FINAL

CORRECTIVE ACTION PLAN - PART B REPORT
FOR
UNDERGROUND STORAGE TANK 94A
FACILITY ID #9-089078
BUILDING 1320
FORT STEWART, GEORGIA

Prepared for

U. S. Army Corps of Engineers, Savannah District
and
Fort Stewart Directorate of Public Works
under Contract Number DACA21-02-D-0004
Delivery Order 0054

Prepared by

Science Applications International Corporation
151 Lafayette Drive
Oak Ridge, TN 37830

July 2006

CORRECTIVE ACTION PLAN

PART B

Facility Name: UST 94A, Building 1320 Street Address: Wilson Ave. and W. 18th Street

Facility ID: 9-089078 City: Fort Stewart County: Liberty Zip Code: 31314

Latitude: 31° 52′ 40″ Longitude: 81° 37′ 48″

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 2501
	1550 Frank Cochran Drive		
City:	Fort Stewart State: GA	City:	Oak Ridge State: TN
Zip Code:	31314-4927	Zip Code:	37831

I. PLAN CERTIFICATION

A. UST Owner/Operator

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

Name: Thomas C. Fry

Signature: _____ Date: _____

B. Professional Engineer or Professional Geologist

Name: Patricia Stoll

Signature: Patricia A Stoll

Date: 7/11/06

Georgia Stamp or Seal

Check all boxes below that apply. Attach supporting documentation, i.e., narrative, figures, tables, maps, boring/well logs, etc., for all items checked. Supporting documentation should be three-hole punched and prepared in conformity with the guidance document "Underground Storage Tank (UST) Release: Corrective Action Plan – Part B (CAP-B) Content", GUST-7B.

II. SITE INVESTIGATION REPORT

☒ Not Applicable: The extent of contamination and the local and site hydrogeology requirements have been fulfilled under the Corrective Action Plan (CAP) – Part A; therefore, additional site investigation reporting is not necessary [as indicated in correspondence from the Georgia Environmental Protection Department (GA EPD) dated August 5, 2005 (Logan 2005)].

☒ Extent of Contamination: See attached discussion on October 2005 sampling results.

☐ Local and Site Hydrogeology

III. REMEDIAL ACTION PLAN

A. Corrective Action Completed or In-Progress

☐ Not Applicable

☒ Other (specify): Semiannual monitoring only program implemented in June 2000.

B. Objective of Corrective Action

☒ No Further Action

☐ Provide Risk Based Corrective

☐ Monitor Soil and/or Groundwater Contamination That Exceeds Levels in Rule -.09 (3) But Is Less Than ACLs

C. Design Operation of Corrective Action Systems

☒ Not **Applicable**

D. Implementation (MUST INCLUDE THE FOLLOWING)

NOTE: If No Further Action is proposed and none of the following apply, a brief explanation must be provided with the signed Certificate of Completion.

- Milestone schedule for proposed site activities
- Monitoring/sampling and reporting plan for measuring interim progress and project completion
- Plan to decommission equipment/wells and close site

IV. PUBLIC NOTICE

☒ Not Applicable: The Corrective Action Objectives submitted and approved under the CAP – Part A have not changed [as indicated in correspondence from GA EPD dated August 5, 2005 (Logan 2005)].

☐ Certified Letters to Adjacent, and Potentially Affected Property Owners and Local Officials

☐ Legal Notice in Newspaper, as approved by EPD

☐ Other EPD-approved Method (specify)

V. CLAIM FOR REIMBURSEMENT (For GUST Trust Fund sites only)

☐ GUST Trust Fund Application - (attach if applicable)

☐ Cost Proposal

☐ A Total of All Costs Incurred To Date (MUST INCLUDE THE FOLLOWING):

- Invoices and proofs-of payment for all costs incurred to date
- Invoices itemized on the GUST-4D
- All non-eligible costs clearly identified as such
- Incurred costs itemized per GUST-92 form or EPD provided form/specifications

☐ A Total of Estimated Costs to Complete Corrective Action

- Estimated costs itemized per GUST-92 form or EPD provided form/specifications

☐ Total Project Costs

☐ Proposed Schedule For Reimbursement

☐ Lump Sum Payment Upon Completion Of Corrective Action
OR
☐ Interim Payments With Final Payment Upon Completion
OR
☐ EPD Established Payment Schedule

☒ Not Applicable

1.0 INTRODUCTION

Underground Storage Tank (UST) 94A, Facility ID #9-089078, was located near Building 1320 at Fort Stewart, Georgia (Figure 1). It had a capacity of 1,000 gal and was used for the storage of used oil. The tank was removed, and the piping was excavated and removed on January 25, 1995. Science Applications International Corporation (SAIC) performed a Corrective Action Plan (CAP) – Part A investigation in 1996, with additional investigation activities being conducted in 1998 and 2000. A full description of the site history can be found in the Fifth Annual Monitoring Only Report (SAIC 2005).

The Monitoring Only Plan for the site was presented in the CAP – Part A Addendum #2 Report, which was approved by the Georgia Environmental Protection Department (GA EPD) in correspondence dated December 18, 2000 (Logan 2000b). The Monitoring Only Plan recommended semiannual monitoring of three monitoring wells (i.e., 37-06, 37-07, and 37-09) for benzene, toluene, ethylbenzene, and xylenes (BTEX) and was initiated in June 2000. During the second semiannual sampling event, free product in excess of 1/8 in. was observed in well 37-06 on January 9, 2001, and the GA EPD Underground Storage Tank Management Program (USTMP) was notified of the product in correspondence dated February 1, 2001 (Stanley 2001). Free product removal using absorbent socks was implemented in January 2001. The absorbent socks have been removed and replaced periodically throughout the monitoring program. Additional activities have been conducted to address the free product. Well 37-06 has been was overdrilled for the installation of a 2-in. well in 2002. In November 2004, Solutions To Environmental Problems (STEP) completed an interim removal action (IRA) at the site. The IRA consisted of excavating a 22- x 15.8- x 6-ft deep area around well 37-06R and replacing the well with a 4-in. well.

The Fifth Annual Monitoring Only Report requested a No Further Action status; however, in correspondence dated August 5, 2005, GA EPD requested that a groundwater sample be collected downgradient of the excavated area and that a CAP – Part B report be submitted. The GA EPD correspondence indicated that only the CAP – Part B template and the results of the findings would be required to be submitted as the CAP – Part B Report to fulfill Georgia Underground Storage Tank (GUST) Rule 391-3-15.09.

As a result, a downgradient well (37-10) was installed at the site in September 2005 and monitoring wells 37-06R2, 37-07, 37-09, and 37-10 were sampled in October 2005. The results of this well installation and groundwater sampling are presented in this document.

For convenience, the reports and correspondence regarding this site are summarized below.

- *Corrective Action Plan–Part A Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 1997), which was submitted to GA EPD in March 1997. GA EPD USTMP conducted a technical review of the CAP – Part A Report and provided comments in correspondence dated July 30, 1997 (White 1997). GA EPD requested that fate and transport modeling be conducted to identify the risk of exposure. Fort Stewart submitted comment responses in correspondence dated September 9, 1997 (Brown 1997).

- *Corrective Action Plan–Part A Addendum Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 1998), which was submitted to GA EPD in July 1998. GA EPD conducted a technical review of the CAP – Part A Addendum Report and provided comments in correspondence dated November 16, 1998 (Logan 1998). The comments indicated that the target risk factor used in developing the benzene alternate concentration limit

(ACL) was not sufficiently conservative and that three monitoring wells should be installed at the site at which semiannual monitoring would be performed. Fort Stewart submitted a response in correspondence dated September 9, 1997 (Perez 1999a).

- On January 27, 1999, representatives from GA EPD USTMP, the Fort Stewart Directorate of Public Works, the U. S. Army Corps of Engineers (USACE), and SAIC met to discuss further action required at 15 former UST sites at Fort Stewart. UST 94A was one of the sites discussed. As a result of the meeting, GA EPD stated that the site would require monitoring. Fort Stewart agreed to re-rank the site using the September 1997 version of the CAP – Part A site ranking score; install a vertical-profile boring and three monitoring wells at the site; and perform semiannual monitoring for BTEX only. Fort Stewart submitted proposed well locations in correspondence dated June 22, 1999 (Perez 1999b). In correspondence dated March 6, 2000, GA EPD requested an additional well be installed to determine the groundwater flow direction.

- *Corrective Action Plan–Part A Addendum #2 Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2000), which was submitted to GA EPD in May 2000. GA EPD conducted a technical review of the CAP – Part A Addendum #2 Report and provided comments in correspondence dated September 5, 2000 (Logan 2000a). The comments indicated that the additional well (37-09) should be sampled. Analytical results for well 37-09, which was sampled as part of the first semiannual sampling event in June 2000, were submitted to GA EPD in correspondence dated October 5, 2000 (Stanley 2000). The CAP – Part A Addendum #2 Report with the Monitoring Only Plan was approved in correspondence dated December 18, 2000 (Logan 2000b).

- *First Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2001), which was submitted to GA EPD in May 2001. GA EPD conducted a technical review of the First Annual Monitoring Only Report and provided approval in correspondence dated August 21, 2001 (Logan 2001).

- *Second Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2002), which was submitted to GA EPD in May 2002. GA EPD did not provide correspondence on this report.

- *Third Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2003), which was submitted to GA EPD in May 2003. GA EPD did not provide correspondence on this report.

- *Fourth Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2004), which was submitted to GA EPD in May 2004. GA EPD conducted a technical review of the Fourth Annual Monitoring Only Report and provided comments in correspondence dated June 29, 2004 (Logan 2004). GA EPD requested that an additional downgradient well be installed at the site to delineate the free product and that if free product is present, a CAP – Part B be submitted. Due to personnel turnover at Fort Stewart, this issue was not addressed and a comment response letter was not submitted to GA EPD.

- In November 2004, the former tank pit was excavated to address the limited amount of waste oil tied up in the subsurface pore space. The results of the excavation were detailed in the *Final Report for Interim Removal Activities at UST 89, Facility ID #9-089074, Building 1247 and UST 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (STEP 2005).

- *Fifth Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (SAIC 2005), which was submitted to GA EPD in July 2005. GA EPD conducted a technical review of the Fifth Annual Monitoring Only Report and provided comments in correspondence dated August 5, 2005 (Logan 2005). GA EPD reiterated the June 29, 2004, request for an additional downgradient monitoring well and requested that only the CAP – Part B template and the findings be submitted.

2.0 SUPPLEMENTAL WELL INSTALLATION AND SEMIANNUAL MONITORING

The July 2005 semiannual sampling event was not conducted because of the request for no further action in the Fifth Annual Monitoring Only Report. Due to the request by GA EPD for a groundwater sample downgradient of the excavation area, well 37-10 was installed on September 17, 2005. The well was installed using a Geoprobe® and constructed of 1-in. inside diameter polyvinyl chloride with 10 ft of 0.010-in. slotted screen. The well construction information is presented Table 1 and Appendix III.

On October 12, 2005, the groundwater elevations were measured in all of the monitoring wells. The data are presented in Table 2 and Figure 2. The groundwater flow direction was toward the west, and the groundwater gradient was approximately 0.036 ft/ft. Free product was not present in well 37-06R2 during this sampling event.

Monitoring wells 37-06R2, 37-07, 37-09, and 37-10 were sampled on October 12, 2005, and the samples were analyzed for BTEX using U. S. Environmental Protection Agency Method 8021B/8260B. The analytical data are presented in Table 3 and Figure 3. The analytical holding time for the samples was exceeded by 1 day. Laboratory analytical results from the sampling event are summarized below and provided in Appendix IV.

- Benzene was estimated to be present in four of four groundwater samples at concentrations of 0.43J and 46.J7 µg/L. None of the concentrations exceeded the ACL and In-Stream Water Quality Standards (IWQS) of 71.28 µg/L.

- Toluene was estimated to be present in one of four groundwater samples at a concentration of 2.9J µg/L. The concentration did not exceed the IWQS.

- Ethylbenzene was estimated to be present in one of four groundwater samples at a concentration of 2.9J µg/L. The concentration did not exceed the IWQS.

- Total xylenes were estimated to be present in one of four groundwater samples at a concentration of 4J µg/L. There is no IWQS, but the concentrations did not exceed the maximum contaminant level of 10,000 µg/L.

The benzene concentrations at the site in October 2005 did not exceed the IWQS and ACL of 71.28 µg/L. None of the other constituents exceeded the respective IWQS. Figure 4 shows the variations in benzene concentrations in groundwater for the wells in the monitoring only program. Historical data and figures can be found in the Fifth Annual Monitoring Only Report.

Based on the results of the October 2005 sampling, the site ranking score is 350 (see Appendix V). As indicated in the Fifth Annual Monitoring Only Report, the site ranking score was 350 in January 2005.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The Monitoring Only Plan was conducted in accordance with Section V of the CAP – Part A Addendum #2 Report (SAIC 2000) and approved by GA EPD USTMP in correspondence dated December 18, 2000 (Logan 2000b). Termination conditions approved in the CAP – Part A Addendum #2 Report indicate that termination will be requested once the measured benzene concentrations are below the ACL. Once the benzene IWQS has been achieved and the product thickness is less than 1/8 in., the Monitoring Only Plan may be terminated regardless of the site ranking score.

Fort Stewart respectfully requests that GA EPD USTMP assign Facility ID #9-089078 a No Further Action Required (NFAR) status for the following reasons:

- The Monitoring Only Plan is being conducted in accordance with Section III of the CAP – Part A Addendum #2 Report (SAIC 2000) and as approved by GA EPD USTMP in correspondence December 18, 2000 (Logan 2000b).
- The additional downgradient well (37-10), which was installed in September 2005, did not contain benzene concentrations that exceeded the ACL.
- Fort Stewart excavated an area around well 37-06R to remove any additional free product that was tied up in the soil.
- The site score for the last two rounds (January 2005 and October 2005) of semiannual groundwater sampling was 350, 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, USACE, and SAIC representatives).
- The various revisions to the fate and transport model summarized in the Fifth Annual Monitoring Only Report indicate 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 and ACL of 71.28 µg/L during the two semiannual sampling events following the soil excavation.
- The closest surface water bodies are a drainage ditch located 500 ft west of the site and Mill Creek located 2,212 ft west of the site.
- Natural attenuation will continue to take place at the site, and the benzene concentrations at the site are below the IWQS.

4.0 REFERENCES

Brown, Carey W. 1997. Letter to Kenneth White (Georgia Environmental Protection Division, Underground Storage Tank Management Program), September 9. Comment responses to letter from Kenneth White dated July 30, 1997.

Logan, William E. 1998. Letter to John Spears (Fort Stewart Directorate of Public Works, Environmental Branch), November 16. Technical review and comments on CAP – Part A Report.

Logan, William E. 2000a. Letter to Colonel Gregory V. Stanley (Fort Stewart Directorate of Public Works, Environmental Branch), September 5. Technical Review and comments on CAP – Part A Addendum #2 Report.

Logan, William E. 2000b. Letter to Colonel Gregory V. Stanley (Fort Stewart Directorate of Public Works, Environmental Branch), December 18. Approval of CAP – Part A Addendum #2 Report.

Logan, William E. 2001. Letter to Colonel Gregory V. Stanley (Fort Stewart Directorate of Public Works, Environmental Branch), August 20. Technical review and approval of First Annual Monitoring Only Report.

Logan, William E. 2004. Letter to Colonel Gregory V. Stanley (Fort Stewart Directorate of Public Works, Environmental Branch), June 29. Technical review and comments on the Fourth Annual Monitoring Only Report.

Logan, William E. 2005. Letter to Colonel Gregory V. Stanley (Fort Stewart Directorate of Public Works, Environmental Branch), August 5. Technical review and comments on the Fifth Annual Monitoring Only Report.

Perez, Ovidio, E. 1999a. Letter to William E. Logan (Georgia Environmental Protection Division, Underground Storage Tank Management Program), September 9. Response to letter from William Logan dated November 16, 1999.

Perez, Ovidio, E. 1999b. Letter to William E. Logan (Georgia Environmental Protection Division, Underground Storage Tank Management Program), June 22. Proposed well locations.

SAIC (Science Applications International Corporation) 1997. *Corrective Action Plan–Part A Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia,* Oak Ridge, Tennessee, March.

SAIC 1998. *Corrective Action Plan–Part A Addendum Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, July.

SAIC 2000. *Corrective Action Plan–Part A Addendum #2 Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia,* May.

SAIC 2001. *First Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, May.

SAIC 2002. *Second Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, May.

SAIC 2003. *Third Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, May.

SAIC 2004. *Fourth Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, May.

SAIC 2005. *Fifth Annual Monitoring Only Report for Underground Storage Tank 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, July.

Stanley, Gregory V. 2000. Letter to William E. Logan (Georgia Environmental Protection Division, Underground Storage Tank Management Program), October 5. Sampling results of well 37-09.

Stanley, Gregory V. 2001. Letter to William E. Logan (Georgia Environmental Protection Division, Underground Storage Tank Management Program), February 1.

STEP (Solutions To Environmental Problems, Inc.) 2005. *Final Report for Interim Removal Activities at UST 89, Facility ID #9-089074, Building 1247 and UST 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia*, February.

White, Kenneth F. 1997. Letter to John Spears (Fort Stewart Directorate of Public Works, Environmental Branch), July 30. Technical review and comments on CAP – Part A Report.

White, Kenneth F. 1998. Letter to John Spears (Fort Stewart Directorate of Public Works, Environmental Branch), March 19. Acknowledgement of letter from Carey Brown dated September 9, 1997.

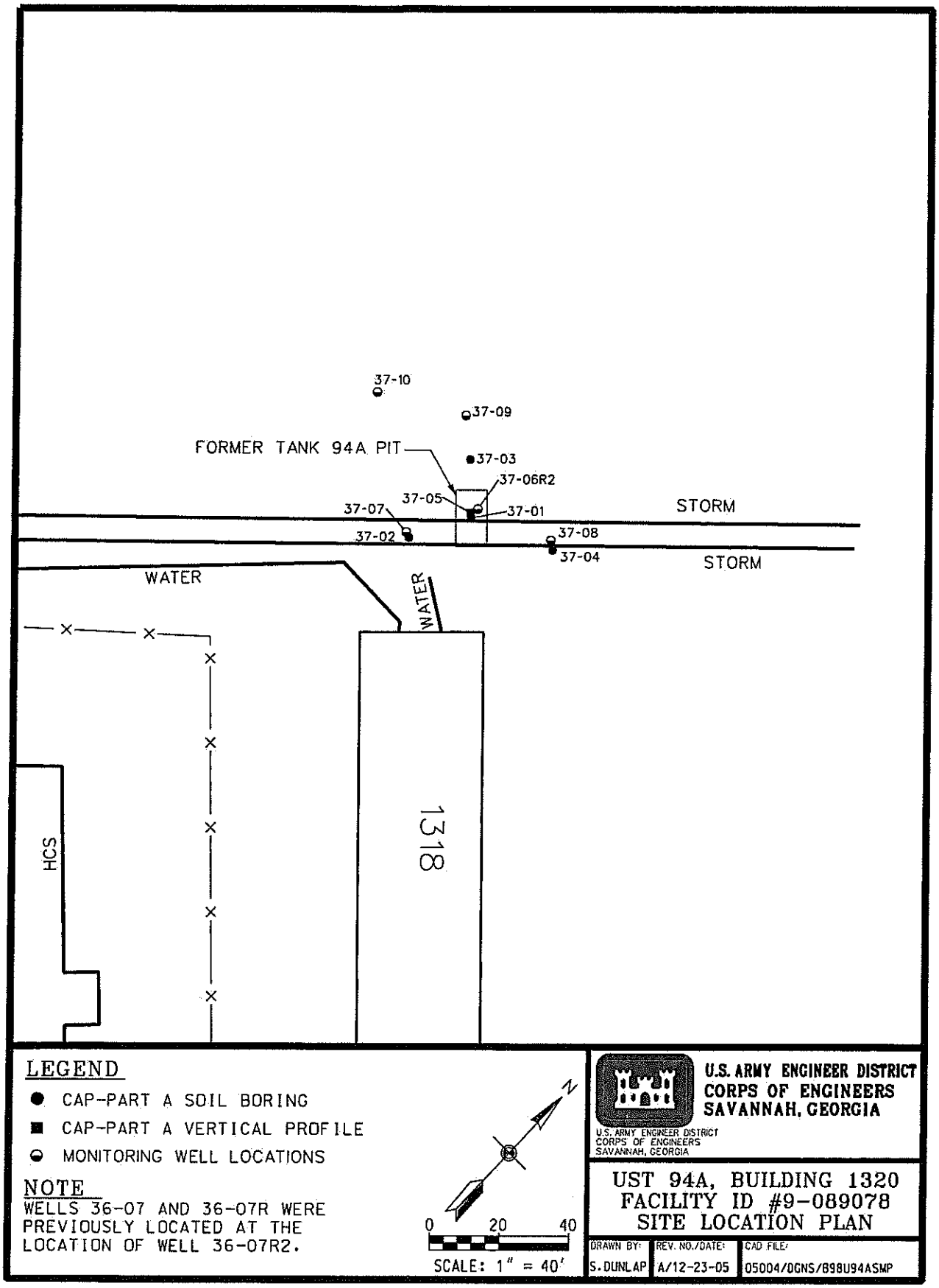


Figure 1. Location Map of UST 94A at Fort Stewart, Liberty County, Georgia

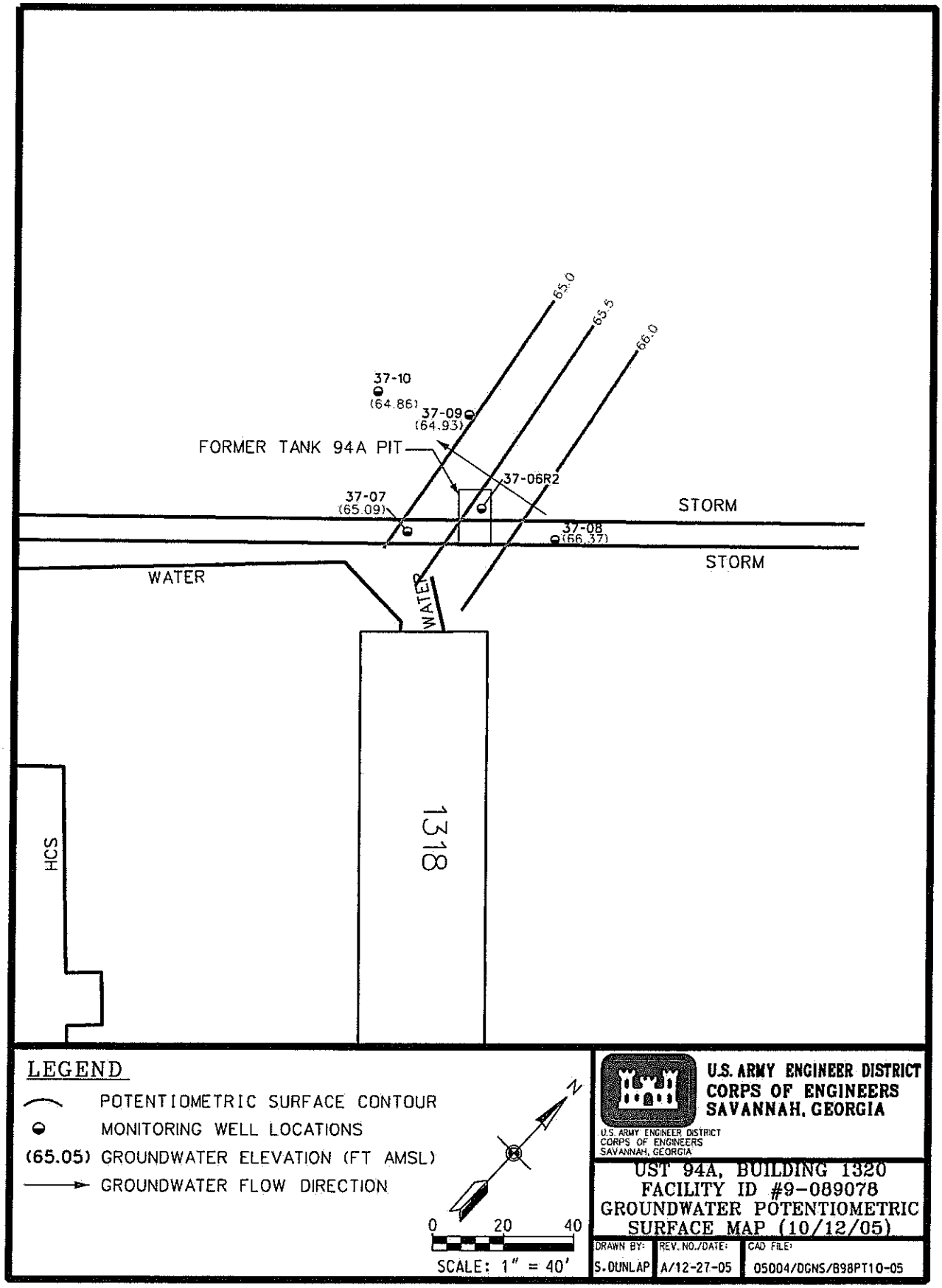


Figure 2. Potentiometric Surface Map for the UST 94A Site (October 2005)

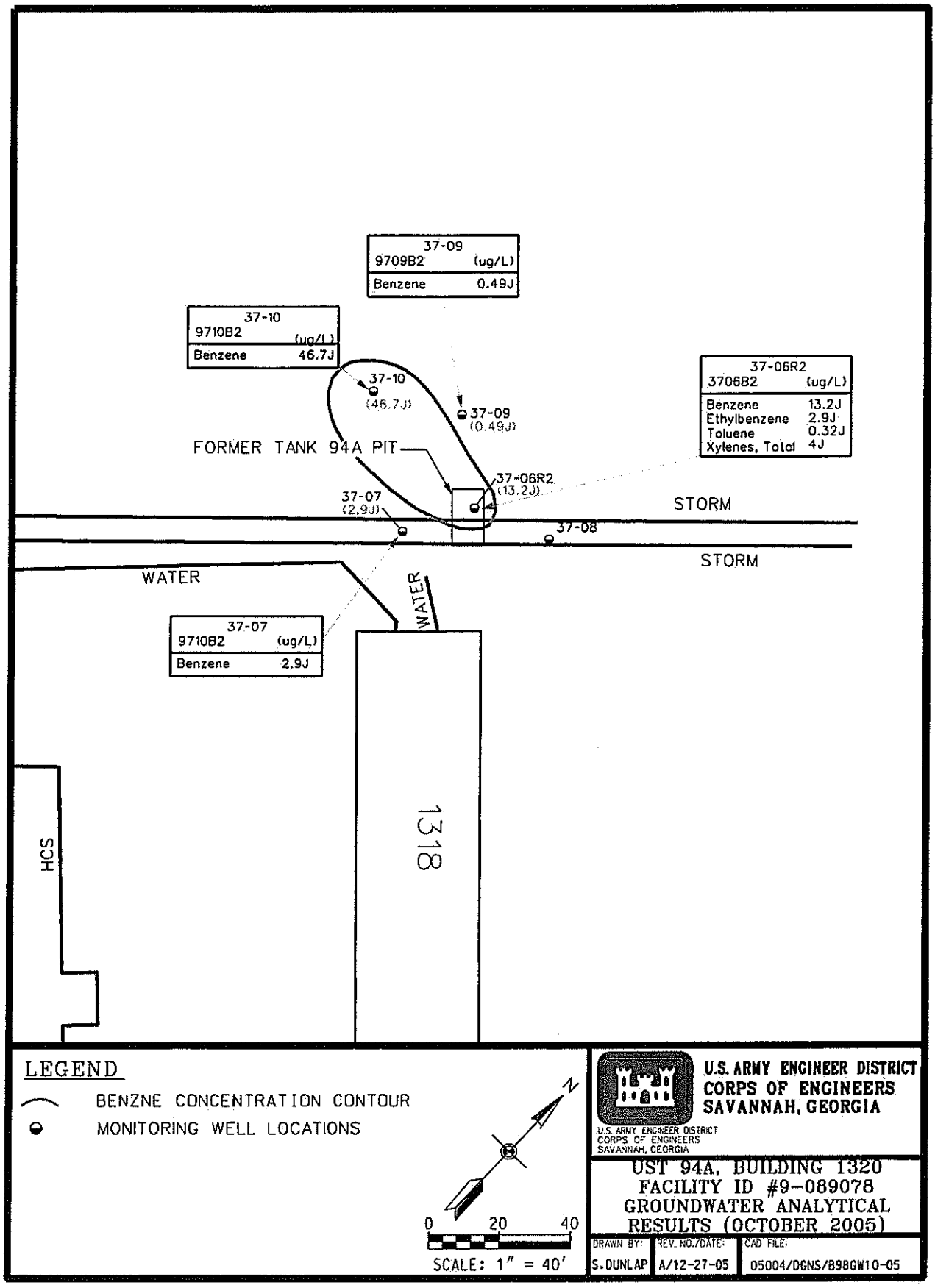


Figure 3. Groundwater Quality Map for the UST 94A Site (October 2005)

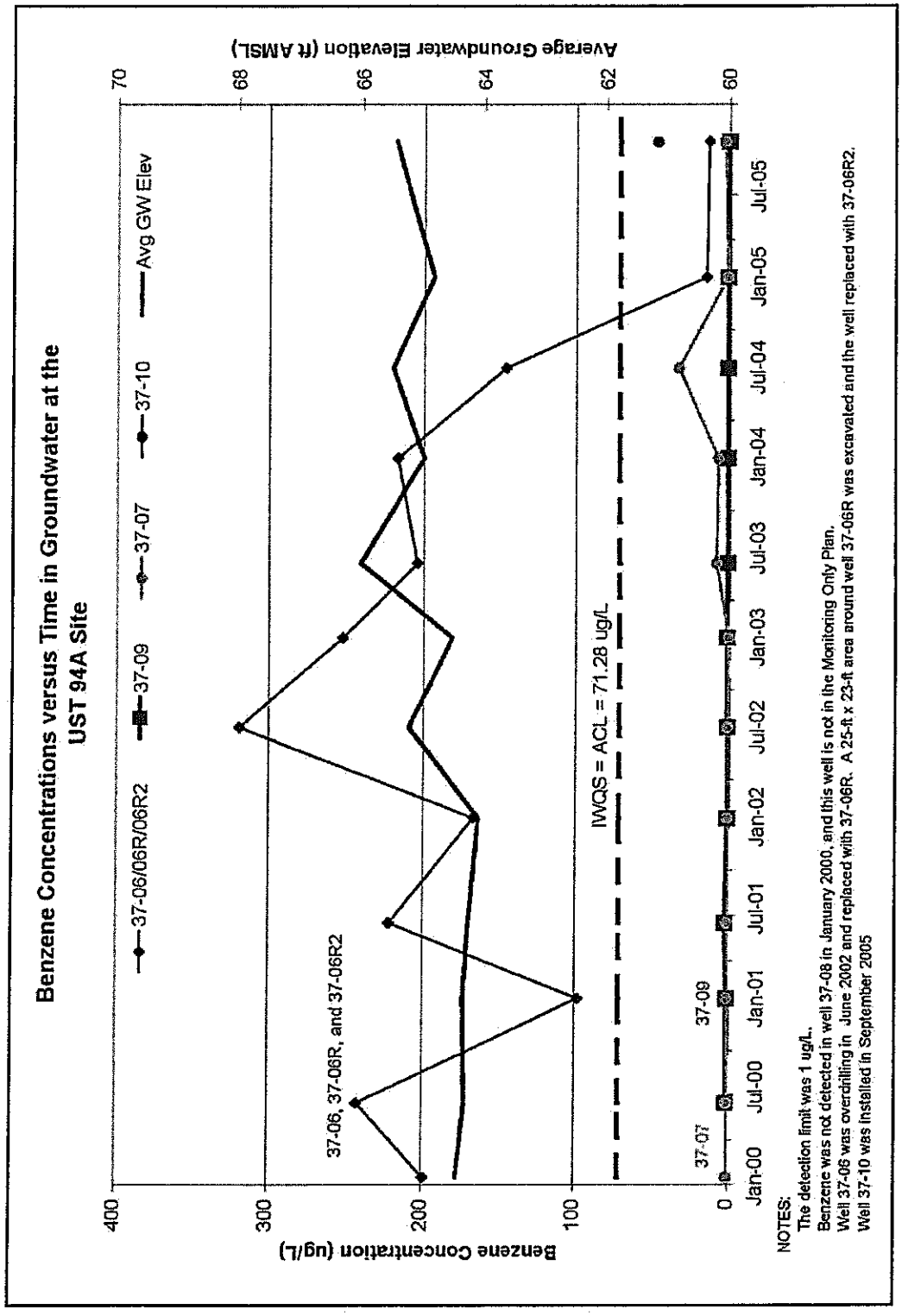


Figure 4. Trend of Benzene Concentrations at the UST 94A Site

APPENDIX II

TABLES

Table 1. Well Construction Details

Boring/Well Number	Date Installed	Boring Depth (ft BGS)	Screened Interval (ft BGS)	Type of Completion	Coordinates (NAD83)		Elevation (NAVD88)	
					Northing	Easting	Ground Surface	Top of Casing
Additional Well Installation – October 2005								
37-10	09/17/05	12.4	2.3 – 12.3	1-in. PVC	683430.70	822731.64	68.98	69.13

NOTES:
BGS Below ground surface.
NAD North American Datum.
PVC Polyvinyl chloride.

Table 2. Groundwater Elevations

Well Number	Date Measured	Top of Casing Elevation (ft AMSL)	Depth of Screened Interval (ft BGS)	Depth to Free Product (ft BTOC)	Depth to Water (ft BTOC)	Product Thickness (ft)	Corrected Groundwater Elevation (ft AMSL)
Eleventh Semiannual Monitoring Event – October 2005							
37-06R2	10/12/05	unknown [a]	unknown [a]	—	2.64	0	67.22
37-07	10/12/05	70.15	3.7 – 13.7	—	5.06	0	65.09
37-08	10/12/05	69.88	5.7 – 15.7	—	3.51	0	66.37
37-09	10/12/05	68.78	4.7 – 14.7	—	3.85	0	64.93
37-10	10/12/05	68.98	2.3 – 12.3	—	4.12	0	64.86

NOTES:
[a] Well construction detail and survey data were not provided in the *Final Report for Interim Removal Activities at UST 89, Facility ID #9-089074, Building 1247 and UST 94A, Facility ID #9-089078, Building 1320, Fort Stewart, Georgia* (STEP 2005).
AMSL Above mean sea level.
BGS Below ground surface.
BTOC Below top of casing.

Table 3. Groundwater Analytical Results

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Eleventh Semiannual Monitoring Event – October 2005								
37-06R2	3706B2[a]	unknown	10/12/05	13.2 J	0.32 J	2.9 J	4 J	20.42
37-07	3707B2[a]	3.7 – 13.7	10/12/05	2.9 J	1 UJ	1 UJ	1 UJ	2.9
37-09	3709B2[a]	5.7 – 15.7	10/12/05	0.49 J	1 UJ	1 UJ	1 UJ	0.49
37-10	3710B2[a]	2.3 – 12.3	10/12/05	46.7 J	1 UJ	1 UJ	1 UJ	46.7
In-Stream Water Quality Standards (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limits				71.28	—	—	—	—

NOTES:

[a] The holding time was exceeded by 1 day.

Bold values exceed In-Stream Water Quality Standards.

Italic values exceed alternate concentration limits.

BGS Below ground surface.

BTEX Benzene, toluene, ethylbenzene, and xylenes.

GA EPD Georgia Environmental Protection Division.

NRC No regulatory criterion.

Data Qualifiers

U Indicates that the compound was not detected above the reported 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.

APPENDIX III

WELL CONSTRUCTION DIAGRAM

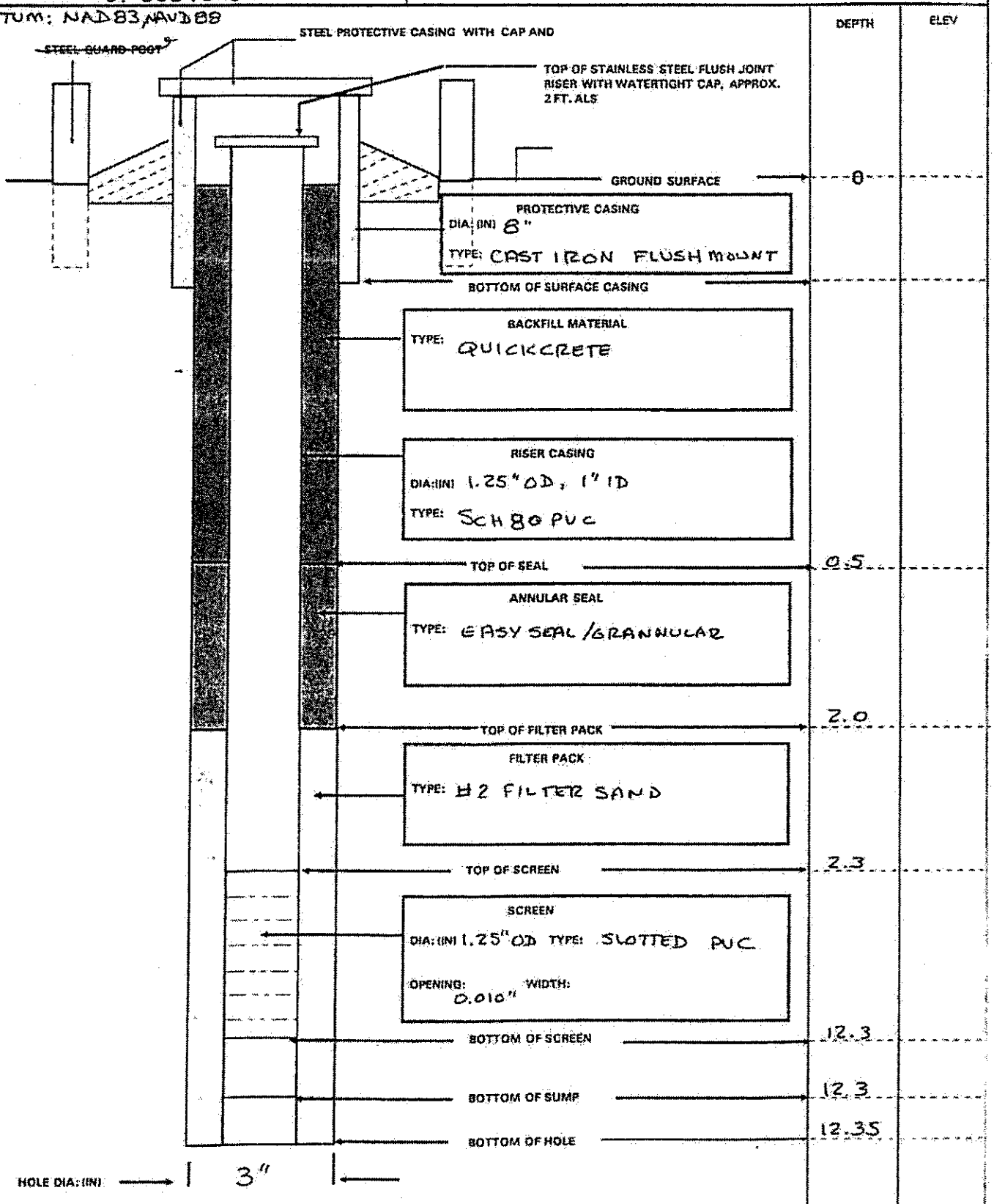
MONITORING WELL

PROJECT NAME: [illegible] DELIVERY ORDER NO:

WELL NUMBER: 37-10 BEGIN: 9/17/05 END: 9/17/05

COORDINATES: N: 683430.76 E: 822731.64 REFERENCE POINT: TOC ELEVATION: 69.13 MSL

DATUM: NAD83/NAVD88



APPENDIX IV

LABORATORY ANALYTICAL RESULTS

STATE OF GEORGIA
ENVIRONMENTAL LABORATORY ACCREDITATION

	Name of Laboratory:	**General Engineering Laboratories, Inc.**
	Address:	P.O. Box 30712 2040 Savage Road Charleston, SC 29407
	Contact:	Bob Pullano or Wendy Dimmick
	Telephone number:	(843) 556-8171
	Fax number:	(843) 766-1178
#1	Accrediting Authority:	**State of South Carolina**
	Accreditation Number:	SC-10120001
	Effective Date:	Extension granted while recertification in process, January 27, 2003
	Expiration Date:	March 26, 2006
	Accreditation Scope:	SDWA, CWA, RCRA, CERCLA
#2	Accrediting Authority:	**State of Florida**
	Accreditation Number:	E-87156
	Effective Date:	July 1, 2001 (initial and reaccredited on July 1 each year thereafter)
	Expiration Date:	June 30, 2006
	Accreditation Scope:	SDWA, CWA, RCRA, CERCLA

DATA VALIDATION REASON CODES

Organic, Inorganic, and Radiological Analytical Data

Holding Times

A01 Extraction holding times were exceeded.
A02 Extraction holding times were grossly exceeded.
A03 Analysis holding times were exceeded.
A04 Analysis holding times were grossly exceeded.
A05 Samples were not preserved properly.
A06 Professional judgment was used to qualify the data.

Gas Chromatography/Mass Spectroscopy Tuning

B01 Mass calibration was in error, even after applying expanded criteria.
B02 Mass calibration was not performed every 12 hours.
B03 Mass calibration did not meet ion abundance criteria.
B04 Professional judgment was used to qualify the data.

Initial/Continuing Calibration – Organics

C01 Initial calibration relative response factor (RRF) was <0.05.
C02 Initial calibration relative standard deviation (RSD) was >30%.
C03 Initial calibration sequence was not followed as required.
C04 Continuing calibration RRF was <0.05.
C05 Continuing calibration percent difference (%D) was >25%.
C06 Continuing calibration was not performed at the required frequency.
C07 Resolution criteria were not met.
C08 Relative percent difference (RPD) criteria were not met.
C09 RSD criteria were not met.
C10 Retention time of compounds was outside windows.
C11 Compounds were not adequately resolved.
C12 Breakdown of endrin or dichlorodiphenyltrichloroethane (DDT) was >30%.
C13 Combined breakdown of endrin/DDT was >30%.
C14 Professional judgment was used to qualify the data.

Initial/Continuing Calibration – Inorganics

D01 Initial calibration verification (ICV) or continuing calibration verification (CCV) was not performed for every analyte.
D02 ICV recovery was above the upper control limit.
D03 ICV recovery was below the lower control limit.
D04 CCV recovery was above the upper control limit.
D05 CCV recovery was below the lower control limit.
D06 Standard curve was not established with the minimum number of standards.
D07 Instrument was not calibrated daily or each time the instrument was set up.
D08 Correlation coefficient was <0.995.
D09 Mid-range cyanide standard was not distilled.
D10 Professional judgment was used to qualify the data.

Inductively Coupled Plasma and Furnace Requirements

E01 Interference check sample recovery was outside the control limit.
E02 Duplicate injections were outside the control limit.
E03 Post-digestion spike recovery was outside the control limit.
E04 Method of standard additions (MSA) was required but not performed.
E05 MSA correlation coefficient was <0.995.
E06 MSA spikes were not at the correct concentration.
E07 Serial dilution criteria were not met.
E08 Professional judgment was used to qualify the data.

Blanks

F01 Sample data were qualified as a result of the method blank.
F02 Sample data were qualified as a result of the field blank.
F03 Sample data were qualified as a result of the equipment rinsate.
F04 Sample data were qualified as a result of the trip blank.
F05 Gross contamination exists.
F06 Concentration of the contaminant was detected at a level below the contract-required quantitation limit (CRQL).
F07 Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL.
F08 Concentration of the contaminant was detected at a level that exceeds the action level.
F09 No laboratory blanks were analyzed.
F10 Blank had a negative value >2 times the instrument detection limit.
F11 Blanks were not analyzed at the required frequency.
F12 Professional judgment was used to qualify the data.

Surrogate/Radiological Chemical Recovery

G01 Surrogate/radiological chemical recovery was above the upper control limit.
G02 Surrogate/radiological chemical recovery was below the lower control limit.
G03 Surrogate recovery was <10%.
G04 Surrogate recovery was zero.
G05 Surrogate/radiological chemical recovery data were not present.
G06 Professional judgment was used to qualify the data.
G07 Radiological chemical recovery was <20%.
G08 Radiological chemical recovery was >150%.

Matrix Spike/Matrix Spike Duplicate

H01 Matrix spike (MS)/matrix spike duplicate (MSD) recovery was above the upper control limit.
H02 MS/MSD recovery was below the lower control limit.
H03 MD/MSD recovery was <10%.
H04 MS/MSD pairs exceeded the RPD limit.
H05 No action was taken on MS/MSD limit.
H06 Professional judgment was used to qualify the data.
H07 Radiological MS/MSD recovery was <20%.
H08 Radiological MS/MSD recovery was >160%.
H09 Radiological MS/MSD samples were not analyzed at the required frequency.

DATA VALIDATION REASON CODES (continued)

Organic, Inorganic, and Radiological Analytical Data

Matrix Spike
- I01 MS recovery was above the upper control limit.
- I02 MS recovery was below the lower control limit.
- I03 MS recovery was <30%.
- I04 No action was taken on MS data.
- I05 Professional judgment was used to qualify the data.

Laboratory Duplicate
- J01 Duplicate RPD/radiological duplicate error ratio (DER) was outside the control limit.
- J02 Duplicate sample results were >5 times the contract-required detection limit (CRDL).
- J03 Duplicate sample results were <5 times the CRDL.
- J04 Professional judgment was used to qualify the data.
- J05 Duplicate was not analyzed at the required frequency.

Internal Area Summary
- K01 Area counts were outside the control limits.
- K02 Extremely low area counts or performance was exhibited by a major drop-off.
- K03 IS retention time varied by more than 30 sec.
- K04 Professional judgment was used to qualify the data.

Pesticide Cleanup Checks
- L01 10% recovery was obtained during either check.
- L02 Recoveries during either check were >120%.
- L03 Gel permeation chromatography cleanup recoveries were outside the control limits.
- L04 Florisil cartridge cleanup recoveries were outside the control limits.
- L05 Professional judgment was used to qualify the data.

Target Compound Identification
- M01 Incorrect identifications were made.
- M02 Qualitative criteria were not met.
- M03 Cross contamination occurred.
- M04 Confirmatory analysis was not performed.
- M05 No results were provided.
- M06 Analysis occurred outside 12-hour gas chromatography/mass spectroscopy window.
- M07 Professional judgment was used to qualify the data.
- M08 The %D between the two pesticide/polychlorinated biphenyl column checks was >25%.

Compound Quantitation and Reported CRQLs
- N01 Quantitation limits were affected by large off-scale peaks.
- N02 Method detection limits reported by the laboratory exceeded corresponding CRQLs.
- N03 Professional judgment was used to qualify the data.

Tentatively Identified Compounds
- O01 Compound was suspected laboratory contaminant and was not detected in the blank.
- O02 Tentatively identified compound result was not above 10 times the level found in the blank.
- O03 Professional judgment was used to qualify analytical data.

Laboratory Control Samples
- P01 Laboratory control sample (LCS) recovery was above the upper control limit.
- P02 LCS recovery was below the lower control limit.
- P03 LCS recovery was <50%.
- P04 No action was taken on the LCS data.
- P05 LCS was not analyzed at the required frequency.
- P06 Radiological LCS recovery was <50% for aqueous samples, <40% for solid samples.
- P07 Radiological LCS recovery was >150% for aqueous samples, >160% for solid samples.
- P08 Professional judgment was used to qualify the data.

Field Duplicate
- Q01 Field duplicate RPDs were >30% for waters and/or >50% for soils.
- Q02 Radiological DER was outside the control limit.
- Q03 Duplicate sample results were >5 times the CRDL.
- Q04 Duplicate sample results were <5 times the CRDL.

Radiological Calibration
- R01 Efficiency calibration criteria were not met.
- R02 Energy calibration criteria were not met.
- R03 Resolution calibration criteria were not met.
- R04 Background determination criteria were not met.
- R05 Quench curve criteria were not met.
- R06 Absorption curve criteria were not met.
- R07 Plateau curve criteria were not met.
- R08 Professional judgment was used to qualify the data.

Radiological Calibration Verification
- S01 Efficiency verification criteria were not met.
- S02 Energy verification criteria were not met.
- S03 Resolution verification criteria were not met.
- S04 Background verification criteria were not met.
- S05 Cross-talk verification criteria were not met.
- S06 Professional judgment was used to qualify the data.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3706B2

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1H347

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/27/05 - 1 DAY 3CJ

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/L	Q
71-43-2	Benzene	13.2	
108-88-3	Toluene	0.32	J
100-41-4	Ethylbenzene	2.9	
1330-20-7	Xylenes (total)	4.0	

J A03

FORM I VOA OLM03.0

DATA VALIDATION COPY

DUPLICATE

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
3706B4

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1H346

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/27/05 - 1 DAY OUT

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/L	Q
71-43-2	Benzene	13.1	
108-88-3	Toluene	0.36	J
100-41-4	Ethylbenzene	2.8	
1330-20-7	Xylenes (total)	3.8	

J A03

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3707B2

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1H343

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/27/05 - 1 DNA out

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/L	Q	
71-43-2	Benzene	2.9		J A07
108-88-3	Toluene	1.0	U	
100-41-4	Ethylbenzene	1.0	U	
1330-20-7	Xylenes (total)	1.0	U	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3709B2

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1H344

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/27/05

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/L	Q
71-43-2	Benzene	0.49	J
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3710B2

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 1H345

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/27/05 - 1 DAYS OUT

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/L	Q
71-43-2	Benzene	46.7	
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (total)	1.0	U

5 DAYS OUT

DATA VALIDATION COPY

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB0416

Lab Name: GEL, LLC. Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 147791

Matrix: (soil/water) WATER Lab Sample ID: 147791018

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 9G413

Level: (low/med) LOW Date Received: 10/13/05

% Moisture: not dec. _____ Date Analyzed: 10/21/05

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/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)	1.0	U	

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PO Box 2501, 151 Lafayette Dr., Oak Ridge, TN 37831 (423)481-4600

8005104063

Page 1 of 2

CHAIN OF CUSTODY RECORD

COC NO.: GLTM48

PROJECT NAME: Fort Stewart LTM, DO 54

PROJECT NUMBER: 01-1055-04-2945-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature): Patricia A. Stoll (Printed Name): PATRICIA A. STOLL

1497917 REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	VOC	SVOC	Nitrate, Nitrite, Sulfate	Sulfide	Total Iron	Methane	Carbon Dioxide	Total Phosphorus	MTBE	Hexavalent Chromium	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS,
1 37Ø6B2	10/12/05	1030	water	2											2		
2 37Ø6B4		1030		2											2		
3 371ØB2		0955		2											2		
4 37Ø9B2		0935		2											2		
5 37Ø7B2		0915		2											2		
6 931582	10/11/05	1525		2											2		
7 93Ø882		1505		2											2		
8 932582		1450		2											2		
9 931482		1425		2											2		
10 932Ø82		1405		2											2		
11 931782		1340		2											2		
12 931786		1320		2											2		
13 931982		1305		2											2		

IV-11

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040Savage Road, Charleston, SC 29407

PHONE NO: (843)556-8171

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
Patricia A. Stoll	10/12/05 1600	[signature]	10/13/05 0915
COMPANY NAME: SAIC		COMPANY NAME: GEL	
RECEIVED BY: 8431-2138-1074	Date/Time 10/12/05 1600	RELINQUISHED BY:	Date/Time
COMPANY NAME: FEDEX		COMPANY NAME:	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME:		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 36

Cooler Temperature: 4°C

Cooler ID: #1.

FEDEX NUMBER: 8431-2138-1074

APPENDIX V

SITE RANKING FORM

SITE RANKING FORM

Facility Name: UST 94A, Building 1320 **Ranked by:** S. Stoller

County: Liberty **Facility ID #:** 9-089078 **Date Ranked:** 12/20/05

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

* *Closure sample T94A-A-S (1995)*

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. 10) = (10) x (C. 10) = (D. 100)

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 = 1000 +

* *No free product in October 2005*

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

* *Sample 3710B2 (October 2005)*

Fill in the blanks: (E. 0) + (F. 5) = (G. 5)

Facility Name: UST 94A, Building 1320 **County:** Liberty **Facility ID #:** 9-089078

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

(M. 250) + (D. 100) = N. 350

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. 350) x (P. 1) = (350) + (Q. 0)

= 350 (October 2005 – Eleventh Semiannual Monitoring Event)
ENVIRONMENTAL SENSITIVITY SCORE

ADDITIONAL GEOLOGIC AND HYDROGEOLOGIC DATA

The following provides supplemental information to Item H of the Site Ranking Form. It also provides details relating to the geologic and hydrogeologic conditions at Fort Stewart that support Fort Stewart's determination that the water withdrawal points located at the site are not hydraulically connected to the surficial aquifer.

1.0 REGIONAL AND LOCAL GEOLOGY

Fort Stewart is located within the coastal plain physiographic province. This province is typified by nine southeastward-dipping strata that increase in thickness from 0 ft at the fall line, located approximately 150 miles inland from the Atlantic coast, to approximately 4,200 ft 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 ft 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 ft thick and dominated by clastics. The Tertiary section was found to be approximately 2,170 ft thick and dominated by limestone, with a 175-ft-thick cap of dark green phosphatic clay. This clay is regionally extensive and is known as the Hawthorn Group. The interval from approximately 110 ft 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 1/4 mile north of the runway at Wright Army Airfield within the Fort Stewart Military Reservation. The log for this well describes a 410-ft section, the lowermost 110 ft of which consisted predominantly of limestone sediments, above which 245 ft 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 ft 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 in. in depth. The surface layer is underlain by material consisting of pale yellow loamy sand and extends to a depth of approximately 29 in. The subsoil is predominantly sandy clay loam and extends to a depth of 72 in. 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, Ocala Group, and Suwannee Limestone. These formations are approximately 800 ft thick, and groundwater from this aquifer is used primarily for drinking water (Arora 1984).

The uppermost hydrologic unit is the surficial aquifer, which consists of widely varying amounts of sand and clay ranging from 55 to 150 ft in thickness. This aquifer is used primarily for domestic lawn and

agricultural irrigation. The top of the water table ranges from approximately 2 to 10 ft BGS (Geraghty and Miller 1993). The base of the aquifer corresponds to the top of the underlying dense clay of the Hawthorn Group. The Hawthorn Group was not encountered during drilling at this site but is believed to be located at 40 to 50 ft BGS; therefore, the effective aquifer thickness would be approximately 35 to 45 ft. Soil surveys for Liberty and Long Counties describe the occurrence of a perched water table within the Stilson loamy sands present within Fort Stewart (Looper 1980).

The confining layer for the Principal Artesian Aquifer is the phosphatic clay of the Hawthorn Group and ranges in thickness from 15 to 90 ft. 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, Markshead, and Parachula, listed from youngest to oldest.

The Coosawhatchie Formation is predominantly composed of clay but also has sandy clay, argillaceous sand, and phosphorite units. The formation is approximately 170 ft 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 ft 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 ft thick in the Savannah, Georgia, area. The Parachula Formation generally overlies the Suwannee Limestone in Georgia.

Groundwater encountered at all the underground storage tank (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.

3.0 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.

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.

APPENDIX VI

CERTIFICATES OF ANALYSIS

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3706B2
Sample ID: 147791001
Matrix: Water
Collect Date: 12-OCT-05 10:30
Receive Date: 13-OCT-05
Collector: Client

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics Federal											
5035/8260B BTEX in Liquid Federal											
Benzene	H	13.2	0.300	1.00	ug/L	1	TLW	10/27/05	0720	474114	1
Ethylbenzene	H	2.94	0.250	1.00	ug/L	1					
Toluene	HJ	0.325	0.250	1.00	ug/L	1					
Xylenes (total)	H	3.97	0.250	1.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	5035/8260B BTEX in Liquid Federal	50.2	50.0	100	(75%-119%)
Dibromofluoromethane	5035/8260B BTEX in Liquid Federal	48.7	50.0	97	(85%-120%)
Toluene-d8	5035/8260B BTEX in Liquid Federal	53.4	50.0	107	(79%-122%)

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value.
P The response between the confirmation and the primary columns is >40% Different.
R Sample results are rejected.
U Target analyte was analyzed for but not detected above the MDL or LOD.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
d The 2:1 depletion requirement was not met for this sample
h Sample preparation or preservation holding time exceeded.

The above sample is reported on an "as received" basis.

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3706B2
Sample ID: 147791001

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Cheryl Jones.

Reviewed by

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3706B4
Sample ID: 147791002
Matrix: Water
Collect Date: 12-OCT-05 10:30
Receive Date: 13-OCT-05
Collector: Client

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics Federal											
5035/8260B BTEX in Liquid Federal											
Benzene	H	13.1	0.300	1.00	ug/L	1	TLW	10/27/05	0654	474114	1
Ethylbenzene	H	2.84	0.250	1.00	ug/L	1					
Toluene	HJ	0.361	0.250	1.00	ug/L	1					
Xylenes (total)	H	3.81	0.250	1.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	5035/8260B BTEX in Liquid Federal	51.0	50.0	102	(75%-119%)
Dibromofluoromethane	5035/8260B BTEX in Liquid Federal	48.3	50.0	97	(85%-120%)
Toluene-d8	5035/8260B BTEX in Liquid Federal	53.0	50.0	106	(79%-122%)

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value.
P The response between the confirmation and the primary columns is >40% Different.
R Sample results are rejected.
U Target analyte was analyzed for but not detected above the MDL or LOD.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
d The 2:1 depletion requirement was not met for this sample
h Sample preparation or preservation holding time exceeded.

The above sample is reported on an "as received" basis.

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3706B4
Sample ID: 147791002

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Cheryl Jones.

Reviewed by

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3707B2
Sample ID: 147791005
Matrix: Water
Collect Date: 12-OCT-05 09:15
Receive Date: 13-OCT-05
Collector: Client

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics, Federal											
5035/8260B BTEX in Liquid Federal											
Benzene	H	2.95	0.300	1.00	ug/L	1	TLW	10/27/05	0537	474114	1
Ethylbenzene	HU	ND	0.250	1.00	ug/L	1					
Toluene	HU	ND	0.250	1.00	ug/L	1					
Xylenes (total)	HU	ND	0.250	1.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	5035/8260B BTEX in Liquid Federal	51.9	50.0	104	(75%-119%)
Dibromofluoromethane	5035/8260B BTEX in Liquid Federal	47.6	50.0	95	(85%-120%)
Toluene-d8	5035/8260B BTEX in Liquid Federal	52.4	50.0	105	(79%-122%)

Notes:
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D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
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H Analytical holding time exceeded.
J Indicates an estimated value.
P The response between the confirmation and the primary columns is >40% Different.
R Sample results are rejected.
U Target analyte was analyzed for but not detected above the MDL or LOD.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
d The 2:1 depletion requirement was not met for this sample
h Sample preparation or preservation holding time exceeded.

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Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3707B2
Sample ID: 147791005

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method

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Reviewed by

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Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour

Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3709B2
Sample ID: 147791004
Matrix: Water
Collect Date: 12-OCT-05 09:35
Receive Date: 13-OCT-05
Collector: Client

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics Federal											
5035/8260B BTEX in Liquid Federal											
Benzene	HJ	0.492	0.300	1.00	ug/L	1	TLW	10/27/05	0603	474114	1
Ethylbenzene	HU	ND	0.250	1.00	ug/L	1					
Toluene	HU	ND	0.250	1.00	ug/L	1					
Xylenes (total)	HU	ND	0.250	1.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	5035/8260B BTEX in Liquid Federal	50.4	50.0	101	(75%-119%)
Dibromofluoromethane	5035/8260B BTEX in Liquid Federal	47.5	50.0	95	(85%-120%)
Toluene-d8	5035/8260B BTEX in Liquid Federal	53.4	50.0	107	(79%-122%)

Notes:
The Qualifiers in this report are defined as follows :

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D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value.
P The response between the confirmation and the primary columns is >40% Different.
R Sample results are rejected.
U Target analyte was analyzed for but not detected above the MDL or LOD.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
d The 2:1 depletion requirement was not met for this sample
h Sample preparation or preservation holding time exceeded.

The above sample is reported on an "as received" basis.

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Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3709B2
Sample ID: 147791004

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method

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Reviewed by

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Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3710B2
Sample ID: 147791003
Matrix: Water
Collect Date: 12-OCT-05 09:55
Receive Date: 13-OCT-05
Collector: Client

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics Federal											
5035/8260B BTEX in Liquid Federal											
Benzene	H	46.7	0.300	1.00	ug/L	1	TLW	10/27/05	0628	474114	1
Ethylbenzene	HU	ND	0.250	1.00	ug/L	1					
Toluene	HU	ND	0.250	1.00	ug/L	1					
Xylenes (total)	HU	ND	0.250	1.00	ug/L	1					

The following Analytical Methods were performed

Method	Description	Analyst Comments
	SW846 8260B	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Bromofluorobenzene	5035/8260B BTEX in Liquid Federal	51.0	50.0	102	(75%-119%)
Dibromofluoromethane	5035/8260B BTEX in Liquid Federal	47.8	50.0	96	(85%-120%)
Toluene-d8	5035/8260B BTEX in Liquid Federal	54.2	50.0	108	(79%-122%)

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
D Sample has been diluted and reanalyzed after initially exceeding inst. calibration range
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value.
P The response between the confirmation and the primary columns is >40% Different.
R Sample results are rejected.
U Target analyte was analyzed for but not detected above the MDL or LOD.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
d The 2:1 depletion requirement was not met for this sample
h Sample preparation or preservation holding time exceeded.

The above sample is reported on an "as received" basis.

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : SAIC
Address : 151 Lafayette Drive
Oak Ridge, Tennessee 37831

Report Date: March 28, 2006

Contact: Ms. Leslie Barbour
Project: **Fort Stewart LTM, DO 54**

Client Sample ID: 3710B2
Sample ID: 147791003

Project: SAIC07300
Client ID: SAIC073

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Cheryl Jones.

Reviewed by

Science Applications International Corporation — An Employee-Owned Company

PO Box 2501, 151 Lafayette Dr., Oak Ridge, TN 37831 (423)481-4600

@0051090057

Page 1 of 2

CHAIN OF CUSTODY RECORD

COC NO.: GLTM48

PROJECT NAME: Fort Stewart LTM, DO 54

PROJECT NUMBER: 01-1055-04-2945-200

PROJECT MANAGER: Patty Stoll

Sampler (Signature): Patricia A Stoll (Printed Name): PATRICIA A. STOLL

1497791 REQUESTED PARAMETERS

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040Savage Road, Charleston, SC 29407

PHONE NO: (843)556-8171

	Sample ID	Date Collected	Time Collected	Matrix	BTEX	VOC	SVOC	Nitrate, Nitrite, Sulfate	Sulfide	Total Iron	Methane	Carbon Dioxide	Total Phosphorus	MTBE	Hexavalent Chromium	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS,
001	37Ø6B2	10/12/05	1030	Water	2											2		
002	37Ø6B4		1030		2											2		
003	371ØB2		0955		2											2		
004	37Ø9B2		0935		2											2		
005	37Ø7B2		0915		2											2		
006	931582	10/11/05	1525		2											2		
007	93Ø882		1505		2											2		
008	932582		1450		2											2		
009	931482		1425		2											2		
010	932Ø82		1405		2											2		
011	931782		1340		2											2		
012	931786		1320		2											2		
013	931982		1305		2											2		

VI-12

RELINQUISHED BY: Patricia A Stoll	Date/Time 10/12/05 1600	RECEIVED BY:	Date/Time 10/13/05 0915	TOTAL NUMBER OF CONTAINERS: 36	Cooler Temperature: 4°C
COMPANY NAME: SAIC		COMPANY NAME: GEL		Cooler ID: #1	FEDEX NUMBER: 8431-2138-1074
RECEIVED BY: 8431-2138-1074	Date/Time 10/12/05 1600	RELINQUISHED BY:	Date/Time		
COMPANY NAME: FEDEX		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			