FIRST SEMIANNUAL MONITORING ONLY REPORT
FOR
UNDERGROUND STORAGE TANK 29
FACILITY ID 9-089088
BUILDING 1633
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 0016

Prepared by:

Science Applications International Corporation
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830

May 1999

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List of Abbreviations and Acronyms

ACL	alternate concentration limit
AMSL	above mean sea level
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
BTOC	below top of casing
CAP	Corrective Action Plan
DAF	dilution-attenuation factor
DPW	Directorate of Public Works
GA EPD	Georgia Environmental Protection Division
IWQS	In-stream Water Quality Standards
MCL	maximum contaminant level
ND	not detected
NRC	no regulatory criteria
PAH	polynuclear aromatic hydrocarbon
SAIC	Science Applications International Corporation
TPH	total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
UST	underground storage tank

MONITORING ONLY REPORT

Submittal Date: May 1999 Monitoring Report Number: 1st Semiannual

For Period Covering: January 1999 to May 1999

Facility Name: UST 29, Building 1633 Street Address: McFarland Avenue between Divarty Avenue and W. 8th Street

Facility ID: 9-089088 City: Fort Stewart County: Liberty Zip Code: 31314

Latitude: 32° 15' 57" Longitude: 82° 05' 14"

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) 481-8792

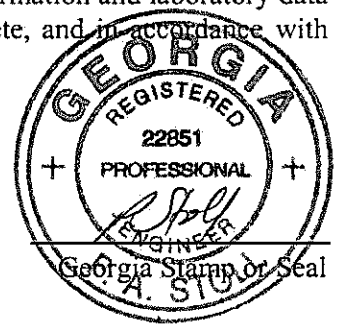
I. REGISTERED PROFESSIONAL ENGINEER OR PROFESSIONAL GEOLOGIST CERTIFICATION

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: 5/14/99



Georgia Stamp or Seal

II. PROJECT SUMMARY

(Appendix I, Figure 1: Site Location Map)

Provide a brief description or explanation of the site and a brief chronology of environmental events leading up to this report.

Former UST 29, Facility ID #9-089088 was located near Building 1633 at Fort Stewart, Georgia. One UST containing waste oil was removed from the site in 1995. SAIC performed a CAP-Part A investigation in 1996 and a CAP-Part B investigation in 1997 to determine the extent of petroleum contamination at the site. Five monitoring wells and seven soil borings were installed during these investigations. The CAP-Part B Report was submitted in March 1999. The CAP-Part B Report recommended semiannual monitoring of four of the seven monitoring wells: 14-08, 14-09, 14-11, and 14-12. Two additional monitoring wells were installed following the first semiannual monitoring event.

The purpose of the semiannual monitoring is to confirm the results of the fate and transport modeling and to confirm that natural attenuation is taking place at the site. A request for no further action will be made to GA EPD after two years of semiannual monitoring if the measured benzene concentrations in the wells are less than or equal to those predicted by the fate and transport model.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. Potentiometric Data:

(Appendix I, Figure 2a and 2b: Potentiometric Surface Maps)
(Appendix II, Table 1: Groundwater Elevations)

Discuss groundwater flow at this site and implications for this project.

During the first semiannual sampling event in January 1999, groundwater elevations were measured in the seven site monitoring wells to determine the groundwater flow direction. In January 1999, the groundwater flow direction was towards the west, and the groundwater gradient was approximately 0.0033 ft/ft. In December 1998, during the CAP-Part B investigation, the groundwater flow direction was towards the north–northwest.

B. Analytical Data:

(Appendix I, Figure 3a and 3b: Groundwater Quality Maps)
(Appendix I, Figure 4: Trend of Contaminant Concentrations)
(Appendix II, Table 2, Groundwater Analysis Results)
(Appendix III, Laboratory Analysis Results)

Discuss groundwater analysis results, trend of contaminant concentrations, and implications for this project.

During the first semiannual sampling event in January 1999, monitoring wells 14-08, 14-09, 14-11, and 14-12 were sampled for BTEX and PAH in accordance with the CAP-Part B Report. Analytical results from the first sampling event showed elevated BTEX concentrations in wells 14-08, 14-09, and 14-12. The benzene concentrations in these wells exceeded the MCL of 5 µg/L. The benzene concentrations decreased in well 14-08 and increased in wells 14-09 and 14-12 from the concentrations from the CAP-Part B sampling event (December 1997). In addition, the benzene concentration observed in well 14-11 remained constant from the CAP-Part B sampling event (December 1997) at slightly below its respective MCL of 5 µg/L.

In February 1999, wells 14-13 and 14-14 were installed at the site. The wells were sampled in March 1999, and analytical results indicated low concentrations of benzene toluene and xylenes in 14-13 and low concentrations of toluene and xylenes in 14-14.

IV. SITE RANKING (Note: re-rank site after each monitoring event
(Appendix IV: Site Ranking Form)

Environmental Site Sensitivity Score: 510

V. CONCLUSIONS/RECOMMENDATIONS

Provide justification of no-further-action-required recommendation or briefly discuss future monitoring plans for this site.

Semiannual monitoring will continue in wells 14-08, 14-09, 14-11, and 14-12, and groundwater samples will only be collected for BTEX. In addition, to provide better coverage of the site, groundwater samples will be collected from 14-07, 14-13, and 14-14 and analyzed for BTEX. Naphthalene is the only PAH compound that has been detected in groundwater during the semiannual monitoring event. This compound does not have an MCL or IWQS, and the concentrations are below the risk-based value provided in the CAP-Part B Report.

VI. REIMBURSEMENT

Attached _____ N/A X

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the UST 29 Site, Building 1633, Facility ID #9-089088, using Department of Defense Environmental Restoration Account Funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.

APPENDIX I

REPORT FIGURES

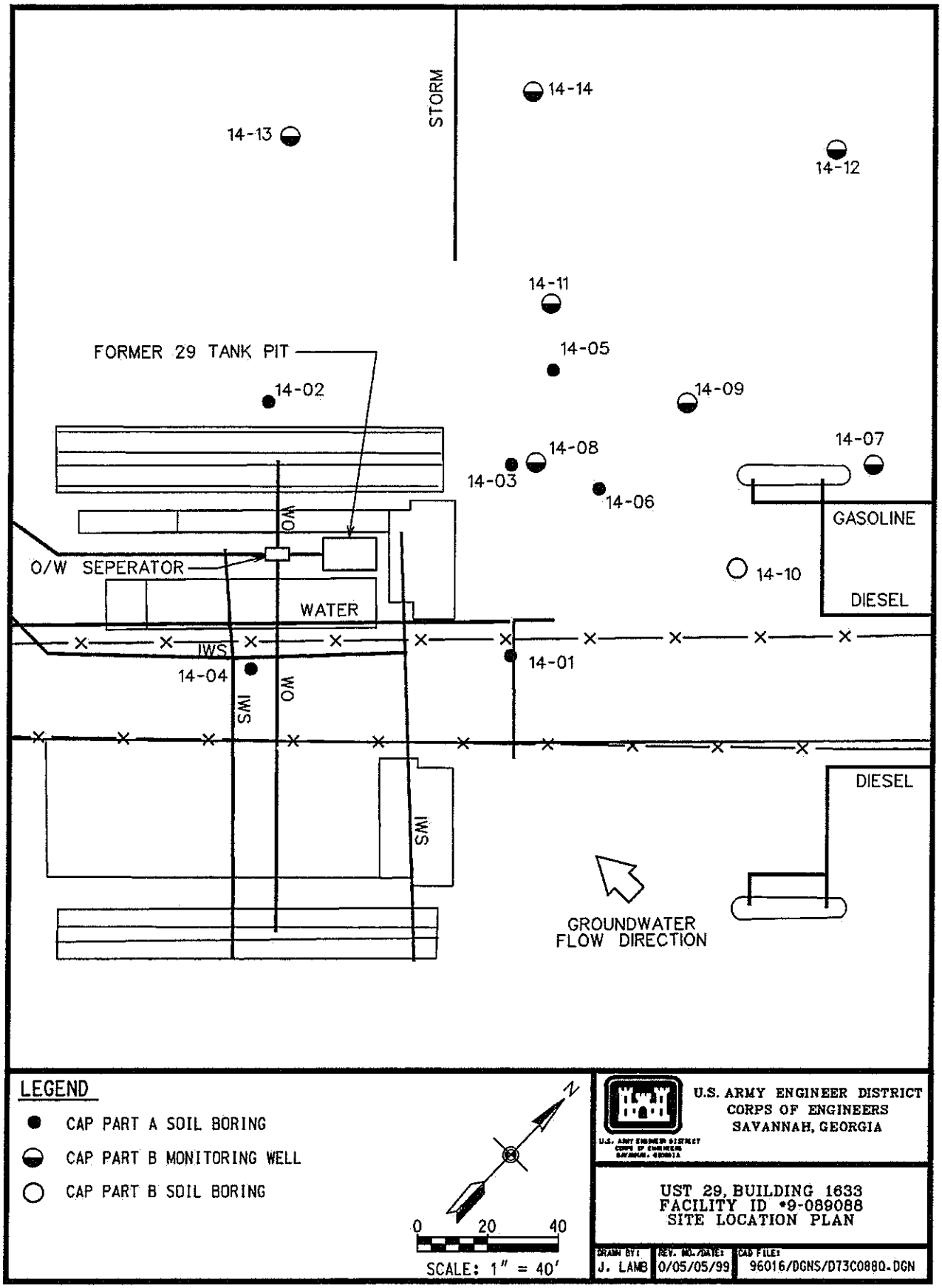


Figure 1. Location Map of UST 29 at Fort Stewart, Liberty County, Georgia

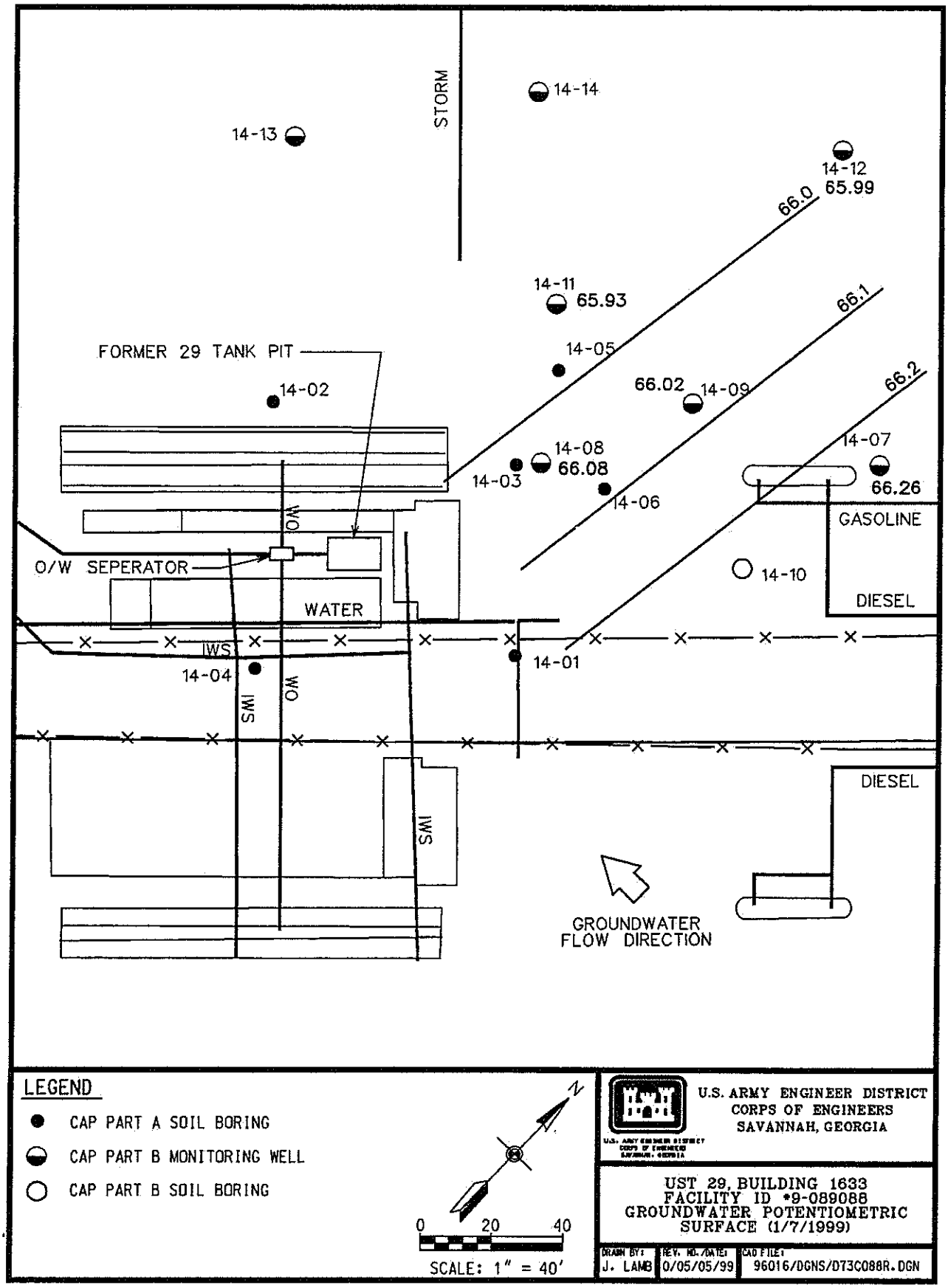


Figure 2. Potentiometric Surface Map of the UST 29 Site (1/7/99)

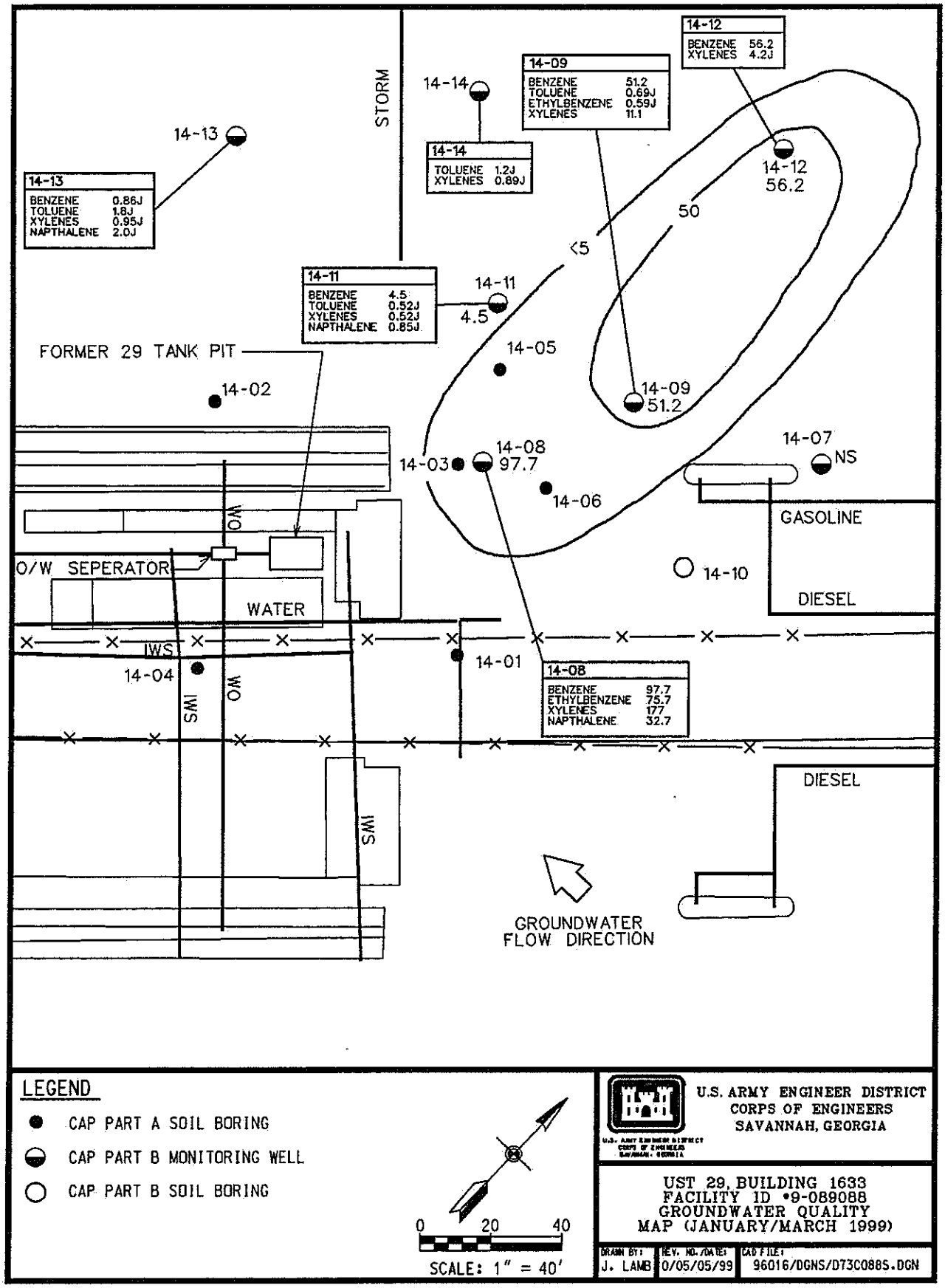


Figure 3. Groundwater Quality Map for the UST 29 Site (January/March 1999)

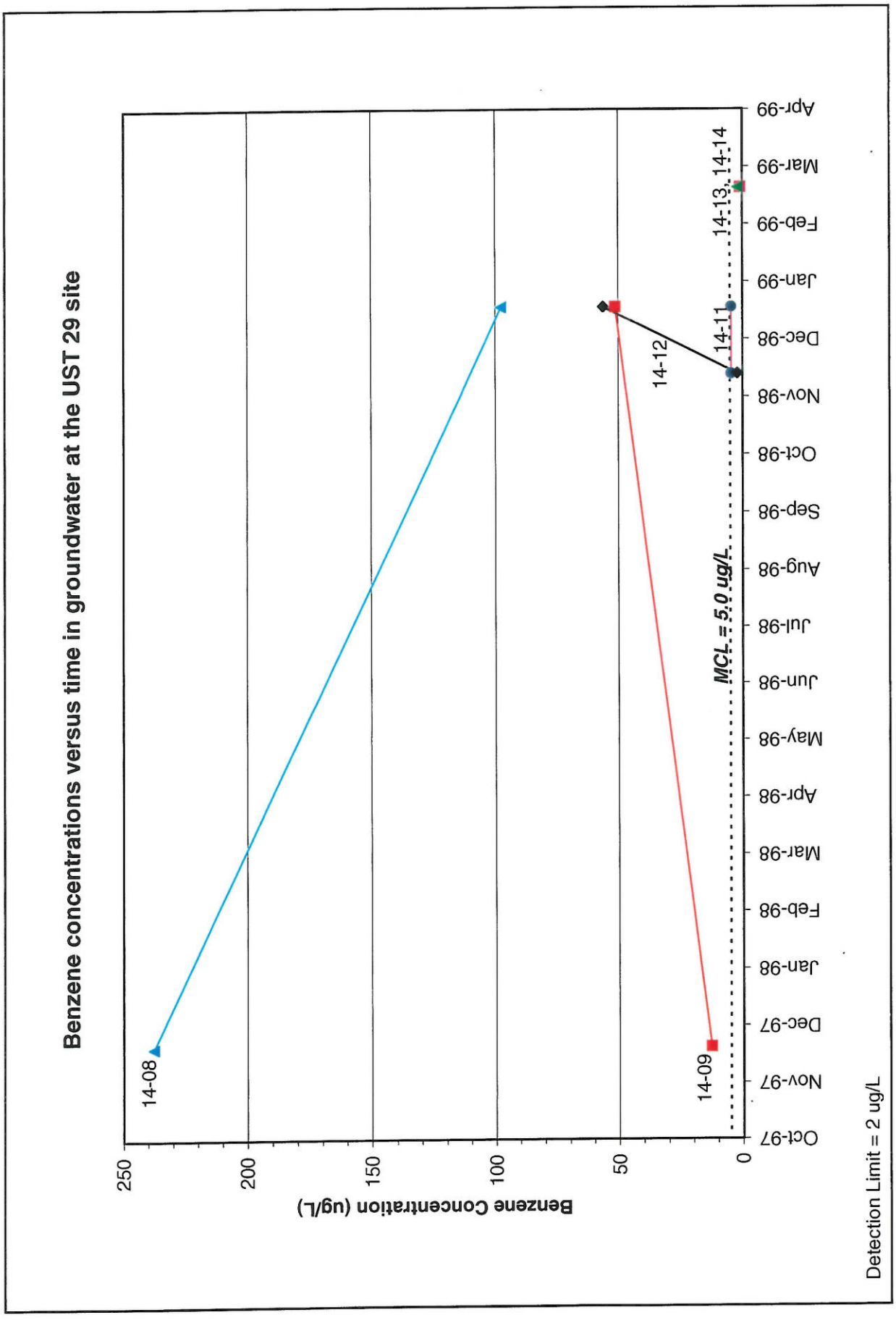


Figure 4. Trend of Benzene Concentrations for the UST 29 Site

APPENDIX II

REPORT TABLES

TABLE 1: GROUNDWATER ELEVATIONS

Well Number	Date of Measurement	Top of Casing Elevation (ft AMSL)	Screened Interval (ft BGS)	Water Depth (ft BTOC)	Groundwater Elevation (ft AMSL)
14-07	1/7/99	71.06	3.0 – 13.0	4.80	66.26
14-08	1/7/99	70.18	3.0 – 13.0	4.10	66.08
14-09	1/7/99	70.59	3.0 – 13.0	4.57	66.02
14-11	1/7/99	69.91	4.7 – 14.7	3.98	65.93
14-12	1/7/99	70.73	9.7 – 19.7	4.74	65.99

TABLE 2: GROUNDWATER ANALYTICAL RESULTS

Sample Location	Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)	Total PAH (µg/L)
14-08	140822	1/7/99	**97.7 =**	20 U	75.7 =	177 =	350.4	32.7
14-09	140922	1/6/99	**51.2 =**	0.69 J	0.59 J	11.1 =	63.58	ND
14-11	141122	1/7/99	4.5 =	0.52 J	2 U	0.52 J	5.02	0.85
14-12	141222	1/7/99	**56.2 =**	2 U	2 U	4.2 J	60.4	ND
14-13	141312	3/10/99	0.86 J	1.8 J	2 U	0.95 J	3.61	2.0
14-14	141412	3/10/99	2 U	1.2 J	2 U	0.89 J	2.09	ND
Applicable Standards[1]			5	1000	700	10,000	NRC	NRC
Alternate Concentration Limit			550	-	-	-	-	-

NOTE:

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

Bold values exceed MCLs

BTEX Benzene, toluene, ethylbenzene, and xylene

BGS Below ground surface

ND Not detected

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 3a: 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 (mg/kg)
14-13	141311	0.8 – 2.8	2/17/99	0.00097 J	0.00061 J	0.0022 U	0.0033 U	0.00158	155 =
14-13	141321	10.0 – 12.5	2/17/99	0.002 U	0.002 U	0.002 U	0.0029 U	ND	5.66 U
14-14	141411	7.5 – 9.4	2/17/99	0.002 U	0.002 U	0.002 U	0.003 U	ND	238 =
14-14	141421	10.0 – 12.0	2/17/99	0.0021 U	0.0021 U	0.0021 U	0.0031 U	ND	11.4 U
Applicable Standards[1]				0.008	10	6	700	NRC	NRC

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

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Detected PAH Compounds (mg/kg)						Total PAHs (mg/kg)
14-13	141311	0.8 – 2.8	2/17/99							ND
14-13	141321	10.0 – 12.5	2/17/99							ND
14-14	141411	7.5 – 9.4	2/17/99							ND
14-14	141421	10.0 – 12.0	2/17/99							ND
Applicable Standards[1]										NRC

NOTE:

[1] U.S. Environmental Protection Agency maximum contaminant level
BTEX Benzene, toluene, ethylbenzene, and xylene
BGS Below ground surface
ND Not detected
NRC No regulatory criteria
PAH Polynuclear aromatic hydrocarbon
TPH Total petroleum hydrocarbons

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

LABORATORY ANALYTICAL RESULTS

FIRST SEMIANNUAL MONITORING EVENT

JANUARY 1999

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

140822

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A04W

Matrix: (soil/water) WATER Lab Sample ID: 9901222-04

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2R211

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: not dec. _____ Date Analyzed: 01/12/99

GC Column: DB-624 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	97.7	
108-88-3	toluene	20.0	U
100-41-4	ethylbenzene	75.7	
75-71-8	xylenes (total)	177	

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

140822

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A03W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9901223-08

Sample wt/vol: 1010 (g/mL) ML Lab File ID: 4C222

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: _____ decanted: (Y/N) Date Extracted: 01/11/99

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 01/13/99

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/L	Q
91-20-3	naphthalene	32.7	
91-58-7	2-chloronaphthalene	9.9	U
209-96-8	acenaphthylene	9.9	U
83-32-9	acenaphthene	9.9	U
86-73-7	fluorene	9.9	U
85-01-8	phenanthrene	9.9	U
120-12-7	anthracene	9.9	U
206-44-0	fluoranthene	9.9	U
129-00-0	pyrene	9.9	U
56-55-3	benzo(a)anthracene	9.9	U
218-01-9	chrysene	9.9	U
205-99-2	benzo(b)fluoranthene	9.9	U
207-08-9	benzo(k)fluoranthene	9.9	U
50-32-8	benzo(a)pyrene	9.9	U
193-39-5	indeno(1,2,3-cd)pyrene	9.9	U
53-70-3	dibenz(a,h)anthracene	9.9	U
191-24-2	benzo(g,h,i)perylene	9.9	U

= U ↓ U5 PQL U ↓

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS5A04W

Method Type: Total Metals

Sample ID: 9901222-04

Client ID: 140822

Contract: SAIC01298 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 1/8/99 Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	27500	µg/L			P	4.6	TJA61 Trace2 ICPAES	990120-2

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

140922

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A04W

Matrix: (soil/water) WATER Lab Sample ID: 9901222-10

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2R111

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: not dec. _____ Date Analyzed: 01/11/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

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

DATA VALIDATION COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
71-43-2	benzene	51.2		
108-88-3	toluene	0.69	J	
100-41-4	ethylbenzene	0.59	J	
75-71-8	xylenes (total)	11.1		

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

140922

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A03W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9901223-01

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 4C215

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: _____ decanted: (Y/N) _____ Date Extracted: 01/11/99

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 01/13/99

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/L	Q
91-20-3	naphthalene	10.0	U
91-58-7	2-chloronaphthalene	10.0	U
209-96-8	acenaphthylene	10.0	U
83-32-9	acenaphthene	10.0	U
86-73-7	fluorene	10.0	U
85-01-8	phenanthrene	10.0	U
120-12-7	anthracene	10.0	U
206-44-0	fluoranthene	10.0	U
129-00-0	pyrene	10.0	U
56-55-3	benzo(a)anthracene	10.0	U
218-01-9	chrysene	10.0	U
205-99-2	benzo(b)fluoranthene	10.0	U
207-08-9	benzo(k)fluoranthene	10.0	U
50-32-8	benzo(a)pyrene	10.0	U
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U
53-70-3	dibenz(a,h)anthracene	10.0	U
191-24-2	benzo(g,h,i)perylene	10.0	U

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DATA VALIDATION COPY

Form 1: Inorganic Analyses Data Sheet

G No.: FS5A04W Method Type: Total Metals

Sample ID: 9901222-10 Client ID: 140922

Contract: SAIC01298 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 1/8/99 Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	34000	µg/L			P	4.6	TJA61 Trace2 ICPAES	990120-2

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141122

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A01W

Matrix: (soil/water) WATER Lab Sample ID: 9901216-01

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2Q607

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: not dec. _____ Date Analyzed: 01/09/99

GC Column: DB-624 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	4.5	
108-88-3	toluene	0.52	J
100-41-4	ethylbenzene	2.0	U
75-71-8	xylenes (total)	0.52	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141122

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A01W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9901216-01

Sample wt/vol: 940.0 (g/mL) ML Lab File ID: 5B615

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 01/08/99

% Moisture: _____ decanted: (Y/N) Date Extracted: 01/09/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/09/99

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	0.85	J
91-58-7	2-chloronaphthalene	10.6	U
208-96-8	acenaphthylene	10.6	U
83-32-9	acenaphthene	10.6	U
86-73-7	fluorene	10.6	U
85-01-8	phenanthrene	10.6	U
120-12-7	anthracene	10.6	U
206-44-0	fluoranthene	10.6	U
129-00-0	pyrene	10.6	U
56-55-3	benzo(a)anthracene	10.6	U
218-01-9	chrysene	10.6	U
205-99-2	benzo(b)fluoranthene	10.6	U
207-08-9	benzo(k)fluoranthene	10.6	U
50-32-8	benzo(a)pyrene	10.6	U
193-39-5	indeno(1,2,3-cd)pyrene	10.6	U
53-70-3	dibenz(a,h)anthracene	10.6	U
191-24-2	benzo(g,h,i)perylene	10.6	U

J
U

DATA VALIDATION COPY

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS5A04W

Method Type: Total Metals

Sample ID: 9901222-07

Client ID: 141122

Contract: SAIC01298 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 1/8/99 Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	33900	µg/L			P	4.6	TJA61 Trace2 ICPAES	990120-2

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141222

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A04W

Matrix: (soil/water) WATER Lab Sample ID: 9901222-08

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2R216

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: not dec. _____ DATA VALIDATION COPY Date Analyzed: 01/12/99

GC Column: DB-624 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	56.2	
108-88-3	toluene	2.0	U
100-41-4	ethylbenzene	2.0	U
75-71-8	xylenes (total)	4.2	J

UCL

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141222

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A03W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9901223-10

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: 4C306

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: _____ decanted: (Y/N) Date Extracted: 01/11/99

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 01/13/99

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/L	Q
91-20-3	naphthalene	10.3	U
91-58-7	2-chloronaphthalene	10.3	U
209-96-8	acenaphthylene	10.3	U
83-32-9	acenaphthene	10.3	U
86-73-7	fluorene	10.3	U
85-01-8	phenanthrene	10.3	U
120-12-7	anthracene	10.3	U
206-44-0	fluoranthene	10.3	U
129-00-0	pyrene	10.3	U
56-55-3	benzo(a)anthracene	10.3	U
218-01-9	chrysene	10.3	U
205-99-2	benzo(b)fluoranthene	10.3	U
207-08-9	benzo(k)fluoranthene	10.3	U
50-32-8	benzo(a)pyrene	10.3	U
193-39-5	indeno(1,2,3-cd)pyrene	10.3	U
53-70-3	dibenz(a,h)anthracene	10.3	U
191-24-2	benzo(g,h,i)perylene	10.3	U

U

UJ P01

U

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS5A04W

Method Type: Total Metals

Sample ID: 9901222-08

Client ID: 141222

Contract: SAIC01298 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 1/8/99 Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	4250	µg/L			P	4.6	TJA61 Trace2 ICPAES	990120-2

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141224

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A04W

Matrix: (soil/water) WATER Lab Sample ID: 9901222-09

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2R110

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: not dec. _____ Date Analyzed: 01/11/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

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

DATA VALIDATED COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
71-43-2	benzene	54.7		U
108-88-3	toluene	0.69	J	J
100-41-4	ethylbenzene	2.0	U	U
75-71-8	xylenes (total)	4.7	J	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141224

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FS5A03W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9901223-09

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 4C305

Level: (low/med) LOW Date Received: 01/08/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 01/11/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/13/99

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/L	Q
91-20-3	naphthalene	10.0	U
91-58-7	2-chloronaphthalene	10.0	U
209-96-8	acenaphthylene	10.0	U
83-32-9	acenaphthene	10.0	U
86-73-7	fluorene	10.0	U
85-01-8	phenanthrene	10.0	U
120-12-7	anthracene	10.0	U
206-44-0	fluoranthene	10.0	U
129-00-0	pyrene	10.0	U
56-55-3	benzo(a)anthracene	10.0	U
218-01-9	chrysene	10.0	U
205-99-2	benzo(b)fluoranthene	10.0	U
207-08-9	benzo(k)fluoranthene	10.0	U
50-32-8	benzo(a)pyrene	10.0	U
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U
53-70-3	dibenz(a,h)anthracene	10.0	U
191-24-2	benzo(g,h,i)perylene	10.0	U

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DATA VALIDATION COPY

Form 1: Inorganic Analyses Data Sheet

SDG No.: FS5A04W

Method Type: Total Metals

Sample ID: 9901222-09		Client ID: 141224	
Contract: SAIC01298	Lab Code: GEL	Case No.:	SAS No.:
Matrix: WATER	Date Received: 1/8/99	Level: LOW	
% Solids: 0.00			

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	4380	µg/L			P	4.6	TJA61 Trace2 ICPAES	990120-2

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

ADDITIONAL WELL INSTALLATION

FEBRUARY/MARCH 1999

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141312

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB13W

Matrix: (soil/water) WATER Lab Sample ID: 9903450-19

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1A620

Level: (low/med) LOW Date Received: 03/11/99

% Moisture: not dec. _____ Date Analyzed: 03/20/99

GC Column: DB-624 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	0.86	J	JSJ
108-88-3	toluene	1.8	J	
100-41-4	ethylbenzene	2.0	U	
75-71-8	xylenes (total)	0.95	J	

DATA VALIDATION COPY

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141312RE

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB11W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9903448-20

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 7M325

Level: (low/med) LOW Date Received: 03/11/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 03/19/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 03/24/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

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

USR

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	2.0	J
91-58-7	2-chloronaphthalene	10.2	U
208-96-8	acenaphthylene	10.2	U
83-32-9	acenaphthene	10.2	U
86-73-7	fluorene	10.2	U
85-01-8	phenanthrene	10.2	U
120-12-7	anthracene	10.2	U
206-44-0	fluoranthene	10.2	U
129-00-0	pyrene	10.2	U
56-55-3	benzo(a)anthracene	10.2	U
218-01-9	chrysene	10.2	U
205-99-2	benzo(b)fluoranthene	10.2	U
207-08-9	benzo(k)fluoranthene	10.2	U
50-32-8	benzo(a)pyrene	10.2	U
193-39-5	indeno(1,2,3-cd)pyrene	10.2	U
53-70-3	dibenz(a,h)anthracene	10.2	U
191-24-2	benzo(g,h,i)perylene	10.2	U

DATA VALIDATION COPY

J A01

U

Form 1: Inorganic Analyses Data Sheet

SDG No.: FSB13W

Method Type: Total Metals

Sample ID: 9903450-19

Client ID: 141312

Contract: SAIC00299

Lab Code: GEL

Case No.:

SAS No.:

Matrix: WATER

Date Received: 3/11/99

Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	11100	µg/L	=		P	4.6	TJA61 Trace ICPAES	990325-2

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141412

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB14W

Matrix: (soil/water) WATER Lab Sample ID: 9903461-01

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1A306

Level: (low/med) LOW Date Received: 03/11/99

% Moisture: not dec. _____ Date Analyzed: 03/17/99

GC Column: DB-624 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	2.0	U	UJ
108-88-3	toluene	1.2	J	
100-41-4	ethylbenzene	2.0	U	UJ
75-71-8	xylenes (total)	0.89	J	

DATA VALIDATION COPY

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141412

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB12W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9903449-03

Sample wt/vol: 940.0 (g/mL) ML Lab File ID: 2L409

Level: (low/med) LOW Date Received: 03/11/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:03/12/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 03/18/99

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	10.6	U
91-58-7	2-chloronaphthalene	10.6	U
208-96-8	acenaphthylene	10.6	U
83-32-9	acenaphthene	10.6	U
86-73-7	fluorene	10.6	U
85-01-8	phenanthrene	10.6	U
120-12-7	anthracene	10.6	U
206-44-0	fluoranthene	10.6	U
129-00-0	pyrene	10.6	U
56-55-3	benzo(a)anthracene	10.6	U
218-01-9	chrysene	10.6	U
205-99-2	benzo(b)fluoranthene	10.6	U
207-08-9	benzo(k)fluoranthene	10.6	U
50-32-8	benzo(a)pyrene	10.6	U
193-39-5	indeno(1,2,3-cd)pyrene	10.6	U
53-70-3	dibenz(a,h)anthracene	10.6	U
191-24-2	benzo(g,h,i)perylene	10.6	U

U

Form 1: Inorganic Analyses Data Sheet

SDG No.: FSB12W

Method Type: Total Metals

Sample ID: 9903449-11

Client ID: 141412

Contract: SAIC00299 Lab Code: GEL Case No.: SAS No.:

Matrix: WATER Date Received: 3/11/99 Level: LOW

% Solids: 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-89-6	Iron	20700	µg/L	=		P	4.6	TJA61 Trace ICPAES	990316-1

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141311

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB01S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-18

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 5X507

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: not dec. 9 Date Analyzed: 02/26/99

GC Column: DB624 ID: 0.25 (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	0.97	J	J
108-88-3	toluene	0.61	J	J
100-41-4	ethylbenzene	2.2	U	U
1330-20-7	xylenes (total)	3.3	U	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141311

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSBQ1S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-18

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 4I311

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 02/20/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/24/99

Injection Volume: 1.0(uL) Dilution Factor: 4.0

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	1460	U
91-58-7	2-chloronaphthalene	1460	U
208-96-8	acenaphthylene	1460	U
83-32-9	acenaphthene	1460	U
86-73-7	fluorene	1460	U
85-01-8	phenanthrene	1460	U
120-12-7	anthracene	1460	U
206-44-0	fluoranthene	1460	U
129-00-0	pyrene	1460	U
56-55-3	benzo(a)anthracene	1460	U
218-01-9	chrysene	1460	U
205-99-2	benzo(b)fluoranthene	1460	U
207-08-9	benzo(k)fluoranthene	1460	U
50-32-8	benzo(a)pyrene	1460	U
193-39-5	indeno(1,2,3-cd)pyrene	1460	U
53-70-3	dibenz(a,h)anthracene	1460	U
191-24-2	benzo(g,h,i)perylene	1460	U

U

FORM I SV-1 OLM03.0

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: CAP-Part A and B UST Sites

cc: SAIC00299

Report Date: March 12, 1999

Sample ID	: 141311
Lab ID	: 9902752-18
Matrix	: Soil
Date Collected	: 02/17/99
Date Received	: 02/18/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		155	=	10.9	22.0	mg/kg	1.0	AAT	03/11/99	1200	144327	1

M = Method	Method-Description
M 1	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141313

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB01S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-19

Sample wt/vol: 5.5 (g/mL) G Lab File ID: 5X508

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: not dec. 8 Date Analyzed: 02/26/99

GC Column: DB624 ID: 0.25 (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	0.58	J	J
108-88-3	toluene	2.0	U	U
100-41-4	ethylbenzene	2.0	U	U
1330-20-7	xylenes (total)	2.9	U	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141313

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB01S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-19

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 4I312

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: 8 decanted: (Y/N) N Date Extracted: 02/20/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/24/99

Injection Volume: 1.0(uL) Dilution Factor: 4.0

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	1450	U
91-58-7	2-chloronaphthalene	1450	U
208-96-8	acenaphthylene	1450	U
83-32-9	acenaphthene	1450	U
86-73-7	fluorene	1450	U
85-01-8	phenanthrene	1450	U
120-12-7	anthracene	1450	U
206-44-0	fluoranthene	1450	U
129-00-0	pyrene	1450	U
56-55-3	benzo(a)anthracene	1450	U
218-01-9	chrysene	1450	U
205-99-2	benzo(b)fluoranthene	1450	U
207-08-9	benzo(k)fluoranthene	1450	U
50-32-8	benzo(a)pyrene	1450	U
193-39-5	indeno(1,2,3-cd)pyrene	1450	U
53-70-3	dibenz(a,h)anthracene	1450	U
191-24-2	benzo(g,h,i)perylene	1450	U

U

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: CAP-Part A and B UST Sites

cc: SAIC00299 Report Date: March 12, 1999

Sample ID	: 141315
Lab ID	: 9902752-19
Matrix	: Soil
Date Collected	: 02/17/99
Date Received	: 02/18/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		37.9	10.8	21.7	mg/kg	1.0	AAT	03/11/99	1200	144327	1

M = Method	Method-Description
M 1	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB02S

Matrix: (soil/water) SOIL Lab Sample ID: 9902753-01

Sample wt/vol: 6.0 (g/mL) G Lab File ID: 1Y131

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: not dec. 15 Date Analyzed: 03/02/99

GC Column: DB-624 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	2.0	U	U
108-88-3	toluene	2.0	U	
100-41-4	ethylbenzene	2.0	U	
75-71-8	xylenes (total)	2.9	U	

DATA VALIDATION COPY

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141321

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB02S

Matrix: (soil/water) SOIL Lab Sample ID: 9902753-01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 8J319

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: 15 decanted: (Y/N) N Date Extracted:02/19/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 03/04/99

Injection Volume: 1.0(uL) Dilution Factor: 4.0

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	1570	U
91-58-7	2-chloronaphthalene	1570	U
208-96-8	acenaphthylene	1570	U
83-32-9	acenaphthene	1570	U
86-73-7	fluorene	1570	U
85-01-8	phenanthrene	1570	U
120-12-7	anthracene	1570	U
206-44-0	fluoranthene	1570	U
129-00-0	pyrene	1570	U
56-55-3	benzo(a)anthracene	1570	U
218-01-9	chrysene	1570	U
205-99-2	benzo(b)fluoranthene	1570	U
207-08-9	benzo(k)fluoranthene	1570	U
50-32-8	benzo(a)pyrene	1570	U
193-39-5	indeno(1,2,3-cd)pyrene	1570	U
53-70-3	dibenz(a,h)anthracene	1570	U
191-24-2	benzo(g,h,i)perylene	1570	U

U

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: CAP-Part A and B UST Sites

cc: SAIC00299 Report Date: March 12, 1999

Sample ID	: 141321
Lab ID	: 9902753-01
Matrix	: Soil
Date Collected	: 02/17/99
Date Received	: 02/18/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons	U	5.66	U	11.6	23.5	mg/kg	1.0	AAT	03/11/99	1200	144327	1
TOTAL ORGANIC CARBON (TOC)		303	=	43.1	100	mg/kg	1.0	JHC	02/28/99	1534	143154	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 415.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Form 1: Inorganic Analyses Data Sheet

SDG No.: FSB02S

Method Type: Total Metals

Sample ID: 9902753-01		Client ID: 141321	
Contract: SAIC00299	Lab Code: GEL	Case No.:	SAS No.:
Matrix: SOIL	Date Received: 2/18/99	Level: LOW	
% Solids: 85.00			

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	0.99	mg/kg	=		P	0.16	TJA61 Trace ICPAES	990303-1

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

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

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB01S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-20

Sample wt/vol: 5.9 (g/mL) G Lab File ID: 5X509

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: not dec. 14 Date Analyzed: 02/26/99

GC Column: DB624 ID: 0.25 (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	2.0	U
108-88-3	toluene	2.0	U
100-41-4	ethylbenzene	2.0	U
1330-20-7	xylenes (total)	3.0	U

U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB01S

Matrix: (soil/water) SOIL Lab Sample ID: 9902752-20

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 4I313

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: 14 decanted: (Y/N) N Date Extracted: 02/20/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/24/99

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	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

U

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: CAP-Part A and B UST Sites

cc: SAIC00299

Report Date: March 12, 1999

Sample ID	: 141411
Lab ID	: 9902752-20
Matrix	: Soil
Date Collected	: 02/17/99
Date Received	: 02/18/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		238	11.5	23.2	mg/kg	1.0	AAT	03/11/99	1200	144327	1

M = Method	Method-Description
M 1	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB02S

Matrix: (soil/water) SOIL Lab Sample ID: 9902753-02

Sample wt/vol: 5.8 (g/mL) G Lab File ID: 1Y132

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: not dec. 17 Date Analyzed: 03/02/99

GC Column: DB-624 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	2.1	U	U
108-88-3	toluene	2.1	U	
100-41-4	ethylbenzene	2.1	U	
75-71-8	xylenes (total)	3.1	U	

FORM I VOA OLM03.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

141421

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: FSB02S

Matrix: (soil/water) SOIL Lab Sample ID: 9902753-02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 8J320

Level: (low/med) LOW Date Received: 02/18/99

% Moisture: 17 decanted: (Y/N) N Date Extracted:02/19/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 03/04/99

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	402	U
91-58-7	2-chloronaphthalene	402	U
208-96-8	acenaphthylene	402	U
83-32-9	acenaphthene	402	U
86-73-7	fluorene	402	U
85-01-8	phenanthrene	402	U
120-12-7	anthracene	402	U
206-44-0	fluoranthene	402	U
129-00-0	pyrene	402	U
56-55-3	benzo(a)anthracene	402	U
218-01-9	chrysene	402	U
205-99-2	benzo(b)fluoranthene	402	U
207-08-9	benzo(k)fluoranthene	402	U
50-32-8	benzo(a)pyrene	402	U
193-39-5	indeno(1,2,3-cd)pyrene	402	U
53-70-3	dibenz(a,h)anthracene	402	U
191-24-2	benzo(g,h,i)perylene	402	U

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: CAP-Part A and B UST Sites

cc: SAIC00299 Report Date: March 12, 1999

Sample ID	: 141421
Lab ID	: 9902753-02
Matrix	: Soil
Date Collected	: 02/17/99
Date Received	: 02/18/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons	U	11.4	U	11.9	24.1	mg/kg	1.0	AAT	03/11/99	1200	144327	1
TOTAL ORGANIC CARBON (TOC)		846	=	43.1	100	mg/kg	1.0	JHC	02/28/99	1554	143154	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 415.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

Form 1: Inorganic Analyses Data Sheet

SDG No.: FSB02S

Method Type: Total Metals

Sample ID: 9902753-02

Client ID: 141421

Contract: SAIC00299 Lab Code: GEL Case No.: SAS No.:

Matrix: SOIL Date Received: 2/18/99 Level: LOW

% Solids: 83.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7439-92-1	Lead	2.2	mg/kg			P	0.16	TJA61 Trace ICPAES	990303-1

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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

2013

CHAIN CUSTODY RECORD

COC NO.: 003

PROJECT NAME: CAP-Part B UST Investigations	
PROJECT NUMBER: 01-0331-04-1593-200	
PROJECT MANAGER: Patty Stoll	
Sampler (Signature) Laura Lumley (Printed Name) Laura Lumley	

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	GRO	PAH, DRO	PAH, DRO, Lead, TOC	PAH, TPH	PAH, TPH, Lead, TOC	Dissolved iron	No. of Bottles/ Vials	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
761921	2/17/99	1115	Soil	1		1		1				3		9902752-14
761323	2/17/99	1715		1		1		1				3		-15
421211	2/17/99	1515		1		1		1				3		-16
762423	2/17/99	1515		1		1		1				3		-17
141311	2/17/99	1353		1								2		-18
141313	2/17/99	1353		1								2		-19
141411	2/17/99	1510		1								2		-20
141321	2/17/99	1355		1					1			2		9902753-01
141421	2/17/99	1521		1					1			2		-02
620612	2/17/99	1230	water	2								2		9902754-01
640912	2/17/99	1040		2								2		-02
641212	2/17/99	1700		2								2		-03
641025	2/17/99	1730		2								2		-04

RELINQUISHED BY: Laura Lumley	Date/Time 2/18/99 1145	RECEIVED BY: [illegible]	Date/Time 2/18/99 1730	TOTAL NUMBER OF CONTAINERS:
COMPANY NAME: SAIC		COMPANY NAME: GEL		Cooler ID: # 675
RECEIVED BY: [illegible]	Date/Time 2/18/99 1145	RELINQUISHED BY:	Date/Time	
COMPANY NAME: GEL		COMPANY NAME:		
RELINQUISHED BY: [illegible]	Date/Time 2/18/99 1730	RECEIVED BY:	Date/Time	
COMPANY NAME: GEL		COMPANY NAME:		

LABORATORY NAME: General Engineering Laboratory	
LABORATORY ADDRESS: 2040 Savage Road Charleston, SC 29417	
PHONE NO: (803) 556-8171	
Cooler Temperature: 4 °C	
FEDEX NUMBER:	

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

2 of 3

CHAIN OF CUSTODY RECORD

COC NO.: D03522

PROJECT NAME: CAP-Part B UST Investigations

PROJECT NUMBER: 01-0331-04-1593-200

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	GRO	PAH, DRO	PAH, DRO, Lead, TOC	PAH, TPH	PAH, TPH, Lead, TOC	Dissolved Iron	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
790714	3/9/99	1715	water	2								3		9903450-13
790912	3/9/99	1710		2								3		-14
260622	3/10/99	1725		2								3		-15
260722	3/10/99	1710		2								3		-16
260822	3/10/99	1435		2								3		-17
260922	3/10/99	1204		2								3		-18
141312	3/10/99	915		2								2		-19
141412	3/10/99	1020										1		9903449-11
421112	3/10/99	1410										1		-12
421212	3/10/99	1245										1		-13
790612	3/10/99	1054										1		-14
791012	3/10/99	926										1		-15
791112	3/10/99	1225										1		-16

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	3/11/99 1030	Branch	3/11/99 1520
COMPANY NAME: SAIC		COMPANY NAME: GEL	
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL	3/11/99 1030	COMPANY NAME:	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME: GEL	3/11/99 1520	COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS:

Cooler ID: #1486

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.: D03523

PROJECT NAME: CAP-Part B UST Investigations

PROJECT NUMBER: 01-0331-04-1593-200

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	GRO	PAH, DRO	PAH, DRO, Lead, TOC	PAH, TPH	PAH, TPH, Lead, TOC	Dissolved Iron	Oil & Grease	Total Phenols	8260 VOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
D03504	3/11/99	1100	water									2	1	2	7		9903460-01
141412	3/10/99	1020		2											2		9903461-01
421112	3/10/99	1410		2											2		-02
421212	3/10/99	1245		2											2		-03
790812	3/10/99	1045		2											2		-04
79101Z	3/10/99	926		2											2		-05
791112	3/10/99	1225		2											2		-06
930812	3/10/99	950		2											2		-07
930912	3/10/99	1715		2											2		-08
93101Z	3/10/99	1530		2											2		-09
931014	3/10/99	1530		2											2		-10
93111Z	3/10/99	1135		2											2		-11
TB0011	3/10/99	745	✓	2											2		-12

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	3/11/99	Brasco	3/11/99
COMPANY NAME: SAIC	1140	COMPANY NAME: Gel	1520
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time
COMPANY NAME:	3/11/99 1140	COMPANY NAME:	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME:	3/11/99 1520	COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 31

Cooler ID: # 221

Cooler Temperature: 4°C

FEDEX NUMBER:

7 DAY turn

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Science Applications International Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: D03520

PROJECT NAME: CAP-Part B UST Investigations

PROJECT NUMBER: 01-0331-04-1593-200

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	GRO	PAH, DRO	PAH, DRO, Lead, TOC	PAH, TPH	PAH, TPH, Lead, TOC	Dissolved Iron	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
791012	3/10/99	926	water		N							2		990348-19
141312	3/10/99	915			N							2		-20
421112	3/10/99	1410			N							2		9903449-01
421212	3/10/99	1245			N							2		-02
141412	3/10/99	1020			N							2		-03
2160622	3/10/99	1725			N							2		-04

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	3/11/99 1030	[illegible]	3/11/99 1520
COMPANY NAME: SAIC		COMPANY NAME: GEL	
RECEIVED BY: [illegible]	Date/Time 3/11/99 1030	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY: [illegible]	Date/Time 3/11/99 1520	RECEIVED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 12

Cooler ID: #724, 5°C

Cooler Temperature:

FEDEX NUMBER:

APPENDIX IV

SITE RANKING FORM

SITE RANKING FORM

Facility Name: UST 29, Building 1633 **Ranked by:** S. Stoller

County: Liberty **Facility ID #:** 9-089088 **Date Ranked:** 4/7/99

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. 1) = (26) x (C. 10) = (D. 260)**

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. 5) = (G. 5)**

Facility Name: UST 29, Building 1633 **County:** Liberty **Facility ID #:** 9-089088

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 attached text.

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. 5) x (L. 50) = **M. 250**

(M. 250) + (D. 260) = **N. 510**

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. 510) x (P. 1) = (510) + (Q. 0)

= 510 (based on CAP-Part B soil data and January 1999 groundwater data)
ENVIRONMENTAL SENSITIVITY SCORE

ADDITIONAL GEOLOGIC AND HYDROLOGIC DATA

The following information is presented to provide supplemental information to Item H of the Site Ranking Form and provides detailed information relating to the geologic and hydrogeologic conditions at Fort Stewart which supports Fort Stewart's determination that the water withdrawal point(s) located at Fort Stewart are not hydraulically connected to the surficial aquifer.

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 4,254 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: Coosawhatchie 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 Markshead Formation is approximately 70 feet thick in the Savannah Georgia area and consists of light-colored phosphatic, slightly dolomitic, argillaceous sand to fine-grained sandy clay with scattered beds of dolostone and limestone.

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.

Groundwater encountered at all the UST investigation sites is part of the Surficial Aquifer system. Based on the fact that all public and non-public water supply wells draw water from the Principal (Floridan) Aquifer, and that the Hawthorn confining unit separates the Principal Aquifer from the Surficial Aquifer, it is concluded that there is no hydraulic interconnection between the Surficial Aquifer (and associated groundwater plumes, if applicable) located beneath former UST sites and identified water supply withdrawal points at Fort Stewart.

APPENDIX V

REIMBURSEMENT APPLICATION

Fort Stewart is a federally owned facility and has funded the investigation for the UST 29 site, Building 1633, Facility ID #9-089088, using Department of Defense Environmental Restoration Account Funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.

ATTACHMENT A

REVISED FATE AND TRANSPORT MODELING

1. FATE AND TRANSPORT MODELING

The fate and transport modeling that was performed as part of the CAP-Part B Report is based on the assumption of a continuous source of contamination of infinite duration at the site based on the maximum observed benzene concentration in groundwater. In summary, the AT123D model was used to model contaminant migration to two potential downgradient receptors: a drainage ditch located approximately 500 feet west of the site and Mill Creek located approximately 2000 feet west of the site. A catch basin for a storm drain is located approximately 60 feet downgradient of the site; the depth of the basin is approximately 2.0 feet bgs. Thus, the storm drain is above the water table and is not a potential preferential pathway for contaminant migration. The modeling results indicated that, due to dilution attenuation, benzene will not reach the drainage ditch at concentrations above the MCL or Mill Creek at detectable concentrations.

Based on modeling results the estimated dilution attenuation factor (DAF) for benzene at drainage ditch is 110 and the DAF at Mill Creek is 400,000. Simulations were also performed to predict the maximum concentrations of benzene over a simulation period of two years in the downgradient wells that will be used for long-term monitoring. The predicted two-year maximum concentrations in the wells are presented in Table A-1. The alternate concentration limits (ACLs) for the site are presented in Table A-2.

Table A-1. Predicted Two-Year Maximum Concentrations in Groundwater at the UST 29 Site

Well	Predicted Maximum Concentration (µg/L)
14-08	90
14-09	35
14-11	43
14-12	10

Table A-2. Revised ACLs for the UST 29 Site

Contaminant	MCL (µg/L)	DAF[1]	ACL[2] (µg/L)
Benzene	5	110	550

[1] DAF = Maximum Observed Concentration ÷ Predicted Concentration at the Receptor
= 239 ÷ 2.2 ≈ 110 at the drainage ditch

[2] ACL = MCL × DAF

Fate and Transport Modeling Conclusions

The conclusions below are based on a fate and transport modeling assuming a continuous source of contamination of infinite duration at the site based on the maximum observed benzene concentration in groundwater during the CAP-Part A and CAP-Part B investigations.

- Benzene concentrations in groundwater do not exceed the ACL of 550 µg/L in any of the wells at the site indicating that the benzene concentrations at the site are not high enough to reach the drainage ditch above MCLs.

- Benzene concentrations in wells 14-08, 14-09, and 14-12 exceed their respective predicted two-year maximum concentrations of benzene. However, this sampling event is the first of the two-year monitoring period, and concentrations are expected to decrease with time as biodegradation occurs.

ATTACHMENT B

REFERENCES

REFERENCES

Arora, Ram 1984. Hydrologic Evaluation for Underground Injection Control in the Coastal Plain of Georgia, Department of Natural Resources, Environmental Protection Division, Georgia Geological Survey.

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