FORSCOM

FIRST ANNUAL MONITORING ONLY REPORT

FINAL

3d Inf Div (Mech)

Underground Storage Tanks 21 & 22
Facility ID #9-025053
Building 1327
Hunter Army Airfield, Georgia

Prepared for

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. DACA21-95-D-0022
Delivery Order 0061

December 2000

SAIC®

DOCUMENT 2.6

FINAL

FIRST ANNUAL MONITORING ONLY REPORT
FOR
UNDERGROUND STORAGE TANKS 21 & 22
FACILITY ID #9-025053
BUILDING 1327
HUNTER ARMY AIRFIELD, 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 0061

Prepared by

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

December 2000

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List of Abbreviations and Acronyms

ACL	alternate concentration limit
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
DAF	dilution attenuation factor
GA EPD	Georgia Environmental Protection Division
HAAF	Hunter Army Airfield
IWQS	In-stream Water Quality Standard
NFAR	No Further Action Required
PAH	polynuclear aromatic hydrocarbon
SAIC	Science Applications International Corporation
UST	underground storage tank
USTMP	Underground Storage Tank Management Program

MONITORING ONLY REPORT

Submittal Date: December 2000 Monitoring Report Number: 1st Annual

For Period Covering: December 1999 to December 2000

Facility Name: USTs 21 & 22 , Building 1327 Street Address: White Drive & Wilson Boulevard

Facility ID: 9-025053 City: Hunter Army Airfield County: Chatham Zip Code: _____

Latitude: 32° 00′ 59″ Longitude: 81° 07′ 26″

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:	Directorate of Public Works, Bldg. 1137	Address:	P.O. Box 2502
	1550 Frank Cochran Drive		
City:	Fort Stewart State: GA	City:	Oak Ridge State: TN
Zip Code:	31314-4927	Zip Code:	37831
Telephone:	(912) 767-2010	Telephone:	(865) 481-8792

I. REGISTERED PROFESSIONAL ENGINEER OR PROFESSIONAL GEOLOGIST CERTIFICATION

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

Name: Patricia A. Stoll

Signature: _____

Date: 11/21/00

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 Underground Storage Tanks (USTs) 21 & 22, Facility ID #9-025053 were located near Building 1327 at Hunter Army Airfield (HAAF), Georgia. The tanks were removed and the piping was abandoned in place on September 12, 1996. Science Applications International Corporation (SAIC) performed a Corrective Action Plan (CAP)–Part A investigation in 1998 (SAIC 1999a) and a CAP–Part B investigation in 1999 (SAIC 1999b) to determine the extent of petroleum contamination at the site. Five monitoring wells, five soil borings, and two vertical-profile borings were installed during these investigations. The CAP–Part B Report was submitted in October 1999 and approved by the Georgia Environmental Protection Division (GA EPD) Underground Storage Tank Management Program (USTMP) in correspondence January 25, 2000 (Logan 2000). The CAP–Part B Report recommended that two additional wells (MW-L8 and MW-L9) be installed as part of the long-term monitoring and that five monitoring wells (MW-L1, MW-L2, MW-L7, MW-L8, and MW-L9) be sampled on a semiannual basis for benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAHs) because benzene and naphthalene were selected as constituents of potential concern in groundwater.

The fate and transport modeling performed as part of the CAP–Part B Report (SAIC 1999b) reflected a continuous source of contamination. The results are summarized in Attachment A of this document. As a result of the semiannual monitoring events in February 2000 and June 2000, it was not necessary to revise the fate and transport modeling results.

As recommended in the CAP–Part B Report (SAIC 1999b), monitoring wells MW-L8 and MW-L9 were installed in December 1999. One soil sample was collected from each boring and analyzed for BTEX, PAHs, total petroleum hydrocarbons (TPH)–diesel-range organics, and TPH–gasoline-range organics. The boring logs are provided in Attachment C of this report.

The purpose of the semiannual monitoring summarized in this report was to confirm the results of the fate and transport modeling and that natural attenuation is taking place at the site. The benzene and naphthalene concentrations during the February 2000 and June 2000 sampling events were below their respective In-stream Water Quality Standards (IWQSs) or alternate concentration limits (ACLs); therefore, a No Further Action Required status is being recommended for the site.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. Potentiometric Data:

(Appendix I, Figures 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 February 2000, groundwater elevations were measured in all of the monitoring wells to determine the groundwater flow direction. In

February 2000, the groundwater flow direction was toward the east, and the groundwater gradient was approximately 0.0154 foot/foot.

During the second semiannual sampling event in June 2000, groundwater elevations were measured in all of the monitoring wells to determine the groundwater flow direction. In June 2000, the groundwater flow direction was toward the east-southeast, and the groundwater gradient was approximately 0.011 foot/foot.

B. Analytical Data:

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

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

In December 1999, monitoring wells MW-L8 and MW-L9 were installed in accordance with the recommendation of the CAP–Part B Report (SAIC 1999b). One soil sample was collected from each boring, and the results are presented in Table 3.

During the first semiannual sampling event in February 2000, monitoring wells MW-L1, MW-L2, MW-L7, MW-L8, and MW-L9 were sampled for BTEX and PAHs. Analytical results from the first sampling event showed no detectable BTEX or PAH concentrations in well MW-L7. Benzene, ethylbenzene, xylenes, acenaphthane, fluorene, naphthalene, and phenanthrene were either detected or were estimated to be present in wells MW-L1, MW-L2, MW-L8, and MW-L9; however, none of the concentrations exceeded the respective IWQS. Benzene was detected at 2.6 µg/L in well MW-L1 and 2.8 µg/L in well MW-L2. Naphthalene was detected at 14.8 µg/L in well MW-L1, 17.7 µg/L in well MW-L2, 3.5 µg/L in well MW-L8, and 1.4 µg/L in well MW-L9.

During the second semiannual sampling event in June 2000, monitoring wells MW-L1, MW-L2, MW-L7, MW-L8, and MW-L9 were sampled for BTEX and PAHs. Analytical results from the second sampling event showed no detectable BTEX or PAH concentrations in well MW-L7. Benzene, ethylbenzene, xylenes, acenaphthane, naphthalene, and phenanthrene were either detected or were estimated to be present in wells MW-L1, MW-L2, MW-L8, and MW-L9; however, none of the concentrations exceeded the respective IWQS. Benzene was detected at 2.7 µg/L in well MW-L1 and 2.8 µg/L in well MW-L2. Naphthalene was detected at 12.0 µg/L in well MW-L1, 16.4 µg/L in well MW-L2, 6.7 µg/L in well MW-L8, and 1.2 µg/L in well MW-L9.

The benzene concentrations during the two semiannual sampling events were below the IWQS of 71.28 µg/L and the ACL of 2,210 µg/L. Figure 4 shows the variations in benzene concentrations in groundwater for all the wells. There is not an IWQS for naphthalene; however, the concentrations during the two semiannual sampling events were below the naphthalene ACL of 201 µg/L.

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

(Appendix IV: Site Ranking Form)

Environmental Site Sensitivity Score: *(April 1999 version of the Site Ranking Form was used for 2000 scores.)*	0 (Jan. 2000 – First Semiannual Monitoring Event) 0 (June 2000 – Second Semiannual Monitoring Event)

V. CONCLUSIONS/RECOMMENDATIONS

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

Fort Stewart respectfully requests that GA EPD USTMP assign Facility ID #9-025053 a No Further Action Required (NFAR) status for the following reasons:

- The Monitoring Only Plan was conducted in accordance with Section III of the CAP–Part B Report (SAIC 1999b) and was submitted to GA EPD USTMP in October 1999 and approved by GA EPD USTMP in correspondence January 25, 2000 (Logan 2000).

- The site score for the last two rounds of semiannual groundwater sampling has been 0, which GA EPD USTMP representatives have indicated is an acceptable score for requesting an NFAR status (i.e., January 27, 1999, meeting between GA EPD, Fort Stewart, U.S. Army Corps of Engineers, and SAIC representatives).

- The fate and transport modeling conducted during the CAP–Part B Report (SAIC 1999b), which used a continuous source of contamination and which is summarized in Attachment A of this report, indicated that benzene will never reach the nearest potential preferential pathway (i.e., a drainage ditch) at a concentration above the IWQS of 71.28 µg/L.

- The benzene concentrations in all wells were below the IWQS of 71.28 µg/L and the ACL of 2,210 µg/L during the CAP–Part B investigation in April 1999 and the semiannual monitoring events in February and June 2000.

- The naphthalene concentrations in all wells were below the ACL of 201 µg/L during the CAP–Part A investigation, CAP–Part B investigation, and the semiannual monitoring events in February and June 2000.

- The closest surface water body is a drainage ditch 114 feet downgradient from the site.

- Natural attenuation has continued to take place at the site, as shown by the lower benzene concentrations observed during the CAP–Part B investigation and semiannual monitoring events compared to those observed during the CAP–Part A investigation.

The monitoring only program at this site will be discontinued.

VI. REIMBURSEMENT

Attached _____ N/A X

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the USTs 21 & 22 site, Building 1327, Facility ID #9-025053 using U.S. 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

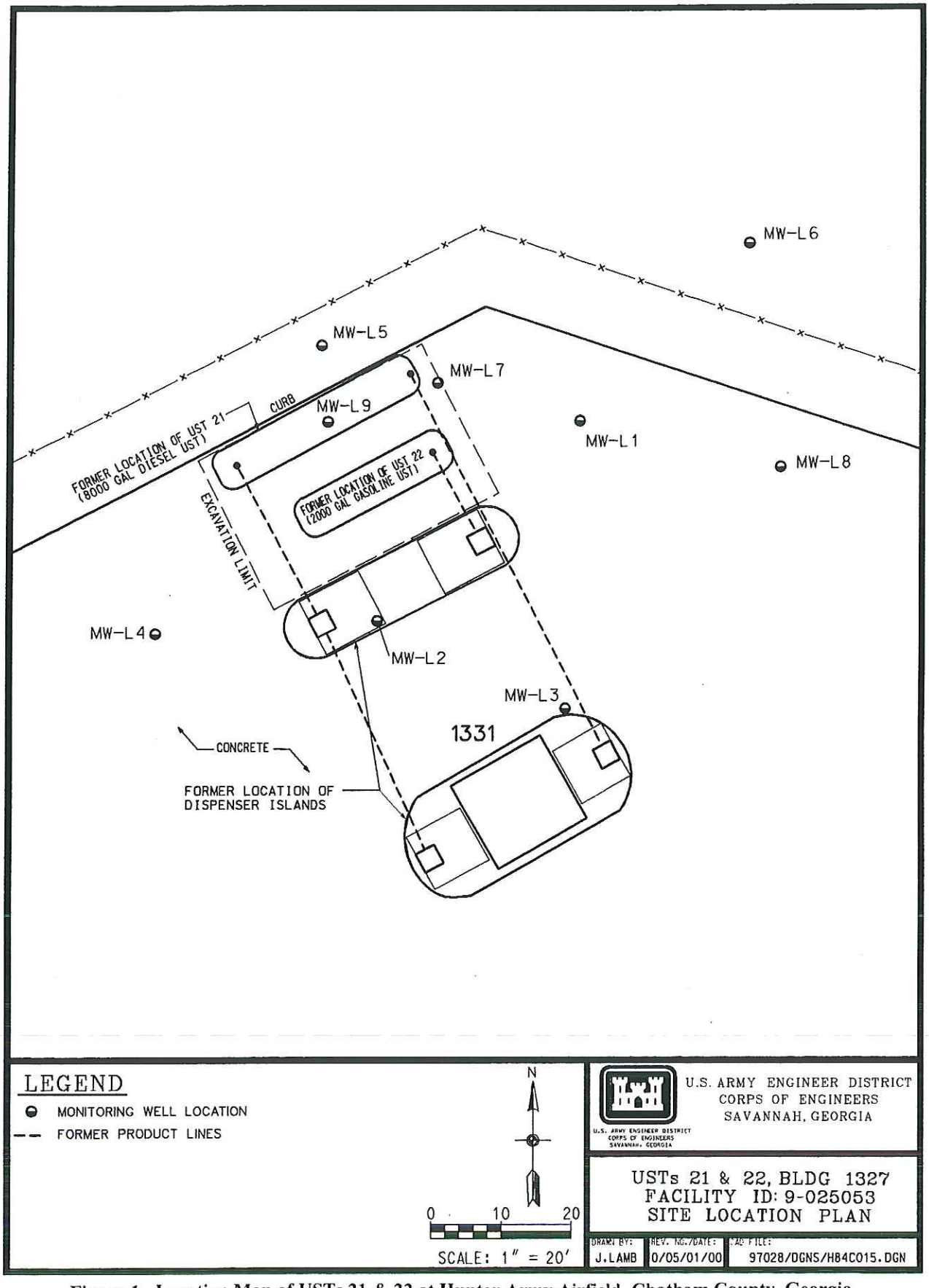

Figure 1. Location Map of USTs 21 & 22 at Hunter Army Airfield, Chatham County, Georgia

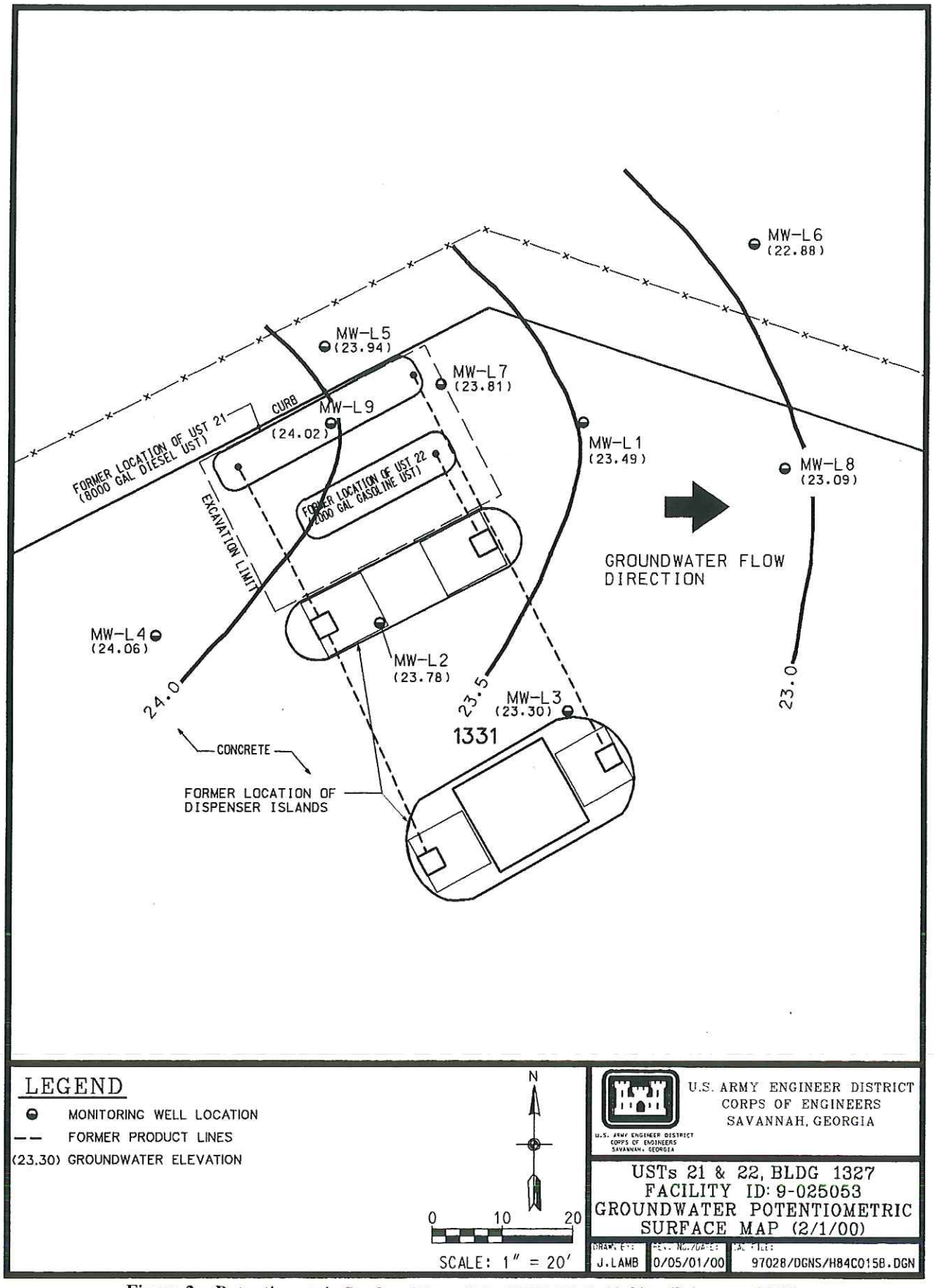

Figure 2a. Potentiometric Surface Map of the USTs 21 & 22 Site (February 2000)

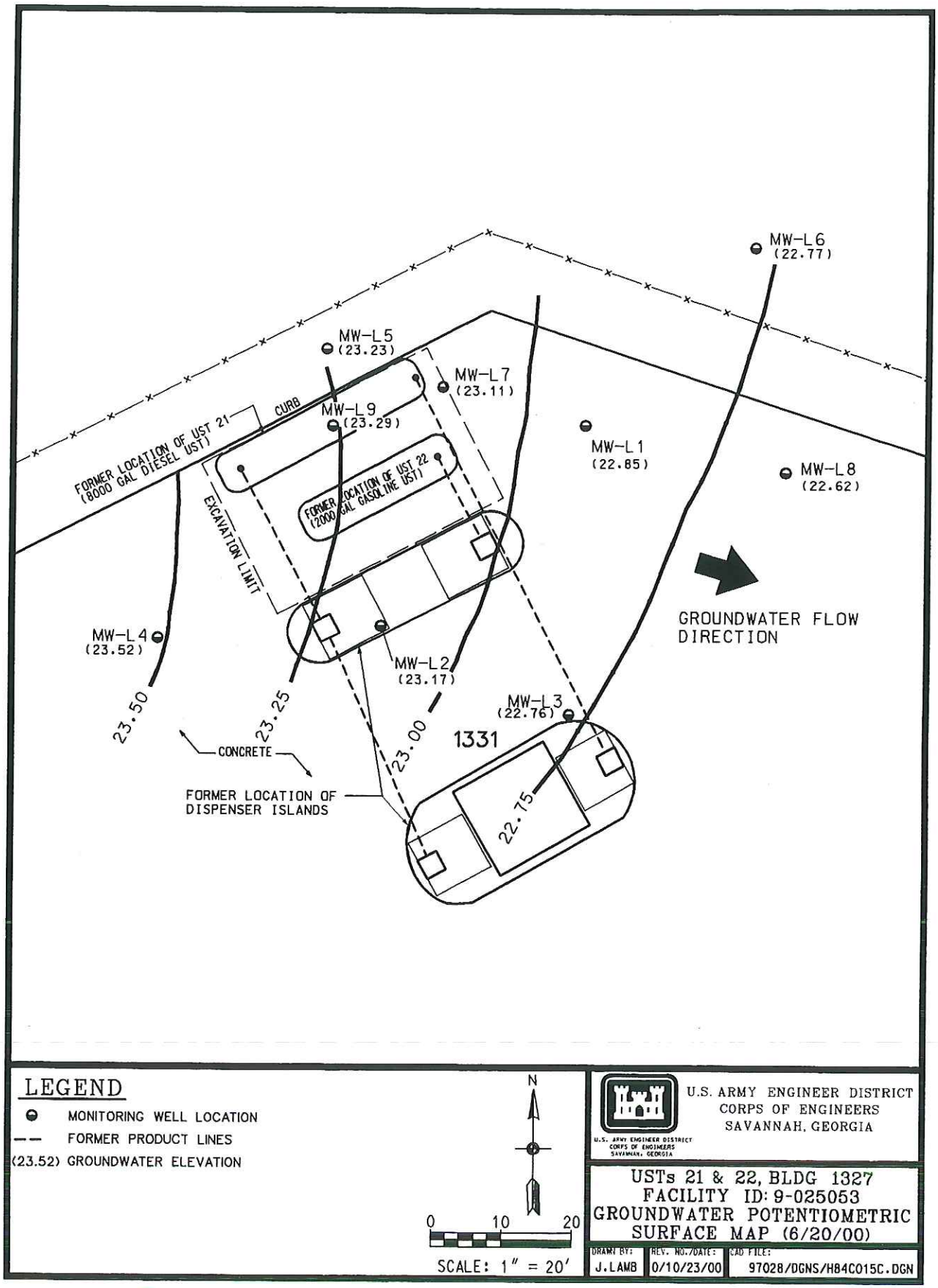

Figure 2b. Potentiometric Surface Map of the USTs 21 & 22 Site (June 2000)

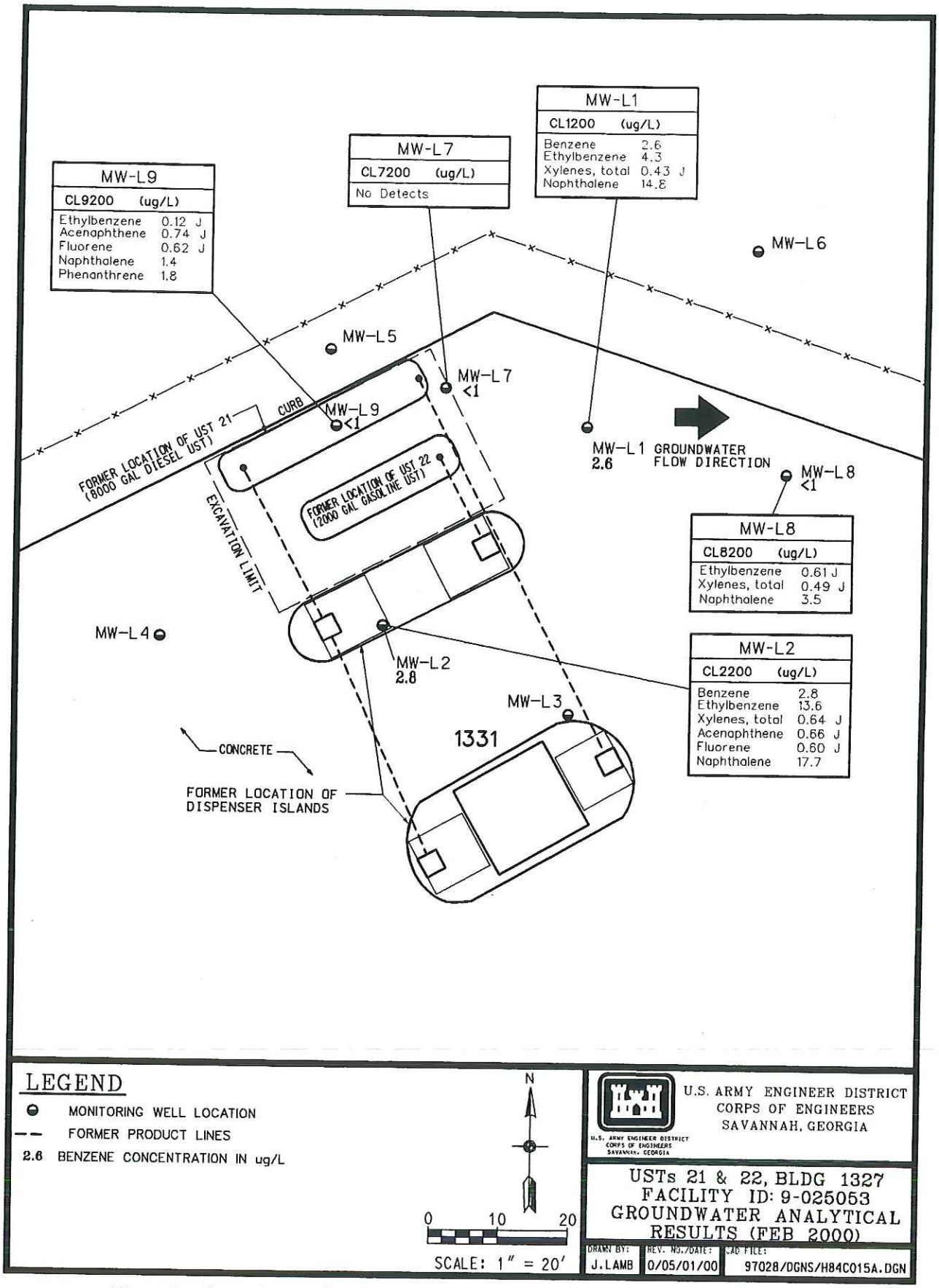

Figure 3a. Groundwater Quality Map for the USTs 21 & 22 Site (February 2000)

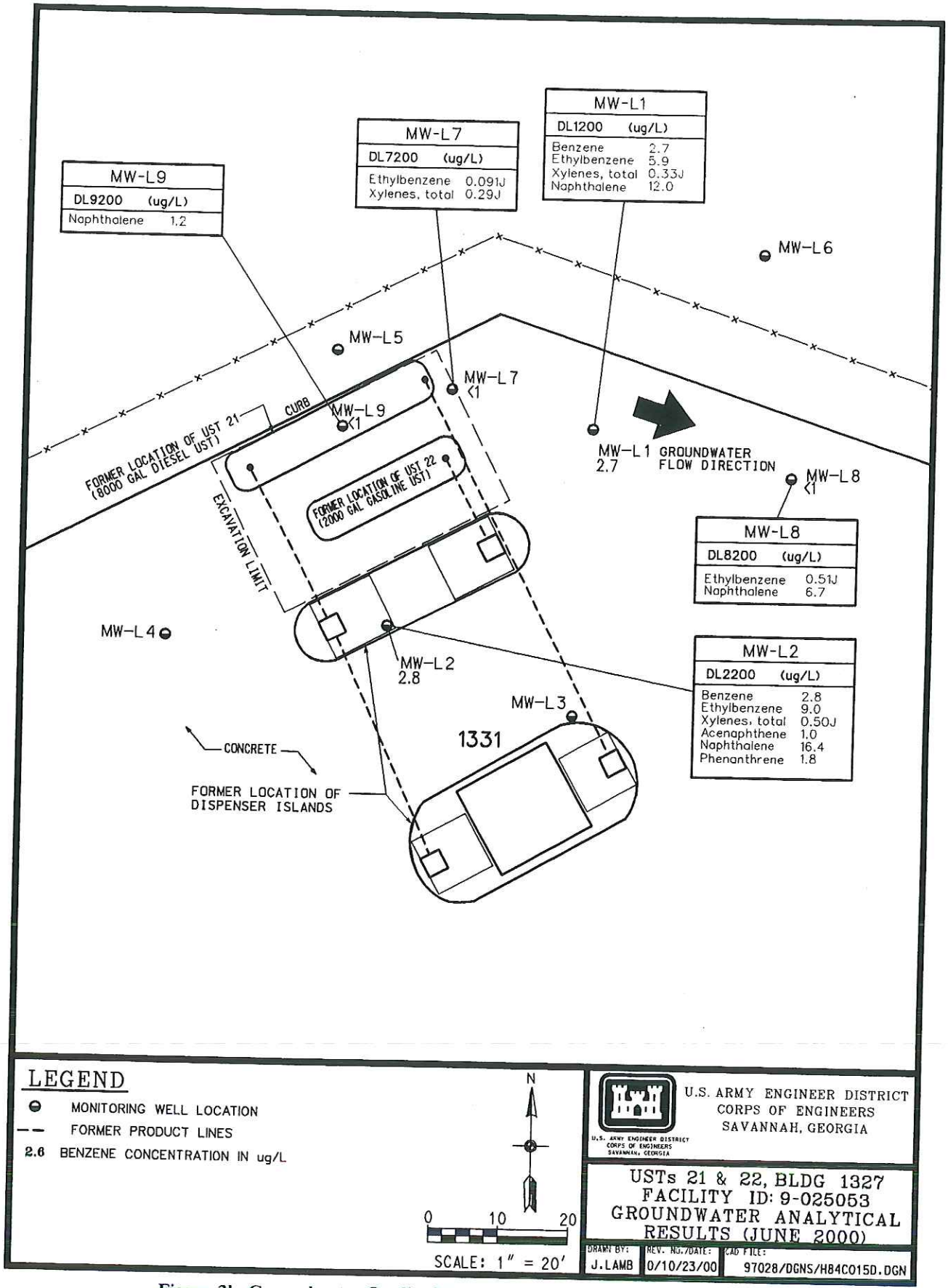

Figure 3b. Groundwater Quality Map for the USTs 21 & 22 Site (June 2000)

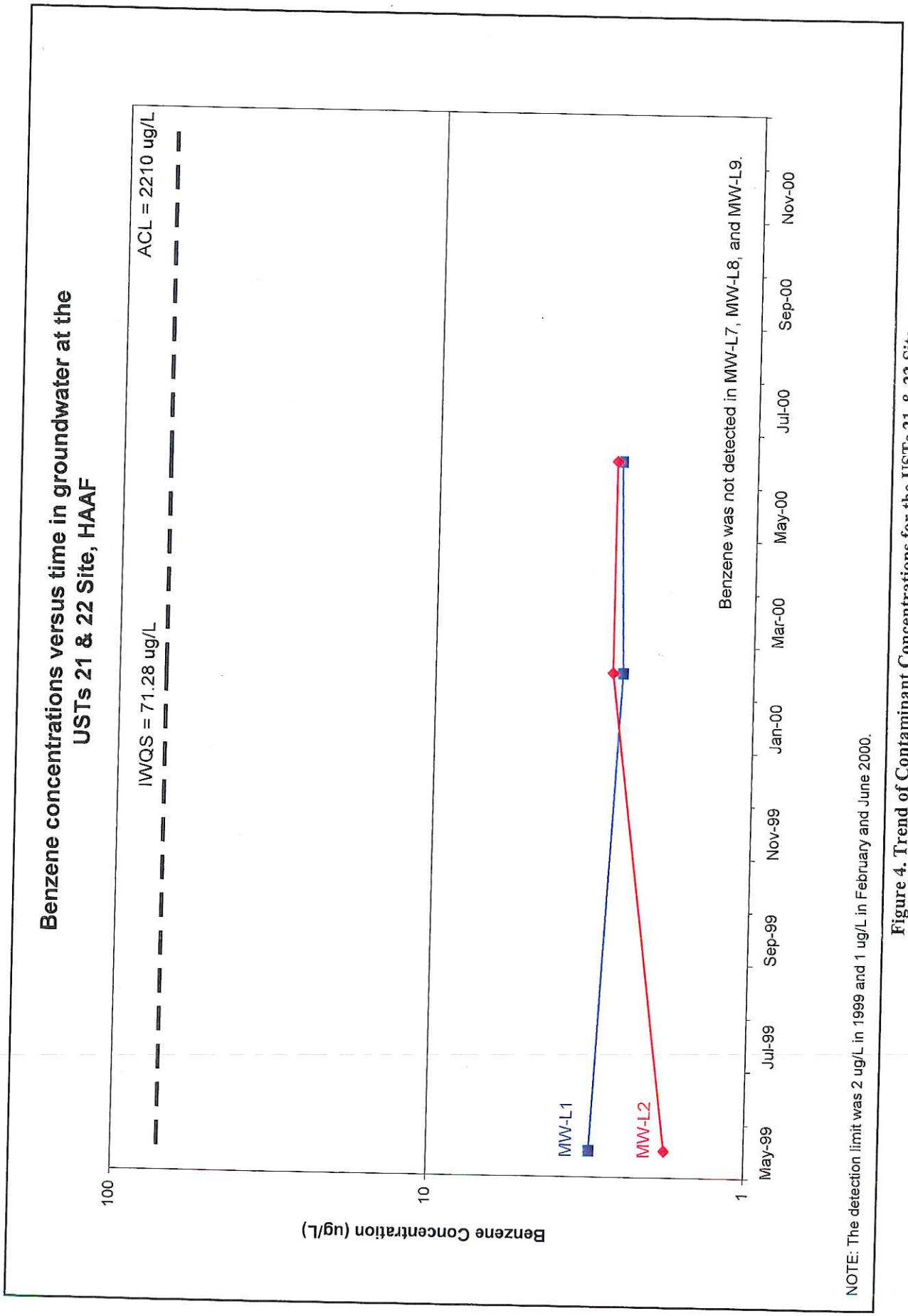

Figure 4. Trend of Contaminant Concentrations for the USTs 21 & 22 Site

APPENDIX II

REPORT TABLES

Table 1. Groundwater Elevations

Well Number	Date of Measurement	Top of Casing Elevation (feet AMSL)	Screened Interval (feet BGS)	Water Depth (feet BTOC)	Product Thickness (feet)	Groundwater Elevation (feet AMSL)
First Semiannual Monitoring Event – February 2000						
MW-L1	2/1/00	28.18	4.4 – 14.4	4.69	0	23.49
MW-L2	2/1/00	28.70	4.6 – 14.6	4.92	0	23.78
MW-L3	2/1/00	28.85	4.9 – 14.9	5.55	0	23.30
MW-L4	2/1/00	28.73	4.1 – 14.1	4.67	0	24.06
MW-L5	2/1/00	28.55	3.6 – 13.6	4.61	0	23.94
MW-L6	2/1/00	27.98	5.2 – 15.2	5.1	0	22.88
MW-L7	2/1/00	28.18	3.7 – 13.7	4.37	0	23.81
MW-L8	2/1/00	27.97	3.1 – 13.1	4.88	0	23.09
MW-L9	2/1/00	28.28	1.9 – 11.9	4.26	0	24.02
Second Semiannual Monitoring Event – June 2000						
MW-L1	06/20/00	28.18	4.4 – 14.4	5.33	0	22.85
MW-L2	06/20/00	28.70	4.6 – 14.6	5.53	0	23.17
MW-L3	06/20/00	28.85	4.9 – 14.9	6.09	0	22.76
MW-L4	06/20/00	28.73	4.1 – 14.1	5.21	0	23.52
MW-L5	06/20/00	28.55	3.6 – 13.6	5.32	0	23.23
MW-L6	06/20/00	27.98	5.2 – 15.2	5.21	0	22.77
MW-L7	06/20/00	28.18	3.7 – 13.7	5.07	0	23.11
MW-L8	06/20/00	27.97	3.1 – 13.1	5.35	0	22.62
MW-L9	06/20/00	28.28	1.9 – 11.9	4.99	0	23.29

NOTES:

AMSL	Above mean sea level
BGS	Below ground surface
BTOC	Below top of casing

Table 2. Groundwater Analytical Results

Sample Location	Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
First Semiannual Monitoring Event – February 2000							
MW-L1	CL1200	2/2/00	2.6 =	1 U	4.3 =	0.43 J	7.33
MW-L2	CL2200	2/2/00	2.8 =	1 U	13.6 =	0.64 J	17.04
MW-L7	CL7200	2/2/00	1 U	1 U	1 U	3 U	ND
MW-L8	CL8200	2/2/00	1 U	1 U	0.61 J	0.49 J	1.1
MW-L9	CL9200	2/2/00	1 U	1 U	0.12 J	3 U	0.12
Second Semiannual Monitoring Event – June 2000							
MW-L1	DL1200	6/23/00	2.7 =	1 U	5.9 =	0.33 J	8.93
MW-L2	DL2200	6/23/00	2.8 =	1 U	9.0 =	0.50 J	12.3
MW-L7	DL7200	6/23/00	1 U	1 U	0.091 J	0.29 J	0.381
MW-L8	DL8200	6/25/00	1 U	1 U	0.51 J	3 U	0.51
MW-L9	DL9200	6/25/00	1 U	1 U	1 U	3 U	ND
In-stream Water Quality Standard (GA EPD Chapter 391-3-6)			71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit			2,210	—	—	—	—

Sample Location	Sample ID	Date Sampled	Detected PAH Compounds (µg/L)				Total PAHs (µg/L)
			Acenaphthene	Fluorene	Naphthalene	Phenanthrene	
First Semiannual Monitoring Event – February 2000							
MW-L1	CL1200	2/2/00			14.8 =		14.8
MW-L2	CL2200	2/2/00	0.66 J	0.60 J	17.7 =		18.96
MW-L7	CL7200	2/2/00					ND
MW-L8	CL8200	2/2/00			3.5 =		3.5
MW-L9	CL9200	2/2/00	0.74 J	0.62 J	1.4 =	1.8 =	4.56
Second Semiannual Monitoring Event – June 2000							
MW-L1	DL1200	6/23/00			12 =		12
MW-L2	DL2200	6/23/00	1.0 =		16.4 =	1.8 =	19.2
MW-L7	DL7200	6/23/00					ND
MW-L8	DL8200	6/25/00			6.7 =		6.7
MW-L9	DL9200	6/25/00			1.2 =		1.2
In-stream Water Quality Standard (GA EPD Chapter 391-3-6)			NRC	14,000	NRC	NRC	NRC
Alternate Concentration Limit			—	—	201	—	—

NOTES:

Bold values exceed IWQSs.

BTEX Benzene, toluene, ethylbenzene, and xylenes
ND Not detected
NRC No regulatory criteria
PAH Polynuclear aromatic hydrocarbon

Laboratory Qualifiers

U Indicates that the compound was not detected at the concentration reported.
J Indicates that the value for the compound is an estimated value.
= Indicates that the compound was detected at the concentration reported.

Table 3. Soil Analytical Results

Sample Location	Sample ID	Sample Depth (feet 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)
Additional Well Installation – December 1999										
MW-L8	HLB811	4.0 – 6.0	12/1/99	0.00091 J	0.0048 =	0.0014 U	0.0042 U	0.0057	3.8 U	0.165 =
MW-L9	HLB911	4.0 – 5.2	12/1/99	0.0023 U	0.0054 =	0.0023 U	0.0070 U	0.0054	2.0 U	0.111 U
GUST Soil Threshold Levels (Table A, Column 2)				0.008	6.0	10.0	700.0	NRC	NRC	NRC

Sample Location	Sample ID	Sample Depth (feet BGS)	Date Sampled	Polynuclear Aromatic Hydrocarbons (mg/kg)				Total PAHs (mg/kg)
Additional Well Installation – December 1999								
MW-L8	HLB811	4.0 – 6.0	12/1/99					ND
MW-L9	HLB911	4.0 – 5.2	12/1/99					ND
GUST Soil Threshold Levels (Table A, Column 2)								NRC

NOTES:

BTEX	Benzene, toluene, ethylbenzene, and xylenes
BGS	Below ground surface
DRO	diesel-range organic
GRO	gasoline-range organic
GUST	Georgia Underground Storage Tank
ND	Not detected; the detection limit for PAH compounds was less than 0.040 mg/kg.
NRC	No regulatory criteria
PAH	Polynuclear aromatic hydrocarbon
TPH	Total petroleum hydrocarbons

Laboratory Qualifiers

U	Indicates that the compound was not detected at the concentration reported.
J	Indicates that the value for the compound is an estimated value.
=	Indicates that the compound was detected at the concentration reported.

APPENDIX III

LABORATORY ANALYTICAL RESULTS

ADDITIONAL WELL INSTALLATION

DECEMBER 1999

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB011

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFA11S

Matrix: (soil/water) SOIL Lab Sample ID: 9900838106

Sample wt/vol: 4.1 (g/mL) G Lab File ID: SN120

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 12/01/99

% Moisture: not dec. 13 Date Analyzed: 12/13/99

GC Column: DB-624 ID: 0.25 (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	
71-43-2	Benzene	0.91	J	J
108-88-3	Toluene	4.8		=
100-41-4	Ethylbenzene	1.4	J	U
1330-20-7	Xylenes (total)	4.2	U	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB811

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835006

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 5X420

Level: (low/med) LOW DATA VALIDATION Date Received: 12/01/99

% Moisture: 13 decanted: (Y/N) N COPY Date Extracted: 12/02/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 12/09/99

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/KG	Q
91-20-3	Naphthalene	38.3	U
91-58-7	2-Chloronaphthalene	38.3	U
208-96-8	Acenaphthylene	38.3	U
83-32-9	Acenaphthene	38.3	U
86-73-7	Fluorene	38.3	U
85-01-8	Phenanthrene	38.3	U
120-12-7	Anthracene	38.3	U
206-44-0	Fluoranthene	38.3	U
129-00-0	Pyrene	38.3	U
56-55-3	Benzo(a)anthracene	38.3	U
218-01-9	Chrysene	38.3	U
205-99-2	Benzo(b)fluoranthene	38.3	U
207-08-9	Benzo(k)fluoranthene	38.3	U
50-32-8	Benzo(a)pyrene	38.3	U
193-39-5	Indeno(1,2,3-cd)pyrene	38.3	U
53-70-3	Dibenz(a,h)anthracene	38.3	U
191-24-2	Benzo(g,h,i)perylene	38.3	U

u

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAIC SAMPLE NO.

HLB811

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835006

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 005F0501

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 12/01/99

% Moisture: 13 decanted: (Y/N) N Date Extracted: 12/03/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 12/06/99

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) MG/KG	Q	
	----------Diesel Range Organics	3.8	B	U F01,F07

FORM I SV

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB811

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFAC2S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835006

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 1M505

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: not dec. 13 Date Analyzed: 12/10/99

DATA VALIDATION COPY

GC Column: RTX-VOLATILES ID: 0.25 (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	165	

FORM I VOA

DUPLICATE

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB813

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFA[illegible]

Matrix: (soil/water) SOIL Lab Sample ID: 9908[illegible]

Sample wt/vol: 3.8 (g/mL) G Lab File ID: SN211

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: not dec. 10 Date Analyzed: 12/14/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

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

DATA VALID AND COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	Benzene	1.5	U	U
108-88-3	Toluene	2.6		=
100-41-4	Ethylbenzene	1.5	U	U
1330-20-7	Xylenes (total)	4.4	U	U

FORM I VOA

DUPLICATE

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB813

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835005

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 5X419

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 12/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 12/02/99

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 12/09/99

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/KG	Q
91-20-3	Naphthalene	36.9	U
91-58-7	2-Chloronaphthalene	36.9	U
208-96-8	Acenaphthylene	36.9	U
83-32-9	Acenaphthene	36.9	U
86-73-7	Fluorene	36.9	U
85-01-8	Phenanthrene	36.9	U
120-12-7	Anthracene	36.9	U
206-44-0	Fluoranthene	36.9	U
129-00-0	Pyrene	36.9	U
56-55-3	Benzo(a)anthracene	36.9	U
218-01-9	Chrysene	36.9	U
205-99-2	Benzo(b)fluoranthene	36.9	U
207-08-9	Benzo(k)fluoranthene	36.9	U
50-32-8	Benzo(a)pyrene	36.9	U
193-39-5	Indeno(1,2,3-cd)pyrene	36.9	U
53-70-3	Dibenz(a,h)anthracene	36.9	U
191-24-2	Benzo(g,h,i)perylene	36.9	U

U

FORM I SV-1 OLM03.0

DUPLICATE

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAIC SAMPLE NO.

HLB813

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFAC2S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835005

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 004F0401

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 12/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 12/03/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 12/06/99

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) MG/KG	Q	
	Diesel Range Organics	2.0	B	U Fol, FC?

DUPLICATE

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB813

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835005

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 1M408

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: not dec. 10 Date Analyzed: 12/09/99

GC Column: RTX-VOLATILES ID: 0.25 (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/KG	Q
	Gasoline Range Organics	182	=

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB911

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFA025

Matrix: (soil/water) SOIL Lab Sample ID: 9900835007

Sample wt/vol: 2.4 (g/mL) G Lab File ID: 5N121

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: not dec. 10 Date Analyzed: 12/13/99

GC Column: DB-624 ID: 0.25 (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	
71-43-2	Benzene	2.3	U	U
108-88-3	Toluene	5.4		
100-41-4	Ethylbenzene	2.3	U	U
1330-20-7	Xylenes (total)	7.0	U	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB911

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835007

Sample wt/vol: 30.0 (g/mL) G Lab File ID: SX421

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 12/02/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 12/09/99

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/KG	Q
91-20-3	Naphthalene	36.9	U
91-58-7	2-Chloronaphthalene	36.9	U
208-96-8	Acenaphthylene	36.9	U
83-32-9	Acenaphthene	36.9	U
86-73-7	Fluorene	36.9	U
85-01-8	Phenanthrene	36.9	U
120-12-7	Anthracene	36.9	U
206-44-0	Fluoranthene	36.9	U
129-00-0	Pyrene	36.9	U
56-55-3	Benzo(a)anthracene	36.9	U
218-01-9	Chrysene	36.9	U
205-99-2	Benzo(b)fluoranthene	36.9	U
207-08-9	Benzo(k)fluoranthene	36.9	U
50-32-8	Benzo(a)pyrene	36.9	U
193-39-5	Indeno(1,2,3-cd)pyrene	36.9	U
53-70-3	Dibenz(a,h)anthracene	36.9	U
191-24-2	Benzo(g,h,i)perylene	36.9	U

FORM I SV-1 OLM03.0

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAIC SAMPLE NO.

HLB911

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HBFA02S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835007

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 014F1401

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 12/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 12/03/99

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 12/03/99

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) MG/KG	Q	
	Diesel Range Organics	2.0	B	U Fo1,F07

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HLB911

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HBFAC2S

Matrix: (soil/water) SOIL Lab Sample ID: 9900835007

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 1M4010

Level: (low/med) LOW Date Received: 12/01/99

% Moisture: not dec. 10 Date Analyzed: 12/09/99

GC Column: RTX-VOLATILES ID: 0.25 (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/KG	Q	
	Gasoline Range Organics	111	U	U

FORM I VOA

Science Applications International Corporation — An Employee Owned Company

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

CHAIN OF CUSTODY RECORD

COC NO.:

PROJECT NAME: HAAF Bulk Fuel Facility CAP - Part A

PROJECT NUMBER: DACA21-95-D-0022, DO # 0051

PROJECT MANAGER: Allison Bailey

Sampler (Signature): (Printed Name): C Allison Bailey

Sample ID	Date Collected	Time Collected	Matrix	BTEX (3 enclave)	PAH, TPH-DRO	THP-GRO, MOISTURE Evaporation Loss	PAH	CHLOR. SOLVENTS	VOC	SVOC, pH, Oil & Grease, Phenols	TCLP VOC	TCLP SVOC	TCLP Metal	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
LB813	12/1/99	1115	SO.1	1	—	1									3	ØPPM	
LB811	12/1/99	1115	SO.1	1	—	1									3	Ø PPM	
LB911	12/1/99	ØB3Ø	SO.1	1	—	1									3	Ø PPM	

REQUESTED PARAMETERS

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Road, Charleston, SC 29407

PHONE NO: (843) 556-8171

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC	12/1/99 1200	COMPANY NAME: GEL	12/1/99 1610
RELINQUISHED BY:	Date/Time 12-1-99 1210	COMPANY NAME:	Date/Time
RELINQUISHED BY:	Date/Time 12-1-99 1610	RECEIVED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 9

Cooler ID: #52

Cooler Temperature: 4°C

FEDEX NUMBER: NA

GEL courier

FIRST SEMIANNUAL MONITORING EVENT

FEBRUARY 2000

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL1200

Lab Name: GENERAL ENGINEERING LABCR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2V311

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: not dec. _____ Date Analyzed: 02/09/00

GC Column: DB-624 ID: 0.25 (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	2.6		=
108-88-3	Toluene	1.0 ~~2.5~~	J	U FOY, FO6
100-41-4	Ethylbenzene	4.3		=
1330-20-7	Xylenes (total)	0.43	J	J

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL1200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342001

Sample wt/vol: 1020 (g/mL) ML Lab File ID: 8G413

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/04/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/10/00

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	14.8	
91-58-7	2-Chloronaphthalene	0.98	U
208-96-8	Acenaphthylene	0.98	U
83-32-9	Acenaphthene	0.98	U
86-73-7	Fluorene	0.98	U
85-01-8	Phenanthrene	0.98	U
120-12-7	Anthracene	0.98	U
206-44-0	Fluoranthene	0.98	U
129-00-0	Pyrene	0.98	U
56-55-3	Benzo(a)anthracene	0.98	U
218-01-9	Chrysene	0.98	U
205-99-2	Benzo(b)fluoranthene	0.98	U
207-08-9	Benzo(k)fluoranthene	0.98	U
50-32-8	Benzo(a)pyrene	0.98	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.98	U
53-70-3	Dibenz(a,h)anthracene	0.98	U
191-24-2	Benzo(g,h,i)perylene	0.98	U

= U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL2200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLEM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342302

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2V312

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: not dec. _____ Date Analyzed: 02/09/00

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

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

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

CAS NO.	COMPOUND		Q	
71-43-2	Benzene	2.8		=
108-88-3	Toluene	1.0 ~~0.27~~	J	= 6 FOY, FOG
100-41-4	Ethylbenzene	13.6		=
1330-20-7	Xylenes (total)	0.64	J	J

FORM 1 VOA

DATA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL2200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342002

Sample wt/vol: 1030 (g/mL) ML Lab File ID: 8G414

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/04/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/10/00

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	17.7	
91-58-7	2-Chloronaphthalene	0.97	U
208-96-8	Acenaphthylene	0.97	U
83-32-9	Acenaphthene	0.66	J
86-73-7	Fluorene	0.60	J
85-01-8	Phenanthrene	0.97	U
120-12-7	Anthracene	0.97	U
206-44-0	Fluoranthene	0.97	U
129-00-0	Pyrene	0.97	U
56-55-3	Benzo(a)anthracene	0.97	U
218-01-9	Chrysene	0.97	U
205-99-2	Benzo(b)fluoranthene	0.97	U
207-08-9	Benzo(k)fluoranthene	0.97	U
50-32-8	Benzo(a)pyrene	0.97	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.97	U
53-70-3	Dibenz(a,h)anthracene	0.97	U
191-24-2	Benzo(g,h,i)perylene	0.97	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL7200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLIM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2V313

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: not dec. _____ Date Analyzed: 02/09/00

GC Column: DB-624 ID: 0.25 (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	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (total)	3.0	U

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FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL7200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342003

Sample wt/vol: 1010 (g/mL) ML Lab File ID: 8G415

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted:02/04/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/10/00

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	0.99	U
91-58-7	2-Chloronaphthalene	0.99	U
208-96-8	Acenaphthylene	0.99	U
83-32-9	Acenaphthene	0.99	U
86-73-7	Fluorene	0.99	U
85-01-8	Phenanthrene	0.99	U
120-12-7	Anthracene	0.99	U
206-44-0	Fluoranthene	0.99	U
129-00-0	Pyrene	0.99	U
56-55-3	Benzo(a)anthracene	0.99	U
218-01-9	Chrysene	0.99	U
205-99-2	Benzo(b)fluoranthene	0.99	U
207-08-9	Benzo(k)fluoranthene	0.99	U
50-32-8	Benzo(a)pyrene	0.99	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.99	U
53-70-3	Dibenz(a,h)anthracene	0.99	U
191-24-2	Benzo(g,h,i)perylene	0.99	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL6200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTMC4W

Matrix: (soil/water) WATER Lab Sample ID: 21342004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3V314

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: not dec. _____ Date Analyzed: 02/09/00

GC Column: DB-624 ID: 0.25 (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	1.0	U	U
108-88-3	Toluene	~~0.40~~ 1.0	J	U FOR, FOR
100-41-4	Ethylbenzene	0.61	J	J
1330-20-7	Xylenes (total)	0.49	J	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL8200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342004

Sample wt/vol: 1020 (g/mL) ML Lab File ID: 8G416

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/04/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 02/10/00

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	3.5	
91-58-7	2-Chloronaphthalene	0.98	U
208-96-8	Acenaphthylene	0.98	U
83-32-9	Acenaphthene	0.98	U
86-73-7	Fluorene	0.98	U
85-01-8	Phenanthrene	0.98	U
120-12-7	Anthracene	0.98	U
206-44-0	Fluoranthene	0.98	U
129-00-0	Pyrene	0.98	U
56-55-3	Benzo(a)anthracene	0.98	U
218-01-9	Chrysene	0.98	U
205-99-2	Benzo(b)fluoranthene	0.98	U
207-08-9	Benzo(k)fluoranthene	0.98	U
50-32-8	Benzo(a)pyrene	0.98	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.98	U
53-70-3	Dibenz(a,h)anthracene	0.98	U
191-24-2	Benzo(g,h,i)perylene	0.98	U

LA

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL9200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER Lab Sample ID: 21342005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2V315

Level: (low/med) LOW Date Received: 02/03/00

% Moisture: not dec. _____ Date Analyzed: 02/09/00

GC Column: DB-624 ID: 0.25 (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	1.0	U	U
108-88-3	Toluene	1.0 ~~2.2~~	J	U FD4, FD6
100-41-4	Ethylbenzene	0.12	J	J
1330-20-7	Xylenes (total)	3.0	U	U

FORM I VOA

OLM03.0

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CL9200

Lab Name: GENERAL ENGINEERING LABOR   Contract: N/A

Lab Code: N/A   Case No.: N/A   SAS No.: N/A   SDG No.: HAAFLTM04W

Matrix: (soil/water) WATER   Lab Sample ID: 21342005

Sample wt/vol: 1020 (g/mL) ML   Lab File ID: 8G417

Level: (low/med) LOW   Date Received: 02/03/00

% Moisture: ____   decanted: (Y/N) ___   Date Extracted: 02/04/00

Concentrated Extract Volume: 1.00(mL)   Date Analyzed: 02/10/00

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	1.4		=
91-58-7	2-Chloronaphthalene	0.98	U	U
208-96-8	Acenaphthylene	0.98	U	U
83-32-9	Acenaphthene	0.74	J	J
86-73-7	Fluorene	0.62	J	J
85-01-8	Phenanthrene	1.8		=
120-12-7	Anthracene	0.98	U	U
206-44-0	Fluoranthene	0.98	U	
129-00-0	Pyrene	0.98	U	
56-55-3	Benzo(a)anthracene	0.98	U	
218-01-9	Chrysene	0.98	U	
205-99-2	Benzo(b)fluoranthene	0.98	U	
207-08-9	Benzo(k)fluoranthene	0.98	U	
50-32-8	Benzo(a)pyrene	0.98	U	
193-39-5	Indeno(1,2,3-cd)pyrene	0.98	U	
53-70-3	Dibenz(a,h)anthracene	0.98	U	
191-24-2	Benzo(g,h,i)perylene	0.98	U	

FORM I SV-1   OLM03.0

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

CHAIN OF CUSTODY RECORD

COC NO.: C-11/6/17

PROJECT NAME: HAAF-LTM USTs 21 & 22

PROJECT NUMBER: 01-1624-04-1764-220

PROJECT MANAGER: Patty Stoll

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

LABORATORY NAME:
General Engineering Laboratory

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	No. of Bottles/ Vials	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
CL1200	2/2/00	1345	water	2	2	4		21342
CL2200	2/2/00	1235		2	2	4		
CL7200	2/2/00	1445		2	2	4		
CL8200	2/2/00	1440		2	2	4		
CL9200	2/2/00	1340		2	2	4		
MP0022	2/2/00	0745	↓	2		2		

REQUESTED PARAMETERS

2/3/00

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	2/3/00 1045	Patricia A Power	2-3-00 14:00
COMPANY NAME: SAIC		COMPANY NAME: SAIC GEL	
RECEIVED BY: Catherine C Brien	Date/Time 2/3/00 1045	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY: Catherine Brien	Date/Time 2/3/00	RECEIVED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 22

Cooler ID: #31

Cooler Temperature: 3°C

FEDEX NUMBER:

III-27

SECOND SEMIANNUAL MONITORING EVENT

JUNE 2000

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL1200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HA2LTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2P214

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: not dec. _____ Date Analyzed: 06/27/00

GC Column: DB-624 ID: 0.25 (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	2.7	B	= F01, F08
108-88-3	Toluene	1.0	U	U =
100-41-4	Ethylbenzene	5.9		
1330-20-7	Xylenes (total)	0.33	J	J

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL1200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499003

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 4A311

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 06/27/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/28/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	12.0	
91-58-7	2-Chloronaphthalene	1.0	U
208-96-8	Acenaphthylene	1.0	U
83-32-9	Acenaphthene	1.0	U
86-73-7	Fluorene	1.0	U
85-01-8	Phenanthrene	1.0	U
120-12-7	Anthracene	1.0	U
206-44-0	Fluoranthene	1.0	U
129-00-0	Pyrene	1.0	U
56-55-3	Benzo(a)anthracene	1.0	U
218-01-9	Chrysene	1.0	U
205-99-2	Benzo(b)fluoranthene	1.0	U
207-08-9	Benzo(k)fluoranthene	1.0	U
50-32-8	Benzo(a)pyrene	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	U
53-70-3	Dibenz(a,h)anthracene	1.0	U
191-24-2	Benzo(g,h,i)perylene	1.0	U

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DATA VALIDATION COPY

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL2200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2P213

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: not dec. _____ Date Analyzed: 06/27/00

GC Column: DB-624 ID: 0.25 (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	2.8	B	= F01, F08
108-88-3	Toluene	1.0	U	= U
100-41-4	Ethylbenzene	9.0		
1330-20-7	Xylenes (total)	0.50	J	= J

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL2200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499002

Sample wt/vol: 1020 (g/mL) ML Lab File ID: 4A310

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 06/27/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/28/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	16.4	
91-58-7	2-Chloronaphthalene	0.98	U
208-96-8	Acenaphthylene	0.98	U
83-32-9	Acenaphthene	1.0	
86-73-7	Fluorene	0.98	U
85-01-8	Phenanthrene	1.8	
120-12-7	Anthracene	0.98	U
206-44-0	Fluoranthene	0.98	U
129-00-0	Pyrene	0.98	U
56-55-3	Benzo(a)anthracene	0.98	U
218-01-9	Chrysene	0.98	U
205-99-2	Benzo(b)fluoranthene	0.98	U
207-08-9	Benzo(k)fluoranthene	0.98	U
50-32-8	Benzo(a)pyrene	0.98	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.98	U
53-70-3	Dibenz(a,h)anthracene	0.98	U
191-24-2	Benzo(g,h,i)perylene	0.98	U

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DATA VALIDATION COPY

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL7200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2P212

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: not dec. _____ Date Analyzed: 06/27/00

GC Column: DB-624 ID: 0.25 (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	1.0	U	U
108-88-3	Toluene	1.0	U	U
100-41-4	Ethylbenzene	0.091	J	J
1330-20-7	Xylenes (total)	0.29	J	J

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL7200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499001

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 4A309

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted:06/27/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/28/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
91-20-3	Naphthalene	1.0	U	U
91-58-7	2-Chloronaphthalene	1.0	U	
208-96-8	Acenaphthylene	1.0	U	
83-32-9	Acenaphthene	1.0	U	
86-73-7	Fluorene	1.0	U	
85-01-8	Phenanthrene	1.0	U	
120-12-7	Anthracene	1.0	U	
206-44-0	Fluoranthene	1.0	U	
129-00-0	Pyrene	1.0	U	
56-55-3	Benzo(a)anthracene	1.0	U	
218-01-9	Chrysene	1.0	U	
205-99-2	Benzo(b)fluoranthene	1.0	U	
207-08-9	Benzo(k)fluoranthene	1.0	U	
50-32-8	Benzo(a)pyrene	1.0	U	
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	U	
53-70-3	Dibenz(a,h)anthracene	1.0	U	
191-24-2	Benzo(g,h,i)perylene	1.0	U	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL8200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499008

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2P309

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: not dec. _____ Date Analyzed: 06/28/00

GC Column: DB-624 ID: 0.25 (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	1.0	U	U
108-88-3	Toluene	1.0	U	U
100-41-4	Ethylbenzene	0.51	J	J
1330-20-7	Xylenes (total)	3.0	U	U

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL8200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499008

Sample wt/vol: 900.0 (g/mL) ML Lab File ID: 4A316

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 06/27/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/28/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	6.7	
91-58-7	2-Chloronaphthalene	1.1	U
208-96-8	Acenaphthylene	1.1	U
83-32-9	Acenaphthene	1.1	U
86-73-7	Fluorene	1.1	U
85-01-8	Phenanthrene	1.1	U
120-12-7	Anthracene	1.1	U
206-44-0	Fluoranthene	1.1	U
129-00-0	Pyrene	1.1	U
56-55-3	Benzo(a)anthracene	1.1	U
218-01-9	Chrysene	1.1	U
205-99-2	Benzo(b)fluoranthene	1.1	U
207-08-9	Benzo(k)fluoranthene	1.1	U
50-32-8	Benzo(a)pyrene	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1.1	U
53-70-3	Dibenz(a,h)anthracene	1.1	U
191-24-2	Benzo(g,h,i)perylene	1.1	U

= U

FORM I SV-1 OLM03.0

DATA VALIDATION COPY

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL9200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HALTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499009

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2P308

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: not dec. _____ Date Analyzed: 06/28/00

GC Column: DB-624 ID: 0.25 (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	1.0	U	U
108-88-3	Toluene	1.0	U	
100-41-4	Ethylbenzene	1.0	U	
1330-20-7	Xylenes (total)	3.0	U	

DATA VALIDATION COPY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DL9200

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: HAGLTM02W

Matrix: (soil/water) WATER Lab Sample ID: 27499009

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 4A317

Level: (low/med) LOW Date Received: 06/24/00

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 06/27/00

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 06/29/00

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	1.2	
91-58-7	2-Chloronaphthalene	1.0	U
208-96-8	Acenaphthylene	1.0	U
83-32-9	Acenaphthene	1.0	U
86-73-7	Fluorene	1.0	U
85-01-8	Phenanthrene	1.0	U
120-12-7	Anthracene	1.0	U
206-44-0	Fluoranthene	1.0	U
129-00-0	Pyrene	1.0	U
56-55-3	Benzo(a)anthracene	1.0	U
218-01-9	Chrysene	1.0	U
205-99-2	Benzo(b)fluoranthene	1.0	U
207-08-9	Benzo(k)fluoranthene	1.0	U
50-32-8	Benzo(a)pyrene	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	U
53-70-3	Dibenz(a,h)anthracene	1.0	U
191-24-2	Benzo(g,h,i)perylene	1.0	U

U

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

CHAIN OF CUSTODY RECORD

COC NO.: HLTM14

PROJECT NAME: HAAF Long Term Monitoring

PROJECT NUMBER: 01-1624-04-2725-200

PROJECT MANAGER: Patty Stoll

SAMPLER (Signature) Laura Lumley (Printed Name) Laura Lumley

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	VOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
OL7200	6/23/00	1320	water	2	2		4		27499
OL2200	6/23/00	1405		2	2		4		
OL1200	6/23/00	1230		2	2		4		
AF4032	6/23/00	1500				2	2		27497
AF4132	6/23/00	1550				2	2		
AF4232	6/23/00	1730	↓			2	2		

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417

PHONE NO: (843) 556-8171

2000063239

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	6/24/00 0930		6/24/00 1155
COMPANY NAME: SAIC		COMPANY NAME: GEL	
RELINQUISHED BY: Laura Reed	Date/Time 6/24/00 0930	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY: Laura Reed	Date/Time 6/24/00 1155	RECEIVED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 16

Cooler Temperature: 4.2

Cooler ID: #476

FEDEX NUMBER:

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

CHAIN OF CUSTODY RECORD

COC NO.: HLTM16

PROJECT NAME: HAAF Long Term Monitoring

PROJECT NUMBER: 01-1624-04-2725-200

PROJECT MANAGER: Patty Stoll

SAMPLER (Signature) Laura Lumley (Printed Name) Laura Lumley

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	VOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
AGL022	6/24/00	1235	water	2	N		4		27499
AGL122	6/24/00	1325		2	N		4		
AGL322	6/24/00	1350		2	N		4		
AGL324	6/24/00	1350		2	N		4		
DL9200	6/25/00	1130		2	N		4		
DL9200	6/25/00	1035		2	N		4		
AG0922	6/24/00	1300		2			2		
TB5512	6/24/00	0745	↓	2			2		

6/26/00

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417

PHONE NO: (843) 556-8171

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Laura Lumley	6/26/00 1100	Scott Rudd	6/26/00 1400
COMPANY NAME: SAIC		COMPANY NAME: GEL	
RELINQUISHED BY:	Date/Time 6/26/00 1100	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY:	Date/Time 6/26/00 1440	RECEIVED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 26

Cooler ID: #511

Cooler Temperature: 4

FEDEX NUMBER:

III-40

7

APPENDIX IV

SITE RANKING FORMS

FIRST SEMIANNUAL MONITORING EVENT

FEBRUARY 2000

SITE RANKING FORM

Facility Name: USTs 21 & 22, Building 1327 **Ranked by:** S. Stoller

County: Chatham **Facility ID #:** 9-025053 **Date Ranked:** 5/4/00

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

* *CAP-Part B location BL2 was installed immediately adjacent to CAP-Part A location L-9, thus analytical data from sample BL2103 superceded analytical data from sample HL9101.*

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. 0) + (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	= 500
☐	>10,000 µg/L	= 1500

* *LTM Sample CL2200 (February 2000)*

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

Facility Name: USTs 21 & 22, Building 1327 **County:** Chatham **Facility ID #:** 9-025053

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

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.

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

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'	= 2

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. 0) x (L. 50) = **M.** 0

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

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

= 0 (January 2000 - First Semiannual Monitoring Event)
ENVIRONMENTAL SENSITIVITY SCORE

SECOND SEMIANNUAL MONITORING EVENT

JUNE 2000

SITE RANKING FORM

Facility Name: USTs 21 & 22, Building 1327 **Ranked by:** S. Stoller

County: Chatham **Facility ID #:** 9-025053 **Date Ranked:** 10/25/00

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

* *CAP-Part B location BL2 was installed immediately adjacent to CAP-Part A location L-9, thus analytical data from sample BL2103 superceded analytical data from sample HL9101.*

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. 0) + (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	= 500
☐	>10,000 µg/L	= 1500

* *LTM Sample DL2200 (June 2000)*

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

Facility Name: USTs 21 & 22, Building 1327 **County:** Chatham **Facility ID #:** 9-025053

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'	= 2

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. 0) x (L. 50) = M. 0

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

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

= 0 (June 2000 - Second Semiannual Monitoring Event)
ENVIRONMENTAL SENSITIVITY SCORE

ADDITIONAL GEOLOGIC AND HYDROGEOLOGIC DATA

The following information is presented to provide supplemental information to Item H of the Site Ranking Form. It provides detailed information relating to the geologic and hydrogeologic conditions at HAAF that supports HAAF's determination that the water withdrawal points located at the airfield cannot hydraulically connect to the surficial aquifer.

1.0 REGIONAL GEOLOGY

Southeastern Georgia is located within the coastal plain physiographic province of the southeastern united states (Clark and Zisa 1976). In this region the thickness of southeastward-dipping, subsurface strata ranges from 0 feet at the fall line, located approximately 350 miles inland from the Atlantic coast, to approximately 4,200 feet below ground surface at the coast. Herrick (1961) provides detailed lithologic descriptions of the stratigraphic units encountered during the installation of water and petroleum exploration wells in Chatham County. The well log of GGS Well 125, located on White Bluff Road (700 feet west and 0.3 mile north of Buckhalter Road in Savannah, Georgia) provides one of the more complete lithologic descriptions of upper Eocene, Miocene, and Pliocene to Recent sedimentary strata in Chatham County.

The upper Eocene (Ocala Limestone) section of GGS Well 125 is approximately 225 feet thick and is dominated by light gray to white, fossiliferous limestone. The Miocene section is approximately 250 feet thick and consists of limestone with a 160-foot-thick cap of dark green phosphatic clay. This clay is regionally extensive and is known to occupy the Coosawatchie Formation of the Hawthorn Group (Furlow 1969; Arora 1984; Huddlestun 1988). The interval from approximately 80 feet to the surface is Pliocene to Recent in age and composed primarily of sand interbedded with clay and silt. This section is occupied by the Satilla and Cypresshead Formations (Huddlestun 1988).

2.0 LOCAL GEOLOGY

HAAF is located within the barrier island sequence district of the coastal plain physiographic province of the southeastern United States (Clark and Zisa 1976). The barrier island sequence district in Chatham and Bryan counties is characterized by the existence of several marine terraces (step-like topographic surfaces that decrease in elevation toward the coast). These marine terraces, and their associated deposits, are the results of sea level fluctuations that occurred during the Pleistocene epoch. The surficial (Quaternary) deposits in Chatham and Bryan counties, by decreasing elevation and age, are part of the Okefenokee, Wicomico, Penholoway, Pamlico, and Silver Bluff Terrace complexes (Wilkes et al. 1974; GA DNR 1976; Huddlestun 1988).

HAAF, as well as most of Chatham County, is underlain by the Pleistocene Pamlico Terrace. The Pleistocene Satilla Formation (formerly known as the Pamlico Formation) consists of deposits of the Pamlico Terrace complex and other terrace complexes in the region (Huddlestun 1988). The Satilla Formation is a lithologically heterogeneous unit that consists of variably bedded to nonbedded sand and variably bedded silty to sandy clay. During the Pleistocene epoch, these sand and clay deposits were formed in offshore and inner continental shelf, barrier island, and marsh/lagoonal-type environments (Huddlestun 1988). According to the *Geologic Map of Georgia* (GA DNR 1976), clay beds of marsh origin, which were deposited on the northwestern side of the former Pamlico barrier island complex, exist in the western quarter of HAAF. Very fine- to coarse-grained sand deposits of barrier island origin are more common throughout the remaining areas of HAAF.

Based on the coring and sampling of unconsolidated strata at HAAF during the CAP–Part A investigations, it is concluded that all former USTs were buried within the Satilla Formation, which is overlain by various soil types. Soil groups at HAAF include the Chipley, Leon, Ellabelle, Kershaw, Pelham, Albany, Wahee, and Ogeechee (Wilkes et al. 1974).

3.0 REGIONAL AND LOCAL HYDROGEOLOGY

The hydrogeology in the vicinity of HAAF is mostly influenced by two aquifer systems. These are referred to as the Principal Artesian (Floridan) Aquifer and the surficial aquifer (Miller 1990). 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, which is approximately 800 feet in total thickness, is composed primarily of Tertiary-age limestone, including the Bug Island Formation, the Ocala Group, and the Suwannee Limestone. Groundwater from the Floridan is used primarily for drinking water (Arora 1984). According to Miller (1990), one of the largest cones of depression produced in the Upper Floridan Aquifer exists directly beneath Savannah, Georgia. Net water-level decline in the Floridan system between the predevelopment period and 1980 exceeded 80 feet beneath Savannah. In addition, according to 1980 estimates, more than 500 million gallons of water per day were withdrawn from the Floridan for public and industrial use in southeastern Georgia, more than any other region.

The confining layer for the Principal Artesian (Floridan) Aquifer is the phosphatic clay of the Hawthorn Group. There are minor occurrences of aquifer material within the Hawthorn Group; however, they have limited utilization (Miller 1990). The surficial aquifer overlies the Hawthorn confining unit.

The surficial aquifer consists of widely varying amounts of sand and clay, ranging from 55 feet to 150 feet in thickness, and is composed primarily of the Satilla and Cypresshead Formations in the Savannah vicinity (Arora 1984). This aquifer is primarily used for domestic lawn and agricultural irrigation. The top of the water table ranges from approximately 2 feet to 10 feet below ground level (Miller 1990). Groundwater in the surficial aquifer system is under unconfined, or water table, conditions; however, locally, thin clay beds create confined or semiconfined conditions, as is the case at HAAF where thin, surficial clay beds are present in the western quadrant (GA DNR 1976).

Groundwater encountered at all the UST investigation sites is part of the surficial aquifer system. Based on the fact that all public and nonpublic water supply wells draw water from the Principal Artesian (Floridan) Aquifer and that the Hawthorn confining unit separates the Principal Artesian 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 HAAF.

APPENDIX V

REIMBURSEMENT APPLICATION

Fort Stewart is a federally owned facility and has funded the investigation for the USTs 21 & 22 site, Building 1327, Facility ID #9-025053 using U.S. 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

SUMMARY OF FATE AND TRANSPORT MODELING RESULTS

A.1. FATE AND TRANSPORT MODELING

The fate and transport modeling that was performed as part of the CAP–Part B Report (SAIC 1999b) was 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 (i.e., 217 µg/L temporary piezometer L-2 during the CAP–Part A investigation in April 1998). In summary, the Analytical Transient 1-, 2-, 3-Dimensional Model was used to model contaminant migration to one potential downgradient receptor: a drainage ditch located approximately 114 feet east-northeast of the site. The modeling results indicated that, due to dilution attenuation, benzene would not reach the drainage ditch at concentrations above the IWQS.

Based on modeling results, the estimated dilution attenuation factor (DAF) for benzene at the drainage ditch is 31. ACLs were developed by adjusting the regulatory level by the DAF. The ACLs for the site are presented in Table A-1.

Table A-1. ACLs for the USTs 21 & 22 Site

Contaminant	Regulatory Level (µg/L)	DAF[a] (Drainage Ditch)	ACL[b] (µg/L)
Benzene	71.28[c]	31	2,210
Naphthalene	6.5[d]	31	201

[a] DAF = Maximum observed benzene concentration ÷ predicted benzene concentration at the receptor
= 217 ÷ 7 = 31 at the drainage ditch.
[b] ACL = Regulatory level × DAF.
[c] IWQS.
[d] Risk-based screening criterion

1.1 FATE AND TRANSPORT MODELING CONCLUSIONS

The conclusions below are based on fate and transport modeling that assumed a continuous source of contamination of infinite duration at the site based on the maximum observed benzene concentration (i.e., 217 µg/L) in groundwater during the CAP–Part A and CAP–Part B investigations.

- Benzene concentrations in groundwater have not exceeded the ACL of 2,210 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 at levels above the IWQS.

- Naphthalene concentrations in groundwater have not exceeded the ACL of 201 µg/L in any of the wells at the site, indicating that the naphthalene concentrations at the site are not high enough to reach the drainage ditch at levels above the risk-based screening criterion.

ATTACHMENT B

REFERENCES

REFERENCES

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ATTACHMENT C

BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

HTRW DRILLING LOG

HOLE NUMBER MW-L8

PROJECT: HAAF - USTs 21 & 22 | INSPECTOR H. Smith | SHEET 1 OF 1

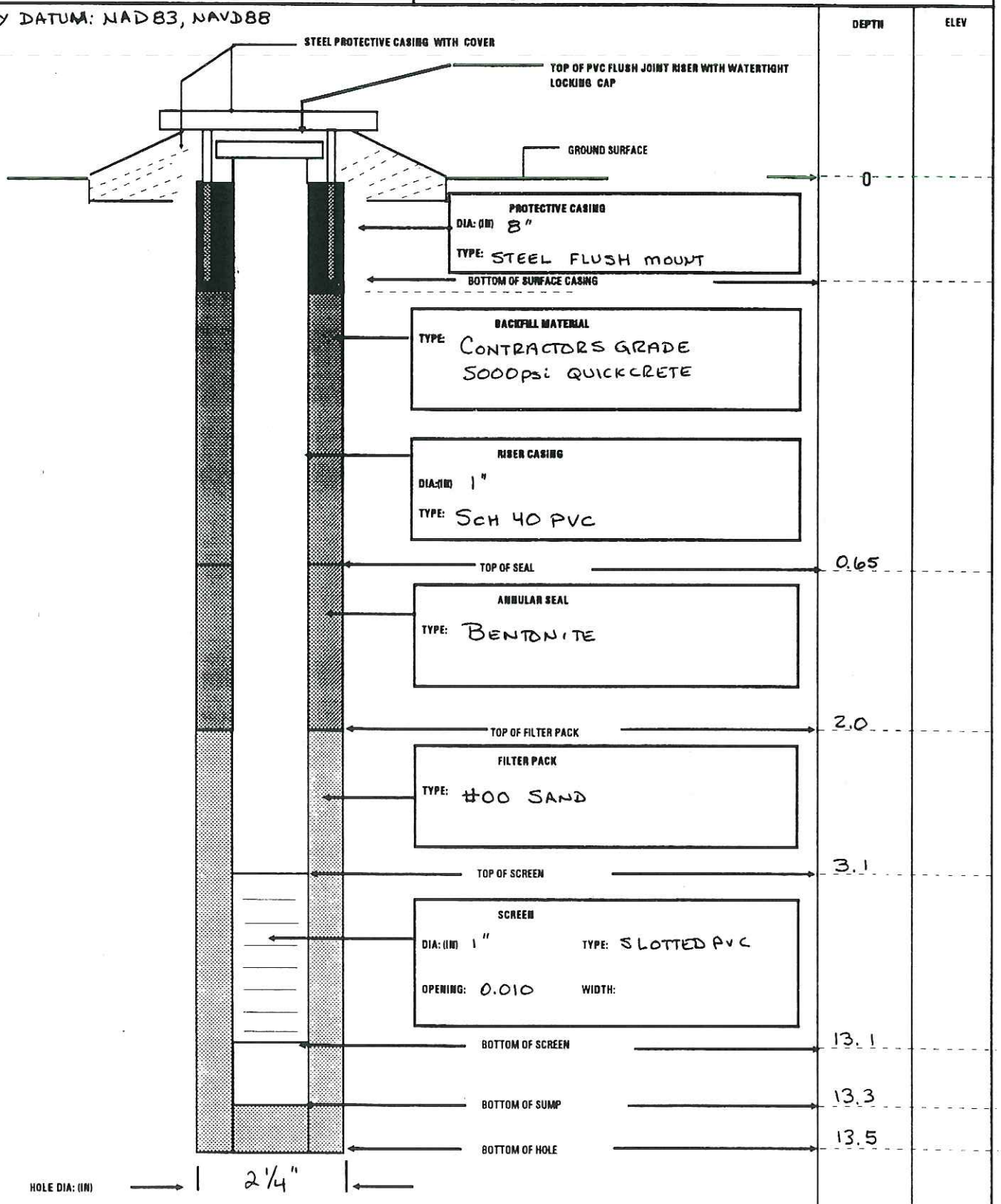
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		CONCRETE				
	1	Silty SAND (sm), medium grained, subrounded to angular, moist, soft, nonplastic, loose, pale brown (10YR 6/3)	0 ppm			
	2					
	3	Silty SAND (sm), fine grained, soft to firm, black (10YR 2/1)	0ppm			
	4	Silty SAND (sm), medium grained, angular to subangular, moist, gray (10YR 5/1) to light gray (10YR 7/2)				
	5	Silty SAND (sm), fine grained, soft to firm 30% silt, nonplastic	0ppm		Soil Sample HLB811	
	6					▽ WET BELOW 6.0 FT
	7		0ppm			
	8	END OF CORING AT 8.0 FT				PUSHED TO 13.5 FT BGS TO SET 1" WELL
	9					
	10					

MONITORING WELL

PROJECT: HAAF USTs 21&22

WELL NUMBER: MW-L8	**BEGIN:** 12-1-99	**END:** 12-1-99
COORDINATES: N: 734992.35 E: 979399.86	**REFERENCE POINT:** TOC	**ELEVATION:** 27.97

SURVEY DATUM: NAD83, NAVD88



HTRW DRILLING LOG

HOLE NUMBER MW-L9

PROJECT: HAAF - USTs 21 & 22 | INSPECTOR H. Smith | 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	Silty SAND (sm), medium grained, loose, soft light brownish yellow (10 YR 6/4), Fill to build parking lot	0 ppm			
	2					
	3		N/A			
	4	CONCRETE				
		Silty SAND (sm), medium grained, loose, soft, wet, Olive brown (2.5Y 4/3)	0 ppm		Soil Sample HLB911	▽ WET BELOW 5.0 FT
	5					
	6		N/A			
	7					
	8		0 ppm			
	9		N/A			
	10	END OF CORING AT 12.0 FT				Pushed to 12.0 ft BGS to set 1" well