FINAL

FIRST ANNUAL MONITORING ONLY REPORT FOR UNDERGROUND STORAGE TANK 38 FACILITY ID #9-089109 BUILDING 1510

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 0061

Prepared by

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

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List of Abbreviations and Acronyms

BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
GA EPD	Georgia Environmental Protection Division
IWQS	In-stream Water Quality Standard
NFAR	No Further Action Required
SAIC	Science Applications International Corporation
UST	underground storage tank
USTMP	Underground Storage Tank Management Program

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MONITORING ONLY REPORT

Monitoring Report Number: 1st Annual
o November 2000
Street Address: West 8th Street
t County: Liberty Zip Code: <u>31314</u>
' 34"
Prepared by Consultant/Contractor:
hch Name: Patricia A. Stoll
Company: SAIC
1137 Address: P.O. Box 2502
City: Oak Ridge State: TN
Zip Code: 37831
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
Signat	ure: fating Atol
Date:	11/20/00

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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 Tank (UST) 38, Facility ID #9-089109 was located near Building 1510 at Fort Stewart, Georgia. The tank was excavated and removed on August 9, 1996, and the associated ancillary piping was closed in place. Science Applications International Corporation (SAIC) performed a Corrective Action Plan (CAP)-Part A investigation in 1998 and 1999 to determine the extent of petroleum contamination at the site. Two vertical-profile borings and seven temporary piezometers were installed during the investigation. The CAP-Part A Report (SAIC 1999) was submitted in August 1999 and recommended monitoring only at the site. As recommended in the Monitoring Only Plan, four shallow monitoring wells (80-10 through 80-13) were installed as part of the first semiannual sampling event in January/February 2000, and groundwater was sampled for benzene, toluene, ethylbenzene, and xylenes (BTEX).

The fate and transport modeling performed as part of the CAP-Part A Report (SAIC 1999) 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 January/February and June/July 2000, it was not necessary to revise the fate and transport modeling results.

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 concentrations during the January/February and June/July 2000 sampling events were below the In-stream Water Quality Standard (IWQS); therefore, a No Further Action Required status is being recommended for the site.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. <u>Potentiometric Data</u>:

(Appendix I, Figure 2: Potentiometric Surface Map) (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/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 south, and the groundwater gradient was approximately 0.0053 foot/foot.

During the second semiannual sampling event in June/July 2000, groundwater elevations were measured in all of the monitoring wells to determine the groundwater flow direction. In July 2000, the groundwater flow direction was toward the south, and the groundwater gradient was approximately 0.0038 foot/foot.

B. <u>Analytical Data</u>:

(Appendix I, Figure 3: Groundwater Quality Map) (Appendix I, Figure 4: Trend of Contaminant Concentrations) (Appendix II, Table 2: Groundwater Analytical Results) (Appendix III: Laboratory Analytical Results)

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

During the first semiannual sampling event in January/February 2000, monitoring wells 80-10, 80-11, 80-12, and 80-13 were sampled for BTEX. Analytical results from the first sampling event showed estimated concentrations below the analytical reporting limits or no detectable BTEX concentrations in wells 80-11, 80-12, and 80-13. BTEX compounds were present in well 80-10; however, none of the constituents exceeded its respective IWQS. Benzene was detected at 20 μ g/L in well 80-10 and 0.2J μ g/L in well 80-12, both of which concentrations are below the IWQS of 71.28 μ g/L. Figure 4 shows the variations in benzene concentrations in groundwater for all the wells.

During the second semiannual sampling event in June/July 2000, monitoring wells 80-10, 80-11, 80-12, and 80-13 were sampled for BTEX. Analytical results from the second sampling event showed estimated concentrations below the analytical reporting limits or no detectable BTEX concentrations in wells 80-11 and 80-13. BTEX compounds were present in wells 80-10 and 80-12; however, none of the constituents exceeded its respective IWQS. Benzene was detected at 40.5 μ g/L in well 80-10, 0.25J μ g/L in well 80-12, and 0.18J μ g/L in well 80-13, all of which concentrations are below the IWQS of 71.28 μ g/L. Figure 4 shows the variations in benzene concentrations in groundwater for all the wells.

As recommended in the CAP-Part A Report (SAIC 1999), polynuclear aromatic hydrocarbon analysis was not recommended as part of the Monitoring Only Plan for the site.

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 January 2000 score.)2,500 (CAP–Part A Report)250 (Jan. 2000 – First Semiannual Monitoring Event)
250 (June 2000 – First 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 the Georgia Environmental Protection Division (GA EPD) Underground Storage Tank Management Program (USTMP) assign Facility ID #9-089109 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 A Report (SAIC 1999) and was submitted to GA EPD USTMP in October 1999 and was 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 250, 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 A Report (SAIC 1999), which used a continuous source of contamination and which is summarized in Attachment A of this report, indicates that benzene will never reach the nearest potential preferential pathway (i.e., a storm drain) 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 during the semiannual monitoring events in January/February and June/July 2000.
- The closest surface water bodies are a drainage ditch and Mill Creek, located at 800 feet and 2,500 feet, respectively, downgradient from the site.
- Natural attenuation has continued to take place at the site, as shown by the lower benzene concentrations observed during the semiannual monitoring events in comparison to those observed during the CAP-Part A investigation.

The monitoring only program at this site will be discontinued.

VI. REIMBURSEMENT

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the UST 38 site, Building 1510, Facility ID #9-089109 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.

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Attached _____ N/A __X

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APPENDIX I

REPORT FIGURES



Figure 1. Location Map of UST 38 at Fort Stewart, Liberty County, Georgia



Figure 2a. Potentiometric Surface Map of the UST 38 Site (February 2000)



Figure 2b. Potentiometric Surface Map of the UST 38 Site (July 2000)



Figure 3a. Groundwater Quality Map for the UST 38 Site (January 2000)



Figure 3b. Groundwater Quality Map for the UST 38 Site (June 2000)

Jan-01 t Benzene was not detected in well 80-11 Benzene concentrations versus time in groundwater at the Oct-00 **UST 38 Site** Jul-00 IWQS = 71.28 ug/L 1 Apr-00 Note: The detection limit was 1 ug/L in January and June 2000, 80-13 Jan-00 80-10 80-12 100 -0.1 10 -Benzene Concentration (ug/L)

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Figure 4. Trend of Contaminant Concentrations for the UST 38 Site

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APPENDIX II

REPORT TABLES

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Table 1. Groundwater Elevations

		Top of Casing	Screened	Water	Groundwater
Well	Date of	Elevation	Interval	Depth	Elevation
Number	Measurement	(feet AMSL)	(feet BGS)	(feet BTOC)	(feet AMSL)
	First Semia	nnual Monitoring I	Event – Januar	v/February 200	0
80-10	02/21/00	74.55	3.0 - 12.0	5.80	68:75
80-11	02/21/00	74.60	2.7 – 12.7	5.86	68.74
80-12	02/21/00	74.56	2.7 - 12.7	5.96	68.60
80-13	02/21/00	74.62	2.8 - 12.8	5.85	68.77
	Second S	emiannual Monito	ring Event – Ju	ne/July 2000	
80-10	07/25/00	74.55	3.0 - 12.0	6.33	68.22
80-11	07/25/00	74.60	2.7 – 12.7	6.44	68.16
80-12	07/25/00	74.56	2.7 – 12.7	6.51	68.05
80-13	07/25/00	74.62	2.8 - 12.8	6.39	68.23

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)	Ethyl- benzene (μg/L)	Xylenes (µg/L)	Total BTEX (µg/L)	Total PAH (µg/L)
		First Semia	nnual Monite	oring Event –	January/Feb	ruary 2000		
80-10	801012	1/13/00	20 =	0.62 J	2.4 =	3.8 =	26.82	NA
80-11	801112	1/16/00	Ì U	1 U	1 U	3 U	ND	NA
80-12	801212	1/16/00	0.2 J	1 U	1 U	3 U	0.2	NA
80-13	801312	1/13/00	1 U	1 U	1 U	3 U	ND	NA
		Second S	Semiannual N	Ionitoring Ev	ent – June/Ju	ly 2000		· · · · · · · · · · · · · · · · · · ·
80-10	801022	06/25/00	40.5 =	2.7 =	32.5 =	40.1 =	115.8	NA
80-11	801122	06/21/00	1.0 U	1.0 U	1.0 U	3.0 U	ND	NA
80-12	801222	06/27/00	0.25 J	9.1 =	0.64 J	0.31 J	10.3	NA
80-13	801322	06/21/00	0.18 J	1.0 U	1.0 U	3.0 U	0.18	NA
	Water Quali PD Chapter	-	71.28	200,000	28,718	NRC	NRC	NRC
Alterna	te Concentrat	ion Limit	ü	_	_		_	-

NOTES:

Bold values exceed IWQSs.

Italic values exceed .

ACLs were not developed because the dilution attenuation factor for the receptor was infinity.

ACL Alternate concentration limit

BTEX Benzene, toluene, ethylbenzene, and xylenes

NA Not analyzed; PAH compounds were not required as part of the Monitoring Only Plan.

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.

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

J Indicates that the value for the compound is an estimated value.

= Indicates that the compound was detected at the concentration reported.

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Table 3. Well Construction Details

		Boring	Screened		Coordinates	(NAD83)	Elevation	(NAVD88)
Boring/Well Number	Date Installed	Depth (feet BGS)	Interval (feet BGS)	Type of Completion	Northing	Easting	Ground Surface	Top of Casing
First Semiannual Monitoring Event – January/February 2000								
80-10	1/13/00	12.1	3.0 - 12.0	¾″ PVC	678999.6	824814.3	74.87	74.55
80-11	1/16/00	12.8	2.7 - 12.7	3⁄4″ PVC	679003.6	824775.3	74.88	74.60
80-12	1/16/00	12.8	2.7 - 12.7	3⁄4" PVC	678958.1	824809.8	74.81	74.56
80-13	1/13/00	13.0	2.8 - 12.8	3⁄4″ PVC	679016.2	824873.1	74.83	74.62

NOTES:

BGS Below ground surface

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APPENDIX III

LABORATORY ANALYTICAL RESULTS

FIRST SEMIANNUAL MONITORING EVENT

JANUARY/FEBURARY 2000

1A VOLATILE ORGANICS ANALYSIS	DATA SHEET
Lab Name: GENERAL ENGINEERING LABOR Co	501012
Lab Code: N/A Case No.: N/A S	AS NO.: N/A SDG NO.: FSAB001W
Matrix: (soil/water) WATER	Lab Sample ID: 23655003
Sample wt/vol: 5.000 (g/ml) ML	Lab File ID: 53418
Level: (low/med) LOW	Date Received: 31/14/00
<pre>% Moisture: not dec()))</pre>	Daté Analyzed: 31/20/00
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
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	20.0 0.62 2.4 3.8 ±

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LA VOLATILE ORGANICS ANALYSIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Contract: N/A	801014
Lab Code: N/A Case No.: N/A SAS No.: N/A SDG	No.: FSAB001W
Matrix: (soil/water) WATER Lab Sample ID:	20655001
Sample wt/vol: 5.000 (g/ml) ML Lab File ID:	55416
Level: (low/med) LOW (D) Date Received:	01/14/00
* Moisture: not dec (CU) Date Analyzed:	01/20/00
GC Column: DB-624 ID: 0.25 (mm) Dilution Facto	pr: 1.0
Soil Extract Volume:(uL) Soil Aliquot V	Volume:(uL
CONCENTRATION UNITS CAS NO. COMPOUND (ug/L or ug/Kg) UG/I	•
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	24.8 =

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VOLATILE ORGA	1A INICS ANALYSIS DATA SI	HEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEE	RING LABOR Contract	: N/A	80111,2
Lab Code: N/A Case	No.: N/A SAS No.	N/A SDG N	Io.: FSAB005W
Matrix: (soil/water) WATE	2R	Lab Sample ID:	20661018
Sample wt/vol: 5.00	lė (g/ml) ML	Lab File ID:	51208
Level: (low/med) LOW		Date Received:	01/17/00
% Moisture: not dec.		Date Analyzed:	01/25/00
GC Column: DB-624 ID:	0.25 (mm)	Dilution Factor	r: 1.0
Soil Extract Volume:	(uL)	Soil Aliquot Vo	olume:(uI
CAS NO. CO		NTRATION UNITS: of ug/Kg) UG/L	Q

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71-43-2Benzere	1.0	J	U
108-88-3Toluene	1.0	ਹ	1
100-41-4Ethylbenzene	1.0	-	
1330-20-7Xylenes (total)	3.0	υ	
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1A VOLATILE ORGANICS ANALYSIS DAT	A SHEET
Lab Name: GENERAL ENGINEERING LABOR Contr	801212
Lab Code: N/A Case No.: N/A SAS	NO.: N/A SDG NO.: FSAB0CSW
Matrix: (soil/water) WATER	Lab Sample ID: 20661017
Sample wt/vol: 5.000 (g/ml) ML	Lab File ID: 5T207
Level: (low/med) LOW	Date Received: 01/17/00
% Moisture: not dec.	Date Analyzed: 01/25/00
GC Column: DB-624 ID: 0.25 (mm)	Dilution Factor: 1.0
Soil Extract Volume:(uL)	Soil Aliquot Volume:(uL
	NCENTRATION UNITS: ug/L or ug/Kg) UG/L Q
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	

1A VOLATILE ORGANICS ANALYSIS DATA SHEET	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Contract: N/A	801312
Lab Code: N/A Case No.: N/A SAS No.: N/A SDG	No : FSAB001W
Matrix: (scil/water) WATER Lab Sample ID	: 20655002
Sample wt/vol: 5.000 (g/ml) ML Lab File ID:	55417
Level: (low/med) LOW Date Received	: 01/14/00
% Moisture: not dec Date Analyzed	: 01/20/00
GC Column: DB-624 ID: 0.25 (mm) Dilution Fact	or: 1.0
Soil Extract Volume:(uL) Soil Aliquot	Volume:(ur
CONCENTRATION UNITS CAS NO. COMPCUND (ug/L or ug/Kg) UG/	
71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	

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SECOND SEMIANNUAL MONITORING EVENT

JUNE/JULY 2000

	1A VOLATILE ORGANICS ANALYSIS DAT	TA SHEET	
(,	Lab Name: GENERAL ENGINEERING LABOR Contr	801022	
	Lab Code: N/A Case No.: N/A SAS	No.: N/A SDG No.: FSBLTM13W	
	Matrix: (soil/water) WATER	Lab Sample ID: 27482003	
	Sample wt/vol: 5.000 (g/ml) ML	Lab File ID: 8P414	
	Level: (low/med) LOW	Date Received: 06/26/00	
	% Moisture: not dec.	Date Analyzed: 06/29/00	
	GC Column: DB-624 ID: 0.25 (mm)	Dilution Factor: 1.0	
	Soil Extract Volume:(uL)	Soil Aliquot Volume:	(uL

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q	
71-43-2 108-88-3 100-41-4 1330-20-7	-Toluene		40.5 2.7 32.5 40.1		-

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VOLATILE OR	la RGANICS ANALYSIS DATA S	HEET	EPA SAMPLE NO.	
Lab Name: GENERAL ENGIN	NEERING LABOR Contract	: N/A	801122	
Lab Code: N/A Cas	se No.: N/A SAS No.	: N/A SOG N	Io.: FSBLTM10W	
Matrix: (soil/water) WA	ATER	Lab Sample ID:	27385001	
Sample wt/vol: 5.	.000 (g/ml) ML	Lab File ID:	8P107	
Level: (low/med) LO	WC	Date Received:	06/22/00	
<pre>% Moisture: not dec</pre>		Date Analyzed:	06/26/00	
GC Column: DB-624 ID	D: 0.25 (mm) .	Dilution Factor	: 1.0	
Soil Extract Volume:	(uL)	Soil Aliquot Vo	lume:	(uI

CAS NO.	-	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q	
108-88-3- 100-41-4-		Benzene Toluene Ethylbenzene Xylenes (total)		1.0 1.0 1.0 3.0	U . U	I I I
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VOLATILE	1A ORGANICS ANALYSIS 1	DATA SHEET	EPA SAMPLE NO	ľ.
Lab Name: GENERAL EN	GINEERING LABOR Con	ntract: N/A	801222	
Lab Code: N/A	Case No.: N/A Si	AS NO.: N/A SDG	No.: FSBLTM14W	
Matrix: (soil/water)	WATER	Lab Sample ID:	27566006	
Sample wt/vol:	5.000 (g/ml) ML	Lab File ID:	8P518	
Level: (low/med)	LOW	Date Received:	06/27/00	
% Moisture: not dec.	<u></u>	Date Analyzed:	06/30/00	
GC Column: DB-624	ID: 0.25 (mm)	Dilution Facto	or: 1.0	
Soil Extract Volume:	(uL)	Soil Aliquot V	olume:	(uL



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1A VOLATILE ORGANICS ANALYSIS DATA S	EPA SAMPLE NO.
Lab Name: GENERAL ENGINEERING LABOR Contract	: N/A 801322
Lab Code: N/A Case No.: N/A SAS No.	: N/A SDG No.: FSBLTM10W
Matrix: (soil/water) WATER	Lab Sample ID: 27385002
Sample wt/vol: 5.000 (g/ml) ML	Lab File ID: 8P108
Level: (low/med) LOW	Date Received: 06/22/00
* Moisture: not dec.	Date Analyzed: 06/26/00
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) JG/L

71-43-2Benzene 108-88-3Toluene 100-41-4Ethylbenzene 1330-20-7Xylenes (total)	0.18 J 1.0 U 1.3 U 3.0 U	J U
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APPENDIX IV

SITE RANKING FORMS

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FIRST SEMIANNUAL MONITORING EVENT

JANUARY/FEBRUARY 2000

SITE RANKING FORM

Facility Name: <u>UST 38, Building 1510</u>					Ranked by: S. Sto		
Coun	ty: <u>Li</u>	perty Facility ID #	#: <u>9-089109</u>	Date	Ranked:	5/24/2000	
SOIL		MINATION					
A.	Maxir (Assu	PAHs – num Concentration foun me <0.660 mg/kg if only tored on site)			l Benzene - imum Conce	entration found	on the site
	was s			* 🛛	<u><</u> 0.005 m	g/kg =	÷ 0
	* 🛛	<u><</u> 0.660 mg/kg	= 0		>0.005	05 mg/kg =	: 1
		>0.66 - 1 mg/kg	= 10		>0.05 - 1	mg/kg =	: 10
		>1 - 10 mg/kg	= 25		>1 - 10 m	g/kg =	25
	□.	>10 mg/kg Elevated PAH reporting limit fo	= 50 or several samples		>10 - 50 r	ng/kg =	40
		however, no estimated concer			>50 mg/k No benzene d	g	
C.		to Groundwater below land surface)			and no soil clo	osure samples.	
		>50' bis = 1					
		>25' - 50' bls = 2					
		>10' - 25' bls = 5					
	\boxtimes	<u>≤</u> 10' bls = 10	0				
Fill in	the bla	nks: (A. <u>0</u>) + (B.) = () x (C	<u>10)</u> =	(D. <u>0</u>)		
CROIL							
GROU	INDIVA	FER CONTAMINATION	<u>.</u>				
E.	liquid	Product (Nonaqueous-phydrocarbons; See Guic finition of "sheen").		Maxi (One		ne - ntration at the s e located at the	
	\boxtimes	No free product = 0			<u>≤</u> 5 µg/L		= 0
		Sheen - 1/8" = 25				ю/I	-
		>1/8" ~ 6" = 50		* 🖾	>5 - 100 µ	-	≕.5 - 50
		>6" - 1ft. = 1,0	000		>100 - 1,0		= 50
		For every additional in 100 points = <u>1,000 +</u>	nch, add another		>10,000 µ	0,000 µg/L g/L 01012 (January 200	= 500 = 1500 20)
Fill in	the bla	nks: (E. <u>0</u>) + (F.	. <u>5</u>) = (G. <u>5</u>)				

Page I of 2 IV-3 ...

Facility Name: UST 38, Building 1510

County: Liberty Facility ID #: 9-089109

POTENTIAL RECEPTORS (MUST BE FIELD-VERIFIED)

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

Н.	Public Wa	ater Supply		I.	Non-P	ublic Water Sup	ply	
		npacted 500' 500' - ¼ mi 4 mi - 1 mi 1 mi - 2 mi				Impacted ≤100' >100' - 500' >500' - ¼ mi >¼ - ½ mi	= 1000 = 500 = 25 = 5 = 2	
*		2 mi	= 0			>1⁄2 mi	= 0	
	□ >	susceptibility 1 mi	= 0			ver susceptibility >¼ mi	= 0	
			er susceptibility a					
	[°] For jus	stification that	withdrawal point is	not hydrau	ilically co	onnected, see at	tached text.	2
J.	boundary OR UTILI trench ma	to downgradie ITY TRENCHI ay be omitted	Contaminant Plume ent Surface Waters E S & VAULTS (a u from ranking if its in 5 feet above the wa	s tility nvert		ce from any Fre ements and crav		
		mpacted	= 500	(2004) (COM) (COM) (COM) (COM)		Impacted <500'	= 500 = 50	
		500'	= 50			>500' - 1,000'	= 5	
		500' - 1,000' 1,000'	= 5 = 2		Ø	>1,000' or no free produc	= 0 .t.	
Fill in	the blanks	s: (H. <u>0</u>) +	· (I. <u>0</u>) + (J	50_)+	(K. <u>0</u>	_) = L. <u>50</u>		
			(G	<u>5</u>) x	(L. <u>50</u>	_) = M. <u>250</u>		
			(M.	250_)+	(D. <u>0</u>	_) = N. <u>250</u>		
Ρ.	SUSCEP		EA MULTIPLIER					
	🗌 lf	f site is located	d in a Low Ground-	Water Poll	ution Su	sceptibility Area	= 0.5	
	A N	All other sites =	= 1					
Q.	EXPLOS	ION HAZARD						
	Have any subsurfac	y explosive per ce structure (e	troleum vapors, pos .g., utility trenches,	ssibly origir , basement	nating fro ts, vaults	om this release, , crawl spaces, o	been detected ir etc.)?	n any
	□ Y	/es = 200,0	000					
	N N	10 = 0						
Fill in	the blanks	s: (N. <u>250</u>) x (P. <u>1</u>) = (<u>25</u>	<u>0</u>) + (Q	0_)			
		= <u>250 (.</u> ENVIR	January 2000 - Firs CONMENTAL SENS	<u>st Semian</u> SITIVITY S	nual Sai CORE	npling Event)		

SECOND SEMIANNUAL MONITORING EVENT

JUNE/JULY 2000

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SITE RANKING FORM

Facility Name	e: UST 38, Building 1510	Ran	Ranked by: S. Stoller		··
County: Lib	erty Facility ID #: 9-089109	Date	Ranked:	9/26/2000	
SOIL CONTA	MINATION				
Maxim (Assur	PAHs – B. num Concentration found on the site me <0.660 mg/kg if only gasoline cored on site)		l Benzene - imum Concer	tration found o	on the site
		* 🛛	<u><</u> 0.005 mg	/kg =	0
* 🖾	<u><</u> 0.660 mg/kg = 0		>0.0050	5 mg/kg =	1
	>0.66 - 1 mg/kg = 10		>0.05 - 1 n	ng/kg =	10
	>1 - 10 mg/kg = 25		>1 - 10 mg	/kg =	25
	>10 mg/kg = 50 Elevated PAH reporting limit for several samples,		>10 - 50 m	g/kg =	40
	however, no estimated concentrations below that limit.			= tected during CAP	50 -Part A
	to Groundwater below land surface)		and no soil clos	ure sampies.	
	>50' bls = 1				
	>25' - 50' bls = 2				
	>10' - 25' bls = 5				
\boxtimes	<u>≤</u> 10' bls = 10				
Fill in the blar	nks: (A. <u>0</u>) + (B. <u>0</u>) = (<u>0</u>) x (C. <u></u>	<u>10_</u>) =	(D. <u>0</u>)		
	ER CONTAMINATION				
liquid h	roduct (Nonaqueous-phase F. hydrocarbons; See Guidelines finition of "sheen").	Maxi (One		e - tration at the s located at the	
\boxtimes	No free product = 0		<u><</u> 5 µg/L		= 0
	Sheen - 1/8" = 250		<u>_</u> 5 µg/∟ >5 - 100 µg	Л	= 5
	>1/8" - 6" = 500				= 50
	>6" - 1ft. = 1,000		>100 - 1,00		
	For every additional inch, add another 100 points = <u>1,000 +</u>		>1,000 - 10 >10,000 µg LTM sample 80		= 500 = 1500
Fill in the blan	ıks: (E. <u>0</u>) + (F. <u>5</u>) = (G. <u>5</u>)				

(

Facility Name: UST 38, Building 1510

County: Liberty Facility ID #: 9-089109

POTENTIAL RECEPTORS (MUST BE FIELD-VERIFIED)

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

Н.	Public W	Vater Supply		I.	Non-P	ublic Water Sup	ply	
*		lmpacted ≤500' >500' - ¼ mi ¼ mi - 1 mi >1 mi - 2 mi	= 10 = 2			Impacted ≤100' >100' - 500' >500' - 1⁄4 mi >1⁄4 - 1∕2 mi	= = =	25 5 2
Ŷ		> 2 mi er susceptibility	= 0 areas only:		Eor lov	>1⁄2 mi ver susceptibility	= are	
		>1 mi	= 0			>1⁄4 mi	=	
			er susceptibility are withdrawal point is no					ad taxt
	Forju	istincation that	withdrawar point is no	ot nyurau	lically co	metieu, see au	acm	eu lext.
J.	boundar OR UTII trench m	ry to downgradi LITY TRENCH nay be omitted	Contaminant Plume ent Surface Waters E S & VAULTS (a utili from ranking if its inv 5 feet above the wate	ert		ce from any Free ements and craw		aces
		Impacted	= 500		H	Impacted <500'	=	500 50
	\boxtimes	<u><</u> 500' >500' - 1,000'	= 50			>500' - 1,000' >1,000' or		5 0
		>1,000'- 1,000 >1,000'	= 2			no free produc		0
Fill in	the blank	(S: (H. <u>0</u>) +	· (I) + (J5	<u>i0</u>) + ((K. <u>0</u>	_) = L. <u>50</u>		
) = M. <u>250</u>		
			(M	<u>250</u>)+ (D. <u>0</u>	_) = N. <u>250</u>		
Ρ.	SUSCE	PTIBILITY ARE	EA MULTIPLIER					
		If site is located	l in a Low Ground-W	ater Pollu	ition Sus	ceptibility Area	= 0.5	5
		All other sites =	= 1					
Q.	EXPLOS	SION HAZARD						
			troleum vapors, possi .g., utility trenches, b					
		Yes = 200,0	000					
	\boxtimes	No = 0						
Fill in	the blank	s: (N. <u>250</u>) x (P. <u>1</u>) = (<u>250</u>)	+ (Q	0)			
			une 2000 - Second ONMENTAL SENSIT			npling Event)		_

OTHER GEOLOGIC AND HYDROLOGIC DATA

The following information is presented to provide supplemental information to Item H of the Site Ranking Form and details relating to the geologic and hydrogeologic conditions at Fort Stewart to support determinations of groundwater flow pathway(s) or direction(s) and contaminant transport.

1.0 REGIONAL AND LOCAL GEOLOGY

Fort Stewart is located within the coastal plain physiographic province. This province is typified by nine southeastward-dipping strata that increase in thickness from 0 feet at the fall line, located approximately 150 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 below ground surface (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 (Herrick and Vochis 1963).

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 were 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 (Herrick and Vochis 1963).

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 predominantly sandy clay loam and extends to a depth of 72 inches or more (Herrick and Vochis 1963).

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 feet 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 feet 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 feet to 50 feet BGS; thus, the effective aquifer thickness would be approximately 35 feet 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 feet 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 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 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 Fort Stewart.

APPENDIX V

REIMBURSEMENT APPLICATION

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Fort Stewart is a federally owned facility and has funded the investigation for the UST 38 site, Building 1510, Facility ID #9-089109 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

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A.1. FATE AND TRANSPORT MODELING

The fate and transport modeling that was performed as part of the CAP–Part A Report (SAIC 1999) 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., $229 \mu g/L$ in vertical profile 80-05 in June 1998). In summary, the Analytical Transient 1-, 2-, 3-Dimensional Model was used to model contaminant migration to two potential downgradient receptors: a drainage ditch located approximately 800 feet west of the site and Mill Creek located approximately 2,500 feet west of the site. The modeling results indicated that, due to dilution attenuation, benzene would not reach the drainage ditch or Mill Creek at detectable concentrations. In February 2000, the groundwater flow direction changed toward the south; therefore, the underground storm drain located approximately 80 feet south of the former tank pit may act as a preferential pathway. Using the results of the modeling performed during the CAP–Part A, the model indicated that benzene would not reach the storm drain at detectable concentrations.

Based on modeling results, the estimated dilution attenuation factor for benzene was 763,000 at the storm drain and infinity at the drainage ditch and at Mill Creek, indicating that the predicted concentrations at these two receptors are zero. During the CAP-Part A, simulations of a 2-year period were not performed to predict the maximum concentrations of benzene in the downgradient wells that will be used for long-term monitoring because permanent wells did not exist at the site. As a result of the semiannual monitoring events in January/February and June/July 2000, it was not necessary to revise the fate and transport modeling results.

Benzene was identified as a contaminant of potential concern during the risk screening performed as part of the CAP-Part A investigation; however, an alternate concentration limit was not developed for benzene because the fate and transport modeling results indicated that the CAP-Part A concentrations at the site were not high enough to result in detectable concentrations at the receptor locations. Benzene concentrations observed during the semiannual sampling events in January/February and June/July 2000 were less than the concentrations observed during the CAP-Part A investigation.

1.1 FATE AND TRANSPORT MODELING CONCLUSIONS

The conclusion below is based on a fate and transport model that assumes a continuous source of contamination of infinite duration at the site based on the maximum observed benzene concentration (i.e., 229 μ g/L) in groundwater at the source during the CAP-Part A investigation.

• Benzene concentrations in groundwater during the semiannual monitoring events did not exceed the IWQS of 71.28 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 storm drain, drainage ditch, or Mill Creek at concentrations above the IWQS.

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.

Geraghty and Miller 1993. RCRA Facility Investigation Work Plan, Fort Stewart, Georgia.

- Herrick, S.M., and R.C. Vochis 1963. Subsurface Geology of the Georgia Coastal Plain, Georgia Geologic Survey Information Circular 25.
- Logan, William E., 2000. Letter to Ovidio Perez (Fort Stewart Directorate of Public Works, Environmental Branch), January 25.
- Looper, Edward E., 1980. Soil Survey of Liberty and Long Counties, Georgia, U.S. Department of Agriculture, Soil Conservation Service.
- Miller, James A., 1990. Groundwater Atlas of the United States, U.S. Department of the Interior, U.S. Geological Survey, Hydrologic Inventory Atlas 730G.
- SAIC (Science Applications International Corporation) 1999. CAP-Part A Report for UST 38, Facility ID #9-089109, Building 1510, Fort Stewart, Georgia, August.
- SAIC 2000. First Semiannual Monitoring Only Report for UST 38, Facility ID #9-089109, Building 1510, Fort Stewart, Georgia, June.

ATTACHMENT C

BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

PROJECT	F: Forte	HOLE NUMBER SO . 10 SHEET 1. OF 1				
ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	INSPECTOR). FIELD SCREENING RESULTS	Celeste GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	1	CONCRETE SAND(SW), fine grainx Some silt, soft to very Soft (2.5 y 2.5/1)	ed,			
	3	SAND(SW), fine grained some SIIT, soft to very so $(2.5 Y \frac{6}{2})$	 {+ 			-
	•	NO RECOVERY SAND(Su), Fine graine	d,			
	5	SAND(SW), fine graine Some Silt, Moist to we light gray to reddish brown (2.5 y 4/2)	\$, 			
	6					∑ wet below 6.5 ft BGS
	7	NO RECOVERY	1			
	*					PUSHED TO 12.1 FT BGS TO SET 34" MONITORING POINT SCREENED PROM 3.0TO 12.0 FT BGS
	,					COLLECTED GROUNDWATE SAMPLE BOIDIZ FROM MONITORING POINT

	.	HOLE NUMBER					
ROJEC		tewart USTs	NSPECTOR J. Celeste			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)	
ĺ		CANAGETE					
		CONCRETE					
	۱ <u> </u>	SittuSAND(Sm), fine grainer				4	
	_	Soft to very soft, dork	· /				
		SiltySAND(Sm), fine grained Soft to very Soft, dark brown, (7.5 YR3/2)					
		-					
	,						
	•						
	TT				[
	3						
			:				
	_						
		NO RECOVERY					
	` - 	SILITY SAND (SM) fine					
		Silty SAND (Sm), frne Grained, moist to wet, Gark brown, (7.5 VR3/2)					
		(ark brown, (7.5 yR3/2)					
	5						
	=						
						V wet below	
	=					5.5 A Bas	
	, -						
	* <u> </u>						
		Silty SAND(Sm), fine grained Soft tovery soft, wet, light Gray, (2.547/1)					
	ゴ	Soft to very soft, wet, light					
	7	gray, (2.5471)				A	
	1	Condu CI INV CONTRACTOR	-			COLLECTED GROUNDWATEL	
		Sandy CLAY (CH), fine grained, oft to very soft, wet, black (25)35	r)			SAMPLE BOILD - FROM	
		NO RECOVERY				MONITORING POINT	
	, ⊣	NU NCLUVERY					
	°+				· · · · · · · · · · · · · · · ·		
	\exists						
	-						
Ì	، ج					PUSHED TO 13.0 FTBGS	
	_					TO SET 3/4" MONITORING	
					i	POINT SCREENED FROM	
						27 TO 127 FT BGS	
			1				

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on o refer	r. r	HTRW DRI		(a) = +	· · · ·	HOLE NUMBER
PROJEC		Stewart USTs	INSPECTOR ,	<u>Celeste</u>	1	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)
	<u>-</u>					
:	_	CONCRETE				
	' <u>-</u>	Silty SAND (SM), fine grai Soft to very soft, dark Drown, (7.5 YR3/2)	ned			
	_	both to very soft, dark	1			
	=					
	2					
	_					
ľ	_					_
	3	NO RECOVERY				7
	_					
	•					
		Silty SAND (Sm), fine grained, soft to very soft, dark brain, (7.5 VR 73)	·····			
		(7.5 VR 33)				
		Silty SAND(SM), fine graine Soft & very Soft, brown (7.5 YR 72)	d,			
		(7.5 YR 72)				
	5	Silty SAND (SM), finegrain	æd,			
		Silty SAND (SM), finegrain Soft to very soft, moist to wet, dark brown, (7.5 YR3)		2	2	
		wel, yark mown, cro the	2)			vet below 5.5 ft BGS
	-					2.5 FT 045
	6					
	, []					A
	_					COLLECTED GROUNDWATE
						SAMPLE 801212 FROM MONITOKING POINT
	° –	NO RECOVERY				
						1
	-					
	°					PUSHED TO 13.0 FTBGS
	-					TO SET 3/4" MONITORING
						POINT SCREENED FROM 2.7 TO 12.7 FT BGS
1			1			

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		HTRW DRI				HOLE NUMBER 80-13
PROJEC ELEV. (A)	T: Fort S DEPTH (B)	DESCRIPTION OF MATERIALS (C)	INSPECTOR J FIELD SCREENING	GEOTECH SAMPLE	ANALYTICAL SAMPLE NO.	SHEET 1 OF 1 REMARKS (G)
 			RESULTS	OR CORE BOX	(F)	
		CONDETE				
	_	CONCRETE				
	1	SAND(SW), fine grained Some Silt, soft to very Soft (2.5425/1)	,			
		Soft (2.542.5/)				
	2				-	
					- 	
	J	SAND W/SILT (SP-SM), fin grained, some silt, soft, moist, well-rounded (2.5 Y 8/1)	re			
		moist, well-rounded				
						4
	• <u> </u>	NO RECOVERY	-			
		Silty SAND (SM), fine grains Soft, Moist, (25 Y 6/2)				- weat balava
	5	50 ft, Moist, $(25 Y \theta/2)$				∇ wet below = 5.0 FT BGS
	-	Silty SAND (SM), fine graine Soft to firm (2.5 Y2.5/)				
	6 <u> </u>	soft to firm (2.5 y2.5/1)				
	Ξ	Silte SAND (CAR) for action	<u>,</u>			
	7	Silty SAND (SM), fine graine firm to hard (5 yR 473)				
	-					
	8					COLLECTED GROUNDWATE
	_				-	SAMPLE BOISIZ PROM MONITORING POINT
			_			
	,	sandy CLAY (Ctt) soft to Very soft and wet (2.5 y 2.5)	(j)			
		,, ,, ,, ,, , , , , , , ,	2			PUSHED TO 13. 0 FT BES
						TO SET 3/4" MONITORING POINT SCREENED FROM 2.8 TO 12.8 FT BGS
	10					n.0.10 m.0 FT 043





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