

SITE: HAA-09 R2, HAAF, GEORGIA

****FSGA First Annual Monitoring Report for Release 1 with notification and proposed corrective action (CAP) for Release 2 - 8 Sep 2003**

****GA EPD CAP-Part B approval to implement action proposed in First Monitoring Rpt R1 – 6 Oct 2003**

****FSGA Second Annual Monitoring Rpt documenting approval to remove R2 free product- 8 Feb 2006**

****GA EPD CAP-Part B Approval with request for Amendment - 28 Feb 2008**

****GA EPD CAP-Part B R2, Progress Monitoring Rpt approved further investigation - 16 May 2006**

****FSGA Thlrd Annual Monitoring Rpt, R2 (summary attached) - 19 Sep 2007**

****GA EPD CAP-Part B Approval (references FSGA Letter, 8 Feb 2006) - 16 May 2006**

****GA EPD CAP-Part B Approval request Amendment (ref: FSGA Letter, 19 Sept 2007) - 28 Feb 2008**

FSGA CAP-Part B Amend #1 Submittal - 20 April 2011

GA EPD CAP-Part B Amend #1 Approval - 2 May 2011

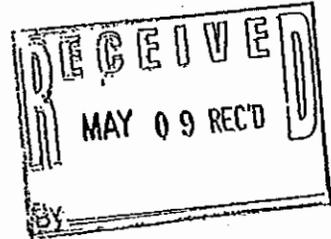
****THERE WAS NO CAP-PART B PREPARED FOR THIS SITE. CORRECTIVE ACTIONS PROPOSED IN ANNUAL MONIORING REPORTS WERE APPROVED BY THE REGULATOR AS "DECISION DOCUMENTS". AFTER THE SUBMISSION OF THE 3d ANNUAL MONITORING REPORT ON 19 SEP 2007, THE REGULATOR REQUESTED THE INSTALLATION PROVIDE AN AMENDMENT TO THE CAP-PART B (RELEASE 1) BE PREPARED. AMENDMENT # 1 WAS APPROVED BY REGULATOR OF 2 MAY 2011.**

R*2

Georgia Department of Natural Resources

Environmental Protection Division
Solid Waste Management Program
4244 International Parkway, Suite 104, Atlanta, Georgia 30354
Mark Williams, Commissioner
F. Allen Barnes, Director
404/362-2692

May 2, 2011



Mr. Thomas Fry
Directorate of Public Works/Environmental Branch
US Army/HQ 3rd Inf. Div.
1550 Frank Cochran Dr. Bldg. 1137
Fort Stewart, Georgia 31314-4927

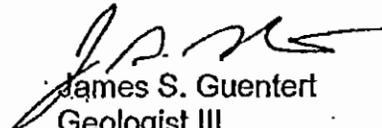
SUBJECT: AST 7009, Bulk Facility – HAA-09, Hunter Army Airfield, Savannah,
Georgia

Dear Mr. Fry:

The Georgia Environmental Protection Division (EPD) has reviewed the Corrective Action Plan – Part B Addendum prepared by SAIC for the site referenced above. EPD approves of the CAP-Part B Addendum and milestone schedule. According to the schedule the pilot-scale remediation system will be installed by the end of July 2011.

Feel free to contact me at 404 362-2556 if you have any comments or questions.

Sincerely,


James S. Guentert
Geologist III

cc: Tressa Rutland, Department of Army
Patricia Stoll, SAIC
Melanie Henry, EPD
File





DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, US ARMY GARRISON, FORT STEWART/HUNTER ARMY AIRFIELD
DIRECTORATE OF PUBLIC WORKS
1687 FRANK COCHRAN DRIVE
FORT STEWART, GEORGIA 31314-5048

REPLY TO
ATTENTION OF

Office of the Directorate

April 20, 2011

CERTIFIED MAIL
7009 28200000 77085979

Georgia Environmental Protection Division
Underground Storage Tank Management Program
Attn: Mr. Jim Guentert
4244 International Parkway, Suite 104
Atlanta, GA 30354

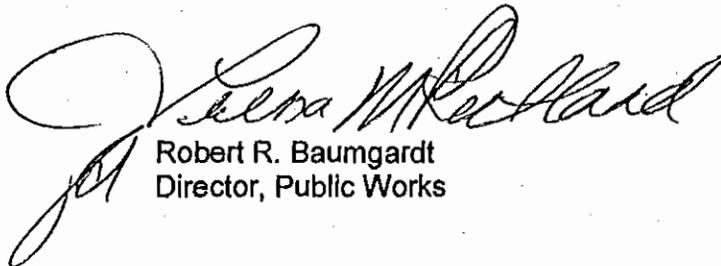
Dear Mr. Guentert:

Fort Stewart is pleased to submit one (1) hard copy and one (1) electronic copy of the Final Corrective Action Plan Part-B Addendum #1, Bulk Fuel Facility (HAA-09), Building 7009, Facility ID#9-025113*2, Hunter Army Airfield, Georgia, dated April 2011 for your review. This report presents information relating to a pilot-scale product recovery system for corrective action of Release #2 at the Bulk Fuel Facility (BFF).

Free product continues to be measured in monitoring well BF-MW-E5 at a thickness ranging from 0.46 to 1.95 ft. during the four vacuum extraction events in 2009. Historically, the level of free product and water has been periodically observed above the screened interval. The vertical and horizontal extents of soil contamination in the vicinity of aboveground storage tank (AST) 7009 were delineated during the Corrective Action Plan (CAP) Part-A and CAP Part-B investigations. The vertical and horizontal extents of groundwater contamination in the vicinity of AST 7009 are below federal maximum contaminant levels and Georgia In-Stream Water Quality Standards (IWQS) and were delineated during the CAP Part-A and CAP Part-B investigations. No active remediation of groundwater was recommended. The BFF is located within the confines of Hunter Army Airfield, and the October 2009 benzene concentrations in groundwater are below the IWQS; however, free product in excess of 1/8 of an inch in thickness continues to persist at the site. Therefore, corrective action to address the free product is recommended.

If you have any questions or comments, regarding the enclosed report, please contact Ms. Algeana Stevenson, at (912) 315-5144 or Ms. Tressa Rutland, Directorate of Public Works, Environmental Division, Prevention and Compliance Branch at (912) 767-2010.

Sincerely,



Robert R. Baumgardt
Director, Public Works

Enclosures



FINAL



IMA

CORRECTIVE ACTION PLAN

PART B
ADDENDUM #1



3d Inf Div (Mech)

**Bulk Fuel Facility (HAA-09)
Building 7009
Hunter Army Airfield, Georgia
Facility ID #9-025113*2**

Prepared for



U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. W91278-10-D-0089
Delivery Order No. CVO1

April 2011

SAIC
From Science to Solutions



FINAL

**CORRECTIVE ACTION PLAN
PART B
ADDENDUM #1
FOR THE
BULK FUEL FACILITY (HAA-09)
BUILDING 7009
HUNTER ARMY AIRFIELD, GEORGIA
FACILITY ID #9-025113*2**

Prepared for

**U. S. Army Corps of Engineers, Savannah District
and
Fort Stewart Directorate of Public Works
under Contract Number W91278-10-D-0089
Delivery Order Number CV01**

Prepared by

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

April 2011

II. SITE INVESTIGATION

The Bulk Fuel Facility (BFF) is approximately 600 x 1,200 ft and covers an area of approximately 16.5 acres (Figure 1). Currently, the facility contains two active aboveground storage tanks (ASTs) (AST 7007 and AST 7009) for the storage of jet propellant (JP)-8 with capacities of approximately 500,000 gal each, above- and underground piping, and off-loader and pump stations for the distribution of fuel to and from the tanks. In 2011, an AST was constructed at the location of former AST 7005. The capacity of this AST is 30,000 barrels or 1,260,000 gal. Previously, Underground Storage Tank (UST) 117, a 550-gal JP-4 fuel tank, and three 500,000-gal ASTs (AST 7001, AST 7003, and AST 7005) were located at the BFF. Since the closure of UST 117 in 1996, three separate releases have been identified at the BFF under the Georgia Environmental Protection Division (GA EPD) Underground Storage Tank Management Program (USTMP) regulations.

Science Applications International Corporation (SAIC) performed a soil gas survey of the BFF in January 1999 to identify areas of significant contaminant concentrations (SAIC 1999). SAIC conducted a Corrective Action Plan (CAP)-Part A investigation in December 1999 and January 2000 and a CAP-Part B investigation from November 2000 to March 2001 to determine the extent of petroleum contamination at the BFF, including the areas around UST 117, AST 7001, AST 7003, AST 7005, AST 7007, and AST 7009. Thirty-four monitoring wells, seven soil borings, and six vertical-profile borings were installed during these investigations, and surface water and sediment samples were collected from Lamar Canal. The CAP-Part B Report (SAIC 2001) was submitted to GA EPD USTMP in July 2001.

Release #1: UST 117, Building 7002. UST 117 was a 500-gal UST located near Building 7002 at the BFF. This tank was removed and the piping abandoned in place on September 30, 1996. A CAP-Part A investigation was conducted by SAIC between December 1999 and January 2000 to identify areas of significant contamination concentrations (SAIC 2000). A CAP-Part B investigation was conducted by SAIC from November 2000 to March 2001 to determine the extent of petroleum contamination at the site (SAIC 2001). As part of these investigations, a groundwater plume was identified in the vicinity of AST 7003, which is located 100 to 150 ft south of UST 117. Semiannual monitoring of Release #1 was initiated in July 2002 and discontinued in January 2003. GA EPD USTMP granted no further action (NFA) status for Release #1 in correspondence dated October 6, 2003 (Lewis 2003).

Release #3: AST 7003. In May 2006, the concrete foundation and berm for AST 7003 were removed by CAPE Environmental and free product was discovered at a depth of 3 to 4 ft below ground surface. In August 2006, CAPE Environmental installed four, 2-ft-diameter sumps in the bermed area of former AST 7003. In November 2006, monitoring points were installed on 50-ft centers in the bermed area of the former AST. No water or free product was measured in any of the points; however, soil contamination was identified in the soil headspace readings. Griffin Services was contracted to remove the free product on a routine basis. In November 2009, Arcadis initiated remedial action in the vicinity of former AST 7003. Impacted soil exceeding alternate threshold levels (ATLs) was excavated, and an oxygen-releasing substance was placed in the excavated area to enhance bioremediation of contaminated groundwater. Quarterly groundwater monitoring events through October 2010 demonstrated that dissolved benzene in groundwater near former AST 7003 continues to exceed the alternate concentration limit (ACL) but that attenuation is occurring. Semi-annual monitoring of groundwater in this area has been recommended.

Release #2: AST 7009. In December 1999 and January 2000, the CAP-Part A investigation associated with Release #1 to identify areas of significant contamination concentrations involved collecting samples

from the vicinity of AST 7009. A CAP-Part B investigation, which included the vicinity of AST 7009, was conducted by SAIC from November 2000 to March 2001 to determine the extent of petroleum contamination at the site (SAIC 2001). The nature and extent of contamination was determined during the CAP-Part B investigation. In July 2002, as part of the groundwater monitoring for Release #1, free product was observed in well BF-MW-E5, which is located within the bermed area of AST 7009. This tank is approximately 500 ft northeast of AST 7003 and is hydraulically sidegradient to AST 7003. Semiannual monitoring of Release #2 was initiated in July 2004 and discontinued in January 2005 because detected benzene, toluene, ethylbenzene, and xylenes (BTEX) and polycyclic aromatic hydrocarbon (PAH) constituents were below the In-Stream Water Quality Standards (IWQSSs). Free product removal activities were implemented in July 2004 consisting of absorbent socks in well BF-MW-E5 and bimonthly or quarterly pumping of the same well. In July 2007, an 8-hr Enhanced Fluid Recovery® (EFR®) event was initiated to vacuum extract the free product from well BF-MW-E5 on a quarterly basis. Free product has not been observed in the other wells located within the berm or those located around the perimeter of the berm for AST 7009. EFR® events were conducted on a quarterly basis through the spring of 2010 with biannual groundwater monitoring of sentinel well BF-MW-38.

Soil Contamination in the Vicinity of AST 7009

Three soil samples were collected from borings in the vicinity of AST 7009 during the CAP-Part A investigation prior to well installation (SB-25, SB-26, and SB-27). Twelve soil samples were collected from an additional six borings during the CAP-Part B investigation prior to installation of wells BF-MW-E1 through BF-MW-E6. Results for these 15 soil samples are shown in Tables 1 and 2. Maximum detected concentrations (MDCs) were 0.002 mg/kg of benzene, 0.0025 mg/kg of toluene, 4.5 mg/kg of ethylbenzene, and 17 mg/kg of xylenes. The Georgia UST (GUST) soil threshold level (STL) (i.e., Table A, Column 1) for ethylbenzene of 0.37 mg/kg was exceeded in one sample collected during installation of BF-MW-E3. No other BTEX constituents exceeded the applicable GUST STLs (i.e., Table A, Column 1). Thirteen PAHs were detected, all at levels below the applicable GUST STLs (i.e., Table A, Column 1).

Groundwater Contamination in the Vicinity of AST 7009

Groundwater samples were collected from monitoring wells BF-MW-25, BF-MW-26, and BF-MW-27 during the CAP-Part A investigation. Additional groundwater samples were collected from these same three wells and wells BF-MW-E1 through BF-MW-E6 during the CAP-Part B investigation. Results for all 12 groundwater samples are shown in Tables 3 and 4. MDCs were 3.6 µg/L of benzene, 1.0 µg/L of toluene, 17.2 µg/L of ethylbenzene, and 19 µg/L of xylenes. All four MDCs were detected in well BF-MW-E5. Three PAHs were detected. All detected concentrations of BTEX constituents and PAHs fell below applicable GA EPD IWQSSs.

As recommended in the *First Annual Monitoring Only Report for Former Underground Storage Tank 117, Building 7002, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*1, Hunter Army Airfield, Georgia* (SAIC 2003), three additional wells (MW-35, MW-36, and MW-37) were installed around the perimeter of the bermed area in the vicinity of AST 7009 to confirm that free product in BF-MW-E5 was not from an upgradient source or migrating downgradient of the AST containment area. The results of semiannual well gauging from 2002 to 2009 with an oil/water interface probe have indicated that the free product is limited to well BF-MW-E5 and does not extend beyond the bermed area.

Following the CAP-B Report, semiannual monitoring was commenced at the BFF. A monitoring only plan for the groundwater plume in the vicinity of AST 7009 began with the third semiannual event at the BFF in accordance with the technical approach provided in the *First Annual Monitoring Only Report* (SAIC 2003). In July 2004 and January 2005, BTEX and PAH concentrations from wells within the

vicinity of AST 7009 remained well below applicable regulatory criteria (Tables 3 and 4). GA EPD concurred with the recommendation of suspending the semiannual groundwater sampling until free product removal in BF-MW-E5 is complete (Logan 2006).

Sentinel well BF-MW-38 was installed and sampled for BTEX in December 2007. The results are shown in Table 3 No BTEX constituents were detected.

Following submittal of the *Third Annual Monitoring and Free Product Removal Report for Former Underground Storage Tank 117, Building 7009, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*2, Hunter Army Airfield, Georgia* (SAIC 2007), GA EPD USTMP recommended that the site be transferred to the GA EPD Solid Waste Program in correspondence dated February 28, 2008 (Logan 2008).

In October 2009, wells BF-MW-E5 and BF-MW-38 were sampled for BTEX and PAHs. All BTEX and PAH concentrations remained well below applicable regulatory criteria (see Tables 3 and 4).

This CAP-Part B Addendum presents information relating to a pilot-scale product recovery system for corrective action of Release #2 at the BFF (HAA-09) in the vicinity of AST 7009. Nature and extent of groundwater and soil contamination was fully delineated in the CAP-Part B investigation and subsequent monitoring reports. Free product was not identified in the area of AST 7009 during the CAP-Part B investigation but has been consistently encountered in BF-MW-E5 since 2002.

Georgia Department of Natural Resources

Environmental Protection Division
Underground Storage Tank Management Program
4244 International Parkway, Suite 104, Atlanta, Georgia 30354
Noel Holcomb, Commissioner
Carol A. Couch, Ph.D., Director
(404) 362-2687

February 28, 2008

Algeana Stevenson
U.S. Army/HQ 3rd Inf. Div. (Mech) and Ft. Stewart
Directorate of Public Works
1550 Frank Cochran Drive, Building 1137
Fort Stewart, GA 31314-4927

**SUBJECT: Corrective Action Plan (CAP)-Part B
Progress Report Review Comments:
Hunter AAF, Former UST #117
Building 7009, Bulk Fuel Facility (HAA-09)
Savannah, Chatham County, GA
Facility ID: 9025113*2**

Dear Ms. Stevenson:

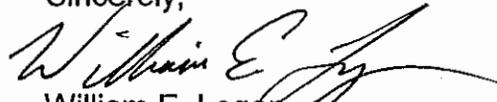
The Georgia Underground Storage Tank Management Program (USTMP) has received your consultant's letter, dated September 19, 2007, that forwarded a properly certified CAP-Part B Progress Report]. The report was prepared by Science Applications International Corporation (SAIC).

We have conducted a technical review of the CAP-Part B. The basis for this review is the Georgia Rules for Underground Storage Tank Management (GUST Rules, revised 1996). Our comments are outlined in the enclosure. Please amend the CAP-Part B to address these by **June 30, 2008**.

Unless one of the outlined EPD Comments requests otherwise, you are required to submit only your responses to these comments. Resubmittal of a complete CAP -Part B is not necessary.

If you have any questions, please contact me at (404) 362-4529.

Sincerely,


William E. Logan
Advanced Geologist
Corrective Action Unit II

WEL;

S: land/landdocs/williaml/pend08/9025113R2&3. 15

Enclosure

cc with EPD comments: Patricia A. Stoll, P.E., SAIC
Jim Guentert, GA EPD
Lisa L. Lewis, GA EPD

File (CA): CHATHAM; 9025113



EPD Review Comments

Corrective Action Plan (CAP)-Part B
Progress Report:
Hunter AAF, Former UST #117
Building 7009, Bulk Fuel Facility (HAA-09)
Savannah, Chatham County, GA
Facility ID: 9025113*2 &3

February 28, 2008

In reviewing the monitoring report (Progress Report), observed that previous figures were given new revision dates, but the report was lacking a current groundwater potentiometric map. It is assumed that activities associated with free product removal that there would be gauging of monitoring wells for free product as well as the collection of groundwater elevations and in turn potentiometric maps produced from that data. Please, submit a current potentiometric map

In reference to Release #2: In reviewing information concerning Release #2, the location of the release is cross-gradient to observed groundwater flow directions, lack of free product and high dissolved in the direction of AST 7009 and recorded free product adjacent too the AST and not in the perimeter monitoring wells. Release is from the AST. Recommend a manifold be installed so that high vacuum recovery events can be conducted without entering the bermed area.

In reference to Release #3: In reviewing information concerning Release #1 and 3, the location of Release#1 was upgradient to Former AST 7003 (Release #3), lack of free product and high dissolved in the direction of AST 7003 and historical gauging recorded greater thickness of free product adjacent too the AST than what was observed at UST 117. Release is from the AST. Recommend that an enhanced fluid recovery system be installed to recover free product.

In reference to Release #3, it was observed that a majority of the free product monitoring points (40 units) were dry at installation and noted that they were only advanced to a depth of 5 feet. In reviewing the given groundwater elevations (1/12/2005) presented in the submitted report would have been idea for 5 feet, but with the drought conditions? Also, the use of the monitoring wells from Release#1 would have addressed the suspected release. Free product would have been noticed when the monitoring wells that were associated with Release #1 when they were abandoned-it is assumed that groundwater levels were collected prior to abandonment of the those monitoring wells.

In reference to Release #2 and #3, will be transferred to Mr. Jim Guentert of the Solid Waste Program.

Address:

Georgia Environmental Protection Division
Solid Waster Program
Mr. Jim Guentert
4244 International Parkway, Suite 104
Atlanta, Georgia 30354



DEPARTMENT OF THE A
US ARMY INSTALLATION MANAGEMENT COMMAND
UNITED STATES ARMY GARRISON, FORT STEWART / HUNTER ARMY AIRFIELD
DIRECTORATE OF PUBLIC WORKS
1587 FRANK COCHRAN DRIVE
FORT STEWART, GEORGIA 31314

REPLY TO
ATTENTION OF

SEP 19 2007

Office of the Directorate

CERTIFIED MAIL

Georgia Environmental Protection Division
Underground Storage Tank Management Program
Attention: Mr. William Logan
4244 International Parkway, Suite 104
Atlanta, Georgia 30354

Dear Mr. Logan:

Fort Stewart is pleased to submit one copy of the Third Annual Monitoring and Free Product Removal Report for former Underground Storage Tank (UST) 117, Building 7002, Facility Identification Number 9-025113*2, Hunter Army Airfield, Georgia, dated September 2007, for your review and approval. This report documents the semiannual monitoring events conducted in July 2004 and January 2005. In a letter dated May 16, 2005 (Logan to Stevenson), Georgia Environmental Underground Storage Management approved the suspension of semiannual groundwater sampling until free product removal in BF-MW-E5 is complete. This report documents the free product removal activities at monitoring well BF-MW-E5 (i.e., Release #2), in accordance with the technical approach provided in the First Annual Monitoring Only Report (SAIC 2003). It also documents the efforts to delineate free product associated with Release #3. ←7009

In accordance with the recommendations provided in the First Annual Monitoring Only Report (SAIC 2003), Fort Stewart will continue enhanced fluid recovery of free product on a bi-monthly basis via vacuum pumping for one year from monitoring well BF-MW-E5, with free product levels measured prior to each pumping event, as described in Section V, page 8, of the enclosed report.

If you have any questions or comments regarding the enclosed report, please contact Ms. Algeana Stevenson at (912)315-4226 or Ms. Tressa Rutland, Directorate of Public Works, Prevention and Compliance Branch, at (912)767-2010.

Sincerely,

for *Thomas C. Fry*
Michael W. Biering, P.E.
Director, Public Works

Enclosure

Copy



FINAL

**THIRD ANNUAL MONITORING AND FREE PRODUCT
REMOVAL REPORT
FOR
FORMER UNDERGROUND STORAGE TANK 117
BUILDING 7009
BULK FUEL FACILITY (HAA-09)
FACILITY ID #9-025113*2
HUNTER ARMY AIRFIELD, GEORGIA**

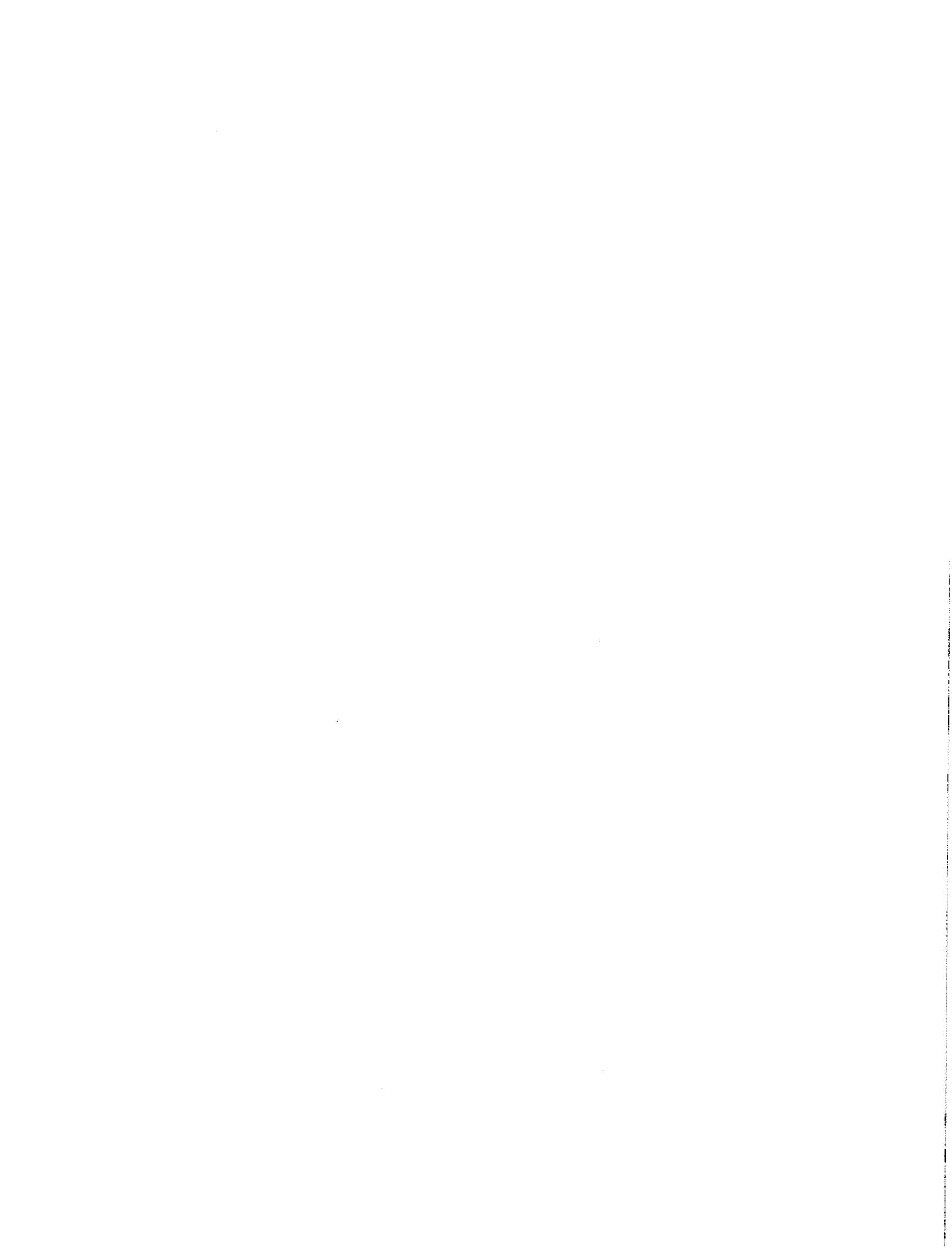
Prepared for

**U. S. Army Corps of Engineers, Savannah District
and
Fort Stewart Directorate of Public Works
Under Contract Number DACA21-02-D-0004
Delivery Order 0066**

Prepared by

**Science Applications International Corporation
P.O. Box 2501
Oak Ridge, TN 37831**

September 2007



Attachments

A SUMMARY OF FATE AND TRANSPORT MODELINGA-1
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C CERTIFICATES OF ANALYSIS..... C-1
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DIAGRAMSD-1

List of Abbreviations and Acronyms

ACL	alternate concentration limit
AST	aboveground storage tank
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
EPA	U. S. Environmental Protection Agency
GA EPD	Georgia Environmental Protection Division
IWQS	In-Stream Water Quality Standard
MCL	maximum contaminant level
PAH	polynuclear aromatic hydrocarbon
SAIC	Science Applications International Corporation
UST	underground storage tank

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MONITORING AND FREE PRODUCT REMOVAL REPORT

Submittal Date: September 2007 Monitoring Report Number: 3rd Annual

For Period Covering: January 2005 to December 2006

Facility Name: Former UST 117 Street Address: Bulk Fuel Facility, Building 7002

Facility ID: 9-025113*2 City: Savannah County: Chatham Zip Code: 31409

Latitude: 32°01'43" Longitude: 81°08'37"

Submitted by UST Owner/Operator:

Name: Thomas C. Fry/Environmental Branch
Company: U. S. Army/HQ 3d, Inf. Div. (Mech)
Address: Directorate of Public Works,
Building 1137
1550 Frank Cochran Drive
City: Fort Stewart State: GA
Zip Code: 31314-4927
Telephone: (912) 767-2010

Prepared by Consultant/Contractor:

Name: Patricia A. Stoll
Company: SAIC
Address: P.O. Box 2501
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
Signature: *Patricia A. Stoll*
Date: 9/10/07



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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) 117, Facility ID #9-025113*1, was located near Building 7002 at the Bulk Fuel Facility at Hunter Army Airfield, Georgia. The Bulk Fuel Facility is approximately 600 by 1,200 ft and covers an area of approximately 16.5 acres. Currently, the facility contains three aboveground storage tanks (ASTs) for the storage of jet propellant (JP)-8 with capacities of approximately 500,000 gal each, aboveground and underground piping, and off-loader and pump stations for the distribution of fuel to and from the tanks. The tank was removed and the piping abandoned in place on September 30, 1996. Science Applications International Corporation (SAIC) performed a soil gas survey in January 1999 to identify areas of significant contaminant concentrations (SAIC 1999). SAIC conducted a Corrective Action Plan (CAP)-Part A investigation in December 1999 and January 2000 and a CAP-Part B investigation from November 2000 to March 2001 to determine the extent of petroleum contamination at the site. Thirty-four monitoring wells, seven soil borings, and six vertical-profile borings were installed during these investigations, and surface water and sediment samples were collected from Lamar Canal. The CAP-Part B Report (SAIC 2001) was submitted to the Georgia Environmental Protection Division (GA EPD) UST Management Program in July 2001. The report recommended that a well be installed to replace BF-MW-21, which had been destroyed, and that seven monitoring wells (i.e., BF-MW-19, BF-MW-20, BF-MW-21R, BF-MW-22, BF-MW-32, BF-MW-33, and BF-MW-34) be sampled on a semiannual basis for benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAHs) because benzene and naphthalene were selected as constituents of potential concern in groundwater. The fate and transport modeling performed as part of the CAP-Part B Report for Release #1 reflected a continuous source of contamination. The results are summarized in Attachment A of this document.

In July 2002 and January 2003, free product was observed in well BF-MW-E5, which is located in the vicinity of AST 7009. This tank is approximately 500 ft northeast of AST 7003, which is where the groundwater plume is being monitored. Free product was not observed in this well during the CAP-Part B investigation. During that investigation, the BTEX and PAH constituents detected in the well were below the maximum contaminant level (MCL), the In-Stream Water Quality Standard (IWQS), and the alternate concentration limit (ACL); therefore, groundwater monitoring of this area was not warranted.

It was apparent that there were two separate releases at the Bulk Fuel Facility. For clarification, Release #1 is associated with the groundwater plume in the vicinity of AST 7003 where the original semiannual monitoring only program was conducted. GA EPD granted no further action for Release #1 in correspondence dated October 6, 2003 (Lewis 2003). Release #2 is associated with the free product observed in well BF-MW-E5, which is in the vicinity of AST 7009 and has been assigned Facility ID #9-025113*2.

As recommended in the First Annual Monitoring Only Report (SAIC 2003), three additional wells were installed around the perimeter of the bermed area in the vicinity of AST 7009 to confirm that free product in BF-MW-E5 was not from an upgradient source or migrating downgradient of the AST containment area. Well construction diagrams are provided in Attachment D. Due to the construction of the containment area around the AST, the "E" series of monitoring wells could not be overdrilled and screened across the water table. Also,

additional wells could not be installed within the containment area do to accessibility issues. The purpose of the semiannual monitoring, summarized in the Second Annual Monitoring and Free Product Removal Report issued December 2006, was to confirm that natural attenuation is taking place at the site and to document the free product removal activities at the site. In accordance with recommendations made in the First Annual Monitoring Only Report (SAIC 2003), ACLs were to be developed for any constituent exceeding its respective IWQS by conducting fate and transport modeling specifically for Release #2. During the year of semiannual monitoring associated with Release #2, none of the constituents exceeded its respective IWQS, thus ACLs were not developed at this time. The monitoring only plan for Release #2 will be terminated if contaminant concentrations are less than their respective IWQS or ACL and if free product is less than 1/8-in. The monitoring only program may be terminated regardless of the site ranking score.

The concrete foundations within the berms and UST 117 at the BFF were removed by CAPE Environmental in May 2006. During the removal of the concrete foundations free product was discovered approximately 3 to 4 ft BGS. This was identified as Release #3 at UST 117. Three 6-inch diameter sumps were installed by CAPE Environmental in the bermed area to collect free product. A subcontractor to HAAF, Griffin Services, was contracted to measure the level of free product in the sumps and to pump the free product on a routine basis starting in May 2006 and continuing through August 2006.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. Potentiometric Data:

(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 water level measurement activities at the site during the semiannual monitoring for Release #1, free product was identified in well BF-MW-E5 (i.e., Release #2). This well is located within the containment system of active AST 7009 and is approximately 500 ft northeast of AST 7003 and Release #1. During the CAP-Part B investigation, free product was not observed in well BF-MW-E5. In June 2004, three additional wells were installed around the perimeter of the containment area associated with AST 7009 to confirm that free product was not migrating beyond the perimeter of the containment area and that free product was not coming from an upgradient source. Well BF-MW-E5 is the only well at the site that contains free product.

At various times throughout the year, the water level in BF-MW-E5 is above the screened interval, thus free product is being removed by aggressively pumping the well on a bi-monthly basis with absorbent socks placed in the well in between pumping events when the presence of free product warrants absorbent sock placement. This alternative ensures the active AST system for the Army's Southeastern Power Projection Platform stays operational and that the integrity of the associated system remains intact. The free product removal activities were initiated in June 2004, when there was 3.14 ft of free product present in BF-MW-E5. The free product thickness has continued to decrease since June 2004 with the bi-monthly pumping events. Absorbent socks have not been placed in the well since July 2004. Since October 2004, the maximum free product thickness was 0.01 ft in February 2005. In the other monthly measurements, there has either been a sheen or no product present.

Third Annual Monitoring and Free Product Removal Report
Former UST 117, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*2

During CY 2006, 8 monthly evaluations of free product in BF-MW-E5 were performed consisting of measuring free product in the well followed by potentially pumping the well and/or placing absorbent socks in the well. Measurable free product was identified during 4 of the 8 evaluations. The maximum free product thickness was 4.32 ft in December 2006. A summary of free product removal activities is provided in Table 4a.

During the third semiannual monitoring event in July 2004, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In July 2004, the groundwater flow direction ranged from the south to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.008 ft/ft. Free product was observed in well BF-MW-E5, which is associated with Release #2.

During the fourth semiannual monitoring event in January 2005, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In January 2005, the groundwater flow direction was to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.007 ft/ft. A sheen was observed in well BF-MW-E5, which is associated with Release #2.

On February 15, 2006, 23 monitoring wells associated with Release #1 (MW-01, MW-02, MW-03, MW-06, MW-07, MW-08, MW-09, MW-10, MW-11, MW-12, MW-13, MW-14, MW-17, MW-18, MW-20, MW-21R, MW-22, MW-23, MW-28, MW-29, MW-30, MW-31, and MW-32) located throughout the BFF were abandoned by SAIC personnel. The abandonment was documented in the *Completion Report for Former UST 117, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*1* dated April 2006. Six monitoring wells (MW-15, MW-16, MW-19, MW-24, MW-33, and MW-34) located around the perimeter of the site could not be located during abandonment activities and were not abandoned. Monitoring wells around Tank 7009 were left for potential future use for Release #2. Figure 1a identifies the monitoring wells that were abandoned in February 2006 and the remaining wells at the BFF.

The concrete foundations within the berms and UST 117 at the BFF were removed by CAPE Environmental in May 2006. During the removal of the concrete foundations free product was discovered approximately 3 to 4 ft BGS. Three 6-inch diameter sumps were installed by CAPE Environmental in the bermed area to collect free product. A subcontractor to HAAF, Griffin Services, was contracted to measure the level of free product in the sumps and to pump the free product on a routine basis starting in May 2006 and continuing through August 2006. The results of these pumping activities are presented in Table 4b. This area is presently being investigated under Release #3.

In an effort to delineate free product associated with Release #3, 42 2-inch diameter monitoring points (FP-1 through FP-42) were installed on an approximate 50-ft centers in the bermed area of the former ASTs at the BFF in November 2006. The monitoring points were constructed of 1.5-inch diameter PVC 0.010-in slot screen and installed from ground surface to 3 to 4 ft BGS. Filter pack sand was poured around the annulus between the borehole and the screen. Each monitoring point has a flush surface completion with an approximate 2 ft x 2 ft concrete pad. Each monitoring point was installed using mechanical hand techniques. The location of the free product monitoring points are presented in Figure 1b. The soil boring logs and free product monitoring point construction diagrams are presented in Attachment D.

Water and free product levels were measured in the free product monitoring wells after installation in November 2006. No water or free product was measured in any of the points. No groundwater sampling was performed in CY 2006.

B. Analytical Data:

(Appendix I, Figure 3: Groundwater Quality Map)

(Appendix I, Figure 4: Trend of Contaminant Concentrations)

(Appendix II, Table 2: Groundwater Analytical Results)

(Appendix II, Table 3: Soil Analytical Results)

(Appendix III: Laboratory Analytical Results)

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

During the third semiannual sampling event in July 2004, which is associated with Release #2, monitoring wells BF-MW-E1, BF-MW-E2, BF-MW-E3, BF-MW-E4, BF-MW-E5, BF-MW-E6, BF-MW-04, BF-MW-25, BF-MW-26, BF-MW-27, BF-MW-35, BF-MW-36, and BF-MW-37 were sampled for BTEX using U. S. Environmental Protection Agency (EPA) Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was detected in 1 of 13 groundwater samples at a concentration of 2.0 µg/L. The concentration did not exceed the IWQS of 71.28 µg/L or the ACL of 634 µg/L associated with Release #1.
- Toluene was not detected in any of the groundwater samples.
- Ethylbenzene was detected in 1 of 13 groundwater samples at a concentration of 17.3 µg/L. The concentration did not exceed the IWQS of 28,718 µg/L.
- Total xylenes were detected in 1 of 13 groundwater samples at a concentration of 42.7 µg/L. There is no ACL or IWQS for total xylenes; however, the concentration did not exceed the MCL of 10,000 µg/L.
- 2-Methylnaphthalene was detected in 4 of 13 groundwater samples at concentrations ranging from 0.6J to 8.4 µg/L. There is no ACL or IWQS for 2-methylnaphthalene.
- Acenaphthene was detected in 2 of 13 groundwater samples at concentrations of 1.6 and 2.8 µg/L. There is no ACL or IWQS for acenaphthene.
- Fluorene was detected in 2 of 13 groundwater samples at concentrations of 2.6 and 5.7 µg/L. The concentrations did not exceed the IWQS of 14,000 µg/L.
- Naphthalene was detected in 4 of 13 groundwater samples at concentrations ranging from 0.49J to 17.3 µg/L. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 µg/L associated with Release #1.
- Phenanthrene was detected in 2 of 13 groundwater samples at concentrations of 0.57J and 5.28 µg/L. There is no ACL or IWQS for phenanthrene.

None of the constituents exceeded its respective IWQS or ACLs calculated for Release #1. Since none of the constituents associated with Release #2 exceed their respective IWQS, the development of ACLs for Release #2 is not necessary. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #2.

During the fourth semiannual sampling event in January 2005, which is associated with Release #2, monitoring wells BF-MW-E1, BF-MW-E2, BF-MW-E3, BF-MW-E4, BF-MW-E5, BF-MW-E6, BF-MW-04, BF-MW-25, BF-MW-26, BF-MW-27, BF-MW-35, BF-MW-36, and BF-MW-37 were sampled for BTEX using EPA Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was not detected in any of the groundwater samples.
- Toluene was detected in 2 of 13 groundwater samples at concentrations of 0.43J and 0.47J $\mu\text{g/L}$. The concentrations did not exceed the IWQS of 200,000 $\mu\text{g/L}$.
- Ethylbenzene was detected in 1 of 13 groundwater samples at a concentration of 10.4 $\mu\text{g/L}$. The concentration did not exceed the IWQS of 28,718 $\mu\text{g/L}$.
- Total xylenes were detected in 2 of 13 groundwater samples at concentration of 0.9J and 34.9 $\mu\text{g/L}$. There is no ACL or IWQS for total xylenes; however, the concentration did not exceed the MCL of 10,000 $\mu\text{g/L}$.
- 2-Methylnaphthalene was detected in 3 of 13 groundwater samples at concentrations ranging from 1.4 and 43.2 $\mu\text{g/L}$. There is no ACL or IWQS for 2-methylnaphthalene.
- Acenaphthene was detected in 2 of 13 groundwater samples at concentrations of 1.6 and 5.4 $\mu\text{g/L}$. There is no ACL or IWQS for acenaphthene.
- Fluorene was detected in 2 of 13 groundwater samples at concentrations of 3.1 and 10.3 $\mu\text{g/L}$. The concentrations did not exceed the IWQS of 14,000 $\mu\text{g/L}$.
- Naphthalene was detected in 3 of 12 groundwater samples at concentrations ranging from 0.31J to 32.9 $\mu\text{g/L}$. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 $\mu\text{g/L}$ associated with Release #1.
- Phenanthrene was detected in 2 of 12 groundwater samples at concentrations of 1.2 and 10.7 $\mu\text{g/L}$. There is no ACL or IWQS for phenanthrene.
- Pyrene was detected in 1 of 13 groundwater samples at a concentration of 2.4 $\mu\text{g/L}$. The concentration did not exceed the IWQS of 11,000 $\mu\text{g/L}$.

None of the constituents exceeded its respective IWQS or ACLs calculated for Release #1. Since none of the constituents associated with Release #2 exceed their respective IWQS, the development of ACLs for Release #2 is not necessary. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #2.

GAEPD concurred with the recommendation of suspending the semiannual groundwater sampling until free product removal in BF-MW-E5 is complete (letter from William Logan GAEPD UST Management Program dated May 16, 2006).

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

Environmental Site Sensitivity Score: Release #1
(April 1999 version of the Site Ranking Form 3,250 (CAP-Part B Report)
was used for all scores.) 3,250 (July 2002 – First semiannual sampling event)
 3,250 (Jan. 2003 – Second semiannual sampling event)
 Release #2
 65,250 (July 2004 – Third semiannual sampling event)
 12,750 (Jan. 2005 – Fourth semiannual sampling event)
 145,250 (December 2006 – Third Annual Report)

V. CONCLUSIONS/RECOMMENDATIONS

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

The Monitoring Only Plan for the plume in the vicinity of BF-MW-21 (i.e., Release #1) was conducted in accordance with Section III.D of the CAP-Part B Report (SAIC 2001). Termination conditions in the CAP-Part B Report were achieved and GA EPD granted no further action for Release #1 in correspondence dated October 6, 2003 (Lewis 2003).

The Monitoring Only Plan for the plume in the vicinity of BF-MW-E5 (i.e., Release #2) is being conducted in accordance with the technical approach provided in the First Annual Monitoring Only Report (SAIC 2003). Termination for Release #2 will be requested once the measured contaminants remain below their respective IWQS or ACL for 1 year and the free product thickness is less than 1/8-in. The Monitoring Only Plan may be terminated regardless of the site ranking score if the above conditions are met.

During the last year of the monitoring program, a free-product mixture has been pumped from well BF-MW-E5 on a bi-monthly basis. Free product has measured between 0 and 0.1 ft since September 20, 2004. Because BTEX and PAH concentrations associated with Release #2 have not exceeded their respective IWQS and ACLs since the CAP-Part B Investigation (Release #2) – 2000, semiannual groundwater sampling was discontinued at the site during CY 2006.

For the product delineation points at Release #3, no free product has been detected in the 42 free product monitoring points and the fluid removed from the three 6-inch sumps installed by CAPE Environmental indicates that the recoverable free product in the vicinity of the removed AST foundations is complete.

Residual soil contamination remains in the area of the former foundations, Release #3. This area is estimated to be confined to the area of the foundations plus approximately 10% and to a depth of approximately 7 ft BGS. Soil sampling to determine the residual soil contamination levels and to determine proper soil disposal classification will be required.

Third Annual Monitoring and Free Product Removal Report
Former UST 117, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*2

Free product continues to be measured in BF-MW-E5. The measurement of free product in BF-MW-E5, and the fluid removal from the three sumps will continue along with water/product measurements in the sentinel wells outside the berm to monitor any product movement on a bimonthly basis.

The results of the free product removal and final confirmatory sampling will be documented in the Fourth Annual Monitoring Report, which will be submitted to GA EPD in May 2008.

VI. REIMBURSEMENT

Attached _____ N/A X

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the former UST 117 site, Facility ID #9-025113*2, using U. S. Department of Defense Environmental Restoration Account Funds. Application for Georgia UST Trust Fund reimbursement is not being pursued at this time.

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Georgia Department of Natural Resources

Environmental Protection Division

Underground Storage Tank Management Program

4244 International Parkway, Suite 104, Atlanta, Georgia 30354

Noel Holcomb, Commissioner

Carol A. Couch, Ph.D., Director

(404) 362-2687

May 16, 2006

Algeana Stevenson
U.S. Army/HQ 3rd Inf. Div. (Mech) and Ft. Stewart
Directorate of Public Works
1550 Frank Cochran Drive, Building 1137
Fort Stewart, GA 31314-4927

**SUBJECT: Notice to Implement Corrective Action Plan (CAP)-Part B:
Hunter AAF, Former UST #117
Building 7009, Bulk Fuel Facility (HAA-09)
Savannah, Chatham County, GA
Facility ID: 9025113*2**

Dear Ms. Stevenson:

The Georgia Underground Storage Tank Management Program (USTMP) has received your consultant's letter, dated February 8, 2006, that forwarded a properly certified CAP-Part B. The report was prepared by Science Applications International Corporation (SAIC).

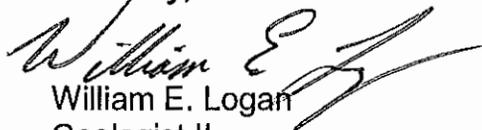
Monitor Report → The technical proposal contained in the CAP-Part B for further investigation, monitoring and/or remediation of the current release is hereby approved by the USTMP. As a result of your CAP-Part B being technically approved, you are authorized to begin implementation of this plan. ← *Monitor Report*

EPD agrees that groundwater sampling for BTEX constituents can be waved, till after free product removal is complete. Be advised that groundwater monitoring will resume for a minimum of one year after the date of last visible free product is removed, with quarterly gauging of the monitoring wells for free product and semi-annual reporting.

Please submit a progress report for the recovery of the free product.

Please submit an updated milestone schedule by **June 23, 2006**, listing specific dates, events and a timetable to complete the proposed activities. If you have any technical questions, please contact me at (404) 362-4529.

Sincerely,



William E. Logan
Geologist II
Corrective Action Unit II

WEL:

S: land/tanddocs/williaml.pending06/9025113R2. 120

cc: Patricia A. Stoll, P.E., SAIC

Lisa L. Lewis, GA EPD

File (CA): CHATHAM; 9025113



DEPARTMENT OF THE ARMY
HEADQUARTERS, FORT STEWART
DIRECTORATE OF PUBLIC WORKS
1550 FRANK COCHRAN DRIVE
FORT STEWART, GEORGIA 31314-4927

REPLY TO
ATTENTION OF

FEB 08 2006

Office of the Directorate

CERTIFIED MAIL

Georgia Environmental Protection Division
Underground Storage Tank Management Program
Attention: Mr. William Logan
4244 International Parkway, Suite 104
Atlanta, Georgia 30354

Dear Mr. Logan:

Fort Stewart is pleased to submit one copy of the Second Annual Monitoring and Free Product Removal Report for former Underground Storage Tank (UST) 117, Building 7009, Facility Identification Number 9-025113*2, Hunter Army Airfield, Georgia, dated December 2005, for your review and approval. This report documents the semiannual monitoring events conducted in July 2004 and January 2005 to confirm that natural attenuation of the constituents of concern are taking place and to document free product removal activities at monitoring well BF-MW-E5 (i.e., Release #2), in accordance with the technical approach provided in the First Annual Monitoring Only Report (SAIC 2003).

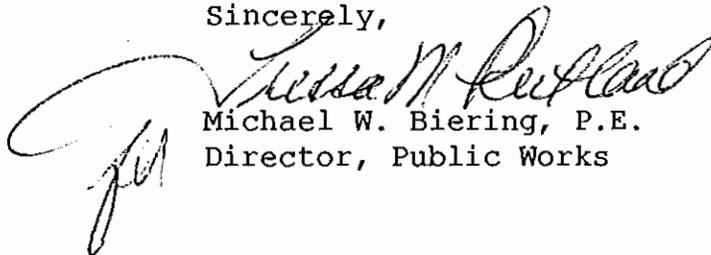
Concentrations of benzene, toluene, ethyl-benzene, xylene (BTEX) and the polynuclear aromatic hydrocarbons (PAHs) at this site have not exceeded their respective In-Stream Water Quality standards and alternate concentration limits since the CAP-Part B Investigation (Release#2)-2000, therefore Fort Stewart would like to request the termination of semiannual groundwater monitoring of BTEX and PAHs. In accordance with the recommendations provided in the First Annual Monitoring Only Report (SAIC 2003), Fort Stewart will continue enhanced fluid recovery of free product on a bi-monthly basis via vacuum pumping for one year, with free product levels measured prior to each pumping event, as described in Section V, page 6, of the enclosed report.

Fort Stewart appreciates your consideration of this recommendation. Pending notification of approval, the semiannual monitoring of BTEX and PAHs will be discontinued. If there are any



questions or comments regarding the enclosed report, please contact Ms. Algeana Stevenson or Ms. Tressa Rutland, Directorate of Public Works, Environmental Branch, at (912) 767-2010.

Sincerely,

A handwritten signature in cursive script, appearing to read "Michael W. Biering". The signature is written in dark ink and is positioned to the left of the typed name and title.

Michael W. Biering, P.E.
Director, Public Works

Enclosure



FINAL

**SECOND ANNUAL MONITORING AND FREE PRODUCT
REMOVAL REPORT
FOR
FORMER UNDERGROUND STORAGE TANK 117
BUILDING 7009
BULK FUEL FACILITY (HAA-09)
FACILITY ID #9-025113*2
HUNTER ARMY AIRFIELD, GEORGIA**

Prepared for

**U. S. Army Corps of Engineers, Savannah District
and
Fort Stewart Directorate of Public Works
Under Contract Number DACA21-02-D-0004
Delivery Order 0044**

Prepared by

**Science Applications International Corporation
P.O. Box 2501
Oak Ridge, TN 37831**

December 2005

MONITORING AND FREE PRODUCT REMOVAL REPORT

Submittal Date: November 2005 Monitoring Report Number: 2nd Annual

For Period Covering: July 2004 to January 2005

Facility Name: Former UST 117 Street Address: Bulk Fuel Facility, Building 7002

Facility ID: 9-025113*2 City: Savannah County: Chatham Zip Code: 31409

Latitude: 32°01'43" Longitude: 81°08'37"

Submitted by UST Owner/Operator:

Name: Thomas C. Fry/Environmental Branch

Company: U. S. Army/HQ 3d, Inf. Div. (Mech)

Address: Directorate of Public Works,
Building 1137

1550 Frank Cochran Drive

City: Fort Stewart State: GA

Zip Code: 31314-4927

Telephone: (912) 767-2010

Prepared by Consultant/Contractor:

Name: Patricia A. Stoll

Company: SAIC

Address: P.O. Box 2501

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

Signature: *Patricia A. Stoll*

Date: 12/6/05



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) 117, Facility ID #9-025113*1, was located near Building 7002 at the Bulk Fuel Facility at Hunter Army Airfield, Georgia. The Bulk Fuel Facility is approximately 600 by 1,200 ft and covers an area of approximately 16.5 acres. Currently, the facility contains three aboveground storage tanks (ASTs) for the storage of jet propellant (JP)-8 with capacities of approximately 500,000 gal each, aboveground and underground piping, and off-loader and pump stations for the distribution of fuel to and from the tanks. The tank was removed and the piping abandoned in place on September 30, 1996. Science Applications International Corporation (SAIC) performed a soil gas survey in January 1999 to identify areas of significant contaminant concentrations (SAIC 1999). SAIC conducted a Corrective Action Plan (CAP)-Part A investigation in December 1999 and January 2000 and a CAP-Part B investigation from November 2000 to March 2001 to determine the extent of petroleum contamination at the site. Thirty-four monitoring wells, seven soil borings, and six vertical-profile borings were installed during these investigations, and surface water and sediment samples were collected from Lamar Canal. The CAP-Part B Report (SAIC 2001) was submitted to the Georgia Environmental Protection Division (GA EPD) UST Management Program in July 2001. The report recommended that a well be installed to replace BF-MW-21, which had been destroyed, and that seven monitoring wells (i.e., BF-MW-19, BF-MW-20, BF-MW-21R, BF-MW-22, BF-MW-32, BF-MW-33, and BF-MW-34) be sampled on a semiannual basis for benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAHs) because benzene and naphthalene were selected as constituents of potential concern in groundwater. The fate and transport modeling performed as part of the CAP-Part B Report reflected a continuous source of contamination. The results are summarized in Attachment A of this document.

In July 2002 and January 2003, free product was observed in well BF-MW-E5, which is located in the vicinity of AST 7009. This tank is approximately 500 ft northeast of AST 7003, which is where the groundwater plume is being monitored. Free product was not observed in this well during the CAP-Part B investigation. During that investigation, the BTEX and PAH constituents detected in the well were below the maximum contaminant level (MCL), the In-Stream Water Quality Standard (IWQS), and the alternate concentration limit (ACL); therefore, groundwater monitoring of this area was not warranted.

It was apparent that there were two separate releases at the Bulk Fuel Facility. For clarification, Release #1 is associated with the groundwater plume in the vicinity of AST 7003 where the original semiannual monitoring only program was conducted. GA EPD granted no further action for Release #1 in correspondence dated October 6, 2003 (Lewis 2003). Release #2 is associated with the free product observed in well BF-MW-E5, which is in the vicinity of AST 7009 and has been assigned Facility ID #9-025113*2.

As recommended in the First Annual Monitoring Only Report (SAIC 2003), three additional wells were installed around the perimeter of the bermed area in the vicinity of AST 7009 to confirm that free product in BF-MW-E5 was not from an upgradient source or migrating downgradient of the AST containment area. Well construction diagrams are provided in Attachment D. Due to the construction of the containment area around the AST, the "E" series of monitoring wells could not be overdrilled and screened across the water table. Also, additional wells could not be installed within the containment area do to accessibility issues.

The purpose of the semiannual monitoring, summarized in this report, was to confirm that natural attenuation is taking place at the site and to document the free product removal activities at the site. In accordance with recommendations made in the First Annual Monitoring Only Report (SAIC 2003), ACLs will be developed for any constituent exceeding its respective IWQS by conducting fate and transport modeling specifically for Release #2. During the year of semiannual monitoring associated with Release #2, none of the constituents exceeded its respective IWQS, thus ACLs were not developed at this time. The monitoring only plan for Release #2 will be terminated if contaminant concentrations are less than their respective IWQS or ACL and if free product is less than 1/8-in. The monitoring only program may be terminated regardless of the site ranking score.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. Potentiometric Data:

(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 water level measurement activities at the site during the semiannual monitoring for Release #1, free product was identified in well BF-MW-E5 (i.e., Release #2). This well is located within the containment system of active AST 7009 and is approximately 500 ft northeast of AST 7003 and Release #1. During the CAP-Part B investigation, free product was not observed in well BF-MW-E5. In June 2004, three additional wells were installed around the perimeter of the containment area associated with AST 7009 to confirm that free product was not migrating beyond the perimeter of the containment area and that free product was not coming from an upgradient source. Well BF-MW-E5 is the only well at the site that contains free product.

At various times throughout the year, the water level in BF-MW-E5 is above the screened interval, thus free product is being removed by aggressively pumping the well on a bi-monthly basis with absorbent socks placed in the well in between pumping events when the presence of free product warrants absorbent sock placement. This alternative ensures the active AST system for the Army's Southeastern Power Projection Platform stays operational and that the integrity of the associated system remains intact. The free product removal activities were initiated in June 2004, when there was 3.14 ft of free product present in BF-MW-05. The free product thickness has continued to decrease since June 2004 with the bi-monthly pumping events. Absorbent socks have not been placed in the well since July 2004. Since October 2004, the maximum free product thickness was 0.01 ft in February 2005. In the other monthly measurements, there has either been a sheen or no product present. A summary of free product removal activities is provided in Table 4.

During the third semiannual monitoring event in July 2004, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In July 2004, the groundwater flow direction ranged from the south to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.008 ft/ft. Free product was observed in well BF-MW-E5, which is associated with Release #2.

During the fourth semiannual monitoring event in January 2005, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In January 2005, the groundwater flow direction was to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.007 ft/ft. A sheen was observed in well BF-MW-E5, which is associated with Release #2.

B. Analytical Data:

(Appendix I, Figure 3: Groundwater Quality Map)

(Appendix I, Figure 4: Trend of Contaminant Concentrations)

(Appendix II, Table 2: Groundwater Analytical Results)

(Appendix II, Table 3: Soil Analytical Results)

(Appendix III: Laboratory Analytical Results)

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

During the third semiannual sampling event in July 2004, which is associated with Release #2, monitoring wells BF-MW-E1, BF-MW-E2, BF-MW-E3, BF-MW-E4, BF-MW-E5, BF-MW-E6, BF-MW-04, BF-MW-25, BF-MW-26, BF-MW-27, BF-MW-35, BF-MW-36, and BF-MW-37 were sampled for BTEX using U. S. Environmental Protection Agency (EPA) Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was detected in 1 of 13 groundwater samples at a concentration of 2.0 µg/L. The concentration did not exceed the IWQS of 71.28 µg/L or the ACL of 634 µg/L associated with Release #1.
- Toluene was not detected in any of the groundwater samples.
- Ethylbenzene was detected in 1 of 13 groundwater samples at a concentration of 17.3 µg/L. The concentration did not exceed the IWQS of 28,718 µg/L.
- Total xylenes were detected in 1 of 13 groundwater samples at a concentration of 42.7 µg/L. There is no ACL or IWQS for total xylenes; however, the concentration did not exceed the MCL of 10,000 µg/L.
- 2-Methylnaphthalene was detected in 4 of 13 groundwater samples at concentrations ranging from 0.6J to 8.4 µg/L. There is no ACL or IWQS for 2-methylnaphthalene.
- Acenaphthene was detected in 2 of 13 groundwater samples at concentrations of 1.6 and 2.8 µg/L. There is no ACL or IWQS for acenaphthene.
- Fluorene was detected in 2 of 13 groundwater samples at concentrations of 2.6 and 5.7 µg/L. The concentrations did not exceed the IWQS of 14,000 µg/L.
- Naphthalene was detected in 4 of 13 groundwater samples at concentrations ranging from 0.49J to 17.3 µg/L. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 µg/L associated with Release #1.
- Phenanthrene was detected in 2 of 13 groundwater samples at concentrations of 0.57J and 5.28 µg/L. There is no ACL or IWQS for phenanthrene.

None of the constituents exceeded its respective IWQS or ACLs calculated for Release #1. Since none of the constituents associated with Release #2 exceed their respective IWQS, the development of ACLs for Release #2 is not necessary. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #2.

During the fourth semiannual sampling event in January 2005, which is associated with Release #2, monitoring wells BF-MW-E1, BF-MW-E2, BF-MW-E3, BF-MW-E4, BF-MW-E5, BF-MW-E6, BF-MW-04, BF-MW-25, BF-MW-26, BF-MW-27, BF-MW-35, BF-MW-36, and BF-MW-37 were sampled for BTEX using EPA Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was not detected in any of the groundwater samples.
- Toluene was detected in 2 of 13 groundwater samples at concentrations of 0.43J and 0.47J $\mu\text{g/L}$. The concentrations did not exceed the IWQS of 200,000 $\mu\text{g/L}$.
- Ethylbenzene was detected in 1 of 13 groundwater samples at a concentration of 10.4 $\mu\text{g/L}$. The concentration did not exceed the IWQS of 28,718 $\mu\text{g/L}$.
- Total xylenes were detected in 2 of 13 groundwater samples at concentration of 0.9J and 34.9 $\mu\text{g/L}$. There is no ACL or IWQS for total xylenes; however, the concentration did not exceed the MCL of 10,000 $\mu\text{g/L}$.
- 2-Methylnaphthalene was detected in 3 of 13 groundwater samples at concentrations ranging from 1.4 and 43.2 $\mu\text{g/L}$. There is no ACL or IWQS for 2-methylnaphthalene.
- Acenaphthene was detected in 2 of 13 groundwater samples at concentrations of 1.6 and 5.4 $\mu\text{g/L}$. There is no ACL or IWQS for acenaphthene.
- Fluorene was detected in 2 of 13 groundwater samples at concentrations of 3.1 and 10.3 $\mu\text{g/L}$. The concentrations did not exceed the IWQS of 14,000 $\mu\text{g/L}$.
- Naphthalene was detected in 3 of 12 groundwater samples at concentrations ranging from 0.31J to 32.9 $\mu\text{g/L}$. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 $\mu\text{g/L}$ associated with Release #1.
- Phenanthrene was detected in 2 of 12 groundwater samples at concentrations of 1.2 and 10.7 $\mu\text{g/L}$. There is no ACL or IWQS for phenanthrene.
- Pyrene was detected in 1 of 13 groundwater samples at a concentration of 2.4 $\mu\text{g/L}$. The concentration did not exceed the IWQS of 11,000 $\mu\text{g/L}$.

None of the constituents exceeded its respective IWQS or ACLs calculated for Release #1. Since none of the constituents associated with Release #2 exceed their respective IWQS, the development of ACLs for Release #2 is not necessary. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #2.

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

<i>Environmental Site Sensitivity Score:</i> (April 1999 version of the Site Ranking Form was used for all scores.)	<u>Release #1</u>
	3,250 (CAP-Part B Report)
	3,250 (July 2002 – First semiannual sampling event)
	3,250 (Jan. 2003 – Second semiannual sampling event)
	<u>Release #2</u>
	65,250 (July 2004 – Third semiannual sampling event)
	12,750 (Jan. 2005 – Fourth semiannual sampling event)

V. CONCLUSIONS/RECOMMENDATIONS

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

The Monitoring Only Plan for the plume in the vicinity of BF-MW-21 (i.e., Release #1) was conducted in accordance with Section III.D of the CAP-Part B Report (SAIC 2001). Termination conditions in the CAP-Part B Report were achieved and GA EPD granted no further action for Release #1 in correspondence dated October 6, 2003 (Lewis 2003).

The Monitoring Only Plan for the plume in the vicinity of BF-MW-E5 (i.e., Release #2) is being conducted in accordance with the technical approach provided in the First Annual Monitoring Only Report (SAIC 2003). Termination for Release #2 will be requested once the measured contaminants remain below their respective IWQS or ACL for 1 year and the free product thickness is less than 1/8-in. The Monitoring Only Plan may be terminated regardless of the site ranking score if the above conditions are met.

During the last year of the monitoring program, a free-product mixture has been pumped from well BF-MW-E5 on a bi-monthly basis. Free product has measured between 0 and 0.1 ft since September 20, 2004. Because BTEX and PAH concentrations associated with Release #2 have not exceeded their respective IWQS and ACLs since the CAP-Part B Investigation (Release #2) – 2000, it is recommended that semiannual groundwater sampling of the site be discontinued. Due to the presence of a sporadic sheen, the pumping of well BF-MW-05 will be continued on a bi-monthly basis for 1 year, with product levels measured prior to each pumping event. The results of the free product removal and final confirmatory sampling will be documented in the Third Annual Monitoring Report, which will be submitted to GA EPD in May 2006.

VI. REIMBURSEMENT

Attached _____ N/A _____ X

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the former UST 117 site, Facility ID #9-025113*2, using U. S. Department of Defense Environmental Restoration Account Funds. Application for Georgia UST Trust Fund reimbursement is not being pursued at this time.

Georgia Department of Natural Resources

Environmental Protection Division
Underground Storage Tank Management Program
4244 International Parkway, Suite 104, Atlanta, Georgia 30354
Lonice Barrett, Commissioner
David M. Word, Assistant Director
(404) 362-2687

October 6, 2003

Thomas C. Fry
U.S. Army/HQ 3rd Inf. Div. (Mech) and Ft. Stewart
Directorate of Public Works
1550 Frank Cochran Drive, Building 1137
Fort Stewart, GA 31314-4927

SUBJECT: Corrective Action Plan (CAP)-Part B Monitoring Report

No Further Action Required:

Hunter AAF, Former UST #117

Building 7002, Bulk Fuel Facility (HAA-09)

Savannah, Chatham County, GA

Facility ID: 9025113*1

← see R2 below.

Dear Mr. Fry:

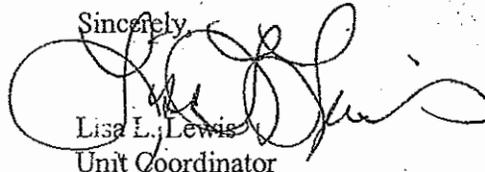
The Georgia Underground Storage Tank Management Program (USTMP) has received your consultant's letter, dated September 8, 2003, that forwarded a properly certified CAP-Part B Monitoring Report. The report was prepared by Science Applications International Corporation (SAIC).

2 → Based on current requirements of the Georgia Underground Storage Tank Act, the Georgia Rules for Underground Storage Tank Management (GUST Rules) and the data submitted, the USTMP has determined that no further action is required for the referenced release. Please proceed with corrective action for Building 7009.

However, further corrective action may be required if mandated through more stringent State or Federal statutory or regulatory changes. Additional measures may also be required if existing or future drinking water systems or surface water bodies within two miles of the site are impacted by any dissolved contamination resulting from this release, or if previously unidentified soil contamination, dissolved contamination or free product are identified as originating from this site.

Please submit a Completion Report and Certification, documenting that the associated monitoring wells have been properly abandoned, by December 4, 2003. If you have any questions, please contact William E. Logan at 404.362.4529.

Sincerely,



Lisa L. Lewis
Unit Coordinator
Corrective Action Unit II

WEL;

S: land/landdocs/williaml/pending03/9025113.34

cc: Patricia A. Stoll, P.E., SAIC

Larry Rogers, GA EPD Coastal District

William E. Logan, GA EPD

File (CA): Chatham; 9025113



DEPARTMENT OF THE ARMY
 HEADQUARTERS, 3D INFANTRY DIVISION (MECHANIZED) AND FORT STEWART
 DIRECTORATE OF PUBLIC WORKS
 1550 FRANK COCHRAN DRIVE
 FORT STEWART, GEORGIA 31314-4927
 September 8, 2003

REPLY TO
 ATTENTION OF

Office of the Directorate

CERTIFIED MAIL

7099 3400 0010
 1218 2845

Georgia Environmental Protection Division
 Underground Storage Tank Management Program
 Attention: Mr. William Logan
 4244 International Parkway, Suite 104
 Atlanta, Georgia 30354

Dear Mr. Logan:

Fort Stewart is pleased to submit to the Georgia Environmental Protection Division (GA EPD) the First Annual Monitoring Only Report for former underground storage tank (UST) 117, Building 7002, Facility Identification Number 9-025113*1, Hunter Army Airfield, Georgia. This report documents the semiannual monitoring conducted in June 2002 and January 2003, in accordance with Section III.D of the Corrective Action Plan (CAP)-Part B.

It is apparent that there are two separate releases at Facility 9-025113. For clarification, Release #1 is associated with the groundwater plume in the vicinity of AST 7003 where the semiannual monitoring only program has been in place for the last year. Release #2 is associated with the free product observed in well BF-MW-E54, which is in the vicinity of above ground storage tank (AST) 7009.

*Sampling for Release #1 indicated that benzene and naphthalene concentrations are below their respective alternate concentration limits (ACLs) of 634µg/L and 820µg/L. Benzene concentrations in groundwater ranged from 0.99µg/L to 178µg/L during the first semiannual monitoring event in July 2002 and 1.3µg/L to 183µg/L during the second semiannual monitoring event in January 2003. Naphthalene concentrations in groundwater ranged from 1µg/L to 168µg/L during the first semiannual monitoring event in July 2002 and 0.22µg/L to 110µg/L during the second semiannual monitoring event in January 2003. Termination conditions in the CAP-Part B Report indicated that termination would be requested once the measured benzene and naphthalene concentrations had remained below their respective ACLs for 1 year. During the first year of the monitoring program for Release #1, the benzene and naphthalene concentrations have been below their respective ACLs; therefore, no further action with respect to Release #1 is being requested. The monitoring program associated with Release #1 will be discontinued as described in Section V, page 5 through 6, of the enclosed report.

In July 2002 and January 2003, free product was observed in well BF-MW-E5 located in the vicinity of AST 7009. As a result, Release #2 ←

was discovered. During the CAP-Part B investigation, free product was not observed in well BF-MW-E5, and the BTEX and PAH constituents detected in the well were below the maximum contaminate level (MCL), In-Stream Water Quality Standard (IWQS), and ACL; therefore, groundwater monitoring of this area was not warranted. At this time, Fort Stewart recommends the installation of three additional wells to further delineate the extent of the free product associated with Release #2. Once the new wells have been installed, it is recommended that semiannual monitoring of Release #2 be initiated at the site.

If there are any questions or comments regarding the enclosed report, please contact Ms. LeAnn Taylor or Ms. Tressa Rutland, Directorate of Public Works, Environmental Branch, at (912) 767-2010.

Sincerely,

for Thomas C. Fry
Michael W. Biering
Colonel, U.S. Army
Director, Public Works

Enclosure

FINAL

**FIRST ANNUAL MONITORING ONLY REPORT
FOR
FORMER UNDERGROUND STORAGE TANK 117
BUILDING 7002
BULK FUEL FACILITY (HAA-09)
FACILITY ID #9-025113*1
HUNTER ARMY AIRFIELD, GEORGIA**

Prepared for

**U.S. Army Corps of Engineers, Savannah District
and
Fort Stewart Directorate of Public Works
Under Contract Number DACA21-02-D-0004
Delivery Order 0006**

Prepared by

**Science Applications International Corporation
P.O. Box 2501
Oak Ridge, TN 37831**

July 2003

MONITORING ONLY REPORT

Submittal Date: July 2003 Monitoring Report Number: 1st Annual

For Period Covering: April 2002 to April 2003

Facility Name: Former UST 117 Street Address: Bulk Fuel Facility, Building 7002

Facility ID: 9-025113 City: Savannah County: Chatham Zip Code: 31409

Latitude: 32°01'43" Longitude: 81°08'37"

Submitted by UST Owner/Operator:

Name: Thomas C. Fry/Environmental Branch
Company: U.S. Army/HQ 3d, Inf. Div. (Mech)
Address: Directorate of Public Works, Bldg. 1137
1550 Frank Cochran Drive
City: Fort Stewart State: GA
Zip Code: 31314-4927
Telephone: (912) 767-2010

Prepared by Consultant/Contractor:

Name: Patricia A. Stoll
Company: SAIC
Address: P.O. Box 2501
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
Signature: *Patricia A. Stoll*
Date: 6/20/03



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) 117, Facility ID #9-025113*1, was located near Building 7002 at the Bulk Fuel Facility at Hunter Army Airfield (HAAF), Georgia. The Bulk Fuel Facility is approximately 600 by 1,200 ft and covers an area of approximately 16.5 acres. Currently, the facility contains three aboveground storage tanks (ASTs) for the storage of JP-8 with capacities of approximately 500,000 gal each, aboveground and underground piping, and off-loader and pump stations for the distribution of fuel to and from the tanks. The tank was removed and the piping abandoned in place on September 30, 1996. Science Applications International Corporation (SAIC) performed a soil gas survey in January 1999 to identify areas of significant contaminant concentrations (SAIC 1999). SAIC conducted a Corrective Action Plan (CAP)-Part A investigation in December 1999 and January 2000 and a CAP-Part B investigation from November 2000 to March 2001 to determine the extent of petroleum contamination at the site. Thirty-four monitoring wells, seven soil borings, and six vertical-profile borings were installed during these investigations, and surface water and sediment samples were collected from Lamar Canal. The CAP-Part B Report (SAIC 2001) was submitted to the Georgia Environmental Protection Division (GA EPD) Underground Storage Tank Management Program in July 2001. The report recommended that a well be installed to replace BF-MW-21, which had been destroyed, and that seven monitoring wells (i.e., BF-MW-19, BF-MW-20, BF-MW-21R, BF-MW-22, BF-MW-32, BF-MW-33, and BF-MW-34) be sampled on a semiannual basis for benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAHs) because benzene and naphthalene were selected as constituents of potential concern in groundwater.

The fate and transport modeling performed as part of the CAP-Part B Report reflected a continuous source of contamination. The results are summarized in Attachment A of this document. The analytical results were evaluated as part of this report, and it was determined that the fate and transport model did not need to be revised.

The purpose of the semiannual monitoring, summarized in this report, was to confirm the results of the fate and transport modeling and that natural attenuation is taking place at the site. The benzene and naphthalene concentrations during the July 2002 sampling event were lower than those of the CAP-Part B investigation and remained below their respective In-Stream Water Quality Standards (IWQSS) or alternate concentration limits (ACLs). In accordance with recommendations made in the CAP-Part B Report for the Monitoring Only Plan, an ACL for benzene of 634 µg/L and an ACL for naphthalene of 820 µg/L were proposed as the monitoring endpoints. If the benzene and naphthalene concentrations remain below their respective ACLs after 1 year of monitoring, the monitoring only program may be terminated regardless of the site ranking score.

In July 2002 and January 2003, free product was observed in well BF-MW-E5, which is located in the vicinity of AST 7009. This tank is approximately 500 ft northeast of AST 7003, which is where the groundwater plume is being monitored. Free product was not observed in this well during the CAP-Part B investigation. During that investigation, the BTEX and PAH constituents detected in the well were below the maximum contaminant level (MCL), IWQS, and ACL; therefore, groundwater monitoring of this area was not warranted.

It is apparent that there are two separate releases at the Bulk Fuel Facility. For clarification, Release #1 is associated with the groundwater plume in the vicinity of AST 7003 where the semiannual monitoring only program has been in place for the last year. Release #2 is associated with the free product observed in well BF-MW-E5, which is in the vicinity of AST 7009.

III. ACTIVITIES AND ASSESSMENT OF EXISTING CONDITIONS

A. Potentiometric Data:

(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 monitoring event in July 2002, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In July 2002, the groundwater flow direction ranged from the south to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.0079 ft/ft. Free product was observed in well BF-MW-E5, which is located 500 ft northeast of the monitored groundwater plume.

During the second monitoring event in January 2003, groundwater elevations were measured in the site monitoring wells to determine the groundwater flow direction (Table 1). In January 2003, the groundwater flow direction ranged from the south to the southeast toward Lamar Canal, and the average groundwater gradient was approximately 0.0046 ft/ft. Free product was observed in well BF-MW-E5, which is located 500 ft northeast of the monitored groundwater plume.

B. Analytical Data:

(Appendix I, Figure 3: Groundwater Quality Map)

(Appendix I, Figure 4: Trend of Contaminant Concentrations)

(Appendix II, Table 2: Groundwater Analytical Results)

(Appendix II, Table 3: Soil Analytical Results)

(Appendix III: Laboratory Analytical Results)

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

During the first sampling event in July 2002 associated with Release #1, monitoring wells BF-MW-19, BF-MW-20, BF-MW-21R, BF-MW-22, BF-MW-32, BF-MW-33, and BF-MW-34 were sampled for BTEX using U.S. Environmental Protection Agency (EPA) Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was detected in five of the seven groundwater samples at concentrations ranging from 0.99J to 178 µg/L. One of the samples exceeded the IWQS of 71.28 µg/L; however, the concentration did not exceed the ACL of 634 µg/L and showed a decrease from the CAP-Part B sampling event.
- Toluene was detected in three of the seven groundwater samples at concentrations ranging from 1.2 to 6 µg/L. None of the concentrations exceeded the IWQS of 200,000 µg/L.

- Ethylbenzene was detected in four of the seven groundwater samples at concentrations ranging from 11.6 to 207 µg/L. None of the concentrations exceeded the IWQS of 28,719 µg/L.
- Total xylenes were detected in four of the seven groundwater samples at concentrations ranging from 103 to 911 µg/L. There is no ACL or IWQS for total xylenes; however, the concentrations did not exceed the MCL of 10,000 µg/L.
- Naphthalene was detected in six of the seven groundwater samples at concentrations ranging from 1 to 168 µg/L. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 µg/L.
- 2-Methylnaphthalene was detected in five of the seven groundwater samples at concentrations ranging from 1.8 to 133 µg/L. There is no ACL or IWQS for 2-methylnaphthalene.
- 2-Chloronaphthalene was detected in one of the seven groundwater samples at a concentration of 41.5 µg/L. There is no ACL or IWQS for 2-chloronaphthalene.
- Acenaphthylene was detected in one of the seven groundwater samples at a concentration of 1.8 µg/L. There is no ACL or IWQS for acenaphthylene.
- Fluorene was detected in one of the seven groundwater samples at a concentration of 5.9 µg/L. There is no ACL or IWQS for fluorene.

None of the benzene or naphthalene concentrations exceeded the ACL of 634 or 820 µg/L, respectively. The benzene concentration in BF-MW-21R exceeded the IWQS of 71.28 µg/L. None of the other constituents exceeded its respective IWQS. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #1.

During the second sampling event in January 2003 associated with Release #1, monitoring wells BF-MW-19, BF-MW-20, BF-MW-21R, BF-MW-22, BF-MW-32, BF-MW-33, and BF-MW-34 were sampled for BTEX using EPA Method 8021B/8260B and PAHs using EPA Method 8270C. Analytical results from the sampling event are summarized below.

- Benzene was detected in four of the seven groundwater samples at concentrations ranging from 1.8 to 183 µg/L. One of the samples exceeded the IWQS of 71.28 µg/L; however, the concentration did not exceed the ACL of 634 µg/L and showed a decrease from the CAP-Part B sampling event.
- Toluene was detected in three of the seven groundwater samples at concentrations ranging from 0.56J to 1.2 µg/L. None of the concentrations exceeded the IWQS of 200,000 µg/L.
- Ethylbenzene was detected in three of the seven groundwater samples at concentrations ranging from 9.9 to 105 µg/L. None of the concentrations exceeded the IWQS of 28,719 µg/L.

- Total xylenes were detected in three of the seven groundwater samples at concentrations ranging from 130 to 328 µg/L. There is no ACL or IWQS for total xylenes; however, the concentrations did not exceed the MCL of 10,000 µg/L.
- Naphthalene was detected in six of the seven groundwater samples at concentrations ranging from 0.22J to 110 µg/L. There is no IWQS for naphthalene; however, the concentrations did not exceed the ACL of 820 µg/L.
- 2-Methylnaphthalene was detected in three of the seven groundwater samples at concentrations ranging from 2.4 to 42 µg/L. There is no ACL or IWQS for 2-methylnaphthalene.

None of the benzene or naphthalene concentrations exceeded the ACL of 634 or 820 µg/L, respectively. The benzene concentration in BF-MW-21R exceeded the IWQS of 71.28 µg/L. None of the other constituents exceeded its respective IWQS. Figure 4 shows the trend in benzene concentrations in groundwater for the wells in the monitoring only program for Release #1.

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

Environmental Site Sensitivity Score: 3,250 (CAP-Part B Report)
(April 1999 version of the Site Ranking Form was used for all scores.) 3,250 (July 2002 – First semiannual sampling event)
3,250 (Jan. 2003 – Second semiannual sampling event)

V. CONCLUSIONS/RECOMMENDATIONS

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

The Monitoring Only Plan for the plume in the vicinity of BF-MW-21 (i.e., Release #1) was conducted in accordance with Section III.D of the CAP-Part B Report (SAIC 2001). Termination conditions in the CAP-Part B Report indicated that termination would be requested once the measured benzene and naphthalene concentrations had remained below their respective ACLs for 1 year. During the first year of the monitoring program for Release #1, the benzene and naphthalene concentrations in the vicinity of BF-MW-21 have been below their respective ACLs; therefore, no further action with respect to Release #1 is being requested. The monitoring program associated with Release #1 will be discontinued.

During the water-level-measurement activities at the site during the semiannual monitoring, however, free product was identified in well BF-MW-E5 (i.e., Release #2). This well is located in the vicinity of AST 7009 and is approximately 500 ft northeast of AST 7003 and Release #1. During the CAP-Part B investigation, free product was not observed in well BF-MW-E5, and the BTEX and PAH constituents detected in the well were below the MCL, IWQS, and ACL; therefore, groundwater monitoring of this area was not warranted.

The six wells with an "E" designator are located within the impermeable bermed area that provides secondary containment for AST 7009. Because of the recent rise in groundwater elevations at the site, the water table is now above the screened interval in all six "E" wells. As a result, it is unknown whether the free product present in BF-MW-E5 extends laterally to

the five wells surrounding BF-MW-E5 or is migrating toward BF-MW-E5 from an upgradient location. The construction of the bermed area did not provide a point of access for motorized vehicles. As a result, the six "E" wells cannot be redrilled and rescreened above the water table, and additional wells cannot be installed within the bermed area.

Because of the proximity of the free product to the AST, excavation of the soil is not practical because of the significant probability of undermining the integrity of the tank and compromising the integrity of the impermeable liner at the base of the bermed area. As a result, it is recommended that three additional wells be installed around the perimeter of the bermed area as shown in Figure 5 to ensure that the free product is not migrating toward Lamar Canal. Wells BF-MW-25, BF-MW-26, and BF-MW-27 are already located on the perimeter of the bermed area and can be used as monitoring points.

Once the three new wells have been installed, it is recommended that semiannual monitoring of Release #2 be initiated at the site. Wells BF-MW-E1, BF-MW-E2, BF-MW-E3, BF-MW-E4, BF-MW-E5, and BF-MW-E6 within the bermed area; BF-MW-25, BF-MW-26, BF-MW-27, and three new wells around the perimeter; and upgradient well BF-MW-04 will be sampled for BTEX and PAHs. Free product will be passively removed from any wells containing product through the use of absorbent socks or periodic pumping. It is expected that the wells will be installed during the fall of 2003, and the next sampling event will be conducted in January 2004. The Second Annual Monitoring Only Report will be submitted to GA EPD in October 2004 and will summarize all previous sampling events.

During each sampling event, water levels will be measured in all of the site monitoring wells. Specific conductivity, pH, and temperature analyses will be completed on each sample from the monitoring wells at which analytical samples are collected. The samples will be shipped to an approved laboratory for BTEX analysis using EPA Method 8021B/8260B and PAH analysis using EPA Method 8270C.

As part of the next annual report, fate and transport modeling will be conducted to predict the time required for the concentrations to reach the IWQS as a result of natural attenuation and to determine the ACLs for the plume associated with BF-MW-E5. Monitoring of this plume will be terminated once contaminant concentrations in the groundwater have remained below their respective ACLs for a minimum of 1 year. Once the ACLs have been maintained, the Monitoring Only Plan for the plume associated with BF-MW-E5 may be terminated regardless of the site ranking score.

VI. REIMBURSEMENT

Attached _____ N/A X

(Appendix V: Reimbursement Application)

Fort Stewart is a federally owned facility and has funded the investigation for the former UST 117 site, Facility ID #9-025113*1, using Department of Defense Environmental Restoration Account Funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.