FINAL

CORRECTIVE ACTION PLAN - PART A REPORT
FOR
UNDERGROUND STORAGE TANKS 48 & 49
FACILITY ID #9-089054
BUILDING 1175
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:

Science Applications International Corporation
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831

December 1998

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List of Abbreviations and Acronyms

ACE	Anderson Columbia Environmental, Inc.
ACL	alternate concentration limit
AMSL	above mean sea level
ASTM	American Society for Testing and Materials
ATL	alternate threshold level
BDL	below detection limit
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
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
MCL	maximum contaminant levels

N/A	not applicable
NRC	no regulatory criteria
OVM	organic vapor meter
PAH	polynuclear aromatic hydrocarbon
PID	photoionization detection
PVC	polyvinyl chloride
SAIC	Science Applications International Corporation
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbon
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UST	underground storage tank
USTMP	Underground Storage Tank Management Program
VOC	volatile organic compound

CORRECTIVE ACTION PLAN PART A

Facility Name: USTs 48 & 49, Building 1175 Street Address: Tilman Avenue and W. 4th Street

Facility ID: 9-089054 City: Fort Stewart County: Liberty Zip Code: 31314

Latitude: 31°51'41" Longitude: 81°37'01"

Submitted by UST Owner/Operator:	Prepared by Consultant/Contractor:
Name: Thomas C. Fry/ Environmental Branch	Name: Patricia A. Stoll
Company: U.S. Army/HQ 3d, Inf. Div (Mech)	Company: SAIC
Address: DPW ENRD ENV. Br. (Fry)	Address: P.O. Box 2502
1557 Frank Cochran Drive	
City: Fort Stewart State: GA	City: Oak Ridge State: TN
Zip Code: 31314-4928	Zip Code: 37831
Telephone: (912) 767-1078	Telephone: (423) 481-8791

I. PLAN CERTIFICATION:

A. UST Owner/Operator Certification

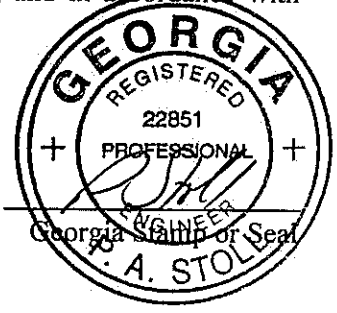
I hereby certify that the information contained in this plan and in all the attachments is true, accurate, and the plan satisfies all criteria and requirements of rule 391-3-15-09 of the Georgia Rules for Underground Storage Tank Management.

Name: THOMAS C. FRY
Signature: for Douglas H Swanson Date: 12/22/98

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: Patricia A Stoll
Date: 12/7/98



Georgia Stamp or Seal

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? YES ____ NO X
If Yes, please summarize. If No, please explain why not.

Actions were not required to abate imminent hazards and/or emergency conditions at the USTs 48 & 49 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 USTs 48 & 49.

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? YES ____ NO X
If Yes, please summarize free product recovery efforts.

Continuing free product recovery proposed? YES ____ NO X
If yes, please indicate the method and frequency of removal.

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)

Tank ID Number	Capacity (gal)	Substance Stored	Age (yrs)	Meets 1998 Upgrade Standards (Yes/No)
N/A	N/A	N/A	N/A	N/A

FORMER UST SYSTEMS (if applicable)

Tank ID Number	Capacity (gal)	Substance Stored	Date Removed
48	5000	Gasoline	3/22/95
49	5000	Diesel	3/22/95

D. Initial Site Characterization

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

1. Regulated Substance Released (gasoline, diesel, used oil, etc.): gasoline, diesel
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 March 22, 1995, by Anderson Columbia Environmental, Inc (ACE). The ancillary piping was closed in-place due to the fact that it was covered with 12 inches of high strength concrete. After removal of the tanks, four soil samples and one groundwater sample were collected from the tank pit (Figure 7). In several soil samples, the method detection limit for benzene exceeded applicable soil threshold levels. Other soil contaminant concentrations were below applicable soil threshold levels. The groundwater concentrations for BTEX were below their respective MCLs.

As requested by GA EPD, additional closure sampling was performed in June 1997. Seven soil samples were collected from the tank pit, along the piping lines, and the dispenser island. One groundwater sample was collected from the tank pit. Soil sample 48-S2-4.75 contained 0.388 mg/kg of benzene, 0.517 mg/kg of SVOCs, and 282 mg/kg of TPH. Other soil contaminant concentrations were below applicable soil threshold levels. The groundwater concentrations for BTEX were below their respective MCLs.

2. Source(s) of Contamination: Unknown; piping leakage or tank overflow suspected
Discuss how this determination was made.

A detailed schematic diagram illustrating the former USTs 48 & 49 and ancillary piping as configured during operation is presented in Figure 2. However, during removal activities by ACE, no holes in the tank were reported. Therefore, the source of contamination is believed to have been leakage and/or tank overflow.

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)

a. *Site located in high/average* X *OR low* ____ *groundwater pollution susceptibility area?*

b. *Water Supplies within applicable radii?* YES X NO ____
If yes,

i. *Nearest public water supply located within:*	1100	*feet*
ii. *Nearest down-gradient public water supply located within:*	7500	*feet*
iii. *Nearest non-public water supply located within:*	>2,640	*feet*
iv. *Nearest down-gradient non-public water supply located within:*	>2,640	*feet*

c. *Surface Water Bodies and sewers:*

i. *Nearest surface water located within*	900	*feet*
ii. *Nearest down-gradient surface water located within*	3500	*feet*
iii. *Nearest storm or sanitary sewer located within:*	40	*feet*
iv. *Depth to bottom of sewer at a point nearest the plume*	est. 4.6	*feet*

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 five 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.

i. Soil contamination above applicable threshold levels?

YES _____ 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?

YES _____ NO _____ N/A X

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 (79-05), soil samples were collected every 5 feet below the water table until several soil 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 X NO _____

ii. Groundwater contamination above In-Stream Water Quality Standards?

YES X NO _____

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

Benzene, toluene, ethylbenzene, and xylenes were detected in borings 79-01 at 940 µg/L, 15,600 µg/L, 3980 µg/L, and 23,800 µg/L, respectively. All of these concentrations exceeded their respective MCLs. Benzene was also detected in borings 79-02, 79-03, and 79-04 at concentrations exceeding the MCL, but less than the concentration in 79-01.

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. Other Geologic/Hydrogeologic Data

a. *Depth to Groundwater (ft BTOC):* 6.15 to 6.87 *(Table 4: Groundwater Elevations)*
b. *Groundwater Flow Direction:* northwest *(Figure 6: Potentiometric Surface Map)*
c. *Hydraulic Gradient* 0.0063 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. Corrective Action Completed or In-Progress (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 removed USTs 48 & 49 on March 22, 1995. 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 tanks were lifted from the excavation pit. The ancillary piping was closed in-place due to the fact that it was covered with 12 inches of high strength concrete. In-place closure consisted of purging the lines and grouting the ends at the tanks and dispensers.

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:

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. However, site/UST-specific information is not available.

7. Site Ranking:

Environmental Site Sensitivity Score: 2500
(Appendix X: Site Ranking Form)

8. Conclusions and Recommendations

Complete applicable section below, one section only

a. No Further Action Required (if applicable) N/A X
(provide justification)

b. Monitoring Only (if applicable) N/A X
(provide justification)

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

BTEX concentrations in groundwater exceed their respective MCLs and the horizontal extent of groundwater contamination was not determined during the CAP-Part A investigation.

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 _____
(Figure 8: Proposed additional boring/monitoring well location)

A. Proposed Investigation of Horizontal and Vertical Extent of Contamination In:

1. Soil N/A _____

Six soil borings will be installed, two downgradient, one upgradient, two side gradient, and one in the area of highest CAP-Part A contamination. Two soil samples will be collected from each borehole and analyzed for BTEX, PAH, TPH-diesel-range organics (DRO), and TPH-gasoline-range organics (GRO).

A underground utility line is located approximately 40 feet to the northeast of the former tank pit. Groundwater is not flowing in the direction of this line, thus sampling along and adjacent to this line is not recommended at this time.

2. Groundwater

a. Free Product N/A _____

Each of the six soil borings will be converted to a monitoring well. The wells will be screened across the water table with 3 feet of screen above the water table in order to detect the presence of free product. All monitoring wells will be completed flush with the ground surface.

b. Dissolved phase NA _____

One groundwater sample will be collected from each monitoring well and analyzed for BTEX and PAH. The vertical extent of contamination was determined during the CAP-Part A investigation. Soil samples were collected up to 34.0 feet BGS in 79-05 and all contaminant concentrations were below applicable soil threshold levels. Therefore, based on the analytical results obtained from boring 79-05, additional vertical delineation of the site is not required.

3. Surface Water N/A X

B. Proposed Investigation of Vadose Zone And Aquifer Characteristics:

A geotechnical soil sample was collected during the CAP-Part A investigation and analyzed for permeability, porosity, grain size distribution, moisture content, bulk density, specific gravity, and total organic carbon (Tables V-A and VI-A). During the CAP-Part B investigation, the groundwater samples will be analyzed for dissolved iron and the soil samples will be analyzed for TPH-DRO and TPH-GRO. A slug test will be performed in three of the monitoring wells to determine the saturated horizontal hydraulic conductivity. This information will be utilized in the fate and transport modeling or remediation system design.

V. PUBLIC NOTICE

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

USTs 48 & 49, Building 1175 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 July 19 and 26, 1998.

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 for the USTs 48 & 49 site, Building 1175, Facility ID #9-089054, using Environmental Restoration Account Funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.

APPENDIX I

REPORT FIGURES

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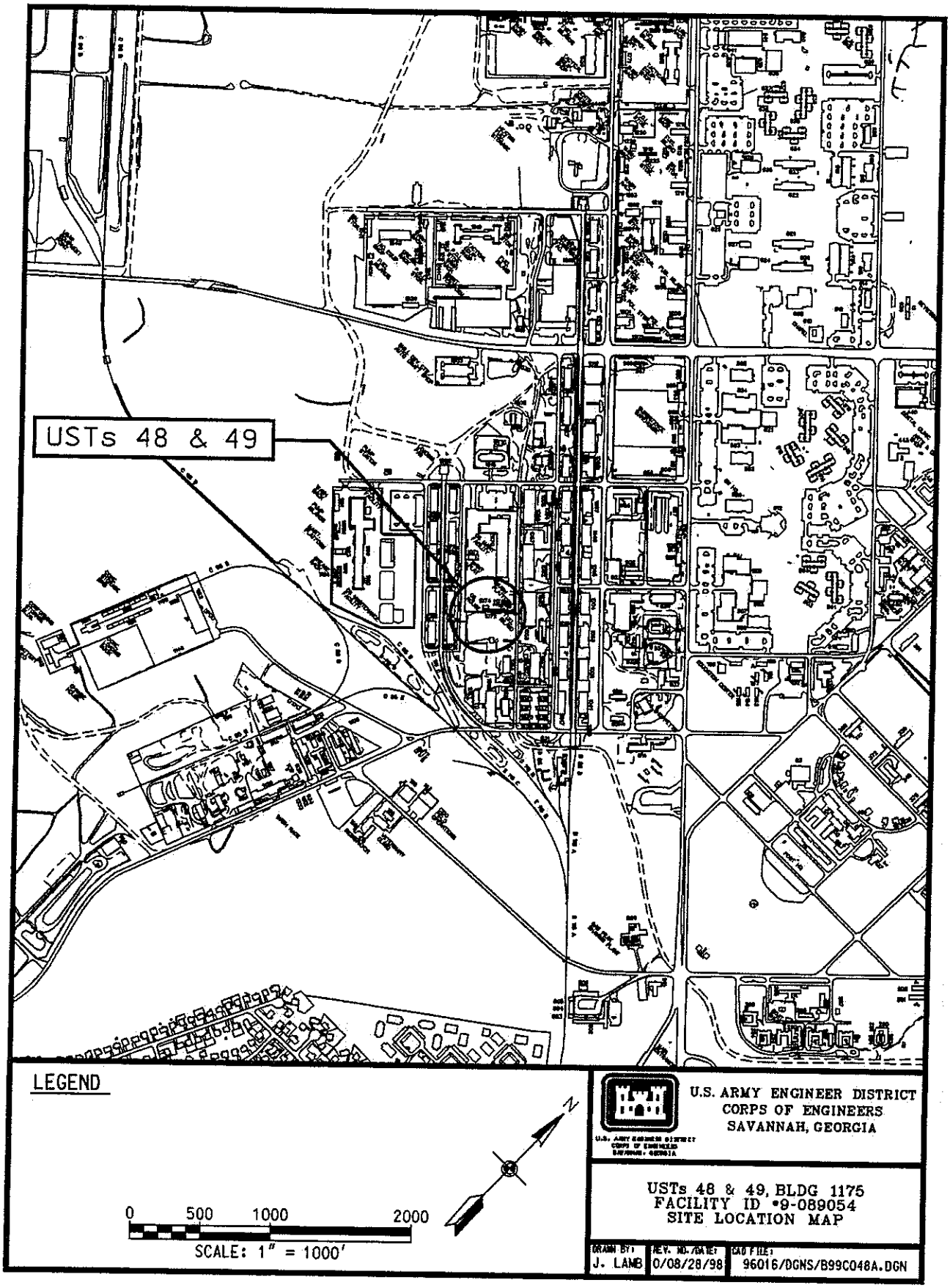


Figure 1. Location Map of Fort Stewart, Liberty County, Georgia

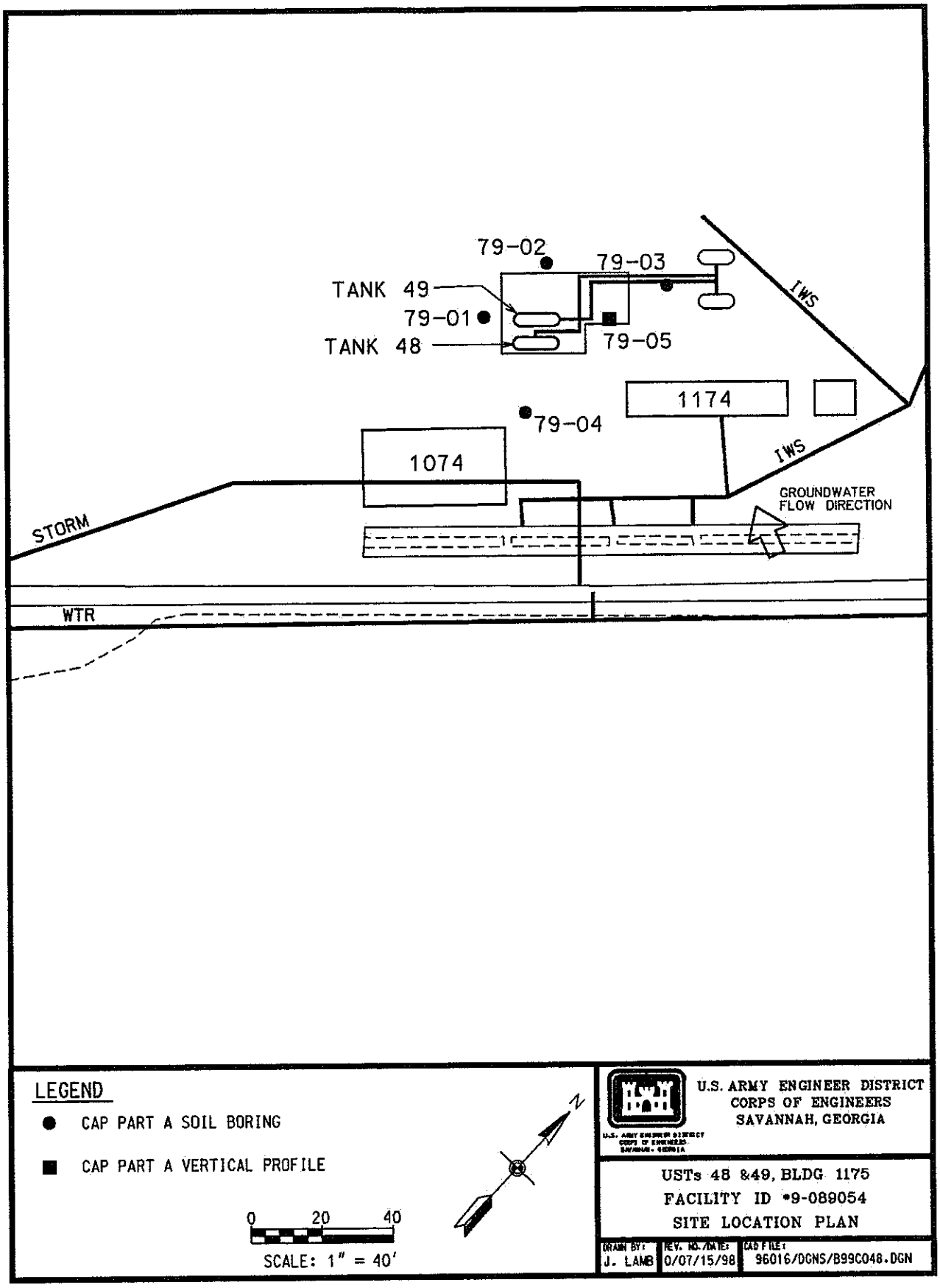
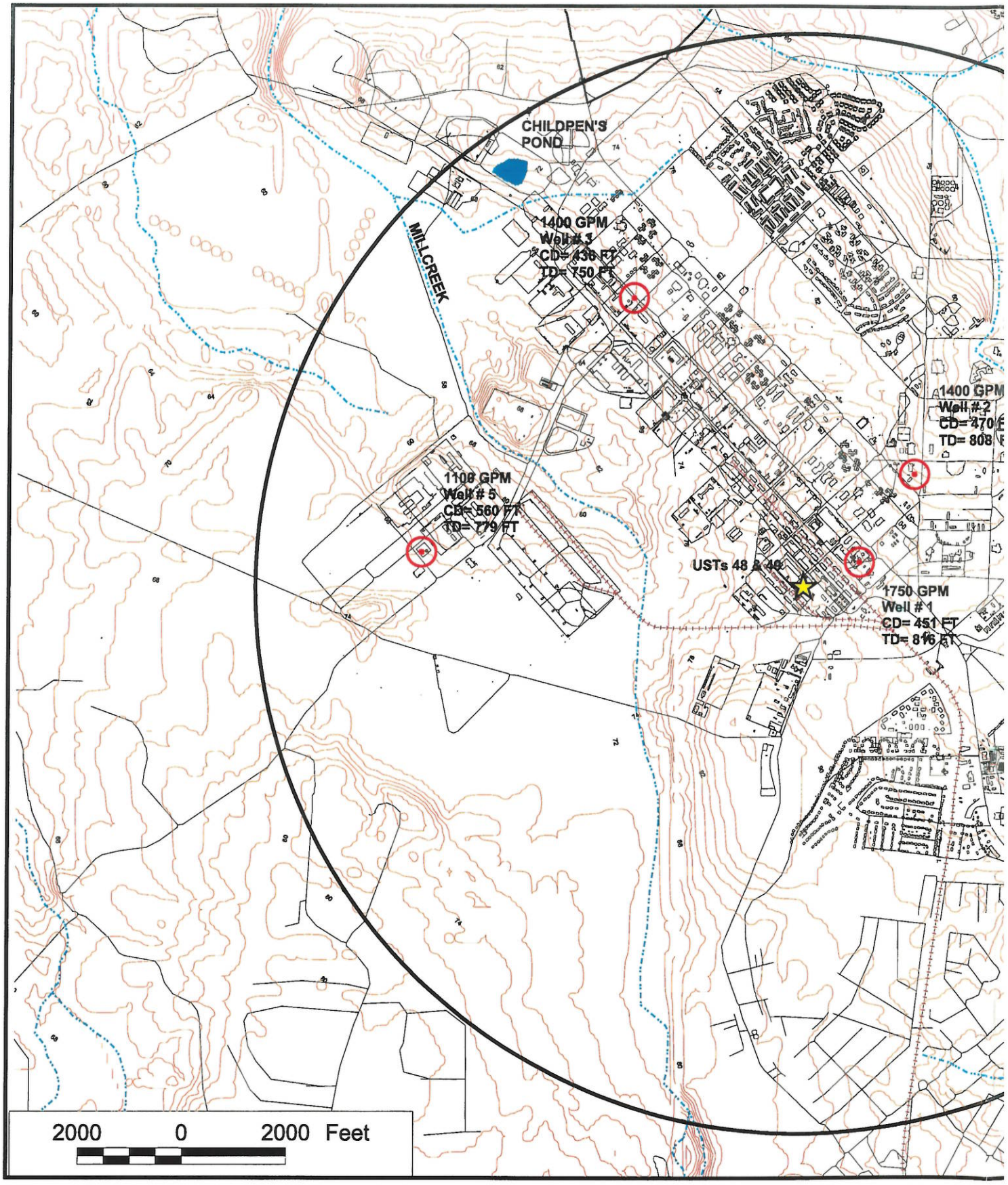


Figure 2. Site Plan for the USTs 48 & 49, Building 1175 Site Investigation


CHILDPEN'S
POND
MILL CREEK
1400 GPM
Well # 3
CD= 436 FT
TD= 750 FT
1400 GPM
Well # 2
CD= 470
TD= 808
1108 GPM
Well # 5
CD= 560 FT
TD= 779 FT
USTs 48 & 49
1750 GPM
Well # 1
CD= 451 FT
TD= 816 FT
2000 0 2000 Feet

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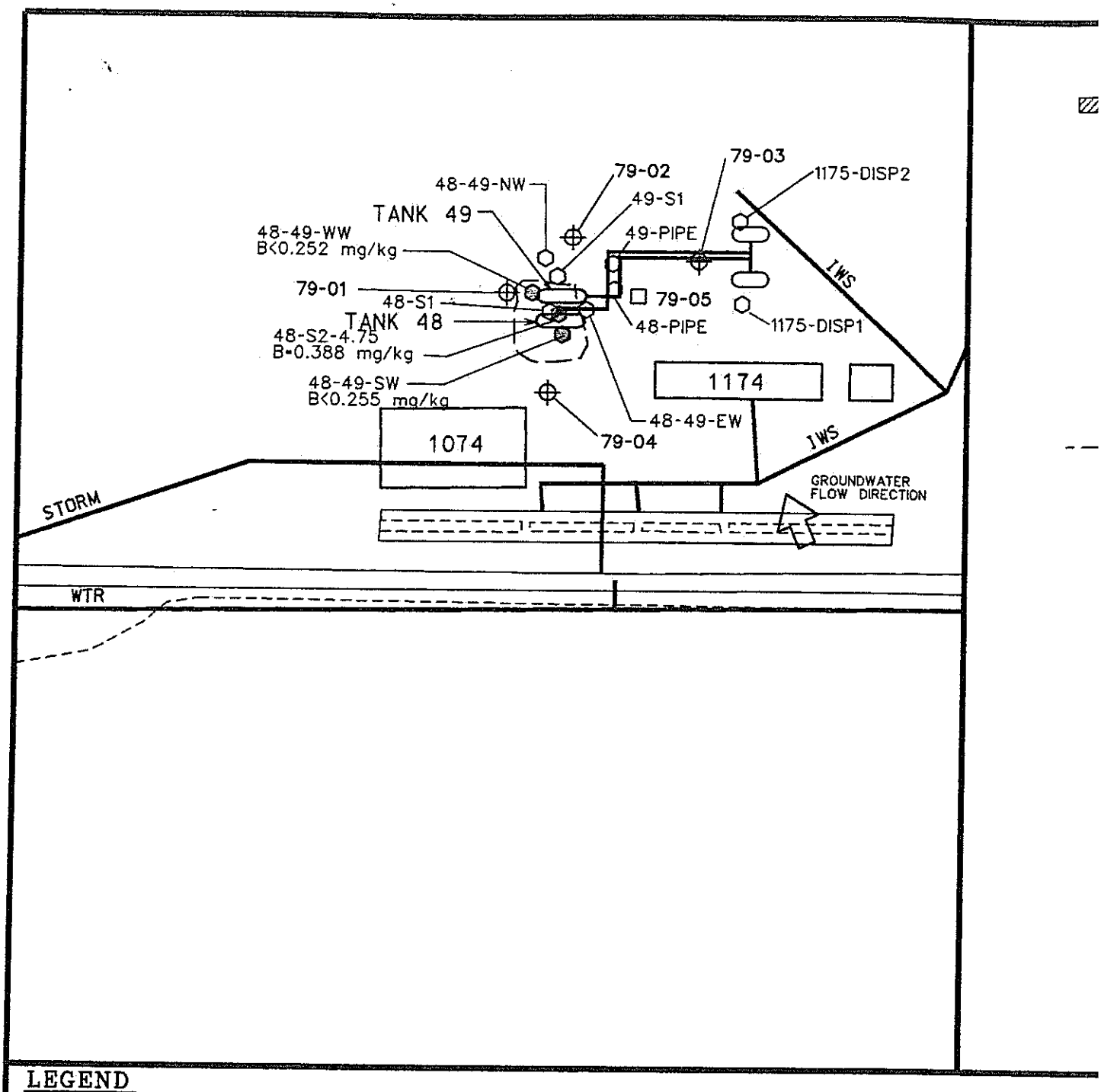

LEGEND

- CAP-PART A INVESTIGATION BOREHOLE
- SOIL SAMPLE LOCATION EXCEEDING THRESHOLD LEVELS
- CLOSURE SAMPLE LOCATION (3/95 OR 6/97)
- CLOSURE SAMPLE LOCATION EXCEEDING THRESHOLD LEVELS
- CAP PART A VERTICAL PROFILE
- SOIL SAMPLE INTERVAL AND SAMPLE ID
- SOIL SAMPLE INTERVAL EXCEEDING THRESHOLD LEVELS
- ESTIMATED LIMIT OF SOIL CONTAMINATION

B	BENZENE	
T	TOLUENE	
E	ETHYLBENZENE	
X	XYLENES, TOTAL	
BTL	BELOW THRESHOLD LEVELS	
	APPROXIMATE WATER LEVEL	

THRESHOLD LEVELS

B = 0.008 mg/kg

T = 6.0 mg/kg

E = 10.0 mg/kg

X = 700 mg/kg

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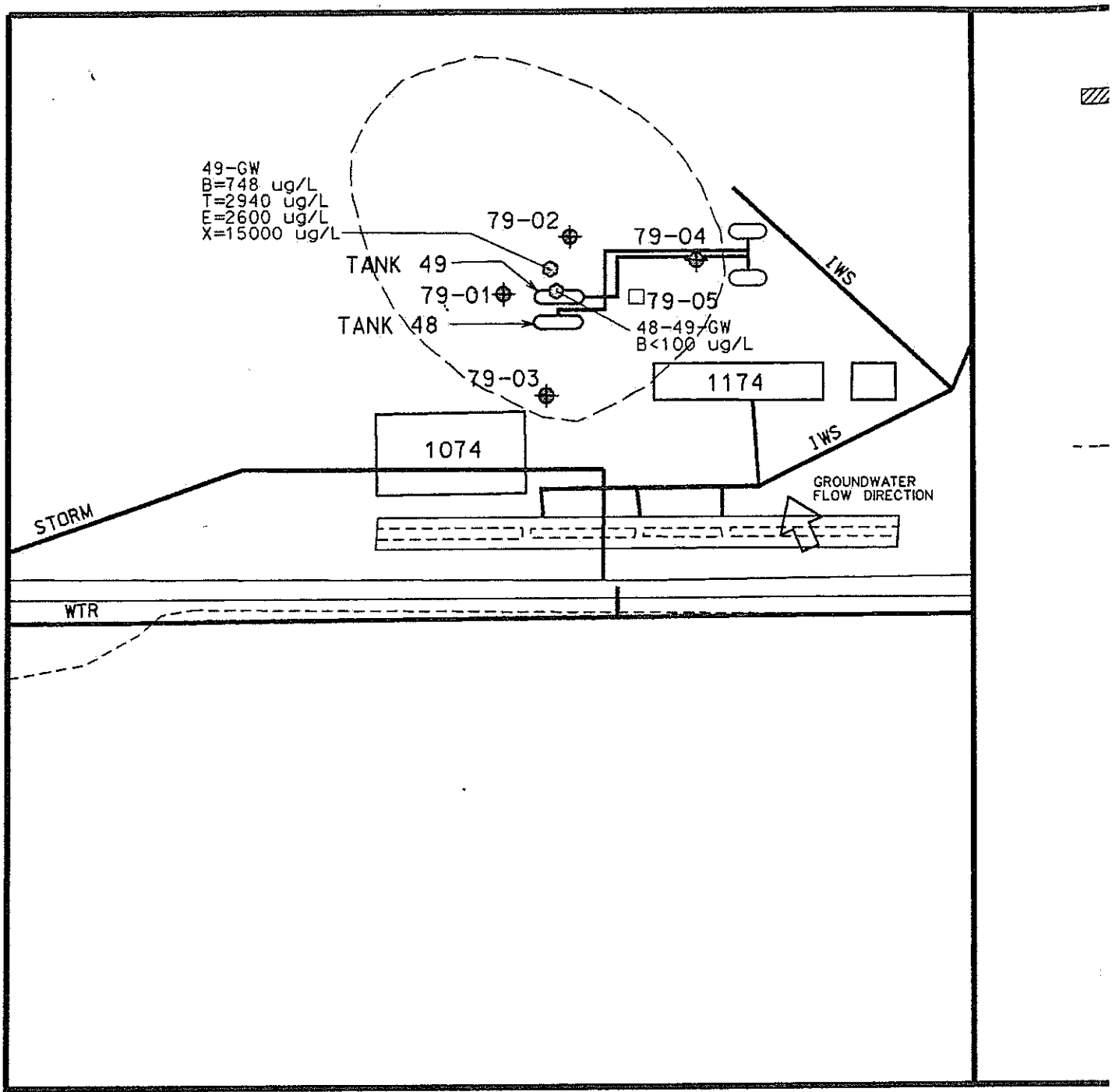

LEGEND

- CAP-PART A INVESTIGATION BOREHOLE
- GROUNDWATER SAMPLE LOCATION EXCEEDING MCLs
- TANK REMOVAL SAMPLE LOCATION EXCEEDING MCLs
- CAP PART A VERTICAL PROFILE
- SCREENED GROUNDWATER SAMPLE INTERVAL AND SAMPLE ID
- GROUNDWATER SAMPLE INTERVAL EXCEEDING MCLs
- ESTIMATED LIMIT OF GW CONTAMINATION

		MAXI
B	BENZENE	B -
T	TOLUENE	T -
E	ETHYLBENZENE	E -
X	XYLENES, TOTAL	X -
BMCL	BELOW MCLs	

- APPROXIMATE WATER LEVEL

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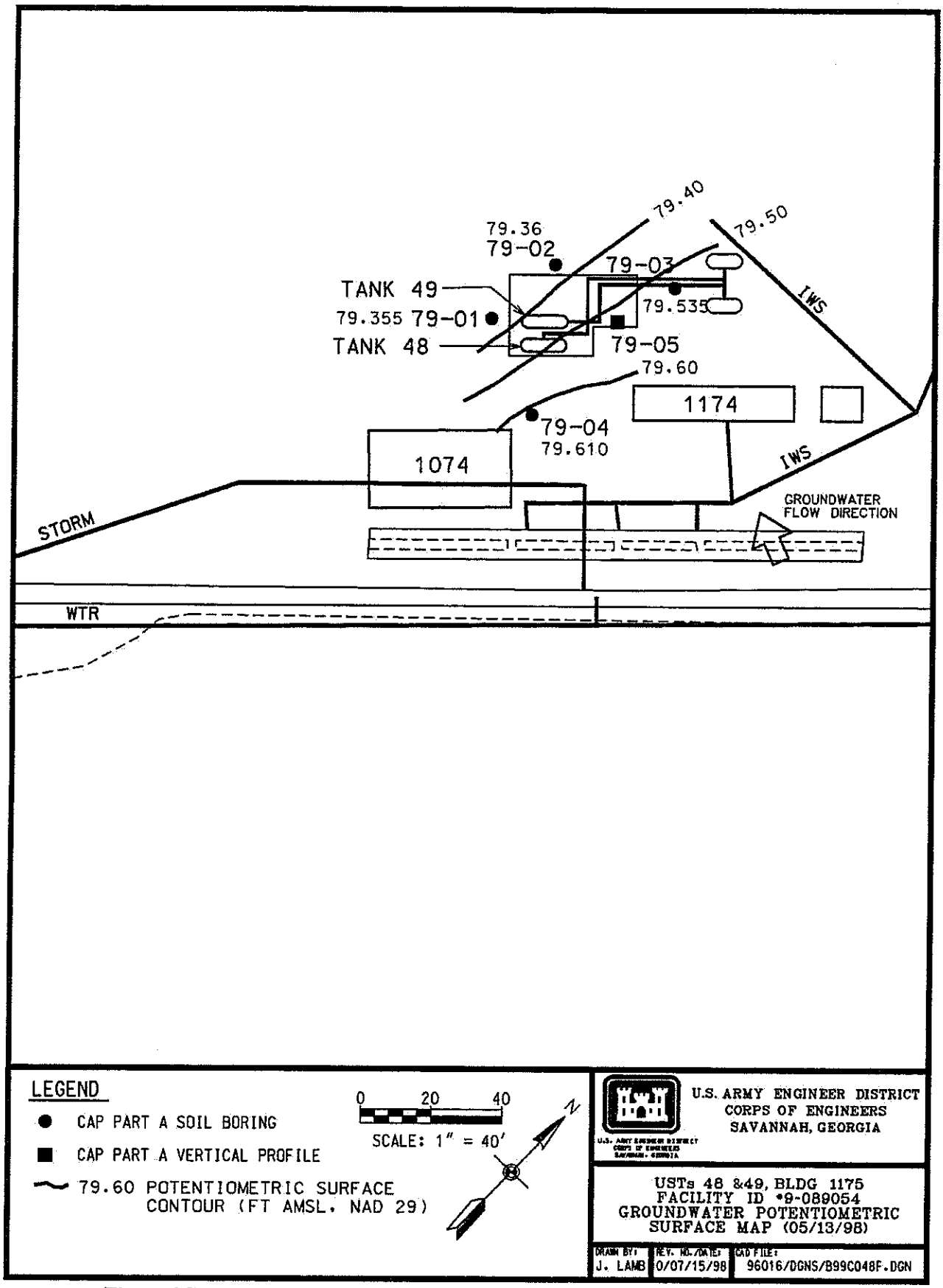
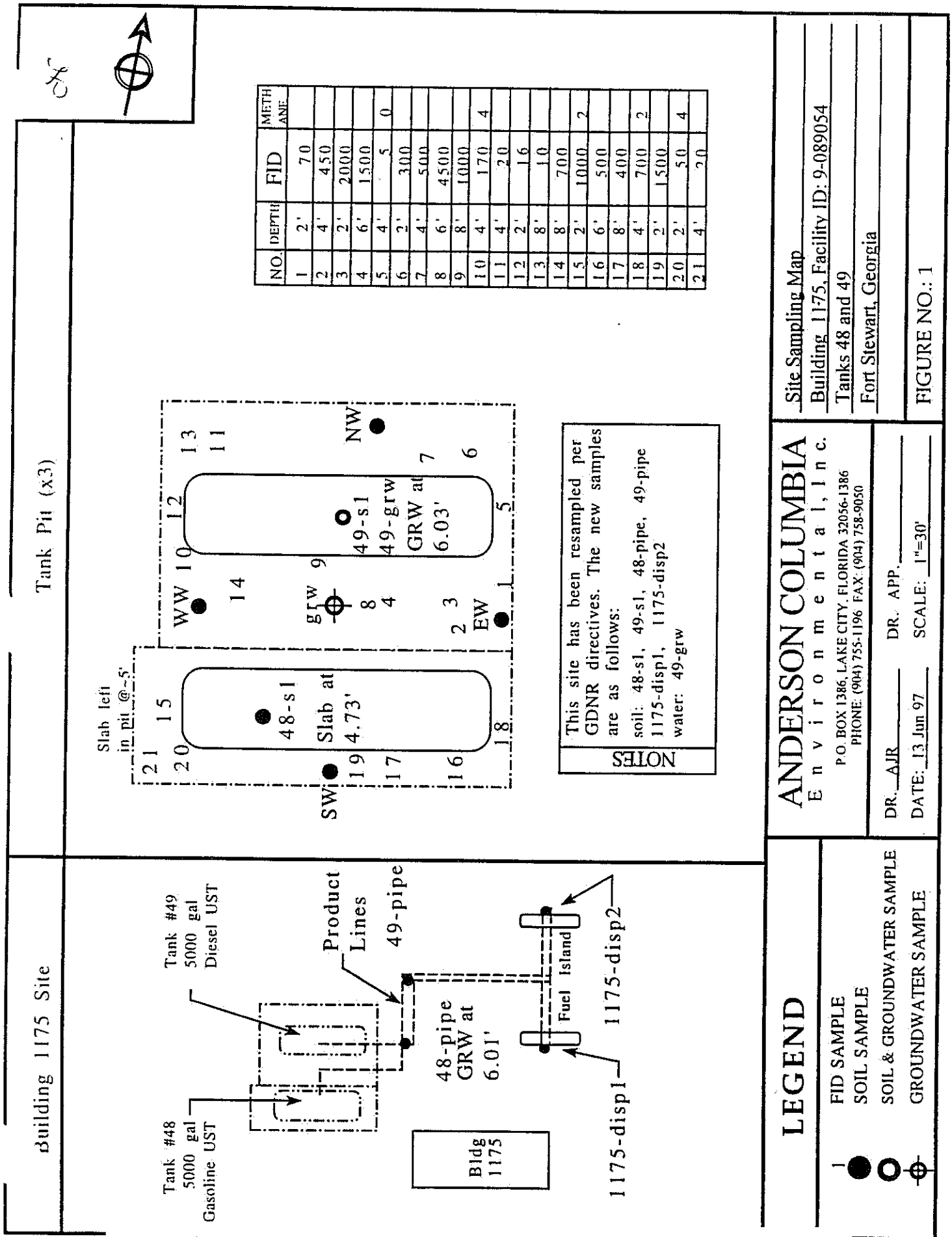


Figure 6. Potentiometric Surface Map of the USTS 48 & 49, Building 1175 Site



NO.	DEPTH	FID	METHANE
1	2'	70	
2	4'	450	
3	2'	2000	
4	6'	1500	
5	4'	5	0
6	2'	300	
7	4'	500	
8	6'	4500	
9	8'	1000	
10	4'	170	4
11	4'	20	
12	2'	16	
13	8'	10	
14	8'	700	
15	2'	1000	2
16	6'	500	
17	8'	400	
18	4'	700	2
19	2'	1500	
20	2'	50	4
21	4'	20	

Figure 7. UST System Closure Sampling Locations at the USTS 48 & 49, Building 1175 Site

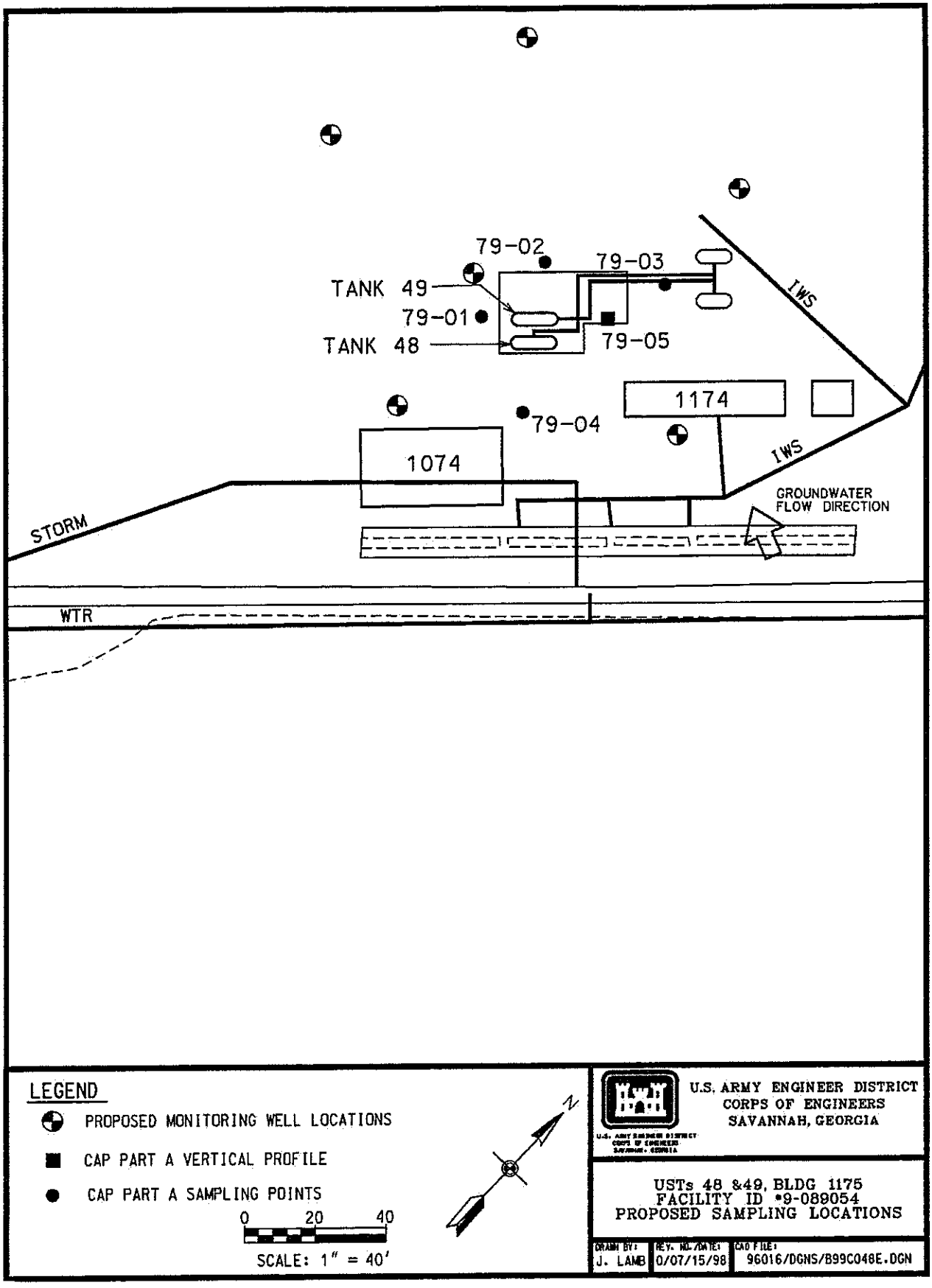


Figure 8. Proposed Additional Boring/Monitoring Well Locations

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

Figure 9. Tax Map

APPENDIX II

REPORT TABLES

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TABLE 1: FREE PRODUCT REMOVAL

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

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

NOTE:
AMSL Above mean sea level.

TABLE 2a: SOIL ANALYTICAL RESULTS
(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-DRO (mg/kg)	TPH-GRO (mg/kg)
79-01	790111	0.0 - 2.00	05/12/98	0.0043 U	0.0043 U	0.0043 U	0.13 U	0.1429	15.4 J	1.09 U
79-01	790121	2.0 -3.6	05/12/98	0.0022 U	0.007 =	0.0022 U	0.0065 U	0.0179	1.6 U	1.09 U
79-02	790211	2.0 - 3.3	05/12/98	0.0022 U	0.0022 U	0.0022 U	0.0066 U	0.0132	0.52 U	1.1 U
79-02	790221	0.0 -2.0	05/12/98	0.0022 U	0.0103 =	0.0022 U	0.0067 U	0.0214	0.45 U	1.11 U
79-03	790321	0.2 -2.9	05/12/98	0.0022 U	0.0022 U	0.0022 U	0.0064 U	0.013	0.37 UJ	1.08 U
79-04	790411	0.0 - 2.0	05/12/98	0.0022 U	0.0102 =	0.0022 U	0.0066 U	0.0212	7 =	0.0916 J
79-04	790421	2.0 -2.9	05/12/98	0.0044 U	0.0044 U	0.0044 U	0.0133 U	0.0265	0.3 U	1.11 U
79-05	790511	2.0 - 4.0	05/12/98	0.0044 U	0.0044 U	0.0044 U	0.0132 U	0.0264	0.86 U	1.1 U
79-05	790521	4.0 -6.0	05/12/98	0.0026 U	0.0046 =	0.0024 J	0.0077 J	0.173	8.6 =	0.116 J
79-05	790531	10.0 - 12.0	05/12/98	0.0026 U	0.005 =	0.0026 U	0.0079 U	0.0181	0.71 U	0.0644 J
79-05	790541	16.0 - 18.0	05/12/98	0.0026 U	0.0036 =	0.0026 U	0.0079 U	0.0167	1.6 U	0.0766 J
79-05	790551	24.0 - 26.0	05/12/98	0.0049 U	0.0098 =	0.0049 U	0.0147 U	0.0343	1.4 R	1.23 U
79-05	790561	30.0 -32.0	05/12/98	0.0033 U	0.0033 U	0.0033 U	0.0098 U	0.0197	0.6 U	1.32 U
79-05	790571	32.0 -34.0	05/12/98	0.0047 U	0.0047 U	0.0047 U	0.0141 U	0.0282	1.3 R	1.18 U
Applicable Standards[1]				0.008	6.000	10	700	NRC	NRC	NRC

NOTES:

Field work was conducted prior to the new CAP-A guidance published in May 1998, thus the new 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

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

TABLE 2b: SOIL ANALYTICAL RESULTS
(POLYNUCLEAR AROMATIC HYDROCARBONS)

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)												Total PAHs (mg/kg)
				acenaphthylene	fluorene	phenanthrene	anthracene	fluoranthene	pyrene	benzo (a) anthracene	chrysene	benzo (b) fluoranthene	benzo (a) pyrene	indeno (1,2,3-cd) pyrene	benzo (g,h,i) perylene	
79-01	790111	0.0 - 2.0	05/12/98					0.28 J	0.48 =		0.552 J	0.758 =	0.438 =	0.297 J	0.282 J	3.087
79-01	790121	2.0 - 3.6	05/12/98						0.195 J		0.252 J	0.432 =	0.239 J			1.118
79-02	790211	2.0 - 3.3	05/12/98								0.207 J	0.257 J				0.464 J
79-02	790221	0.0 - 2.0	05/12/98									0.279 J				0.279 J
79-03	790321	0.2 - 2.9	05/12/98									0.302 J	0.181 J			0.483 J
79-04	790411	0.0 - 2.0	05/12/98					0.823 =	1.48 =	1.0 =	1.4 J	1.88 =	1.24 =	0.797 =	0.891 =	9.511 =
73-04	790421	2.0 - 2.9	05/12/98													ND
79-05	790511	2.0 - 4.0	05/12/98						0.234 J	0.187 J	0.296 J	0.477 =	0.291 J			1.485
79-05	790521	4.0 - 6.0	05/12/98					0.323 J	0.569 J	0.374 J	0.505 J	0.635 =	0.425 J	0.26 J	0.263 J	3.354
79-05	790531	10.0 - 12.0	05/12/98													ND
79-05	790541	16.0 - 18.0	05/12/98	0.061 J	0.111 J	1.87 =	0.185 J	1.19 =	1.57 =	0.485 =	0.66 =	0.41 J	0.337 J	0.195 J	0.19 J	7.2644
79-05	790551	24.0 -26.0	05/12/98			0.278 J		0.341 J	0.498 =		0.234 J					1.351
79-05	790561	30.0 - 32.0	05/12/98													ND
79-05	790571	32.0 - 34.0	05/12/98													ND
Applicable Standards[1]				NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC

NOTES:

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

[1] Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)

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

BGS Below ground surface

N/A Not applicable

PAH Polynuclear aromatic hydrocarbon

Laboratory Qualifiers

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

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

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

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl - benzene (µg/l)	Xylenes (µg/l)	Total BTEX (µg/l)
79-01	790112	0.0 – 8.0	05/12/98	940 =	15600 =	3980 =	23800 J	44320
79-02	790212	0.0 – 8.0	05/12/98	188 =	196 =	197 =	1140 =	1721
79-03	790312	0.0 – 8.0	05/12/98	5.7 =	39.5 =	10.3 =	49.2 =	104.7
79-04	790412	0.0 – 8.0	05/12/98	7.6 =	37.9 =	8.1 =	27.7 =	81.3
Applicable Standards[1]				5	700	1000	10000	NRC

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

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (µg/l)				Total PAH (µg/l)
				naphthalene	fluoranthene	pyrene	benzo (b) fluoranthene	
79-01	790112	0.0 – 8.0	05/12/98	616.0 =	1.0 J	1.9 J		618.9
79-02	790212	0.0 – 8.0	05/12/98	46.0 =				46
79-03	790312	0.0 – 8.0	05/12/98					ND
79-04	790412	0.0 – 8.0	05/12/98		1.0 J	2.2 J	3.1 J	6.3
Applicable Standards[1]				NRC	NRC	NRC	NRC	NRC

NOTE:

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

1 U.S. Environmental Protection Agency maximum contaminant level
BTEX Benzene, toluene, ethylbenzene, and xylene
BGS Below ground surface
N/A Not applicable
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 4: GROUNDWATER ELEVATIONS

Well Number	Date Measured	Ground Surface Elev. (ft MSL)	Top of Casing Elev. (ft MSL)	Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Specific Gravity Adjustment	Corrected Groundwater Elev. (ft MSL)
79-01	05/13/98	83.99	86.84	0.0 - 8.0	N/A	6.45	N/A	N/A	79.36
79-02	05/13/98	83.95	86.37	0.0 - 8.0	N/A	6.87	N/A	N/A	79.36
79-03	05/13/98	83.87	86.94	0.0 - 10.0	N/A	6.15	N/A	N/A	79.54
79-04	05/13/98	83.90	86.79	0.0 - 8.0	N/A	6.15	N/A	N/A	79.61

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
N/A	Not applicable

TABLE 5a: UST SYSTEM CLOSURES[1] - SOIL ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Sample Location	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)	TPH DRO (mg/kg)	TPH GRO (mg/kg)
48-49-N.W.	N/A	03/21/95	0.00103 U	0.00186 =	0.00103 U	5.88 =	5.8839	61.4 =	N/A	N/A
48-49-E.W.	N/A	03/21/95	0.00102 U	0.0025 =	0.00102 U	4.09 =	4.0945	51.1 =	N/A	N/A
48-49-S.W.	N/A	03/21/95	0.255 U	2.75 =	3.98 =	46.2 =	53.185	259 =	N/A	N/A
48-49-W.W.	N/A	03/21/95	0.252 U	2.49 =	2.76 =	34.3 =	39.802	327 =	N/A	N/A
48-S1	N/A	06/11/97	0.0024 U	0.0024 U	0.0024 U	0.0072 U	ND	N/A	N/A	0.6 U
48-S2-4.75	N/A	06/12/97	0.388 =	0.51 =	0.837 =	4.61 =	6.345	N/A	N/A	109 =
49-S1	N/A	06/11/97	0.0058 U	0.0058 U	0.0058 U	0.017 U	ND	N/A	12 U	N/A
48-PIPE	N/A	06/11/97	0.0012 U	0.0012 U	0.0012 U	0.0037 U	ND	N/A	N/A	0.12 U
49-PIPE	N/A	06/11/97	0.0011 U	0.0011 U	0.0011 U	0.0033 U	ND	N/A	11 U	0.11 U
1175-DISP1	N/A	06/11/97	0.0022 U	0.0022 U	0.0022 U	0.0067 U	ND	N/A	11 U	0.56 U
1175-DISP2	N/A	06/11/97	0.0022 U	0.0022 U	0.0022 U	0.0067 U	ND	N/A	11 U	0.56 U
Applicable Standards[2]			0.008	6	10	700	NRC	NRC	NRC	NRC

NOTE:

[1] Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996)
[2] Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)
[3] Not applicable; the health-based threshold level is exceeded only if free product exists
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 5b: UST SYSTEM CLOSURE[1] - SOIL ANALYTICAL RESULTS
(POLYNUCLEAR AROMATIC HYDROCARBONS)

Sample Location	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)							
			Napthalene	2-Methylnaphthalene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene
48-49-N.W.	N/A	03/21/95					0.83 =	0.83 =	1.2 =	1.77 =
48-49-E.W.	N/A	03/21/95								
48-49-S.W.	N/A	03/21/95	8.98 =				3.45 =	3.45 =	5.98 =	6.5 =
48-49-W.W	N/A	03/21/95	16 =		2.19 =	2.29 =	4.12 =	4.12 =	7.59 =	7.41 =
48-S1	N/A	06/11/97								
48-S2-4.75	N/A	06/12/97	1.21 =	2.62 =						
49-S1	N/A	06/11/97								
48-PIPE	N/A	06/11/97								
49-PIPE	N/A	06/11/97					1.07 =		0.87 =	1.16 =
1175-DISP1	N/A	06/11/97								
1175-DISP2	N/A	06/12/97								
Applicable Standards[2]			NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC

Sample Location	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)								Total PAHs (mg/kg)
			Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Indo (1,2,3-cd) pyrene	Dibenz (a,h) Anthracene	Benzo (g,h,i) perylene	
48-49-N.W.	N/A	03/21/95	1.68 =	1.68 =	3.28 =	3.28 =	2.05 =	1.33 =	1.33 =	2.88 =	22.13 =
48-49-E.W.	N/A	03/21/95									ND
48-49-S.W.	N/A	03/21/95	2.85 =	2.85 =	2.45 =	2.45 =	6.55 =			2.22 =	47.73 =
48-49-W.W	N/A	03/21/95	3.83 =	3.83 =	3.36 =	3.36 =	8.3 =			2.77 =	69.17 =
48-S1	N/A	06/11/97									ND
48-S2-4.75	N/A	06/12/97									1.21 =
49-S1	N/A	06/11/97									ND
48-PIPE	N/A	06/11/97									ND
49-PIPE	N/A	06/11/97	0.41 =	0.48 =	0.41 =		0.37 =				4.77 =
1175-DISP1	N/A	06/11/97									ND
1175-DISP2	N/A	06/12/97									ND
Applicable Standards[2]			NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC	NRC

Same notes and laboratory qualifiers as Table 5a

TABLE 6a: UST SYSTEM CLOSURE[1] - GROUNDWATER ANALYTICAL RESULTS
(VOLATILE ORGANIC COMPOUNDS)

Sample Location	Depth (ft BGS)	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethyl - benzene (mg/L)	Xylenes (mg/L)	Total BTEX (mg/L)
48-49-G.W	N/A	03/21/95	0.1 U	0.46 =	0.23 =	1.205 =	1.995
49-GRW	N/A	06/12/97	0.748 =	2.94 =	2.6 =	15 =	21.288
Applicable Standards[2]			5	700	1000	10000	NRC

TABLE 6b: UST SYSTEM CLOSURE[1] - GROUNDWATER ANALYTICAL RESULTS
(POLYNUCLEAR ANALYTICAL RESULTS)

Sample Location	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (µg/L)				Total PAHs (µg/L)
			Napthalene				
48-49-G.W.	N/A	03/21/95	3.13 =				3.13
49-GRW	N/A	06/12/97					NR
Applicable Standards[2]			NRC				NRC

NOTE:

1	Underground storage tank system closure performed by Anderson Columbia Environmental, Inc. (1996)
2	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
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

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 Floridan) 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.

Typically, surface water run-off from the UST site moves over the existing concrete and asphalt 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 USTS 48 & 49 SITE

A field potential receptor survey was conducted for the USTS 48 & 49 site in May 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 USTS 48 & 49

The USTS 48 & 49 site is located approximately 1110 feet southwest (side gradient) of Well #2. Therefore, the USTS 48 & 49 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 7500 feet northwest (downgradient) of the USTS 48 & 49 site.

2.2 Surface Water Bodies Near the USTS 48 & 49 Site

At the closest point, an unnamed tributary that flows into Mill Creek is located approximately 9000 feet southwest of the USTs 48 & 49 site. In the direction of groundwater flow, this tributary is located approximately 3500 feet northwest of the USTS 48 & 49 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 USTs 48 & 49 Site

An industrial wastewater sewer line is located 40 feet to the northeast of the site. The depth of this line is estimated to be approximately 4 to 6 feet BGS.

APPENDIX IV

SOIL BORING LOGS

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HTRW DRILLING LOG

HOLE NUMBER 79-01

PROJECT: Fort Stewart USTs | INSPECTOR K. Ledbetter | 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)
	0	CONCRETE				
	1–2	sandy SILT (ML), 5% fine grained sand, soft, dry, dark brown (10YR 3/3) with bands of silty SAND (SM), some fine grained, some medium grained, subrounded, dry, soft, very Pale brown (10YR 7/3)	126 ppm		Soil Sample 790111	
	3		21.7 ppm		Soil Sample 790121	▽ WET BELOW = 3.6 FT BGS
	4–10					Pushed to 8.0 ft BGS to set temporary piezometer Collected groundwater sample 790112 from temporary piezometer screened at .0 to 8.0 ft BGS

HTRW DRILLING LOG

HOLE NUMBER 79-02

PROJECT: Fort Stewart USTs | INSPECTOR K. LEDBETTER | 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)
		CONCRETE				
	1	sandy SILT (ML), 10% sand, fine grained, firm to soft, dry, dark brown (10YR3/3)	21.4 ppm		Soil Sample 790221	
	2					
	3	silty SAND (SM), 10% silt, very fine to fine grained, dry, very pale brown (10YR8/2) grading to SILT (ML), soft, wet, black (10YR2/1)	0.0 ppm		Soil Sample 790211	▽ = WET BELOW 3.3 FT BGS
	4					
	5					Pushed to 8.0 ft BGS to set temporary piezometer Collected groundwater sample 790212 from temporary piezometer screened at .0 ft to 8.0 ft BGS
	6					
	7					
	8					
	9					
	10					

HTRW DRILLING LOG

HOLE NUMBER 79-03

PROJECT: Fort Stewart USTs | INSPECTOR J. K. Ledbetter | 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)
	0–1	Concrete			Soil Sample 790321	
	1–2	Sandy SILT, 10% fine grained soft, dry, brown (10YR 5/3)	0ppm			
	2–3	SAND, fine grained, soft, dry, yellow (10YR 7/6)				
	3–4	grading to SILT, firm, dry, black (10YR 2/1)	0ppm			▼ Wet below 2.9 FT BGS
	4–8	No Recovery				
	8–10	Shelby Tube 8-10 FT		Soil Sample 790331		End of drilling 10.0 FT BGS Set piezometer

HTRW DRILLING LOG

HOLE NUMBER 79-04

PROJECT: Fort Stewart USTs | INSPECTOR K. LEDBETTER | 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)
	0	CONCRETE				
	1	Sandy SILT (ML), 10% fine grained sand, soft, dry, brown (10YR 4/3) mottled with very pale brown (10YR 7/3)			Soil Sample 790411	
	2	Silty SAND (SM), 10% silt fine to very fine grained, dry soft, very pale brown (10YR 8/2)				
	3	SILT (ML) Firm, dry, black (10 YR 2/1)			Soil Sample 790421	▽ WET BELOW 2.9 FT BGS
	4					Pushed to 8.0 ft BGS to set temporary piezometer
	5					Collected groundwater sample 790412 from temporary piezometer screened at 0.0 to 8.0 ft BGS
	6					
	7					
	8					
	9					
	10					

HTRW DRILLING LOG

HOLE NUMBER 79-05

PROJECT: Fort Stewart USTs | INSPECTOR B. Moeller | SHEET 1 OF 4

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	1	Concrete				Ran 4.0, Rec. 4.0
	2	SAND, fine to medium grained, dry, (2.5YR 2.5/2) very dusky red with mottles	0ppm			
	3		0ppm		Soil Sample 790511	
	4					▼ Wet below = 4.0FT BGS
	5	Same as above, wet	0.4ppm		Soil Sample 790521	Ran 4.0, Rec 4.0
	6					
	7		0ppm			
	8					
	9	No Recovery	N/A			Ran 4.0 Rec. 2.0
	10					

HTRW DRILLING LOG

HOLE NUMBER 79-05

PROJECT: Fort Stewart USTs | INSPECTOR B. Moeller | SHEET 2 OF 4

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	11	SAND, medium to very coarse grained, wet, (5YR3/2) dark reddish brown	0ppm		Soil Sample 79053	
	12					
	13	No Recovery	N/A			Ran 4.0, Rec 0.4
	14					
	15		N/A			
	16	SAND, fine to medium grained, with silt, wet, (5YR4/4) reddish brown				
	17		20.2ppm		Soil Sample 79054	Ran 4.0, Rec. 2.0
	18					
	19		N/A			Heaving Sands - Augered to 24 FT BGS
	20					

HTRW DRILLING LOG

HOLE NUMBER 79-05

PROJECT: Fort Stewart USTs | INSPECTOR B. Moeller | SHEET 3 OF 4

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	21	No Recovery				
	22		N/A			
	23					
	24					
	25	Sandy CLAY, wet, (gley 1 6/1) greenish gray	Oppm		Soil Sample 79051	Ran 2.0, Rec. 2.0
	26					
	27	SAND				Augered to 30FT BGS due to heaving sands
	28		N/A			
	29					
	30					

HTRW DRILLING LOG

HOLE NUMBER 79-05

PROJECT: Fort Stewart USTs | INSPECTOR B. Moeller | SHEET 4 OF 4

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	31		Oppm		Soil Sample 79056	Ran 2.0 Rec. 2.0
	32					
	33		Oppm		Soil Sample 79057	Ran 2.0 Rec. 2.0
	34	SAND, coarse grained with some silt, wet, (gley1 6/1) greenish gray				End of drilling at 34.0 FT BGS
	35					
	36					
	37					
	38					
	39					
	40					

APPENDIX V

SOIL LABORATORY REPORTS

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TABLE V-A. SUMMARY OF SOIL ANALYTICAL RESULTS

Station:	Georgia UST	79-01	79-01	79-02	79-02	79-03	79-04	79-04
Sample ID:	Corrective	790111	790121	790211	790221	790321	790411	790421
Sample Interval:	Action	0.0' - 2.0'	2.0' -3.6'	2.0' - 3.3'	0.0' -2.0'	0.2' -2.9'	0.0' - 2.0'	0.0' - 2.0'
Collection Date:	Levels for Soil[1]	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98
Units:	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
VOLATILE ORGANIC COMPOUNDS								
Benzene	0.008	0.0043 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0044 U
Toluene	6	0.0043 U	0.0077 =	0.0022 U	0.0103 =	0.0022 U	0.0102 =	0.0044 U
Ethylbenzene	10	0.0043 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0044 U
Xylenes, Total	700	0.013 U	0.0065 U	0.0066 U	0.0067 U	0.0064 U	0.0066 U	0.0133 U
POLYNUCLEAR AROMATIC HYDROCARBONS								
2-Chloronaphthalene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Acenaphthene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Acenaphthylene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Anthracene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Benzo(a)anthracene	NRC	0.361 J	0.362 U	0.366 U	0.37 U	0.358 U	1.0 =	0.368 U
Benzo(a)pyrene	NRC	0.438 =	0.239 J	0.366 U	0.37 U	0.181 J	12.4 =	0.368 U
Benzo(b)fluoranthene	NRC	0.758 =	0.432 =	0.257 J	0.37 J	0.302 J	1.88 =	0.368 U
Benzo(g,h,i)perylene	NRC	0.282 J	0.362 U	0.366 U	0.37 U	0.358 U	0.891 =	0.368 U
Benzo(k)fluoranthene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Chrysene	NRC	0.552 J	0.362 J	0.207 J	0.37 U	0.358 U	1.4 J	0.368 U
Dibenzo(a,h)anthracene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Fluoranthene	NRC	0.28 J	0.362 U	0.366 U	0.37 U	0.358 U	0.823 =	0.368 U
Fluorene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Indeno(1,2,3-cd)pyrene	NRC	0.297 J	0.362 U	0.366 U	0.37 U	0.358 U	0.797 =	0.368 U
Naphthalene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Phenanthrene	NRC	0.361 U	0.362 U	0.366 U	0.37 U	0.358 U	0.35 U	0.368 U
Pyrene	NRC	0.48 =	0.195 J	0.366 U	0.37 U	0.358 U	1.48 =	0.368 U
OTHER ANALYTES								
Lead	--		3.7 =		4.5 =	1.9 =		3.3 =
TPH-Diesel Range Organics	--	1504 J	1.6 U	0.52 U	0.45 U	0.37 UJ	7 =	0.3 U
TPH-Gasoline Range Organics	--	1.09 U	1.09 U	1.1 U	1.11 U	1.08 U	0.0916 J	1.11 U

NOTE:

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

1 Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)

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

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

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.

TABLE V-A. Continued

Station:	Georgia UST	79-05	79-05	79-05	79-05	79-05	79-05	79-05
Sample ID:	Corrective	790511	790521	790531	790541	790551	790561	790571
Sample Interval:	Action	2.0' - 4.0'	4.0' -6.0'	10.0' - 12.0'	16.0' - 18.0'	24.0'- 26.0'	30.0' -32.0'	32.0' -34.0'
Collection Date:	Levels for Soil[1]	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98	12-May-98
Units:	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
VOLATILE ORGANIC COMPOUNDS								
Benzene	0.008	0.0044 U	0.0026 U	0.0026 U	0.0026 U	0.0049 U	0.0033 U	0.0047 U
Toluene	6	0.0044 U	0.0046 =	0.005 =	0.0036 =	0.0098 =	0.0033 U	0.0047 U
Ethylbenzene	10	0.0044 U	0.0024 J	0.0026 U	0.0026 U	0.0049 U	0.0033 U	0.0047 U
Xylenes, Total	700	0.0132 U	0.0077 J	0.0079 U	0.0079 U	0.0147 U	0.0098 U	0.0141 U
POLYNUCLEAR AROMATIC HYDROCARBONS								
2-Chloronaphthalene	NRC	0.36 U	0.434 U	0.397 U	0.434 U	0.409 U	0.427 U	0.388 U
Acenaphthene	NRC	0.36 U	0.434 U	0.397 U	0.434 U	0.409 U	0.427 U	0.388 U
Acenaphthylene	NRC	0.36 U	0.434 U	0.397 U	0.0614 J	0.409 U	0.427 U	0.388 U
Anthracene	NRC	0.36 U	0.434 U	0.397 U	0.185 J	0.409 U	0.427 U	0.388 U
Benzo(a)anthracene	NRC	0.187 J	0.374 J	0.397 U	0.485 =	0.409 U	0.427 U	0.388 U
Benzo(a)pyrene	NRC	0.291 J	0.425 J	0.397 U	0.337 J	0.409 U	0.427 U	0.388 U
Benzo(b)fluoranthene	NRC	0.477 =	0.635 =	0.397 U	0.41 J	0.409 U	0.427 U	0.388 U
Benzo(g,h,i)perylene	NRC	0.36 U	0.263 J	0.397 U	0.19 J	0.409 U	0.427 U	0.388 U
Benzo(k)fluoranthene	NRC	0.36 U	0.434 U	0.397 U	0.434 U	0.409 U	0.427 U	0.388 U
Chrysene	NRC	0.36 J	0.505 J	0.397 U	0.66 =	0.234 J	0.427 U	0.388 U
Dibenzo(a,h)anthracene	NRC	0.36 U	0.434 U	0.397 U	0.434 U	0.409 U	0.427 U	0.388 U
Fluoranthene	NRC	0.36 U	0.323 J	0.397 U	1.19 =	0.341 J	0.427 U	0.388 U
Fluorene	NRC	0.36 U	0.434 U	0.397 U	0.111 J	0.409 U	0.427 U	0.388 U
Indeno(1,2,3-cd)pyrene	NRC	0.36 U	0.26 J	0.397 U	0.195 J	0.409 U	0.427 U	0.388 U
Naphthalene	NRC	0.36 U	0.434 U	0.397 U	0.434 U	0.409 U	0.427 U	0.388 U
Phenanthrene	NRC	0.36 U	0.434 U	0.397 U	1.87 =	0.278 J	0.427 U	0.388 U
Pyrene	NRC	0.234 J	0.569 J	0.397 U	1.57 =	0.498 =	0.427 U	0.388 U
OTHER ANALYTES								
Lead	NRC	3.5 =						
TPH-Diesel Range Organics	NRC	0.86 U	8.6 =	0.71 U	1.6 U	1.4 R	0.6 U	1.3 R
TPH-Gasoline Range Organics	NRC	1.1 U	0.116 J	0.0644 J	0.0766 J	1.23 U	1.32 U	1.18 U

NOTE:

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

1 Georgia Department of Natural Resources Applicable Soil Threshold Levels (Table A, Column 2)

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

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

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.

VOLATILE ORGANICS 1A ANALYSIS DATA SHEET

EPA SAMPLE NO.

790111

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-14

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J5017

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 8 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 2.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	4.3	U
108-88-3	Toluene	4.3	U
100-41-4	Ethylbenzene	4.3	U
1330-20-7	Xylenes (total)	13.0	U

Qual - U

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FORM I VOA

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790111

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-14

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 4V311

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 8 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/27/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	naphthalene	361	U
91-58-7	2-chloronaphthalene	361	U
208-96-8	acenaphthylene	361	U
83-32-9	acenaphthene	361	U
86-73-7	fluorene	361	U
85-01-8	phenanthrene	361	U
120-12-7	anthracene	361	U
206-44-0	fluoranthene	280	J
129-00-0	pyrene	480	
56-55-3	benzo(a)anthracene	351	J
218-01-9	chrysene	552	
205-99-2	benzo(b)fluoranthene	758	
207-08-9	benzo(k)fluoranthene	361	U
50-32-8	benzo(a)pyrene	438	
193-39-5	indeno(1,2,3-cd)pyrene	297	J
53-70-3	dibenz(a,h)anthracene	361	U
191-24-2	benzo(g,h,i)perylene	282	J

Qual

U

J = J

J - C02

J = J = J

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7/7/98

FORM I SV-1

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790111

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: PS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-14

Sample wt/vol: 30.0 (g/mL) G Lab File ID: SD5005

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 8 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

Injection Volume: 1.0(uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
	Diesel Range Organics	15.4	B

Qual-
J-P03

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790111

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-14

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J3049

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 8 Date Analyzed: 05/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	Gasoline Range Organics	1090	U

Qual.
U

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FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790121

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-03

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J5033

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 8 Date Analyzed: 05/23/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	Benzene	2.2	U	4
108-88-3	Toluene	7.7		=
100-41-4	Ethylbenzene	2.2	U	4
1330-20-7	Xylenes (total)	6.5	U	u

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790121

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-03

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 1U411

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 8 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/21/98

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/KG	Q
91-20-3	naphthalene	362	U
91-58-7	2-chloronaphthalene	362	U
208-96-8	acenaphthylene	362	U
83-32-9	acenaphthene	362	U
86-73-7	fluorene	362	U
85-01-8	phenanthrene	362	U
120-12-7	anthracene	362	U
206-44-0	fluoranthene	362	U
129-00-0	pyrene	362	U
56-55-3	benzo(a)anthracene	195	J
218-01-9	chrysene	362	U
205-99-2	benzo(b)fluoranthene	252	J
207-08-9	benzo(k)fluoranthene	432	
50-32-8	benzo(a)pyrene	362	U
193-39-5	indeno(1,2,3-cd)pyrene	239	J
53-70-3	dibenz(a,h)anthracene	362	U
191-24-2	benzo(g,h,i)perylene	362	U
		362	U

FORM I SV-1

OLM03.0

FORM 1 Science Applications13-MAY-1998 SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790121

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-03

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 5C50031

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 8 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/23/98

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) MG/KG	Q	
	----------Diesel Range Organics_____	1.6	JB	u F01, F02

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790121

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AK109

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 8 Date Analyzed: 05/25/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	----------Gasoline Range Organics	1090	U

u

FORM I VOA

SDG No.: FS4023S

Method Type: Total Metals

Sample ID: 9805399-03

Client ID: 790121

Contract: SAIC00598 Lab Code: GEL Case No.: SAS No.:

Matrix: SOIL Date Received: 5/13/98 Level: LOW

% Solids: 92.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	3.7	mg/kg			P	0.10	TJA61 Trace ICPAES	980519-1

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790211

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-04

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4055

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 9 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	2.2	U
108-88-3	Toluene	2.2	U
100-41-4	Ethylbenzene	2.2	U
1330-20-7	Xylenes (total)	6.6	U

Qual

U ↓

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FORM I VOA

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790211

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-04

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 4U210

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 9 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/19/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	naphthalene	366	U
91-58-7	2-chloronaphthalene	366	U
208-96-8	acenaphthylene	366	U
83-32-9	acenaphthene	366	U
86-73-7	fluorene	366	U
85-01-8	phenanthrene	366	U
120-12-7	anthracene	366	U
206-44-0	fluoranthene	366	U
129-00-0	pyrene	366	U
56-55-3	benzo(a)anthracene	366	U
218-01-9	chrysene	366	U
205-99-2	benzo(b)fluoranthene	207	J
207-08-9	benzo(k)fluoranthene	257	J
50-32-8	benzo(a)pyrene	366	U
193-39-5	indeno(1,2,3-cd)pyrene	366	U
53-70-3	dibenz(a,h)anthracene	366	U
191-24-2	benzo(g,h,i)perylene	366	U

Qual.

U

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FORM I SV-1

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790211

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-04

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 5D40014

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 9 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

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) MG/KG	Q
	Diesel Range Organics	0.52	JB

Qual.
U-F01, F06

DATA VALIDATION COPY

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790211

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J4011

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 9 Date Analyzed: 05/22/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	Gasoline Range Organics	1100	U

Qual.
U

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7/22/98

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790221

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-02

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J5032

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 10 Date Analyzed: 05/23/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	Benzene	2.2	U	U = U U
108-88-3	Toluene	10.3		
100-41-4	Ethylbenzene	2.2	U	
1330-20-7	Xylenes (total)	6.7	U	

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790221

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 1U410

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 10 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/21/98

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/KG	Q
91-20-3	naphthalene	370	U
91-58-7	2-chloronaphthalene	370	U
208-96-8	acenaphthylene	370	U
83-32-9	acenaphthene	370	U
86-73-7	fluorene	370	U
85-01-8	phenanthrene	370	U
120-12-7	anthracene	370	U
206-44-0	fluoranthene	370	U
129-00-0	pyrene	370	U
56-55-3	benzo(a)anthracene	370	U
218-01-9	chrysene	370	U
205-99-2	benzo(b)fluoranthene	370	U
207-08-9	benzo(k)fluoranthene	279	J
50-32-8	benzo(a)pyrene	370	U
193-39-5	indeno(1,2,3-cd)pyrene	370	U
53-70-3	dibenz(a,h)anthracene	370	U
191-24-2	benzo(g,h,i)perylene	370	U

U

FU

FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790221

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-02

Sample wt/vol: 30.2 (g/mL) G Lab File ID: 5C50030

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 10 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/23/98

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) MG/KG	Q	
	----------Diesel Range Organics	0.45	JB	u F01, F0L

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790221

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AK108

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 10 Date Analyzed: 05/25/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
	Gasoline Range Organics	1110	U	u

FORM I VOA

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS4023S

Method Type: Total Metals

Sample ID: 9805399-02		**Client ID:** 790221	
Contract: SAIC00598	**Lab Code:** GEL	**Case No.:**	**SAS No.:**
Matrix: SOIL	**Date Received:** 5/13/98	**Level:** LOW	
% Solids: 90.00			

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	4.5	mg/kg			P	0.10	TJA61 Trace ICPAES	980519-1

Color Before: **Clarity Before:** **Texture:**

Color After: **Clarity After:** **Artifacts:**

Comments: _____

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4022S

Matrix: (soil/water) SOIL Lab Sample ID: 9805398-17

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J5033

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 7 Date Analyzed: 05/23/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	2.2	U
108-88-3	Toluene	2.2	U
100-41-4	Ethylbenzene	2.2	U
1330-20-7	Xylenes (total)	6.4	U

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FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4022S

Matrix: (soil/water) SOIL Lab Sample ID: 9805398-17

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 1V411

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 7 decanted: (Y/N) N Date Extracted: 05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

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/KG	Q
91-20-3	naphthalene	358	U
91-58-7	2-chloronaphthalene	358	U
208-96-8	acenaphthylene	358	U
83-32-9	acenaphthene	358	U
86-73-7	fluorene	358	U
85-01-8	phenanthrene	358	U
120-12-7	anthracene	358	U
206-44-0	fluoranthene	358	U
129-00-0	pyrene	358	U
56-55-3	benzo(a)anthracene	358	U
218-01-9	chrysene	358	U
205-99-2	benzo(b)fluoranthene	358	U
207-08-9	benzo(k)fluoranthene	302	J
50-32-8	benzo(a)pyrene	358	U
193-39-5	indeno(1,2,3-cd)pyrene	181	J
53-70-3	dibenz(a,h)anthracene	358	U
191-24-2	benzo(g,h,i)perylene	358	U

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FORM I SV-1

OLM03.0

FORM 1 Science Applications 13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
COPY

790321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4022S

Matrix: (soil/water) SOIL Lab Sample ID: 9805398-17

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 5D20019

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 7 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

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) MG/KG	Q	
	----------Diesel Range Organics	0.37	JB	UJ F01, F06

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4022S

Matrix: (soil/water) SOIL Lab Sample ID: 9805398-17

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3K1014

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 7 Date Analyzed: 05/25/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	----------Gasoline Range Organics	1080	U

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FORM I VOA

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS4022S

Method Type: Total Metals

Sample ID: 9805398-17		**Client ID:** 790321	
Contract: SAIC00598	**Lab Code:** GEL	**Case No.:**	**SAS No.:**
Matrix: SOIL	**Date Received:** 5/13/98	**Level:** LOW	
% Solids: 93.00			

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	1.9	mg/kg		—	P	0.10	TJA61 Trace ICPAES	980520-1

Color Before: **Clarity Before:** **Texture:**

Color After: **Clarity After:** **Artifacts:**

Comments: _____

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-03

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4035

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 9 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
71-43-2	Benzene	2.2	U	U
108-88-3	Toluene	10.2		
100-41-4	Ethylbenzene	2.2	U	U
1330-20-7	Xylenes (total)	6.6	U	U

Rem 7/22/98

DATA VALIDATION COPY

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-03

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 4U209

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 6 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/19/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

DATA VALIDATION COPY

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

CAS NO.	COMPOUND		Q	Qual
91-20-3	naphthalene	350	U	U
91-58-7	2-chloronaphthalene	350	U	U
208-96-8	acenaphthylene	350	U	U
83-32-9	acenaphthene	350	U	U
86-73-7	fluorene	350	U	U
85-01-8	phenanthrene	350	U	U
120-12-7	anthracene	350	U	U
206-44-0	fluoranthene	823		=
129-00-0	pyrene	1480		=
56-55-3	benzo(a)anthracene	1000		=
218-01-9	chrysene	1400		=
205-99-2	benzo(b)fluoranthene	1880		J - e02
207-08-9	benzo(k)fluoranthene	350	U	U
50-32-8	benzo(a)pyrene	1240		=
193-39-5	indeno(1,2,3-cd)pyrene	797		=
53-70-3	dibenz(a,h)anthracene	350	U	U
191-24-2	benzo(g,h,i)perylene	891		=

BLW
7/22/98

FORM I SV-1

OLM03.0

FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-03

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 5D40037

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 6 decanted: (Y/N) N Date Extracted:05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/29/98

Injection Volume: 1.0(uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
	----------Diesel Range Organics	7.0	B

Qual - = FOF

DATA VALIDATION COPY

RLM 7/22/98

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J4010

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 6 Date Analyzed: 05/22/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
	----------Gasoline Range Organics	91.6	J	J

DATA VALIDATION COPY

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FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL

Lab Sample ID: 9805399-04

Sample wt/vol: 10.0 (g/mL) G

Lab File ID: 2J6014

Level: (low/med) LOW

Date Received: 05/13/98

% Moisture: not dec. 10

Date Analyzed: 05/23/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm)

Dilution Factor: 2.0

Soil Extract Volume: _____(ml)

Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	4.4	U
108-88-3	Toluene	4.4	U
100-41-4	Ethylbenzene	4.4	U
1330-20-7	Xylenes (total)	13.3	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-04

Sample wt/vol: 30.2 (g/mL) G Lab File ID: 1U412

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 10 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/21/98

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/KG	Q
91-20-3	naphthalene	368	U
91-58-7	2-chloronaphthalene	368	U
208-96-8	acenaphthylene	368	U
83-32-9	acenaphthene	368	U
86-73-7	fluorene	368	U
85-01-8	phenanthrene	368	U
120-12-7	anthracene	368	U
206-44-0	fluoranthene	368	U
129-00-0	pyrene	368	U
56-55-3	benzo(a)anthracene	368	U
218-01-9	chrysene	368	U
205-99-2	benzo(b)fluoranthene	368	U
207-08-9	benzo(k)fluoranthene	368	U
50-32-8	benzo(a)pyrene	368	U
193-39-5	indeno(1,2,3-cd)pyrene	368	U
53-70-3	dibenz(a,h)anthracene	368	U
191-24-2	benzo(g,h,i)perylene	368	U

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-04

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 5C50032

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 10 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/23/98

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) MG/KG	Q	
	----------Diesel Range Organics_____	0.30	JB	u FØ1, FØ6

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AK1010

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 10 Date Analyzed: 05/25/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	----------Gasoline Range Organics	1110	U

FORM I VOA

SDG No.: FS4023S

Method Type: Total Metals

Sample ID: 9805399-04

Client ID: 790421

Contract: SAIC00598 Lab Code: GEL Case No.: SAS No.:

Matrix: SOIL Date Received: 5/13/98 Level: LOW

% Solids: 90.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	3.3	mg/kg			P	0.10	TJA61 Trace ICPAES	980519-1

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790511

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-01

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J6013

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 9 Date Analyzed: 05/23/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 2.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	4.4	U
108-88-3	Toluene	4.4	U
100-41-4	Ethylbenzene	4.4	U
1330-20-7	Xylenes (total)	13.2	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790511

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-01

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 1V104

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 9 decanted: (Y/N) N Date Extracted: 05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/26/98

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/KG	Q
91-20-3	naphthalene	360	U
91-58-7	2-chloronaphthalene	360	U
208-96-8	acenaphthylene	360	U
83-32-9	acenaphthene	360	U
86-73-7	fluorene	360	U
85-01-8	phenanthrene	360	U
120-12-7	anthracene	360	U
206-44-0	fluoranthene	360	U
129-00-0	pyrene	360	U
56-55-3	benzo(a)anthracene	234	J
218-01-9	chrysene	187	J
205-99-2	benzo(b)fluoranthene	296	J
207-08-9	benzo(k)fluoranthene	477	
50-32-8	benzo(a)pyrene	360	U
193-39-5	indeno(1,2,3-cd)pyrene	291	J
53-70-3	dibenz(a,h)anthracene	360	U
191-24-2	benzo(g,h,i)perylene	360	U

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790511

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-01

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 5C50029

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 9 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/23/98

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) MG/KG	Q	
	----------Diesel Range Organics	0.86	JB	u F01, F06

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790511

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4023S

Matrix: (soil/water) SOIL Lab Sample ID: 9805399-01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: AK107

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 9 Date Analyzed: 05/25/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
	----------Gasoline Range Organics	1100	U	u

FORM I VOA

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS4023S

Method Type: Total Metals

Sample ID: 9805399-01

Client ID: 790511

Contract: SAIC00598 Lab Code: GEL Case No.: SAS No.:

Matrix: SOIL Date Received: 5/13/98 Level: LOW

% Solids: 91.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	3.5	mg/kg			P	0.10	TJA61 Trace ICPAES	980519-1

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790521

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-01

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4034

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	2.6	U
108-88-3	Toluene	4.6	
100-41-4	Ethylbenzene	2.4	J
1330-20-7	Xylenes (total)	7.7	J

Qual
U = U
J = J

Run 7/22/98

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FORM I VOA

V-42

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790521

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-01

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 4U208

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/19/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH 7

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual -
91-20-3	naphthalene	434	U	U
91-58-7	2-chloronaphthalene	434	U	
208-96-8	acenaphthylene	434	U	
83-32-9	acenaphthene	434	U	
86-73-7	fluorene	434	U	
85-01-8	phenanthrene	434	U	
120-12-7	anthracene	434	U	
206-44-0	fluoranthene	323	J	J
129-00-0	pyrene	569		J - HØ1
56-55-3	benzo(a)anthracene	374	J	J
218-01-9	chrysene	505		J - CØ2
205-99-2	benzo(b)fluoranthene	635		
207-08-9	benzo(k)fluoranthene	434	U	U = UJJJUJ
50-32-8	benzo(a)pyrene	425	J	
193-39-5	indeno(1,2,3-cd)pyrene	260	J	
53-70-3	dibenz(a,h)anthracene	434	U	
191-24-2	benzo(g,h,i)perylene	263	J	

RLM
7/22/98

FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790521

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-01

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 5D40036

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted:05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/29/98

Injection Volume: 1.0(uL) Dilution Factor: 3.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
	----------Diesel Range Organics	8.6	B

Qual- = FD8

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790521

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J408

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	Gasoline Range Organics	116	J

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790531

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-05

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4037

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
71-43-2	Benzene	2.6	U	U
108-88-3	Toluene	5.0		=
100-41-4	Ethylbenzene	2.6	U	U
1330-20-7	Xylenes (total)	7.9	U	U

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7/22/98

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790531

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-05

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 4U211

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 18 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/19/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	naphthalene	397	U
91-58-7	2-chloronaphthalene	397	U
208-96-8	acenaphthylene	397	U
83-32-9	acenaphthene	397	U
86-73-7	fluorene	397	U
85-01-8	phenanthrene	397	U
120-12-7	anthracene	397	U
206-44-0	fluoranthene	397	U
129-00-0	pyrene	397	U
56-55-3	benzo(a)anthracene	397	U
218-01-9	chrysene	397	U
205-99-2	benzo(b)fluoranthene	397	U
207-08-9	benzo(k)fluoranthene	397	U
50-32-8	benzo(a)pyrene	397	U
193-39-5	indeno(1,2,3-cd)pyrene	397	U
53-70-3	dibenz(a,h)anthracene	397	U
191-24-2	benzo(g,h,i)perylene	397	U

Qual.

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790531

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-05

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 5D40015

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 18 decanted: (Y/N) N Date Extracted:05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

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) MG/KG	Q
	----------Diesel Range Organics	0.71	JB

Qual:
U-F01,F06

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790531

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J4036

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 18 Date Analyzed: 05/22/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual
	Gasoline Range Organics	64.4	J	J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790541

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-02

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4032

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual
71-43-2	Benzene	2.6	U	U
108-88-3	Toluene	3.6		
100-41-4	Ethylbenzene	2.6	U	U
1330-20-7	Xylenes (total)	7.9	U	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790541

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-02

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 2U509

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted: 05/21/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/22/98

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/KG	Q	Qual
91-20-3	naphthalene	434	U	U
91-58-7	2-chloronaphthalene	434	U	U
208-96-8	acenaphthylene	61.4	J	J
83-32-9	acenaphthene	434	U	U
86-73-7	fluorene	111	J	J
85-01-8	phenanthrene	1870		
120-12-7	anthracene	185	J	J
206-44-0	fluoranthene	1190		
129-00-0	pyrene	1570		
56-55-3	benzo(a)anthracene	485		
218-01-9	chrysene	660		
205-99-2	benzo(b)fluoranthene	410	J	J
207-08-9	benzo(k)fluoranthene	434	U	U
50-32-8	benzo(a)pyrene	337	J	J
193-39-5	indeno(1,2,3-cd)pyrene	195	J	J
53-70-3	dibenz(a,h)anthracene	434	U	U
191-24-2	benzo(g,h,i)perylene	190	J	J

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FORM I SV-1

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790541

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-02

Sample wt/vol: 30.9 (g/mL) G Lab File ID: SD40042

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted:05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/29/98

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) MG/KG	Q
	Diesel Range Organics	1.6	JB

Qual.
J U-F01,F06
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790541

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J409

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
	----------Gasoline Range Organics_____	76.6	J	J

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790551

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-20

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 2J406

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 19 Date Analyzed: 05/21/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q	Qual.
71-43-2	Benzene		4.9	U	u
108-88-3	Toluene		9.8		=
100-41-4	Ethylbenzene		4.9	U	u
1330-20-7	Xylenes (total) RW 7/6/98	14.7	~~3.2~~	J	u-FB1,FB

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: 790551

Lab Name: GENERAL ENGINEERING LABOR   Contract: NA

Lab Code: NA   Case No.: NA   SAS No.: NA   SDG No.: FS402CS

Matrix: (soil/water) SOIL   Lab Sample ID: 9805395-20

Sample wt/vol: 30.2 (g/mL) G   Lab File ID: 4W107

Level: (low/med) LOW   Date Received: 05/13/98

% Moisture: 19   decanted: (Y/N) N   Date Extracted: 05/15/98

Concentrated Extract Volume: 1000(uL)   Date Analyzed: 06/01/98

Injection Volume: 1.0(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) N   pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
91-20-3	naphthalene	409	U	U
91-58-7	2-chloronaphthalene	409	U	
208-96-8	acenaphthylene	409	U	
83-32-9	acenaphthene	409	U	
86-73-7	fluorene	409	U	
85-01-8	phenanthrene	278	J	J-C02
120-12-7	anthracene	409	U	
206-44-0	fluoranthene	341	J	
129-00-0	pyrene	498		
56-55-3	benzo(a)anthracene	409	U	
218-01-9	chrysene	234	J	
205-99-2	benzo(b)fluoranthene	409	U	
207-08-9	benzo(k)fluoranthene	409	U	
50-32-8	benzo(a)pyrene	409	U	
193-39-5	indeno(1,2,3-cd)pyrene	409	U	
53-70-3	dibenz(a,h)anthracene	409	U	
191-24-2	benzo(g,h,i)perylene	409	U	

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7/7/98

FORM I SV-1

OLM03.0

FORM I Science Applications13-MAY-1998 SAMPLE NO
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790551

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-20

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 5D30017

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 19 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/27/98

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) MG/KG	Q
	----------Diesel Range Organics	1.4	JB

Qual.
R-F01, F06, P03

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790551

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-20

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J3043

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 19 Date Analyzed: 05/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
	Gasoline Range Organics	1230	U	U

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FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790561

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-06

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J4038

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 39 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	3.3	U
108-88-3	Toluene	3.3	U
100-41-4	Ethylbenzene	3.3	U
1330-20-7	Xylenes (total)	9.8	U

Qual

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FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790561

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-06

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 4U212

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/19/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

DATA VALIDATION COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	naphthalene	427	U
91-58-7	2-chloronaphthalene	427	U
208-96-8	acenaphthylene	427	U
83-32-9	acenaphthene	427	U
86-73-7	fluorene	427	U
85-01-8	phenanthrene	427	U
120-12-7	anthracene	427	U
206-44-0	fluoranthene	427	U
129-00-0	pyrene	427	U
56-55-3	benzo(a)anthracene	427	U
218-01-9	chrysene	427	U
205-99-2	benzo(b)fluoranthene	427	U
207-08-9	benzo(k)fluoranthene	427	U
50-32-8	benzo(a)pyrene	427	U
193-39-5	indeno(1,2,3-cd)pyrene	427	U
53-70-3	dibenz(a,h)anthracene	427	U
191-24-2	benzo(g,h,i)perylene	427	U

Qual.

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FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790561

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-06

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 5D40018

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 24 decanted: (Y/N) N Date Extracted:05/19/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/28/98

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) MG/KG	Q
	----------Diesel Range Organics	0.60	JB

Qual- U-F01, F06

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790561

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4021S

Matrix: (soil/water) SOIL Lab Sample ID: 9805396-06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J4016

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 24 Date Analyzed: 05/22/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
	Gasoline Range Organics	1320	U

Qual.
U

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FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790571

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-19

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 2J5022

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 15 Date Analyzed: 05/22/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 2.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
71-43-2	Benzene	4.7	U	U
108-88-3	Toluene	4.7	U	
100-41-4	Ethylbenzene	4.7	U	
1330-20-7	Xylenes (total)	14.1	U	

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FORM I VOA

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790571

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-19

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 4W106

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 15 decanted: (Y/N) N Date Extracted: 05/15/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/01/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.1

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual - U
91-20-3	naphthalene	388	U	
91-58-7	2-chloronaphthalene	388	U	
208-96-8	acenaphthylene	388	U	
83-32-9	acenaphthene	388	U	
86-73-7	fluorene	388	U	
85-01-8	phenanthrene	388	U	
120-12-7	anthracene	388	U	
206-44-0	fluoranthene	388	U	
129-00-0	pyrene	388	U	
56-55-3	benzo(a)anthracene	388	U	
218-01-9	chrysene	388	U	
205-99-2	benzo(b)fluoranthene	388	U	
207-08-9	benzo(k)fluoranthene	388	U	
50-32-8	benzo(a)pyrene	388	U	
193-39-5	indeno(1,2,3-cd)pyrene	388	U	
53-70-3	dibenz(a,h)anthracene	388	U	
191-24-2	benzo(g,h,i)perylene	388	U	

RLM 7/7/98

FORM 1 Science Applications13-MAY-1998 SAMPLE NO.
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

790571

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-19

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 5D30016

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: 15 decanted: (Y/N) N Date Extracted:05/18/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/27/98

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) MG/KG	Q
	Diesel Range Organics	1.3	JB

Qual - R-F01, F06, P03

DATA VALIDATION COPY

Run 7/7/98

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

790571

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4020S

Matrix: (soil/water) SOIL Lab Sample ID: 9805395-19

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 3J3042

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. 15 Date Analyzed: 05/21/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	Qual.
	Gasoline Range Organics	1180	U	U

RLM
7/6/98

DATA VALIDATION
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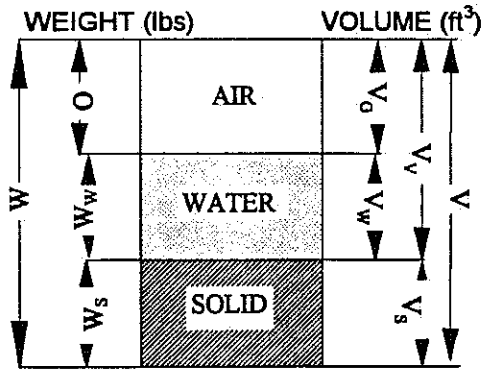
FORM I VOA

SPECIFIC GRAVITY AND POROSITY

PROJECT: Fort Stewart
LOCATION OF PROJECT: CAP Part A
DESCRIPTION OF SOIL: Brown Silty Sand
TESTED BY: B.J. Vance

JOB NO.: 98066
SAMPLE NO: 790331
DEPTH OF SAMPLE: 8-10ft.
DATE OF TESTING: 6/8/98



W = 1.55974
$W_W = W - W_S$ = 0.24870
$W_S = Y_d * V$ = 1.3110

V = 0.01293
$V_W = W_W / Y_W$ = 0.0040
$V_S = W_S / G_S * Y_W$ = 0.0080
$V_G = V - (V_S + V_W)$ = 0.00090
$V_V = V_G + V_W$ 0.0049

MEASUREMENTS OF TUBE/CAN

HEIGHT= 21.1 cm
DIAMETER= 4.7 cm

CALCULATED VOLUME OF TUBE/CAN

V= 366.07 cm^3
0.01293 ft^3

WT. OF TUBE/CAN + WET SOIL= 1097.00 g
WEIGHT OF TUBE/CAN= 389.5 g
WEIGHT OF WET SOIL= 707.50 g
W = 1.55974 lb

MOISTURE CONTENT

M_{CWS} = 37.77 g
M_{CDS} = 34.20 g
M_W = 3.57 g
M_C = 15.38 g
M_S = 18.82 g
w = 19.0 %

Wet Density, $Y_m = W / V$

Dry Density, $Y_d = W_s / V$ or $Y_d = Y_m / (1+ w)$

double check	$Y_d = Y_m / (1+ w)$
$Y_d = W_s / V$	Y_m= 120.63 lbs/ft^3
Y_d= 101.40 lbs/ft^3	Y_d= 101.40 lbs/ft^3

Void Ratio, $e = V_V / V_S$
e = 0.6070

Porosity, $n = V_V / V$
n = 0.38

Specific Gravity = 2.61

Degree of Saturation, $S = V_W / V_V$
S = 0.8157

GRAIN SIZE ANALYSIS-SIEVE (ASTM D422)

Project Su-c Job No. ____

Location of Project Cup Pract A Sample No. # 78 331

Description of Soil ____ Depth of Sample 8-10' Boring No. ____

Tested By BV Date of Testing 6/2/98

Sample preparation procedures outlined in ASTM D421 and D2217.

Nominal diameter of largest particle	Approximate minimum Wt. of sample, g
No. 10 sieve	200
No. 4 sieve	500
3/4 in.	1500

Weight of sample used, M_{ws} = 563.57 g

X-16

M_{cws}	M_{cds}	M_c	M_w	M_s	w %	M_{ws}	M_s
	677.50	113.93					

Sieve analysis and grain shape

Sieve no.	Diam. (mm)	Wt. retained	% retained	Σ % retained	% passing
3"					
2"					
1 1/2 "					
3/4"					
3/8"					
#4					
#10		7.01	1.24	1.24	98.76
#20		25.82	4.59	5.83	94.17
#40		21.26	3.78	9.61	90.39
#60		88.36	15.70	25.31	74.69
#140		378.30	67.22	92.53	7.47
#200		12.20	2.17	94.70	5.30
pan		29.80	5.29	99.99	0.01
		562.80			

% retained = (Wt. retained/W_s) · 100

% passing = 100 - Σ % retained.

PERMEABILITY TEST ANALYSIS (ASTM D5084)

Project : Fort Stewart

Location of Project : CAP Part A

Description of Soil : Brown Silty Sand

Job # : 98066
Date of Testing: 7/13-14/98
Tested by: CA
Boring # :
Sample # : 790331
Sample Depth : 8-10'

Sample Type (Undisturbed or Remolded)
Standard Proctor:
Maximim Dry Density: _____ pcf
Optimum Moisture Content: _____ %

% Sample Compaction: _____ %
Sample Dry Density: _____ pcf
Sample Moisture Content: _____ %
Sample Wet Density: _____ pcf

Sample Permeation:

De-Aired Water
% Saturation: 100 %
Cell Pressure: 65 psi
Lower Pressure: 61 psi
Upper Pressure: 60 psi
Gradient: 11.17

Sample Dimensions		
	Before	After
Length (cm)	6.30	5.10
Diameter (cm)	4.70	4.90
Water Content (%)	17.9	18.7
Weight (g)	215.4	213.5

Constant Head Calculation:

$$K = [V(t_1,t_2)\, LR_T]/[P_B A t] \text{ (cm/sec)}$$

$V(t_1,t_2)$ = Volume of flow from t_1 to t_2 (cm^2)
L = Length of Sample = 6.30 cm
A = Area of Sample = 17.35 cm^2
t = $t_2 - t_1$ (sec)
P_B = Bias Pressure = 1 psi x 70.37 cm/psi $_{(cm - H2O)}$ 70.37 cm
R_T = Temperature correction = 0.931

t_2 (min)	t_1 (min)	$(t_2 - t_1)*60$ (sec)	V (cm^3)	$[LR_T]/[P_B A]$ (cm^3)	K (cm/sec)
1185	1140	2700	5	4.80E-03	8.90E-06
1205	1185	1200	2.4	4.80E-03	9.61E-06
1235	1205	1800	3.3	4.80E-03	8.81E-06
1250	1235	900	1.3	4.80E-03	6.94E-06

K_{avg} = 8.56E-06 cm/sec

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800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: GAB026

PROJECT NAME: Fort Stewart New CAP Part A UST Investigation 9805

PROJECT NUMBER: 01-0331-04-~~9305~~-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature): Laura Lumley (Printed Name): Laura Lumley

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	TOC	BTEX, GRO	PAH, DRO	PAH, DRO, Lead	PAH, TPH	PAH, TPH, Lead	PAH, TPH, Lead, TOC	No. of Bottles/ Vials:
790111	5/12/98	1020	Soil				1	1					2
151651	5/11/98	1320					1	1					2
151631	5/11/98	1305					1	1					2
151671	5/11/98	1340					1	1					2
790411	5/12/98	1005					1	1					2
790571	5/12/98	1235					1	1					2
790551	5/12/98	1152					1	1					2
790521	5/12/98	1016					1	1					2
790541	5/12/98	1110					1	1					2
790411	5/12/98	1100					1	1					2
790211	5/12/98	915					1	1					2
790531	5/12/98	1030					1	1					2
790561	5/12/98	1230					1	1					2

REQUESTED PARAMETERS

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS:	Cooler Temperature: 4°C
Laura Lumley	5/13/98				
COMPANY NAME: SAIC	1140	COMPANY NAME:		Cooler ID: 202	FEDEX NUMBER:
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
COMPANY NAME:	5-13-98 1140	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

20123

CHAIN OF CUSTODY RECORD

COC NO.: GA1540 7

PROJECT NAME: Fort Stewart New CAP Part A UST Investigation 9805

PROJECT NUMBER: 01-0331-04-~~9805~~-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature): Laura Lumley (Printed Name): Laura Lumley

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	TOC	BTEX, GRO	PAH, DRO	PAH, DRO, Lead	PAH, TPH	PAH, TPH, Lead	PAH, TPH, Lead, TOC	No. of Bottles/ Vials:	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
160421	5/12/98	1640	Soil				1		1				2	
720213	5/11/98	930					1		1				2	
160521	5/12/98	1415					1		1				2	
720121	5/11/98	1140					1		1				2	
790321	5/12/98	1310					1		1				2	
160621	5/12/98	1535					1		1				2	
670221	5/11/98	1025					1		1				2	
710321	5/11/98	1555					1		1				2	
790511	5/12/98	1002					1		1				2	
790221	5/12/98	915					1		1				2	
790121	5/12/98	1020					1		1				2	
790421	5/12/98	1100	↓				1		1				2	
~~010711~~	~~5/12/98~~	~~930~~												

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS:	Cooler Temperature:
Laura Lumley	5/13/98			Cooler ID: #133	FEDEX NUMBER:
COMPANY NAME: SAIC	1140	COMPANY NAME:			
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL	5-13-98 1140	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

V-70

APPENDIX VI

ALTERNATE THRESHOLD LEVEL (ATL) CALCULATIONS

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Calculations of alternate threshold levels are not required at this time for the USTS 48 & 49 site. However, the geotechnical data collected during the CAP-Part A investigation are presented in Table VI-A.

VI-A. Geotechnical Results for Soil Samples Collected at the USTS 48 & 49 Site

	79-0
Sample ID	790331
Depth Interval (ft BGS)	8.0 – 10.0
Grain size analysis - % Fines	5
Grain size analysis - % Sand	95
Grain size analysis - % Gravel	0
Liquid Limit	NP
Plastic Limit	NP
Plasticity Index	NP
Natural Moisture Content (%)	19.0
Permeability (cm/sec)	8.56×10^{-6}
Porosity	0.38
Specific Gravity	2.61

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 USTs 48 & 49 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-A. SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Station:		In Stream	79-01	79-02	79-03	79-04
Sample ID:	Federal	Water Quality	790112	790212	790312	790412
Collection Date:	SDWA MCLs[1]	Standards[2]	12-May-98	12-May-98	12-May-98	12-May-98
Units:	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
VOLATILE ORGANIC COMPOUNDS						
Benzene	5	71.28	**940 =**	**188 =**	**5.7 =**	**7.6 =**
Toluene	1000	200,000	**15600 =**	196 =	39.5 =	37.9 =
Ethylbenzene	700	28,718	**3980 =**	197 =	10.3 =	8.1 =
Xylenes, Total	10000	–	**23800 J**	1140 =	49.2 =	27.7 =
POLYNUCLEAR AROMATIC HYDROCARBONS						
2-Chloronaphthalene		–	20 U	20 U	20 U	20 U
Acenaphthene		–	20 U	20 U	20 U	20 U
Acenaphthylene		–	20 U	20 U	20 U	20 U
Anthracene		110,000	20 U	20 U	20 U	20 U
Benzo(a)anthracene		0.0311	20 U	20 U	20 U	20 U
Benzo(a)pyrene	0.2	0.0311	**20 U**	**20 U**	**20 U**	**20 U**
Benzo(b)fluoranthene		–	20 U	20 U	20 U	3.1 J
Benzo(g,h,i)perylene		–	20 U	20 U	20 U	20 U
Benzo(k)fluoranthene		0.0311	20 U	20 U	20 U	20 U
Chrysene		0.0311	20 U	20 U	20 U	20 U
Dibenzo(a,h)anthracene		0.0311	20 U	20 U	20 U	20 U
Fluoranthene		370	1 J	20 U	20 U	1 J
Fluorene		14,000	20 U	20 U	20 U	20 U
Indeno(1,2,3-cd)pyrene		0.0311	20 U	20 U	20 U	20 U
Naphthalene		–	616 =	46 =	20 U	20 U
Phenanthrene		–	20 U	20 U	20 U	20 U
Pyrene		11,000	1.9 J	20 U	20 U	2.2 J

NOTES:

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

[1] U.S. Environmental Protection Agency maximum contaminant level

[2] GA EPD water quality standards (Chapter 391-03-6.03)

Bold values exceed MCLs

QA/QC 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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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790112

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4018W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805390-06

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2J3038

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. _____ Date Analyzed: 05/21/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 100.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	940	=
108-88-3	Toluene	15600	=
100-41-4	Ethylbenzene	3980	=
1330-20-7	Xylenes (total)	23800	P J

MØ8

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790112

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4017W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805388-11

Sample wt/vol: 250.0 (g/mL) ML Lab File ID: 2U408

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/14/98

Concentrated Extract Volume: 0.50(mL) Date Analyzed: 05/21/98

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/L	Q
91-20-3	naphthalene	616 ~~559~~	~~E~~ D
91-58-7	2-chloronaphthalene	20.0	U
209-96-8	acenaphthylene	20.0	U
83-32-9	acenaphthene	20.0	U
86-73-7	fluorene	20.0	U
85-01-8	phenanthrene	20.0	U
120-12-7	anthracene	20.0	U
206-44-0	fluoranthene	1.0	J
129-00-0	pyrene	1.9	J
56-55-3	benzo(a)anthracene	20.0	U
218-01-9	chrysene	20.0	U
205-99-2	benzo(b)fluoranthene	20.0	U
207-08-9	benzo(k)fluoranthene	20.0	U
50-32-8	benzo(a)pyrene	20.0	U
193-39-5	indeno(1,2,3-cd)pyrene	20.0	U
53-70-3	dibenz(a,h)anthracene	20.0	U
191-24-2	benzo(g,h,i)perylene	20.0	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790212

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4018W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805390-05

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2J3020

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. _____ Date Analyzed: 05/20/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 10.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	188	=
108-88-3	Toluene	196	=
100-41-4	Ethylbenzene	197	=
1330-20-7	Xylenes (total)	1140	=

FØ1, FØ8

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790212

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4017W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805388-09

Sample wt/vol: 250.0 (g/mL) ML Lab File ID: 2U323

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/14/98

Concentrated Extract Volume: 0.50(mL) Date Analyzed: 05/21/98

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/L	Q
91-20-3	naphthalene	46.0	
91-58-7	2-chloronaphthalene	20.0	U
209-96-8	acenaphthylene	20.0	U
83-32-9	acenaphthene	20.0	U
86-73-7	fluorene	20.0	U
85-01-8	phenanthrene	20.0	U
120-12-7	anthracene	20.0	U
206-44-0	fluoranthene	20.0	U
129-00-0	pyrene	20.0	U
56-55-3	benzo(a)anthracene	20.0	U
218-01-9	chrysene	20.0	U
205-99-2	benzo(b)fluoranthene	20.0	U
207-08-9	benzo(k)fluoranthene	20.0	U
50-32-8	benzo(a)pyrene	20.0	U
193-39-5	indeno(1,2,3-cd)pyrene	20.0	U
53-70-3	dibenz(a,h)anthracene	20.0	U
191-24-2	benzo(g,h,i)perylene	20.0	U

U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790312

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4018W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805390-10

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2J3040

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. _____ Date Analyzed: 05/21/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	5.7	
108-88-3	Toluene	39.5	
100-41-4	Ethylbenzene	10.3	
1330-20-7	Xylenes (total)	49.2	

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790312

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805387-17

Sample wt/vol: 250.0 (g/mL) ML Lab File ID: 1U215

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/14/98

Concentrated Extract Volume: 0.50(mL) Date Analyzed: 05/19/98

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/L	Q
91-20-3	naphthalene	20.0	U
91-58-7	2-chloronaphthalene	20.0	U
208-96-8	acenaphthylene	20.0	U
83-32-9	acenaphthene	20.0	U
86-73-7	fluorene	20.0	U
85-01-8	phenanthrene	20.0	U
120-12-7	anthracene	20.0	U
206-44-0	fluoranthene	20.0	U
129-00-0	pyrene	20.0	U
56-55-3	benzo(a)anthracene	20.0	U
218-01-9	chrysene	20.0	U
205-99-2	benzo(b)fluoranthene	20.0	U
207-08-9	benzo(k)fluoranthene	20.0	U
50-32-8	benzo(a)pyrene	20.0	U
193-39-5	indeno(1,2,3-cd)pyrene	20.0	U
53-70-3	dibenz(a,h)anthracene	20.0	U
191-24-2	benzo(g,h,i)perylene	20.0	U

U

COPY

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790412

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4018W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805390-04

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2J3010

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: not dec. _____ Date Analyzed: 05/20/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	7.6	
108-88-3	Toluene	37.9	
100-41-4	Ethylbenzene	8.1	
1330-20-7	Xylenes (total)	27.7	

FØ1, FØ8

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

790412

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS4017W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9805388-10

Sample wt/vol: 250.0 (g/mL) ML Lab File ID: 2U407

Level: (low/med) LOW Date Received: 05/13/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/14/98

Concentrated Extract Volume: 0.50(mL) Date Analyzed: 05/21/98

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/L	Q
91-20-3	naphthalene	20.0	U
91-58-7	2-chloronaphthalene	20.0	U
209-96-8	acenaphthylene	20.0	U
83-32-9	acenaphthene	20.0	U
86-73-7	fluorene	20.0	U
85-01-8	phenanthrene	20.0	U
120-12-7	anthracene	20.0	U
206-44-0	fluoranthene	1.0	J
129-00-0	pyrene	2.2	J
56-55-3	benzo(a)anthracene	20.0	U
218-01-9	chrysene	20.0	U
205-99-2	benzo(b)fluoranthene	3.1	J
207-08-9	benzo(k)fluoranthene	20.0	U
50-32-8	benzo(a)pyrene	20.0	U
193-39-5	indeno(1,2,3-cd)pyrene	20.0	U
53-70-3	dibenz(a,h)anthracene	20.0	U
191-24-2	benzo(g,h,i)perylene	20.0	U

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SAIC An Employee-Owned Company
Science Applications International Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

1064

CHAIN OF CUSTODY RECORD

COC NO.: SAB 1-37

PROJECT NAME: Fort Stewart New CAP Part A UST Investigation 9405
PROJECT NUMBER: 01-0331-04-~~9305~~-200
PROJECT MANAGER: Patty Stoll
Sampler (Signature): Laura Lumley (Printed Name): Laura Lumley

LABORATORY NAME: General Engineering Laboratory
LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417
PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	TOC	BTEX, GRO	PAH, DRO	PAH, DRO, Lead	PAH, TPH	PAH, TPH, Lead	PAH, TPH, Lead, TOC	No. of Bottles/ Vials:	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
160312	5/12/98	1700	water	2									2	No Preservative
~~160516~~	~~5/12/98~~	~~1435~~		~~2~~									~~2~~	
610112	5/12/98	1635		2									2	
160616	5/12/98	1520		2									2	
790412	5/12/98	1130		2									2	
790212	5/12/98	1000		2									2	
790112	5/12/98	1045		2									2	
740312	5/11/98	1100		2									2	
740112	5/11/98	1730		2									2	
160512	5/12/98	1635		2									2	
790312	5/12/98	1335		2									2	
160612	5/12/98	1600		2									2	
660212-1	5/11/98	1525	V	2									2	

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS:	Cooler Temperature: 4°C
Laura Lumley	5/13/98				
COMPANY NAME: SAIC	1140	COMPANY NAME:		Cooler ID: # 136	FEDEX NUMBER:
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
COMPANY NAME:	5-13-98 1140	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: GAB023

PROJECT NAME: Fort Stewart New CAP Part A UST Investigation

PROJECT NUMBER: 01-0331-04-~~9305~~ 9405-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature): [signature] (Printed Name): Laura Lumley

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	TOC	BTEX, GRO	PAH, DRO	PAH, DRO, Lead	PAH, TPH	PAH, TPH, Lead	PAH, TPH, Lead, TOC	No. of Bottles/ Vials:	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
790212	5/12/98	1000	water		2								2	
790412	5/12/98	1130	↓		2								2	
790112	5/12/98	1045	↓		2								2	
740312	5/11/98	1900	↓		2								2	
740212	5/11/98	1600	↓		2								2	
770125	5/12/98		↓					3					3	

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
[signature]	5/13/98 1140		
COMPANY NAME: SAIC		COMPANY NAME:	

RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time
[signature]	5-13-98 1140		
COMPANY NAME: GEL		COMPANY NAME:	

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME:		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 13

Cooler ID: # 476

Cooler Temperature: 4°C

FEDEX NUMBER:

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800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: GAB025

PROJECT NAME: Fort Stewart New CAP Part A UST Investigation 9305

PROJECT NUMBER: 01-0331-04-9305-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature) Laura Lumley (Printed Name) Laura Lumley

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	TOC	BTEX, GRO	PAH, DRO	PAH, DRO, Lead	PAH, TPH	PAH, TPH, Lead	PAH, TPH, Lead, TOC	No. of Bottles/ Vials:	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
790412	5/12/98	1025	water		2							2	2	
700212	5/11/98	1130	↓		2							2	2	
700112	5/11/98	1000	↓		2							2	2	
770121	5/12/98	1245	Soil				1		1			2	2	
680121	5/11/98	1350					1		1			2	2	
~~680129~~	~~5/11/98~~	~~1350~~												
151611	5/11/98	940					1		1			2	2	
680221	5/11/98	1455					1		1			2	2	
710521	5/11/98	1215					1		1			2	2	
710221	5/11/98	1415					1		1			2	2	
710113	5/11/98	1250					1		1			2	2	
710111	5/11/98	1250					1		1			2	2	
760421	5/12/98	1010	↓				1		1			2	2	

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS:	Cooler Temperature: 4°C
Laura Lumley	5/13/98				
COMPANY NAME: SAIC	1140	COMPANY NAME:		Cooler ID: # 3416	FEDEX NUMBER:
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
	5-13-98				
COMPANY NAME:	1140	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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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 USTMP 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

Signature: for Douglas H Stewart

Date: 12/22/98

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APPENDIX X

SITE RANKING FORM

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SITE RANKING FORM

Facility Name: USTs 48 & 49, Building 1175 **Ranked by:** P. Stoll

County: Liberty **Facility ID #:** 9-089054 **Date Ranked:** 7/29/98

SOIL CONTAMINATION

A. Total PAHs –
Maximum Concentration found on the site
(Assume <0.660 mg/kg if only gasoline was stored on site)

☐	≤0.660 mg/kg	=	0
☐	>0.66 - 1 mg/kg	=	10
☒	>1 - 10 mg/kg	=	25
☐	>10 mg/kg	=	50

B. Total Benzene -
Maximum Concentration found on the site

☒	≤0.005 mg/kg	=	0
☐	>0.005 - .05 mg/kg	=	1
☐	>0.05 - 1 mg/kg	=	10
☐	>1 - 10 mg/kg	=	25
☐	>10 - 50 mg/kg	=	40
☐	>50 mg/kg	=	50

C. Depth to Groundwater
(bls = below land surface)

☐	>50' bls	=	1
☐	>25' - 50' bls	=	2
☐	>10' - 25' bls	=	5
☒	≤10' bls	=	10

Fill in the blanks: **(A. 25) + (B. 0) = (0) x (C. 10) = (D. 0)**

GROUNDWATER CONTAMINATION

E. Free Product (Nonaqueous-phase liquid hydrocarbons; See Guidelines For definition of "sheen").

☒	No free product	=	0
☐	Sheen - 1/8"	=	250
☐	>1/8" - 6"	=	500
☐	>6" - 1ft.	=	1,000
☐	For every additional inch, add another 100 points = 1,000 +		

F. Dissolved Benzene -
Maximum Concentration at the site
(One well must be located at the source of the release.)

☐	≤5 µg/L	= 0
☐	>5 - 100 µg/L	= 5
☒	>100 - 1,000 µg/L	= 50
☐	>1,000 - 10,000 µg/L	= 100
☐	>10,000 µg/L	= 250

Fill in the blanks: **(E. 0) + (F. 50) = (G. 50)**

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.**

H. Public Water Supply

☐	Impacted	= 2000
☐	≤500'	= 500
☐	>500' - ¼ mi	= 25
☐	¼ mi - 1 mi	= 10
☐	>1 mi - 2 mi	= 2
✳ ☒	> 2 mi	= 0

For lower susceptibility areas only:

☐	>1 mi	= 0

I. Non-Public Water Supply

☐	Impacted	= 1000
☐	≤100'	= 500
☐	>100' - 500'	= 25
☐	>500' - ¼ mi	= 5
☐	>¼ - ½ mi	= 2
☒	>½ mi	= 0

For lower susceptibility areas only:

☐	>¼ mi	= 0

Note: If site is in lower susceptibility area, do not use the shaded areas.

✳ For justification that withdrawal point is not hydraulically connected, see page X-5.

J. Distance from nearest Contaminant Plume boundary to downgradient Surface Waters **OR UTILITY TRENCHES & VAULTS** (a utility trench may be omitted from ranking if its invert elevation is more than 5 feet above the water table)

☐	Impacted	= 500
☒	≤500'	= 50
☐	>500' - 1,000'	= 5
☐	>1,000'	= 1

K. Distance from any Free Product to basements and crawl spaces

☐	Impacted	= 500
☐	<500'	= 50
☐	>500' - 1,000'	= 5
☒	>1,000' or no free product.	= 0

Fill in the blanks: (H. 0) + (I. 0) + (J. 50) + (K. 0) = L. 50

(G. 50) x (L. 50) = M. 2500

(M. 2500) + (D. 0) = N. 2500

P. **SUSCEPTIBILITY AREA MULTIPLIER**

☐ If site is located in a Low Ground-Water Pollution Susceptibility Area = 0.5

☒ All other sites = 1

Q. **EXPLOSION HAZARD**

Have any explosive petroleum vapors, possibly originating from this release, been detected in any subsurface structure (e.g., utility trenches, basements, vaults, crawl spaces, etc.)?

☐ Yes = 200,000

☒ No = 0

Fill in the blanks: (N. 2500) x (P. 1) = (2500) + (Q. 0)

= 2500

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 Floridan, 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, argillacerous 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.

APPENDIX XI

PUBLIC NOTIFICATION

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STATE OF GEORGIA
CHATHAM COUNTY

Affidavit of Publication
___Savannah Morning News
___Savannah Evening Press

Personnally appeared before me, Joan T. Jenkins, to me known, who being sworn, deposes and says:

That he is the Classified Adv Supv 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 7-19, 1998, 7-26, 1998, _____, 1998, _____, 1998, and finds that the following Advertisement, to-wit:

PUBLIC NOTICE
Notification of Corrective Action Plan, Underground Storage Tank Releases, Fort Stewart Garrison Area, Fort Stewart, Georgia

The United States Army Corps of Engineers and Fort Stewart Directorate of Public Works have prepared Corrective Action Plan (CAP) - Part A and Part B reports to assess the environmental impact of diesel, gasoline, or waste oil releases from numerous underground storage tanks (USTs) located at the above referenced property. These reports will be submitted to the Georgia Environmental Protection Division after September 30, 1998. A listing of the UST sites for which CAP - Part A and Part B reports have been prepared is presented at the end of this notification.

The Georgia rules for UST management requires notification of the public most directly affected by the plans. If you would like a copy of any of the plans, please contact:

Commander, 3rd Infantry Division (Mechanized), and Fort Stewart, Attn: AFZP-DEV (T. Rutland), Building 1139, Fort Stewart, Georgia 31314-5000

A copy of each requested plan will be mailed at a nominal copying and shipping fee.

To make comments on any of the plans, or to examine the Georgia Environmental Protection Division's files, contact the Corrective Action Unit, Underground Storage Tank Management Program, Environmental Protection Division at 404-362-2687. The Underground Storage Tank Management Program will accept comments on the CAP - Part A and Part B reports up to 30 days after submittal to the Georgia Environmental Protection Division. Following is their mailing address:

Corrective Action Unit, Underground Storage Tank Management Program, 4244 International Parkway, Suite 100, Atlanta, Georgia 30354

Fort Stewart CAP - Part A and Part B Underground Storage Tank Sites

Tank Number / Facility ID / Building
242, 9-089041, 241
244, 9-089041, 241
28B, 9-089011, 1720
94B, 9-089110, 1339
100B, 9-089081, 1350
214, 9-089015, 1503
215, 9-089015, 1503
123, 9-089092, 933
106, 9-089032, 6923
111, 9-089085, 19109
118, 9-089070, 1239
36, 9-089016, 1512
37, 9-089016, 1512
94, 9-089016, 1328
4, 9-089065, 1840
5 and 6, 9-089066, 1824
52, 9-089050, 1062
X, P, 106501
1, 9-089064, 1842
16, 9-089011, 1720
18, 9-089011, 1720
28A, 9-089011, 1720
30-35, 9-089128, 1721
202-204, 9-089045, 241
241, 9-089118, 420
225, 9-089090, 4529
122, 9-089083, 7705
257-260, 9-089037, 420
2 and 3, 9-089065, 1840
87 and 88, 9-089073, 1245
48 and 49, 9-089054, 1175
226 and 227, 9-089042, 4530

appeared in each of said editions.

Joan T. Jenkins
(Deponent)

Sworn to and subscribed before me this 28 day of July, 1998.

Lillie D. Lang
Notary Public, Chatham County, Georgia

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

Form 121 rev.

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ATTACHMENT A

TECHNICAL APPROACH

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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 Georgia Environmental Protection Division (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 the collection of 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 collecting each sample and completing 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

Collection of groundwater samples from geoprobe boreholes installed during Preliminary Groundwater and CAP-Part A investigations was accomplished 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 investigation-derived waste (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, 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. For a detailed description of all field documentation, see Section 4.5 of Attachment IV of the Work Plan.

3.0 SAMPLE HANDLING AND ANALYSIS

3.1 Analytical Program

Soil samples were screened for the presence of volatile vapors using a MiniRae organic vapor analyzer (PID). The MiniRae was calibrated daily using 100 parts per million 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 GRO and 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 a 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.

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

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

ATTACHMENT B

REFERENCES

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