FINAL

CORRECTIVE ACTION PLAN - PART A REPORT

FOR

Facility ID #9-089064
Underground Storage Tank 1
At
Building 1841
Fort Stewart, Georgia

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

CONTRACT No. DACA21-95-D-0022
DELIVERY ORDER 0003

April 1997

SAIC®

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FOR
FACILITY ID #9-089064
UNDERGROUND STORAGE TANK 1
AT
BUILDING 1841
FORT STEWART, GEORGIA

Prepared for:

U.S. Army Corps of Engineers - Savannah District
and
Fort Stewart Directorate of Public Works
Under Contract Number DACA21-95-D-0022
Delivery Order 0003

Prepared by:

Science Applications International Corporation
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831

April 1997

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LIST OF ACRONYMS

Anderson Columbia	Anderson Columbia Environmental, Inc.
ATL	Alternate Threshold Level
BTEX	benzene, toluene, ethylbenzene, xylenes
CAP	Corrective Action Plan
DPW	Directorate of Public Works
FSMR	Fort Stewart Military Reservation
GDNR	Georgia Department of Natural Resources
GUST	Georgia Underground Storage Tank
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
µg/L	micrograms per liter
PAH	polynuclear aromatic hydrocarbon
PVC	polyvinyl chloride
QCSR	Quality Control Summary Report
SAIC	Science Applications International Corporation
TPH	total petroleum hydrocarbon
USACE	U.S. Army Corps of Engineers
UST	underground storage tank

I. CORRECTIVE ACTION PLAN - PART A FORM & CERTIFICATION

This document represents the Corrective Action Plan (CAP)-Part A Report for underground storage tank (UST) 1 that was located at Building 1841 (Facility ID #9-089064), Fort Stewart, Georgia. This report has been prepared in accordance with requirements defined in the Georgia Underground Storage Tank (GUST) CAP-Part A guidance document GUST-7A *Underground Storage Tank Release: Corrective Action Plan - Part A Content*. The version of guidance document GUST-7A used for this report was issued by the Georgia Department of Natural Resources (GDNR), Environmental Protection Division, Underground Storage Tank Management Program, in November 1995.

Part I of this report contains the completed CAP-Part A form and certification. Supporting documentation related to information indicated on the CAP-Part A form is presented in Parts II through VI of the report, and in the attached appendices.

Georgia Department of Natural Resources

Environmental Protection Division

Underground Storage Tank Management Program
4244 International Parkway, Suite 104, Atlanta, Georgia 30354
Lonice C. Barrett, Commissioner
Harold Reheis, Director
(404)362-2687

CORRECTIVE ACTION PLAN
PART A

Facility Name: Building 1841 Area, UST 1 Site

Street Address: McFarland Avenue north of W. 15th Street

City: Fort Stewart County: Liberty Facility ID: 9-089064

Submitted by UST Owner/Operator:	**Prepared by:**
Name: John H. Spears	Name: Patricia Stoll
Company: U.S. Army/HQ3d Inf. Div. (Mech.)	Company: SAIC
Address: ATTN: AFZP-DEV (Spears) Building 1139	Address: 800 Oak Ridge Turnpike
City: Fort Stewart State: Georgia	City: Oak Ridge State: Tennessee
Zip Code: 31314-5000	Zip Code: 37830

I. PLAN CERTIFICATION:

A. UST Owner/Operator

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

Name: John H. Spears

Signature: ______________________ Date: __________

B. Professional Engineer or Professional Geologist

I hereby certify that I have directed the field work and preparation of this plan, in accordance with State Rules and Regulations. As a registered geologist and/or engineer, I certify that I am a qualified groundwater professional, as defined by the Georgia State Board of Professional Geologists. All of the information and laboratory data in this plan and in all of the attachments are true, accurate, complete, and in accordance with applicable State Rules and Regulations.

Name: Patricia Stoll

Signature:

Date: 4/4/97

22851
P. A. STOLL

Georgia Stamp or Seal

Please complete the following form, check all of the boxes below that apply, and attached supporting documentation (such as narrative, figures, tables, maps, boring/well logs, etc.) where specified and applicable. Supporting documentation should be three-hole punched and prepared in conformity with the attached guidance document "Underground Storage Tank (UST) Release: Corrective Action Plan - Part A (CAP-A) Content", GUST-7A.

II. INITIAL RESPONSE REPORT:

A. Initial Abatement:

☒ No Action Required

☐ Further Release or Migration of Contaminants Prevented

☐ Fire And Safety Hazards From Vapors And/Or Free Product Monitored and Mitigated

☐ Other (specify) ______________________________

____

B. Free Product Removal:

☒ No Free Product Identified As Originating From Release

☐ Free Product (Non-Aqueous Phase Hydrocarbons) Removed by:

- ☐ Manual Bailing
- ☐ Passive Skimming
- ☐ Automated Skimming
- ☐ Automated Total Fluids Pumping, With Treatment System And Approved Wastewater Discharge
- ☐ Other (specify) ______________________________

  ____

C. Tank History

☒ Site Map Attached Identifying Former and/or Existing USTs

☐ Not Applicable

D. Initial Site Characterization:

☒ Site Map: include the following items on an attached site map

- Tank Pit Area
- Piping Trenches
- Dispensers
- Sewer Lines (if present)
- Water Lines
- North Arrow
- Sample Locations (with sample numbers and depths)
- Tanks with ID#s, corresponding to Notification Form 7530-1
- Scale 1 in = 40 ft

1. Regulated Substance Released

☐ Gasoline ☐ Diesel ☐ Kerosene ☒ Waste oil

☐ Other ____________________

2. Source of Contamination

Number of USTs: in use 0 ; closed/removed 1

☐ Existing UST System(s): ☐ piping ☐ tank ☐ other

☒ Former UST System(s): ☒ piping ☐ tank ☒ other

3. Impacted Environmental Media

☒ Groundwater

☐ Free product

☒ Dissolved (BTEX and/or PAH) contamination exceeding:

☐ In-stream water quality standards

☒ Drinking water Maximum Contaminant Levels (MCLs)

☒ Soil Exceeding:

☐ Laboratory Detection Limits, but TPH is vertically delineated to Below Detection Limits (BDL) above the groundwater table or a groundwater sample from the worst-case location has BTEX and/or PAHs below applicable Drinking and/or In-stream water quality standards.

☒ Thresholds listed in Table A, Rule 391-3-15-.09

☐ Thresholds listed in Table B, Rule 391-3-15-.09

☐ Alternate Threshold Levels (ATLs) (Reference Appendix I)

D. **Initial Site Characterization** (continued):

☐ Drinking Water Supply Impacted

☐ Surface Water Impacted

☒ Attach Laboratory Analytical Data: the following items must be included

- Laboratory Method
- Date of Analysis
- Signed Chain of Custody
- Date of Sampling
- Detection Limits
- Quality Control Data

4. Local Water Resources

☒ Drinking Water Supplies Located In:

High or average groundwater pollution susceptibility area:*

☒ Public water systems within 2.0 miles

☐ Non-public water systems within 0.5 mile

Low groundwater pollution susceptibility area:*

☐ Public water systems within 1.0 mile

☐ Non-public water systems within 0.25 mile

* As defined by the Groundwater Pollution Susceptibility Map of Georgia.

☒ Surface Water Bodies: Distance (nearest) 2090 feet (regardless of hydraulic gradient)

☒ Attach Documentation of Water Supply Survey and Field Reconnaissance

5. Other Hydrogeologic Data (specify values)

☒ Depth To Groundwater (shallowest) 3.36 feet BGS

☒ Groundwater Flow Direction South to North

☒ Hydraulic Gradient 0.58 feet/feet

6. Corrective Action Completed Or In-Progress

☒ USTs/Source Removed (after confirmed release)

☐ Excavation And Treatment/Disposal Of Contaminated Backfill Materials & Native Soils
  ☐ Attach manifest of proper soil disposal

☐ Other (specify) ______

D. **Initial Site Characterization** (continued):

7. Conclusions And Recommendations

   ☐ No Further Action Required, including the preparation or implementation of a Site Investigation Plan

   OR

   ☒ Prepare Corrective Action Plan - Part B, with a schedule for SIP implementation and submittal of CAP-Part B

8. Site Ranking

   Environmental Sensitivity Score: 1000
   (see Appendix II)

III. SITE INVESTIGATION PLAN:

A. Horizontal And Vertical Extent Of Contaminants In:

☐ Soil

☐ Groundwater

  ☐ Free product

  ☐ Dissolved phase

☐ Surface Water

B. Vadose Zone and Aquifer Characteristics:

☐ Vertical Soil Permeability (Optional)

☐ Infiltration Rate (Optional)

☐ Saturated Horizontal Hydraulic Conductivity

☐ Total Organic Carbon (Optional)

☐ Dissolved Iron (Optional)

☐ Effective Porosity

☐ Seepage Velocity

☐ Grain-size Distribution (Optional)

☐ Total Petroleum Hydrocarbons (Optional)

☐ Pilot Test(s) (Optional)

☒ Other (specify) No further investigation required

IV.

d Letters to Adjacent and Potentially Affected Property
nd Local Officials

tice in Newspaper, as pre-approved by EPD

D Approved Method (specify): ______________________________

____

V. **MBURSEMENT:** (For GUST Trust Fund sites only)

ust Fund Application (GUST-36), must be attached if applicable

oposal

Non-Reimbursable Costs

OR

Reimbursable Costs

☐ Invoices and Proofs-of-Payment, per GUST-91

☐ Total Projected Costs to implement the Site Investigation Report (SIR) and prepare data for the Site Investigation Review Meeting, per GUST-91

nt Schedule for Reimbursement

II. INITIAL RESPONSE REPORT

A. Initial Abatement

No actions were required to abate imminent hazards and/or emergency conditions at the UST 1, Facility ID #9-089064, site because contaminant migration and release prevention, fire and vapor mitigation, or emergency free product removal were not required prior to or during the removal of this tank.

B. Free Product Removal

No free product was identified as originating from the release that occurred at the site. Therefore, free product removal at this site was not required.

C. Tank History

UST 1 was previously located within the Building 1841 area in the northwest quadrant of the Fort Stewart garrison area. The location of the tank within the Building 1841 area is illustrated in Figure II-1. According to operational information maintained by the Fort Stewart Directorate of Public Works (DPW), UST 1 had a capacity of 1,000 gallons and was used for the storage of waste oil. The tank was constructed of fiberglass reinforced plastic and the associated piping was galvanized steel. The tank and piping were installed on or about January 1, 1982 and the system was last used in April 1995. The tank and piping were excavated and removed on June 19, 1995.

D. Initial Site Characterization

Characterization of petroleum-related contamination at the site was initiated during the tank removal activities on June 19, 1995. After removal of the tank and ancillary piping, six soil samples were collected from the tank pit excavation by Anderson Columbia Environmental, Inc. (Anderson Columbia), the contractor responsible for the tank removal. The location where each of these samples was collected is illustrated in Figure II-2. According to the field report prepared by Anderson Columbia for the site, the soil samples were collected two feet below both ends of the excavated tank and from the excavation walls (Anderson Columbia 1995). However, the depth below ground level from which each of the samples was collected was not identified in the field report.

Analytical results reported for these soil samples are presented in Table II-1. The soil results were compared to the applicable soil threshold levels for Facility ID #9-089064. The applicable threshold levels for the site are those listed in Table A (GDNR Rules for Underground Storage Tank Management, Chapter 391-3-15) for the Average or Higher Groundwater Pollution Susceptibility Area, Column 2, greater than 500 feet to a withdrawal point. Documentation supporting the use of this threshold level category is presented in Section D.4 of this report. Based on this comparison, it was determined that benzene was present at concentrations exceeding the applicable soil threshold level of 0.008 milligrams per kilogram (mg/kg). Total petroleum hydrocarbon (TPH) concentrations ranging between <11.4 mg/kg and 1150 mg/kg were also reported.

Based on these findings, the U.S. Army Corps of Engineers (USACE) - Savannah District and Fort Stewart DPW contracted Science Applications International Corporation (SAIC) to perform a CAP-Part A investigation of the site, and numerous other UST sites located throughout the Fort Stewart garrison area. The scope developed by the USACE-Savannah District and Fort Stewart DPW for the initial site investigation was as follows:

1. Drill two soil boreholes, both located with the former UST 1 pit, down to the local water table using a hollow-stem auger rig.

2. Continuously collect soil samples at 2.5-foot intervals during borehole drilling and perform field headspace gas analysis on each sample to determine organic vapor concentration.

3. Select one or two soil samples for laboratory chemical analysis from each borehole drilled. Chemical parameters for soil samples submitted for laboratory analysis included benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAH), and TPH.

   In boreholes where organic vapors were detected, collect one sample from the 2.5-foot interval where the highest vapor concentration was encountered, and the other from the 2.5-foot interval located immediately above or at the water table.

   In boreholes where no organic vapors were detected, collect one sample from the 2.5-foot interval located near the mid-depth point between the ground surface and the water table.

4. Upon reaching the water table, collect one groundwater sample from each borehole using a Hydropunch II, or similar sampling device. Chemical parameters for groundwater samples submitted for laboratory analysis included BTEX and PAH.

5. After completion of all soil and groundwater sampling, install a temporary polyvinyl chloride (PVC) piezometer within each drilled borehole. Measure static groundwater level 24 hours after piezometer installation, remove each piezometer, and abandon each borehole by grouting to the surface.

The rationale for the design of the site investigation was based on the results from the sampling conducted during the tank removal. These results were insufficient to determine the vertical and horizontal extent of contamination in soil and groundwater. The site investigation was designed to fulfill these identified data needs.

However, the initial site investigation results were also found to be insufficient to determine the vertical and horizontal extent of contamination at the UST 1 site. Therefore, a subsequent investigation was conducted at the site. The scope for the subsequent investigation was identical to the scope of the initial investigation with the following exceptions:

1. Drill three soil borehoels, all located around the perimeter of the former UST 1 pit, down to the local water table using a hollow-stem auger rig.

2. Select two soil samples for laboratory chemical analysis from each borehole drilled.

   In boreholes where organic vapors were detected, collect one sample from the 2.5-foot interval where the highest vapor concentration was encountered, and the other from the 2.5-foot interval where the lowest concentration was encountered.

   In boreholes where no organic vapors were detected, collect one sample from the 2.5-foot interval located near the mid-depth point between the ground surface and the water table, and the other from the 2.5-foot interval located immediately above or at the water table.

The field work for the site investigation was performed by SAIC during September 1996 (initial investigation) and December 1996 (subsequent investigation). Five soil boreholes (designated 01-01 through 01-05) were drilled at the site down to the following depths: 01-01 (8.0 feet), 01-02 (6.0 feet), 01-03 (10.0 feet), 01-04 (15.0 feet), and 01-05 (10.0 feet). The boreholes were advanced between approximately 0.5 feet to 5.0 feet below the water table to accomplish groundwater sampling using a PowerPunch sampler. Figure II-3 illustrates the locations of the site investigation boreholes, and boring logs recorded during drilling are presented in Appendix A of this report.

Collection of soil samples for laboratory chemical analysis from each of the site investigation boreholes was accomplished as planned. Collection of one groundwater sample from each borehole and measurement of static water levels were also accomplished as planned. However, due to problems encountered regarding the collection of the groundwater samples using the PowerPunch sampler, the samples at the borehole 01-03, 01-04, and 01-05 locations were collected from the pre-cleaned temporary piezometers installed in the boreholes using disposable bailers.

A summary of the soil and groundwater samples submitted for analytical analysis during the site investigation is presented in Table II-2. Additional information regarding the technical approach used by SAIC for implementation of the site investigation is presented in Appendix B of this report. Details regarding the analytical results for soil and groundwater samples collected during the investigation are discussed in Section D.3 of this report.

D.1 Regulated Substance Released

According to operational records maintained by the Fort Stewart DPW, UST 1 was used for waste oil storage. Therefore, waste oil is the only regulated substance believed to have been released at this site.

D.2 Source of Contamination

The location of former UST 1 is illustrated in Figure II-1. Detailed schematics illustrating the location of the tank and ancillary piping as configured during operation is not available. During removal activities, Fort Stewart DPW personnel observed no holes in the tank and, therefore, the source of contamination is believed to have been piping leakage and/or tank overflows. At the present time, the only remaining source of contamination at the site is contaminated soil located below the former tank pit.

D.3 Impacted Environmental Media

D.3.a Soils

A summary of the analytical results for the soil samples collected during the CAP-Part A site investigation at the site is presented in Table II-3. Laboratory data sheets for these samples and the project Quality Control Summary Report (QCSR) are presented in Appendices C-1 and C-3 of this report. Figure II-3 illustrates the site investigation borehole locations and corresponding analytical results for soil samples collected at each location.

Soil sample analytical results were compared to their applicable soil threshold levels. Soil samples collected from the tank pit after the removal of the tank indicated concentrations of benzene in the south side wall of the tank pit above the soil threshold levels.

During the site investigation, trace concentrations of toluene, ethylbenzene, and xylene were detected in samples located in the tank pit and around the perimeter; however, the concentrations were well below the corresponding soil threshold levels. No benzene or PAH compounds were detected. TPH concentrations from the site investigation samples ranged from 12.2 mg/kg to 268 mg/kg.

Evaluation of the nature and extent of the soil contamination at the site was accomplished using analytical data from both the site investigation and the tank removal sampling. Although benzene was detected in the tank pit during closure activities at a concentration exceeding threshold levels, soil samples collected during the initial site characterization of the CAP-Part A investigation showed nondetectable or trace concentrations of BTEX and PAH compounds. Therefore, it is concluded that the soil contamination is limited to the area of the tank pit.

D.3.b Groundwater

A summary of the analytical results for the groundwater samples collected during the CAP-Part A site investigation at the site is presented in Table II-4. Laboratory data sheets for these samples and the project QCSR are presented in Appendices C-2 and C-3 of this report. Figure II-4 illustrates the site investigation borehole locations and corresponding analytical results for groundwater samples collected at each location.

Groundwater sample analytical results were compared to Maximum Contaminant Levels (MCLs) for Safe Drinking Water. No groundwater samples were collected during tank removal activities.

During the site investigation, analytical results of groundwater indicated that benzene concentrations exceeded the corresponding MCL of 5 µg/L. The benzene concentrations were reported to be 77.8 µg/L and 381 µg/L in boreholes 01-01 and 01-02, respectively. No other BTEX compounds were detected above their respective MCLs. In addition, anthracene and naphthalene were detected in groundwater samples at concentrations ranging from 11.1 µg/L to 54.4 µg/L, however, no MCLs exist for these PAH compounds.

Based on an evaluation of the site investigation analytical data, groundwater contaminated with benzene exceeding its MCL is present at the site. However, this contamination appears to be limited to an area in the immediate vicinity of the tank pit.

D.3.c Surface Water Impacted

Based on the estimated nature and extent of petroleum-related groundwater contamination detected at the site, this finding indicates that contamination at the site has not migrated to the point of impacting surface water bodies located in the vicinity of the site. Therefore, collection and analysis of surface water samples were not conducted as part of the site investigation.

D.3.d Drinking Water Supply Impacted

Based on the estimated nature and extent of petroleum-related groundwater contamination detected at the site, this finding indicates that contamination at the site has not migrated to the point of impacting groundwater supply wells located in the vicinity of the site. Therefore, collection and analysis of groundwater samples from vicinity supply wells were not conducted as part of the site investigation.

D.4 Local Water Resources

D.4.a Drinking Water Supplies

According to the Groundwater Pollution Susceptibility Map of Georgia (GDNR 1992), Facility ID #9-089064 is located within an average or higher groundwater pollution susceptibility area. A total of seven groundwater supply wells are located within a 2-mile radius of the Fort Stewart garrison area. Fort Stewart does not use any surface water bodies as water supplies. Documentation of the water supply survey is presented in Appendix D of this report.

Six of these wells are located within the confines of the garrison area. The other well is located at Wright Army Airfield, approximately 1.2 miles northeast of the garrison area. All of the groundwater supply wells are classified as public wells that supply water to Fort Stewart for drinking and nondrinking purposes. These wells are approximately 450 feet in depth and draw groundwater from the Principal Artesian (also known as the Floridan) aquifer. Chlorine and fluoride are added into the groundwater at the well heads prior to being pumped into storage tanks and/or water towers, according to Fort Stewart DPW personnel. The location of these wells along with a 500-foot radius is shown in Figure II-5. Based on the location of Facility ID #9-089064 relative to the identified groundwater supply wells, this site is classified as being located greater than 500 feet to a withdrawal point.

D.4.b Surface Water Bodies

Several surface water bodies are located within a 1-mile radius of the Fort Stewart garrison area. These are shown in Figure II-5 and include Mill Creek, Taylors Creek, Peacock Creek, Childpen's Pond, and two unnamed ponds. Mill Creek extends along the western side of the garrison area and flows into Taylors Creek located approximately 0.75 miles northwest of the garrison area. Taylors Creek then flows northward approximately 3.5 miles to its confluence with Canoochee Creek. Peacock Creek originates near the east corner of the garrison area and flows southward from the garrison. Mill Creek, Taylors Creek, and Peacock Creek all have natural streambeds and exhibit perennial flow.

Childpen's Pond is located at the northwest end of the garrison area. The two unnamed ponds are located at the northwest end of the facility golf course in the vicinity of Childpen's Pond. All of the ponds are isolated water bodies that are relatively small in size, measuring less than 500 feet in diameter. Based on the location of Facility ID #9-089064 relative to the area surface water bodies, this site is classified as being located greater than 500 feet to a surface water body.

D.5 Other Hydrogeologic Data

Regional Geology

The Fort Stewart Military Reservation (FSMR) is located within the coastal plain physiographic province. This province is typified by nine southeastward dipping strata that increase in thickness from zero feet at the fall line located approximately 350 miles inland from the Atlantic coast, to approximately 4,200 feet at the coast. State geologic records describe a probable petroleum exploration well (the No. 1 Jelks-Rogers) located in the region as encountering crystalline basement rocks at a depth of 4254 feet below the land surface. This well provides the most complete record for Cretaceous, Tertiary, and Quaternary sedimentary strata in the region.

The Cretaceous section was found to be approximately 1,970 feet in thickness and dominated by clastics. The Tertiary section was found to be approximately 2,170 feet in thickness and dominated by limestone with a 175-foot thick cap of dark green phosphatic clay. This clay is regionally extensive and is known as the Hawthorn Group. The interval from approximately 110 feet to the surface is Quaternary in age and composed primarily of sand with interbeds of clay or silt. This section is undifferentiated into separate formations (Metcalf & Eddy 1996).

Local Geology

State geologic records contain information regarding a well drilled in October 1942, 1.8 miles north of Flemington at Liberty Field of Camp Stewart (now known as Fort Stewart). This well is believed to be an artesian well located approximately one-quarter mile north of the runway at Wright Army Airfield within the FSMR. The log for this well describes a 410-foot section, the lowermost 110 feet of which consisted predominantly of limestone sediments above which 245 feet of dark green phosphatic clay typical of the Hawthorn Group was encountered. The uppermost portion of the section was found to be Quaternary age interbedded sands and clays. The top 15 feet of these sediments were described as sandy clay (Metcalf & Eddy 1996).

The surface soil located throughout the Fort Stewart garrison area consists of Stilson loamy sand. The surface layer of this soil is typically dark grayish brown loamy sand measuring approximately 6 inches in depth. The surface layer is underlain by material consisting of pale yellow loamy sand and extends to a depth of approximately 29 inches. The subsoil is dominantly sandy clay loam and extends to a depth of 72 inches or more (Metcalf & Eddy 1996).

Hydrogeology

The hydrogeology in the vicinity of the FSMR is dominated by two aquifers referred to as the Principal Artesian and the surficial. The Principal Artesian aquifer is the lowermost hydrologic unit and is regionally extensive from South Carolina through

Georgia, Alabama, and most of Florida. Known elsewhere as the Floridan, this aquifer is composed primarily of Tertiary age limestone including the Bug Island Formation, the Ocala Group, and the Suwannee Limestone. These formations are approximately 800 feet in thickness, and groundwater from this aquifer is used primarily for drinking water (Arora 1984). The confining layer for the Principal Artesian aquifer is the phosphatic clay of the Hawthorn Group. There are minor occurrences of aquifer material within the Hawthorn Group; however, they have limited utilization (Miller 1990).

The uppermost hydrologic unit is the surficial aquifer, which consists of widely varying amounts of sand and clay ranging from 55 to 150 feet in thickness. This aquifer is primarily used for domestic lawn and agricultural irrigation. The top of the water table ranges from approximately 2 to 10 feet below ground level (Geraghty and Miller 1993). However, soil surveys for Liberty and Long Counties describe the occurrence of a perched water table within the Stilson loamy sands present within the FSMR (Looper 1980).

D.5.a Depth to Groundwater

Determination of the depth to groundwater at the site was accomplished by measuring water levels within temporary piezometers. Each temporary piezometer consisted of 2.0-inch PVC slotted screen and casing that was placed into each soil borehole drilled at the site after completion of soil and groundwater sampling. The piezometers remained in the boreholes for an approximately 24-hour period to allow for stabilization of the water table surface. At the end of the stabilization period, static groundwater levels were measured in each piezometer.

Table II-5 presents a summary of the groundwater depth measurement results for the site investigation. Details regarding the procedures used by SAIC for the installation of temporary piezometers, measurement of static water levels, and surveying of borehole elevations are presented in Appendix B of this report.

D.5.b Groundwater Flow Direction

Based on groundwater elevations calculated from the depth to groundwater measurements recorded during the site investigation, the general direction of groundwater flow at Facility ID #9-089064 is from south to north. Equipotential contours illustrating the specific groundwater flow pattern at the site are presented in Figure II-4. However, the groundwater depth measurements recorded at the borehole 01-01 and 01-02 locations drilled within the former tank pit (i.e., non-native material) were not included in the interpretation of the groundwater flow pattern at the site. Groundwater elevations, referenced to mean sea level, for each temporary piezometer installed during the site investigation are also presented in Figure II-4.

D.5.c Hydraulic Gradient

The hydraulic gradient at Facility ID #9-089064 was calculated using the groundwater elevations measured in the boreholes located outside of the tank pit, as these boreholes represent native undisturbed soil. The groundwater flow direction was determined and the hydraulic gradient was computed along the direction of flow. The hydraulic gradient at Facility ID #9-089064 is estimated to be 0.58 feet/feet.

D.5.d Total Organic Carbon (Optional)

Alternate Threshold Levels (ATLs) are not planned to be calculated for contaminated soils located at the site. Therefore, analysis of total organic carbon was not conducted as part of the site investigation.

D.5.e Grain-Size Distribution

ATLs are not planned to be calculated for contaminated soils located at the site. Therefore, analysis of grain-size distribution was not conducted as part of the site investigation.

D.5.f Total Petroleum Hydrocarbons (Optional)

ATLs are not planned to be calculated for contaminated soils located at the site. However, analysis of TPH was included as part of the site investigation in order to provide additional data for use in determining the extent of soil contamination.

D.6 Corrective Action Completed or In-Progress

D.6.a USTs Removed

The UST system, tank and ancillary piping, was removed from service in April 1995, and was subsequently excavated and removed on June 19, 1995. According to Fort Stewart DPW personnel, the UST system was closed in accordance with guidance document GUST-9 *So You Want to Close an UST*.

D.6.b Excavation and Treatment/Disposal of Backfill and Native Soils

The backfill material excavated during the removal of the UST was disposed of at KEDESH, Inc., an asphalt treatment plant, located on Highway 17N in Kingsland, Georgia. No overexcavation of native soil surrounding the tank pit was conducted during the tank removal operation. The excavation was backfilled with clean soil material upon completion of the removal activities.

D.7 Conclusions and Recommendations

Summary of Conclusions

The UST 1 site, Facility ID #9-089064, is located within an average or higher groundwater pollution susceptibility area. Public groundwater supply wells are located within a 2-mile radius of the site; however, the distance between the site and the nearest supply well is greater than 500 feet. Surface water bodies are located within a 1-mile radius of the site; however, the distance between the site and the nearest body is greater than 500 feet. Based on this information, the applicable soil threshold levels for the site are those listed in Table A (GDNR Rules for Underground Storage Tank Management, Chapter 391-3-15) for the Average or Higher Groundwater Pollution Susceptibility Area (Column 2) greater than 500 feet to a withdrawal point category. Regulatory limits (i.e., MCLs) for groundwater contamination at the site are those associated with the Safe Drinking Water Act.

Characterization of the site was accomplished through soil sampling conducted during removal of the tank, and a subsequent two-phase site investigation that involved both soil and groundwater sampling. Six soil samples were collected from the tank pit excavation during tank removal activities. Five soil boreholes were drilled during the site investigations, two located within the former tank pit and three others around the perimeter of the pit. Two soil samples and one groundwater sample were collected from each of the five boreholes.

Soil analytical data from the tank removal sampling indicated that the soil from the tank pit was contaminated with benzene exceeding the applicable soil threshold levels. No soil contamination above soil threshold levels was found during the CAP-Part A investigation in the soil borings around the perimeter of the tank pit or in the backfill soil in the tank pit.

Groundwater analytical data from the initial site characterization of the CAP-Part A investigation indicate that benzene contamination in groundwater exceeds its respective MCL. However, this contamination was fully delineated and is limited to an area in the immediate vicinity of the tank pit. No groundwater contamination was found in the boreholes around the perimeter of the tank pit.

Recommendations

Analytical results for soil and groundwater samples collected during the site investigation at the site are sufficient to define the nature and extent of petroleum-related contamination at the site. Based on these findings, further investigation of the UST 1 site, Facility ID #9-089064, is not required. The rationale for this recommendation is presented in Section III, Site Investigation Plan.

As required by GDNR Underground Storage Tank Management Program, a CAP-Part B report should be prepared to document the remedial actions to be taken at the UST 1 site, Facility ID #9-089064.

D.8 Site Ranking

The Environmental Sensitivity Score for the UST 1 site, Facility ID #9-089064, was determined by completing the Site Ranking Form presented in Appendix II of the GUST-7A CAP-Part A guidance document. The result of the Site Ranking Form calculation indicates that the Environmental Sensitivity Score for the site is 1,000. A copy of the completed Site Ranking Form is presented in Appendix E of this report.

III. SITE INVESTIGATION PLAN

This Site Investigation Plan (SIP) presents the technical approach used to delineate the full extent of soil and/or groundwater contamination as a result of releases from UST 1, Facility ID #9-089064.

A. Horizontal and Vertical Extent of Contamination

A.1 Soils

This Site Investigation Plan presents the technical approach used to delineate the full extent of soil and/or groundwater contamination as a result of releases from UST 1, Facility ID # 9-089064.

A. Horizontal and Vertical Extent of Contamination

A.1 Soils

Soil contamination was delineated by analyzing soil collected during tank removal, 2 boreholes in the tank pit, and 3 boreholes around the perimeter of the tank pit. Soil samples that were collected from the tank pit during the tank removal activities indicated concentrations of benzene above soil threshold levels. The depth at which the tank removal samples were collected is not known; however, given the fact that the groundwater table is located at a depth of 3 to 6 ft below ground surface, it is likely that these samples were taken from a point near the groundwater table. Soil samples collected from boreholes in and around the tank pit did not indicate the presence of BTEX or PAH compounds above or below the water table at concentrations exceeding applicable soil threshold levels.

The horizontal extent of the soil contamination was determined during the initial site characterization. Although not directly determined, the vertical extent of soil contamination is dependent on the groundwater contamination. Therefore, no additional soil borings are recommended as part of the SIP.

A.2 Groundwater

Groundwater contamination was delineated by analyzing groundwater collected from five boreholes installed in and around the contamination source. Groundwater samples collected from the three boreholes that were located around the perimeter of the tank pit did not indicate the presence of BTEX or PAH compounds. The groundwater samples collected from the boreholes in the tank pit indicated that the concentration of benzene in the groundwater exceeds its MCL.

The horizontal extent of the groundwater contamination was determined during the initial site characterization. Although the vertical extent of groundwater contamination was not determined directly, the downward migration of contaminants is expected to be minimal. Waste oil, the substance released from the UST, is a light nonaqueous phase liquid that is lighter than water and tends to spread laterally at the water table surface instead of migrating downward vertically. The groundwater contamination at the water table is limited laterally to the immediate tank pit area so that extensive vertical migration is unlikely. Therefore, no monitoring wells are recommended as part of the SIP.

A.3 Surface Water

There are no surface water bodies near this site, therefore, no surface water sampling is recommended as part of the SIP.

B. Vadose Zone and Aquifer Characteristics

Vadose zone characterization is not recommended since no vadose zone contamination exists. The extent of contamination in the aquifer is limited and typical aquifer parameters can be used during evaluation of remedial alternatives. Presently, no aquifer characterization is planned since no further investigation is being recommended at the site.

IV. PUBLIC NOTICE

Facility ID #9-089064 is located within the confines of the Fort Stewart garrison area, which is part of the FSMR, a federally-owned facility. All of the property contiguous to the site is owned by the U.S. Government. The Fort Stewart DPW will comply with the public notice requirement defined in guidance document GUST-7A for CAP-Part A activity notification by publishing an announcement in the *Coastal Courier* and the *Patriot*, which are both newspapers that are circulated throughout Fort Stewart and the Hinesville, Georgia areas. The announcement will appear in both newspapers over a period of one week.

Publication of this announcement will be completed simultaneously with the submittal of this CAP-Part A report for review by the GDNR Environmental Protection Division. A copy of the newspaper announcement to be used for public notification is presented in Appendix F of this report.

V. CLAIM FOR REIMBURSEMENT: GUST TRUST FUND

The FSMR is a federally-owned facility, and, the owner of Facility ID #9-089064 (i.e., the U.S. Government) is not filing a claim for reimbursement of reasonable cleanup expenses from the GUST Trust Fund.

VI. REFERENCES

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Arora, Ram, 1984. *Hydrologic Evaluation for Underground Injection Control in the Coastal Plain of Georgia*, Department of Natural Resources, Environmental Protection Division, Georgia Geological Survey.

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Metcalf & Eddy, 1996. *Final Work Plan for RCRA Facility Investigation at Bulk Fuel Storage System, Wright Army Airfield, Fort Stewart, Georgia.*

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REPORT TABLES

Table II-1. Analytical Results for Soil Samples Collected by Anderson Columbia During Removal of UST 1

FACILITY ID # 9-089064 (SOIL)

Tank #	Sample # (Sample Date)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	TPH (mg/kg)
1	T1-S1 (6/19/95)	**0.175 ***	1.32	0.515	2.613	1150.0
	T1-S2 (6/19/95)	<0.00116	0.01	0.02	0.0318	821.0
	T1-NSW (6/19/95)	<0.00112	<0.00112	<0.00112	0.974	27.7
	T1-SSW (6/19/95)	<0.00114	<0.00114	<0.00114	<0.00228	<11.4
	T1-WSW (6/19/95)	<0.00123	0.00305	<0.00123	0.0126	<12.3
	T1-ESW (6/19/95)	<0.00117	<0.00117	<0.00117	<0.00234	<11.7

TPH Total Petroleum Hydrocarbons

* Indicates that result exceeds applicable GDNR Soil Threshold Level

Applicable Soil Threshold Levels (mg/kg): Benzene = 0.008 Toluene = 6.00 Ethylbenzene = 10.0 Xylenes = 700.0

Table II-2. Soil and Groundwater Samples Collected by SAIC During the Facility ID #9-089064 Site Investigation

Tank	Borehole Number	Sample Number & Type	Collection Date	Depth Interval (below ground surface)
1	Borehole 01-01	0101A1 (Soil)	9/6/96	1.0 - 2.5 Feet
		0101B1 (Soil)	9/6/96	2.5 - 5.0 Feet
		0101W2 (Groundwater)	9/6/96	5.0 - 8.0 Feet
	Borehole 01-02	0102B1 (Soil)	9/6/96	2.5 - 5.0 Feet
		0102W2 (Groundwater)	9/6/96	5.0 - 5.5 Feet
	Borehole 01-03	0103A1 (Soil)	12/14/96	0.6 - 2.5 Feet
		0103C1 (Soil)	12/14/96	5.0 - 7.0 Feet
		0103W2 (Groundwater)	12/15/96	5.0 - 10.0 Feet
	Borehole 01-04	0104A1 (Soil)	12/14/96	0.7 - 2.5 Feet
		0104B1 (Soil)	12/14/96	2.5 - 5.0 Feet
		0104W2 (Groundwater)	12/14/96	10.0 - 15.0 Feet
	Borehole 01-05	0105A1 (Soil)	12/14/96	0.6 - 2.5 Feet
		0105D1 (Soil)	12/14/96	7.5 - 10.0 Feet
		0105W2 (Groundwater)	12/14/96	5.0 - 10.0 Feet

Table II-3. Soil Analytical Results for the Facility ID #9-089064 Site Investigation

Investigation: 01										
	Station	01-01	01-01	01-02	01-03	01-03	01-04	01-04	01-05	01-05
	Sample ID	0101A1	0101B1	0102B1	0103A1	0103C1	0104A1	0104B1	0105A1	0105D1
	Date Collected	9/6/96	9/6/96	9/6/96	12/14/96	12/14/96	12/14/96	12/14/96	12/14/96	12/14/96
	Depth	1.0 - 2.5 FT	2.5 - 5.0 FT	2.5 - 5.0 FT	0.6 - 2.5 FT	5.0 - 7.0 FT	0.7 - 2.5 FT	2.5 - 5.0 FT	0.6 - 2.5 FT	7.5 - 10.0 FT
	GDNR Level									
Polynuclear Aromatic Hydrocarbons	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
2-Chloronaphthalene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Acenaphthene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Acenaphthylene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Anthracene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Benzo(a)anthracene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Benzo(a)pyrene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Benzo(b)fluoranthene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Benzo(g,h,i)perylene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Benzo(k)fluoranthene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Chrysene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Dibenzo(a,h)anthracene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Fluoranthene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Fluorene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Indeno(1,2,3-cd)pyrene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Naphthalene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Phenanthrene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
Pyrene	NA	0.401 U	0.402 U	0.395 U	0.357 U	0.37 U	0.363 U	0.359 U	0.335 U	0.392 U
	GDNR Level									
Petroleum Hydrocarbons	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Total Petroleum Hydrocarbons	NRC	268 =	208 B	51.4 =	26.9 =	199 =	78.5 =	-7.87 U	12.2 =	-8.34 U
	GDNR Level									
Volatile Organics	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Benzene	0.008	0.006 U	0.0061 U	0.0061 U	0.0054 U	0.0057 U	0.0056 U	0.0055 U	0.0052 U	0.006 U
Ethylbenzene	10	0.006 U	0.0061 U	0.0061 U	0.0054 =	0.0057 U	0.0056 J	0.0055 U	0.0052 U	0.006 J
Toluene	6	0.006 U	0.02 J	0.0061 U	0.0385 U	0.0057 U	0.018 U	0.0058 =	0.0052 U	0.0145 U
Xylenes, Total	700	0.042 =	0.01 =	0.0071 =	0.0054 U	0.0057 U	0.0056 U	0.0055 U	0.0052 U	0.006 U

NRC - No Regulatory Criteria
NA - Not Applicable, the health based threshold level would be exceeded only if free product conditions existed

U - Indicates the compound was not detected at the concentration reported.
J - Indicates that the value for the compound is an estimated value.
UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.
= - Indicates the compound was detected at the concentration reported.

Table II-4. Groundwater Analytical Results for the Facility ID #9-089064 Site Investigation

Investigation: 01						
	Station	01-01	01-02	01-03	01-04	01-05
	Sample ID	0101W2	0102W2	0103W2	0104W2	0105W2
	Date Collected	9/6/96	9/6/96	12/15/96	12/14/96	12/14/96
	Depth	5.0 - 8.0 FT	5.0 - 5.5 FT	5.0 - 10.0 FT	10.0 - 15.0 FT	5.0 - 10.0 FT
	EPA MCL					
Polynuclear Aromatic Hydrocarbons	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
2-Chloronaphthalene	NA	10 U	10 U	10 U	10 U	10 U
Acenaphthene	NA	10 U	5 J	10 U	10 U	10 U
Acenaphthylene	NA	10 U	10 U	10 U	10 U	10 U
Anthracene	NA	10 U	11.1 =	10 U	10 U	10 U
Benzo(a)anthracene	NA	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	0.2	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	NRC	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	NA	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	NRC	10 U	10 U	10 U	10 U	10 U
Chrysene	NRC	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	NRC	10 U	10 U	10 U	10 U	10 U
Fluoranthene	NA	10 U	10 U	10 U	10 U	10 U
Fluorene	NA	10 U	6.7 J	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	NRC	10 U	10 U	10 U	10 U	10 U
Naphthalene	NA	10 U	54.4 =	10 U	10 U	10 U
Phenanthrene	NA	10 U	10 U	10 U	10 U	10 U
Pyrene	NA	10 U	10 U	10 U	10 U	10 U
	EPA MCL					
Volatile Organics	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Benzene	5	77.8 =	381 =	3.9 J	5 UJ	4.6 J
Ethylbenzene	700	0.32 J	83.9 J	2.6 J	5 UJ	3.2 J
Toluene	1000	5 U	32.4 J	5 U	0.23 J	5 U
Xylenes, Total	10000	5 U	153 =	1.4 J	5 UJ	5 U

NRC - No Regulatory Criteria
NA - Not Applicable, the health based threshold level would be exceeded only if free product conditions existed
IV - Insufficient volume to collect sample for analysis

U - Indicates the compound was not detected at the concentration reported.
J - Indicates that the value for the compound is an estimated value.
UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.
= - Indicates the compound was detected at the concentration reported.

Table II-5. Groundwater Depth Measurements and Calculated Groundwater Elevations for the Facility ID #9-089064 Site Investigation

Tank	Borehole	Date Measured	Water Level Depth	Screened Interval Depth	Ground Surface Elevation	Water Level Elevation
1	Borehole 01-01	9/7/96	3.38 Feet BGS	2.7 - 7.7 Feet BGS	67.78 Feet MSL	64.40 Feet MSL
	Borehole 01-02	9/7/96	3.36 Feet BGS	1 - 6 Feet BGS	67.84 Feet MSL	64.48 Feet MSL
	Borehole 01-03	12/15/96	4.82 Feet BGS	5 - 10 Feet BGS	67.91 Feet MSL	63.09 Feet MSL
	Borehole 01-04	12/15/96	6.48 Feet BGS	10 - 15 Feet BGS	67.70 Feet MSL	61.22 Feet MSL
	Borehole 01-05	12/15/96	4.98 Feet BGS	5 - 10 Feet BGS	67.67 Feet MSL	62.69 Feet MSL

BGS	Below Ground Surface
MSL	Mean Sea Level

REPORT FIGURES

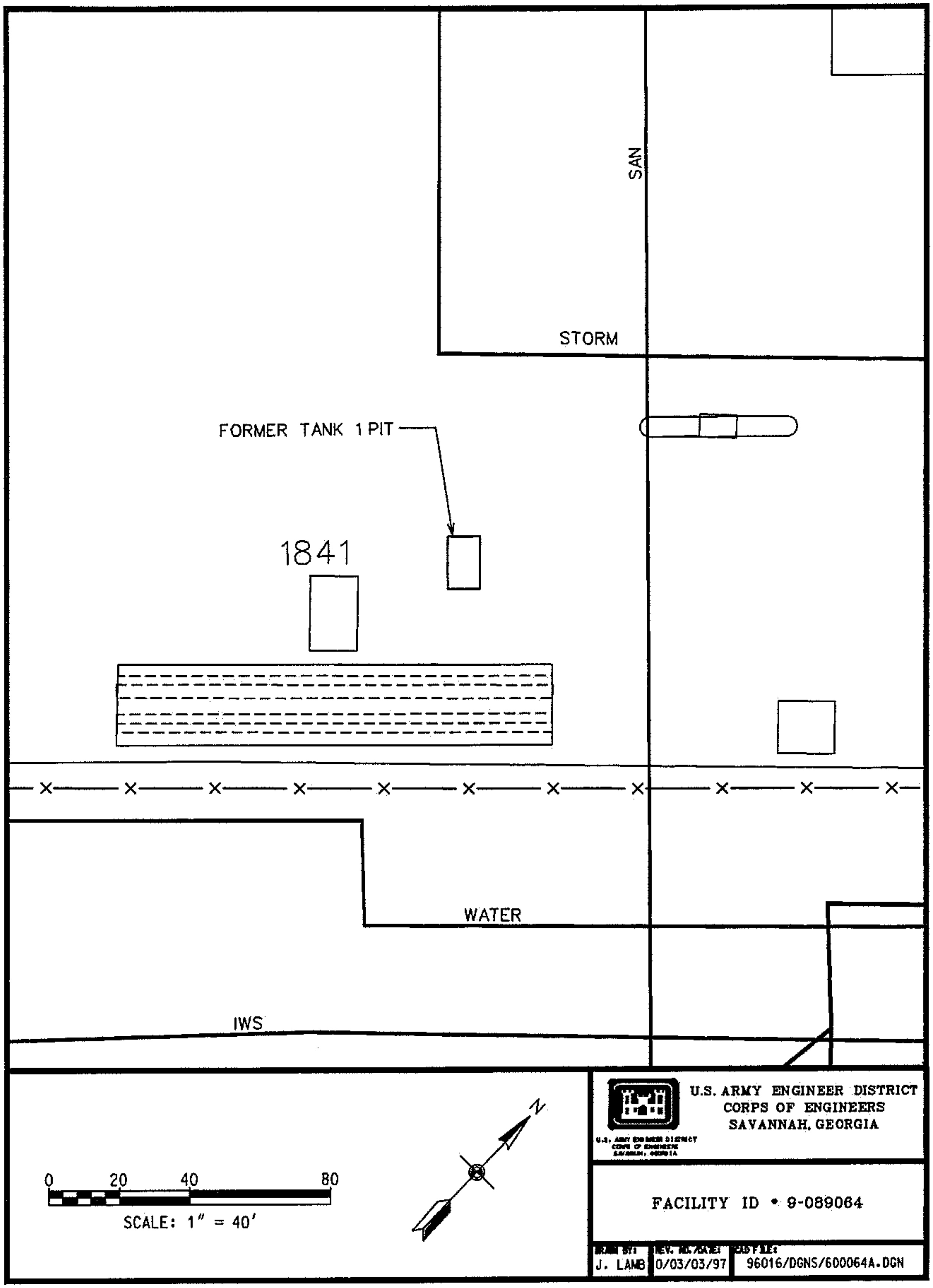


Figure II-1. Facility ID #9-089064, UST 1, Site Map

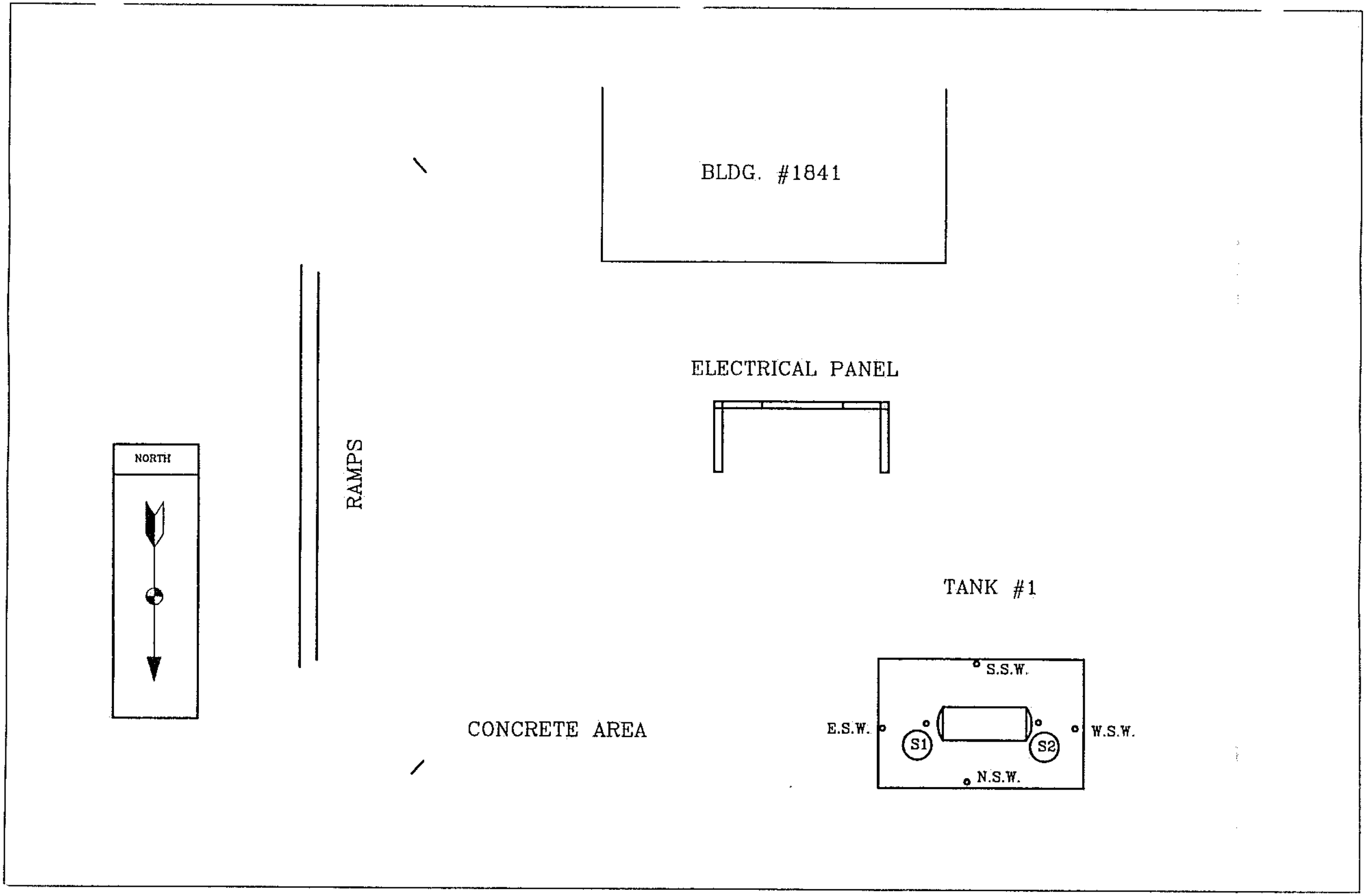
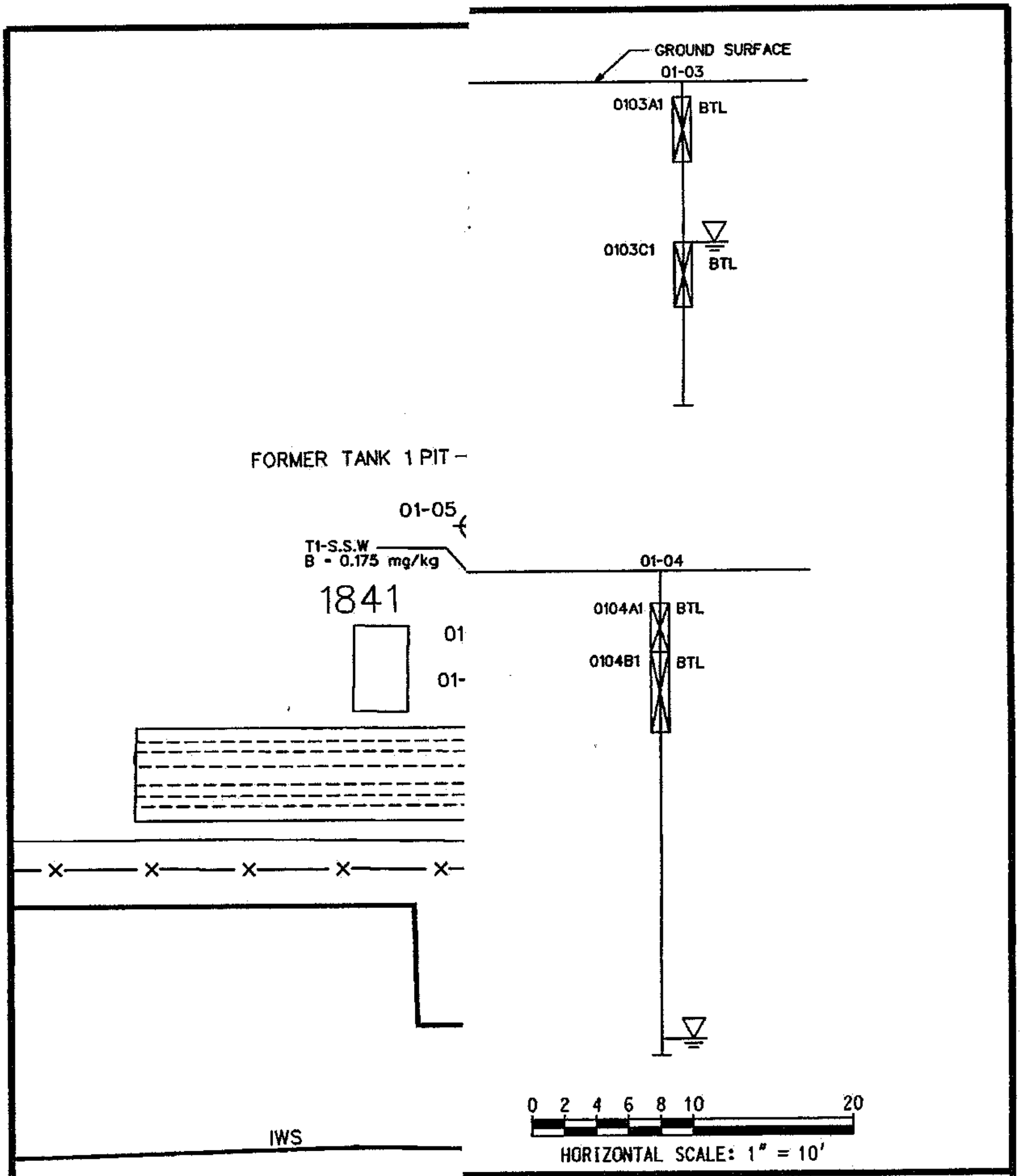


Figure II-2. Site Map of Sampling I ions for the UST 1 Removal



LEGEND

⊕	CAP-PART A INVESTIGATION BOREHOLE
●	SOIL SAMPLE LOCATION EXCEEDING THRESHOLD LEVELS
⬡	TANK REMOVAL SAMPLE LOCATION
⬢	TANK REMOVAL SAMPLE LOCATION EXCEEDING THRESHOLD LEVELS
☒	SOIL SAMPLE INTERVAL AND SAMPLE ID
▨	SOIL SAMPLE INTERVAL EXCEEDING THRESHOLD LEVELS
⊂⊃	ESTIMATED LIMIT OF SOIL CONTAMINATION

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FACILITY ID # 9-089064

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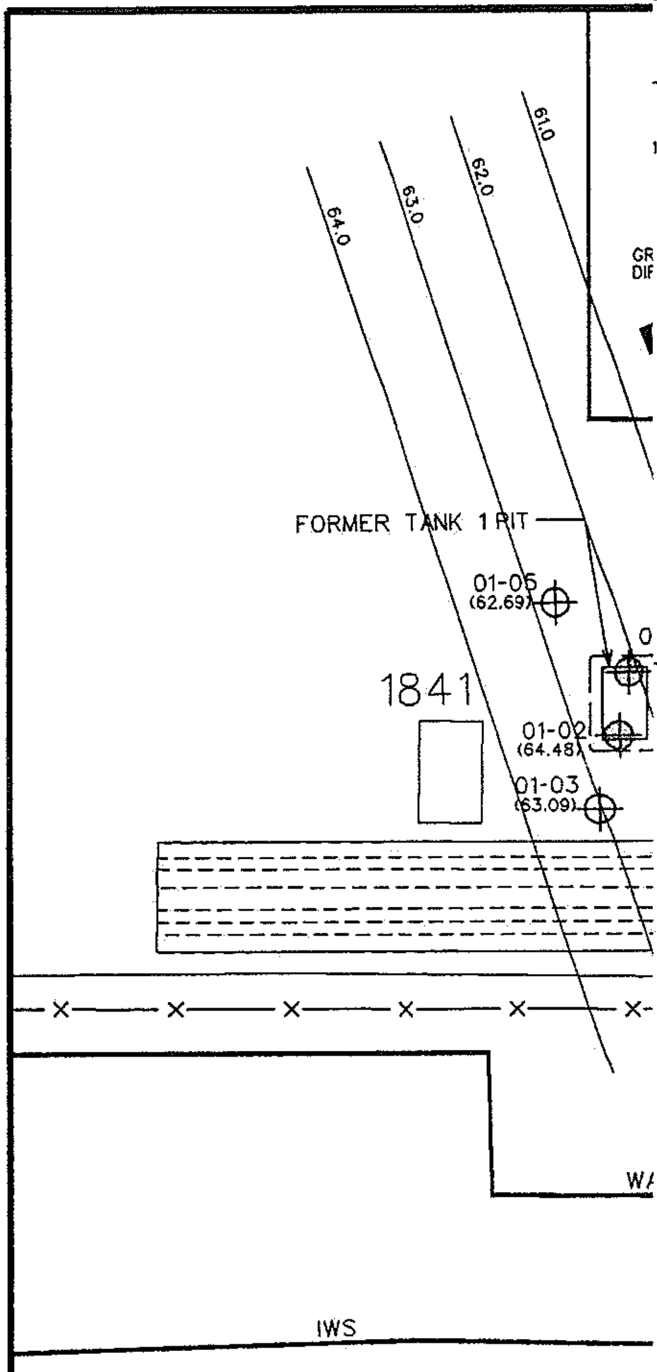

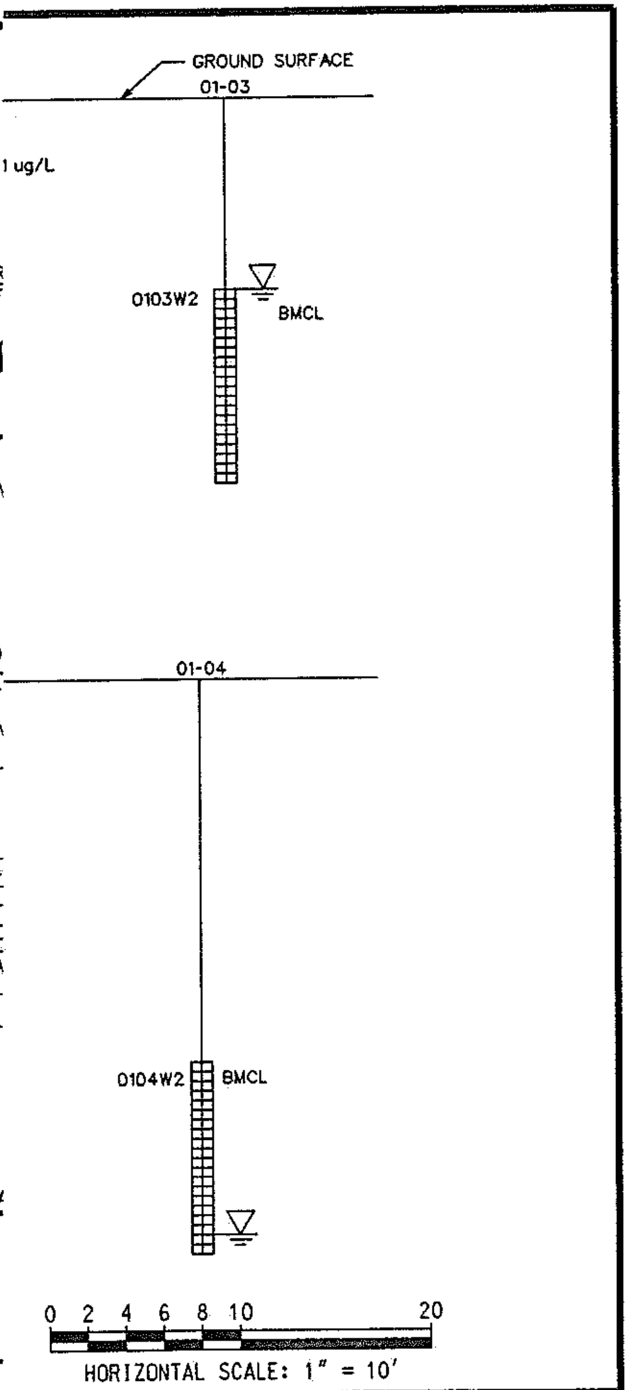

LEGEND

- ⊕ CAP-PART A INVESTIGATION BOREHOLE
- ⊕ GROUNDWATER SAMPLE LOCATION EXCEEDING MCLs
- ▭ SCREENED GROUNDWATER SAMPLE INTERVAL AND SAMPLE ID
- ▨ GROUNDWATER SAMPLE INTERVAL EXCEEDING MCLs
- ⊂⊃ ESTIMATED LIMIT OF GROUNDWATER CONTAMINATION

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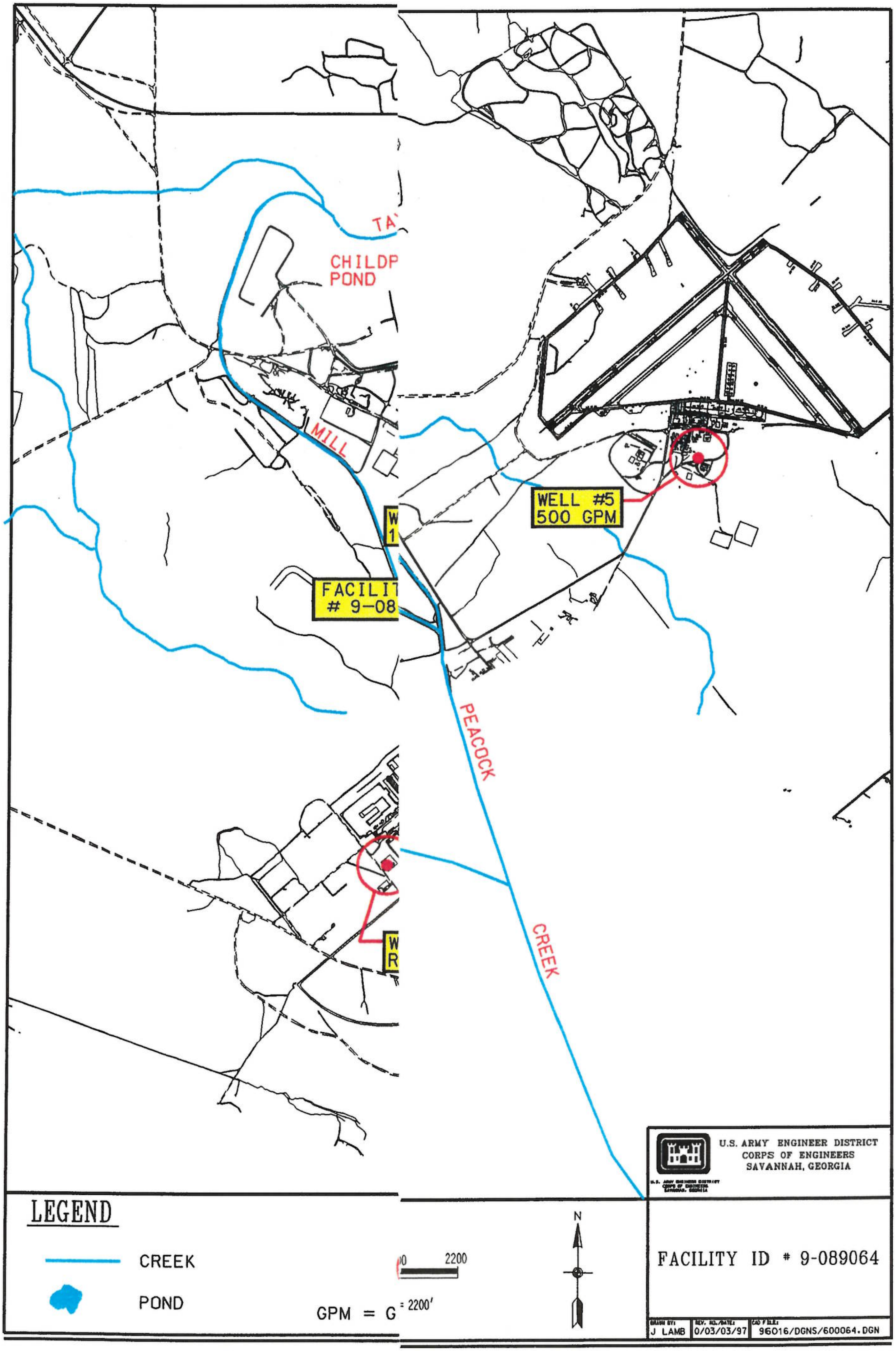

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FACILITY ID # 9-089064

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APPENDIX A

SOIL BORING LOGS
FOR THE FACILITY ID #9-089064 SITE INVESTIGATION

HTRW DRILLING LOG

HOLE NUMBER 01-01

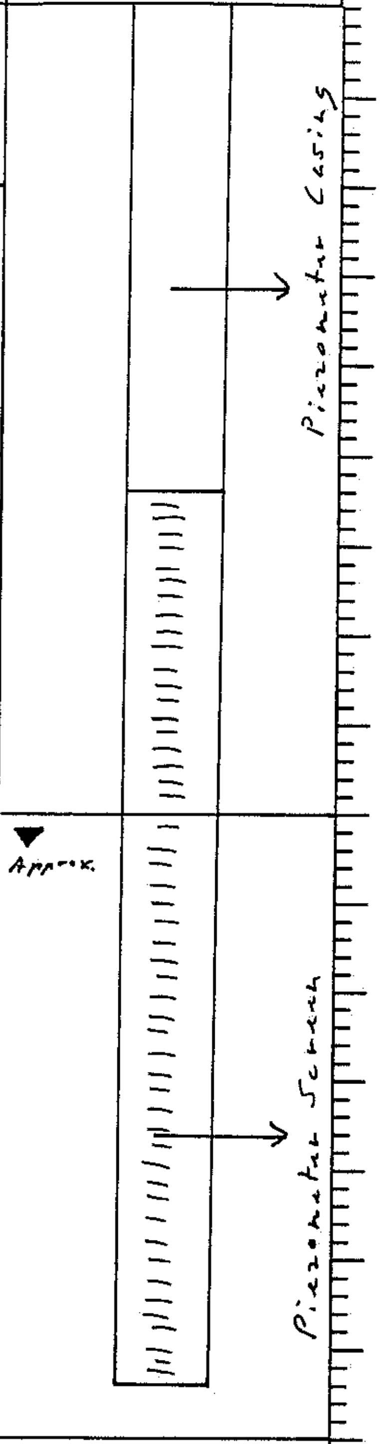
PROJECT Ft. Stewart UST

INSPECTOR J. King

SHEET 1 of 1

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)
	0.0	Concrete Pad			
	1.0	Sand, yellow, fine	59.9 ppm		Soil Sample 0101A1
	2.0				
	3.0	Silty Sand, dark gray, fine Sand, gray, medium	3.6 ppm		Soil Sample 0101B1
	4.0	Sand, grayish brown, fine to medium			
	5.0	No Material Collected (Power Punch)			Groundwater Sample 0101W2
	6.0				
	7.0				
	8.0				

REMARKS (G)

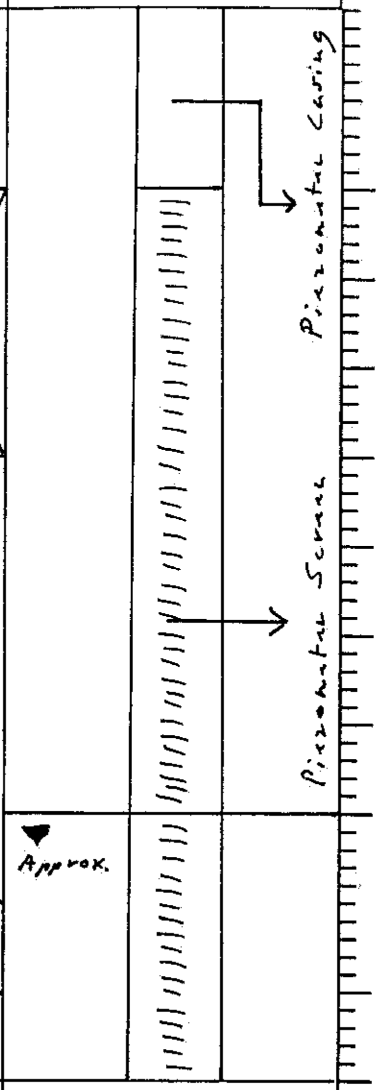


96-108P/100396 SAVforms

HTRW DRILLING LOG

PROJECT Ft. Stewart UST	INSPECTOR J. King	HOLE NUMBER 01-02	SHEET 1 of 1

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	0.0	Concrete Pad				
	1.0	Silty Sand, brownish yellow, fine	0.0 ppm		Soil Sample 0102B1	
	2.0					
	3.0					
	4.0		0.0 ppm			
	5.0	No Material Collected (Power Punch)			Groundwater Sample 0102W2	
	6.0					



Groundwater Sample 0102W2

96-108P/100396.SAVforms

HTRW DRILLING LOG

PROJECT: Ft. Stewart UST	INSPECTOR: M. Vest	HOLE NUMBER: 01-03	SHEET 1 of 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	0.0	Concrete Pad				Piezometer Casing
	1.0	Sand, grayish brown, fine	2.0 ppm		Soil Sample 0103A1	
	2.0					
	3.0		2.5 ppm			
	4.0					
	5.0		6.2 ppm		Soil Sample 0103C1	▼ Approx. Piezometer Screen
	6.0	Sand, gray, fine				
	7.0	No Sample Due To Poor Recovery				
	8.0					
	9.0					
	10.0					

96-108P/100396.SAVforms

Groundwater Sample 0103W2 Collected From Piezometer

HTRW DRILLING LOG

01-04

PROJECT Ft. Stewart UST | INSPECTOR M. Vest | SHEET 1 of 2

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	0.0	Concrete Pad				
	1.0 2.0	Sand, dark gray, fine	4.0 ppm		Soil Sample 0104A1	
	3.0 4.0	Sand, pale yellow, fine Sand & silt, red, fine Sand, dark gray, fine	15.5 ppm		Soil Sample 0104B1	
	5.0 6.0 7.0	No Sample Due To Poor Recovery				→ Piezometer Casing
	8.0 9.0 10.0	Sand, dark gray, fine	5.6 ppm		☒	

HTRW DRILLING LOG

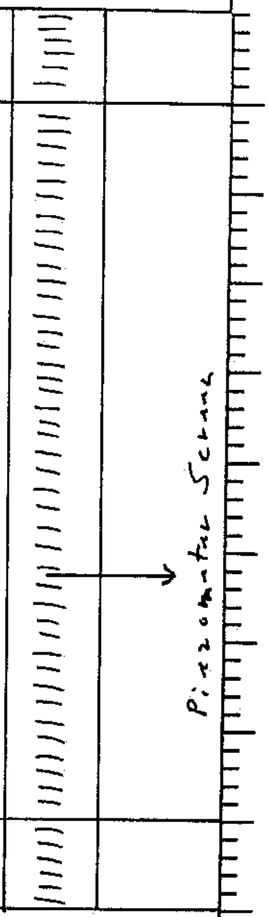
HOLE NUMBER 01-04

PROJECT Ft. Stewart UST

INSPECTOR M. Vest

SHEET 2 of 2

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	10.0		4.2 ppm			Perched
	11.0					
	12.0	Sandy Clay, gray, fine				
	13.0	Sandy Clay greenish gray, fine	5.0 ppm			
	14.0					Approx.
	15.0					Groundwater Sample 0104W2 Collected From Piezometer



HTRW DRILLING LOG | 01-05

PROJECT Ft. Stewart UST | INSPECTOR M. Vert | SHEET 1 of 1

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	0.0	Concrete Pad				
		Sand, dark gray, fine	67.2 ppm		Soil Sample 0105A1	Piezometer Casing
	1.0	Sand+silt, dark gray, fine				
		Sand, pale yellow, fine				
	2.0					
			7.6 ppm			
	3.0					
		Sand, dark gray, fine				
	4.0					
	5.0		4.3 ppm			▼ Approx.
	6.0					Piezometer Screen
		Sandy Clay, dark gray, fine				
	7.0					
			3.3 ppm		Soil Sample 0105D1	
	8.0					
	9.0					
	10.0					

Groundwater Sample 0105W2 Collected From Piezometer

APPENDIX B

TECHNICAL APPROACH FOR THE FACILITY ID #9-089064 SITE INVESTIGATION

TECHNICAL APPROACH

1.0 INTRODUCTION

The overall objective of this project is to provide the engineering services required to produce Corrective Action Plans (CAPs) for the subject UST sites. These reports will conform to the site closure requirements of a CAP-Part A for sites in Georgia. The field investigations necessary to support the report preparation included the installation of temporary piezometers, soil borings, and associated sampling of soil and groundwater. Upon completion of the field investigations, a CAP-Part A will be prepared to meet Georgia Environmental Protection Division (EPD), Fort Stewart, and the USACE-Savannah requirements.

2.0 FIELD ACTIVITIES

The following sections detail the methodologies used for drilling, Powerpunch sampling, and piezometer installation. All boreholes were drilled and piezometers installed by Miller Drilling Company, a drilling firm licensed in the state of Georgia. A geologist from SAIC, either registered or working under the direction of a registered professional, was on site at all times during operations. No drilling activities were undertaken until all utility clearances and permits had been obtained from Fort Stewart's utility personnel.

2.1 Subsurface Soil Sampling

2.1.1 Drilling

The hollow-stem auger drilling method was used during the project for drilling of soil boreholes. The augers used for drilling of boreholes for soil sample collection and groundwater collection using a Powerpunch sampler had a 4.25-inch inside diameter. During all borehole drilling, soil samples were collected continuously on 5.0-foot centers from the ground surface to the bottom of the borehole.

Soil drilling using the hollow-stem auger method was accomplished using truck-mounted CME-55 or similar auger rigs. The total depth of each borehole was dictated by the depth where the water table was encountered.

2.1.2 Sample Collection

Soil samples for chemical analyses were collected from boreholes using 5.0-foot split-barrel samplers. Samples were collected using these samplers as part of hollow-stem auger drilling of the boreholes. Each sampler was inserted into the lead hollow-stem auger and filled as the auger was advanced. Upon retrieval of the sampling device, the soil core was split into two 2.5-foot sections using a stainless steel knife. A portion of each 2.5-foot section was collected for possible laboratory analysis. The remaining portion of each 2.5-foot section was used for field measurements.

Samples designated for possible laboratory analysis were collected from the section using a stainless steel spoon. The spoon was run lengthwise down the core to collect a sample representative of the entire core section. The portion of the sample designated for volatile organic analyses was placed into laboratory sample containers first, followed by placement of the remaining portion of the sample into the containers designated for other types of analyses. Sample containers designated for volatile organic analyses were filled so that minimal headspace was present in the containers. Headspace gas concentration measurements were made using a field organic vapor meter (OVM). Initially, soil from each 2.5-foot interval was placed into a glass jar, leaving some air space, and covered with aluminum foil to create an air-tight seal. The sample was allowed to volatilize for a minimum of 15 minutes. The sealed jar was punctured with the OVM probe and headspace gas drawn until the meter reading was stable. The concentration of the headspace gas was recorded to the nearest 0.1 part per million.

Immediately after collection of each sample and completion of bottle label information, each potential analytical sample container was placed into an ice-filled cooler to ensure preservation. A clean split-barrel sampling device was used to collect soil core from each interval of the project boreholes. Information regarding the criteria for selection of soil samples for off-site shipment to a laboratory for chemical analysis is presented in Section 3.1.3 of the project Work Plan. Soil samples, which were not selected for laboratory analysis, were disposed of as investigation-derived waste.

2.2 Groundwater Sampling

2.2.1 Groundwater Collection

Collection of groundwater samples from soil boreholes advanced during Preliminary Groundwater and CAP-Part A investigations was accomplished using a PowerPunch sampler or from temporary piezometers. The PowerPunch is a probe that allows the collection of a groundwater sample from a discrete undisturbed depth interval in a soil boring. The probe consists of a 1.5-inch outside diameter PVC sample screen that is 5 feet long, a retrievable steel outer casing, and a hardened steel drive point. Temporary piezometers were constructed of 2.5-inch ID PVC casing with a 5-foot screened interval. These piezometers were installed in the open borehole following completion of all drilling activities.

Each soil borehole was advanced to the top of the water table using a 4.25-inch ID HSA. For each borehole, the PowerPunch was inserted into the hollow-stem augers, lowered to the bottom of the borehole, and driven through the undistrubed soil underlying the lead auger to a depth of approximately 3.0 feet below the water table. The outer casing of the PowerPunch was retracted to expose the screen and allow groundwater to enter the chamber. In cases where the PowerPunch could not be driven or where groundwater recovery through the PowerPunch was poor, the groundwater sample was collected through the temporary piezometer.

Groundwater samples were collected using a bailer lowered into the PowerPunch (0.75-inch stainless steel mini bailer) or temporary piezometer (1.0-inch Teflon bailer). The portion of the sample designated for volatile organic analysis was poured into laboratory sample containers first, followed by pouring of the remaining sample portion into containers designated for other types of chemical analyses. Sample containers designated for volatile organic analysis were filled so that no headspace was present in the containers. Samples were poured directly into all containers from the mini or Teflon bailer used for sample retrieval.

2.2.2 Field Measurements

Groundwater field measurements performed during the project included measurement of static groundwater level, pH, specific conductance, and temperature. Measurement of groundwater levels in soil boreholes was accomplished through the installation of temporary PVC piezometers. A summary of the procedures and criteria to be used for groundwater sample field measurements is presented in the following sections.

Static Groundwater Level

Static groundwater level measurements were made using an electronic water level indicator. Initially, the indicator probe was lowered into each temporary piezometer casing until the alarm sounded and/or the indicator light illuminated. The probe was withdrawn several feet and slowly lowered again until the groundwater surface was contacted as noted by the alarm and/or indicator light. Water level measurements were estimated to the nearest 0.01 foot based on the difference between the nearest probe cord mark to the top of the piezometer casing.

The distance between the top of casing and the surrounding ground surface was taken into account in measuring the water level to within 0.01 foot. The static water level measurement procedure was repeated two or three times to ensure that the water level measurements were consistent (plus or minus 0.01 foot). If this was the case, then the first measured level was recorded as the depth to groundwater. If this was not the case, the procedure was repeated until consistent readings were obtained from three consecutive measurements.

pH, Specific Conductance, and Temperature

The pH, specific conductance, and temperature measurements were recorded for groundwater during groundwater sampling. The pH, temperature, and conductivity measurements were made using a combination meter designed to measure these parameters. A portion of each groundwater sample was retrieved from the PowerPunch sampler and poured into the collection cup. With the combination meter set in the pH mode, the meter electrode was swirled at a slow constant rate within the sample until the meter reading reached equilibrium. The sample pH was recorded to the nearest 0.1 pH unit. The pH measurement procedure was repeated, using a new sample each time, until the pH measurements were consistent (less than 0.2 pH units variation).

Upon completion of the pH measurement, conductivity and temperature measurements were made on a groundwater sample collected in the same manner as described above. With the combination meter set in the conductivity mode, the meter electrode was swirled at a slow constant rate within the sample until the meter reading reached equilibrium. Concurrently, a temperature probe was placed into the sample and allowed to reach equilibrium. The sample conductivity was recorded to the nearest 10 mmhos/cm and the temperature to the nearest 0.1° C. All recorded conductivity values were converted to conductance at 25° C. The conductivity and temperature measurement procedure was repeated a minimum of three times using a new sample each time, until the measurements are consistent (less than 10 percent variation for conductance and less than 0.5° C variation for temperatures).

2.3 Temporary Piezometer Installation

Following the collection of the groundwater sample, the borehole was over drilled down to the bottom of the PowerPunch. A 2-inch PVC piezometer, with a 5-foot screened section, was installed in the borehole to prevent the borehole from collapsing. These piezometers remained in the boreholes approximately 24-hours, after which time the static water level was measured.

2.4 Borehole Abandonment

Once the static water level was measured, the temporary piezometers were removed and the boreholes were abandoned. Abandonment was conducted in a manner precluding any current or subsequent fluid media from entering or migrating within the subsurface environment along the axis or from the endpoint of the borehole. Abandonment was accomplished by filling the entire volume of the borehole with grout.

For each borehole located in grass/gravel-covered areas, the borehole was sealed by grouting from the bottom of the borehole to the ground surface. For boreholes located in concrete-covered areas, grout was poured to the interface between the overlying concrete pad and the underlying gravel/soil base. All grouting was accomplished by placing a tremie pipe to the bottom of the borehole and pumping grout through this pipe until undiluted grout was present at the ground surface or the base of the concrete cover. After a 24-hour period, the abandoned borehole was checked for grout settlement. At that time, any settlement depression was filled with grout. Additional grout was added using a tremie pipe. This process was repeated until firm grout remained at the surface.

2.5 Surveying

A topographic survey of the horizontal and vertical locations of all soil boreholes was conducted after completion of all field activities. The topographic survey was conducted by a surveyor registered in the state of Georgia.

The horizontal coordinates for each soil borehole were surveyed to the closest 1.0 foot and referenced to the State Plane Coordinate System. Ground elevations were surveyed to the closest 0.1 foot. Elevations were referenced to the National Geodetic Vertical Datum of 1983.

2.6 Decontamination Procedures

2.6.1 Drilling Equipment

Decontamination of equipment used for the drilling of boreholes was conducted within the temporary decontamination pad constructed at the central staging area. The decontamination pad was constructed so that all decontamination liquids were contained from the surrounding environment and were recovered for disposal as investigation-derived waste (IDW). The entire drill rig and equipment was decontaminated once it arrived on site and the hollow-stem auger drilling equipment was decontaminated after completion of each soil borehole. The drilling equipment was decontaminated by removing the caked soil material from the exterior of equipment using a rod and/or brush, steam cleaning the interior and exterior of equipment, allowing the equipment to air dry as long as possible, and wrapping or covering the equipment in plastic.

2.6.2 Sampling Equipment

Decontamination of equipment used for soil sampling and collection of groundwater samples was conducted at the temporary decontamination area. Nondedicated equipment was decontaminated after each use. The sampling equipment was washed with potable water and phosphate-free detergent using various types of brushes required to remove particulate matter and surface films, followed by a potable water rinse, ASTM Type I or equivalent water rinse, isopropyl alcohol rinse, ASTM Type I or equivalent water rinse, allowed to air dry, and wrapped in plastic or aluminum foil.

In addition to the sampling equipment, field measurement instruments were also decontaminated between uses. Only those portions of each instrument that come into contact with potentially contaminated environmental media were decontaminated. Because of the delicate nature of these instruments, the decontamination procedure only involved initial rinsing of the instrument probes with ASTM Type I or equivalent water.

2.7 Investigation Derived Waste (IDW) Management

Indigenous IDW generated during the project was soil cuttings from boreholes. Nonindigenous generated IDW included solid compactible trash, decontamination solutions, and sludges.

2.7.1 Waste Collection and Containment

All soil and sludge wastes were segregated by borehole and drummed in 55-gallon DOT Specification 17C drums at the point of generation. Drummed wastes were transported to the Central Staging Area (CSA) and stored pending final disposal. Sanitary waste was placed in trash bags at the point of generation. Water derived from decontamination activities was collected in polyethylene tanks and stored at the CSA. All containers were appropriately labeled with generation point information completed on each container.

2.7.2 Waste Characterization

Analytical data gathered from investigation field samples was used to characterize the indigenous soil IDW generated during the project. Where investigation sample analytical data were insufficient for characterization of the wastes, the wastes were sampled and analyzed for RCRA toxicity characteristic contaminants using the Toxicity Characteristic Leaching Procedure (TCLP). Soil from a specific source location was considered noncontaminated if the analytical results for the associated field samples indicated all of the following:

- BTEX and PAH concentrations below applicable Table A or B Threshold Levels as defined in Rules of Georgia Department of Natural Resources, Environmental Protection Division, rule 391-3-15-.09;
- TPH concentrations below 100 ppm; and
- total lead concentrations below 100 ppm.

Soil from a specific source location was considered contaminated nonhazardous if the analytical results for the associated field samples indicated all of the following:

- BTEX and PAH concentrations exceed applicable Table A or B Threshold Levels;
- TPH concentrations exceed 10,000 ppm; and
- total lead concentrations are below 100 ppm.

Soil from a specific source location was considered potentially hazardous, and would be sampled for full TCLP analysis and waste characterization, if one of the following conditions was encountered:

- soil collected from the source location was found to contain free petroleum product or
- total lead concentrations in soil samples collected from the source location exceeded 100 ppm.

Soil/sludge generated from decontamination activities was characterized by collecting one composite sample from each drum of sludge waste. Each composite sample was analyzed for BTEX, PAH, TPH, and total lead. The contents of each drum will be classified based on the analytical results and the categories outlined above.

Decontamination fluid generated from decontamination activities was characterized by collecting one sample from each filled poly tank. Each sample was analyzed for BTEX, pH, oil and grease, and phenols.

2.7.3 Waste Disposal

Soil and soil/sludge waste characterized as being noncontaminated was spread at an area designated by Fort Stewart DPW personnel. Soil and soil/sludge waste characterized as being contaminated nonhazardous or hazardous will be disposed of off-site in accordance with all applicable EPA, DOT, and state of Georgia regulations. Hazardous waste will be transported off-site within 90 days of receipt of characterization data indicating that the waste is hazardous.

Decontamination fluids characterized as meeting the acceptance criteria of the Fort Stewart Industrial Waste Treatment Plant (IWTP) will be transported to and disposed of at the plant. Decontamination fluids exceeding the IWTP waste acceptance criteria will be transferred to 55-gallon DOT Specification 17E closed-top drums and disposed of off-site in accordance with all applicable EPA, DOT, and state of Georgia regulations.

2.8 Documentation of field activities

All information pertinent to drilling and sampling activities, including instrument calibration data, was recorded in field logbooks. The logbooks were bound and the pages consecutively numbered. Entries in the logbooks were made in black permanent ink and included, at a minimum, a description of all activities, individuals involved in drilling and sampling activities, date and time of drilling and sampling, weather conditions, any problems encountered, and all field measurements. Lot numbers, manufacturers name, and expiration dates of standard solutions used for field instrument calibration were also recorded in the field logbooks.

Sufficient information was recorded in the logbooks to permit reconstruction of all drilling and sampling activities. For a detailed description of all field documentation, see section 4.5 of Attachment IV of the Work Plan.

3.0 SAMPLE HANDLING AND ANALYSIS

3.1 Analytical Program

Soil samples were screened for the presence of volatile vapors using a MiniRae organic vapor analyzer (PID). The MiniRae was calibrated daily using 100 parts per million (ppm) isobutylene. The headspace of each sample was measured approximately 15 minutes after collection.

For sites where the UST had contained waste oil, soil samples were analyzed for BTEX by method SW846- 8020, PAH by method SW846-8270, and TPH by method SW846-9073. Groundwater samples were analyzed for BTEX by method SW 846-8240 and PAH by method SW 846-8270. All samples were sent to General Engineering Laboratories, Charleston, South Carolina.

For sites where the UST had contained gasoline or diesel, soil samples were analyzed for BTEX by method SW 846-8020, PAH by method SW 846-8270, and TPH by method SW 846-8015 (modified). Groundwater samples were analyzed for BTEX by method SW 846-8240 and PAH by method SW 846-8270. TPH analysis included both gasoline range organics (GRO) and diesel range organics (DRO). All samples were sent to General Engineering Laboratories, Charleston, South Carolina.

Duplicate samples of soil and groundwater were collected throughout the project and represented approximately 10 percent of the total sample population. Rinsate blanks were collected to determine whether the sampling equipment was causing cross-contamination of the samples and represented approximately 5 percent of the total sample population. Duplicates and rinsates were submitted to General Engineering Laboratories, Charleston, South Carolina.

Split samples were collected in addition to the other quality control samples but were sent to the USACE QA laboratory in Marietta, Georgia as an independent quality check.

3.2 Sample Containers, Preservation, and Holding Times

The soil sample containers, preservatives, and holding times are summarized in Table B-1. The groundwater sample containers, preservatives, and holding times are summarized in Table B-2.

3.3 Sampling Packaging and Shipment

Each sample container was labeled, taped shut with electrical tape (except those containing samples designated for volatile organic analysis), and a initialed/dated custody seal was placed over the lid. Each sample bottle was placed into a separate plastic bag and sealed. The samples were placed upright in thermally insulated rigid-body coolers and surrounded by vermiculite to prevent breakage during shipment. In addition, samples were cooled to approximately 4° C with wet ice. These measures were taken to slow the decomposition and volatilization of contaminants during shipping and handling. The sample coolers were shipped to the analytical laboratory via courier service provided by the laboratory.

Table B-2. Summary of Sample Containers, Preservation Techniques, and Holding Times for Groundwater Samples Collected During the Site Investigation

Analyte Group	Container[1]	Minimum Sample Size	Preservative	Holding Time
Benzene, Toluene, Eethylbenzene, Xylene (BTEX)	2 - 40 mL glass vials with Teflon®-lined septum (no headspace)	40 mL	Cool, 4°C 0.008% $Na_2S_2O_3$ pH 4.5	14 d
Polyaromatic Hydrocarbons (PAHs)	2 - 1L amber glass bottle with Teflon®-lined lid[2]	1000 mL	Cool, 4°C 0.008% $Na_2S_2O_3$ pH 4.5	7 d (extraction) 40 d (analysis)
Metals (Lead only)	1 - 250 mL polybottle	100 mL	HNO_3 to pH <2 Cool, 4°C	180 d

[1] Container and preservation specifications shall meet all appropriate requirements (See Appendix F to ER 1110-1-263 [31 Mar 95] and in EM200-1-3, Table I-1 [1 Sept 94]).

[2] One investigative water sample in twenty will require an additional 2 liters volume for the laboratory to perform appropriate laboratory QC analysis.

Table B-1. Summary of Sample Containers, Preservation Techniques, and Holding Times for Soil Samples Collected During the Site Investigation

Analyte Group	Container[1]	Minimum Sample Size	Preservative	Holding Time
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	1 - 4 oz glass jar with Teflon®-lined cap (no headspace)	20 g	Cool, 4°C	14 d
TPH - GRO	use same container as BTEX	20 g	Cool, 4°C	14 d
Polyaromatic Hydrocarbons (PAHs)	1 - 8 oz glass jar with Teflon®-lined cap	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
TPH - DRO	use same container as PAHs	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
TPH (9073)	use same container as PAHs	90 g	Cool, 4°C	14 d (extraction) 40 d (analysis)
Metals (lead)	use same container as PAHs	20 g	Cool, 4°C	180 d
Waste Samples for TCLP analysis	1 - 16 oz wide mouth glass jar with Teflon®-lined cap	200 g	Cool, 4°C	14 d (extraction)

[1] Container and preservation specifications shall meet all appropriate requirements (See Appendix F to ER 1110-1-263 [31 Mar 95] and in EM200-1-3, Table I-1 [1 Sept 94]).

APPENDIX C

ANALYTICAL DATA SHEETS
AND
QUALITY CONTROL SUMMARY REPORT
FOR THE FACILITY ID #9-089064 SITE INVESTIGATION

APPENDIX C-1

ANALYTICAL DATA SHEETS FOR SOIL SAMPLES

Definition of Data Qualifiers (Flags)

During the data validation process, all laboratory data were assigned appropriate data validation flags and flagging codes. Validation flags are defined as follows:

"U"	When the material was analyzed for, but not detected above the level of the associated value.
"J"	When the associated value is an estimated quantity. Indicating there is cause to question accuracy or precision of the reported value.
"UJ"	When the analyte was analyzed for, but not detected, above the associated value, however, the reported value is an estimate and demonstrates an decreased knowledge of its accuracy or precision.
"R"	When the analyte value reported is unusable. The integrity of the analyte's identification, accuracy, precision, or sensitivity have raised significant question as to the reality of the information presented.

SAIC validation flagging codes have been provided on the next page.

DATA VALIDATION FLAGGING CODES

Blanks

F01	Sample data were qualified as a result of the method blank.
F02	Sample data were qualified as a result of the field blank.
F03	Sample data were qualified as a result of the equipment rinsate.
F04	Sample data were qualified as a result of the trip blank.
F05	Gross contamination exists.
F06	Concentration of the contaminant was detected at a level below the CRQL.
F07	Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL.
F08	Concentration of the contaminant was detected at a level that exceeds the action level.
F09	No laboratory blanks were analyzed.
F10	Blank had a negative value >5×'s the IDL.
F11	Blanks were not analyzed at required frequency.
F12	Professional judgement was used to qualify the data.

Surrogate Recovery

G01	Surrogate recovery was above the upper control limit.
G02	Surrogate recovery was below the lower control limit.
G03	Surrogate recovery was <10%.
G04	Surrogate recovery was zero.
G05	Surrogate was not present.
G06	Professional judgement was used to qualify the data.

Matrix Spike/Matrix Spike Duplicate

H01	MS/MSD recovery was above the upper control limit.
H02	MS/MSD recovery was below the lower control limit.
H03	MS/MSD recovery was <10%.
H04	MS/MSD pairs exceed the RPD limit.
H05	No action was taken on MS/MSD results.
H06	Professional judgement was used to qualify the data.

Matrix Spike

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

Laboratory Duplicate

J01	Duplicate RPD was outside the control limit.
J02	Duplicate sample results were >5× the CRDL.
J03	Duplicate sample results were <5× the CRDL.
J04	Professional judgement was used to qualify the data.

Internal Area Summary

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

Laboratory Control Samples (LCSs)

P01	LCS recovery was above upper control limit.
P02	LCS recovery was below lower control limit.
P03	LCS recovery was <50%.
P04	No action was taken on the LCS data.
P05	LCS was not analyzed at required frequency.

Target Compound Identification

M01	Incorrect identifications were made.
M02	Qualitative criteria were not met.
M03	Cross contamination occurred.
M04	Confirmatory analysis was not performed.
M05	No results were provided.
M06	Analysis occurred outside 12 hr GC/MS window.
M07	Professional judgement was used to qualify the data.
M08	The %D between the two pesticide/PCB column checks was >25%.

Initial/Continuing Calibration - Organics

C01	Initial calibration RRF was <0.05.
C02	Initial calibration RSD was >30%.
C03	Initial calibration sequence was not followed as required.
C04	Continuing calibration RRF was <0.05.
C05	Continuing calibration %D was >25%.
C06	Continuing calibration was not performed at the required frequency.
C07	Resolution criteria were not met.
C08	RPD criteria were not met.
C09	RSD criteria were not met.
C10	Retention time of compounds was outside windows.
C11	Compounds were not adequately resolved.
C12	Breakdown of endrin or DDT was >20%.
C13	Combined breakdown of endrin/DDT was >30%.
C14	Professional judgement was used to qualify the data.

C. An Employee-Owned Company
International Corporation
800 Oak R pike, Oak Ridge, TN 37831 (423) 481-4800

CHAIN OF CUSTODY RECORD

COC NO.: G0009

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature)

(Printed Name) SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO:(803) 556-8171

				REQUESTED PARAMETERS														
Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO					No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
0502W2	9/7/96	1515	WATER				2	1									3	0 ppm	
5302W2	9/7/96	1725	WATER				2										2	not recorded	
0502W4	9/7/96	1515	WATER				2	1									3	0 ppm	
0501W2	9/7/96	1330	WATER				2	1									3	0 ppm	
0102B1	9/~~7~~6/96 SLS 9/11/96	0934 ~~1115~~ SLS 9/11/96	SOIL		X					1							2	61.2 ~~3.6~~ ppm SLS 9/11/96	
4001C1	9/6/96	1115	SOIL		1					1							2	61.6 ppm	

SLS 9/8/96

RELINQUISHED BY:	Date/Time 9/8/96 1310	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 15	Cooler Temperature: 2°C
COMPANY NAME: SAIC		COMPANY NAME:		Cooler ID: #215	
RECEIVED BY: Raymond E Reed	Date/Time 9/8/96 1310	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY: Raymond E Reed	Date/Time 9/9/96 1630	RECEIVED BY:	Date/Time 09-09-96 16:30		
COMPANY NAME: GEL		COMPANY NAME: GEL			

SAIC An Employee-Owned Company
Science Applications International Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: G0017

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature) ShJStllr **(Printed Name)** SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD TPH	PAH, TPH	PAH, DRO	TPH				No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
3904W3	9/6/96	0945 ~~9/6/96~~ SS	WATER				2	1									3		
0301W2	9/6/96	1500	WATER				2	1									3		
0101A1	9/6/96	1145	SOIL		1					1	1						2	59.9 ppm	
0101B3	9/6/96	1145	SOIL		1												2	3.6 ppm	
1506A1	9/6/96	1317	SOIL	1								1					2	0ppm	
0202B1	9/6/96	1315	SOIL		1					1							2	1999 ppm	
0101B1	9/6/96	1145	SOIL		1						1						2	3.6 ppm	
		SS	9/6/96																

RELINQUISHED BY:	Date/Time 9/8/96 1310	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC		COMPANY NAME:	
RECEIVED BY: Raymond E Reed	Date/Time 9/8/96 1310	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL.		COMPANY NAME:	
RELINQUISHED BY: Raymond E Reed	Date/Time 9/8/96 16:30	RECEIVED BY:	Date/Time 9.9.96 16:?
COMPANY NAME: GEL		COMPANY NAME: GEL	

TOTAL NUMBER OF CONTAINERS:

Cooler ID: #248

Cooler Temperature: 3°

Chain says 3904W3 bottle says 3904W2 used what was on bottle.

An Employee-Owned Company
Scie ions International Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

PAGE 1 OF 2

CHAIN OF CUSTODY RECORD

COC NO.: G0122

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature)

(Printed Name) SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO:(803) 556-8171

				REQUESTED PARAMETERS																
Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH				No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS	
0105A1	12/14/96	1615	SOIL		1					1							2	67.2 ppm	9612339-07	.6
0105D1	12/14/96	1625			1						1						2	3.3 ppm	9612338-02	.5
0104B1	12/14/96	1700			1					1							2	15.5 ppm	9612339-08	.6
0104A1	12/14/96	1700			1						1						2	4.0 ppm	9612338-03	.5
0103C1	12/14/96	1835			1					1							2	6.2 ppm	9612339-09	.6
0103A1	12/14/96	1830			1						1						2	2.0 ppm	9612338-04	.5
5506D1	12/14/96	1150			1						1						2	0 ppm	9612338-05	.5
5506A1	12/14/96	1140			1					1							2	0.7 ppm	9612339-10	.6
4306B1	12/14/96	1630			1						1						2	0 ppm	9612338-06	.5
4306C1	12/14/96	1650			1					1							2	0 ppm	9612340-01	.6
5505A1	12/14/96	1005			1						1						2	0 ppm	9612338-07	.5
5505D1	12/14/96	1015			1					1							2	32.6 ppm	9612340-02	.6
0804A1	12/14/96	1240			1					1							2	18.2 ppm	9612340-03	.6

RELINQUISHED BY:
Date/Time 12/16/96 1330
COMPANY NAME: SAIC
RECEIVED BY:
Date/Time
COMPANY NAME:

RECEIVED BY: B Kochler
Date/Time 12/16/96
COMPANY NAME: GEL
RELINQUISHED BY:
Date/Time
COMPANY NAME:

RELINQUISHED BY: B Kochler
Date/Time 121696 1550
COMPANY NAME: GEL
RECEIVED BY:
Date/Time 12-16-96 1545
COMPANY NAME: GEL

TOTAL NUMBER OF CONTAINERS: 40

Cooler ID: #57

Cooler Temperature: 4.0

1D

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0101A1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 69088S

Matrix: (soil/water) SOIL Lab Sample ID: 9609088-12

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B2Z319

% Moisture: 17 decanted: (Y/N) N Date Received: 09/08/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 09/11/96

Injection Volume: ________(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	6.0	U	U
108-88-3	Toluene	6.0	U	↓
100-41-4	Ethylbenzene	6.0	U	
1330-20-7	Xylenes (total)	42		=

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0101A1

Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: 69088S

Matrix: (soil/water) SOIL Lab Sample ID: 9609088-12

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 1L319

Level: (low/med) LOW Date Received: 09/08/96

% Moisture: 17 decanted: (Y/N) N Date Extracted: 09/11/96

Concentrated Extract Volume: 1(mL) Date Analyzed: 09/19/96

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	401	U	U
91-58-7	2-chloronaphthalene	401	U	
209-96-8	acenaphthylene	401	U	
83-32-9	acenaphthene	401	U	
86-73-7	fluorene	401	U	
85-01-8	phenanthrene	401	U	
120-12-7	anthracene	401	U	
206-44-0	fluoranthene	401	U	
129-00-0	pyrene	401	U	
56-55-3	benzo(a)anthracene	401	U	
218-01-9	chrysene	401	U	
205-99-2	benzo(b)fluoranthene	401	U	
207-08-9	benzo(k)fluoranthene	401	U	
50-32-8	benzo(a)pyrene	401	U	
193-39-5	indeno(1,2,3-cd)pyrene	401	U	
53-70-3	dibenz(a,h)anthracene	401	U	
191-24-2	benzo(g,h,i)perylene	401	U	

Client: Science Applications International Corporation
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831

Date: 10/10/96

Contact: Mr. Chris Potter
ProjectDescription: Ft. Stewart UST Sites

Client Code: SAIC00396

Project Manager: Linda Darrington

Page: 1

Sample I.D.:	0101A1
Lab I.D.:	9609088-12
Sample Matrix:	Soil
Date Collected:	09/06/96
Date Received:	09/08/96
Priority:	Routine
Collected by:	Client

Parameter

Analyte:	**Qualifier**	**Result**	**Units**	**Method**	**Analyst**	**DateTime**
Total Rec. Petro.Hydrocarbons	B	268 ⇐ FD9	mg/kg	EPA 418.1 Mod.	EAN	09/09/961100
Evaporative Loss		17	%			

1D
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0101B1

Name: GENERAL ENGINEERING LABOR   Contract: NA

Lab Code: NA   Case No.: NA   SAS No.: NA   SDG No.: 69089S

Matrix: (soil/water) SOIL   Lab Sample ID: 9609089-09

Sample wt/vol: 5.0 (g/mL) g   Lab File ID: B2Z335

% Moisture: 18   decanted: (Y/N) N   Date Received: 09/08/96

Extraction: (SepF/Cont/Sonc) PURGETRAP   Date Extracted:N/A

Concentrated Extract Volume: 10(ml)   Date Analyzed: 09/12/96

Injection Volume: ________(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) N   pH: 7.0   Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	6.1	U	U
108-88-3	Toluene	20	P	J JM03
100-41-4	Ethylbenzene	6.1	U	U
1330-20-7	Xylenes (total)	10		=

1/6/97

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0101B1

Lab Name:
Contract:
Lab Code:
Case No.:
SAS No.:
SDG No.: 69089S
Matrix: (soil/water) SOIL
Lab Sample ID: 9609089-09
Sample wt/vol: 30.4 (g/mL) g
Lab File ID: 2L307
Level: (low/med) LOW
Date Received: 09/08/96
% Moisture: 18
decanted: (Y/N) N
Date Extracted: 09/11/96
Concentrated Extract Volume: 1 (mL)
Date Analyzed: 09/18/96
Injection Volume: 1.0 (uL)
Dilution Factor: 1.0
GPC Cleanup: (Y/N) N
pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	402	U	U
91-58-7	2-chloronaphthalene	402	U	
209-96-8	acenaphthylene	402	U	
83-32-9	acenaphthene	402	U	
86-73-7	fluorene	402	U	
85-01-8	phenanthrene	402	U	
120-12-7	anthracene	402	U	
206-44-0	fluoranthene	402	U	
129-00-0	pyrene	402	U	
56-55-3	benzo(a)anthracene	402	U	
218-01-9	chrysene	402	U	
205-99-2	benzo(b)fluoranthene	402	U	
207-08-9	benzo(k)fluoranthene	402	U	
50-32-8	benzo(a)pyrene	402	U	
193-39-5	indeno(1,2,3-cd)pyrene	402	U	
53-70-3	dibenz(a,h)anthracene	402	U	
191-24-2	benzo(g,h,i)perylene	402	U	

Client:
Science Applications International Corporation
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831

Date: 10/10/96

Contact: Mr. Chris Potter
ProjectDescription: Ft. Stewart UST Sites

Client Code: SAIC00396

Project Manager: Linda Darrington

Page: 1

Sample I.D.: 0101B1
Lab I.D.: 9609088-09
Sample Matrix: Soil
Date Collected: 09/06/96
Date Received: 09/08/96
Priority: Routine
Collected by: Client

Parameter

Analyte:	Qualifier	Result	Units	Method	Analyst	DateTime
Total Rec. Petro.Hydrocarbons	B	27.3 U F01 F07	mg/kg	EPA 418.1 Mod.	EAN	09/09/961100
Evaporative Loss		10	%			

1D
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0102B1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 69088S

Matrix: (soil/water) SOIL Lab Sample ID: 9609088-14

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B2Z321

% Moisture: 18 decanted: (Y/N) N Date Received: 09/08/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 09/11/96

Injection Volume: _______(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	---------Benzene	6.1	U	U
108-88-3	--------Toluene	6.1	U	↓
100-41-4	--------Ethylbenzene	6.1	U	
1330-20-7	-------Xylenes (total)	7.1		=

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0102B1

Name:		Contract:	
Lab Code:	Case No.:	SAS No.:	SDG No.: 69088S
Matrix: (soil/water)	SOIL		Lab Sample ID: 9609088-14
Sample wt/vol:	30.9 (g/mL) g		Lab File ID: 1L321
Level: (low/med)	LOW		Date Received: 09/08/96
% Moisture: 18	decanted: (Y/N) N		Date Extracted: 09/11/96
Concentrated Extract	Volume: 1(mL)		Date Analyzed: 09/19/96
Injection Volume:	1.0(uL)		Dilution Factor: 1.0
GPC Cleanup: (Y/N) N	pH: 7.0		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	395	U	U
91-58-7	2-chloronaphthalene	395	U	↓
209-96-8	acenaphthylene	395	U	
83-32-9	acenaphthene	395	U	
86-73-7	fluorene	395	U	
85-01-8	phenanthrene	395	U	
120-12-7	anthracene	395	U	
206-44-0	fluoranthene	395	U	
129-00-0	pyrene	395	U	
56-55-3	benzo(a)anthracene	395	U	
218-01-9	chrysene	395	U	
205-99-2	benzo(b)fluoranthene	395	U	
207-08-9	benzo(k)fluoranthene	395	U	
50-32-8	benzo(a)pyrene	395	U	
193-39-5	indeno(1,2,3-cd)pyrene	395	U	
53-70-3	dibenz(a,h)anthracene	395	U	
191-24-2	benzo(g,h,i)perylene	395	U	

Client: Science Applications International Corporation
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831

Date: 10/10/96

Contact: Mr. Chris Potter
ProjectDescription: Ft. Stewart UST Sites

Client Code: SAIC00396 Project Manager: Linda Darrington Page: 1

Sample I.D.: 0102B1
Lab I.D.: 9609088-14
Sample Matrix: Soil
Date Collected: 09/06/96
Date Received: 09/08/96
Priority: Routine
Parameter Collected by: Client

Analyte:	Qualifier	Result	Units	Method	Analyst	DateTime
Total Rec. Petro.Hydrocarbons	B	51.4 =	mg/kg	EPA 418.1 Mod.	EAN	09/09/961100
Evaporative Loss		18	%			

1D

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0103A1

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C338S

Matrix: (soil/water) SOIL Lab Sample ID: 9612338-04

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B2N38

% Moisture: 7 decanted: (Y/N) N Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 12/18/96

Injection Volume: _______(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	5.4	U	U
108-88-3	Toluene	38.5		=
100-41-4	Ethylbenzene	5.4	U	U
1330-20-7	Xylenes (total)	5.4	U	U

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0103A1

Lab Name: GENERAL ENGINEERING LABS. Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C338S
Matrix: (soil/water) SOIL Lab Sample ID: 9612338-04
Sample wt/vol: 30.1 (g/mL) g Lab File ID: 6A410
Level: (low/med) LOW Date Received: 12/16/96
% Moisture: 7 decanted: (Y/N) N Date Extracted:12/18/96
Concentrated Extract Volume: 1(mL) Date Analyzed: 01/02/97
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	357	U	U
91-58-7	2-chloronaphthalene	357	U	
208-96-8	acenaphthylene	357	U	
83-32-9	acenaphthene	357	U	
86-73-7	fluorene	357	U	
85-01-8	phenanthrene	357	U	
120-12-7	anthracene	357	U	
206-44-0	fluoranthene	357	U	
129-00-0	pyrene	357	U	
56-55-3	benzo(a)anthracene	357	U	
218-01-9	chrysene	357	U	
205-99-2	benzo(b)fluoranthene	357	U	
207-08-9	benzo(k)fluoranthene	357	U	
50-32-8	benzo(a)pyrene	357	U	
193-39-5	indeno(1,2,3-cd)pyrene	357	U	
53-70-3	dibenz(a,h)anthracene	357	U	
191-24-2	benzo(g,h,i)perylene	357	U	↓

DATA VALIDATION
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Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Mr. Nile Luedtke
Project Description:	Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 14, 1997 Page 1 of 2

Sample ID	: 0103A1
Lab ID	: 9612338-04
Matrix	: Soil
Date Collected	: 12/14/96
Date Received	: 12/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep												
Evaporative Loss @ 105 C		7.00		1.00	1.00	wt%	1.0	CEC	12/16/96	2030	95110	1
General Chemistry												
Total Rec. Petro. Hydrocarbons		26.9	=	7.30	10.8	mg/kg	1.0	SLR	01/02/97	1745	95331	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

1D

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0103C1

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C339S

Matrix: (soil/water) SOIL Lab Sample ID: 9612339-09

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B1N414

% Moisture: 12 decanted: (Y/N) N Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 12/19/96

Injection Volume: ________(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	5.7	U	U
108-88-3	Toluene	5.7	U	
100-41-4	Ethylbenzene	5.7	U	
1330-20-7	Xylenes (total)	5.7	U	

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0103C1

ab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C339S

Matrix: (soil/water) SOIL Lab Sample ID: 9612339-09

Sample wt/vol: 30.7 (g/mL) g Lab File ID: 2A520

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: 12 decanted: (Y/N) N Date Extracted:12/18/96

Concentrated Extract Volume: 1(mL) Date Analyzed: 01/03/97

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	370	U	U
91-58-7	2-chloronaphthalene	370	U	
209-96-8	acenaphthylene	370	U	
83-32-9	acenaphthene	370	U	
86-73-7	fluorene	370	U	
85-01-8	phenanthrene	370	U	
120-12-7	anthracene	370	U	
206-44-0	fluoranthene	370	U	
129-00-0	pyrene	370	U	
56-55-3	benzo(a)anthracene	370	U	
218-01-9	chrysene	370	U	
205-99-2	benzo(b)fluoranthene	370	U	
207-08-9	benzo(k)fluoranthene	370	U	
50-32-8	benzo(a)pyrene	370	U	
193-39-5	indeno(1,2,3-cd)pyrene	370	U	
53-70-3	dibenz(a,h)anthracene	370	U	
191-24-2	benzo(g,h,i)perylene	370	U	↓

DATA VALIDATION
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GENERAL ENGINEERING LABORATORIES, INC.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Mr. Nile Luedtke
Project Description:	Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 07, 1997 Page 1 of 2

Sample ID	: 0103C1
Lab ID	: 9612339-09
Matrix	: Soil
Date Collected	: 12/14/96
Date Received	: 12/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep												
Evaporative Loss @ 105 C		12.0		1.00	1.00	wt%	1.0	CEC	12/16/96	2200	95137	1
General Chemistry												
Total Rec. Petro. Hydrocarbons		199	= F08	38.5	57.0	mg/kg	5.0	TSM	01/06/97	1235	95749	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

177

9612339-09

1D

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0104A1

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C338S

Matrix: (soil/water) SOIL Lab Sample ID: 9612338-03

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B2N37

% Moisture: 11 decanted: (Y/N) N Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted: N/A

Concentrated Extract Volume: 10 (ml) Date Analyzed: 12/18/96

Injection Volume: _______ (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	5.6	U	U
108-88-3	Toluene	18.0	P	J M08
100-41-4	Ethylbenzene	5.6	U	U
1330-20-7	Xylenes (total)	5.6	U	U

DATA VALIDATION
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0104A1

Lab Name: GENERAL ENGINEERING LABS. Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C338S

Matrix: (soil/water) SOIL Lab Sample ID: 9612338-03

Sample wt/vol: 31.0 (g/mL) g Lab File ID: 6A409

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: 11 decanted: (Y/N) N Date Extracted:12/18/96

Concentrated Extract Volume: 1(mL) Date Analyzed: 01/02/97

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	naphthalene	363	U
91-58-7	2-chloronaphthalene	363	U
208-96-8	acenaphthylene	363	U
83-32-9	acenaphthene	363	U
86-73-7	fluorene	363	U
85-01-8	phenanthrene	363	U
120-12-7	anthracene	363	U
206-44-0	fluoranthene	363	U
129-00-0	pyrene	363	U
56-55-3	benzo(a)anthracene	363	U
218-01-9	chrysene	363	U
205-99-2	benzo(b)fluoranthene	363	U
207-08-9	benzo(k)fluoranthene	363	U
50-32-8	benzo(a)pyrene	363	U
193-39-5	indeno(1,2,3-cd)pyrene	363	U
53-70-3	dibenz(a,h)anthracene	363	U
191-24-2	benzo(g,h,i)perylene	363	U

U

DATA VALIDATION
COPY

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Mr. Nile Luedtke
Project Description: Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 14, 1997 Page 1 of 2

Sample ID : 0104A1
Lab ID : 9612338-03
Matrix : Soil
Date Collected : 12/14/96
Date Received : 12/16/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
Evaporative Loss @ 105 C		11.0	1.00	1.00	wt%	1.0	CEC	12/16/96	2030	95110	1
General Chemistry											
Total Rec. Petro. Hydrocarbons		78.5 =	7.57	11.2	mg/kg	1.0	SLR	01/02/97	1742	95331	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

1D
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0104B1

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C339S

Matrix: (soil/water) SOIL Lab Sample ID: 9612339-08

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B1N412

% Moisture: 9 decanted: (Y/N) N Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 12/19/96

Injection Volume: ________(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	5.5	U	U
108-88-3	Toluene	5.8		=
100-41-4	Ethylbenzene	5.5	U	U
1330-20-7	Xylenes (total)	5.5	U	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0104B1

.b Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C339S

Matrix: (soil/water) SOIL

Lab Sample ID: 9612339-08

Sample wt/vol: 30.6 (g/mL) g

Lab File ID: 2A519

Level: (low/med) LOW

Date Received: 12/16/96

% Moisture: 9 decanted: (Y/N) N

Date Extracted:12/18/96

Concentrated Extract Volume: 1(mL)

Date Analyzed: 01/03/97

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	359	U	U
91-58-7	2-chloronaphthalene	359	U	
209-96-8	acenaphthylene	359	U	
83-32-9	acenaphthene	359	U	
86-73-7	fluorene	359	U	
85-01-8	phenanthrene	359	U	
120-12-7	anthracene	359	U	
206-44-0	fluoranthene	359	U	
129-00-0	pyrene	359	U	
56-55-3	benzo(a)anthracene	359	U	
218-01-9	chrysene	359	U	
205-99-2	benzo(b)fluoranthene	359	U	
207-08-9	benzo(k)fluoranthene	359	U	
50-32-8	benzo(a)pyrene	359	U	
193-39-5	indeno(1,2,3-cd)pyrene	359	U	
53-70-3	dibenz(a,h)anthracene	359	U	
191-24-2	benzo(g,h,i)perylene	359	U	

DATA VALIDATION
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Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Mr. Nile Luedtke
Project Description: Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 06, 1997 Page 1 of 2

Sample ID : 0104B1
Lab ID : 9612339-08
Matrix : Soil
Date Collected : 12/14/96
Date Received : 12/16/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep												
Evaporative Loss @ 105 C		9.00		1.00	1.00	wt%	1.0	CEC	12/16/96	2200	95137	1
General Chemistry												
Total Rec. Petro. Hydrocarbons	U	-7.87	U	7.44	11.0	mg/kg	1.0	SLR	01/02/97	1827	95331	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

9612339-08

1D
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0105A1

ab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C339S

Matrix: (soil/water) SOIL Lab Sample ID: 9612339-07

Sample wt/vol: 5.0 (g/mL) g Lab File ID: B1N411

% Moisture: 3 decanted: (Y/N) N Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP Date Extracted:N/A

Concentrated Extract Volume: 10(ml) Date Analyzed: 12/19/96

Injection Volume: ________(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	5.2	U	U
108-88-3	Toluene	5.2	U	
100-41-4	Ethylbenzene	5.2	U	
1330-20-7	Xylenes (total)	5.2	U	

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0105A1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C339S

Matrix: (soil/water) SOIL Lab Sample ID: 9612339-07

Sample wt/vol: 30.8 (g/mL) g Lab File ID: 2A518

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: 3 decanted: (Y/N) N Date Extracted: 12/18/96

Concentrated Extract Volume: 1 (mL) Date Analyzed: 01/03/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
91-20-3	naphthalene	335	U	U
91-58-7	2-chloronaphthalene	335	U	
209-96-8	acenaphthylene	335	U	
83-32-9	acenaphthene	335	U	
86-73-7	fluorene	335	U	
85-01-8	phenanthrene	335	U	
120-12-7	anthracene	335	U	
206-44-0	fluoranthene	335	U	
129-00-0	pyrene	335	U	
56-55-3	benzo(a)anthracene	335	U	
218-01-9	chrysene	335	U	
205-99-2	benzo(b)fluoranthene	335	U	
207-08-9	benzo(k)fluoranthene	335	U	
50-32-8	benzo(a)pyrene	335	U	
193-39-5	indeno(1,2,3-cd)pyrene	335	U	
53-70-3	dibenz(a,h)anthracene	335	U	
191-24-2	benzo(g,h,i)perylene	335	U	↓

DATA VALIDATION
COPY

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Mr. Nile Luedtke
Project Description:	Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 06, 1997 Page 1 of 2

Sample ID	: 0105A1
Lab ID	: 9612339-07
Matrix	: Soil
Date Collected	: 12/14/96
Date Received	: 12/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
Evaporative Loss @ 105 C		3.00	1.00	1.00	wt%	1.0	CEC	12/16/96	2200	95137	1
General Chemistry											
Total Rec. Petro. Hydrocarbons		12.2	6.96	10.3	mg/kg	1.0	SLR	01/02/97	1825	95331	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

DATA VALIDATION
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173

9612339-07

1D

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0105D1

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C338S

Matrix: (soil/water) SOIL

Lab Sample ID: 9612338-02

Sample wt/vol: 5.0 (g/mL) g

Lab File ID: B2N36

% Moisture: 17 decanted: (Y/N) N

Date Received: 12/16/96

Extraction: (SepF/Cont/Sonc) PURGETRAP

Date Extracted:N/A

Concentrated Extract Volume: 10(ml)

Date Analyzed: 12/18/96

Injection Volume: _______(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q	
71-43-2	Benzene	6.0	U	U
108-88-3	Toluene	14.5	P	J M08
100-41-4	Ethylbenzene	6.0	U	U
1330-20-7	Xylenes (total)	6.0	U	U

DATA VALIDATION
COPY

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0105D1

b Name: GENERAL ENGINEERING LABS.   Contract: NA

Lab Code: NA   Case No.: NA   SAS No.: NA   SDG No.: 6C338S

Matrix: (soil/water) SOIL   Lab Sample ID: 9612338-02

Sample wt/vol: 30.7 (g/mL) g   Lab File ID: 6A408

Level: (low/med) LOW   Date Received: 12/16/96

% Moisture: 17   decanted: (Y/N) N   Date Extracted:12/18/96

Concentrated Extract Volume: 1(mL)   Date Analyzed: 01/02/97

Injection Volume: 1.0(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) N   pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	naphthalene	392	U
91-58-7	2-chloronaphthalene	392	U
208-96-8	acenaphthylene	392	U
83-32-9	acenaphthene	392	U
86-73-7	fluorene	392	U
85-01-8	phenanthrene	392	U
120-12-7	anthracene	392	U
206-44-0	fluoranthene	392	U
129-00-0	pyrene	392	U
56-55-3	benzo(a)anthracene	392	U
218-01-9	chrysene	392	U
205-99-2	benzo(b)fluoranthene	392	U
207-08-9	benzo(k)fluoranthene	392	U
50-32-8	benzo(a)pyrene	392	U
193-39-5	indeno(1,2,3-cd)pyrene	392	U
53-70-3	dibenz(a,h)anthracene	392	U
191-24-2	benzo(g,h,i)perylene	392	U

U ↓

DATA VALIDATION COPY

GENERAL ENGINEERING LABORATORIES, INC.

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Mr. Nile Luedtke
Project Description:	Ft. Stewart UST Sites

cc: SAIC00396 Report Date: January 14, 1997 Page 1 of 2

Sample ID	: 0105D1
Lab ID	: 9612338-02
Matrix	: Soil
Date Collected	: 12/14/96
Date Received	: 12/16/96
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Organic Prep											
Evaporative Loss @ 105 C		17.0	1.00	1.00	wt%	1.0	CEC	12/16/96	2030	95110	1
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	-8.34 U	8.11	12.0	mg/kg	1.0	SLR	01/02/97	1740	95331	2

M = Method	Method-Description
M 1	EPA 3550
M 2	EPA 418.1 Modified

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

DATA VALIDATION COPY

APPENDIX C-2

ANALYTICAL DATA SHEETS FOR GROUNDWATER SAMPLES

Definition of Data Qualifiers (Flags)

During the data validation process, all laboratory data were assigned appropriate data validation flags and flagging codes. Validation flags are defined as follows:

"U"	When the material was analyzed for, but not detected above the level of the associated value.
"J"	When the associated value is an estimated quantity. Indicating there is cause to question accuracy or precision of the reported value.
"UJ"	When the analyte was analyzed for, but not detected, above the associated value, however, the reported value is an estimate and demonstrates an decreased knowledge of its accuracy or precision.
"R"	When the analyte value reported is unusable. The integrity of the analyte's identification, accuracy, precision, or sensitivity have raised significant question as to the reality of the information presented.

SAIC validation flagging codes have been provided on the next page.

DATA VALIDATION FLAGGING CODES

Blanks

F01	Sample data were qualified as a result of the method blank.
F02	Sample data were qualified as a result of the field blank.
F03	Sample data were qualified as a result of the equipment rinsate.
F04	Sample data were qualified as a result of the trip blank.
F05	Gross contamination exists.
F06	Concentration of the contaminant was detected at a level below the CRQL.
F07	Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL.
F08	Concentration of the contaminant was detected at a level that exceeds the action level.
F09	No laboratory blanks were analyzed.
F10	Blank had a negative value >5×'s the IDL.
F11	Blanks were not analyzed at required frequency.
F12	Professional judgement was used to qualify the data.

Surrogate Recovery

G01	Surrogate recovery was above the upper control limit.
G02	Surrogate recovery was below the lower control limit.
G03	Surrogate recovery was <10%.
G04	Surrogate recovery was zero.
G05	Surrogate was not present.
G06	Professional judgement was used to qualify the data.

Matrix Spike/Matrix Spike Duplicate

H01	MS/MSD recovery was above the upper control limit.
H02	MS/MSD recovery was below the lower control limit.
H03	MS/MSD recovery was <10%.
H04	MS/MSD pairs exceed the RPD limit.
H05	No action was taken on MS/MSD results.
H06	Professional judgement was used to qualify the data.

Matrix Spike

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

Laboratory Duplicate

J01	Duplicate RPD was outside the control limit.
J02	Duplicate sample results were >5× the CRDL.
J03	Duplicate sample results were <5× the CRDL.
J04	Professional judgement was used to qualify the data.

Internal Area Summary

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

Laboratory Control Samples (LCSs)

P01	LCS recovery was above upper control limit.
P02	LCS recovery was below lower control limit.
P03	LCS recovery was <50%.
P04	No action was taken on the LCS data.
P05	LCS was not analyzed at required frequency.

Target Compound Identification

M01	Incorrect identifications were made.
M02	Qualitative criteria were not met.
M03	Cross contamination occurred.
M04	Confirmatory analysis was not performed.
M05	No results were provided.
M06	Analysis occurred outside 12 hr GC/MS window.
M07	Professional judgement was used to qualify the data.
M08	The %D between the two pesticide/PCB column checks was >25%.

Initial/Continuing Calibration - Organics

C01	Initial calibration RRF was <0.05.
C02	Initial calibration RSD was >30%.
C03	Initial calibration sequence was not followed as required.
C04	Continuing calibration RRF was <0.05.
C05	Continuing calibration %D was >25%.
C06	Continuing calibration was not performed at the required frequency.
C07	Resolution criteria were not met.
C08	RPD criteria were not met.
C09	RSD criteria were not met.
C10	Retention time of compounds was outside windows.
C11	Compounds were not adequately resolved.
C12	Breakdown of endrin or DDT was >20%.
C13	Combined breakdown of endrin/DDT was >30%.
C14	Professional judgement was used to qualify the data.

Scienc[illegible] International Corporation An Employee-Owned Company
800 Oak Ri[illegible] ke, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: G0013

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature) ShISH **(Printed Name)** SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH			No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
040185	9/7/96	0840	WATER				2	1					2			5		
0101W2	9/6/96	1205	WATER				2									2		
0102W2	9/6/96	1020	WATER				2									2		
1601W2	9/6/96	1540	WATER				2									2		

RELINQUISHED BY: ShISH	Date/Time 9/8/96 1310	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC		COMPANY NAME:	
RECEIVED BY: Raymond E Reed	Date/Time 9/8/96 13:10	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY: Raymond E Reed	Date/Time 9/8/96 16 30	RECEIVED BY:	Date/Time 9-9-96 16:30
COMPANY NAME: GEL		COMPANY NAME: GEL	

TOTAL NUMBER OF CONTAINERS: 11

Cooler ID: #76

Cooler Temperature: 3

25

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I HOE 1 OF 7

CHAIN OF CUSTODY RECORD

COC NO.: G0018

PROJECT NAME: Fort Stewart UST Sites
PROJECT NUMBER: 0003
PROJECT MANAGER: Chris Potter
Sampler (Signature) (Printed Name) SHARON STOLLER

LABORATORY NAME: GEL
LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417
PHONE NO:(803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO								No. of Bottles/Vials	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
TB0008	9/6/96	0759	WATER		2												2		
1601W2	9/6/96	1500			2												2		
0102W2	9/6/96	1020			2												2		
1506W4	9/6/96	1340			2												2		
1502W2	9/6/96	1535			2												2		sample water only, not product
0202W2	9/6/96	1335			2												2		
1602W2	9/6/96	1638			2												2		
~~010A1~~ SLS 9/8/96																			
~~[illegible]~~ 4001W2	9/6/96	1135			2												2		
1501W2	9/6/96	1006			2												2		
0201W2	9/6/96	1550			2												2		
SLS 9/8/96 ~~1602R6~~	~~9/6/96~~	~~1550~~		2	~~2~~ SLS														
3904W2	9/6/96	945			2												2		

RELINQUISHED BY: SLS
COMPANY NAME: SAIC
Date/Time 9/8/96 1310
RECEIVED BY:
COMPANY NAME:
Date/Time

RECEIVED BY: Raymond E Reed
COMPANY NAME: G.E.L.
Date/Time 9/8/96 13:10
RELINQUISHED BY:
COMPANY NAME:
Date/Time

RELINQUISHED BY: Raymond E Reed
COMPANY NAME: G[illegible]L
Date/Time 9/8/96 1630
RECEIVED BY:
COMPANY NAME: GEL
Date/Time 09-09-96 16:3

TOTAL NUMBER OF CONTAINERS: 84
Cooler ID: #237
Cooler Temperature: 5°

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International Corporation
800 Oak R npike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: G0019

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature) Sh T S

(Printed Name) SHARON STALLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO:(803) 556-8171

				REQUESTED PARAMETERS														
Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO								No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
1505W2	9/6/96	1125	WATER		2												2		
0201W4	9/6/96	1550			2												2		
1506W2	9/6/96	1330			2												2		
0101W2	9/6/96	1205			2												2		
TB0005	9/6/96	0759			2												2		
TB0006	9/6/96	0759			2												2		
1602R6	9/6/96	1550			2												2		
0301W2	9/7/96	1500			2												2		
0502W2	9/7/96	1515			2												2		
5302W2	9/7/96	1725			2												2		
0502W4	9/7/96	1515			2												2		
2002W2	9/7/96	1525			2												2		
1507W2	9/7/96	1425			2												2		

RELINQUISHED BY: Sh T S COMPANY NAME: SAIC	Date/Time 9/8/96 1310	RECEIVED BY: COMPANY NAME:	Date/Time
RECEIVED BY: Raymond E Reed COMPANY NAME: G.E.L.	Date/Time 9/8/96 13:10	RELINQUISHED BY: COMPANY NAME:	Date/Time
RELINQUISHED BY: Raymond E Reed COMPANY NAME: GEL	Date/Time 9/8/96 1630	RECEIVED BY: COMPANY NAME: GEL	Date/Time 09-09-96 16:30

TOTAL NUMBER OF CONTAINERS: 84

Cooler ID: #237

Cooler Temperature: 5°

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Science Applications International Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: G0115

PROJECT NAME: Fort Stewart UST Sites
PROJECT NUMBER: 0003
PROJECT MANAGER: Chris Potter
Sampler (Signature) (Printed Name) Sharon Stoller

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

				REQUESTED PARAMETERS													
Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD TPH	PAH, TPH	PAH, DRO	TPH			No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
3305W2	12/15/96	1030	WATER				2	1								3	0 ppm	9612330-06
3303W2	12/15/96	1050	WATER				2	1								3	not recorded	9612330-07
3304W2	12/15/96	1215	WATER				2	1								3	0 ppm	9612330-08
4004W2	12/15/96	0935	WATER				2	1								3	0 ppm	9612330-09
0105W2	12/14/96	1635	WATER				2	1								3	0 ppm	9612330-10

SLS 12/16/96

RELINQUISHED BY:	Date/Time 12/16/96 1330	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC		COMPANY NAME:	
RECEIVED BY:	Date/Time 12/16/96 1370	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY:	Date/Time 12/16/96 1545	RECEIVED BY:	Date/Time 12-16-96 1545
COMPANY NAME: GEL		COMPANY NAME: GEL	

TOTAL NUMBER OF CONTAINERS: 15

Cooler ID: #140

Cooler Temperature: 3°

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CHAIN OF CUSTODY RECORD

COC NO.: G0116

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature)

(Printed Name) SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO:(803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH			No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
0104W2	12/14/96	1755	WATER				2	1								3	0 ppm	9612332-06
4305W2	12/14/96	1855	WATER				2	1								3	5.9 ppm	9612332-07
5506W2	12/14/96	1720	WATER				2	1								3	not recorded	9612332-08
4307W2	12/14/96	1605	WATER				2	1								3	3.7 ppm	9612332-09
4306W2	12/14/96	1745	WATER				2	1								3	4.8 ppm	9612332-10

SLS 12/16/96

RELINQUISHED BY:	Date/Time 12/16/96 1334	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC		COMPANY NAME:	
RECEIVED BY:	Date/Time 12/16/96 1330	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL		COMPANY NAME:	
RELINQUISHED BY:	Date/Time 121696 1545	RECEIVED BY:	Date/Time 12-16-96 1545
COMPANY NAME: GEL		COMPANY NAME: [illegible]	

TOTAL NUMBER OF CONTAINERS: 15

Cooler ID: #228

Cooler Temperature: 2°

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CHAIN OF CUSTODY RECORD

COC NO.: G0118

PROJECT NAME: Fort Stewart UST Sites

PROJECT NUMBER: 0003

PROJECT MANAGER: Chris Potter

Sampler (Signature) Sh Stoller **(Printed Name)** SHARON STOLLER

LABORATORY NAME: GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO: (803) 556-8171

				REQUESTED PARAMETERS														
Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH			No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
0103W2	12/15/96	1530	WATER				~~2~~ 3	1								~~3~~ 4	not recorded	9612330-01
1003W4	12/14/96	1400	WATER				2	1								3	0 ppm	9612330-02
5507W2	12/14/96	0845	WATER				1	1								2	5.7 ppm	9612330-03 only 1 bottle for PAH
2804W2	12/14/96	1250	WATER				2	1								3	not recorded	9612330-04
1304W2	12/14/96	0835	WATER				2	1								3	0 ppm	9612330-05

SLS 12/16/96

RELINQUISHED BY: Sh Stoller	Date/Time 12/16/96 1330	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 15	Cooler Temperature: 3°
COMPANY NAME: SAIC		COMPANY NAME:		Cooler ID: #128	
RECEIVED BY:	Date/Time 12/16/96 1330	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY:	Date/Time 12 16 96 1545	RECEIVED BY:	Date/Time 12-16-96 154		
COMPANY NAME:		COMPANY NAME: GEL			

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PAGE 2 OF -

CHAIN OF CUSTODY RECORD

COC NO.: G0125

PROJECT NAME: Fort Stewart UST Sites
PROJECT NUMBER: 0003
PROJECT MANAGER: Chris Potter
Sampler (Signature) (Printed Name) SHARON STOLLER

LABORATORY NAME: GEL
LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417
PHONE NO:(803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH			No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
3304W2	12/15/96	1215	WATER		2											2	0 ppm	9612334-06
3305W2	12/15/96	1030			2											2	0 ppm	9612334-07
3303W2	12/15/96	1050			2											2	not recorded	9612334-08
0103W2	12/15/96	1530			2											2	not recorded	9612334-09
TB0073	12/15/96	0630			2											2	N/A	9612334-10
4004W2	12/15/96	0935			2											2	0 ppm	9612334-11
0804W2	12/15/96	1455			2											2	not recorded	9612334-12
1004W2	12/14/96	1510			2											2	0 ppm	9612334-13
1303W2	12/14/96	1015			2											2	~~n/a~~ SU 12/14/96 0 ppm	9612334-14
0105W2	12/14/96	1635			2											2	0 ppm	9612334-15
TB0069	12/14/96	0630			2											2	N/A	9612335-01
4305W2	12/14/96	1855			2											2	5.9 ppm	9612335-02
1003W4	12/14/96	1400			2											2	0 ppm	9612335-03

RELINQUISHED BY:	Date/Time 12/16/96 1330	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 26	Cooler Temperature: 4°
COMPANY NAME: SAIC		COMPANY NAME:		Cooler ID: #37	
RECEIVED BY: Bob Locke	Date/Time 12/16/96 1330	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY: B Locke	Date/Time 12/16/96 1600	RECEIVED BY:	Date/Time 12-16-96 1545		
COMPANY NAME: GEL		COMPANY NAME: GEL			

PAGE 3 OF 3

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CHAIN OF CUSTODY RECORD

COC NO.: G0126

PROJECT NAME: Fort Stewart UST Sites
PROJECT NUMBER: 0003
PROJECT MANAGER: Chris Potter
Sampler (Signature)
(Printed Name) SHARON STOLLER

LABORATORY NAME:
GEL

LABORATORY ADDRESS:
2040 Savage Road
Charleston, SC 29417

PHONE NO:(803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX, GRO	BTEX	PAH, Lead, DRO	PAH	Lead	DRO	PAH, LEAD, TPH	PAH, TPH	PAH, DRO	TPH				No. of Bottles/Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
0104W2	12/14/96	1755	WATER		2												2	0 ppm	9612335-04
1003W2	12/14/96	1400			2												2	0 ppm	9612335-05
1304W2	12/14/96	0835			2												2	0 ppm	9612335-06
5505RS	12/14/96	0920			2												2	N/A	9612335-07
TB0067	12/14/96	0630			2												2	N/A	9612335-08
4306W2	12/14/96	1745			2												2	4.8 ppm	9612335-09
5506W2	12/14/96	1720			2												2	not recorded	9612335-10
1303RS	12/14/96	0905			2												2	N/A	9612335-11
5507W2	12/14/96	0845			2												2	5.7 ppm	9612335-12
4307W2	12/14/96	1605			2												2	3.7 ppm	9612335-13
5505W2	12/14/96	1220			2												2	2.5 ppm	9612335-14
2804W2	12/14/96	1250			2												2	not recorded	9612335-15
	SCS 12/16/96																		

RELINQUISHED BY:	Date/Time 12/16/96 1330	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 76	Cooler Temperature: 4°
COMPANY NAME: SAIC		COMPANY NAME:		Cooler ID: #37	
RECEIVED BY:	Date/Time 12/14/96 1330	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY:	Date/Time 12/16/96 1600	RECEIVED BY:	Date/Time 12-16-96 18		
COMPANY NAME: GEL		COMPANY NAME: GEL			

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0101W2

Name: GENERAL ENGINEERING LABOR Contract:

Lab Code: Case No.: SAS No.: SDG No.: 69092W

Matrix: (soil/water) WATER

Lab Sample ID: 9609092-15

Sample wt/vol: 20 (g/ml) ml

Lab File ID: 1Z322

Level: (low/med) LOW

Date Received: 09/08/96

% Moisture: not dec. ________

Date Analyzed: 09/11/96

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:________(uL)

Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q	
71-43-2	benzene	77.8		=
108-88-3	toluene	5 ~~0.63~~	JB	U FD1, FD1
100-41-4	ethylbenzene	0.32	J	J
1330-20-7	xylenes (total)	5.0	U	U

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12/10/96

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0101W2

Lab Name: GENERAL ENGINEERING LABOR Contract:

Lab Code: Case No.: SAS No.: SDG No.: 69090W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9609090-07

Sample wt/vol: 500 (g/mL) mL Lab File ID: 2K217

Level: (low/med) LOW Date Received: 09/08/96

% Moisture: ______ decanted: (Y/N)___ Date Extracted: 09/09/96

Concentrated Extract Volume: 0.5(mL) Date Analyzed: 09/10/96

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q	
91-20-3	naphthalene	10.0	U	U
91-58-7	2-chloronaphthalene	10.0	U	
209-96-8	acenaphthylene	10.0	U	
83-32-9	acenaphthene	10.0	U	
86-73-7	fluorene	10.0	U	
85-01-8	phenanthrene	10.0	U	
120-12-7	anthracene	10.0	U	
206-44-0	fluoranthene	10.0	U	
129-00-0	pyrene	10.0	U	
56-55-3	benzo(a)anthracene	10.0	U	
218-01-9	chrysene	10.0	U	
205-99-2	benzo(b)fluoranthene	10.0	U	
207-08-9	benzo(k)fluoranthene	10.0	U	
50-32-8	benzo(a)pyrene	10.0	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U	
53-70-3	dibenz(a,h)anthracene	10.0	U	
191-24-2	benzo(g,h,i)perylene	10.0	U	↓

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0102W2DL2

Name: GENERAL ENGINEERING LABOR Contract:

Lab Code: Case No.: SAS No.: SDG No.: 69092W

Matrix: (soil/water) WATER

Lab Sample ID: 9609092-03

Sample wt/vol: 20 (g/ml) ml

Lab File ID: 1Z404

Level: (low/med) LOW

Date Received: 09/08/96

% Moisture: not dec. ________

Date Analyzed: 09/12/96

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 20.0

Soil Extract Volume:________(uL)

Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q	Usl
71-43-2	---------benzene	381		=
108-88-3	--------toluene	32.4	J	J
100-41-4	--------ethylbenzene	83.9	J	J
1330-20-7	-------xylenes (total)	153		=

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0102W2

Lab Name: GENERAL ENGINEERING LABOR Contract:

Lab Code: Case No.: SAS No.: SDG No.: 69090W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9609090-08

Sample wt/vol: 500 (g/mL) mL Lab File ID: 2K218

Level: (low/med) LOW Date Received: 09/08/96

% Moisture: ______ decanted: (Y/N)___ Date Extracted: 09/09/96

Concentrated Extract Volume: 0.5 (mL) Date Analyzed: 09/10/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q	
91-20-3	naphthalene	54.5		=
91-58-7	2-chloronaphthalene	10.0	U	U
209-96-8	acenaphthylene	10.0	U	U
83-32-9	acenaphthene	5.0	J	J
86-73-7	fluorene	6.7	J	J
85-01-8	phenanthrene	10.0	U	U
120-12-7	anthracene	11.1		=
206-44-0	fluoranthene	10.0	U	U
129-00-0	pyrene	10.0	U	↓
56-55-3	benzo(a)anthracene	10.0	U	
218-01-9	chrysene	10.0	U	
205-99-2	benzo(b)fluoranthene	10.0	U	
207-08-9	benzo(k)fluoranthene	10.0	U	
50-32-8	benzo(a)pyrene	10.0	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U	
53-70-3	dibenz(a,h)anthracene	10.0	U	
191-24-2	benzo(g,h,i)perylene	10.0	U	

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0103W2

ab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C334W

Matrix: (soil/water) WATER

Lab Sample ID: 9612334-09

Sample wt/vol: 20 (g/ml) ml

Lab File ID: 1N520

Level: (low/med) LOW

Date Received: 12/16/96

% Moisture: not dec. ________

Date Analyzed: 12/20/96

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:________(uL)

Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q	
71-43-2	benzene	3.9	J	J
108-88-3	toluene	5 ~~1.1~~	J	UFD4,FD6
100-41-4	ethylbenzene	2.6	J	J
1330-20-7	xylenes (total)	2/12/97 1.4	J	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
0103W2

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C330W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9612330-01

Sample wt/vol: 500 (g/mL) mL Lab File ID: 5Y407

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: ______ decanted: (Y/N)___ Date Extracted:12/17/96

Concentrated Extract Volume: 0.5(mL) Date Analyzed: 12/19/96

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q	
91-20-3	naphthalene	10.0	U	U
91-58-7	2-chloronaphthalene	10.0	U	
208-96-8	acenaphthylene	10.0	U	
83-32-9	acenaphthene	10.0	U	
86-73-7	fluorene	10.0	U	
85-01-8	phenanthrene	10.0	U	
120-12-7	anthracene	10.0	U	
206-44-0	fluoranthene	10.0	U	
129-00-0	pyrene	10.0	U	
56-55-3	benzo(a)anthracene	10.0	U	
218-01-9	chrysene	10.0	U	
205-99-2	benzo(b)fluoranthene	10.0	U	
207-08-9	benzo(k)fluoranthene	10.0	U	
50-32-8	benzo(a)pyrene	10.0	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U	
53-70-3	dibenz(a,h)anthracene	10.0	U	
191-24-2	benzo(g,h,i)perylene	10.0	U	

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0104W2

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 6C335W

Matrix: (soil/water) WATER Lab Sample ID: 9612335-04

Sample wt/vol: 20 (g/ml) ml Lab File ID: 1P106

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: not dec. ________ Date Analyzed: 12/30/96

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:________(uL) Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q	
71-43-2	benzene	5.0	U	UJ AD3
108-88-3	toluene	0.23	J	J
100-41-4	ethylbenzene	5.0	U	UJ
1330-20-7	xylenes (total)	5.0	U	UJ ↓

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0104W2

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C332W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9612332-06

Sample wt/vol: 500 (g/mL) mL Lab File ID: 2Y513

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: ______ decanted: (Y/N)___ Date Extracted:12/17/96

Concentrated Extract Volume: 0.5(mL) Date Analyzed: 12/20/96

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q	
91-20-3	naphthalene	10.0	U	U
91-58-7	2-chloronaphthalene	10.0	U	
209-96-8	acenaphthylene	10.0	U	
83-32-9	acenaphthene	10.0	U	
86-73-7	fluorene	10.0	U	
85-01-8	phenanthrene	10.0	U	
120-12-7	anthracene	10.0	U	
206-44-0	fluoranthene	10.0	U	
129-00-0	pyrene	10.0	U	
56-55-3	benzo(a)anthracene	10.0	U	
218-01-9	chrysene	10.0	U	
205-99-2	benzo(b)fluoranthene	10.0	U	
207-08-9	benzo(k)fluoranthene	10.0	U	
50-32-8	benzo(a)pyrene	10.0	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U	
53-70-3	dibenz(a,h)anthracene	10.0	U	
191-24-2	benzo(g,h,i)perylene	10.0	U	

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0105W2

ab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C334W

Matrix: (soil/water) WATER

Lab Sample ID: 9612334-15

Sample wt/vol: 20 (g/ml) ml

Lab File ID: 10514

Level: (low/med) LOW

Date Received: 12/16/96

% Moisture: not dec. ________

Date Analyzed: 12/27/96

GC Column: DB624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:________(uL)

Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q	
71-43-2	benzene	4.6	J	J
108-88-3	toluene	5 ~~0.78~~	JB	UF01,F06
100-41-4	ethylbenzene	3.2	J	J
1330-20-7	xylenes (total)	5.0	U	U

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DATA VALIDATION

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

0105W2RE1

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: 6C330W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9612330-10

Sample wt/vol: 500 (g/mL) mL Lab File ID: 2A110

Level: (low/med) LOW Date Received: 12/16/96

% Moisture: ______ decanted: (Y/N)___ Date Extracted: 12/23/96

Concentrated Extract Volume: 0.5(mL) Date Analyzed: 12/30/96

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q	
91-20-3	naphthalene	10.0	U	U
91-58-7	2-chloronaphthalene	10.0	U	
209-96-8	acenaphthylene	10.0	U	
83-32-9	acenaphthene	10.0	U	
86-73-7	fluorene	10.0	U	
85-01-8	phenanthrene	10.0	U	
120-12-7	anthracene	10.0	U	
206-44-0	fluoranthene	10.0	U	
129-00-0	pyrene	10.0	U	
56-55-3	benzo(a)anthracene	10.0	U	
218-01-9	chrysene	10.0	U	
205-99-2	benzo(b)fluoranthene	10.0	U	
207-08-9	benzo(k)fluoranthene	10.0	U	
50-32-8	benzo(a)pyrene	10.0	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U	
53-70-3	dibenz(a,h)anthracene	10.0	U	
191-24-2	benzo(g,h,i)perylene	10.0	U	↓

DATA VALIDATION
COPY

APPENDIX C-3

QUALITY CONTROL SUMMARY REPORT

APPENDIX C-3
QUALITY CONTROL SUMMARY REPORT
for
PHASE I & II CAP-PART A INVESTIGATIONS
FORMER UNDERGROUND STORAGE TANK SITES
FORT STEWART, GEORGIA
March 1997

1.0 INTRODUCTION

The purpose of this project was to perform initial characterization investigations at former underground storage tank (UST) sites located throughout the Fort Stewart garrison area to determine the nature and extent of petroleum contamination at each site and to define a Site Investigation Plan for each site where the initial characterization effort was insufficient to complete delineation of soil and/or groundwater contamination extent. A total of 81 individual former USTs located at 57 separate sites segregated into 26 general areas were included in this project.

Each of the project UST sites were initially assigned either preliminary groundwater status or CAP-Part A status. Preliminary groundwater status was assigned to sites where analytical results for soil samples collected during removal of the tank(s) suggested that groundwater contamination exceeding applicable regulatory limits may be present. CAP-Part A status was assigned to sites where results for the tank(s) removal soil samples indicated that soil and/or groundwater contamination exceeding applicable regulatory limits was present. Of the 57 separate sites included in the project scope, 33 sites were assigned preliminary groundwater status and the remaining 24 sites were assigned CAP-Part A status.

This Quality Control Summary Report (QCSR) consolidates quality control information for the Phase I & II investigations. Sampling and analytical efforts were coordinated for the various tank locations providing a combined data set for evaluation of data integrity.

1.1 Project Description

Phase I field sampling activities for the 57 UST sites began and were completed in September of 1996. Phase II sampling activities for 20 of the 57 UST sites began and were completed in December of 1996. Phase I inspection activities at preliminary groundwater sites consisted of continuous collection of soil samples over 2.5-foot intervals from two boreholes located within the former tank pit. Each borehole was advanced down to the water table using the hollow-stem auger drilling method and soil samples were collected using a split-barrel sampler. Immediately after collection of each soil sample, a portion of the sample underwent field screening to determine organic vapor headspace gas concentration. Based on these results, two soil samples were selected for laboratory chemical analysis from boreholes where detectable vapor concentrations were encountered, or one sample was selected for analysis from boreholes where no vapor concentrations were encountered.

Phase I inspection activities at CAP-Part A sites were similar to those described for the preliminary groundwater sites with the following exceptions. First, four soil boreholes were drilled within and around the former tank pit. Second, two soil samples were selected for laboratory chemical analysis from each borehole regardless of the field screening results. Phase II inspection activities were conducted at those Phase I sites where sampling results were insufficient to characterize the nature and extent of soil and/or groundwater contamination. The Phase II activities were identical to those described for Phase I activities at CAP-Part A sites. However, soil boreholes drilled during the Phase II investigations were all located around the perimeter of the former tank pit locations and/or downgradient of the pit locations.

Upon completion of Phase I and Phase II soil sampling at both preliminary groundwater and CAP-Part A sites, one groundwater sample was collected from each borehole for laboratory chemical analysis. These samples were either collected directly from the saturated zone using a PowerPunch in situ sampling device, or from temporary piezometers installed within the boreholes using a Teflon bailer. Collection of samples from temporary piezometers was only implemented at borehole locations where the PowerPunch device could not be used because of subsurface obstructions or slow groundwater recharge into the device.

Phase I and Phase II laboratory analytical results for the soil samples collected at each site were screened against applicable risk-based threshold levels for those compounds identified in Chapter 391-3-15 of the Georgia Department of Natural Resources (GDNR) Rules for Underground Storage Tank Management. Phase I and Phase II analytical results for the groundwater samples collected at each site were screened against federally mandated Maximum Contaminant Levels (MCLs) for those compounds identified by the GDNR. The screening results for both soil and groundwater samples were used to delineate the nature and extent of contamination at each UST site.

1.2 Project Objectives

The scope of the project involved performance of initial characterization activities relative to the GDNR Underground Storage Tank Management Program regulations at 57 sites, and preparation of CAP-Part A reports as required based on the investigation results. The overall purpose of the site investigations was to determine the nature and extent of soil and groundwater contamination exceeding regulatory screening criteria, and to determine if additional characterization sampling was necessary to complete delineation of contaminant extent. Additional sampling requirements were defined in the Site Investigation Plan section of the CAP-Part A reports. CAP-Part A reports were not prepared for those preliminary groundwater sites where soil and groundwater contamination was documented to be below applicable regulatory screening criteria.

Specific requirements for the preliminary groundwater and CAP-Part A investigations were defined in the Georgia Underground Storage Tank (GUST) CAP-Part A guidance document GUST-7A (issued November 1995), the project Work Plan, and subsequent work plan revisions developed by the U.S. Army Corps of Engineers (USACE)-Savannah District for the project. In summary, the objectives of the project were as follows:

1. Determine the vertical extent of Total Recoverable Petroleum Hydrocarbon (TRPH) contamination below UST sites designated for preliminary groundwater investigations. Determine if benzene, toluene, ethylbenzene, xylene (BTEX), or polyaromatic hydrocarbon (PAH) compounds were present at concentrations exceeding screening criteria.

2. Determine the horizontal and vertical extent of BTEX or PAH contamination exceeding threshold levels in soil below UST sites designated for CAP-Part A investigations. Determine horizontal and vertical extent of BTEX or PAH contamination exceeding MCLs in groundwater at these sites.

3. Delineate soil and groundwater contaminant plumes where present.

4. Determine groundwater flow direction for all sites included in the project.

5. Prepare No Further Action reports and CAP-Part A reports for the various UST sites as deemed appropriate from the information gathered.

The general quality assurance (QA) objectives of the project are as follows:

1. Ensure that the method used for borehole drilling will allow for collection of soil samples representative of surface and subsurface soil contamination conditions, and for description of the hydrogeologic environment.

2. Ensure that the method used for collection of groundwater samples will allow for collection of samples representative of water table contamination conditions.

3. Ensure that sampling methods used for soil and groundwater collection minimize alteration of contaminant concentrations, and that drilling and sampling equipment decontamination methods prevent cross-contamination between sampling locations.

4. Ensure that field measurement and analytical laboratory results are accurate, representative of site conditions, and fulfill data quality objectives (DQOs) defined for the project.

The first three QA objectives were accomplished through implementation of the procedures and requirements described in the Work Plan and associated Field Sampling Plan. The fourth QA objective was accomplished through data management practices, associated internal laboratory QC analyses, related procedures and requirements defined in the Chemical Data Acquisition Plan (CDAP), and through collection and analysis of field quality control (QC) samples.

1.3 Project Implementation

Phase I field work was initiated and completed by Science Applications International Corporation (SAIC) in September 1996. Phase II field work was initiated and completed by SAIC in December 1996. A project-specific Site Health and Safety Plan was compiled for the work completed by SAIC and sub-tier contractors. Ms. Patty Stoll was designated as Field Manager for the project. She was responsible for the collection of samples in accordance with the work plan, completion of the Daily Quality Control Reports (DQCRs), coordination of site access, shipment of samples to the laboratories, and documentation and correction of problems as they occurred. Quality Control Officer for the project was Ms. Sharon Stoller. She was responsible for data quality control for the SAIC sampling effort. This included, but was not limited to, validation of both field and laboratory data in accordance with the Geological Data Acquisition Plan (GDAP), the CDAP, and the Work Plan. As laboratory and analytical data coordinator, Mr. Nile Luedtke was responsible for maintaining analytical files for the project, approval of payment invoices from the laboratories, and documentation and correction of problems as they occurred. As the SAIC project manager, Christopher Potter was responsible for overall project success, budgetary control, USACE interfaces, and completion of Monthly Progress Reports (MPRs).

One analytical laboratory was used by SAIC for testing samples collected by SAIC personnel during both the Phase I and Phase II investigations. General Engineering Laboratory of Charleston, South Carolina completed all groundwater and soil analysis for BTEX, PAHs, gasoline range organics (GRO), diesel range organics (DRO), and TRPH. The laboratory used U.S. Environmental Protection Agency (EPA) analytical methods and is validated through the USACE Missouri River Division (MRD) laboratory review process. The QA laboratory for the entire project was the USACE South Atlantic Division (SAD) Laboratory in Marietta, Georgia.

1.4 Purpose of This Report

Environmental data must always be interpreted relative to known limitations and intended use. As can be expected in environmental media of this type, there are areas and data points where the user needs to be cautioned relative to the quality of the project information presented. The data validation process and this data quality assessment are intended to provide current and future data users assistance throughout the interpretation of these data.

The purpose of this QCSR is to describe Quality Control (QC) procedures followed to ensure data generated by SAIC during the investigations at Fort Stewart would meet project requirements, to describe the quality of the data collected, and to describe problems encountered during the course of the study and their solutions. A separate QA report will be completed by the SAD Laboratory covering data generated from SAIC collected samples remanded to their custody.

This appendix provides an assessment of the analytical information gathered during the course of the Phase I and Phase II UST investigations and documents that the quality of the data employed for the CAP-Part A reports met the objectives. Evaluation of field and laboratory QC measures will constitute the majority of this assessment; however, references will also be directed toward those QA procedures that establish data credibility. The primary intent of this assessment is to illustrate that data generated for the UST investigations can withstand scientific scrutiny, are appropriate for their intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy.

Multiple activities were performed to achieve the desired data quality in this project. As discussed in the text, decisions were made during the initial scoping to define the quality and quantity of data required. DQOs were established to guide the implementation of the field sampling and laboratory analysis. A QA program was established to standardize procedures and to document activities. This program provided a means to detect and correct any deficiencies in the process. Upon receipt by the project team, data were subjected to a verification and validation review that identified and qualified problems related to the analysis. These review steps contribute to this final Data Quality Assessment (DQA) that defines that data used in the investigation met the criteria and are used appropriately.

2.0 QUALITY ASSURANCE PROGRAM

A CDAP was developed for this project and was included as one of several subplans with the overall project Work Plan. The purpose of this document was to enumerate the quantity and type of samples to be taken to inspect the various sites, and to define the quantity and type of Quality Assurance/Quality Control (QA/QC) samples to be used to evaluate the quality of the data obtained.

The CDAP established requirements for both field and laboratory QC procedures. In general, field QC duplicates and QA split samples were required for each environmental sample matrix collected at sites being investigated at a frequency of 10%; volatile organic compound (VOC) trip blanks were to accompany each cooler containing water samples for VOC determinations; and analytical laboratory QC duplicates, matrix spikes, laboratory control samples, and method blanks were required for every 20 samples or less of each matrix and analyte.

A primary goal of the QA program was to ensure that the quality of results for all environmental measurements were appropriate for their intended use. To this end, a CDAP and standardized field procedures were compiled to guide the investigation. Through the process of readiness review, training, equipment calibration, QC implementation, and detailed documentation, the project has successfully accomplished the goals set by the QA Program.

2.1 Monthly Progress Reports

An MPR was completed by the SAIC Project Manager for every month during project implementation. The MPRs contain the following information: work completed, problems encountered, corrective actions/solutions, summary of findings, and upcoming work. These reports were issued to the USACE-Savannah District Project Manager and may be obtained through their office.

2.2 Daily Quality Control Reports (DQCRs)

The Field Manager, Patty Stoll, produced all Daily Quality Control Reports. These include information such as, but not limited to, sub-tier contractors on site, equipment on site, work performed summaries, QC activities, Health and Safety activities, problems encountered, and corrective actions. The DQCRs were submitted to the SAIC and USACE-Savannah District Project Managers, and are on file in their offices.

2.3 Laboratory "Definitive" Level Data Reporting

The CDAP for this project identified requirements for laboratory data reporting and identified General Engineering Laboratories as the laboratory for the project. EPA "definitive" data have been reported including the following basic information:

a. laboratory case narratives
b. sample results
c. laboratory method blank results
d. laboratory control standard results
e. laboratory sample matrix spike recoveries
f. laboratory duplicate results
g. surrogate recoveries (BTEX, GRO, PAHs, DRO)
h. sample extraction dates
I. sample analysis dates

This information from the laboratory, along with field information, provides the basis for subsequent data evaluation relative to sensitivity, precision, accuracy, representativeness, and completeness. These have been presented in Section 4.0 of this appendix.

3.0 DATA VALIDATION

The objective when evaluating the quality of the project data is to determine its usability. The evaluation is based on the interpretation of laboratory QC measures, field QC measures, and the project DQOs.

This project implemented the use of data validation checklists to facilitate laboratory data validation. These checklists were completed by the project-designated SAIC validation staff and were reviewed by the project laboratory coordinator. Data validation checklists for each laboratory sample delivery group (SDG) have been retained with laboratory data deliverables by SAIC.

3.1 Field Data Validation

DQCRs were completed by the Field Manager. The DQCRs and other field generated documents such as sampling logs, boring logs, daily health and safety summaries, daily safety inspections, equipment calibration and maintenance logs, and sample management logs were peer reviewed on site. These logs and all associated field information have been delivered to the USACE-Savannah District Project Manager and can be obtained through their office.

3.2 Laboratory Data Validation

Analytical data generated for this project have been subjected to a process of data verification, validation, and review. The following describes this systematic process and the evaluation activities performed. Several criteria have been established against which the data are compared and from which a judgment is rendered regarding the acceptance and qualification of the data. Because it is beyond the scope of this report to cite those criteria, the reader is directed to the following documents for specific detail:

- SAIC Technical Support Contractor QA Technical Procedure (TP-DM-300-7) Data Verification and Validation;
- Region I EPA - Laboratory Data Validation, Functional Guidelines for Evaluating Inorganic Analyses;
- Region I EPA- Laboratory Data Validation, Functional Guidelines for Evaluating Organic Analyses; and
- Work Plan for Preliminary Groundwater and Corrective Action Plan - Part A & Part B Investigations at Former Underground Storage Tank Sites, Fort Stewart, Georgia, August 1996.

Upon receipt of field and analytical data, SAIC verification staff performed a systematic examination of the reports, following standardized data package checklists, to ensure the content, presentation, and administrative validity of the data. Discrepancies identified during this process were recorded and documented using the QA program Analytical Data Nonconformance Report (ADNCR) and Nonconformance Report (NCR) systems.

In conjunction with the data verification, and if standardized laboratory electronic data diskettes were available, the diskette deliverables were subjected to review using SAIC Electronic Data Deliverable (EDD) review software. This software performed both a structural and technical assessment of the laboratory-delivered electronic reports. The structural evaluation ensured that all required data had been reported and contract specified requirements were met (i.e., analytical holding times, contractual turnaround times, etc.).

During the validation phase of the review and evaluation process, data were subjected to a systematic technical review by examining all field and analytical QC results and laboratory documentation, following appropriate guidelines for laboratory data validation. These data validation guidelines define the technical review criteria, methods for evaluation of the criteria, and actions to be taken resulting from the review of these criteria. The primary objective of this phase was to assess and summarize the quality and reliability of the data for the intended use and to document factors that may affect the usability of the data. Data verification/validation included but was not necessarily limited to the following parameters:

Inorganic	Organic
Data completeness	Data completeness
Holding times	Holding times
Calibration	Calibration
- Initial	- Initial
- Continuing	- Continuing
Blanks	Blanks
Sample results verification	Surrogate recovery
Matrix spike recovery	
Field duplicate sample analysis	
Laboratory control sample analysis	Internal standards performance
Furnace atomic absorption QC (when implemented)	
Detection limits	Compound quantitation and reported detection limits
Secondary dilutions	Secondary dilutions

As an end result of this phase of the review, the data were qualified based on the technical assessment of the validation criteria. Qualifiers were applied to each field and analytical result to indicate the usability of the data for their intended purpose.

3.3 Definition of Data Qualifiers (Flags)

During the data validation process, all laboratory data were assigned appropriate data validation flags and reason codes. Validation flags are defined as follows:

"U"	When the material was analyzed for, but not detected above the level of the associated value.
"J"	When the associated value is an estimated quantity, indicating there is cause to question accuracy or precision of the reported value.
"UJ"	When the analyte was analyzed for, but not detected, above the associated value; however, the reported value is an estimate and demonstrates a decreased knowledge of its accuracy or precision.
"R"	When the analyte value reported is unusable. The integrity of the analyte's identification, accuracy, precision, or sensitivity have raised significant question as to the reality of the information presented.

SAIC validation flagging codes have been provided in Attachment 1 of this appendix, while copies of validation checklists and qualified data forms are on-file with the analytical laboratory deliverable.

3.4 Data Acceptability

3.4.1 Phase I

A total of 749 environmental soil, groundwater, and field QC samples were collected with approximately 11,000 discrete analyses (i..e., analytes) being obtained, reviewed, and integrated into the assessment (these totals do not include field measurements and field descriptions). The project produced acceptable results for over 99% of the sample analyses performed and successfully collected all required investigation samples. Rejected data were relegated to PAH determinations in one soil and two groundwater samples.

Table 1 presents a summary of the number of collected investigation samples for each of the 26 general investigation areas. It also tallies the successful collection of appropriate targeted field QC and QA split samples. Table 2 provides a summary of rejected analyses grouped by media and analyte category. Copies of the project Chain-of-Custody forms are provided in Appendices C-1 and C-2 of the CAP-Part A reports.

Through appropriate data verification, validation, and review, analytical information has been identified as estimated and rejected. Analyses were estimated for several soil samples due to missed analytical holding times. This occurred because of the need to re-analyze these samples or it consisted of a time lapse of only a few days. Subsequently, the data has been estimated, however, it is considered useable to the project. None of the

Table 1. Summary of Samples Collected

Phase I

Tank Area	Environmental Samples				Field QC Samples		QA Split Samples
	Soil	Soil Duplicates	Water	Water Duplicates	Trip Blanks	Equipment Rinsates	
A	13	2	7	1	2	0	2
C	18	4	10	1	3	3	3
D	37	2	24	3	8	3	1
E	12	0	6	0	1	2	3
E/F	16	2	8	1	1	0	3
G	3	0	2	0	1	2	0
H	10	2	6	1	2	0	0
I	7	0	4	1	2	0	1
J	4	0	2	0	1	0	2
K	8	2	4	1	1	0	0
L	7	0	4	0	1	2	2
M	26	3	14	2	3	2	2
N	26	5	13	1	3	2	3
O	6	0	4	1	1	0	0
P	17	0	9	0	2	3	3
Q	9	2	5	0	1	1	0
R	16	2	8	1	3	0	3
S	13	1	9	0	2	3	3
T	18	4	9	2	2	0	2
U	8	0	4	0	1	0	0
V	22	4	11	1	2	3	0
W	20	2	12	3	3	0	5
X	12	2	6	0	1	1	0
Y	28	2	16	3	6	4	4
Z	28	1	14	1	0	4	3
Totals	384	42	211	24	53	35	

Table 1. (Continued)

Phase II

Tank Area	Environmental Samples				Field QC Samples		QA Split Samples
	Soil	Soil Duplicates	Water	Water Duplicates	Trip Blanks	Equipment Rinsates	
A	6	-	3	-	1	-	-
C	-	-	-	-	-	-	-
D	12	2	6	1	1	1	3
E	4	-	2	-	1	1	-
E/F	-	-	-	-	-	-	-
G	-	-	-	-	-	-	-
H	-	-	-	-	-	-	-
I	-	-	-	-	-	-	-
J	-	-	-	-	-	-	-
K	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-
M	16	2	8	1	2	2	3
N	10	2	5	-	1	2	2
O	4	-	2	1	-	-	1
P	6	-	3	-	2	1	-
Q	6	2	3	-	1	-	3
R	-	-	-	-	-	-	-
S	-	-	-	-	-	-	-
T	6	-	3	1	1	-	-
U	-	-	-	-	-	-	-
V	6	2	3	-	1	-	3
W	4	-	2	1	-	-	1
X	4	2	2	-	1	-	2
Y	4	-	2	1	1	1	-
Z	6	-	3	-	1	1	-
Totals	94	12	47	6	13	9	

Table 2. Summary of Rejected Analytes
(grouped by media and analysis group)

Media	Analysis Group	Rejected/Total	Percent Rejected
Soil	BTEX Compounds	0/ 1,280	0.0
	Diesel Range Org.	0/ 165	0.0
	Gasoline Range Org.	0/ 165	0.0
	PAH Compounds	9/ 5,432	0.2
	TRPH	0/ 154	0.0
	Subtotal	9/ 7,196	0.1
Groundwater	BTEX Compounds	0/ 735	0.0
	PAH Compounds	34/ 3,084	1.1
	Subtotal	34/ 3,819	0.9
Phase I Total		**43/ 11,015**	**0.4**
Soil	BTEX Compounds	0/ 408	0.0
	Diesel Range Org.	0/ 28	0.0
	Gasoline Range Org.	0/ 28	0.0
	PAH Compounds	0/ 1,802	0.0
	TRPH	0/ 78	0.0
	Subtotal	0/ 2,344	0.0
Groundwater	BTEX Compounds	0/ 212	0.0
	PAH Compounds	0/ 833	0.0
	Subtotal	0/ 1,045	0.0
Phase II Total		**0/ 3,389**	**0.0**
OVERALL TOTAL		**43/ 14,404**	**0.3**

soil or groundwater BTEX, DRO, or GRO data were rejected. BTEX values were estimated in various soil samples due to poor second column gas chromatograph (GC) confirmation percent difference comparisons (>25%). None of the results were extremely disparate and the data have been appropriately identified. Approximately 2% of the DRO and GRO data have been estimated due to variable matrix spike/matrix spike duplicate (MS/MSD) recoveries or continuing calibration variances, however, all data are considered useable for the project needs.

A total of three sample's (1-soil, 2-water) PAH analyses have been rejected. Soil data were rejected relative to internal standard deviations, while groundwater data were rejected due to extremely poor surrogate standard recoveries. Additional PAH data have been estimated due to less extreme variation in these same control parameters. All rejected results reflect a tendency to exhibit extreme negative bias and were therefore unable to support the requirements of the project.

3.4.2 Phase II

A total of 181 environmental soil, groundwater, and field QC samples were collected with approximately 3,400 discrete analyses (i..e., analytes) being obtained, reviewed, and integrated into the assessment (these totals do not include field measurements and field descriptions). This phase of the project produced acceptable results for 100% of the sample analyses performed and successfully collected all required investigation samples.

Table 1 presents a summary of the number of collected investigation samples for each of the 26 general investigation areas. It also tallies the successful collection of appropriate targeted field QC and QA split samples. Table 2 provides a summary of rejected analyses grouped by media and analyte category. Copies of the project Chain-of-Custody forms are provided in Appendices C-1 and C-2 of the CAP-Part A reports.

Analytical information has been identified as estimated where necessary. Analyses were estimated for three water samples due to missed analytical holding times. These consisted of a time lapse of only a few days. Subsequently, the data have been estimated, however, it is considered useable to the project. None of the soil or groundwater BTEX, DRO, or GRO data were rejected. BTEX values were estimated in various soil samples due to poor second column gas chromatograph (GC) confirmation percent difference comparisons (>25%). None of the results were extremely disparate and the data have been appropriately identified.

4.0 DATA EVALUATION

4.1 Accuracy

Accuracy provides a gauge or measure of the agreement between an observed result and the true value for an analysis. Analytical accuracy is evaluated by measuring the agreement between an analytical result and its known or true value. This is generally determined through use of Laboratory Control Samples (LCSs), Matrix Spike (MS) analysis, and Performance Evaluation (PE) Samples. Accuracy as measured through the use of LCSs determines the method implementation accuracy independent of sample matrix. They document laboratory analytical process control. Accuracy determined by the MS is a function of both matrix and analytical process. Tables 3 and 4 present average LCS recovery values for the various parameters under investigation during these studies. Method blank surrogate compound recoveries and method blank target compound spiked analyses are two forms of laboratory control sample analyses. Table 5 consolidates the average sample matrix spike (MS) recovery values for BTEX, GRO, PAH, DRO, and TRPH parameters.

Volatile Organic Compounds

Volatile organic compounds (BTEX) LCS recovery, surrogate recovery, and MS recovery information provide measures of accuracy. Recoveries determined for laboratory volatile organic method blank spike and method blank surrogate analyses indicate the analytical processes for both GC and gas chromatograph/mass spectrometer (GC/MS) procedures were in control. Individual sample surrogate recoveries and sample MS recoveries indicate analytical accuracy for these compounds was in control and the data are usable.

Phase I

Average method blank surrogate recoveries (Table 3) were all within 80 to 100% for the volatile analyses. Summaries in Table 4 show average soil and water LCS values range from 94.8% to 104.1%, while all recoveries were within 80 to 120% for the four target compounds.

BTEX sample MS recoveries (Table 5) indicate analytical accuracy was in control with average soil MS recoveries of 105.5%, 97.6%, 97.7%, and 88.2% for benzene, toluene, ethylbenzene, and xylenes, respectively. Average groundwater sample MS recoveries for benzene and toluene were 104.9% and 93.5%, respectively. The wider range of spike recovery observed in actual environmental samples is indicative of matrix heterogeneity variations, especially when dealing with soil matrices.

Phase II

Method blank surrogate recoveries for Phase II analyses (Table 3) were also within 80 to 100% for the volatile analyses. Summaries in Table 4 show average soil and water LCS values range from 88.1% to 104.5%, while all recoveries were within 75 to 120% for the four target compounds.

BTEX sample MS recoveries (Table 5) indicate analytical accuracy was also in control during Phase II activities, with average soil MS recoveries of 94.0%, 108.6%, 87.8%, and 92.4% for benzene, toluene, ethylbenzene, and xylenes, respectively. Average

Table 3. Laboratory Control Sample Evaluation - Method Blank Average Surrogate Percent Recovery (%Rec)

Phase I

Analysis	Soil				Water			
	Average %Rec	Min. %Rec	Max. %Rec	N	Average %Rec	Min. %Rec	Max. %Rec	N
Volatile Organic Compounds (BTEX)								
TOLUENE-d8	-	-	-	-	105.2	86	111	29
BROMOFLUOROBENZENE	-	-	-	-	108.4	89	116	29
DIBROMOFLUOROMETHANE	-	-	-	-	116.8	95	135	29
Volatile Organic Compounds (BTEX)								
n-PROPYLBENZENE (primary column)	101.6	87	136	35	-	-	-	-
n-PROPYLBENZENE (secondary column)	100.6	84	107	35	-	-	-	-
Gasoline Range Organics								
n-PROPYLBENZENE	97.6	47	144	22	94.0	61	110	6
Polyaromatic Hydrocarbons (PAHs)								
NITROBENZENE-d5	62.8	23	96	23	75.5	48	101	26
2-FLUOROBIPHENYL	68.2	37	103	23	77.7	52	90	26
TERPHENYL-d14	90.2	74	103	23	83.4	54	112	26
Diesel Range Organics								
o-TERPHENYL	83.4	58	109	16	81.4	76	89	7

Table 3. (Continued)

Phase II

Analysis	Soil Average %Rec	 Min. %Rec	 Max. %Rec	 N	Water Average %Rec	 Min. %Rec	 Max. %Rec	 N
<u>Volatile Organic Compounds (BTEX)</u>								
TOLUENE-d8	-	-	-	-	104.8	102	109	10
BROMOFLUOROBENZENE	-	-	-	-	105.1	97	112	10
DIBROMOFLUOROMETHANE	-	-	-	-	118.1	112	128	10
<u>Volatile Organic Compounds (BTEX)</u>								
n-PROPYLBENZENE (primary column)	96.5	90	100	10	-	-	-	-
n-PROPYLBENZENE (secondary column)	92.5	59	101	10	-	-	-	-
<u>Gasoline Range Organics</u>								
n-PROPYLBENZENE	91.4	83	105	5	105.0	105	105	2
<u>Polyaromatic Hydrocarbons (PAHs)</u>								
NITROBENZENE-d5	80.6	66	98	9	72.7	56	85	13
2-FLUOROBIPHENYL	83.3	76	95	9	79.8	68	90	13
TERPHENYL-d14	79.0	72	87	9	85.5	65	107	13
<u>Diesel Range Organics</u>								
o-TERPHENYL	91.5	82	98	4	87.5	84	91	2

Table 4. Laboratory Control Sample Evaluation - Method Blank Matrix Spike Average Percent Recovery (%Rec)

Phase I

	Soil				Water			
Analysis	Average %Rec	Min. %Rec	Max. %Rec	N	Average %Rec	Min. %Rec	Max. %Rec	N
Volatile Organic Compounds (BTEX)								
BENZENE	98.3	80	110	51	102.2	94	110	19
TOLUENE	103.0	90	115	51	94.8	87	101	19
ETHYLBENZENE	98.7	85	110	51	-	-	-	-
XYLENES	104.1	88	120	51	-	-	-	-
Gasoline Range Organics								
GRO	91.9	78	108	42	89.0	79	105	4
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	77.8	47	108	45	79.6	52	94	50
PYRENE	87.5	65	103	45	88.8	53	115	50
Diesel Range Organics								
DRO	57.5	44	73	32	68.5	60	81	10
Total Recoverable Petroleum Hydrocarbon								
TRPH	113.0	102	126	22	102.3	83	121	4

Table 4. (Continued)

Phase II

Analysis	Soil Average %Rec	Soil Min. %Rec	Soil Max. %Rec	Soil N	Water Average %Rec	Water Min. %Rec	Water Max. %Rec	Water N
Volatile Organic Compounds (BTEX)								
BENZENE	96.3	89	114	10	104.5	92	118	10
TOLUENE	96.1	88	116	10	96.6	90	102	10
ETHYLBENZENE	88.1	77	96	10	-	-	-	-
XYLENES	96.1	76	106	10	-	-	-	-
Gasoline Range Organics								
GRO	94.4	81	107	8	88.5	83	94	2
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	82.0	74	92	9	86.2	72	96	11
PYRENE	81.8	67	103	9	92.9	76	102	11
Diesel Range Organics								
DRO	84.3	71	114	4	76.0	67	85	2
Total Recoverable Petroleum Hydrocarbon								
TRPH	94.6	74	113	9	75.5	72	79	2

Table 5. Sample Matrix Spike Evaluation - Average Percent Recovery (%Rec)

Phase I

Analysis	Soil Average %Rec	Soil Min. %Rec	Soil Max. %Rec	Soil N	Water Average %Rec	Water Min. %Rec	Water Max. %Rec	Water N
Volatile Organic Compounds (BTEX)								
BENZENE	105.5	80	280	42	104.9	96	118	34
TOLUENE	97.6	10	210	42	93.5	86	99	34
ETHYLBENZENE	97.7	70	176	42	-	-	-	-
XYLENES	88.2	70	128	42	-	-	-	-
Gasoline Range Organics								
GRO	74.7	6	213	30	92.5	88	101	4
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	68.7	22	94	42	70.1	31	147	26
PYRENE	84.9	23	123	42	82.0	30	146	26
Diesel Range Organics								
DRO	49.3	8	110	18	65.7	47	95	10
Total Recoverable Petroleum Hydrocarbon								
TRPH	84.3	76	103	20	-	-	-	-

Table 5. (Continued)

Phase II

Analysis	Soil Average %Rec	Min. %Rec	Max. %Rec	N	Water Average %Rec	Min. %Rec	Max. %Rec	N
Volatile Organic Compounds (BTEX)								
BENZENE	94.0	80	104	14	98.4	83	119	14
TOLUENE	108.6	86	142	14	97.2	92	102	14
ETHYLBENZENE	87.8	72	97	14	-	-	-	-
XYLENES	92.4	66	104	12	-	-	-	-
Gasoline Range Organics								
GRO	72.2	69	84	6	46.5	46	47	2
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	85.1	70	93	14	75.5	60	94	10
PYRENE	87.6	62	104	14	82.8	43	113	10
Diesel Range Organics								
DRO	78.0	77	79	2	88.0	71	114	4
Total Recoverable Petroleum Hydrocarbon								
TRPH	77.9	63	105	6	-	-	-	-

groundwater sample MS recoveries for benzene and toluene were 98.4% and 97.2%, respectively. Phase II analyses exhibited only a slightly wider range for sample matrix spike recovery than LCS results, with a low of 66% and a high of 142%. The wider range of spike recovery observed in actual environmental samples is indicative of matrix heterogeneity variations, especially when dealing with soil matrices.

Polyaromatic Hydrocarbon Compounds

Phase I

Average LCS percent recovery values for PAH compounds in soils and waters range from 77.8% to 88.8%. These values are well within the normally accepted advisory limits established by the analytical methods. They are also within project accuracy goals of 30 to 140% for semivolatile compounds. None of the soil data required qualification based on the LCS, while only a few of the groundwater samples required qualification as estimated due to low LCS recoveries. Method blank surrogate recoveries (Table 3) were all well within acceptable ranges for semivolatile compounds. Re-enforcing the analytical process was in control.

Sample MS information (Table 5) for PAH compounds parallels LCS data, with the overall accuracy for these measurements being considered acceptable.

Phase II

Method blank surrogate recoveries, LCS values, and sample matrix spike recoveries combine to document the overall accuracy of Phase II data. As presented in Tables 3, 4, and 5, method blank surrogate average recoveries range from 72.7% to 85.5%, LCS average recovery values range from 81.8% to 92.9%, while sample MS recoveries range from 74.5% to 76.6%.

Gasoline Range, Diesel Range, and Total Recoverable Petroleum Hydrocarbons

Phase I and II

The laboratory analytical process for these measurements in both Phase I and Phase II was demonstrated to be under control by maintaining a general 50 to 150% LCS percent recovery for both water and soil matrices. Average method blank surrogate recoveries were maintained in the range of 80 to 120%.

Matrix spike information demonstrated acceptable accuracy control for both soils and waters. A few low soil MS recovery values did cause some data to be estimated. During data use and interpretation, these values present the possibility of providing false negative results and must be interpreted relative to validation flags placed on the data.

4.2 Precision

Laboratory Precision

As a measure of analytical precision, Tables 6 and 7 contain average relative percent differences (RPD) for laboratory duplicate sample pairs for the various analytical groups. Data are presented for parameters where both values meet or exceed five times the project required detection limits for that analyte. TRPH duplicate pairs evaluate actual sample concentrations while other organic duplicate pairs compare MS and MSD values. As the RPD approaches zero, complete agreement is achieved between the duplicate sample pairs. Sample homogeneity, analytical method performance, and the quantity of the analyte being measured all contribute to this measure of sample analytical precision.

Soil and water precision are considered acceptable when the RPD does not exceed 40. This limit was not exceeded for most analytes. All average RPD values were well within this criteria, with only one average RPD exceeding 15%. In only a few instances did individual duplicate comparisons fall outside the criteria as demonstrated by the maximum RPDs presented. RPD values are quite good for these samples and reflect great effort on the part of the field and laboratory teams to homogenize the samples prior to aliquotting and analysis.

Duplicate comparison for those data within five times the reporting level have also been reviewed and evaluated. Acceptance limits for these data were set at ± two times the reporting level. In all cases, laboratory duplicate comparison at these low levels were in agreement.

Individual data points affected by poor precision measures appear in the data set qualified as estimated, when necessary. The precision for those data is considered acceptable and has been determined to be useable for project objectives.

Field Precision

Field duplicate samples were collected to ascertain the contribution to variability (i.e., precision) due to the combination of environmental media, sampling consistency, and analytical precision. Field duplicate samples were collected from the same spatial and temporal conditions as the primary environmental sample. Soil samples were collected from the same sampling device after homogenization for all analytes except BTEX.

Tables 8 and 9 provide a summary of soil and groundwater field duplicate comparisons by analyte. The tables present both absolute difference and RPD evaluations for field duplicate measurements. RPD was calculated only when both samples were >5 times the analyte reporting level. When one or both sample values were between the quantitation level and 5 times the analyte reporting level, the absolute difference was evaluated. If both samples were not detected for a given analyte, precision was considered acceptable. Only duplicate pairs having measurable values are included in the tabulation.

Table 6. Laboratory Control Sample Evaluation - Method Blank Matrix Spike Duplicate Relative Percent Difference (RPD)

Phase I

	Soil				Water			
Analysis	Average RPD	Min. RPD	Max. RPD	N	Average RPD	Min. RPD	Max. RPD	N
Volatile Organic Compounds (BTEX)								
BENZENE	7.6	0	22	18	-	-	-	-
TOLUENE	7.0	0	20	18	-	-	-	-
ETHYLBENZENE	7.9	0	21	18	-	-	-	-
XYLENES	6.7	0	17	18	-	-	-	-
Gasoline Range Organics								
GRO	7.3	0	24	21	12.0	6	18	2
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	10.6	1	50	21	8.0	0	35	24
PYRENE	6.6	2	19	21	7.7	0	36	24
Diesel Range Organics								
DRO	5.8	0	13	16	9.6	3	17	5
Total Recoverable Petroleum Hydrocarbon								
TRPH	6.7	4	13	11	5.7	5	7	2

Table 6. (Continued)

Phase II

Analysis	Soil Average RPD	Min. RPD	Max. RPD	N	Water Average RPD	Min. RPD	Max. RPD	N
Volatile Organic Compounds (BTEX)								
BENZENE	4.0	3	5	2	-	-	-	-
TOLUENE	5.5	5	6	2	-	-	-	-
ETHYLBENZENE	1.0	1	1	1	-	-	-	-
XYLENES	0.0	0	0	1	-	-	-	-
Gasoline Range Organics								
GRO	9.3	4	12	4	12.0	12	12	1
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	-	-	-	-	-	-	-	-
PYRENE	-	-	-	-	-	-	-	-
Diesel Range Organics								
DRO	-	-	-	-	-	-	-	-
Total Recoverable Petroleum Hydrocarbon								
TRPH	4.3	1	10	3	9.0	9	9	1

Table 7. Sample Matrix Spike Duplicate or Duplicate Evaluation - Relative Percent Difference (RPD)

Phase I

	Soil				Water			
Analysis	Average RPD	Min. RPD	Max. RPD	N	Average RPD	Min. RPD	Max. RPD	N
Volatile Organic Compounds (BTEX)								
BENZENE	6.2	0	21	21	3.9	0	9	17
TOLUENE	13.2	0	133	21	1.4	0	4	17
ETHYLBENZENE	7.0	0	22	21	-	-	-	-
XYLENES	8.0	0	24	21	-	-	-	-
Gasoline Range Organics								
GRO	26.9	0	162	15	10.0	6	14	2
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	8.5	0	26	21	12.3	0	57	13
PYRENE	8.2	0	28	21	14.5	0	58	13
Diesel Range Organics								
DRO	38.2	8	86	9	9.4	0	22	5
Total Recoverable Petroleum Hydrocarbon								
TRPH	11.8	0	29	14	-	-	-	-

Table 7. (Continued)

Phase II

Analysis	Soil Average RPD	Soil Min. RPD	Soil Max. RPD	Soil N	Water Average RPD	Water Min. RPD	Water Max. RPD	Water N
Volatile Organic Compounds (BTEX)								
BENZENE	3.7	0	7	7	4.9	1	10	7
TOLUENE	8.1	2	17	7	2.9	0	10	7
ETHYLBENZENE	5.2	2	8	6	-	-	-	-
XYLENES	4.3	0	9	6	-	-	-	-
Gasoline Range Organics								
GRO	9.7	1	24	3	2.0	2	1	1
Polyaromatic Hydrocarbons (PAHs)								
ACENAPTHENE	4.4	1	17	7	9.4	0	19	5
PYRENE	7.5	2	16	7	5.2	1	11	5
Diesel Range Organics								
DRO	2.0	2	2	1	8.5	1	16	2
Total Recoverable Petroleum Hydrocarbon								
TRPH	-	-	-	-	-	-	-	-

Table 8. Soil Field Duplicate Evaluation - Relative Percent Difference (RPD) and Absolute Difference

Phase I Analysis	Area A 0101A1/0101A3 RPD(%)	Area C 0304A1/0304A3 RPD(%)	Area C 0304B1/0304B3 RPD(%)	Area E/F 1505B1/1505B3 RPD(%)	Area H 1803D1/1803D3 RPD(%)	Area K 2203B1/2203B3 RPD(%)
<u>Volatile Organic Compounds (BTEX)</u>						
BENZENE	*	*	*	*	*	*
TOLUENE	*	*	*	*	97	*
ETHYLBENZENE	*	*	UNAC	*	*	*
XYLENES	27	98	126	*	*	*
<u>Gasoline Range Organics</u>	-	114	5	2	*	-
<u>Polyaromatic Hydrocarbons (PAHs)</u>						
NAPHTHALENE	*	*	*	*	*	*
2-CHLORONAPTHALENE	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	*	*
FLUORENE	*	*	*	*	*	*
PHENANTHRENE	*	*	*	*	*	*
ANTHRACENE	*	*	*	*	*	*
FLUORANTHENE	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*
<u>Diesel Range Organics</u>	-	*	*	*	*	-
<u>Total Petroleum Hydrocarbon</u>	59	-	-	-	-	*

* Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.

UNAC Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 8. (Continued)

Phase I Analysis	Area K 2203C1/2203C3 RPD(%)	Area N 3001B1/3001B3 RPD(%)	Area N 3001D1/3001D3 RPD(%)	Area R 3401A1/3401A3 RPD(%)	Area R 3401C1/3401C3 RPD(%)	Area T 3903C1/3903C3 RPD(%)
Volatile Organic Compounds (BTEX)						
BENZENE	*	101	132	*	*	*
TOLUENE	3	63	*	*	*	*
ETHYLBENZENE	*	52	187	*	38	*
XYLENES	*	76	*	*	9	*
Gasoline Range Organics	-	28	118	56	5	*
Polyaromatic Hydrocarbons (PAHs)						
NAPHTHALENE	*	*	*	*	*	*
2-CHLORONAPTHALENE	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	*	*
FLUORENE	*	*	*	*	*	*
PHENANTHRENE	*	*	*	*	*	42
ANTHRACENE	*	*	*	*	103	*
FLUORANTHENE	*	*	114	*	*	*
PYRENE	*	*	115	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*
Diesel Range Organics	-	UNAC	13	126	135	38
Total Petroleum Hydrocarbon	*	-	-	-	-	-

* Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.

UNAC Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 8. (Continued)

Phase I Analysis	Area T 4002C1/4002C3 RPD(%)	Area T 4002D1/4002D3 RPD(%)	Area V 4203B1/4203B3 RPD(%)	Area V 4203D1/4203D3 RPD(%)	Area W 4401A1/4401A3 RPD(%)	Area W 4401B1/4401B3 RPD(%)	Area Y 5401E1/5401E3 RPD(%)
Volatile Organic Compounds (BTEX)							
BENZENE	*	*	74	*	*	*	*
TOLUENE	*	*	81	*	*	*	UNAC
ETHYLBENZENE	95	40	48	*	*	*	82
XYLENES	103	18	45	*	*	*	120
Gasoline Range Organics	-	-	5	17	-	-	67
Polyaromatic Hydrocarbons (PAHs)							
NAPHTHALENE	*	5	35	*	*	*	4
2-CHLORONAPTHALENE	*	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*	*
ACENAPHTHENE	55	*	29	*	*	*	*
FLUORENE	*	*	*	*	*	*	*
PHENANTHRENE	*	35	48	*	*	*	5
ANTHRACENE	*	*	*	*	*	*	*
FLUORANTHENE	*	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*	6
BENZO(a)ANTHRACENE	*	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*	*
Diesel Range Organics	-	-	83	*	-	-	81
Total Petroleum Hydrocarbon	54	19	-	-	46	13	-

* Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.
UNAC Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 8. (Continued)

Phase II Analysis	Area D 0803A1/0803A3 RPD(%)	Area D 0803B1/0803B3 RPD(%)	Area M 2603A1/2603A3 RPD(%)	Area M 2603C1/2603C3 RPD(%)	Area N 3005A1/3005A3 RPD(%)	Area N 3005B1/3005B3 RPD(%)
Volatile Organic Compounds (BTEX)						
BENZENE	*	*	*	*	*	*
TOLUENE	*	59	7	*	108	*
ETHYLBENZENE	*	*	*	*	*	67
XYLENES	*	*	*	*	7	104
Gasoline Range Organics	-	-	-	-	48	49
Polyaromatic Hydrocarbons (PAHs)						
NAPHTHALENE	*	*	*	*	*	11
2-CHLORONAPTHALENE	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	*	*
FLUORENE	*	*	*	*	*	*
PHENANTHRENE	*	*	*	*	*	*
ANTHRACENE	*	*	*	*	*	*
FLUORANTHENE	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*
Diesel Range Organics	-	-	-	-	3	39
Total Petroleum Hydrocarbon	*	135	48	22	-	*

* Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.

UNAC Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 8. (Continued)

Phase II Analysis	Area Q 3303A1/3303A3 RPD(%)	Area Q 3303C1/3303C3 RPD(%)	Area V 4305B1/4305B3 RPD(%)	Area V 4305C1/4305C3 RPD(%)	Area X 4805B1/4805B3 RPD(%)	Area X 4805C1/4805C3 RPD(%)
<u>Volatile Organic Compounds (BTEX)</u>						
BENZENE	*	*	*	*	*	*
TOLUENE	*	*	107	UNAC	*	*
ETHYLBENZENE	*	*	*	*	5	*
XYLENES	*	*	22	*	45	95
<u>Gasoline Range Organics</u>	-	-	-	-	3	4
<u>Polyaromatic Hydrocarbons (PAHs)</u>						
NAPHTHALENE	*	*	*	*	67	*
2-CHLORONAPTHALENE	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	34	*
FLUORENE	*	*	*	*	*	*
PHENANTHRENE	*	*	*	*	174	*
ANTHRACENE	*	*	*	*	38	*
FLUORANTHENE	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*
<u>Diesel Range Organics</u>	-	-	-	-	51	1
<u>Total Petroleum Hydrocarbon</u>	1	-	83	*	-	-

*	Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.
UNAC	Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 9. Groundwater Field Duplicate Evaluation - Relative Percent Difference (RPD) and Absolute Difference

Phase I Analysis	Area D 0802W2/0802W4 RPD(%)	Area D 1302W2/1302W4 RPD(%)	Area E/F 1506W2/1506W4 RPD(%)	Area I 1901W2/1901W4 RPD(%)	Area M 2602W2/2602W4 RPD(%)	Area N 3002W2/3002W4 RPD(%)	Area R 3402W2/3402W4 RPD(%)
<u>Volatile Organic Compounds (BTEX)</u>							
BENZENE	*	*	14	*	*	*	*
TOLUENE	*	*	*	*	6	*	*
ETHYLBENZENE	*	*	*	*	3	*	*
XYLENES	*	*	*	*	4	*	*
<u>Polyaromatic Hydrocarbons (PAHs)</u>							
NAPHTHALENE	*	*	*	*	41	*	*
2-CHLORONAPTHALENE	*	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	*	*	*
FLUORENE	*	*	*	*	51	*	*
PHENANTHRENE	*	*	*	*	*	*	*
ANTHRACENE	*	*	*	*	*	*	*
FLUORANTHENE	*	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*	*

*	Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.
UNAC	Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 9. (Continued)

Phase II Analysis	Area D 1003W2/1003W4 RPD(%)	Area M 2505W2/2505W4 RPD(%)	Area O 2803W2/2803W4 RPD(%)	Area T 4003W2/4003W4 RPD(%)	Area W 4705W2/4705W4 RPD(%)	Area Y 5303W2/5303W4 RPD(%)
<u>Volatile Organic Compounds (BTEX)</u>						
BENZENE	*	*	*	*	*	*
TOLUENE	*	*	*	*	*	*
ETHYLBENZENE	*	*	*	*	*	*
XYLENES	*	*	*	*	*	*
<u>Polyaromatic Hydrocarbons (PAHs)</u>						
NAPHTHALENE	*	*	*	*	*	*
2-CHLORONAPTHALENE	*	*	*	*	*	*
ACENAPHTHYLENE	*	*	*	*	*	*
ACENAPHTHENE	*	*	*	*	*	*
FLUORENE	*	*	*	*	*	*
PHENANTHRENE	*	*	*	*	*	*
ANTHRACENE	*	*	*	*	*	*
FLUORANTHENE	*	*	*	*	*	*
PYRENE	*	*	*	*	*	*
BENZO(a)ANTHRACENE	*	*	*	*	*	*
CHRYSENE	*	*	*	*	*	*
BENZO(b)FLUORANTHENE	*	*	*	*	*	*
BENZO(k)FLUORANTHENE	*	*	*	*	*	*
BENZO(a)PYRENE	*	*	*	*	*	*
INDENO(1,2,3-cd)PYRENE	*	*	*	*	*	*
DIBENZO(a,h)ANTHRACENE	*	*	*	*	*	*
BENZO(g,h,i)PERYLENE	*	*	*	*	*	*

* Acceptable = At least one value is <5X the reported detection level and duplicate comparison is within 3X the reported detection level.

UNAC Unacceptable = At least one value is <5X the reported detection level and duplicate comparison is greater than 3X the reported detection level.

Table 11. Field Blank Detected Values

Phase I

Trip Blank

Area	Sample ID	Date Collected	Analyte	Results	Units	Qual
Tank Area D	TB0010	09/07/96	Toluene	0.19	UG/L	J
Tank Area Y	TB0050	09/21/96	Xylenes, Total	0.34	UG/L	J

Equipment Rinsate

Area	Sample ID	Date Collected	Analyte	Results	Units	Qual
Tank Area C	0302R6	09/07/96	Toluene	2.4	UG/L	J
Tank Area S	3804R5	09/17/96	TPH-Diesel Range Organics	.041	MG/L	=
Tank Area X	4804R5	09/17/96	TPH-Diesel Range Organics	0.043	MG/L	=

Phase II

Trip Blank

Area	Sample ID	Date Collected	Analyte	Results	Units	Qual
	TB0071	12/15/96	Toluene	0.68	UG/L	J
	TB0072	12/15/96	Toluene	0.73	UG/L	J
	TB0073	12/15/96	Toluene	0.58	UG/L	J
	TB0075	12/16/96	Toluene	0.22	UG/L	J

Equipment Rinsate

Area	Sample ID	Date Collected	Analyte	Results	Units	Qual
Tank Area M	2404R5	12/10/96	Toluene	0.14	UG/L	J
Tank Area N	3003R6	12/11/96	Toluene	0.16	UG/L	J

the project has established the confidence that the data will be comparable to other project and programmatic information.

4.5 Completeness

Usable data are defined as those data that pass individual scrutiny during the verification and validation process and are accepted for unrestricted application to the human health risk assessment evaluation or equivalent type applications. It has been determined that estimated data are acceptable for the UST project objectives.

Objectives for the UST investigations have been achieved. The project produced valid results for over 99% of the sample analyses performed and successfully collected all required investigation samples.

5.0 DATA QUALITY ASSESSMENT SUMMARY

The overall quality of Fort Stewart preliminary groundwater and CAP-Part A investigation information meets or exceeds the established project objectives. Through proper implementation of the project data verification, validation, and assessment process, project information has been determined to be acceptable for use.

Data, as presented, have been qualified as usable, but estimated when necessary. Data that have been estimated provide indications of either accuracy, precision, or sensitivity being less than desired but adequate for interpretation.

Data produced for these studies demonstrate that they can withstand scientific scrutiny, are appropriate for intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy. Data integrity has been documented through proper implementation of QA/QC measures. The environmental information presented has an established confidence that allows use for the project objectives and provides data for future needs.

6.0 REFERENCES

SAIC (Science Applications International Corporation) 1995. *Data Validation Guidelines for Analytical Data*, Quality Assurance Technical Procedure TP-DM-300-7, Rev. 1.

Work Plan for Preliminary Groundwater and Corrective Action Plan - Part A & Part B Investigations at Former Underground Storage Tank Sites, Fort Stewart, Georgia, August 1996.

ATTACHMENT 1
to
APPENDIX C-3

SAIC VALIDATION FLAGGING CODES

DATA VALIDATION FLAGGING CODES

Blanks

F01	Sample data were qualified as a result of the method blank.
F02	Sample data were qualified as a result of the field blank.
F03	Sample data were qualified as a result of the equipment rinsate.
F04	Sample data were qualified as a result of the trip blank.
F05	Gross contamination exists.
F06	Concentration of the contaminant was detected at a level below the CRQL.
F07	Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL.
F08	Concentration of the contaminant was detected at a level that exceeds the action level.
F09	No laboratory blanks were analyzed.
F10	Blank had a negative value >5×'s the IDL.
F11	Blanks were not analyzed at required frequency.
F12	Professional judgement was used to qualify the data.

Surrogate Recovery

G01	Surrogate recovery was above the upper control limit.
G02	Surrogate recovery was below the lower control limit.
G03	Surrogate recovery was <10%.
G04	Surrogate recovery was zero.
G05	Surrogate was not present.
G06	Professional judgement was used to qualify the data.

Matrix Spike/Matrix Spike Duplicate

H01	MS/MSD recovery was above the upper control limit.
H02	MS/MSD recovery was below the lower control limit.
H03	MS/MSD recovery was <10%.
H04	MS/MSD pairs exceed the RPD limit.
H05	No action was taken on MS/MSD results.
H06	Professional judgement was used to qualify the data.

Matrix Spike

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

Laboratory Duplicate

J01	Duplicate RPD was outside the control limit.
J02	Duplicate sample results were >5× the CRDL.
J03	Duplicate sample results were <5× the CRDL.
J04	Professional judgement was used to qualify the data.

Internal Area Summary

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

Laboratory Control Samples (LCSs)

P01	LCS recovery was above upper control limit.
P02	LCS recovery was below lower control limit.
P03	LCS recovery was <50%.
P04	No action was taken on the LCS data.
P05	LCS was not analyzed at required frequency.

Target Compound Identification

M01	Incorrect identifications were made.
M02	Qualitative criteria were not met.
M03	Cross contamination occurred.
M04	Confirmatory analysis was not performed.
M05	No results were provided.
M06	Analysis occurred outside 12 hr GC/MS window.
M07	Professional judgement was used to qualify the data.
M08	The %D between the two pesticide/PCB column checks was >25%.

Initial/Continuing Calibration - Organics

C01	Initial calibration RRF was <0.05.
C02	Initial calibration RSD was >30%.
C03	Initial calibration sequence was not followed as required.
C04	Continuing calibration RRF was <0.05.
C05	Continuing calibration %D was >25%.
C06	Continuing calibration was not performed at the required frequency.
C07	Resolution criteria were not met.
C08	RPD criteria were not met.
C09	RSD criteria were not met.
C10	Retention time of compounds was outside windows.
C11	Compounds were not adequately resolved.
C12	Breakdown of endrin or DDT was >20%.
C13	Combined breakdown of endrin/DDT was >30%.
C14	Professional judgement was used to qualify the data.

APPENDIX D

DOCUMENTATION OF WATER SUPPLY SURVEY FOR THE FORT STEWART GARRISON AREA

APPENDIX E

SITE RANKING FORM
FOR FACILITY ID #9-089064

APPENDIX II

SITE RANKING FORM

1. Soil Contamination

a. Total PAHs - Maximum Concentration

☐	> 10 mg/kg	= 50
☐	1 - 10 mg/kg	= 25
☐	0.66 - 0.99 mg/kg	= 10
☒	< 0.660	= 0

b. Total BTEX - Maximum Concentration

☐	> 150 mg/kg	= 50
☐	50 - 149.9 mg/kg	= 40
☐	10 - 49.9 mg/kg	= 25
☒	0.5 - 9.9 mg/kg	= 10
☐	0.005 - .499 mg/kg	= 1
☐	<0.005 mg/kg	= 0

c. Depth to Groundwater (bls = Below Land Surface)

☒	< 10' bls	= 10
☐	10' - 25' bls	= 5
☐	25' - 50' bls	= 2
☐	>50' bls	= 1

2. Groundwater Contamination

a. Free Product (Nonaquaeous-phase liquid hydrocarbons)

☐	> 6"	= 2,000
☐	1/8" - 6"	= 1,500
☐	Sheen - 1/8"	= 250
☒	No free product	= 0

b. Dissolved Benzene - Maximum Concentration

☐	> 10,000 ug/L	= 250
☐	1,000 - 10,000 ug/L	= 100
☒	100 - 1,000 ug/L	= 50
☐	5 - 100 ug/L	= 10
☐	<5 ug/L	= 0

If (1.a.) + (1.b.) + (2.a.) + (2.b) is < 1, and the CAP is complete, then no further action is required. Go to summary.

3. Distance from Contaminant Plume to Point of Withdrawal for Water Supply

A. Public				B. Non-public			
CATEGORY	NUMBER IDENTIFIED	SCORE	TOTAL	CATEGORY	NUMBER IDENTIFIED	SCORE	TOTAL
Impacted	0 X	100 =	0	Impacted	0 X	100 =	0
< 500'	0 X 0.5 X	50 =	0	< 100'	0 X 0.5 X	26 =	0
500' - 1/4 mi	0 X 0.5 X	20 =	0	100' - 500'	0 X 0.5 X	10 =	0
1/4 mi - 1 mi	1 X 0.5 X	10 =	5	500' - 1/4 mi	0 X 0.5 X	6 =	0
1 mi - 2 mi	4 X 0.5 X	6 =	12	1/4 - 1/2 mi	0 X 0.5 X	4 =	0
> 3 mi	N/A	0 =	0	> 1/2 mi	N/A	0 =	0
		A. Subtotal =	17			B. Subtotal =	0

Note: If site is in lower susceptibility area, do not use the shaded area.

4. Distance from Contaminant Plume to Surface-Waters or Utility Trenches Below the Water Table

___ Impacted = 100

___ < 500 = 12

___ 500' - 1000' = 6

X > 1,000 = 1

5. Susceptibility Area Multiplier

___ If site is located in a Low Ground-Water Pollution Susceptibility Area,
<u>and</u> no points of withdrawal for water supply lie within 500'
<u>and</u> no surface water bodies or submerged utility trenches lie within 500'
of the source: = 0.5

X All other sites = 1

<u>SUMMARY</u>

[(1.a. + 1.b.) X (1.c.) + (2.a. + 2.b.) X (3.a. + 3.b. + 4.)] X [(5.)] = 1000

ENVIRONMENTAL SENSITIVITY SCORE

APPENDIX F

PUBLIC NOTIFICATION NEWSPAPER ANNOUNCEMENT FOR THE FACILITY ID #9-089064 CAP-PART A ACTIVITIES

**** PUBLIC NOTICE ****

Notification of Corrective Action Plan
Underground Storage Tank Releases
Fort Stewart Garrison Area
Fort Stewart, Georgia

The United States Army Corps of Engineers and Fort Stewart Directorate of Public Works have prepared Corrective Action Plan (CAP)-Part A reports to assess the environmental impact of diesel, gasoline, or waste oil releases from numerous underground storage tanks (USTs) located at the above referenced property. These reports were submitted to the Georgia Environmental Protection Division on or about February 3, 1997. A listing of the UST sites for which CAP-Part A reports have been prepared is presented at the end of this notification.

The Georgia rules for UST Management require notification of the public most directly affected by the plans. If you would like a copy of any of the plans, please contact:

Commander
24th Infantry Division (Mechanized) and Fort Stewart
ATTN: AFZP-DEV (M. Little)
Building 1139
Fort Stewart, Georgia 31314-5000

A copy of each requested plan will be mailed at a nominal copying and shipping fee.

If you desire to make comments on any of the plans, or to examine the Georgia Environmental Protection Division's files, you should contact the Corrective Action Unit, Underground Storage Tank Management Program, Environmental Protection Division, at (404) 362-2687. The Underground Storage Tank Management Program will accept public comments on the CAP-Part A reports up to 30 days after submittal to the Georgia Environmental Protection Division. Their mailing address is:

Corrective Action Unit
Underground Storage Tank Management Program
4244 International Parkway
Suite 100
Atlanta, Georgia 30354

Fort Stewart CAP-Part A Underground Storage Tank Sites

Facility ID Number	Building Number	Tank Number
9-089064	Building 1841	Tank #1
9-089068	Building 1810	Tank #11, #12
9-089069	Building 1811	Tank #14
9-089012	Building 1721	Tank #15, #16
9-089011	Building 1722/1720	Tank #18, #20, #28A
9-089088	Building 1636/1643	Tank #29
9-089114	Building 1630	Tank #30, #31, #32
9-089028	Building 1622	Tank #33, #34, #35
9-089013	Building 1544	Tank #43, #44
9-089104	Building 1161	Tank #61
9-089046	Building 1130	Tank #64A
9-089021	Building 967	Tank #67
9-089020	Building 961	Tank #68, #69
9-089019	Building 955	Tank #70
9-089024	Building 1205/1255	Tank #72, #73
9-089003	Building 1809	Tank #75
9-089025	Building 1213	Tank #77, #78
9-089089	Building 1266/1268	Tank #80, #81
9-089029	Building 1281	Tank #82
9-089074	Building 1247	Tank #89
9-089075	Building 1333	Tank #90, #91
9-089111	Building 1331	Tank #92
9-089078	Building 1320	Tank #94A
9-089077	Building 1325	Tank #95, #96, #97
9-089079	Building 1346	Tank #98, #99
9-089115	Building 1343	Tank #100
9-089040	Building 233	Tank #205, #206
9-089036	Building 275	Tank #208, #209
9-089035	Building 272	Tank #210
9-089059	Building 4506	Tank #222, #223
9-089042	Building 4526/4530	Tank #226, #227
9-089061	Building 4577	Tank #232, #233
9-089117	Building 4572	Tank #234, #235
9-089062	Building 4578	Tank #236, #237
9-089100	Building 4583/4578	Tank #239, #240