports to assess the environ- mental impact of drest, goas into, or woste of releases from numerous underground storage obove referenced of the power restremented in pace to the Georgia Environmental Protection Division of the Part B reports have been and Part B reports have been	The Georgia rules of the end of this notification. of the Georgia rules of UST mon- operand a rules of UST mon- operative notification of the plots. If you would like o controct: Commonder. 3rd Interity Divi- controct frames of the plots. Plot- sion. (Machinelee), and Fort Stwart, of this DpWeNRD ENV Stwart, of this Down of Strange and an animal cop- ting and shipaing lee. The Monosemental Protection Divi- ion's files, contrast an any of the Brivionmental Protection Divi- sion's files, contrast Protection Division. at 44.357.3697. The Diverse flaw Monosement Protection Division. at 44.357.3697. The Diverse flaw and Port B reports up to the Georale Environmention Protection Division. at 44.347.3697. The Diverse flaw Monosement Division. at 44.347.3697. The Diverse flaw Monose the Correction Division. At and Port B report Division. at 44.347.3697. The Diverse flaw Monose Division. Division. The Division. The Diverse Diverse flaw Monose Division. Division. The Division. The Division. The Diverse Division. Division. The Division. The Diverse Division. Divisi

appeared in each of said editions.

Sworn to and subscribed before me this 26 day of 0 ct, 1998.

(Deponen

Notary Public, Chatham County, Borgia

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LILLIE D. LANG Notary Public, Chatham County, Ga. My Commission Expires Apr. 8, 2001.



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## ATTACHMENT A

# **TECHNICAL APPROACH**

#### TECHNICAL APPROACH

#### 1.0 INTRODUCTION

The overall objective of this project is to provide the engineering services required to produce Corrective Action Plans (CAPs) for the subject UST sites. These reports will conform to the site closure requirements of a CAP-Part A for sites in Georgia. The field investigations necessary to support the report preparation included the installation of temporary piezometers, soil borings, and associated sampling of soil and groundwater. Upon completion of the field investigations, a CAP-Part A will be prepared to meet GA EPD, Fort Stewart, and the USACE-Savannah requirements.

#### 2.0 FIELD ACTIVITIES

The following sections detail the methodologies used for geoprobe drilling, sampling, and piezometer installation. A geologist from SAIC was on site at all times during operations. No drilling activities were undertaken until all utility clearances and permits had been obtained from Fort Stewart's utility personnel.

#### 2.1 Subsurface Soil Sampling

#### 2.1.1 Geoprobe Drilling

The geoprobe method was used during the project for collecting soil samples. During all geoprobe drilling, soil samples were collected continuously on 4.0-foot centers from the ground surface to the bottom of the borehole. The total depth of each borehole was dictated by the depth where the water table was encountered.

#### 2.1.2 Sample Collection

Soil samples for chemical analyses were collected from boreholes using 4.0-foot macro-core samplers. Upon retrieval of the sampling device, the soil core was split into two 2.0-foot sections using a stainless steel knife. A portion of each 2.0-foot section was collected for possible laboratory analysis. The remaining portion of each 2.0-foot section was used for field measurements.

Samples designated for possible laboratory analysis were collected from the section using a stainless steel spoon. The spoon was run lengthwise down the core to collect a sample representative of the entire core section. The portion of the sample designated for volatile organic analyses was placed into laboratory sample containers first, followed by placement of the remaining portion of the sample into the containers designated for other types of analyses. Sample containers designated for volatile organic analyses were filled so that minimal headspace was present in the containers. Headspace gas concentration measurements were made using a field organic vapor meter (OVM). Initially, soil from each 2.0-foot interval was placed into a glass jar, leaving some air space, and covered with aluminum foil to create an air-tight seal. The sample was allowed to volatilize for a minimum of 15 minutes. The sealed jar was punctured with the OVM probe and headspace gas drawn until the meter reading was stable. The concentration of the headspace gas was recorded to the nearest 0.1 part per million.

Immediately after collection of each sample and completion of bottle label information, each potential analytical sample container was placed into an ice-filled cooler to ensure preservation. A clean split-barrel sampling device was used to collect soil core from each interval of the project boreholes. Information regarding the criteria for selection of soil samples for off-site shipment to a laboratory for chemical analysis

is presented in Section 3.1.3 of the project Work Plan. Soil samples, which were not selected for laboratory analysis, were disposed of as investigation-derived waste.

#### 2.2 Groundwater Sampling

#### 2.2.1 Groundwater Collection

Groundwater samples from geoprobe boreholes installed during Preliminary Groundwater and CAP-Part A investigations were collected using a geoprobe sampler or from temporary piezometers. The geoprobe sampler is a probe that allows the collection of a groundwater sample from a discrete undisturbed depth interval in a soil boring. Temporary piezometers were constructed of 1.0-inch inside diameter (ID) polyvinyl chloride (PVC) casing with a 5-foot or 10-foot screened interval. These piezometers were installed in the open borehole following completion of all drilling activities.

Each soil borehole was advanced to the top of the water table using direct push methods. For each borehole, the geoprobe sampler was lowered to the bottom of the borehole and driven through the undisturbed soil to a depth of approximately 3.0 feet below the water table. The outer casing of the geoprobe sampler was retracted to expose the screen and allow groundwater to enter the chamber. In cases where the geoprobe sampler could not be driven or where groundwater recovery through the geoprobe sampler was poor, the groundwater sample was collected through the temporary piezometer.

Groundwater samples were collected using a peristaltic pump or a 0.75-inch diameter stainless steel bailer. The portion of the sample designated for volatile organic analysis was poured into laboratory sample containers first, followed by pouring of the remaining sample portion into containers designated for other types of chemical analyses. Sample containers designated for volatile organic analysis were filled so that no headspace was present in the containers.

#### 2.2.2 Field Measurements

Groundwater field measurements performed during the project included measurement of static groundwater level, pH, specific conductance, and temperature. Measurement of groundwater levels in soil boreholes was accomplished through the installation of temporary PVC piezometers. A summary of the procedures and criteria to be used for groundwater sample field measurements is presented in the following sections.

#### Static Groundwater Level

Static groundwater level measurements were made using an electronic water level indicator. Initially, the indicator probe was lowered into each temporary piezometer casing until the alarm sounded and/or the indicator light illuminated. The probe was withdrawn several feet and slowly lowered again until the groundwater surface was contacted as noted by the alarm and/or indicator light. Water level measurements were estimated to the nearest 0.01 foot based on the difference between the nearest probe cord mark to the top of the piezometer casing.

The distance between the top of casing and the surrounding ground surface was taken into account in measuring the water level to within 0.01 foot. The static water level measurement procedure was repeated two or three times to ensure that the water level measurements were consistent (plus or minus 0.01 foot). If this was the case, then the first measured level was recorded as the depth to groundwater. If this was not the case, the procedure was repeated until consistent readings were obtained from three consecutive measurements.

#### pH, Specific Conductance, and Temperature

The pH, specific conductance, and temperature measurements were recorded for groundwater during groundwater sampling. The pH, temperature, and conductivity measurements were made using a combination meter designed to measure these parameters. A portion of each groundwater sample was retrieved from the PowerPunch sampler and poured into the collection cup. With the combination meter set in the pH mode, the meter electrode was swirled at a slow constant rate within the sample until the meter reading reached equilibrium. The sample pH was recorded to the nearest 0.1 pH unit. The pH measurement procedure was repeated, using a new sample each time, until the pH measurements were consistent (less than 0.2 pH units variation).

Upon completion of the pH measurement, conductivity, and temperature measurements were made on a groundwater sample collected in the same manner as described above. With the combination meter set in the conductivity mode, the meter electrode was swirled at a slow constant rate within the sample until the meter reading reached equilibrium. Concurrently, a temperature probe was placed into the sample and allowed to reach equilibrium. The sample conductivity was recorded to the nearest 10 mmhos/cm and the temperature to the nearest 0.1° C. All recorded conductivity values were converted to conductance at 25° C. The conductivity and temperature measurement procedure was repeated a minimum of three times using a new sample each time, until the measurements are consistent (less than 10 percent variation for conductance and less than 0.5° C variation for temperatures).

#### 2.3 Temporary Piezometer Installation

Following the collection of the groundwater sample, a 1.0-inch PVC piezometer, with a 5-foot or 10-foot screened section, was installed in the borehole to prevent the borehole from collapsing. These piezometers remained in the boreholes approximately 24 hours, after which time the static water level was measured.

#### 2.4 Borehole Abandonment

Once the static water level was measured, the temporary piezometers were removed and the boreholes were abandoned. Abandonment was conducted in a manner precluding any current or subsequent fluid media from entering or migrating within the subsurface environment along the axis or from the endpoint of the borehole. Abandonment was accomplished by filling the entire volume of the borehole with grout.

#### 2.5 Surveying

A topographic survey of the horizontal and vertical locations of all soil boreholes was conducted after completion of all field activities. The topographic survey was conducted by a surveyor registered in the state of Georgia.

The horizontal coordinates for each soil borehole were surveyed to the closest 1.0 foot and referenced to the State Plane Coordinate System. Ground elevations were surveyed to the closest 0.1 foot. Elevations were referenced to the National Geodetic Vertical Datum of 1983.

#### 2.6 Decontamination Procedures

#### 2.6.1 Geoprobe Equipment

Decontamination of equipment used for the drilling of boreholes was conducted within the temporary decontamination pad constructed at the central staging area. The decontamination pad was constructed so that all decontamination liquids were contained from the surrounding environment and were recovered for disposal as IDW. The entire geoprobe vehicle and equipment was decontaminated once it arrived on site and the geoprobe sampling equipment was decontaminated after completion of each soil borehole. The equipment was decontaminated by removing the caked soil material from the exterior of equipment using a rod and/or brush, steam cleaning the interior and exterior of equipment, allowing the equipment to air dry as long as possible, and wrapping or covering the equipment in plastic.

#### 2.6.2 Sampling Equipment

Decontamination of equipment used for soil sampling and collection of groundwater samples was conducted at the temporary decontamination area. Nondedicated equipment was decontaminated after each use. The sampling equipment was washed with potable water and phosphate-free detergent using various types of brushes required to remove particulate matter and surface films, followed by a potable water rinse, American Society of Testing and Materials (ASTM) Type I or equivalent water rinse, isopropyl alcohol rinse, ASTM Type I or equivalent water rinse, allowed to air dry, and wrapped in plastic or aluminum foil.

In addition to the sampling equipment, field measurement instruments were also decontaminated between uses. Only those portions of each instrument that come into contact with potentially contaminated environmental media were decontaminated. Because of the delicate nature of these instruments, the decontamination procedure only involved initial rinsing of the instrument probes with ASTM Type I or equivalent water.

#### 2.7 Documentation of field activities

All information pertinent to sampling activities, including instrument calibration data, was recorded in field logbooks. The logbooks were bound and the pages consecutively numbered. Entries in the logbooks were made in black permanent ink and included, at a minimum, a description of all activities, individuals involved in drilling and sampling activities, date and time of drilling and sampling, weather conditions, any problems encountered, and all field measurements. Sufficient information was recorded in the logbooks to permit reconstruction of all sampling activities

#### 3.0 SAMPLE HANDLING AND ANALYSIS

#### 3.1 Analytical Program

Soil samples were screened for the presence of volatile vapors using a organic vapor analyzer (OVA). The OVA was calibrated daily using 100 parts per million (ppm) isobutylene. The headspace of each sample was measured approximately 15 minutes after collection.

For sites where the UST had contained waste oil, soil samples were analyzed for BTEX by method SW846-8020, PAH by method SW846-8270, and TPH by method SW846-9073. Groundwater samples were analyzed for BTEX by method SW 846-8240 and PAH by method SW 846-8270. All samples were sent to General Engineering Laboratories, Charleston, South Carolina.

For sites where the UST had contained gasoline or diesel, soil samples were analyzed for BTEX by method SW 846-8020, PAH by method SW 846-8270, and TPH by method SW 846-8015 (modified). Groundwater samples were analyzed for BTEX by method SW 846-8240 and PAH by method SW 846-8270. TPH analysis included both gasoline range organics (GRO) and diesel range organics (DRO). All samples were sent to General Engineering Laboratories, Charleston, South Carolina.

Duplicate samples of soil and groundwater were collected throughout the project and represented approximately 10 percent of the total sample population. Rinsate blanks were collected to determine whether the sampling equipment was causing cross-contamination of the samples and represented approximately 5 percent of the total sample population. Duplicates and rinsates were submitted to General Engineering Laboratories, Charleston, South Carolina.

#### 3.2 Sample Containers, Preservation, and Holding Times

The soil sample containers, preservatives, and holding times are summarized in Table A-1. The groundwater sample containers, preservatives, and holding times are summarized in Table A-2.

#### 3.3 Sampling Packaging and Shipment

Each sample container was labeled, taped shut with electrical tape (except those containing samples designated for volatile organic analysis), and an initialed/dated custody seal was placed over the lid. Each sample bottle was placed into a separate plastic bag and sealed. The samples were placed upright in thermally insulated rigid-body coolers and surrounded by vermiculite to prevent breakage during shipment. In addition, samples were cooled to approximately 4° C with wet ice. These measures were taken to slow the decomposition and volatilization of contaminants during shipping and handling. The sample coolers were shipped to the analytical laboratory via courier service provided by the laboratory.

Analyte Group	Container	Minimum Sample Size	Preservative	Holding Time
BTEX	1-4 oz jar with Teflon <sup>®</sup> -lined cap (no headspace)	20 g	Cool, 4°C	14 d
TPH-GRO	use same container as BTEX	20 g	Cool, 4°C	14 d
PAHs	1 – 8 oz jar with Teflon <sup>®</sup> -lined cap	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
TPH-DRO	use same container as PAHs	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
ТРН	use same container as PAHs	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
Metals (lead)	use same container as PAHs	20 g	Cool, 4°C	180 d

# Table A-1. Summary of Sample Containers, Preservation Techniques, and Holding Times for Soil Samples Collected During the Site Investigation

# Table A-2. Summary of Sample Containers, Preservation Techniques, and Holding Times for Groundwater Samples Collected During the Site Investigation

Analyte Group	Container	Minimum Sample Size	Preservative	Holding Time
BTEX	2-40 mL glass vials with Teflon <sup>®</sup> -lined septum (no headspace)	40 mL	Cool, 4°C HCl to pH < 2	14 d
PAHs	2 – 1L amber glass bottle with Teflon <sup>®</sup> -lined lid	1000 mL	Cool, 4°C	7 d (extraction) 40 d (analysis)

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# ATTACHMENT B

# REFERENCES

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