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PILOT STUDY
INTERIM PROGRESS REPORT
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

January 2012

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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

January 2012

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.

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

CONTENTS

FIGURES

TABLES

ACRONYMS

AST	aboveground storage tank
BFF	Bulk Fuel Facility
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
EFR®	Enhanced Fluid Recovery®
GA EPD	Georgia Environmental Protection Division
GUST	Georgia Underground Storage Tank
HAAF	Hunter Army Airfield
IWQS	In-stream Water Quality Standards
JP	jet propellant
MPE	multi-phase extraction
PAH	polycyclic aromatic hydrocarbon
PVC	polyvinyl chloride
SAIC	Science Applications International Corporation
STL	soil threshold level
UST	underground storage tank
USTMP	Underground Storage Tank Management Program
WWTP	waste water treatment plant

1.0 INTRODUCTION

This document represents the first corrective action progress report for the pilot study being conducted 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). Pilot study activities are being performed by Science Applications International Corporation (SAIC) for the U. S. Army Corps of Engineers, Savannah District under Contract Number W91278-10-D-0089, Task Order Number CV01.

Pilot study activities are being 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). 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.

This document presents the site history and contaminants, summarizes the pilot study installation and startup activities, and discusses field observations related to subsurface conditions 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. 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, 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 GA EPD Underground Storage Tank Management Program (USTMP) regulations.

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.

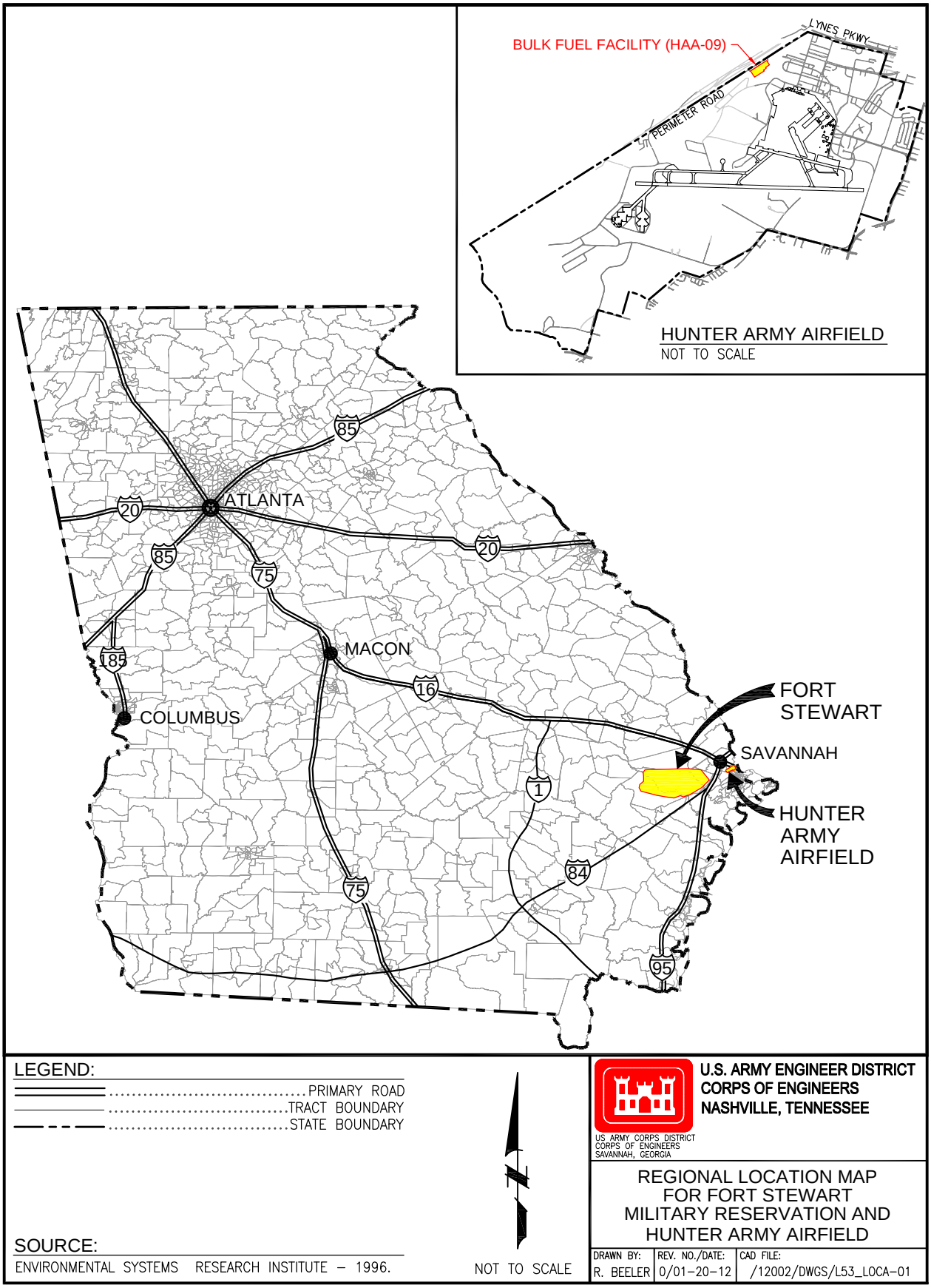


Figure 1. Location of the Bulk Fuel Facility, Hunter Army Airfield, Georgia

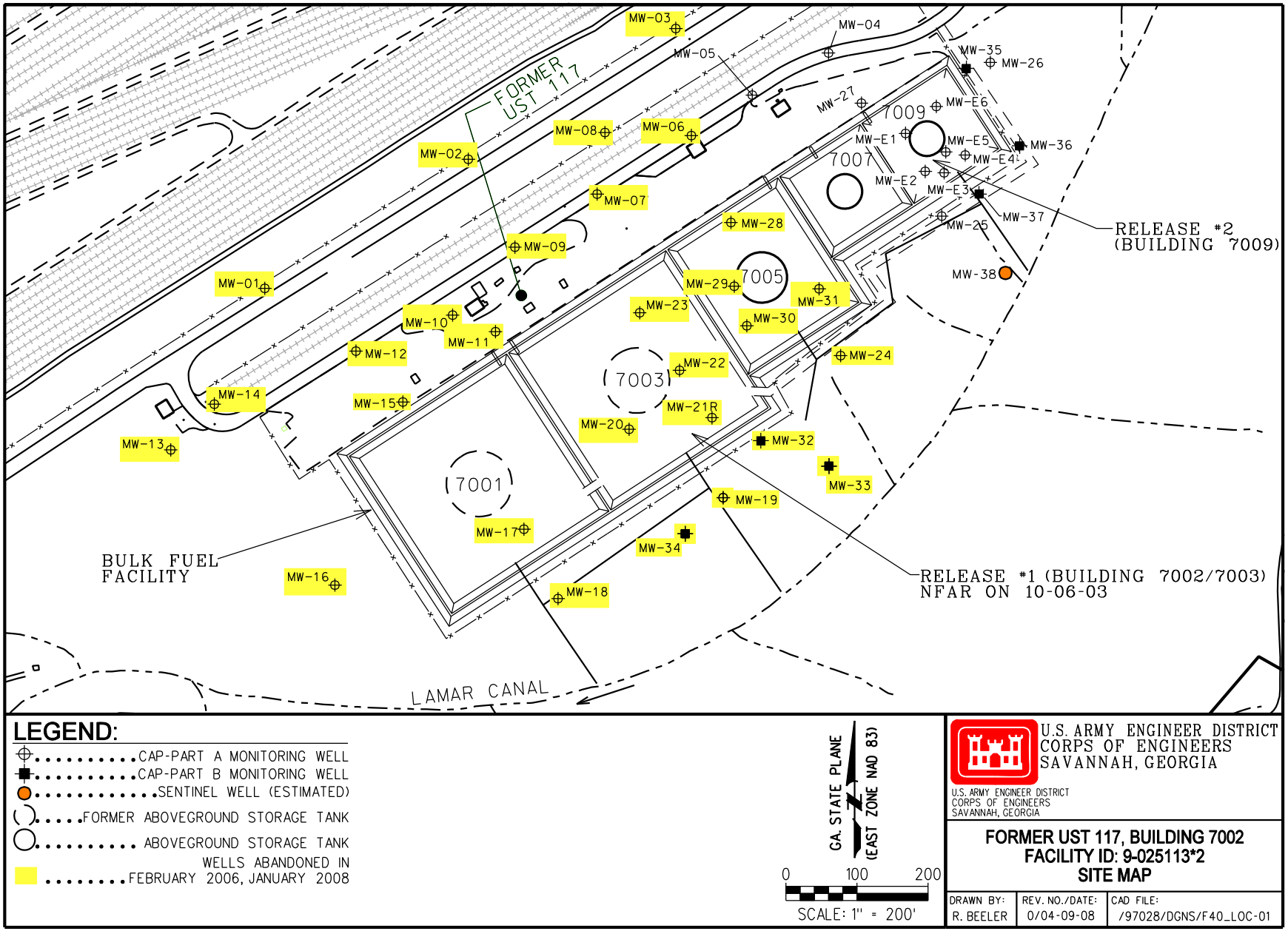


Figure 2. Site Location Map for the Bulk Fuel Facility, Hunter Army Airfield, Georgia

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 #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 xylenes (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.

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 has been recommended.

The pilot study activities described within this report are being conducted for 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 Soil

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. 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 Groundwater

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 PAHs 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 (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 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 is limited to well BF-MW-E5 and does 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 in 1999. The CAP–Part B Addendum #1 (SAIC 2011a) concluded that no groundwater remediation is warranted.

However, free product has been consistently encountered in BF-MW-E5 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.

3.0 INSTALLATION

3.1 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 treatment trailer.
- Placing injection and extraction lines.
- Connecting the fire hydrant for water supply.
- Horizontal drilling to install the effluent discharge line beneath Lamar Canal.
- Connecting the sewer line leading to the HAAF waste water treatment plant (WWTP).

Mid-Atlantic Environmental Equipment, Inc. wet-tested the multi-phase extraction (MPE) and injection system prior to delivery. The system trailer arrived on-site on August 1, 2011.

Photographs of these installation activities are presented in Appendix A.

3.2 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 prepacked screen. Well construction diagrams are presented in Appendix B.

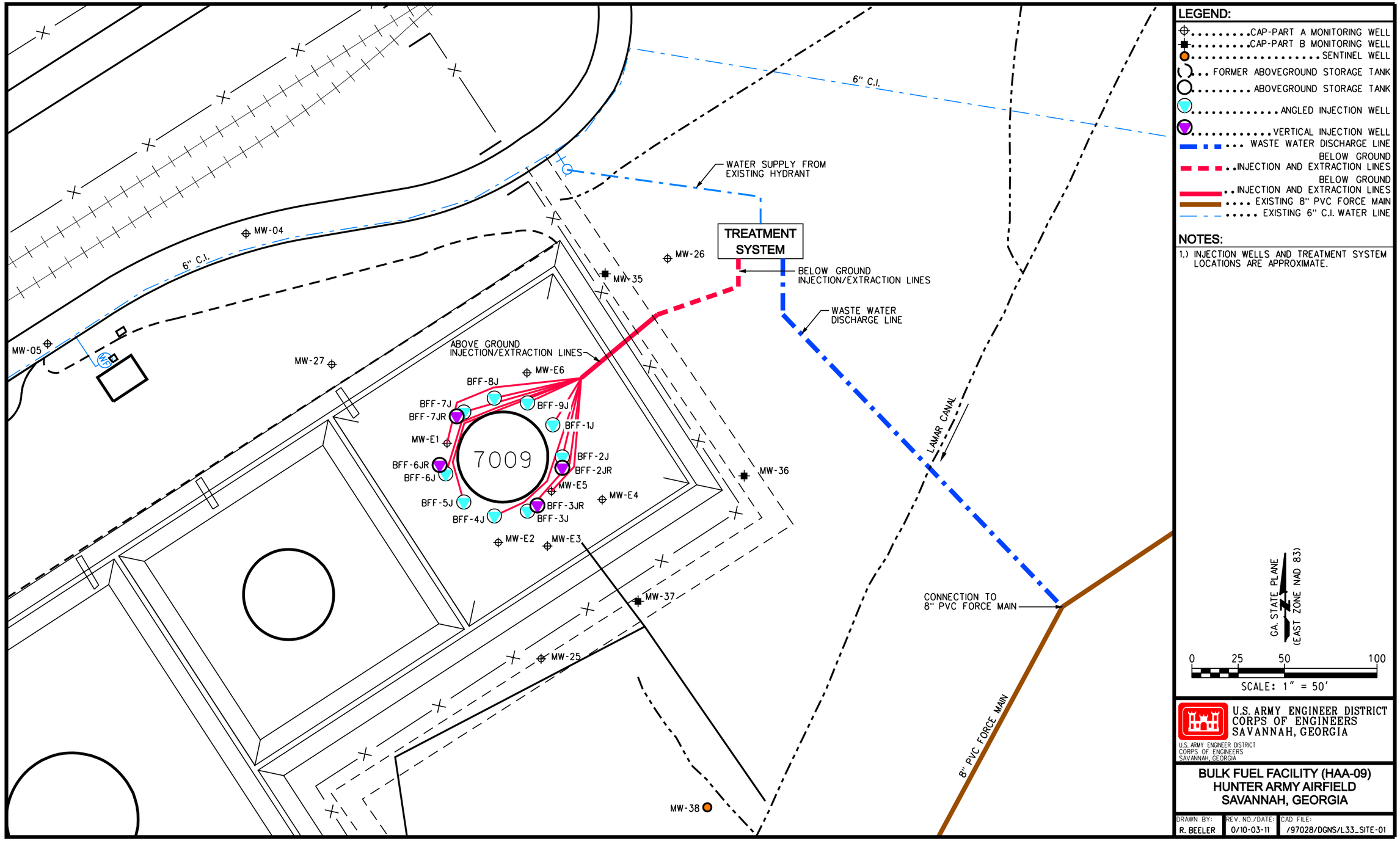


Figure 3. Locations of Pilot Study Injection and Extraction Wells

Table 1. Angled Injection Wells Installed at AST 7009

Injection Well ID	Angle of Installation [a]	Screened Interval [b]	
		ft	ft BGS
BFF-1J	33°	3.5 – 8.5	2.0 – 4.9
BFF-2J	40°	3.5 – 8.5	2.3 – 5.5
BFF-3J	32°	3.5 – 8.5	1.9 – 4.5
BFF-4J	35°	3.7 – 8.7	2.1 – 5.0
BFF-5J	35°	3.5 – 8.5	2.0 – 4.9
BFF-6J	32°	4.0 – 9.0	2.1 – 4.8
BFF-7J	33°	3.5 – 8.5	1.9 – 4.6
BFF-8J	33°	3.9 – 8.9	2.1 – 4.8
BFF-9J	33°	3.9 – 8.9	2.1 – 4.8

[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.

4.0 SYSTEM OPERATION

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.

A discussion of the MPE/injection system design can be found in *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). The MPE/injection system began operating on August 15, 2011. During the first week of operation, groundwater was extracted from the two extraction wells (MW-E1 and MW-E5) through an applied vacuum of approximately 21 in. of mercury. Initial injection of a 5% solution of Biosolve began on August 18, 2011.

Initial discharge from the operating MPE 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; validated certificates of analysis can be found in Appendix C. 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, and the Baker tank was removed from the site. Effluent from the MPE system now discharges directly to the HAAF WWTP.

Table 2. Analytical Results of Initial 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.
SU = Standard unit.
Qualifiers:
J = Estimated concentration.
U = Not detected at the concentration shown.
UJ = Not detected at the estimated concentration shown.

5.0 PROBLEMS ENCOUNTERED

The injection design presented in Addendum #28 to the Work Plan (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.

Due to the shallow screened interval of the angled wells and the encountered subsurface conditions, the four injection wells closest to the two extraction wells (BFF-2J, BFF-3J, BFF-6J, and BFF-7J) were abandoned on September 6, 2011. Four replacement injection wells (BFF-2JR, BFF-3JR, BFF-6JR, and BFF-7JR) were installed September 7 through 9, 2011, at locations immediately adjacent to the abandoned angled wells (Figure 3). The four replacement vertical injection wells were installed to approximately 9 ft BGS and were constructed of 1-in. Schedule 40 PVC with a 5-ft prepacked screen. Screened intervals for each of the four replacement wells are shown in Table 3. Well construction diagrams are presented in Appendix B.

Injections into the replacement wells began in September 2011.

Table 3. Vertical Injection Wells Installed at AST 7009

Injection Well ID	Screened Interval (ft BGS)
BFF-2JR	4.2 – 9.2
BFF-3JR	4.0 – 9.0
BFF-6JR	4.3 – 9.3
BFF-7JR	4.0 – 9.0

AST = Aboveground storage tank.
BGS = Below ground surface.

6.0 COMMUNICATIONS/CONTACTS

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 D.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The MPE/injection system is operational. Four vertical wells have been installed to replace the initial angled injection wells and injections are ongoing. Addendum #28 to the Work Plan assumed that approximately 12,000 gal of surfactant would be injected at a 5% solution (SAIC 2011b). The next progress report will follow completion of the pilot study. Bi-weekly letter updates will be provided during operation of the pilot study; results of bi-weekly effluent samples collected to date (through December 2011) have been included in Appendix E.

8.0 REFERENCES

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.

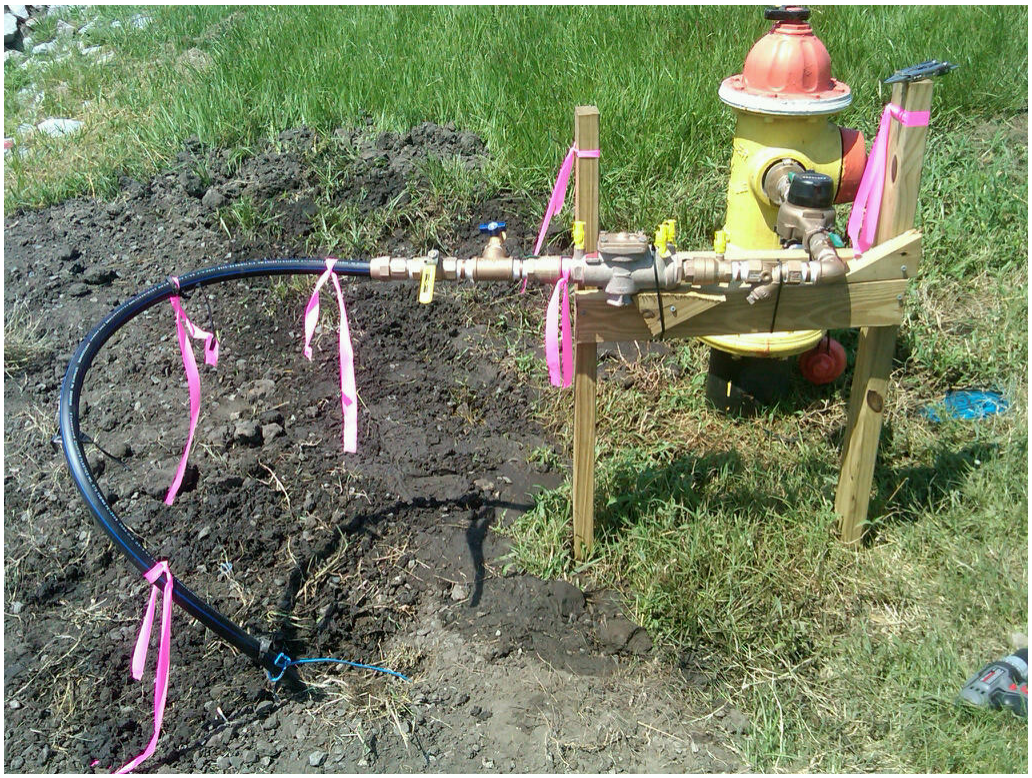
APPENDIX A

PHOTOGRAPHS

07/26/11: Site preparation begins for the MPE/injection system trailer

07/26/11: Looking south from the future site of the MPE/injection system trailer toward AST 7009 within the BFF

07/27/11: Geotextile liner (foreground) placed beneath the gravel pad for the MPE/injection system trailer. Horizontal boring rig (background) used to install the effluent line beneath Lamar Canal



07/30/11: Connection to water supply

07/30/11: Water supply line for the MPE/injection system trailer following completion of the gravel pad but prior to arrival of the trailer

07/30/11: Treatment discharge line (center) runs underground beneath Lamar Canal to a Base sewer line

07/30/11: Markers indicate the location of the buried treatment discharge line

08/01/11: Connection of treatment discharge line to the sewer line leading to the Hunter WWTP

08/01/11: MPE/injection system trailer on-site

08/03/11: Injection and extraction lines lead from the MPE/injection system to wells encircling AST 7009 within the BFF

09/08/11: Boring of BFF-8JR; former BFF-8J abandoned immediately adjacent

09/08/11: View from BFF-8JR east illustrating the distance to the MPE/injection system trailer

09/09/11: Completed replacement injection well BFF-2JR

09/09/11: Completed replacement injection well BFF-3JR

09/09/11: Completed replacement injection well BFF-6JR

09/09/11: Completed replacement injection well BFF-7JR

APPENDIX B

WELL INSTALLATION DIAGRAMS

MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-15

BEGIN: 07/26/11

END: 07/27/11

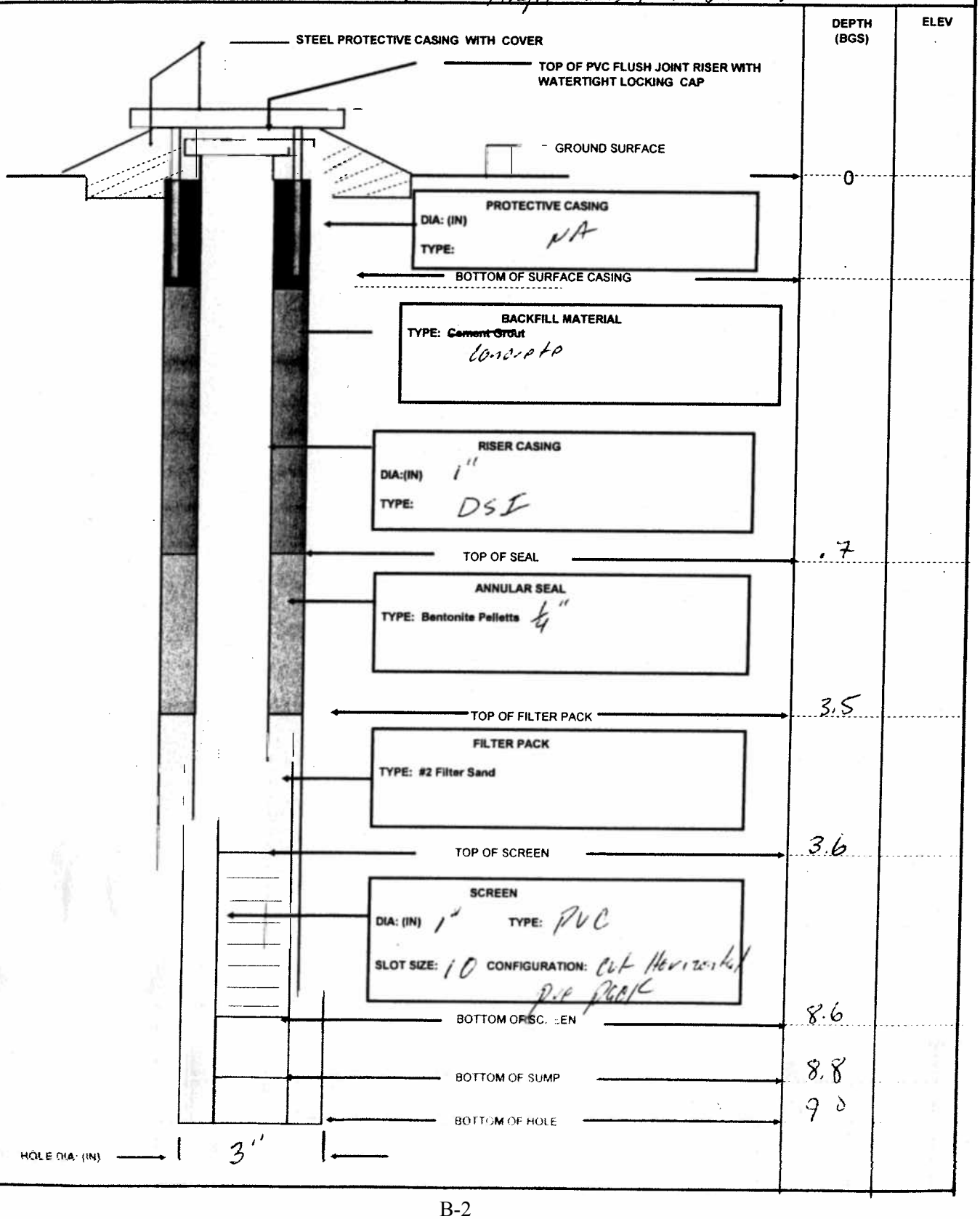
COORDINATES: N:

E:

DATUM/UNITS:

REFERENCE POINT: **ELEVATION:** **DATUM/UNITS:**

Angle Installation 40°



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-25

BEGIN:

END:

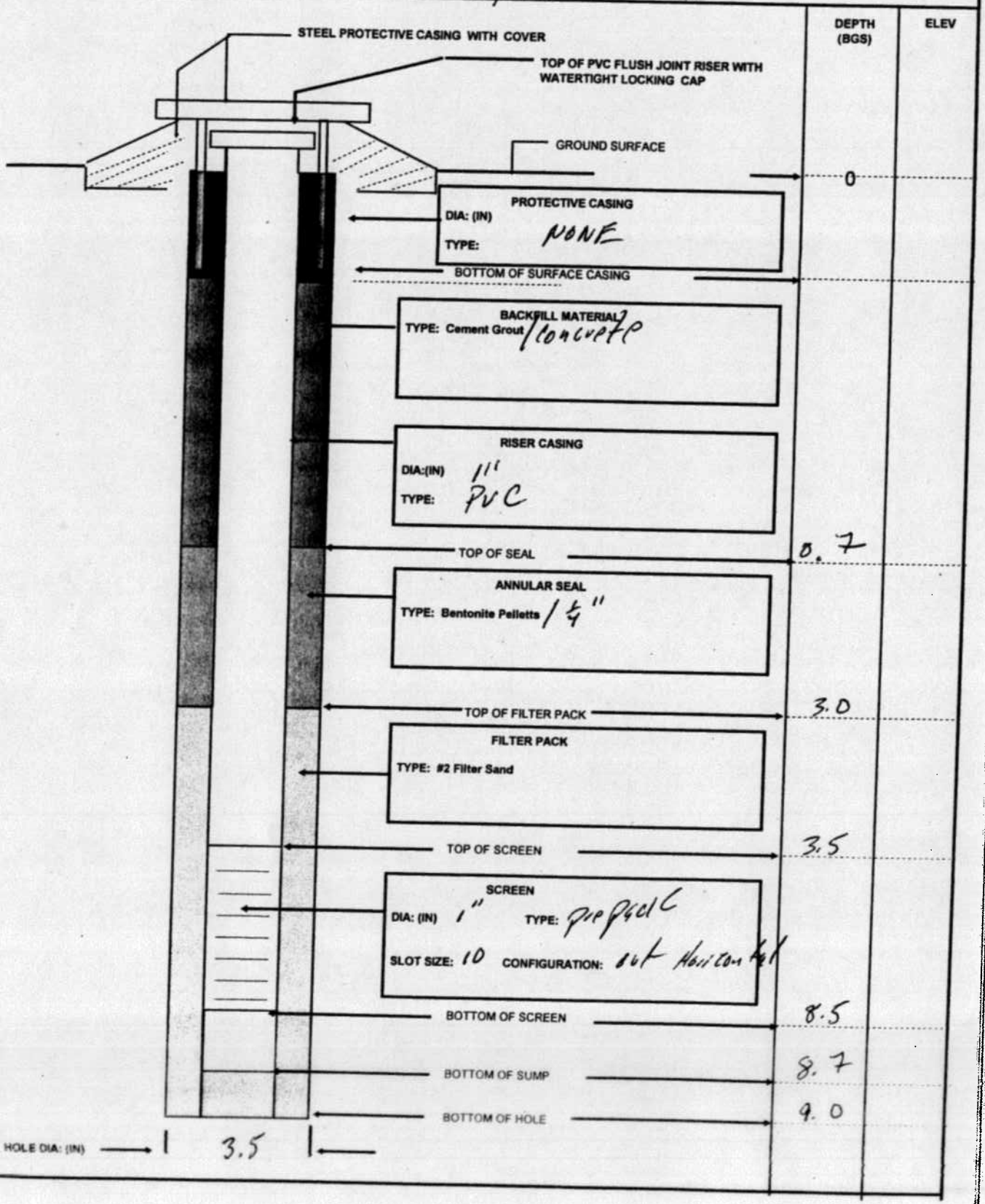
COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: Angled well 40°

ELEVATION:

DATUM/UNITS:



MONITORING WELL BFF-35

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-35

BEGIN: 07/27/11

END: 07/27/11

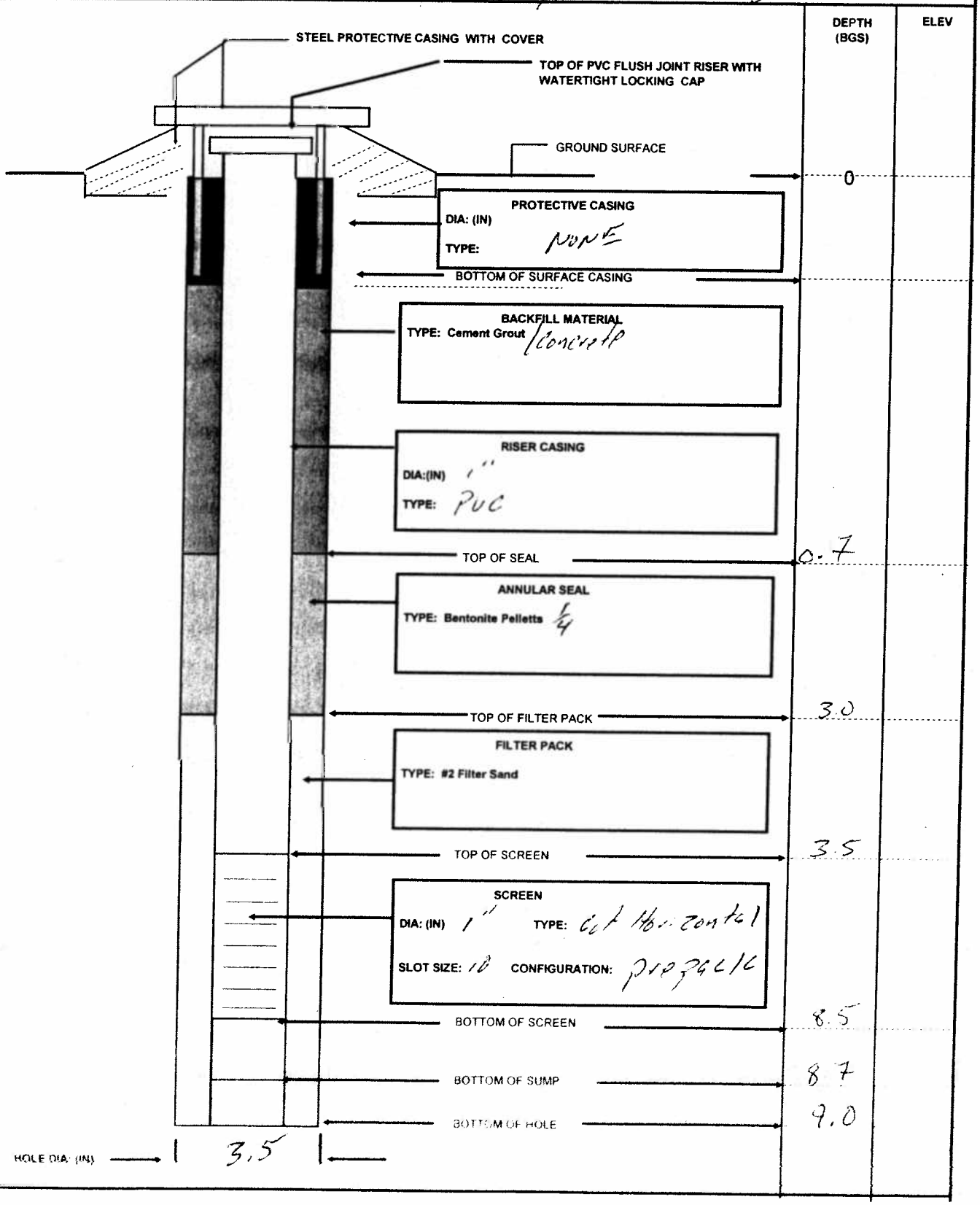
COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: Angled well 32°

ELEVATION:

DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-4J

BEGIN: 07/28/11

END: 07/28/11

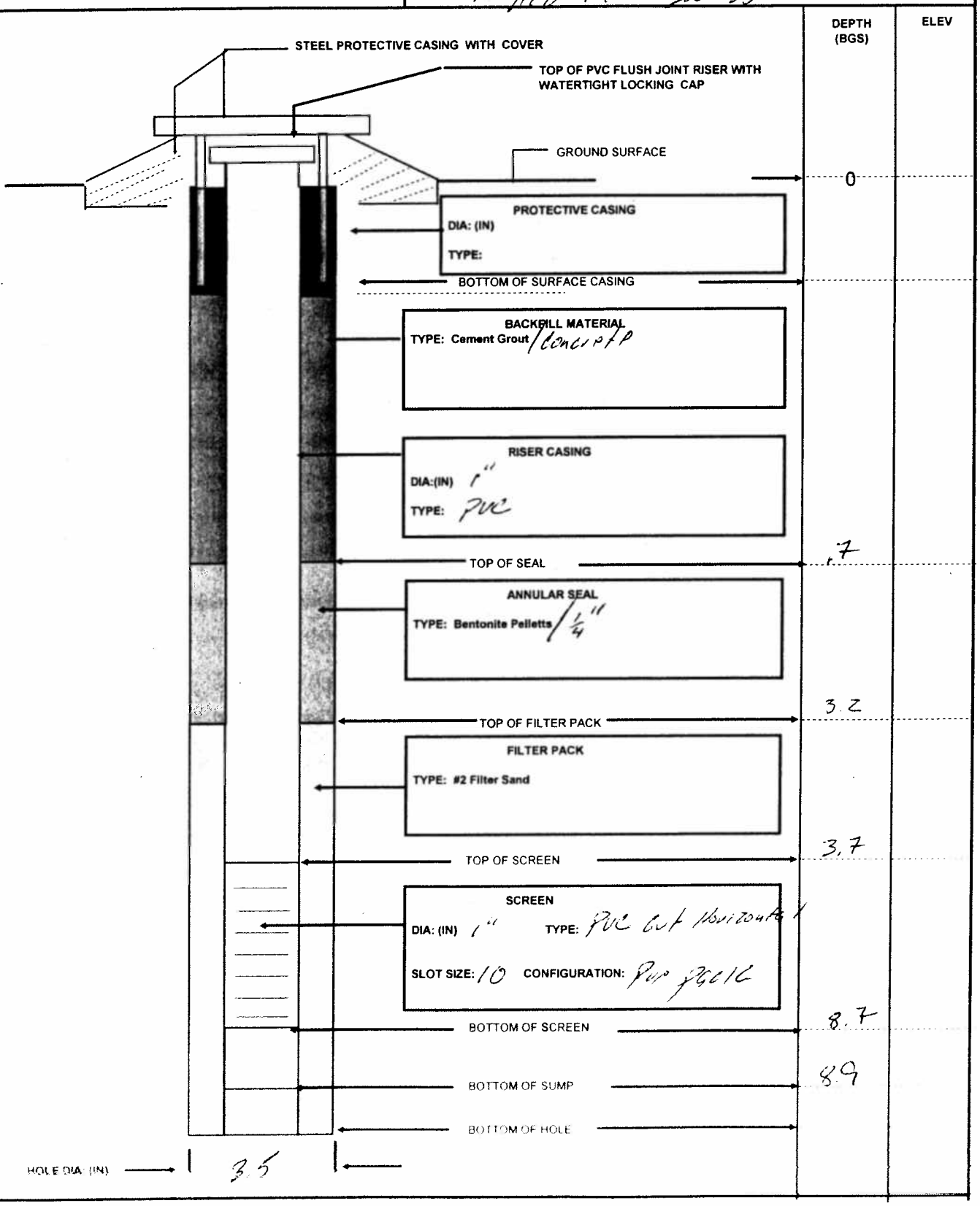
COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: Angled well ~~30~~ 35°

ELEVATION:

DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-5J

BEGIN: 7/28/11

END: 7/28/11

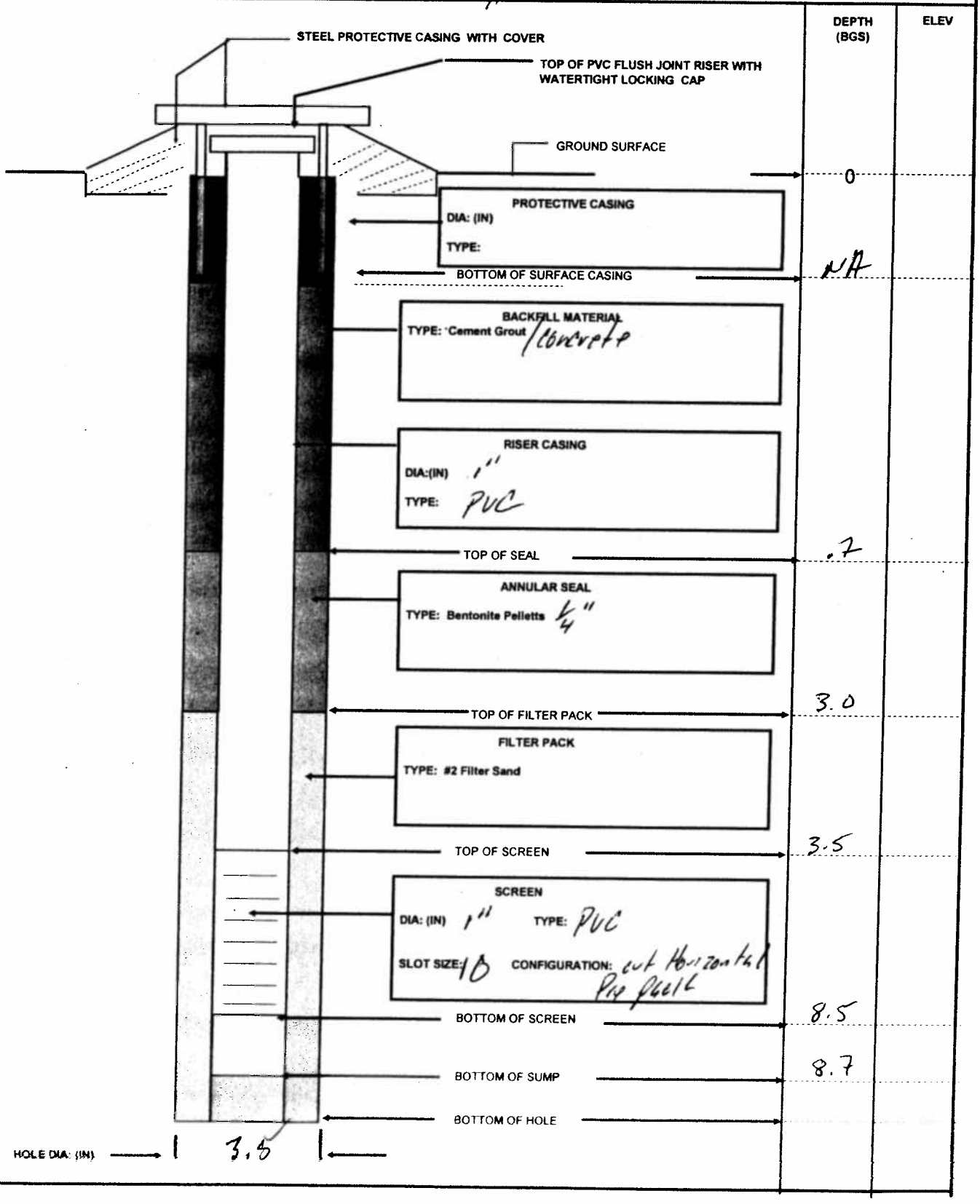
COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: Angle of well 35°

ELEVATION:

DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-6J

BEGIN: 07/24/11

END: 07/24/11

COORDINATES: N:

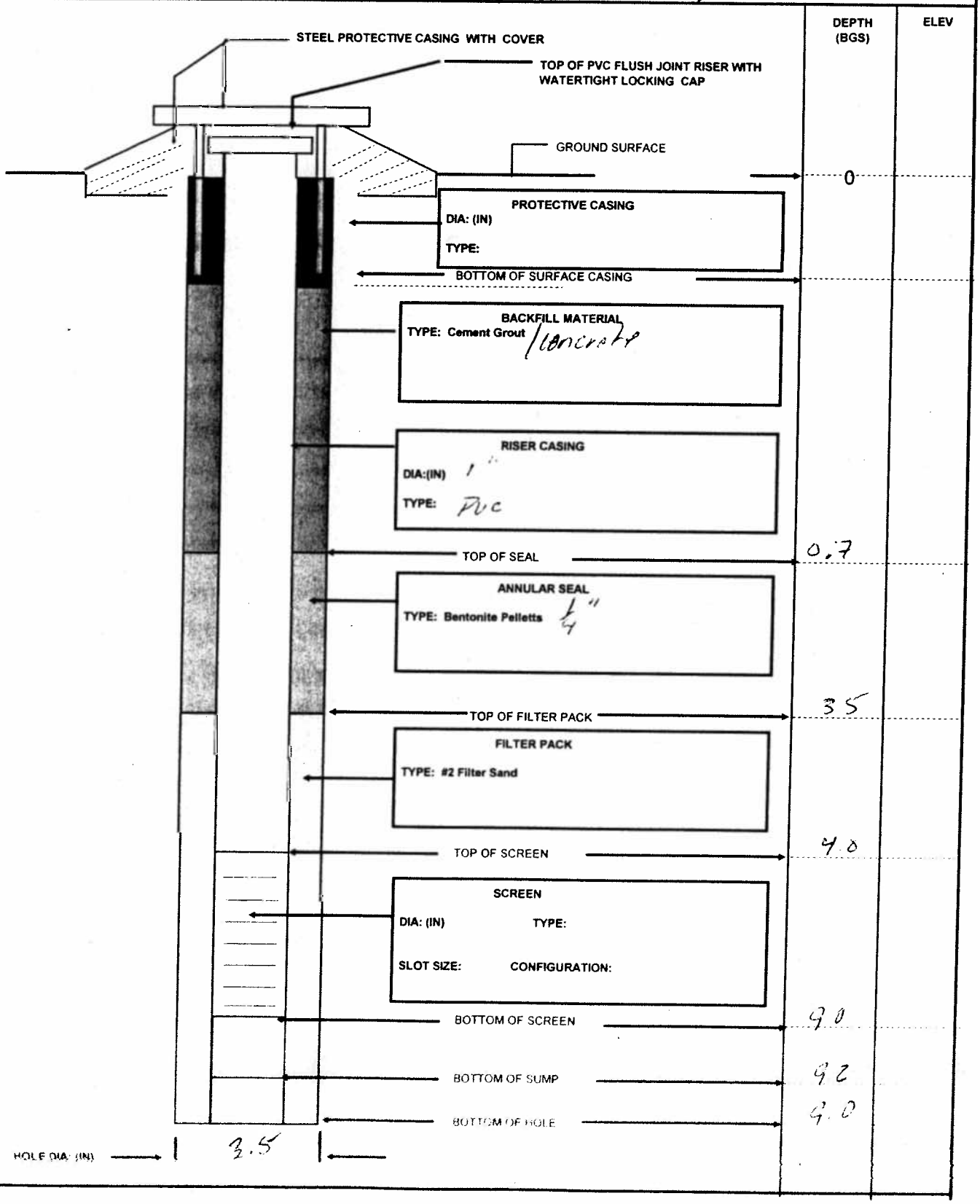
E:

DATUM/UNITS:

REFERENCE POINT: Angle of well 32°

ELEVATION:

DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

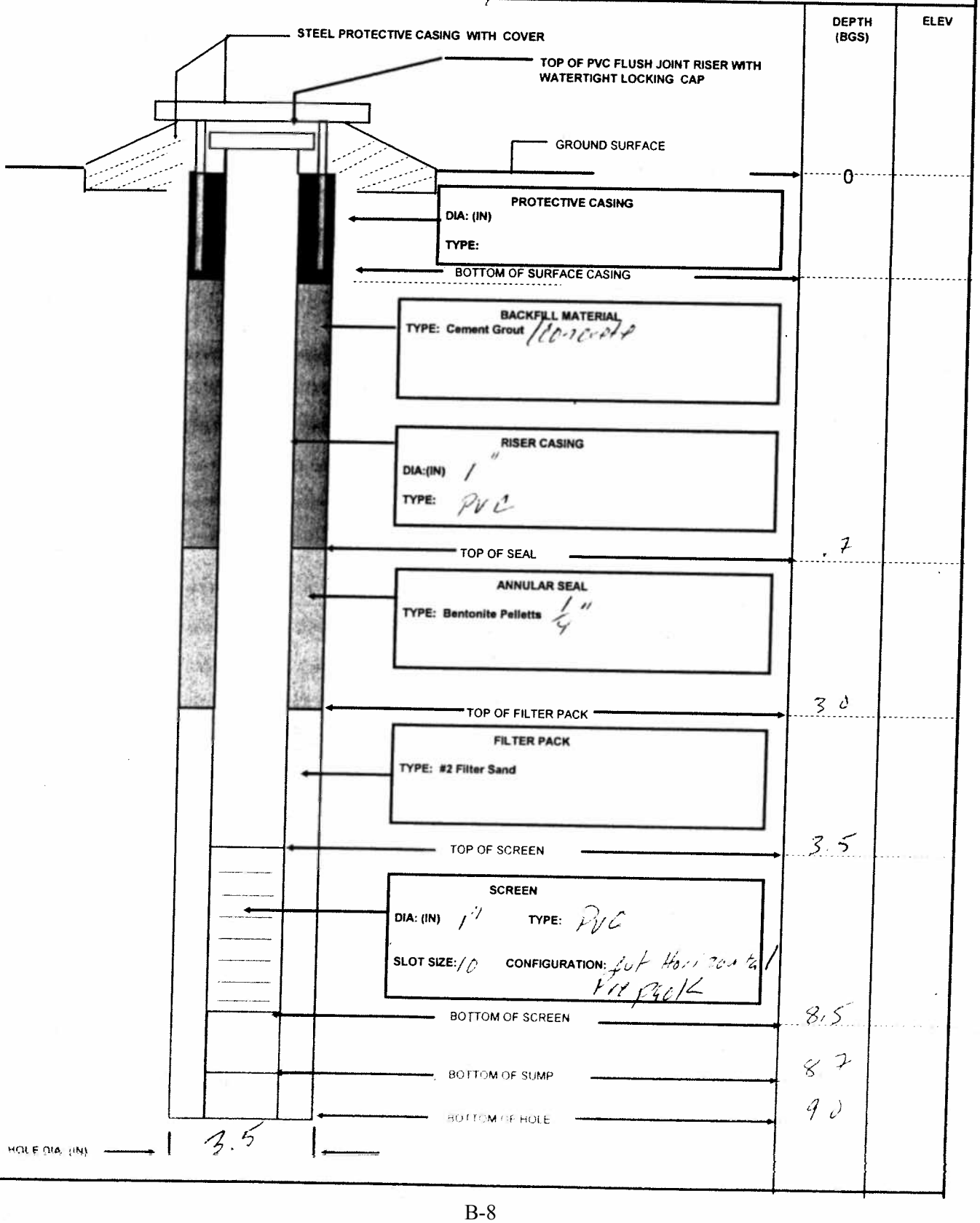
WELL NUMBER: BFF-75

BEGIN: 07/29/11 **END:** 07/29/11

COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: Angled Well ~~30~~ 33° **ELEVATION:** **DATUM/UNITS:**



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-8J

BEGIN: 07/29/11

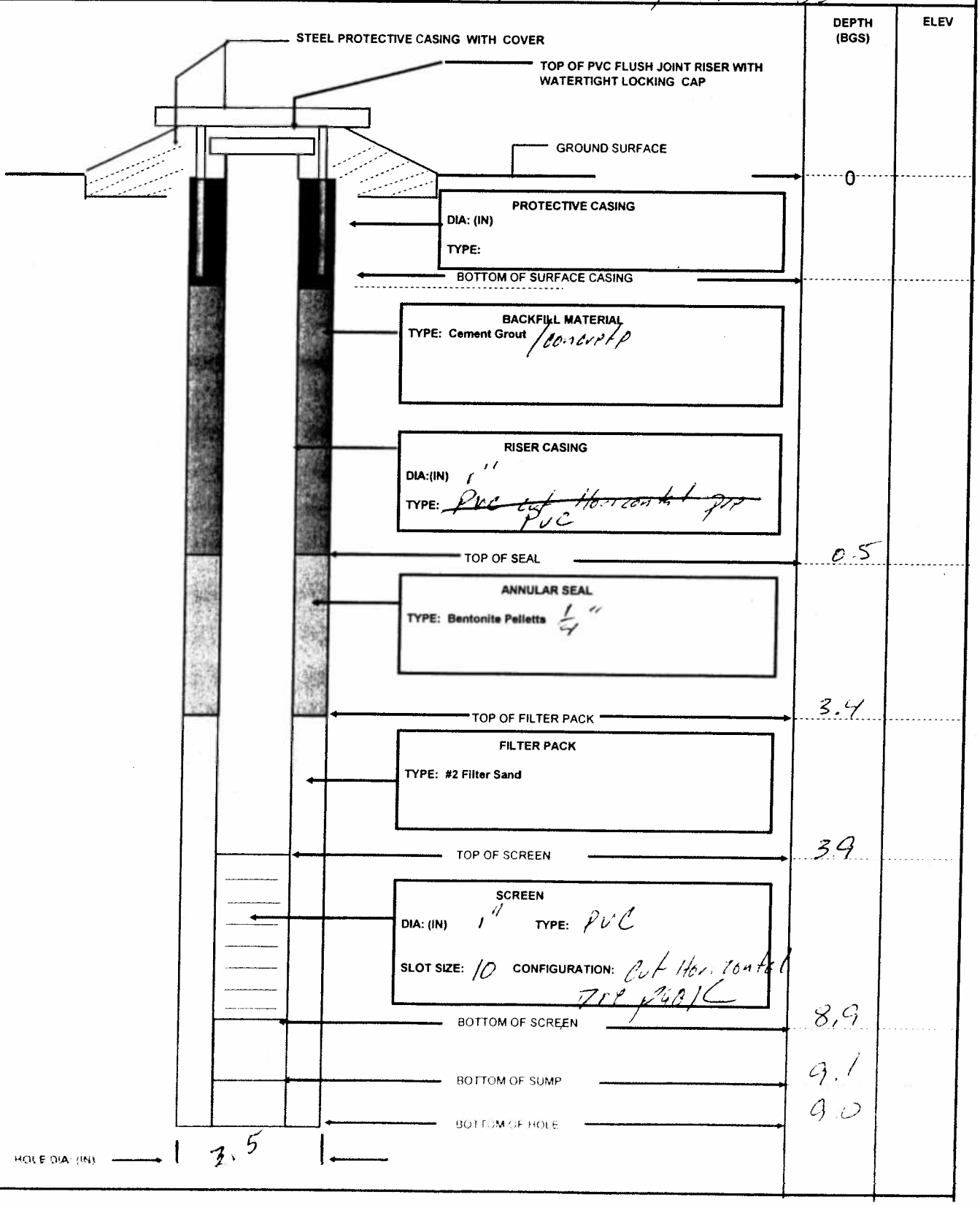
END: 07/29/11

COORDINATES: N:

E:

DATUM/UNITS:

REFERENCE POINT: Angled Boring well **ELEVATION:** 33° **DATUM/UNITS:**



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-95

COORDINATES: N:
E:

DATUM/UNITS:

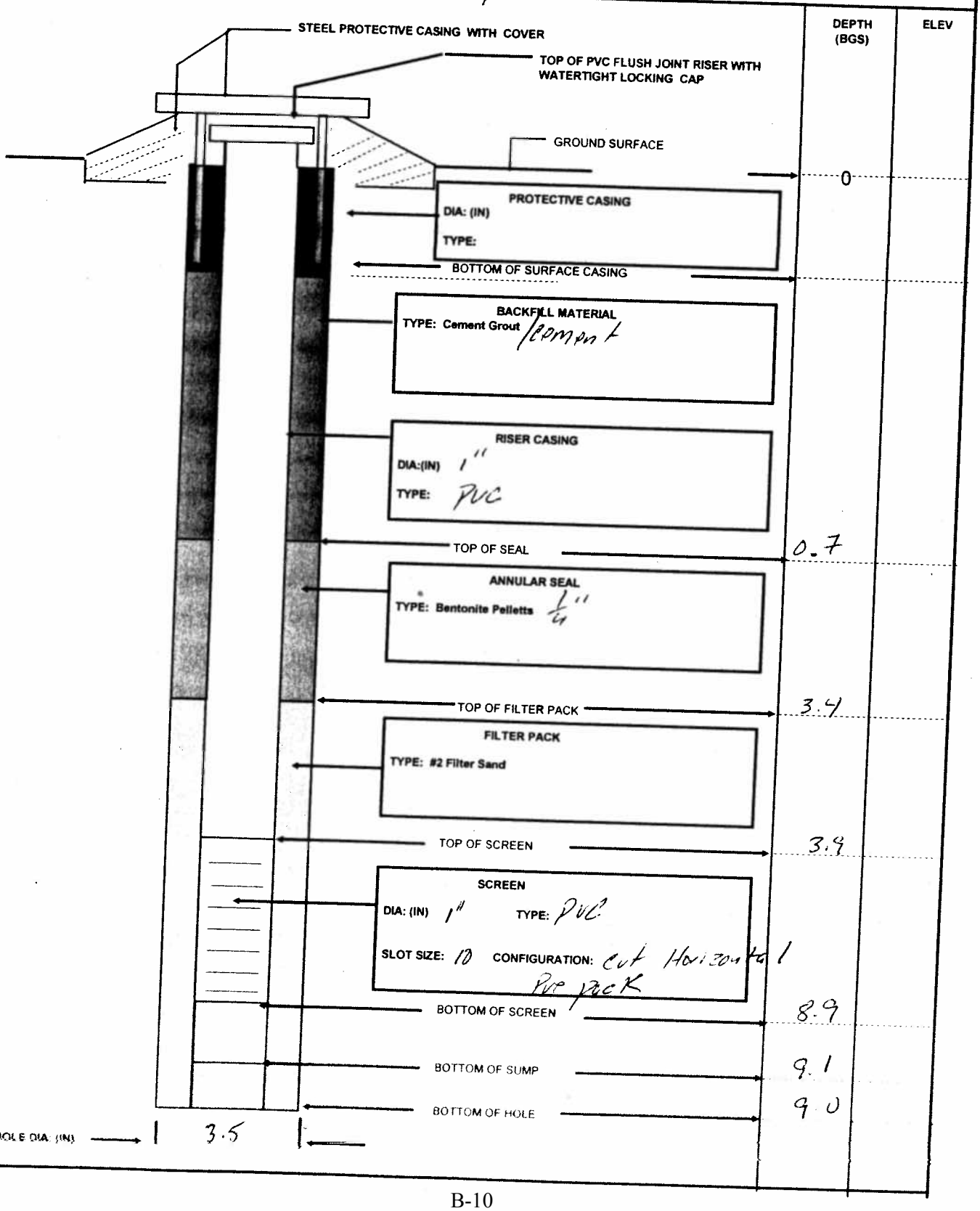
BEGIN: 08/01/11

END: 08/01/11

REFERENCE POINT: Angled well 33°

ELEVATION:

DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-2JR

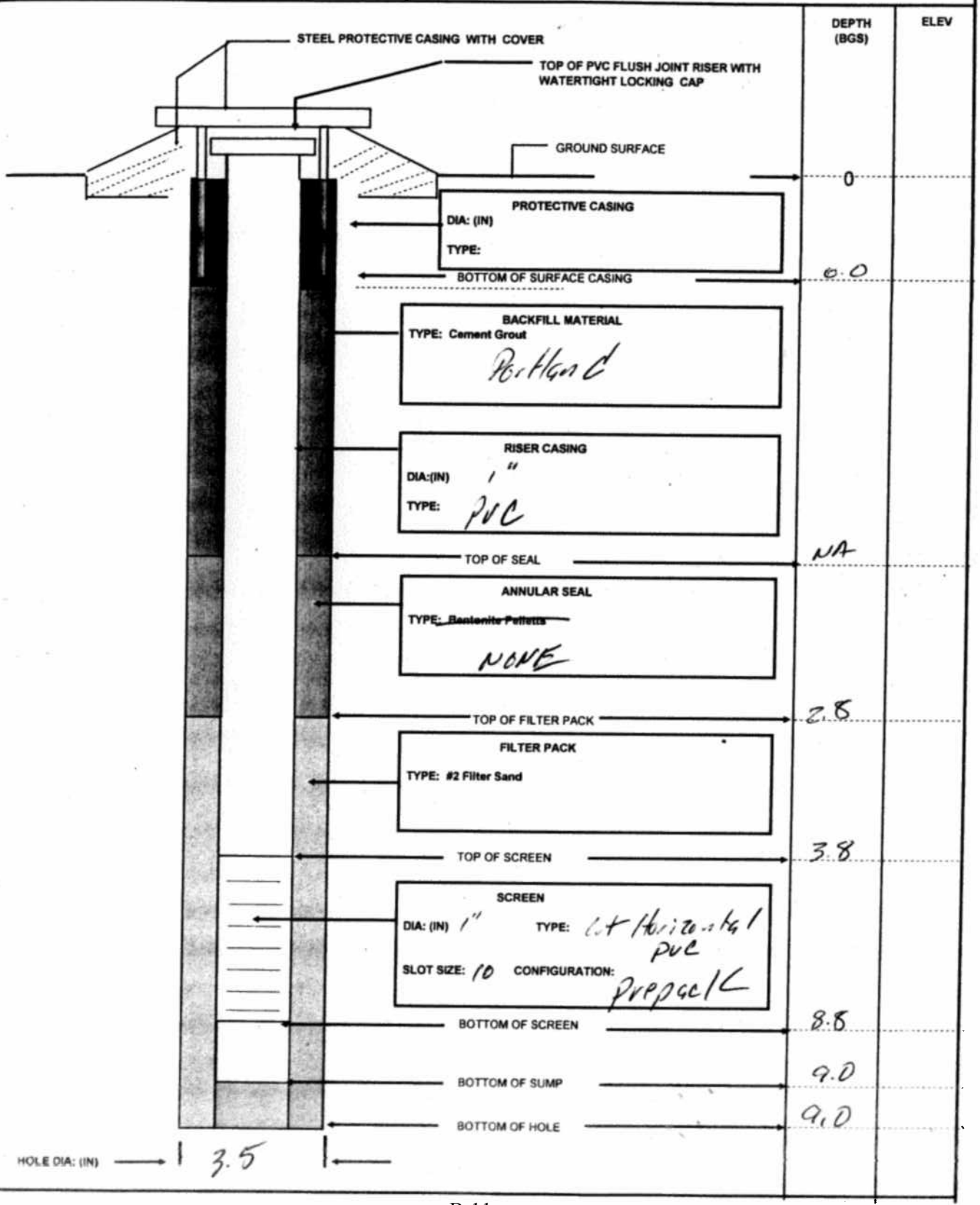
BEGIN: 08/08/11

END: 08/08/11

COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: **ELEVATION:** **DATUM/UNITS:**



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-3JR

BEGIN: 09/09/11

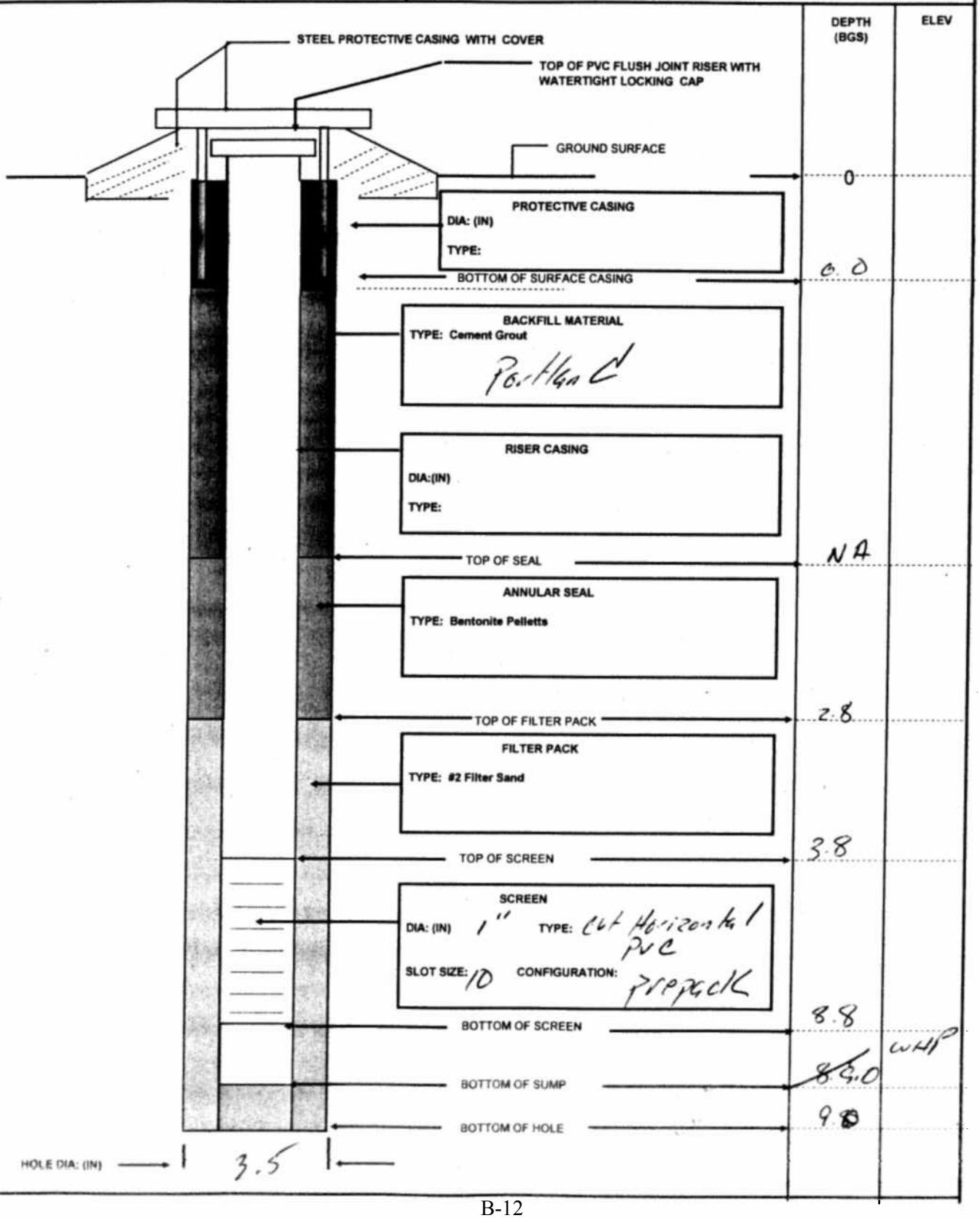
END: 09/09/11

COORDINATES: N:

E:

DATUM/UNITS:

REFERENCE POINT: **ELEVATION:** **DATUM/UNITS:**



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-6JR

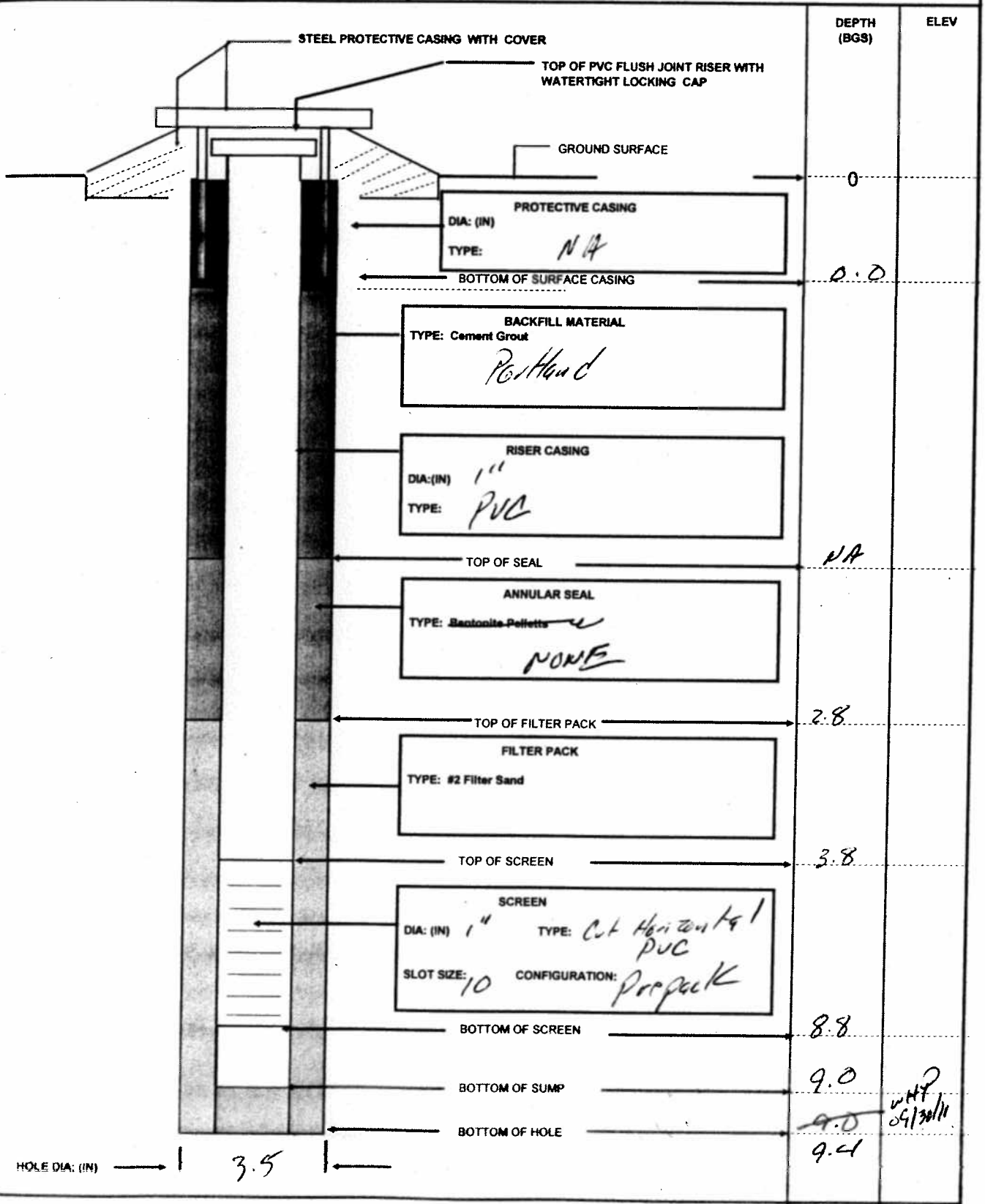
BEGIN: 09/08/11

END: 09/08/11

COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: ELEVATION: DATUM/UNITS:



MONITORING WELL

PROJECT NAME: Hunter Pilot Study

DELIVERY ORDER NO: CV01

WELL NUMBER: BFF-75R

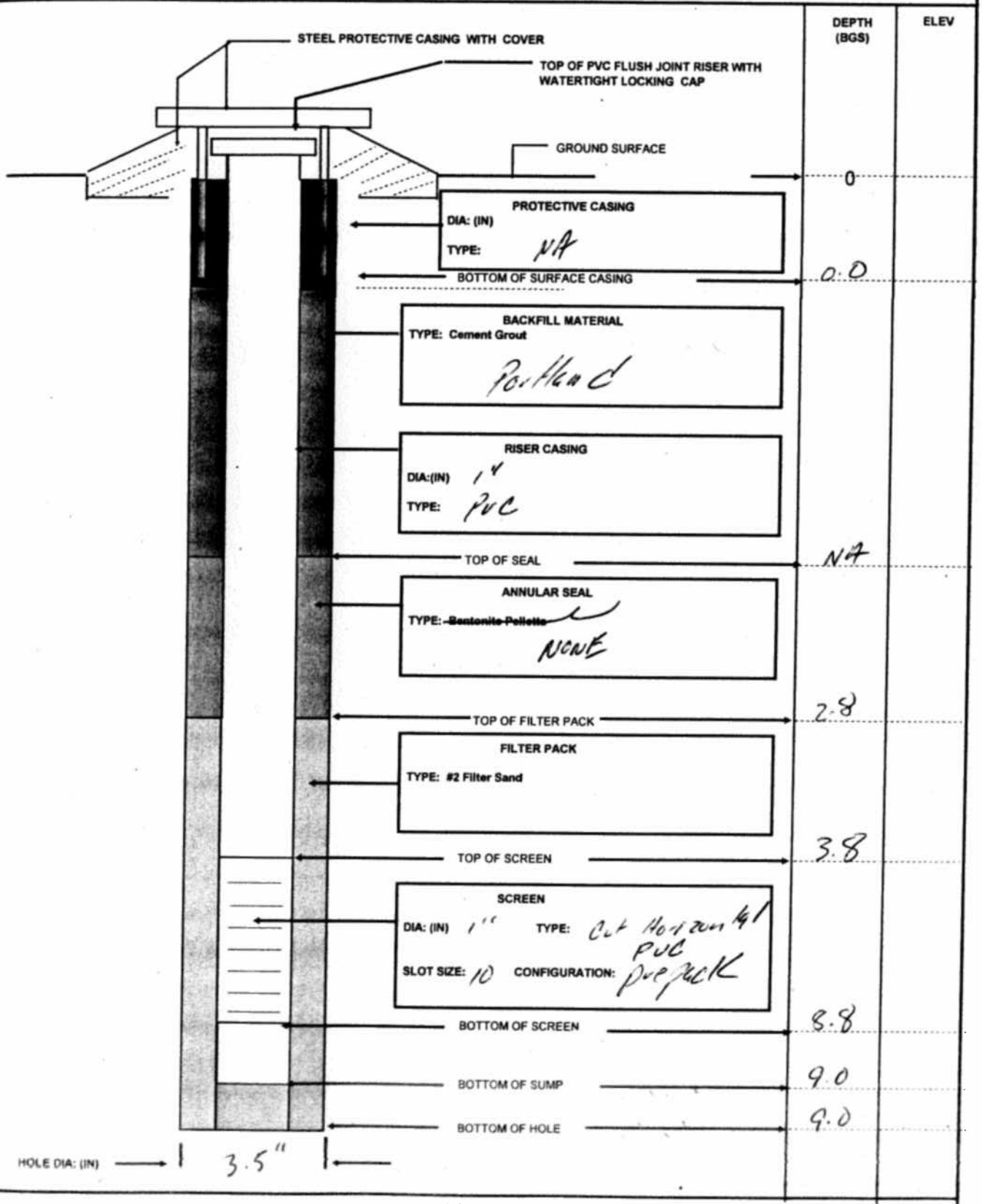
BEGIN: 09/08/11

END: 09/08/11

COORDINATES: N:
E:

DATUM/UNITS:

REFERENCE POINT: ELEVATION: DATUM/UNITS:



APPENDIX C

ANALYTICAL RESULTS OF TREATMENT SYSTEM EFFLUENT

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	284289	**Date Collected:**	08/17/2011 13:44	**Matrix:**	WATER
Lab Sample ID:	284289002	**Date Received:**	08/18/2011 07:35		
		Client:	SAIC117	**Project:**	SAIC00111
Client ID:	BAKERTANK	**Method:**	SW846 8260B	**SOP Ref:**	GL-OA-E-038
Batch ID:	1134332	**Inst:**	VOA4.I	**Dilution:**	1
Run Date:	08/19/2011 17:47	**Analyst:**	ACJ	**Purge Vol:**	5 mL
Prep Date:	08/19/2011 17:47				
Data File:	081911V4\4Z520.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
75-71-8	Dichlorodifluoromethane	U U	1.00	ug/L	0.300		1.00
74-87-3	Chloromethane	U	1.00	ug/L	0.300		1.00
75-01-4	Vinyl chloride	U	1.00	ug/L	0.500		1.00
74-83-9	Bromomethane	U	1.00	ug/L	0.300		1.00
75-00-3	Chloroethane	U	1.00	ug/L	0.300		1.00
75-69-4	Trichlorofluoromethane	U	1.00	ug/L	0.300		1.00
67-64-1	Acetone	U	5.00	ug/L	1.50		5.00
75-35-4	1,1-Dichloroethylene	U	1.00	ug/L	0.300		1.00
79-20-9	Methyl acetate	U	5.00	ug/L	1.25		5.00
75-09-2	Methylene chloride	U	5.00	ug/L	2.00		5.00
75-15-0	Carbon disulfide	J J	1.97	ug/L	1.25		5.00
1634-04-4	tert-Butyl methyl ether	U U	1.00	ug/L	0.250		1.00
156-60-5	trans-1,2-Dichloroethylene	U	1.00	ug/L	0.300		1.00
75-34-3	1,1-Dichloroethane	U	1.00	ug/L	0.300		1.00
78-93-3	2-Butanone	U UJ	5.00 C05	ug/L	1.25		5.00
156-59-2	cis-1,2-Dichloroethylene	U U	1.00	ug/L	0.300		1.00
67-66-3	Chloroform	U	1.00	ug/L	0.250		1.00
74-97-5	Bromochloromethane	U	1.00	ug/L	0.300		1.00
71-55-6	1,1,1-Trichloroethane	U	1.00	ug/L	0.325		1.00
110-82-7	Cyclohexane	U	1.00	ug/L	0.300		1.00
56-23-5	Carbon tetrachloride	U	1.00	ug/L	0.300		1.00
107-06-2	1,2-Dichloroethane	U	1.00	ug/L	0.250		1.00
71-43-2	Benzene	U	1.00	ug/L	0.300		1.00
79-01-6	Trichloroethylene	U	1.00	ug/L	0.250		1.00
78-87-5	1,2-Dichloropropane	U	1.00	ug/L	0.250		1.00
108-87-2	Methylcyclohexane	U	1.00	ug/L	0.250		1.00
75-27-4	Bromodichloromethane	U	1.00	ug/L	0.250		1.00
108-10-1	4-Methyl-2-pentanone	U	5.00	ug/L	1.25		5.00
10061-01-5	cis-1,3-Dichloropropylene	U	1.00	ug/L	0.250		1.00
108-88-3	Toluene	U	1.00	ug/L	0.250		1.00
10061-02-6	trans-1,3-Dichloropropylene	U	1.00	ug/L	0.250		1.00
79-00-5	1,1,2-Trichloroethane	U	1.00	ug/L	0.250		1.00
591-78-6	2-Hexanone	U UJ	5.00 C05	ug/L	1.25		5.00
127-18-4	Tetrachloroethylene	U U	1.00	ug/L	0.300		1.00
124-48-1	Dibromochloromethane	U	1.00	ug/L	0.300		1.00
106-93-4	1,2-Dibromoethane	U	1.00	ug/L	0.250		1.00
108-90-7	Chlorobenzene	U	1.00	ug/L	0.250		1.00

DATA VALIDATION COPY

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	284289	**Date Collected:**	08/17/2011 13:44	**Matrix:**	WATER
Lab Sample ID:	284289002	**Date Received:**	08/18/2011 07:35		
		Client:	SAIC117	**Project:**	SAIC00111
Client ID:	BAKERTANK	**Method:**	SW846 8260B	**SOP Ref:**	GL-OA-E-038
Batch ID:	1134332	**Inst:**	VOA4.1	**Dilution:**	1
Run Date:	08/19/2011 17:47	**Analyst:**	ACJ	**Purge Vol:**	5 mL
Prep Date:	08/19/2011 17:47				
Data File:	081911V4\4Z520.D		DB-624		

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
100-41-4	Ethylbenzene	U u	1.00	ug/L	0.250		1.00
100-42-5	Styrene	U	1.00	ug/L	0.250		1.00
75-25-2	Bromoform	U	1.00	ug/L	0.250		1.00
79-34-5	1,1,2,2-Tetrachloroethane	U	1.00	ug/L	0.250		1.00
98-82-8	Isopropylbenzene	U	1.00	ug/L	0.250		1.00
541-73-1	1,3-Dichlorobenzene	U	1.00	ug/L	0.250		1.00
106-46-7	1,4-Dichlorobenzene	U	1.00	ug/L	0.250		1.00
96-12-8	1,2-Dibromo-3-chloropropane	U	1.00	ug/L	0.300		1.00
87-61-6	1,2,3-Trichlorobenzene	U	1.00	ug/L	0.332		1.00
76-13-1	Trichlorotrifluoroethane	U	5.00	ug/L	1.00		5.00
123-91-1	1,4-Dioxane	U	50.0	ug/L	15.0		50.0
540-59-0	1,2-Dichloroethylene (total)	U	1.00	ug/L	0.300		1.00
1330-20-7	Xylenes (total)	U	1.00	ug/L	0.300		1.00
120-82-1	1,2,4-Trichlorobenzene	U	1.00	ug/L	0.300		1.00
95-50-1	1,2-Dichlorobenzene	U	1.00	ug/L	0.250		1.00

Tentatively Identified Compound Summary

CAS No.	Tentatively Identified Compound (TIC)	RT	Estimated	Units	Fit	Qual
	unknown	4.47	7.44	ug/L	0	J

DATA VALIDATION COPY

Page 1 of 1

FID Diesel Range Organics
Certificate of Analysis
Sample Summary

SDG Number:	284289	**Date Collected:**	08/17/2011 13:44	**Matrix:**	WATER
Lab Sample ID:	284289001	**Date Received:**	08/18/2011 07:35		
		Client:	SAIC117	**Project:**	SAIC00111
Client ID:	BAKERTANK	**Method:**	SW846 3510C/8015C	**SOP Ref:**	GL-OA-E-003
Batch ID:	1133879	**Inst:**	FID7.1	**Dilution:**	1
Run Date:	08/22/2011 02:25	**Analyst:**	KXR2	**Inj. Vol:**	1 uL
Prep Date:	08/18/2011 17:30	**Aliquot:**	1000 mL	**Final Volume:**	1 mL
Data File:	007f0701.d		DB-5MS	**Level:**	LOW

CAS No.	Parmname	Qualifier	Result	Units	MDL	LOD	LOQ
DRO	Diesel Range Organics	U	0.200	mg/L	0.065	0.130	0.200

U

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GC Volatiles (GRO)
Certificate of Analysis
Sample Summary

SDG Number:	284289	**Date Collected:**	08/17/2011 13:44	**Matrix:**	WATER
Lab Sample ID:	284289002	**Date Received:**	08/18/2011 07:35		
Client ID:	BAKERTANK	**Client:**	SAIC117	**Project:**	SAIC00111
Batch ID:	1134195	**Method:**	SW846 8015C	**SOP Ref:**	GL-OA-E-004
Run Date:	08/19/2011 14:39	**Inst:**	VOC4A.I	**Dilution:**	1
Prep Date:	08/19/2011 14:39	**Analyst:**	ACJ	**Inj. Vol:**	1 uL
Data File:	081911\4A509.D	**Column:**	DB-MTBE		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
	Gasoline Range Organics	U *U*	50.0	ug/L	10.5	50.0

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 284289 **METHOD TYPE:** SW846

SAMPLE ID: 284289001 **CLIENT ID:** BAKERTANK

CONTRACT: SAIC00111

MATRIX: Water **DATE RECEIVED** 18-AUG-11 **LEVEL:** Low **%SOLIDS:**

CAS No	Analyte	Result		Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7439-89-6	Iron	160	=	ug/L			P	30	1	OPTIMA	081911-1

***Analytical Methods:**

P	SW846 6010B
MS	SW846 6020
AV	SW846 7470A/7471A
AF	EPA 1631E

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

Certificate of Analysis

Report Date: August 25, 2011

Company : Science Applications International Corporation
Address : 151 Lafayette Drive

Oak Ridge, Tennessee 37831
Contact: Ms. Marie Simpson
Project: Hunter Pilot Study

Client Sample ID: BAKERTANK
Sample ID: 284289001
Matrix: Water
Collect Date: 17-AUG-11 13:44
Receive Date: 18-AUG-11
Collector: Client

Project: SAIC00111
Client ID: SAIC117

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
EPA 150.1 pH "As Received"											
pH at Temp 19.1C		7.84 J A03	0.010	0.100	SU	1	LXH2	08/18/11	1904	1133992	1
Flow Injection Analysis											
EPA 420.4 Total Phenols "As Received"											
Total Phenol		ND U	1.60	5.00	ug/L	1	SDS	08/19/11	0836	1133718	2
Spectrometric Analysis											
EPA 410.4 Chem. Oxygen Demand "As Received"											
COD		26.4 U F01, F07	6.50	20.0	mg/L	1	BYV1	08/19/11	1418	1133986	3
Titration Analysis											
SM 2340 C Total Hardness "As Received"											
Hardness as CaCO3		130 =	2.00	4.00	mg/L		LXA1	08/19/11	1315	1133987	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 420.4	EPA 420.4 Phenols, Total in liquid PREP	AXS5	08/18/11	1406	1133717

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 150.1	
2	EPA 420.4	
3	EPA 410.4	
4	SM 2340 C	

DATA VALIDATION COPY

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

Certificate of Analysis

Report Date: August 25, 2011

Company : Science Applications International Corporation
Address : 151 Lafayette Drive

Oak Ridge, Tennessee 37831
Contact: Ms. Marie Simpson
Project: Hunter Pilot Study

Client Sample ID: BAKERTANK
Sample ID: 284289002
Matrix: Water
Collect Date: 17-AUG-11 13:44
Receive Date: 18-AUG-11
Collector: Client

Project: SAIC00111
Client ID: SAIC117

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Oil & Grease Analysis												
EPA 1664A n-Hexane Extractable Material (Oil and G "As Received"												
Oil and Grease		ND	UJ H02	1.63	5.81	mg/L		JXT1	08/19/11	0639	1134009	1
Solids Analysis												
SM 2540D Total Suspended Liq "As Received"												
Total Suspended Solids		ND	U	0.606	2.66	mg/L		JXT1	08/18/11	1129	1133589	2
SM2540C Solids, Dissolved "As Received"												
Total Dissolved Solids		267	=	3.40	14.3	mg/L		JXT1	08/18/11	1129	1133588	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1664A	
2	SM 2540D	
3	SM 2540C	

DUPLICATION
COPY

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

Certificate of Analysis

Report Date: August 25, 2011

Company : Science Applications International Corporation
Address : 151 Lafayette Drive

Oak Ridge, Tennessee 37831
Contact: Ms. Marie Simpson
Project: Hunter Pilot Study

Client Sample ID: BAKERTANK
Sample ID: 284290001
Matrix: Water
Collect Date: 17-AUG-11 13:44
Receive Date: 18-AUG-11
Collector: Client

Project: SAIC00111
Client ID: SAIC117

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Micro-biology											
SM18_5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND UJ A03	1.00	2.00	mg/L		LXH2	08/19/11	0607	1133989	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 18-5210B	

DATA VALIDATION
COPY

APPENDIX D

UIC PERMIT REQUEST 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"
Resources Optimize Compliance Keep improving

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 E

BI-WEEKLY LETTER UPDATES

October 5, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for August 18 and 30, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on August 18 and 30, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01.

Installation of an injection/multi-phase extraction system was completed in August 2011 as described by SAIC in the *Pilot Study Interim Progress Report for Corrective Actions at Bulk Fuel Facility (HAA-09), Former UST 117, AST 7009, Hunter Army Airfield, Georgia, Facility ID #9-025113**2, dated October 2011. Sample port locations and a general process flow diagram are shown in Figure 1.

On August 18, 2011, an air sample was collected from the discharge of the treatment system air stripper (SP402). The air sample was analyzed for volatile organic compounds (VOCs). Thirteen VOCs were detected at the concentrations shown in Table 1.

On August 30, 2011, process water samples were collected from four locations within the treatment system

- 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.

All four samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for VOCs, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 2. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

Data shown in Tables 1 and 2 have not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

The second bi-weekly sampling event occurred on September 15, 2011. Results will be summarized in an upcoming letter report.

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc with enclosures:
Zsolt Haverland (USACE-Savannah District)
Algeana Stevenson (Fort Stewart)
Bijan Rahbar (Georgia Department of Natural Resources)
Martha Turpin, Contract Representative (SAIC)
Project File (SAIC)
Central Records (SAIC)

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Table 1. Volatile Organic Compounds Detected in Air Sample

Date		**08/18/11**
Sample Location		**SP402**
Sample ID	**Units**	**AIRSTART**
1,2,4-Trimethylbenzene	ppb_v	7,700 J
1,3,5-Trimethylbenzene	ppb_v	2,800 J
1-Ethyl-4-methylbenzene	ppb_v	2,600 J
2,2,4-Trimethylpentane	ppb_v	36,000 J
Acetone	ppb_v	2,400 J
Benzene	ppb_v	64
Carbon Disulfide	ppb_v	10
Cyclohexane	ppb_v	1,300
Ethylbenzene	ppb_v	2,000 J
Heptane	ppb_v	390
Hexane	ppb_v	480
m,p-Xylene	ppb_v	3,800 J
o-Xylene	ppb_v	73

Note: Only detected analytes are shown.
ppb_v = Parts per billion by volume.
Laboratory Qualifier
J = Detected at an estimated concentration.

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Table 2. Analytical Results of Process Water Samples

Date		08/31/11	08/31/11	08/31/11	08/31/11
Sample Location		**SP602**	**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF60208BE**	**BF80108BE**	**BF80208BE**	**BF80308BE**
Volatile Organic Compounds[a]					
2-Butanone	µg/L	NA	NA	NA	2.24 J
Acetone	µg/L	NA	NA	NA	8.14
Carbon Disulfide	µg/L	NA	NA	NA	18
Chloromethane	µg/L	NA	NA	NA	1.14
Total Petroleum Hydrocarbons					
DRO	mg/L	0.969	8.59	1.70	0.804
GRO	mg/L	0.0577	0.0510	0.0500 U	0.0500
Miscellaneous					
BOD	mg/L	NA	NA	NA	1.52 J
COD	mg/L	NA	NA	NA	52.4
Hardness (as $CaCO_3$)	mg/L	NA	NA	NA	152
Iron	mg/L	NA	NA	NA	0.100
Oil and Grease	mg/L	NA	NA	NA	1.58 J
pH	SU	NA	NA	NA	7.69
Phenol	mg/L	NA	NA	NA	0.00324 J
TDS	mg/L	NA	NA	NA	286
TSS	mg/L	NA	NA	NA	1.31 U

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

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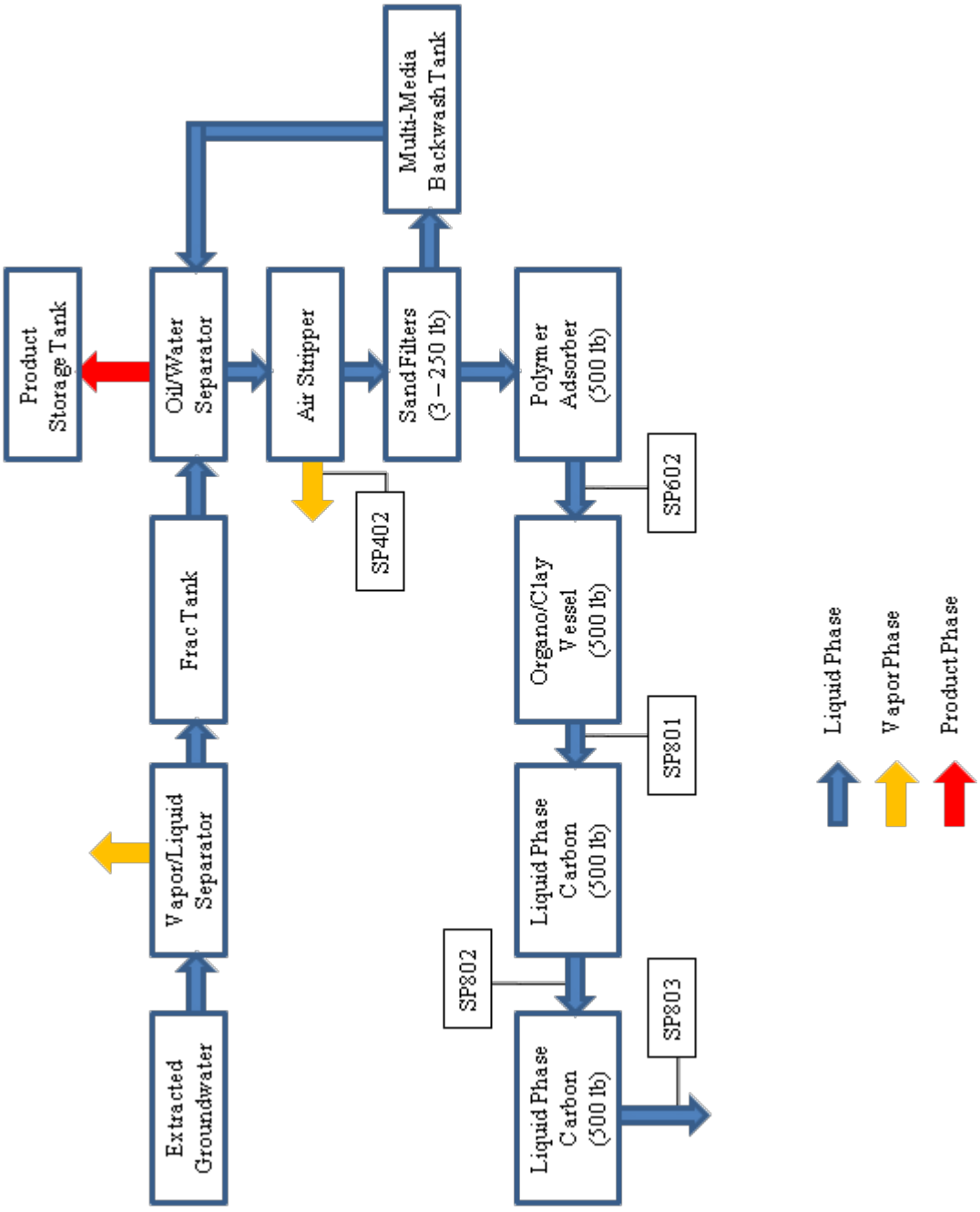

Figure 1. Sample Port Locations

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

October 7, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for September 15, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on September 15, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the second bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of September 15, 2011, approximately 6,500 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

Process water samples were collected from four locations within the treatment system:

- 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.

All four samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 1. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

Data shown in Table 1 have not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

The third biweekly sampling event was conducted on September 30, 2011. Results will be summarized in an upcoming letter report.

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:

Zsolt Haverland (USACE-Savannah District)
Algeana Stevenson (Fort Stewart)
Bijan Rahbar (Georgia EPD)
Project File (SAIC)
Central Records (SAIC)

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Table 1. Analytical Results of Process Water Samples

Date		**9/15/2011**	**9/15/2011**	**9/15/2011**	**9/15/2011**
Sample Location		**SP602**	**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF60209AE**	**BF80109AE**	**BF80209AE**	**BF80309AE**
Volatile Organic Compounds[a]					
Acetone	µg/L	NA	NA	NA	5.71
Total Petroleum Hydrocarbons					
DRO	mg/L	3.57	0.915	1	0.582
GRO	mg/L	0.0146 J	0.0500 U	0.0500 U	0.0500 U
Miscellaneous					
BOD	mg/L	NA	NA	NA	1.64 J
COD	mg/L	NA	NA	NA	60.4
Hardness (as $CaCO_3$)	mg/L	NA	NA	NA	198
Iron	mg/L	NA	NA	NA	14.2
Oil and Grease	mg/L	NA	NA	NA	1.63 J
pH	SU	NA	NA	NA	6.3
Phenol	mg/L	NA	NA	NA	0.0016 U
TDS	mg/L	NA	NA	NA	394
TSS	mg/L	NA	NA	NA	0.76 U

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

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October 20, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for September 29 and 30, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on September 29 and 30, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the third bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of September 30, 2011, approximately 8,500 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On September 29, an air sample was collected from the discharge of the treatment system air stripper (SP402) and analyzed for volatile organic compounds (VOCs). Six VOCs were detected at the concentrations shown in Table 1.

On September 30, process water samples were collected from four locations within the treatment system:

- 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.

All four samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 2. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

Data shown in Tables 1 and 2 reflects preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

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Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:

Zsolt Haverland (USACE-Savannah District)
Algeana Stevenson (Fort Stewart)
Bijan Rahbar (Georgia EPD)
Project File (SAIC)
Central Records (SAIC)

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Table 1. Volatile Organic Compounds Detected in Air Sample

Date		**09/29/2011**
Sample Location		**SP402**
Sample ID	**Units**	**BF40209BA**
Acetone	ppb_v	31
Cyclohexane	ppb_v	40
Ethylbenzene	ppb_v	6.6
Methylene Chloride	ppb_v	3.1 J
m,p-Xylene	ppb_v	32
o-Xylene	ppb_v	0.7

Note: Only detected analytes are shown.
ppb_v = Parts per billion by volume.
Laboratory Qualifier
J = Detected at an estimated concentration.

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Table 2. Analytical Results of Process Water Samples

Date		9/30/2011	9/30/2011	9/30/2011	9/30/2011
Sample Location		**SP602**	**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF60209BE**	**BF80109BE**	**BF80209BE**	**BF80309BE**
Volatile Organic Compounds[a]					
Carbon Disulfide	µg/L	NA	NA	NA	3.50 J
Total Petroleum Hydrocarbons					
DRO	mg/L	21.9	32.2	16.1	9.27
GRO	mg/L	24.9 J	81.5	20.0 J	11.2 J
Miscellaneous					
BOD	mg/L	NA	NA	NA	4.06
COD	mg/L	NA	NA	NA	66.5
Hardness (as $CaCO_3$)	mg/L	NA	NA	NA	188
Iron	mg/L	NA	NA	NA	1.98
Oil and Grease	mg/L	NA	NA	NA	10.7
pH	SU	NA	NA	NA	7.25
Phenol	mg/L	NA	NA	NA	1.60 U
TDS	mg/L	NA	NA	NA	321
TSS	mg/L	NA	NA	NA	3.20 J

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

November 21, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for October 26 and 27, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on October 26 and 27, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the fourth bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. No mid-month samples were collected in the month of October as replacement injection wells were being installed and the treatment system was, therefore, not operating. As of October 19, 2011, the treatment system (including initial setup and system testing) had used approximately 39,040 gallons of potable water from the fire hydrant located at the site. As of October 27, 2011, approximately 12,600 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On October 27, an air sample was collected from the discharge of the treatment system air stripper (SP402) and analyzed for volatile organic compounds (VOCs). Eight VOCs were detected at the concentrations shown in Table 1.

On October 26, process water samples were collected from three locations within the treatment system:

- 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.

A sample was not collected from SP602, located between the polymer absorber and the organo/clay vessel, as process valves for the sand filter media were temporarily closed pending replacement of the sand filter media. All three process water samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 2. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

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Data shown in Tables 1 and 2 reflects preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:

Zsolt Haverland (USACE-Savannah District)
Algeana Stevenson (Fort Stewart)
Bijan Rahbar (Georgia EPD)
Project File (SAIC)
Central Records (SAIC)

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Table 1. Volatile Organic Compounds Detected in Air Sample

Date		**10/27/2011**
Sample Location		**SP402**
Sample ID	**Units**	**BF40210BA**
2-Butanone	ppb_v	1.1 J
Acetone	ppb_v	30
Carbon Disulfide	ppb_v	3.9 J
Benzene	ppb_v	14
Ethylbenzene	ppb_v	15
Methylene Chloride	ppb_v	1.7
m,p-Xylene	ppb_v	54
o-Xylene	ppb_v	15

Note: Only detected analytes are shown.
ppb_v = Parts per billion by volume.
Laboratory Qualifier
J = Detected at an estimated concentration.

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Table 2. Analytical Results of Process Water Samples

Date		**10/26/2011**	**10/26/2011**	**10/26/2011**
Sample Location		**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF80110AE**	**BF80210AE**	**BF80310AE**
Volatile Organic Compounds[a]				
Acetone	µg/L	NA	NA	2.14 J
Total Petroleum Hydrocarbons				
DRO	mg/L	15.5	2.52	1.13
GRO	mg/L	0.0633	0.0500 U	0.0500 U
Miscellaneous				
BOD	mg/L	NA	NA	1.28 J
COD	mg/L	NA	NA	32.4
Hardness (as $CaCO_3$)	mg/L	NA	NA	165
Iron	mg/L	NA	NA	0.283
Oil and Grease	mg/L	NA	NA	2.15 J
pH	SU	NA	NA	7.97
Phenol	mg/L	NA	NA	0.00388 J
TDS	mg/L	NA	NA	327
TSS	mg/L	NA	NA	2.58 U

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

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December 22, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for November 16, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on November 16, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the fifth bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of November 16, 2011, the treatment system (including initial setup and system testing) had used approximately 53,526 gallons of potable water from the fire hydrant located at the site. As of November 15, 2011, approximately 30,000 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On November 16, process water samples were collected from three locations within the treatment system:

- 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.

A sample was not collected from SP602, located between the polymer absorber and the organo/clay vessel, as process valves for the sand filter media were temporarily closed pending replacement of the sand filter media. All three process water samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 1. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

Data shown in Table 1 reflect preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:

Zsolt Haverland (USACE-Savannah District)
Algeana Stevenson (Fort Stewart)
Bijan Rahbar (Georgia EPD)
Project File (SAIC)
Central Records (SAIC)

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

Table 1. Analytical Results of Process Water Samples

Date		**11/16/2011**	**11/16/2011**	**11/16/2011**
Sample Location		**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF80111AE**	**BF80211AE**	**BF80311AE**
Volatile Organic Compounds[a]	µg/L	NA	NA	ND
Total Petroleum Hydrocarbons				
DRO	mg/L	14.8 J	9.33 J	6.28 J
GRO	mg/L	0.0500 U	0.0500 U	0.0500 U
Miscellaneous				
BOD	mg/L	NA	NA	3.59
COD	mg/L	NA	NA	53.1
Hardness (as $CaCO_3$)	mg/L	NA	NA	198
Iron	mg/L	NA	NA	1.600
Oil and Grease	mg/L	NA	NA	8.39
pH	SU	NA	NA	7.56
Phenol	mg/L	NA	NA	0.00794
TDS	mg/L	NA	NA	321
TSS	mg/L	NA	NA	1.69 J

[a] Only detected volatile organic compounds are shown; in this sampling event, none were detected.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
ND = Not detected.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

151 Lafayette Drive / PO Box 2501 / Oak Ridge, TN 37831 / tel: 865.481.4600 / fax: 865.482.7257

December 23, 2011

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for November 30, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on November 30, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the sixth bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of November 30, 2011, the treatment system (including initial setup and system testing) had used approximately 56,740 gallons of potable water from the fire hydrant located at the site and approximately 36,500 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On November 30, an air sample was collected from the discharge of the treatment system air stripper (SP402) and analyzed for volatile organic compounds (VOCs). Eight VOCs were detected at the concentrations shown in Table 1.

On November 30, process water samples were collected from three locations within the treatment system:

- 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.

A sample was not collected from SP602, located between the polymer absorber and the organo/clay vessel, as process valves for the sand filter media were temporarily closed pending replacement of the sand filter media. All three process water samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 2. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

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Data shown in Tables 1 and 2 reflects preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:
Zsolt Haverland (USACE-Savannah District)
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Bijan Rahbar (Georgia EPD)
Project File (SAIC)
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Table 1. Volatile Organic Compounds Detected in Air Sample

Date		**11/30/2011**
Sample Location		**SP402**
Sample ID	**Units**	**BF40211BA**
Acetone	ppb_v	18
Carbon Disulfide	ppb_v	1.2 J
Cyclohexane	ppb_v	65
Benzene	ppb_v	3.6 J
Ethylbenzene	ppb_v	3.2 J
Methylene Chloride	ppb_v	1.9 J
m,p-Xylene	ppb_v	11
o-Xylene	ppb_v	3.1 J

Note: Only detected analytes are shown.
ppb_v = Parts per billion by volume.
Laboratory Qualifier
J = Detected at an estimated concentration.

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Table 2. Analytical Results of Process Water Samples

Date		**11/30/2011**	**11/30/2011**	**11/30/2011**
Sample Location		**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF80111BE**	**BF80211BE**	**BF80311BE**
Volatile Organic Compounds[a]				
Acetone	µg/L	NA	NA	30.5
Total Petroleum Hydrocarbons				
DRO	mg/L	27.5	17.5	10.6
GRO	mg/L	0.0168 J	0.0154 J	0.050 U
Miscellaneous				
BOD	mg/L	NA	NA	15.4
COD	mg/L	NA	NA	149
Hardness (as $CaCO_3$)	mg/L	NA	NA	148
Iron	mg/L	NA	NA	10.700
Oil and Grease	mg/L	NA	NA	17.8
pH	SU	NA	NA	6.72
Phenol	mg/L	NA	NA	0.022
TDS	mg/L	NA	NA	263
TSS	mg/L	NA	NA	34.4

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

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January 10, 2012

Ana Vergara
U. S. Army Corps of Engineers - Savannah District
CESAS-PM-H
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for December 15, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on December 15, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the seventh bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of December 15, 2011, the treatment system (including initial setup and system testing) had used approximately 60,700 gallons of potable water from the fire hydrant located at the site and approximately 41,000 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On December 15, process water samples were collected from three locations within the treatment system:

- 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.

A sample was not collected from SP602, located between the polymer absorber and the organo/clay vessel, as process valves for the sand filter media were temporarily closed pending replacement of the sand filter media. All three process water samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 1. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

Data shown in Table 1 reflect preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

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Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
Project Manager

cc:

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Table 1. Analytical Results of Process Water Samples

Date		**12/15/2011**	**12/15/2011**	**12/15/2011**
Sample Location		**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF80112AE**	**BF80212AE**	**BF80312AE**
Volatile Organic Compounds[a]				
2-Butanone	µg/L	NA	NA	1.77 J
Acetone	µg/L	NA	NA	56.6 J
Methyl acetate	µg/L	NA	NA	1.37 J
Total Petroleum Hydrocarbons				
DRO	mg/L	3.13 J	9.71 J	7.05 J
GRO	mg/L	0.0139 J	0.0181 J	0.050 U
Miscellaneous				
BOD	mg/L	NA	NA	30.7 J
COD	mg/L	NA	NA	187
Hardness (as $CaCO_3$)	mg/L	NA	NA	99.9
Iron	mg/L	NA	NA	90.20
Oil and Grease	mg/L	NA	NA	4.61 J
pH	SU	NA	NA	6.66 J
Phenol	mg/L	NA	NA	479 J
TDS	mg/L	NA	NA	307
TSS	mg/L	NA	NA	1.63 J

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
ND = Not detected.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
U = Not detected at the concentration shown.

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January 20, 2012

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Reference: **Contract Number W91278-10-D-0089, Delivery Order Number CV01, Product Recovery System Pilot Study for the Bulk Fuel Facility (HAA-09), Former UST 117, Building 7009, at Hunter Army Airfield, Georgia**

Subject: **Letter Report for December 29, 2011, Sampling Results**

Dear Ms. Vergara:

This letter report documents the results of sampling activities conducted on December 29, 2011, by Science Applications International Corporation (SAIC) as part of the Product Recovery System Pilot Study at the Bulk Fuel Facility under Contract W91278-10-D-0089, Delivery Order CV01. These sampling activities represent the eighth bi-weekly sampling event following start up of the injection/multi-phase extraction treatment system. As of December 29, 2011, the treatment system (including initial setup and system testing) had used approximately 68,900 gallons of potable water from the fire hydrant located at the site and approximately 48,500 gallons of surfactant solution (approximately 5% Biosolve) had been injected at the Bulk Fuel Facility.

On December 29, 2011, an air sample was collected from the discharge of the treatment system air stripper (SP402) and analyzed for volatile organic compounds (VOCs). Nine VOCs were detected at the concentrations shown in Table 1.

On December 29, 2011, process water samples were collected from four locations within the treatment system:

- 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.

All four process water samples were analyzed for diesel-range organics and gasoline-range organics. In addition, the sample from SP803 was analyzed for volatile organic compounds, biological oxygen demand, chemical oxygen demand, hardness, iron, oil and grease, pH, phenol, total dissolved solids, and total suspended solids. Results of these analyses are shown in Table 2. Please note that results of the sample collected from SP803, representative of discharge from the treatment system, continue to meet acceptance criteria of the Hunter waste water treatment plant.

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Data shown in Tables 1 and 2 reflects preliminary results not yet been validated by SAIC and are, therefore, shown with laboratory qualifiers as appropriate. Validated data will be included in a future report following completion of the pilot study.

Should you have any questions regarding this submittal, please do not hesitate to contact me by telephone at (865) 481-8792 or patricia.a.stoll@saic.com.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Patricia A. Stoll
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Table 1. Volatile Organic Compounds Detected in Air Sample

Date		**12/29/2011**
Sample Location		**SP402**
Sample ID	**Units**	**BF40212BA**
2-Butanone	ppb_v	1.1 J
Acetone	ppb_v	61
Carbon Disulfide	ppb_v	2.9 J
Cyclohexane	ppb_v	100
Benzene	ppb_v	4.7 J
Ethylbenzene	ppb_v	17
Methylene Chloride	ppb_v	1.9 J
m,p-Xylene	ppb_v	43
o-Xylene	ppb_v	5.4

Note: Only detected analytes are shown.
ppb_v = Parts per billion by volume.
Laboratory Qualifier
J = Detected at an estimated concentration.

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Table 2. Analytical Results of Process Water Samples

Date		12/29/2011	12/29/2011	12/29/2011	12/29/2011
Sample Location		**SP602**	**SP801**	**SP802**	**SP803**
Sample ID	**Units**	**BF60212BE**	**BF80112BE**	**BF80212BE**	**BF80312BE**
Volatile Organic Compounds[a]					
Acetone	µg/L	NA	NA	NA	2.80 J
Total Petroleum Hydrocarbons					
DRO	mg/L	8.89	91.3	16.9	9.59
GRO	mg/L	0.502	0.561	0.224	0.0367 J
Miscellaneous					
BOD	mg/L	NA	NA	NA	30.6
COD	mg/L	NA	NA	NA	118
Hardness (as $CaCO_3$)	mg/L	NA	NA	NA	99.5
Iron	mg/L	NA	NA	NA	2.710
Oil and Grease	mg/L	NA	NA	NA	5.81
pH	SU	NA	NA	NA	6.21
Phenol	mg/L	NA	NA	NA	0.0052
TDS	mg/L	NA	NA	NA	297
TSS	mg/L	NA	NA	NA	5.08

[a] Only detected volatile organic compounds are shown.
BOD = Biological oxygen demand.
COD = Chemical oxygen demand.
DRO = Diesel-range organics.
GRO = Gasoline-range organics.
NA = Not analyzed.
SU = Standard unit.
TDS = Total dissolved solids.
TSS = Total suspended solids.
Laboratory Qualifiers
J = Detected at an estimated concentration.
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