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PILOT STUDY
INTERIM PROGRESS REPORT #3
FOR CORRECTIVE ACTIONS AT
BULK FUEL FACILITY (HAA-09)
FORMER UST 117
AST 7009
HUNTER ARMY AIRFIELD, GEORGIA
FACILITY ID #9-025113*2

Prepared for

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract Number W91278-10-D-0089
Delivery Order Number CV01

May 2013

SAIC®

13-016(E)/043013

DOCUMENT 18

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

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Prepared by

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

May 2013

The undersigned certifies that I am a qualified groundwater scientist who has received a baccalaureate or postgraduate degree in the natural sciences or engineering and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completions of accredited university courses, to enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report was prepared by myself or by a subordinate working under my direction.

5/1/13

Patricia A. Stoll, P.E.
Project Manager
Science Applications International Corporation

13-016(E)/043013

CONTENTS

FIGURES iii
TABLES iii
ACRONYMS iii

1.0 INTRODUCTION 1

2.0 SITE HISTORY OF AND CONTAMINANTS AT ABOVEGROUND STORAGE TANK 7009 1
2.1 RELEASES AT THE BULK FUEL FACILITY 1
2.2 NATURE AND EXTENT OF CONTAMINATION AT ABOVEGROUND STORAGE TANK 7009 5
2.2.1 Historical Soil Contamination 5
2.2.2 Historical Groundwater Contamination 5
2.3 REGULATORY REQUIREMENTS 6

3.0 PILOT STUDY TREATMENT PHASE 6

4.0 INSTALLATION ACTIVITIES 7
4.1 SITE PREPARATION 7
4.2 INJECTION WELL INSTALLATION 7

5.0 ACTIVE TREATMENT 9
5.1 INJECTION 9
5.2 EXTRACTION AND TREATMENT 10
5.3 OPERATION AND MAINTENANCE 10
5.4 EFFLUENT SAMPLING 10
5.5 SYSTEM SHUTDOWN 17
5.6 CONTAMINANT RECOVERY 17
5.6.1 Method of Calculation 17
5.6.2 Volume Recovered 18

6.0 PERFORMANCE MONITORING 18
6.1 WELL GAUGING 18
6.2 GROUNDWATER SAMPLING 20

7.0 REMEDIATION-DERIVED WASTE 23

8.0 PROBLEMS ENCOUNTERED 23

9.0 CONCLUSIONS 23

10.0 REFERENCES 24

APPENDIX A UNDERGROUND INJECTION CONTROL REQUESTS AND APPROVAL A-1
APPENDIX B CHAINS OF CUSTODY AND ANALYTICAL RESULTS B-1
APPENDIX C WASTE MANIFESTS C-1

FIGURES

1 Location of the Bulk Fuel Facility, Hunter Army Airfield, Georgia 2
2 Site Location Map for the Bulk Fuel Facility, Hunter Army Airfield, Georgia..... 3
3 Locations of Pilot Study Injection and Extraction Wells..... 8

TABLES

1 Pilot Study Injection Wells Installed at AST 7009 9
2 Analytical Results of Initial Liquid-Phase Effluent Sample 11
3 Analytical Results for Air Samples..... 12
4 Analytical Results for Liquid-Phase Effluent Within Treatment Train 14
5 Analytical Results for Liquid-Phase Effluent from SP803 15
6 Results of Well Gauging from January 30, 2012, through February 2, 2013 19
7 Groundwater Analytical Results for BTEX, 1999 through 2012..... 21

ACRONYMS

AST	aboveground storage tank
BFF	Bulk Fuel Facility
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CAP	Corrective Action Plan
EFR®	Enhanced Fluid Recovery®
EQ	EQ-Environmental Quality Co
GA EPD	Georgia Environmental Protection Division
gpm	gallons per minute
GUST	Georgia Underground Storage Tank
HAAF	Hunter Army Airfield
IWQS	In-stream Water Quality Standards
JP	jet propellant
MAE2	Mid-Atlantic Environmental Equipment, Inc.
MPE	multi-phase extraction
O&M	operation and maintenance
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
PVC	polyvinyl chloride
RDW	remediation-derived waste
SAIC	Science Applications International Corporation
STL	soil threshold level
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
USTMP	Underground Storage Tank Management Program
VOC	volatile organic compound
WP	Work Plan
WWTP	waste water treatment plant

1.0 INTRODUCTION

This document represents the third and final interim progress report for the pilot study conducted from 2011 through 2012 at the Bulk Fuel Facility (BFF; HAA-09), Former Underground Storage Tank (UST) 117, Aboveground Storage Tank (AST) 7009 at Hunter Army Airfield (HAAF), Georgia (Figure 1). This pilot study was conducted by Science Applications International Corporation (SAIC) for the U. S. Army Corps of Engineers (USACE), Savannah District under Contract Number W91278-10-D-0089, Delivery Order Number CV01.

Pilot study activities were conducted in accordance with the *Corrective Action Plan–Part B Addendum #1, Bulk Fuel Facility (HAA-09), Building 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2* (SAIC 2011a), which was approved by the Georgia Environmental Protection Division (GA EPD) through correspondence dated May 2, 2011 (Guentert 2011), and *Addendum #28 to the Work Plan for Preliminary Groundwater and Corrective Action Plan–Part A/Part B Investigations at Former Underground Storage Tank Sites, Hunter Army Airfield and Fort Stewart, Georgia* (SAIC 2011b). Based upon information gathered during prior facility upgrades and removals, a 4- to 5-ft-thick sand foundation was believed to have been installed underneath the concrete pad of each AST at the BFF. Prior activities at the BFF have resulted in a release of fuel into the subsurface in the vicinity of AST 7009. This fuel would remain trapped within a sand foundation by the surrounding silty clay. Because AST 7009 is an active 500,000-gal AST, a surfactant flood of the fine-grained sand was proposed to flush the free product from the pore space without disruption of facility operations.

The *Pilot Study Interim Progress Report for Corrective Actions at Bulk Fuel Facility (HA-009), Former UST 117, AST 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2* presented the site history and contaminants, summarized the pilot study installation and startup activities, and discussed field observations related to subsurface conditions at AST 7009 (SAIC 2012a). The *Pilot Study Interim Progress Report #2 for Corrective Actions at Bulk Fuel Facility (HA-009), Former UST 117, AST 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2* reviewed the previously presented information and provided additional information on pilot study operation and results through May 2012 (SAIC 2012b). This third and final interim progress report incorporates the results of four quarterly gauging events conducted since the surfactant injection/extraction activities conducted from August 2011 through April 2012 and groundwater sampling at two site monitoring wells, MW-E5 and MW-38, in November 2012 and includes recommendations for further remedial action at AST 7009.

2.0 SITE HISTORY OF AND CONTAMINANTS AT ABOVEGROUND STORAGE TANK 7009

2.1 RELEASES AT THE BULK FUEL FACILITY

The BFF is approximately 600 by 1,200 ft and covers an area of approximately 16.5 acres (Figure 2). Currently, the facility contains two active 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, and a third active AST constructed in 2011 at the location of former AST 7005. The capacity of this third AST is 30,000 barrels or 1,260,000 gal. Previously, 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 GA EPD Underground Storage Tank Management Program (USTMP) regulations.

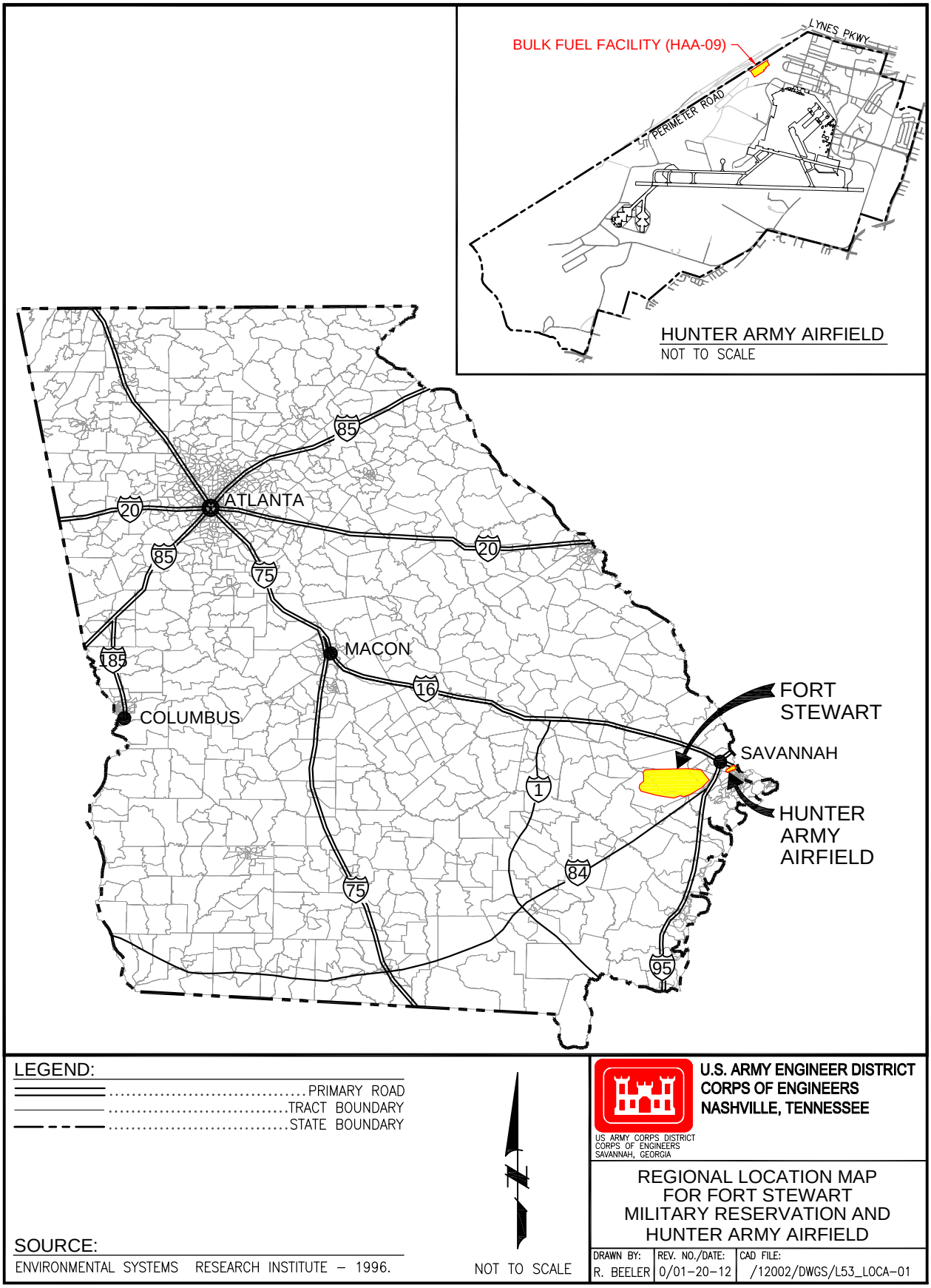

Figure 1. Location of the Bulk Fuel Facility, Hunter Army Airfield, Georgia

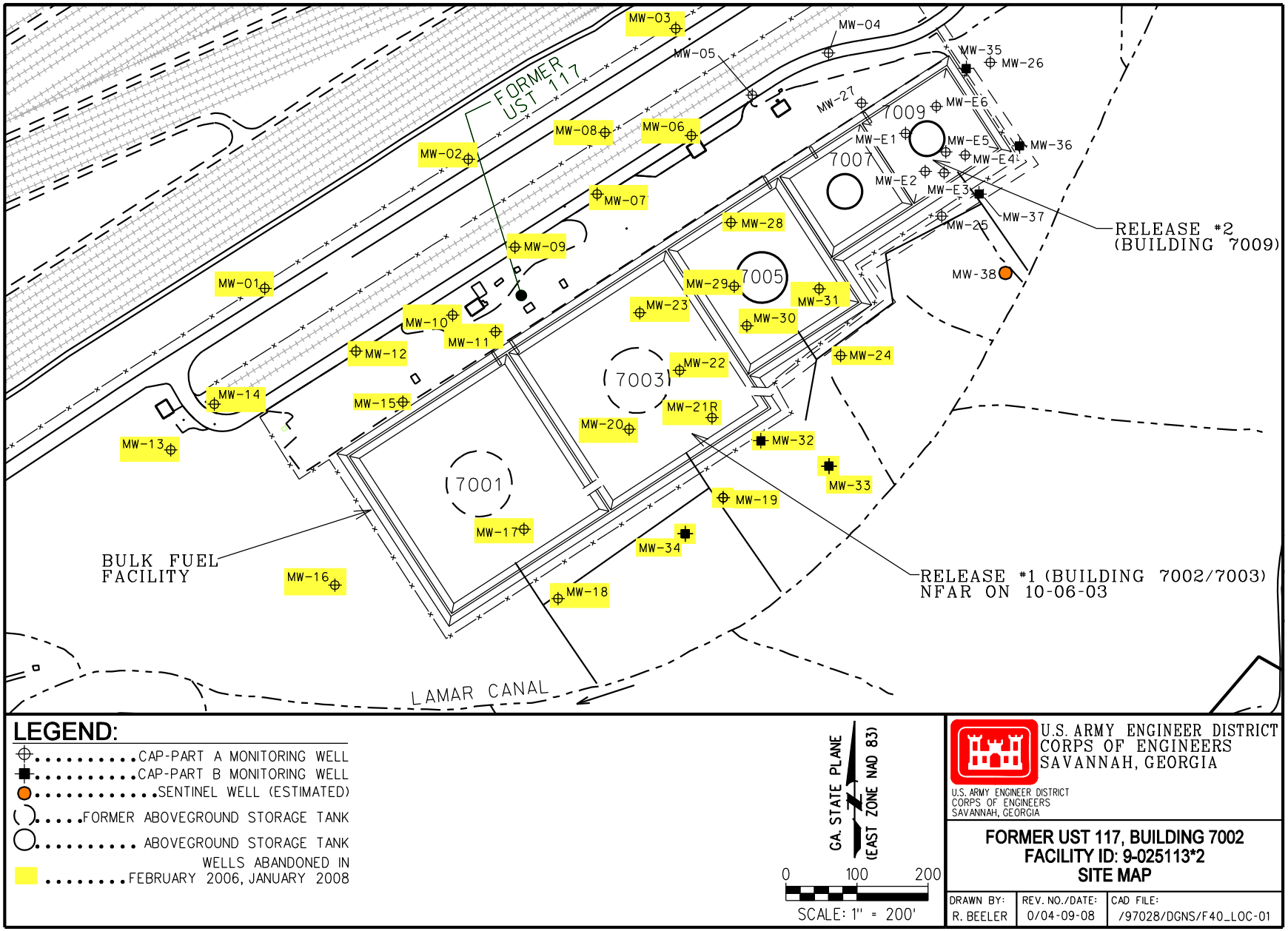

Figure 2. Site Location Map for the Bulk Fuel Facility, Hunter Army Airfield, Georgia

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 (Figure 2). The *Corrective Action Plan–Part B Report for the Former Underground Storage Tank 117, Building 7002 Site, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*1, Hunter Army Airfield, Georgia* (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 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 (BGS). 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 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 but that attenuation is occurring. Semiannual monitoring of groundwater in this area is being conducted by Arcadis on behalf of USACE.

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 (identified as Release #2). 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 xylene (BTEX) and polycyclic aromatic hydrocarbon (PAH) constituents were below the In-Stream Water Quality Standards (IWQSs). 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. The final EFR® event was conducted in March 2010. The last biannual groundwater sample from BF-MW-38 was collected in October 2009. No BTEX constituents were detected.

The pilot study activities described within this report were conducted to address Release #2: AST 7009. By 2010, it was determined that the quarterly vacuum events were not providing the constant treatment needed to remove the measurable free product present at the site. Alternative approaches, such as a soil vapor extraction solution and a surfactant injection solution, were evaluated. Surfactant injection was selected as both a time- and cost-effective option.

2.2 NATURE AND EXTENT OF CONTAMINATION AT ABOVEGROUND STORAGE TANK 7009

2.2.1 Historical Soil Contamination

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 the installation of wells BF-MW-E1 through BF-MW-E6. BTEX and PAH concentrations for all constituents except ethylbenzene in those samples were below Georgia UST (GUST) soil threshold levels (STLs) (i.e., Table A, Column 1). Ethylbenzene exceeded the GUST STL (i.e., Table A, Column 1) of 0.370 mg/kg in one sample collected from BF-MW-E3. The detected concentration of 4.5 mg/kg falls below the alternative threshold level of 61.85 mg/kg established for the site within the CAP–Part B Report (SAIC 2001).

The CAP–Part B Report concluded that active remediation/removal of soil was not required.

2.2.2 Historical Groundwater Contamination

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. Maximum detected concentrations of BTEX constituents were all detected in well BF-MW-E5. All detected concentrations of BTEX and PAH were below applicable GA EPD IWQSs. Free product was not identified in the area of AST 7009 during the CAP–Part B investigation.

Following the CAP–Part B Report, semiannual monitoring was commenced at the BFF. In 2002, free product was noted in well BF-MW-E5. Three additional wells (BF-MW-35, BF-MW-36, and BF-MW-37) were installed around the perimeter of the bermed area in the vicinity of AST 7009 to confirm that the 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 was limited to well BF-MW-E5 and did not extend beyond the bermed area.

BTEX and PAH concentrations from wells within the vicinity of AST 7009 have remained well below applicable regulatory criteria since the first sampling event in 1999. The CAP–Part B Addendum #1 (SAIC 2011a) concluded that no groundwater remediation was warranted.

However, free product has been consistently encountered in BF-MW-E5 at thicknesses as great as 4.32 ft since 2002. The CAP–Part B Addendum #1 proposed a pilot study with the following objective:

- Remove free product in excess of 1/8 in. by using surfactant flooding to flush the free product from the pore space of the fine-grained sand beneath the AST.

2.3 REGULATORY REQUIREMENTS

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). The site is currently being remediated under the GA EPD Solid Waste Program.

In support of the pilot study activities, a temporary underground injection control permit application was submitted to Mr. Bijan Rahbar at GA EPD. Copies of the permit request, the initial approval email, and an email request for an additional 90-day extension can be found in Appendix A.

3.0 PILOT STUDY TREATMENT PHASE

Surfactant flushing is a free product removal technology involving the injection and subsequent extraction of chemicals to solubilize and/or mobilize free product. The surfactant is injected into a system of wells positioned to sweep the source zone. The chemical flood and the solubilized or mobilized free product are removed through extraction wells, and the produced liquids are then either disposed (usually off-site treatment) or treated on-site to remove contaminants.

The Addendum #28 to the Work Plan (WP) identified locations for nine 1-in. injection points to be installed around the perimeter of AST 7009 and existing monitoring wells BF-MW-E5 and BF-MW-E1 as primary extraction points (SAIC 2011b). The custom injection/multi-phase extraction (MPE) and treatment system was manufactured by Mid-Atlantic Environmental Equipment, Inc. (MAE2) and includes a ten-leg injection manifold and five-leg vacuum extraction manifold.

Primary effluent treatment steps are outlined below.

1. Extracted groundwater and vapors flowed through a liquid/vapor separator; separated vapor was sent to an air stripper vapor discharge, while liquid-phase effluent continued on to a 20,000-gal Baker frac tank.

2. In the frac tank, particulates and free product were allowed to settle and separate, respectively.

3. From the frac tank, liquid-phase effluent continued on through an oil/water separator (OWS); separated oil was stored for off-site disposal as free-phase product in 55-gal drums and liquid-phase effluent continued on to an air stripper to remove dissolved volatile organic compounds (VOCs).

4. The liquid-phase effluent passed through an ultra-filtration system comprised of sand filters, polymer absorber, and an organo-clay vessel.

5. Finally, the effluent was passed through liquid-phase granular-activated carbon as a final polishing step and discharged to the HAAF waste water treatment plant (WWTP).

Two chemical dose systems (one for anti-fouling and one for anti-foaming) were used as required.

4.0 INSTALLATION ACTIVITIES

4.1 SITE PREPARATION

Site preparation activities began on July 27, 2011, and consisted of the following:

- Clearing and grubbing approximately 1/4 acre outside the BFF perimeter fence northwest of AST 7009.
- Site grading, installing geotextile, and placing approximately 60 tons of crusher run gravel to create a foundation for the injection/multi-phase treatment trailer.
- Placing injection and extraction lines between the injection/multi-phase treatment trailer and injection/extraction wells.
- Connecting the fire hydrant to the injection/multi-phase treatment trailer.
- Horizontal drilling to install an effluent discharge line from the injection/multi-phase treatment trailer location beneath Lamar Canal to an existing sewer line.
- Connecting the effluent discharge line to the existing sewer line leading to the HAAF WWTP.

MAE2 wet-tested the injection/MPE and treatment system prior to delivery. The system trailer arrived on-site on August 1, 2011.

4.2 INJECTION WELL INSTALLATION

Between July 27 and August 1, 2011, nine angled injection wells were installed at locations surrounding AST 7009 (Figure 3). To intercept the sand foundation beneath AST 7009, each injection well was installed at an angle ranging from approximately 32° to 40° from horizontal (Table 1). A 3-in. hand auger was used to bore approximately 9 ft into the subsurface at each injection well location, with the exception of BFF-1J. A power auger was used to complete the boring for BFF-1J due to extremely tight soil and the presence of wood at approximately 6 ft (3.3 ft BGS). Injection wells were constructed of 1-in. Schedule 40 polyvinyl chloride (PVC) with a 5-ft pre-packed screen.

The injection design presented in Addendum #28 to the WP (SAIC 2011b) was based upon injections into a 5-ft screened interval of fine-grained sand. However, the borings conducted during angled injection well installation activities encountered hard-packed soil coated with crystallized oil. Initial injections into the angled wells failed to penetrate the tight, oil-coated soil; instead, the injection solution took the path of least resistance back up toward the ground surface, short-circuiting the system. Daylighting of the injected solution was observed between the concrete walkway and the AST.

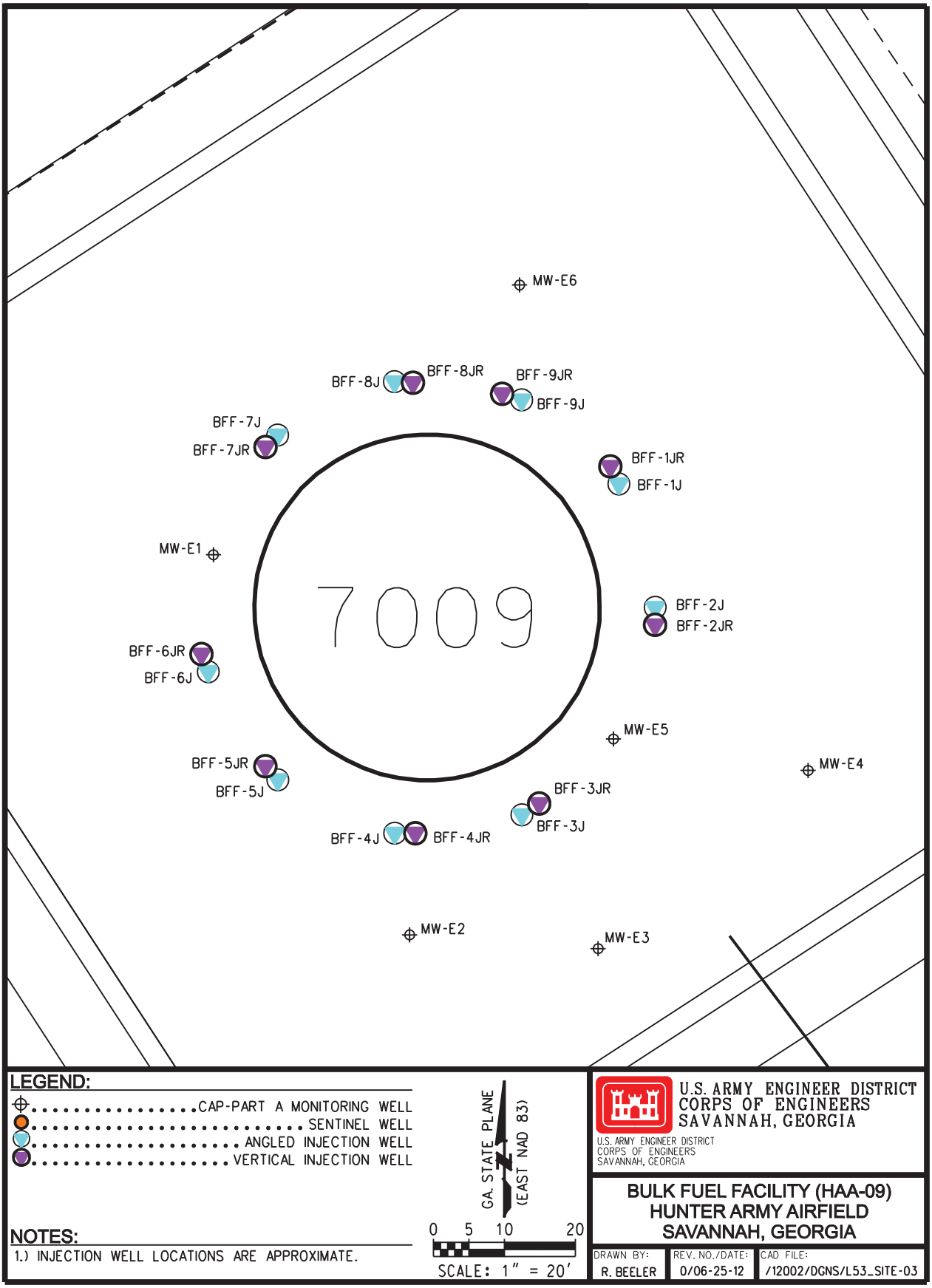

Figure 3. Locations of Pilot Study Injection and Extraction Wells

Table 1. Pilot Study Injection Wells Installed at AST 7009

Initial Injection Well ID	Date of Installation	Angle of Installation[a]	Screened Interval[b]		Replacement Well ID	Date of Installation	Screened Interval
			ft	ft BGS			(ft BGS)
BFF-1J	07/27/11	33°	3.5 – 8.5	2.0 – 4.9	BFF-1JR	10/12/11	4.7 – 9.7
BFF-2J	07/27/11	40°	3.5 – 8.5	2.3 – 5.5	BFF-2JR	09/08/11	4.2 – 9.2
BFF-3J	07/27/11	32°	3.5 – 8.5	1.9 – 4.5	BFF-3JR	09/09/11	4.0 – 9.0
BFF-4J	07/28/11	35°	3.7 – 8.7	2.1 – 5.0	BFF-4JR	10/13/11	4.7 – 9.7
BFF-5J	07/28/11	35°	3.5 – 8.5	2.0 – 4.9	BFF-5JR	10/13/11	4.7 – 9.7
BFF-6J	07/29/11	32°	4.0 – 9.0	2.1 – 4.8	BFF-6JR	09/08/11	4.3 – 9.3
BFF-7J	07/29/11	33°	3.5 – 8.5	1.9 – 4.6	BFF-7JR	09/07/11	4.0 – 9.0
BFF-8J	07/29/11	33°	3.9 – 8.9	2.1 – 4.8	BFF-8JR	10/12/11	4.7 – 9.7
BFF-9J	08/01/11	33°	3.9 – 8.9	2.1 – 4.8	BFF-9JR	10/12/11	4.7 – 9.7

[a] Number of degrees from horizontal.
[b] Screened interval in feet represents the distance along the boring at the angle of installation; screened interval in feet BGS has been adjusted to reflect the true vertical depth.
AST = Aboveground storage tank.
BGS = Below ground surface.

Due to the shallow screened interval of the angled wells and the encountered subsurface conditions, the initial angled injection wells were abandoned and vertical replacement wells installed as replacements. The replacement vertical injection wells were installed to approximately 9 to 10 ft BGS and were constructed of 1-in. Schedule 40 PVC with a 5-ft pre-packed screen. Screened intervals and installation dates for each of the replacement injection wells are shown in Table 1.

5.0 ACTIVE TREATMENT

The injection/MPE and treatment system became operational on August 15, 2011. Injections and extraction activities were conducted in symphony with each other, each for appropriate lengths of time and at appropriate intervals to avoid the creation of significant groundwater mounds or cones of depression in local groundwater and to prevent migration of the injected surfactant solution.

5.1 INJECTION

An initial solution of water and 5% Biosolve (by volume) was injected into the angled injection wells (BFF-1J through BFF-9J) beginning on August 18, 2011. Injection locations were transferred to the replacement injection wells (BFF-1JR through BFF-9JR) as they were installed (September/October 2011).

Injection rates ranged up to 1 gallon per minute (gpm) per well, but flow rates of approximately 0.4 to 0.6 gpm were most common. Pressures ranged from approximately 1 to 13 pounds per square inch at each well during injections.

The Biosolve concentration in the injection solution dropped early in the injection process (by September 2011) due to its viscosity and subsequent problems with the metering pump. The pump was

replaced in October 2011, but an approximately 2% Biosolve concentration was maintained for the injection solution for the remainder of injections.

Injection activities stopped on January 14, 2012; approximately 49,000 total gal of surfactant solution (including approximately 990 gal of Biosolve) had been injected within the vicinity of AST 7009.

5.2 EXTRACTION AND TREATMENT

Beginning on August 15, 2011, a few days before initial injections, groundwater was extracted from the two designated extraction wells (BF-MW-E1 and BF-MW-E5) through an applied vacuum of approximately 21 in. of mercury. Extraction activities continued in conjunction with injection activities until January 14, 2012. The system remained off for approximately 6 weeks (January 14 through February 24, 2012) to allow for planned cleanout of the frac tank and groundwater wells to re-equilibrate. On February 24, 2012, extraction activities were resumed and continued until April 24, 2012.

5.3 OPERATION AND MAINTENANCE

Operation and maintenance (O&M) activities were conducted by MAE2 as required from August 2011 through April 2012. These activities included the cleaning and backwashing of system components, conducting repairs, installing replacement parts and filters, responding to system alarms, and re-filling the surfactant tank.

5.4 EFFLUENT SAMPLING

Initial discharge from the treatment system was sent to a 20,000-gal Baker tank and sampled to ensure compliance with HAAF WWTP water acceptance criteria. Analytical results are summarized in Table 2. Approval to discharge to the HAAF WWTP was obtained from the Directorate of Public Works on September 29, 2011. Upon approval, the contents of the Baker tank were discharged to the HAAF WWTP. The Baker tank was removed from the site and effluent from the treatment system began discharging directly to the HAAF WWTP.

Effluent sampling was conducted twice a month on average throughout the active phase of the pilot study (beginning in September 2011 through April 2012). Samples were collected from a varied combination of the following sample ports located within the treatment train:

- SP109, located between the frac tank and the OWS;
- SP402, located at the air stripper discharge prior to exiting into the atmosphere;
- SP602, located between the polymer absorber and the organo/clay vessel;
- SP801, located prior to the two liquid-phase carbon filters;
- SP802, located between the two liquid-phase carbon filters; and
- SP803, located after the second liquid-phase carbon filter.

An air sample from SP402 was collected each month and analyzed for VOCs. Liquid-phase effluent samples collected from the other listed sample ports were analyzed primarily for total petroleum hydrocarbons: however, samples from SP803 also were analyzed for VOCs, biochemical and chemical oxygen demand, hardness, phenols, iron, pH, total dissolved and suspended solids, and oil and grease. Preliminary analytical results were shared with stakeholders through letter reports following each sampling event. Validated analytical results are presented in Tables 3 through 5.

Table 2. Analytical Results of Initial Liquid-Phase Effluent Sample

Sample ID	BAKERTANK	
Date	**08/17/11**	**Units**
Volatile Organic Compounds[a]		
Carbon Disulfide	1.97 J	µg/L
Inorganics[a]		
Iron	160	µg/L
Petroleum Hydrocarbons		
Diesel-Range Organics	200 U	µg/L
Gasoline-Range Organics	50 U	µg/L
Miscellaneous		
Biological Oxygen Demand	1.00 UJ	mg/L
Chemical Oxygen Demand	26.4	mg/L
Oil and Grease	1.63 UJ	mg/L
pH	7.84	SU
Total Hardness (as $CaCO_3$)	130	mg/L
Total Dissolved Solids	267	mg/L
Total Suspended Solids	0.606 U	mg/L
Total Phenols	1.60 U	µg/L

[a] Only detected analytes are shown for this analysis.
$CaCO_3$ = Calcium carbonate.
SU = Standard unit.
Qualifiers:
J = Estimated concentration.
U = Not detected at the concentration shown.
UJ = Not detected at the estimated concentration shown.

Table 3. Analytical Results for Air Samples

Sample ID	AIRSTART	BF40209BA	BF40210BA	BF40211BA	BF40212BA	BF40201BA	BF40203BA
Station	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**
Date	**8/18/2011**	**9/29/2011**	**10/27/2011**	**11/30/2011**	**12/29/2011**	**3/2/2012**	**3/30/2012**
Media	**Air**	**Air**	**Air**	**Air**	**Air**	**Air**	**Air**
Sample Type	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Volatile Organic Compounds (ppb$_v$)							
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.25 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	1 U	0.25 U	0.25 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.06 J
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	0.8 U	0.25 U	0.25 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.25 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	0.5 U	0.25 U	0.25 U
1,2,4-Trichlorobenzene	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.25 U
1,2,4-Trimethylbenzene	7700 J	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.25 U
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.25 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.25 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
1,3,5-Trimethylbenzene	2800 J	NA	NA	NA	NA	NA	NA
1,3-Butadiene	5 U	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U	0.8 U	0.25 U	0.25 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
1,4-Dioxane	5 U	5 U	5 U	5 U	0.9 U	0.25 U	0.25 U
1-Ethyl-4-methylbenzene	2600 J	NA	NA	NA	NA	NA	NA
2,2,4-Trimethylpentane	36000 J	NA	NA	NA	NA	NA	NA
2-Butanone	5 U	5 U	1.1 J	5 U	1.1 J	1.1 =	2.1 =
2-Hexanone	5 U	5 U	5 U	5 U	0.8 U	0.25 U	0.35 J
2-Methyl-2-propanol	5 U	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
Acetone	2400 J	31 =	30 J	18 J	61 J	11 =	18 J
Allyl chloride	5 U	NA	NA	NA	NA	NA	NA
Benzene	64 J	5 U	14 J	3.6 J	4.7 J	2.1 =	0.33 J
Bromodichloromethane	5 U	5 U	5 U	5 U	0.5 U	0.25 U	0.25 U
Bromoethene	5 U	NA	NA	NA	NA	NA	NA
Bromoform	5 U	5 U	5 U	5 U	0.5 U	0.25 U	0.25 U
Bromomethane	5 U	5 U	5 U	5 U	0.3 U	0.25 U	0.41 J
Carbon disulfide	10 J	5 U	3.9 J	1.2 J	2.9 J	0.21 J	0.07 J
Carbon tetrachloride	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.06 J
Chlorobenzene	5 U	5 U	5 U	5 U	0.9 U	0.25 U	0.25 U
Chloroethane	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.15 J
Chloroform	5 U	5 U	5 U	5 U	0.2 U	0.25 U	0.25 U
Chloromethane	5 U	5 U	5 U	5 U	0.6 U	0.42 J	0.76 =
cis-1,2-Dichloroethene	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
Cyclohexane	1300 J	40 =	280 =	65 J	100 J	0.23 J	0.31 J
Dibromochloromethane	5 U	5 U	5 U	5 U	0.5 U	0.25 U	0.25 U
Dichlorodifluoromethane	5 U	5 U	5 U	5 U	0.4 U	0.31 J	0.39 J
Dichlorotetrafluoroethane	5 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	2000 J	6.6 =	15 J	3.2 J	17 J	0.11 J	0.24 J
Heptane	390 J	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	5 U	NA	NA	NA	NA	NA	NA
Hexane	480 J	NA	NA	NA	NA	NA	NA
m,p-Xylene	3800 J	32 =	54 J	11 =	43 J	0.21 J	0.57 J
Methyl methacrylate	5 U	NA	NA	NA	NA	NA	NA
Methylene chloride	5 U	3.1 J	1.7 J	1.9 J	1.9 J	0.3 J	1.2 =
o-Chlorotoluene	5 U	NA	NA	NA	NA	NA	NA
o-Xylene	73 J	5 U	15 J	3.1 J	5.4 J	0.25 U	0.18 J
Styrene	5 U	5 U	5 U	5 U	0.7 U	1.1 =	0.4 UJ
tert-Butyl methyl ether	5 U	5 U	5 U	5 U	0.5 U	0.25 U	0.25 U

Table 3. Analytical Results for Air Samples (continued)

Sample ID	AIRSTART	BF40209BA	BF40210BA	BF40211BA	BF40212BA	BF40201BA	BF40203BA
Station	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**	**SP402**
Date	**8/18/2011**	**9/29/2011**	**10/27/2011**	**11/30/2011**	**12/29/2011**	**3/2/2012**	**3/30/2012**
Media	**Air**	**Air**	**Air**	**Air**	**Air**	**Air**	**Air**
Sample Type	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**	**Grab**
Volatile Organic Compounds (ppb_v)							
Tetrachloroethene	5 U	5 U	5 U	5 U	0.3 U	0.25 U	0.06 J
Tetrahydrofuran	5 U	NA	NA	NA	NA	NA	NA
Toluene	5 U	5 U	5 U	5 U	0.5 U	0.44 J	2.6 J
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	0.6 U	0.25 U	0.25 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.25 UJ
Trichloroethene	5 U	5 U	5 U	5 U	0.4 U	0.25 U	0.25 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	0.4 U	0.2 J	0.2 J
Vinyl chloride	5 U	5 U	5 U	5 U	0.7 U	0.25 U	0.25 U

pppbv = parts per billion by volume
NA = Not analyzed.
Data Qualifiers:
J - Estimated concentration.
= - Detected at the concentration shown.
U = Not detected at the reporting limit shown.

Table 4. Analytical Results for Liquid-Phase Effluent Within Treatment Train

Sample ID	SP109	SP602	SP602	SP602	SP602	SP602	SP801	SP801
Station	BF10904AE	BF60208BE	BF60209AE	BF60209BE	BF60212BE	BF60203BE	BF80108BE	BF80109AE
Date	4/17/2012	8/30/2011	9/15/2011	9/29/2011	12/29/2011	3/30/2012	8/30/2011	9/15/2011
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Total Petroleum Hydrocarbons								
Diesel Range Organics (mg/L)	203 =	0.969 =	3.57 J	21.9 J	88.9 =	42 =	8.59 J	0.915 =
Gasoline Range Organics (µg/L)	1740 =	57.7 =	14.6 J	24.9 J	502 =	501 =	51 =	50 U

Sample ID	SP801	SP801	SP801	SP801	SP801	SP801	SP801	SP801
Station	BF80109BE	BF80110AE	BF80111AE	BF80111BE	BF80112AE	BF80112BE	BF80101BE	BF80103AE
Date	9/29/2011	10/26/2011	11/16/2011	11/30/2011	12/15/2011	12/29/2011	3/2/2012	3/19/2012
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Total Petroleum Hydrocarbons								
Diesel Range Organics (mg/L)	32.2 J	15.5 J	14.8 J	27.5 =	3.13 J	91.3 =	5.71 J	0.841 =
Gasoline Range Organics (µg/L)	81.5 =	63.3 =	50 U	16.8 J	13.9 J	561 =	16.3 J	33.2 J

Sample ID	SP801	SP801	SP802	SP802	SP802	SP802	SP802	SP802
Station	BF80103BE	BF80104AE	BF80208BE	BF80209AE	BF80209BE	BF80210AE	BF80211AE	BF80211BE
Date	3/30/2012	4/17/2012	8/30/2011	9/15/2011	9/29/2011	10/26/2011	11/16/2011	11/30/2011
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Total Petroleum Hydrocarbons								
Diesel Range Organics (mg/L)	2.85 =	NA	1.7 =	1 =	3.9 J	2.52 =	9.33 J	17.5 =
Gasoline Range Organics (µg/L)	16 J	55.6 =	50 U	50 U	20 J	50 U	50 U	15.4 J

Sample ID	SP802	SP802	SP802	SP802
Station	BF80212AE	BF80212BE	BF80203AE	BF80203BE
Date	12/15/2011	12/29/2011	3/19/2012	3/30/2012
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab
Total Petroleum Hydrocarbons				
Diesel Range Organics (mg/L)	9.71 =	16.9 =	4.17 J	1.56 =
Gasoline Range Organics (µg/L)	18.1 J	224 =	50 U	50 U

mg/L = milligrams per liter
NA = Not analyzed.
µg/L = micrograms per liter

Data Qualifiers:
J - Estimated concentration.
= - Detected at the concentration shown.
U = Not detected at the reporting limit shown.

Table 5. Analytical Results for Liquid-Phase Effluent from SP803

Sample ID	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803
Station	BF80308BE	BF80309AE	BF80309BE	BF80310AE	BF80311AE	BF80311BE	BF80312AE	BF80312BE	BF80301BE	BF80303AE	BF80303BE	BF80304AE
Date	8/30/2011	9/15/2011	9/29/2011	10/26/2011	11/15/2011	11/30/2011	12/15/2011	12/29/2011	3/2/2012	3/19/2012	3/30/2012	4/17/2012
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Total Petroleum Hydrocarbons												
Diesel Range Organics (mg/L)	0.804 =	0.582 =	9.27 J	1.13 =	6.28 J	10.6 =	7.05 J	9.59 =	0.898 =	1.91 =	0.611 =	1.48 =
Gasoline Range Organics (µg/L)	50 U	50 U	11.2 J	50 U	50 U	50 U	50 U	36.7 J	50 U	30.8 J	50 U	83 =
Volatile Organic Compounds (µg/L)												
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
1,2-Dibromo-3-chloropropane	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Butanone	2.24 J	5 U	5 U	5 UJ	5 U	5 U	1.77 J	5 U	2.48 J	59.1 =	4.88 J	139 =
2-Hexanone	5 UJ	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.29 J	5 U	2.31 J
Acetone	8.14 J	5.71 =	5 U	2.14 J	5 UJ	30.5 J	56.6 J	2.8 J	71 J	146 J	145 J	151 =
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	18 =	5 U	3.5 J	5 U	5 U	5 U	5 U	5 U	5 U	21.2 =	2.13 J	7.8 =
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1.14 =	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cumene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.35 J
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl acetate	5 U	5 U	5 U	5 U	5 U	5 U	1.37 J	5 U	5 U	5 UJ	5 U	5 U
Methylcyclohexane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5. Analytical Results for Liquid-Phase Effluent from SP803 (continued)

Sample ID	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803	SP803
Station	BF80308BE	BF80309AE	BF80309BE	BF80310AE	BF80311AE	BF80311BE	BF80312AE	BF80312BE	BF80301BE	BF80303AE	BF80303BE	BF80304AE
Date	8/30/2011	9/15/2011	9/29/2011	10/26/2011	11/15/2011	11/30/2011	12/15/2011	12/29/2011	3/2/2012	3/19/2012	3/30/2012	4/17/2012
Media	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent	Liquid-Phase Effluent
Sample Type	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
tert-Butyl methyl ether	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorotrifluoroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3 U	3 U
Miscellaneous												
Bichemical Oxygen Demand (mg/L)	1.52 J	1.64 J	4.06 =	1.28 J	3.59 J	15.4 J	30.7 J	30.6 =	4.29 =	5.2 J	5.16 =	5.88 J
Chemical Oxygen Demand (mg/L)	52.4 =	60.4 =	66.5 =	32.4 =	53.1 =	149 =	187 =	118 =	65.5 =	83.7 =	61.7 =	107 =
Hardness (mg/L)	152 =	198 =	188 =	165 =	198 =	148 =	99.9 J	99.5 =	149 =	144 =	122 =	198 =
Phenols (µg/L)	3.24 J	5 U	5 U	3.88 J	7.94 U	22.2 =	4.79 J	5.52 =	5 U	5 U	5 U	2.14 J
Iron (µg/L)	100 =	14200 =	1980 =	283 J	1600 =	10700 =	9020 =	2710 =	1080 =	1170 =	1850 =	3400 =
pH (S.U.)	7.69 J	6.3 J	7.25 J	7.97 J	7.56 J	6.72 J	6.66 J	6.21 J	7.48 J	7.58 J	7.78 J	7.63 J
Total Dissolved Solids (mg/L)	286 =	394 =	321 =	327 =	321 =	263 =	307 =	297 =	323 =	298 =	317 =	284 =
Total Suspended Solids (mg/L)	1.31 U	3.33 U	3.2 J	2.58 U	1.69 J	34.4 =	1.63 J	5.08 J	16.6 =	5.87 J	2.97 =	1.23 J
Oil and Grease (mg/L)	1.58 J	1.63 J	10.7 =	2.15 J	8.39 =	17.8 =	4.61 J	5.81 =	1.92 J	4.85 U	1.79 J	4.78 U

mg/L = milligrams per liter
S.U. = standard units
µg/L = micrograms per liter
Data Qualifiers:
J - Estimated concentration.
= - Detected at the concentration shown.
U = Not detected at the reporting limit shown.

These analytical results were collected to demonstrate compliance with HAAF WWTP water acceptance criteria throughout the period of operations and to assist in early detection of potential issues such as iron-fouling of the treatment system. No problems were indicated by analytical results obtained during the pilot study active treatment phase.

5.5 SYSTEM SHUTDOWN

In mid-April 2012, SAIC and USACE agreed to terminate the pilot study treatment phase; the MPE and treatment system was turned off on April 24, 2012. MAE2 disconnected connections to injection and extraction wells, drained lines within and connected to the treatment trailer, and powered down the system.

From August 2011 through April 2012, the injection/MPE and treatment system used approximately 81,000 gal of potable water, which was obtained through an on-site fire hydrant. Approximately 545,000 gal of treated effluent was discharged to the HAAF WWTP.

On June 6, 2012, MAE2 returned to the site to disconnect all plumbing, pumps, and electrical components associated with the Baker frac tank in preparation for its pickup.

5.6 CONTAMINANT RECOVERY

5.6.1 Method of Calculation

The primary purpose of the pilot study was to solubilize and/or mobilize free product contained within the subsurface in the vicinity of AST 7009. Extracted media (primarily liquid phase) contained both free product and petroleum degradation products, which were both seen in the frac tank and OWS (free product) and in the sand filters (petroleum degradation products). In theory, the amount of contaminant material extracted from the ground over the course of a given time period can be calculated from the following four items:

- The amount of dissolved-phase, free product, and related particulates remaining within the frac tank when the treatment system is stopped.
- The amount of free product captured by the OWS during treatment.
- The amount of dissolved-phase contamination within the extracted media destroyed or captured by the treatment system.
- The amount of remaining dissolved-phase contaminant constituents detected in the effluent discharging to the HAAF WWTP at the end of the treatment train.

The first two entries above are volumes that can easily be obtained by field measurement.

The third and fourth entries above, however, require assumptions regarding the specific chemicals that make up the JP-4 contamination at AST 7009. If, for instance, benzene was a primary constituent of the contamination (likely an untrue assumption, as JP-4 contained <0.5% benzene), the amount of benzene in extracted groundwater could be used to extrapolate the volume of JP-4 contamination removed (ATSDR 1993). This approach assumes that the benzene detected in the dissolved phase is accompanied by all the other chemicals that made up the initial contaminant source in the dissolved phase. For

example, if benzene represented 50% of the makeup of JP-4 (by mass), and benzene was detected at 10 µg/L in extracted groundwater, a reasonable conclusion could be that 20 µg of contamination was removed within each liter of extracted groundwater.

Two issues arise that make the third and fourth entries above particularly difficult to estimate in the context of this pilot study. First, JP-4 was a 50-50 kerosene blend made from a complex mixture of hydrocarbons. Depending on the origin of the crude oil and the production method, there could be considerable compositional variety between fuel oils of the same grade (USAF 1988). A list of typical hydrocarbons present in JP-4 listed in the *Toxicological Profile for Jet Fuels JP-4 and JP-7* covers three pages, yet the weight percentages listed do not come close to equaling 100% (ATSDR 1995). Therefore, it is difficult to equate one or more petroleum hydrocarbons with a specific mass percentage that those petroleum hydrocarbons represented in original JP-4 source material.

Secondly, dissolved-phase contamination has never been an issue in the groundwater beneath AST 7009. Primary JP-4 chemical ingredients have not been detected at significant concentrations in the dissolved phase, meaning that even with more detailed information on the makeup of JP-4, the amount of total contamination contributed by dissolved-phase chemicals is likely negligible. The primary indicator of how much contaminant was recovered by the extraction system must be the volume of recovered free product.

5.6.2 Volume Recovered

In January 2012, the treatment system was temporarily shut down following the completion of injection activities. Approximately 700 gal of free product had been recovered within the frac tank at that time.

The frac tank was pumped out on February 13, 2012. Between then and shutdown in April 2012, no additional measureable free product accumulated within the tank.

In theory, oil collected in the OWS during treatment operations would have been skimmed into the 55-gal product recovery drum; in reality, free product present in the treatment system past the point of the frac tank was likely returned to the frac tank during the multiple treatment system cleanings. Sludge resulting from particulate settling was disposed of in May 2012 as described in Chapter 7.0.

Therefore, approximately 700 gal of free product was extracted from the subsurface during the pilot study.

6.0 PERFORMANCE MONITORING

6.1 WELL GAUGING

Table 6 presents water levels and free product thicknesses as measured at extraction wells BF-MW-E1 through BF-MW-E6 between January 30, 2012, and February 2, 2013.

On January 30, 2012, extraction wells BF-MW-E2 through BF-MW-E4 and BF-MW-E6 were gauged; no free product was detected in the four wells. Field personnel lacked the appropriate tool for accessing BF-MW-E1 and BF-MW-E5; therefore, BF-MW-E1 and BF-MW-E5 were gauged 2 days later on February 1, 2012. No free product was detected in either well.

Table 6. Results of Well Gauging from January 30, 2012, through February 2, 2013

Well ID (Screened Interval, ft BGS)	Date	Depth to Water (ft BTOC)	Depth to Product (ft BTOC)	Product Thickness (ft)
BF-MW-E1 (4.6 – 14.6)	02/02/12	NR	NR	NR
	03/19/12	4.70	–	0
	03/30/12	5.03	–	0
	04/17/12	NR	NR	NR
	04/30/12	5.02	–	0
	07/03/12	4.62	–	0
	10/25/12	4.74	–	0
	02/02/13	5.25	–	0
BF-MW-E2 (3.94 – 13.94)	01/30/12	5.38	–	0
	03/19/12	4.75	–	0
	03/30/12	5.07	–	0
	04/17/12	5.00	–	0
	04/30/12	5.07	–	0
	07/03/12	4.39	–	0
	10/25/12	4.56	–	0
	02/02/13	4.91	–	0
BF-MW-E3 (4.4 – 14.4)	01/30/12	6.15	–	0
	03/19/12	5.50	–	0
	03/30/12	5.84	–	0
	04/17/12	5.61	–	0
	04/30/12	5.77	–	0
	07/03/12	4.97	–	0
	10/25/12	5.17	–	0
	02/02/13	5.60	–	0
BF-MW-E4 (4.6 – 14.6)	01/30/12	5.93	–	0
	03/19/12	5.40	–	0
	03/30/12	5.68	–	0
	04/17/12	5.34	–	0
	04/30/12	5.58	–	0
	07/03/12	5.16	–	0
	10/25/12	5.31	–	0
	02/02/13	5.61	–	0
BF-MW-E5 (4.8 – 14.8)	02/02/12	NR	NR	NR
	03/19/12	5.32	–	0
	03/30/12	5.55	–	0
	04/17/12	5.58	–	0
	04/30/12	5.61	–	0
	07/03/12[a]	5.16	5.00	0.16
	10/25/12[b]	5.09	4.98	0.11
	02/02/13[c]	5.29	5.61	0.32

Table 6. Results of Well Gauging from January 30, 2012, through February 2, 2013 (continued)

BF-MW-E6 (3.7 – 13.7)	01/30/12	5.36	–	0
	03/19/12	4.50	–	0
	03/30/12	4.92	–	0
	04/17/12	4.90	–	0
	04/30/12	4.91	–	0
	07/03/12	3.90	–	0
	10/25/12	4.42	–	0
	02/02/13	5.27	–	0

[a]Absorbent sock installed in well BF-MW-E5 on August 7, 2012, after gauging measurements were complete.
[b]Absorbent sock in well BF-MW-E5 was removed prior to the gauging event on October 9, 2012, and a fresh sock was installed on October 25, 2012, after gauging measurements were complete.
[c]Absorbent sock in well BF-MW-E5 was removed on November 29, 2012, prior to sampling, and a fresh sock was installed that same day after sampling was complete. The replacement sock was removed on January 18, 2013, in preparation for gauging on February 2, 2013.
BGS = Below ground surface.
BTOC = Below top of casing.
NR = Not recorded.

Extraction wells BF-MW-E1 through BF-MW-E6 were gauged again on March 19, 2012; March 30, 2012; and April 17, 2012, in conjunction with effluent sampling events. No free product was detected in any of the wells on any of these dates.

Following system shutdown in April 2012, extraction wells BF-MW-E1 through BF-MW-E6 were gauged on a quarterly basis for 1 year. During the first quarterly gauging event on April 30, 2012, no free product was detected in any of the wells.

Free product was detected in BF-MW-E5 during each of the remaining three quarterly gauging events with thicknesses of 0.16 ft on July 3, 2012; 0.11 ft on October 25, 2012; and 0.32 ft on February 2, 2013. Following the recurrence of free product as detected in July 2012, an absorbent sock was placed in BF-MW-E5 on August 7, 2012. The sock was removed approximately 2 weeks before each subsequent gauging event and replaced with a fresh sock following measurements. No fresh sock was installed following the final gauging event on February 2, 2013.

Free product was not detected in any of the remaining five extraction wells during any of the quarterly gauging events.

6.2 GROUNDWATER SAMPLING

Due to active operation of the injection/extraction system, the biannual groundwater sampling event originally planned for late 2011 was delayed 1 year.

On November 29, 2012, groundwater samples were collected from well BF-MW-E5, located within the bermed area of AST 7009, and downgradient sentinel well BF-MW-38. Samples were submitted to an off-site laboratory for analysis of BTEX.

Toluene was detected at an estimated concentration of 0.51 µg/kg in BF-MW-E5; toluene was not detected in BF-MW-38. Benzene, ethylbenzene, and xylene were not detected in either well. Results of the November 2012 sampling event are compared to results of historical sampling events in Table 7.

Table 7. Groundwater Analytical Results for BTEX, 1999 through 2012

Sample Location	Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
CAP-Part A Investigation – December 1999 and January 2000							
BF-MW-25	BF2512	12/02/99	1 U	1 U	1 U	3 U	ND
BF-MW-26	BF2612	12/02/99	1 U	1 U	1 U	3 U	ND
BF-MW-27	BF2712	01/11/00	1 UJ	1 UJ	1 UJ	3 UJ	ND
CAP-Part B Investigation – December 2000							
BF-MW-25	BF2522	12/02/00	1 U	1 U	1 U	3 U	ND
BF-MW-26	BF2622	12/02/00	1 U	1 U	1 U	3 U	ND
BF-MW-27	BF2722	12/03/00	1 U	1 U	1 U	3 U	ND
BF-MW-E1	BFE122	12/01/00	1 U	1 U	0.99 J	0.45 J	1.44
BF-MW-E2	BFE222	12/02/00	1 U	0.3 J	1 U	3 U	0.3
BF-MW-E3	BFE322	12/02/00	1 U	0.48 J	1 U	0.3 J	0.78
BF-MW-E4	BFE422	12/02/00	0.29 J	0.27 J	0.28 J	0.36 J	1.2
BF-MW-E5	BFE522	12/02/00	3.6 =	1 =	17.2 =	19 =	40.8
BF-MW-E6	BFE622	12/01/00	1 U	1 U	1 U	3 U	ND
Third Semiannual Sampling Event – July 2004							
BF-MW-25	BF2552	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-26	BF2652	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-27	BF2752	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-35	BF3552	07/17/04	1 U	1 U	1 U	1 U	ND
BF-MW-36	BF3652	07/17/04	1 U	1 U	1 U	1 U	ND
BF-MW-37	BF3752	07/17/04	1 U	1 U	1 U	1 U	ND
BF-MW-E1	BFE152	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-E2	BFE252	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-E3	BFE352	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-E4	BFE452	07/16/04	1 U	1 U	1 U	1 U	ND
BF-MW-E5	BFE552	07/16/04	2 =	1 U	17.3 =	42.7 =	62.0
BF-MW-E6	BFE652	07/16/04	1 U	1 U	1 U	1 U	ND
In-Stream Water Quality Standards (Georgia Rule 391-3-6.03)			51	200,000	28,718	NRC	NRC
Alternate Concentration Limits			634	—	—	—	—

Table 7. Groundwater Analytical Results for BTEX, 1999 through 2012 (continued)

Sample Location	Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Fourth Semiannual Sampling Event (Release #2) – January 2005							
BF-MW-25	BF2562	01/12/05	1 U	1 U	1 U	1 U	ND
BF-MW-26	BF2662	01/13/05	1 U	1 U	1 U	1 U	ND
BF-MW-27	BF2762	01/13/05	1 U	1 U	1 U	1 U	ND
BF-MW-35	BF3562	01/14/05	1 U	1 U	1 U	1 U	ND
BF-MW-36	BF3662	01/14/05	1 U	1 U	1 U	1 U	ND
BF-MW-37	BF3762	01/14/05	1 U	1 U	1 U	1 U	ND
BF-MW-E1	BFE162	01/13/05	1 U	1 U	1 U	1 U	ND
BF-MW-E2	BFE262	01/13/05	1 U	1 U	1 U	1 U	ND
BF-MW-E3	BFE362	01/13/05	1 U	1 U	1 U	1 U	ND
BF-MW-E4	BFE462	01/13/05	1 U	1 U	1 U	0.9 J	0.9
BF-MW-E5	BFE562	01/13/05	1 U	0.43 J	10.4 =	34.9 =	45.73
BF-MW-E6	BFE662	01/13/05	1 U	0.47 J	1 U	1 U	ND
Sentinel Well Sampling – December 2007							
BF-MW-38	BF3872	12/10/07	1 U	1 U	1 U	1 U	ND
First Biannual Sampling Event – October 2009							
BF-MW-E5	BFE592	10/08/09	3.82 =	0.360 J	34.7 =	69.4 =	108.28
BF-MW-38	BF3892	10/08/09	1 U	1 U	1 U	1 U	ND
Second Biannual Sampling Event – November 2012							
BF-MW-E5	BFE5A2	11/29/12	1 U	0.51 J	1 U	3 U	0.51
BF-MW-38	BF38A2	11/29/12	1 U	1 U	1 U	3 U	ND
In-Stream Water Quality Standards (Georgia Rule 391-3-6.03)			51	200,000	28,718	NRC	NRC
Alternate Concentration Limits			634	—	—	—	—

BTEX = Benzene, toluene, ethylbenzene, and xylenes.
CAP = Corrective Action Plan.
ND = Not detected.
NRC = No regulatory criterion.
Qualifiers:
J = Estimated concentration.
U = Not detected at the concentration shown.
UJ = Not detected at the estimated concentration shown.
'=' = Detected at the concentration shown.

Copies of the chains of custody and validated analytical data are presented in Appendix B.

7.0 REMEDIATION-DERIVED WASTE

Used filter media and petroleum free product collected by the treatment system via the OWS were transported and disposed of by MAE2 as part of O&M and cleanup activities.

Soil remediation-derived waste (RDW) generated during the installation of injection points was containerized in two 55-gal drums. These non-hazardous soil drums were removed from the site on May 24, 2012, and transported for disposal by EQ-Environmental Quality Co (EQ).

The 20,000-gal Baker frac tank was pumped out twice – once on February 13, 2012, following the completion of injection activities, and again on May 24, 2012, following completion of the treatment phase of the pilot study. Accumulated sludge in the Baker frac tank was vacuumed out and transported for disposal, and the tank was pressure-washed in preparation for pickup. In both instances, the non-hazardous material was removed from the site and transported for disposal by EQ.

Copies of the EQ waste manifests are included as Appendix C.

8.0 PROBLEMS ENCOUNTERED

On August 30, 2011, SAIC was notified that there were suds in a holding pond meant to collect surface water runoff within the BFF. Injection activities were temporarily halted. To address concerns of the BFF personnel, SAIC installed a sump pump at the holding basin and agreed to pump any future potentially pilot-study-related surface water directly to the treatment system. No additional reports of impacted water appearing in the holding pond were received.

As noted in the letter report dated March 21, 2012, recurring coating of sand filter media by extracted degraded fuel material was encountered during treatment of extracted groundwater (Stoll 2012). A number of sampling events were affected by this issue, as the process valves for the sand filter media were closed and a sample could not be collected from SP602. However, effluent discharged from the treatment system to the HAAF WWTP continued to meet acceptance criteria, even when the sand filter media was offline. The sand filters were replaced with bag filters on March 20, 2012.

9.0 CONCLUSIONS

Free product was observed consistently in BF-MW-E5 from 2002 through March 2010. Historical EFR® events at BF-MW-E5 from June 18, 2004, through March 15, 2010, recovered a total of approximately 84 gal of free product. However, free product continued to be measured in the well at thicknesses greater than 1/8 in. (0.01 ft). During the four vacuum events conducted in 2009, free product thickness in BF-MW-E5 ranged from 0.46 to 1.95 ft. In March 2010, free product was present in the well at a thickness of 1.28 ft. Other wells within the bermed area of the BFF remained clean, and BTEX and PAH concentrations from all wells within the vicinity of AST 7009 have remained well below applicable regulatory criteria since the first sampling event in 1999.

In 2011, the CAP–Part B Addendum #1 proposed a pilot study with the following objective:

- Remove free product in excess of 1/8 in. by using surfactant flooding to flush the free product from the pore space of the fine-grained sand beneath the AST (SAIC 2011a).

Pilot study activities are being conducted in accordance with the CAP–Part B Addendum #1, which was approved by GA EPD through correspondence dated May 2, 2011 (Guentert 2011). Field activities began with site preparation in July 2011; the injection/MPE and treatment system began operations in August 2011.

Within the first 5 months of operation, approximately 1,000 gal of Biosolve in an average 2% solution were injected to treat one pore volume in the vicinity of AST 7009. By April 2012, the pilot study MPE system recovered approximately five pore volumes of groundwater and surfactant solution containing approximately 700 gal of free product, roughly half the volume estimated to be present in the subsurface. Recovery costs using the MPE system dropped 87% per recovered gallon from historical costs using EFR®.

In mid-April 2012, SAIC and USACE agreed to terminate the pilot study treatment phase; the MPE and treatment system was turned off on April 24, 2012. MAE2 disconnected connections to injection and extraction wells, drained lines within and connected to the treatment trailer, and powered down the system. All RDW has been removed from the site.

Four rounds of quarterly gauging at extraction wells BF-MW-E1 through BF-MW-E6 were performed between April 30, 2012, and February 2, 2013. Results of the most recent three quarterly events show that free product is accumulating in well MW-E5 again, thus indicating that free product is still tied up in the soil column. Results of groundwater sampling conducted in November 2012 confirm that BTEX concentrations remain well below applicable regulatory criteria.

SAIC recommends that a second round of surfactant flushing be performed at the site. This second round of treatment would be similar to the initial treatment in duration. As extraction well BF-MW-E5 is the only impacted well, treatment could target the immediate vicinity of BF-MW-E5. Previous bi-weekly sampling conducted during extraction/treatment operations indicated no issues with discharged effluent concentrations; therefore, reduction of the monitoring frequency during future operations to a monthly basis is recommended.

10.0 REFERENCES

ATSDR (Agency for Toxic Substances and Disease Registry) 1993. *Case Studies in Environmental Medicine: Gasoline Toxicity*, September.

ATSDR 1995. *Toxicological Profile for Jet Fuels JP-4 and JP-7*, June.

Guentert, James S. 2011. Letter to Thomas C. Fry (Fort Stewart Directorate of Public Works Environmental Branch) regarding approval of the Corrective Action Plan–Part B Addendum for AST 7009, Bulk Fuel Facility (HAA-09), May 2.

Lewis, Lisa L. 2003. Letter to Thomas C. Fry (Fort Stewart Directorate of Public Works Environmental Branch) regarding approval of no further action for Release #1 and proceed with corrective action on Release #2, October 6.

Logan, William 2008. Letter to Algeana Stevenson (Fort Stewart Directorate of Public Works Environmental Branch) regarding review comments on the Third Annual Monitoring and Free Product Removal Report, February 28.

SAIC (Science Applications International Corporation) 1999. *Soil Gas Survey Report for the Bulk Fuel Facility (HAA-09) at Hunter Army Airfield, Georgia,* November.

SAIC 2000. *Corrective Action Plan–Part A Report for the Former Underground Storage Tank 117, Building 7002 Site, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*1, Hunter Army Airfield, Georgia,* Oak Ridge, TN, June.

SAIC 2001. *Corrective Action Plan–Part B Report for the Former Underground Storage Tank 117, Building 7002 Site, Bulk Fuel Facility (HAA-09), Facility ID #9-025113*1, Hunter Army Airfield, Georgia,* Oak Ridge, TN. July.

SAIC 2007. *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,* September.

SAIC 2011a. *Corrective Action Plan–Part B Addendum #1, Bulk Fuel Facility (HAA-09), Building 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2,* April.

SAIC 2011b. *Addendum #28 to the Work Plan for Preliminary Groundwater and Corrective Action Plan–Part A/Part B Investigations at Former Underground Storage Tank Sites, Hunter Army Airfield and Fort Stewart, Georgia,* May.

SAIC 2012a. *Pilot Study Interim Progress Report for Corrective Actions at Bulk Fuel Facility (HA-009), Former UST 117, AST 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2,* Final, January.

SAIC 2012b. *Pilot Study Interim Progress Report #2 for Corrective Actions at Bulk Fuel Facility (HA-009), Former UST 117, AST 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113*2,* Final, September.

Stoll, Patricia 2012. Letter to Ana Vergara (U. S. Army Corps of Engineers, Savannah District) regarding April 17, 2012, sampling results for the product recovery pilot study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009 at Hunter Army Airfield, Georgia, March 21.

USAF (U.S. Air Force) 1988. *Environmental fate and effects of shale-derived jet fuel,* Report No. ESL-TR-87-09, Tyndall Air Force Base, FL: Engineering and Services Laboratory, Air Force Engineering and Services Center, U.S. Environmental Protection Agency, Environmental Research Laboratory, Gulf Breeze, FL, Document No. AD-A197683, ~1-19, 80-87.

APPENDIX A

UNDERGROUND INJECTION CONTROL REQUESTS AND APPROVAL

Jill M. Kovalchik

From: Stoll, Patty
Sent: Wednesday, September 21, 2011 3:53 PM
To: Kovalchik, Jill M.
Subject: FW: Hunter Army Airfield Temporary UIC Permit for Bulk FuelFacility

Patty Stoll | SAIC
Project Manager | Energy, Engineering & Infrastructure Business Unit (E2I)
phone: 865.481.8792 | fax 865.482.7257
mobile: 865.556.9421 | email: patricia.a.stoll@saic.com

-----Original Message-----
From: Bijan Rahbar [mailto:Bijan.Rahbar@dnr.state.ga.us]
Sent: Tuesday, July 26, 2011 11:49 AM
To: Algeana L CIV US USA Stevenson
Cc: Stoll, Patty
Subject: Re: Hunter Army Airfield Temporary UIC Permit for Bulk FuelFacility

I reviewed the attached pilot test notification form and the approval letter from the solid waste program. We have no objections to the notification and you may begin the field activities. Please note that 90-day approval window starts from the date that injection begins.
Thanks, Bijan

>>> "Stevenson, Algeana L CIV US USA" <algeana.stevenson@us.army.mil> 7/26/2011 11:22 am >>>
Mr. Rahbar,
Attached is an electronic copy of a request for a temporary UIC permit at the Bulk Fuel Facility Release 2 area located on Hunter Army Airfield.

A hard copy is being forwarded via certified mail. I've also, attached the approval letter from the GA EPD Solid Waste Management Program of the proposed Work Plan. Patty Stoll from SAIC the contractor for this site asked me to forward this to you per your conversation authorizing the receipt of an electronic copy.

Algeana L. Stevenson
Remediation Section Leader
DPW Prevention and Compliance Branch
1550 Frank Cochran Drive, Bldg. # 1137
Ft. Stewart, GA 31314-4927
* Work: (912) 315-5144
* Cell: (912) 210-2950
* Fax: (912) 315-5148
"ROCK"
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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, US ARMY GARRISON, FORT STEWART/HUNTER army AIRFIELD
DIRECTORATE OF PUBLIC WORKS
1587 FRANK COCHRAN DRIVE
FORT STEWART. GEORGIA 31314-5048

REPLY TO
ATTENTION OF

Office of the Directorate

July 26, 2011

CERTIFIED MAIL
7010 2780 0001 4428 1913

Georgia Department of Natural Resources
Environmental Protection Division
Regulatory Support Program
Watershed Protection Branch, Room 400
Attn: Mr. Bijan Rahbar, PhD
19 Martin Luther King Jr. Dr., S.W.
Atlanta, Georgia 30334

Dear Mr. Rahbar:

Fort Stewart is pleased to submit to the Georgia Environmental Protection Division (GA EPD) the temporary permit request for the Injection Well Operating Permit Application, Facility ID#9-025113*2, Hunter Army Airfield, Savannah, Georgia, for your review and approval.

In accordance with the Federal Code of Regulations, Section 270.11(d), the following certification is provided by the Installation:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments 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,

Tressa M Rutland

Robert R. Baumgardt
Director, Public Works

Enclosure

1.0 Address FACILITY: OPERATOR:
1.1 Name **Hunter Army Air Field Bulk Fuel Facility** **United States Army**
1.2 Street Address **Building 7009, Perimeter Road** **Mr. Thomas Fry**
1.3 City, State **Hunter Army Air Field, Savannah, GA** **Chief Environmental Division**
1.4 ZIP CODE **31405**
1.5 Telephone Num. **(912) 767-2010**

2.0 LOCATION: Latitude: **32° 01' 45" (approximate center of site)**
Longitude: **81° 08' 40" (approximate center of site)**

3.0 What is the contaminant in the Ground Water? **Free product (LNAPL)**

4.0 Georgia Licensed Water Well Contractor or Bonded Driller: **N/A, wells will be hand-augered under supervision of a Georgia P.G.**

5.0 Professional Engineer or Geologist: **Patricia Stoll, P.E. and Wayne Parker, P.G.**

6.0 Well Data Table

		Injection Wells	Monitoring Wells
6.1	Number Wells	**Nine (9) – proposed**	**Two (2) extraction wells – existing wells MW-E1 and MW-E5**
6.2	Well Depth(s)	**approx. 6 ft bgs**	**14 ft bgs**
6.3	Well Diameter	**1-inch**	**2-inch**
6.4	Air volume in/out	**IN: 2,000 gal of surfactant (for all 9 wells) and a maximum of 2,800 gal of water per day (for all 9 wells)**	**OUT: Maximum 7,800 gal per day (both wells)**
6.5	Sampling freq	**Not Applicable**	**Bi-weekly**

7.0 Responsible EPD Associate for site: **Jim Guentert of the Solid Waste Program**

8.0 Date injection started: **August 3, 2011 (anticipated)**
8.1 Date* injection stopped: **Surfactant on or before September 3, 2011 (anticipated); Potable water: at completion of Pilot Study (estimated at 6 months)**
8.2 Reason Injection Stopped? **Completion of pilot study**
8.3 Date these injection wells were logged in to the UIC Class V.Well Inventory and file: **Not Applicable**

9.0 UIC Class V Well Inventory Number: **Not Applicable**
10.0 UST/HWMB CAP tracking number: **Facility ID #9-025113*2**
11.0 Pending UIC Class V Permit Number: **Not Applicable**

*Note: This pilot test well form is only valid for 90 days from the start of injection.
**Submit this form to:
Georgia Environmental Protection Division
Regulatory Support Program
UIC Unit
Suite 1062 East Tower
2 M.L.King Jr. Dr.
Atlanta, Georgia, 30334

Bijan Rahbar

From: McGowan, Jimmie M CIV US USA IMCOM [Jimmie.McGowanjr@us.army.mil]
Sent: Tuesday, November 08, 2011 8:32 AM
To: Bijan Rahbar
Cc: Stoll, Patty; Stevenson, Algeana L CIV US USA; Kiefer, Dale F CTR US USA FORSCOM
Subject: RE: Hunter Army Airfield Temporary UIC Permit for Bulk FuelFacility (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Mr. Rahbar,

Fort Stewart is respectfully requesting an additional 90-day extension to the Bulk Fuel Facility (HAA-09 Release #2) Underground Injection Control, Pilot Test Injection Well Notification Permit, located on Hunter Army Airfield. At your earliest convenience, could you please respond with your concurrence to the request of extending the permit for this location. Also, if you need an additional transmittal letter, from the Installation requesting this action, please let me know, and I will assure that one will be routed for approval.

If you have any questions, comments, or concerns, please contact myself or Ms. Algeana Stevenson for further clarification.

Highest Regards,

Jimmie McGowan

Remediation/Restoration and Compliance Division
Versar Inc.
Environmental Division
Directorate of Public Works
(912)-767-2202 (o)
(912)-228-7227 (c)
150*2470*136 (d.c)
(912)-614-5400 (c)

ROCK
"Resources Optimize Compliance Keep Improving"

APPENDIX B

CHAINS OF CUSTODY
AND ANALYTICAL RESULTS

SAIC

151 Lafayette Drive, Oak Ridge, Tennessee 37831(865) 481-4600

~~316032~~ 316042 LH 12/3/12

COC NO.:

CHAIN OF CUSTODY RECORD

PROJECT NAME: Hunter Bulk Fuel Facility

PROJECT NUMBER: 207745.00.00.02.200

PROJECT MANAGER: Patty Stoll

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Road, Charleston, SC 29417

PHONE NO: (843) 556-8171

Sampler (Signature): [signature] (Printed Name): LeAnn McNeal

Sample ID	Date Collected	Time Collected	Matrix	BTEX	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
BFTB13	11/29/12	1400	WATER	3	3		
BF38A2	11/29/12	1415	↓	3	3	0.0 PPM	
BF38A4	11/29/12	1420	↓	3	3	0.0 PPM	
BFE5A2	11/29/12	1545	WATER	3	3	9.8 PPM	

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
[signature] / COMPANY NAME: SES	11/29/12 1630	P. [signature] / COMPANY NAME: GEL	11-30-12 09:15
RECEIVED BY: / COMPANY NAME:	Date/Time	RELINQUISHED BY: / COMPANY NAME:	Date/Time
RELINQUISHED BY: / COMPANY NAME:	Date/Time	RECEIVED BY: / COMPANY NAME:	Date/Time

TOTAL NUMBER OF CONTAINERS: 12

Cooler ID:

Cooler Temperature:

FEDEX NUMBER: 8993 7356 6395

3 business day RUSH TAT Requested

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	316042	**Date Collected:**	11/29/2012 14:15	**Matrix:**	WATER
Lab Sample ID:	316042002	**Date Received:**	11/30/2012 09:15		
		Client:	SAIC117	**Project:**	SAIC01170
Client ID:	BF38A2	**Method:**	SW846 8260B	**SOP Ref:**	GL-OA-E-038
Batch ID:	1267532	**Inst:**	VOA9.I	**Dilution:**	1
Run Date:	12/03/2012 12:39	**Analyst:**	RXY1	**Purge Vol:**	5 mL
Prep Date:	12/03/2012 12:39				
Data File:	120312V9\9P112.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
71-43-2	Benzene	U	1.00	ug/L	0.300		1.00
108-88-3	Toluene	U	1.00	ug/L	0.300		1.00
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300		1.00
1330-20-7	Xylenes (total)	U	3.00	ug/L	0.300		3.00

Page 1 of 1

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	316042	**Date Collected:**	11/29/2012 14:20	**Matrix:**	WATER
Lab Sample ID:	316042003	**Date Received:**	11/30/2012 09:15		
		Client:	SAIC117	**Project:**	SAIC01170
Client ID:	BF38A4	**Method:**	SW846 8260B	**SOP Ref:**	GL-OA-E-038
Batch ID:	1267532	**Inst:**	VOA9.I	**Dilution:**	1
Run Date:	12/03/2012 13:07	**Analyst:**	RXY1	**Purge Vol:**	5 mL
Prep Date:	12/03/2012 13:07				
Data File:	120312V9\9P113.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ	
71-43-2	Benzene	U	1.00	ug/L	0.300		1.00	U
108-88-3	Toluene	U	1.00	ug/L	0.300		1.00	
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300		1.00	
1330-20-7	Xylenes (total)	U	3.00	ug/L	0.300		3.00	U

Volatile

Page 1 of 1

Certificate of Analysis
Sample Summary

SDG Number:	316042	Date Collected:	11/29/2012 15:45	Matrix:	WATER
Lab Sample ID:	316042004	Date Received:	11/30/2012 09:15		
		Client:	SAIC117	Project:	SAIC01170
Client ID:	BFE5A2	Method:	SW846 8260B	SOP Ref:	GL-OA-E-038
Batch ID:	1267532	Inst:	VOA9.I	Dilution:	1
Run Date:	12/03/2012 15:24	Analyst:	RXY1	Purge Vol:	5 mL
Prep Date:	12/03/2012 15:24				
Data File:	120312V9\9P118.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ	
71-43-2	Benzene	U	1.00	ug/L	0.300		1.00	U
108-88-3	Toluene	J	0.510	ug/L	0.300		1.00	J
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300		1.00	U
1330-20-7	Xylenes (total)	U	3.00	ug/L	0.300		3.00	U

Page 1 of 1

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	316042	**Date Collected:**	11/29/2012 14:00	**Matrix:**	WATER
Lab Sample ID:	316042001	**Date Received:**	11/30/2012 09:15		
		Client:	SAIC117	**Project:**	SAIC01170
Client ID:	BFTB13	**Method:**	SW846 8260B	**SOP Ref:**	GL-OA-E-038
Batch ID:	1267532	**Inst:**	VOA9.I	**Dilution:**	1
Run Date:	12/03/2012 11:45	**Analyst:**	RXY1	**Purge Vol:**	5 mL
Prep Date:	12/03/2012 11:45				
Data File:	120312V9\9P110.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ	
71-43-2	Benzene	U	1.00	ug/L	0.300		1.00	U
108-88-3	Toluene	U	1.00	ug/L	0.300		1.00	
100-41-4	Ethylbenzene	U	1.00	ug/L	0.300		1.00	
1330-20-7	Xylenes (total)	U	3.00	ug/L	0.300		3.00	

APPENDIX C

WASTE MANIFESTS

20538

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: GA9 210 020 872

2. Page 1 of: 1

3. Emergency Response Phone: (706) 771-9100

4. Waste Tracking Number: 061168

5. Generator's Name and Mailing Address: DWP ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART, GA 31314
Generator's Phone: (865) 607-8267

Generator's Site Address (if different than mailing address): DWP ENVIRONMENTAL OFFICE-HUNTER ARMY AIR

6. Transporter 1 Company Name: EQ Augusta, Inc.
U.S. EPA ID Number: MIO 000 263 871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ OF AUGUSTA, INC
3920 GOSHEN INDUSTRIAL BLVD.
AUGUSTA, GA 30906
Facility's Phone: (706) 771-9100
U.S. EPA ID Number: GAR 000 011 817

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	NON HAZARDOUS NON DOT REGULATED MATERIAL	001	TT	2,500	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
1 2440 / Non hazardous non regulated

TK101

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Hoana D. Stevenson
Signature:
Month: 2 Day: 13 Year: 12

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: John Coleman
Signature: John Coleman
Month: 2 Day: 13 Year: 12
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: FD CONNER
Signature:
Month: 2 Day: 13 Year: 12

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com

20537 328090

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	GA9 210 020 872	1	(706) 771-9100	061169

5. Generator's Name and Mailing Address: DWP ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART, GA 31314
Generator's Phone: (865) 607-8287

Generator's Site Address (if different than mailing address):
DWP ENVIRONMENTAL OFFICE-HUNTER ARMY AIR

6. Transporter 1 Company Name: EQ Augusta, Inc.
U.S. EPA ID Number: MIO 000 263 871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ OF AUGUSTA, INC
3920 GOSHEN INDUSTRIAL BLVD.
AUGUSTA, GA 30906
Facility's Phone: (706) 771-9100
U.S. EPA ID Number: GAR 000 011 817

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	NON HAZARDOUS NON DOT REGULATED MATERIAL	001	TT	5.000	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
2440 / Non hazardous non regulated

JK101

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Wastes.
Generator's/Offeror's Printed/Typed Name: Hoganab Stevenson
Signature:
Month: 2 Day: 13 Year: 12

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Arthur Weeks
Signature:
Month: 2 Day: 13 Year: 2012
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: EP Colvin
Signature:
Month: 2 Day: 13 Year: 12

169-BLC-I 6 Rev. 8/06

DESIGNATED FACILITY TO GENERATOR

061232

#15380 (2)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
GA9 210 020 872	1	(706) 771-9100	061232

5. Generator's Name and Mailing Address: DPW ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART GA
Generator's Phone: (865) 607-8267

Generator's Site Address (if different than mailing address): DPW ENVIRONMENTAL OFFICE - HUNTER ARMY

6. Transporter 1 Company Name: EQ ~~AUGUSTA, INC~~ ~~ATLANTA, INC~~. ER INDUSTRIAL SERVICES — U.S. EPA ID Number: MID 000 263 871

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address: EQ ~~OF AUGUSTA~~ ATLANTA (UM)
~~3920 GOSHEN INDUSTRIAL BLVD.~~ (UM) 5600 FULTON INDUSTRIAL BLVD.
~~AUGUSTA, GA 30906~~ (UM) ATLANTA, GA 30336
Facility's Phone: ~~(706) 771-9100~~ (UM) (404) 494-3520

U.S. EPA ID Number: ~~GAR 000011817~~ (UM) GAR 000039776

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON HAZARDOUS DOT REGULATED MATERIAL (SOIL)	2	DRUM	1000	P	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
2940 / NON HAZARDOUS - NON REGULATED
A2454DWP-SD1

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Rhonda N. Stevenson — Signature: [signature] — Month 05 Day 24 Year 12

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Raymond Jones — Signature: [signature] — Month 5 Day 24 Year 12
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: JASON SMITH — Signature: [signature] — Month 05 Day 24 Year 12

169-BLC-I 6 Rev. 8/06 — DESIGNATED FACILITY TO GENERATOR

EQ The Environmental Quality Company 1-800-592-8489 www.eqonline.com

EQ The Environmental Quality Company 1-800-592-8489 www.eqonline.com

21150

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
GA9210020872	1	706-771-9100	52412

GENERATOR

5. Generator's Name and Mailing Address: BWP Environmental Office, 1550 Frank Cochran Dr. Bldg 1137, Ft Stewart, GA 31314, Generator's Phone: 912-6078267

Generator's Site Address (if different than mailing address): DOAP Environmental Office Hunter army Air.

6. Transporter 1 Company Name: EQ Augusta, Inc — U.S. EPA ID Number: MTD000263871

7. Transporter 2 Company Name: SWS Environmental — U.S. EPA ID Number: GAR000013086

8. Designated Facility Name and Site Address: EQ of Augusta, Inc, 3920 Goshen Industrial BLVD, Augusta, GA 30906, Facility's Phone: 706-771-9100 — U.S. EPA ID Number:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON Hazardous NON DOT Regulated material	001	TT	3000	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

1. 2440/NON hazardous Non Regulated

TK103

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Algeana D. Stevenson — Signature — Month: 5 — Day: 24 — Year: 12

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Williamson — Signature: Michael Williamson — Month: 5 — Day: 24 — Year: 12

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Antonio Evans — Signature — Month: 5 — Day: 24 — Year: 12

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

21153

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
GA9 210 020 872	1	(706) 771-9100	061285

5. Generator's Name and Mailing Address: DWP ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART, GA 31314
Generator's Phone: (865) 807-8267

Generator's Site Address (if different than mailing address):
DWP ENVIRONMENTAL OFFICE-HUNTER army AIR

6. Transporter 1 Company Name: EQ Augusta, Inc.
U.S. EPA ID Number: MI0 000 263 871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ OF AUGUSTA, INC
3920 GOSHEN INDUSTRIAL BLVD.
AUGUSTA, GA 30906
Facility's Phone: (706) 771-9100
U.S. EPA ID Number: GAR 000 011 817

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZARDOUS NON DOT REGULATED MATERIAL	001	TT	5000	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
2440 / Non hazardous non regulated

TK 103

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Margaret B. Stevenson
Signature:
Month: 5 Day: 24 Year: 12

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: ARTHUR WERKS
Signature:
Month: 5 Day: 24 Year: 12
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: EQ Carrier
Signature:
Month: 5 Day: 24 Year: 12

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com

21151

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
GA9 210 020 872	1	(706) 771-9100	061286

GENERATOR

5. Generator's Name and Mailing Address: DWP ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART, GA 31314
Generator's Phone: (865) 607-8267

Generator's Site Address (if different than mailing address):
DWP ENVIRONMENTAL OFFICE-HUNTER army AIR

6. Transporter 1 Company Name: EQ Augusta, Inc.
U.S. EPA ID Number: MI0 000 263 871

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ OF AUGUSTA, INC
3920 GOSHEN INDUSTRIAL BLVD.
AUGUSTA, GA 30906
Facility's Phone: (706) 771-9100
U.S. EPA ID Number: GAR 000 011 817

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	NON HAZARDOUS NON DOT REGULATED MATERIAL	001	TT	5003	G
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
1. 2440 / Non hazardous non regulated

TK107

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Wastes.
Generator's/Offeror's Printed/Typed Name: Pilgeana D. Stevenson
Signature:
Month 5 Day 24 Year 12

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: John Coleman
Signature:
Month 5 Day 24 Year 12
Transporter 2 Printed/Typed Name: Hugh D. Bouse
Signature:
Month 5 Day 24 Year 12

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Antonio Evans
Signature:
Month 5 Day 24 Year 12

169-BLC-I 6 Rev. 8/06

DESIGNATED FACILITY TO GENERATOR

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com

J-1152

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
GA9210020872	1	(706)771-9100	061325

5. Generator's Name and Mailing Address: DPW ENVIRONMENTAL OFFICE
1550 FRANK COCHRAN DRIVE
BLDG 1137
FORT STEWART, GA 31314
Generator's Phone: (865)607-8267

Generator's Site Address (if different than mailing address): DPW ENVIRONMENTAL OFFICE - HUNTER ARMY AIRFIELD

6. Transporter 1 Company Name: EQ AUGUSTA, INC. — U.S. EPA ID Number: MI0 000 263 871

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: EQ OF AUGUSTA, INC.
3920 GOSHEN INDUSTRIAL BLVD
AUGUSTA GA 30906
Facility's Phone: (706)771-9100
U.S. EPA ID Number: GAR000 011817

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON HAZARDOUS NON DOT REGULATED MATERIAL	001	TT	4758	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
1. 2440/NON HAZARDOUS NON REGULATED

TIR107

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name: Megan D Stevenson — Signature: [signature] — Month/Day/Year: 5/24/12

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: John Coleman — Signature: [signature] — Month/Day/Year: 5/24/12
Transporter 2 Printed/Typed Name — Signature — Month/Day/Year:

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month/Day/Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: EQ Owner — Signature: [signature] — Month/Day/Year: 5/24/12

169-BLC-I 6 Rev. 8/06

DESIGNATED FACILITY TO GENERATOR

EQ The Environmental Quality Company 1-800-592-5489 www.eqonline.com