U.S. Army Corps
of Engineers

FINAL CORRECTIVE ACTION PLAN - PART A
EPD FACILITY ID: 9025090
PHASE 1 SITE INVESTIGATION
AT PUMPHOUSE #6

at

HUNTER ARMY AIRFIELD
SAVANNAH, GEORGIA

under

Contract No. DACA21-93-D-0049
Delivery Order No. 22

April 1997

Submitted to:
U.S. Army Corps of Engineers
Savannah, Georgia

Presented by:
Metcalf & Eddy, Inc.
Atlanta, Georgia

DOCUMENT 4

Pumphouse #6

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) 362-2698

CORRECTIVE ACTION PLAN
PART A

Facility Name: Hunter Army Airfield
Street Address: Strachan Extension, Building 8070
City: Savannah County Chatham Facility ID: 9025090

Submitted by UST Owner/Operator:
Name: Mr. John Spears (AFZP-DEV)
Company: 3rd Infantry Div. (M)
Address: Building 1139
City: Ft. Stewart State: GA
Zip Code: 31314-5000

Prepared by:
Name: David Humphris, P.G.
Company: Metcalf & Eddy, Inc.
Address: 1201 Peachtree Street, NE
400 Colony Square, Suite 1101
City: Atlanta State: GA
Zip Code: 30361

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.

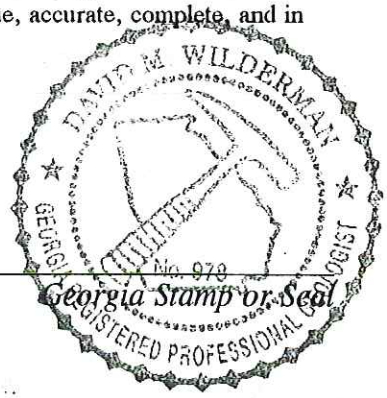
Name: John Spears, Chief Environmental

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: David M. Wilderman, PG
Signature: [signature]
Date: 4.30.97



Georgia Stamp or Seal

Please complete the following form, check all of the boxes below that apply, and attach 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 - **See Supporting Documentation, Section II.C.**

■ Site Map Attached Identifying Former and/or Existing USTs - **See Figure 2**

☐ Not Applicable

Pumphouse #6

D. Initial Site Characterization:

■ Site Map: include the following items on an attached site map. **See Supporting Documentation, Section II.D**

- 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 = 200 ft

1. Regulated Substance Released - **See Supporting Documentation, Section II.D.1.**

☐ Gasoline ☐ Diesel ☐ Kerosene ☐ Waste Oil

■ Other JP-4

2. Source of Contamination - **See Supporting Documentation, Section II.D.2**

Number of USTs: in use 0; closed/removed 10 in place

■	Existing UST System(s):	■ piping	■ Tank	☐ other
☐	Former UST System(s):	☐ piping	☐ Tank	☐ other

3. Impacted Environmental Media - **See Supporting Documentation, Section II.D.3.**

■ 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 GUST-CAPA Appendix I)

D. Initial Site Characterization (continued):

☐ Drinking Water Supply Impacted

☐ Surface Water Impacted

■ Attach Laboratory Analytical Data: the following items must be included - **See Appendix D**

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

4. Local Water Resources - **See Supporting Documentation, Section II.D.4.**

■ 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) approx. 610 feet (regardless of hydraulic gradient)

■ Attach Documentation of Water Supply Survey and Field Reconnaissance

5. Other Hydrogeologic Data (specify values) - **See Supporting Documentation, Section II.D.5.**

■ Depth to Groundwater (shallowest) 5.84 ft (MW8)

■ Groundwater Flow Direction south

■ Hydraulic Gradient 0.007

6. Corrective Action Completed Or In-Progress

☐ USTs/Source Removed (after confirmed release)

☐ Excavation and Treatment/Disposal of Contaminated Backfill Material & Native Soils
- ☐ Attach manifests of proper soil disposal

☐ Other (specify) _____

Pumphouse #6

D. Initial Site Characterization (continued):

7. Conclusions and Recommendations - **See Supporting Documentation, Section II.D.7.**

☐ 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 - **See Supporting Documentation, Section II.D.8 and Appendix F.**

Environmental Sensitivity Score: 900
(see Appendix II)

III. SITE INVESTIGATION PLAN: - **See Supporting Documentation, Section III**

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) _____

Pumphouse #6

IV. PUBLIC NOTICE:

- ☐ Certified Letters to Adjacent and Potentially Affected Property Owners and Local Officials
- ☐ Legal Notice in Newspaper, as pre-approved by EPD
- ■ Other EPD Approved Method (specify): **See Supporting Documentation, Section IV.**

V. CLAIM FOR REIMBURSEMENT: (For GUST Trust Fund sites only) **N/A**

- ☐ GUST Trust Fund Application (GUST-36), must be attached if applicable
- ☐ Cost Proposal
  - ☐ 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
- ☐ Payment Schedule for Reimbursement

SUPPORTING DOCUMENTATION
FINAL CORRECTIVE ACTION PLAN - PART A
EPD FACILITY ID: 9025090
PUMPHOUSE #6 - BUILDING 8070
HUNTER ARMY AIRFIELD
SAVANNAH, GEORGIA

CONTRACT NO. DACA 21-93-D-0049
DELIVERY ORDER NO. 0022

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LIST OF ACRONYMS

ATL's	Alternate Threshold Levels
AVGAS	Aviation gasoline
bls	below land surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAP	Corrective Action Plan
DNR	Department of Natural Resources
DRO	Diesel Range Organics
EPD	Environmental Protection Division (State of Georgia, Department of Natural Resources)
GRO	Gasoline Range Organics
GUST	Georgia Underground Storage Tank
HAAF	Hunter Army Airfield
HP	Hydropunch
IWQS	Instream Water Quality Standards
MCL	Maximum Contaminant Level
M&E	Metcalf & Eddy, Inc.
mg/kg	milligrams per kilogram
MTBE	Methyl Tert-Butyl Ether
MW	Monitoring Well
OVA	Organic Vapor Analyzer
PAH	Polynuclear Aromatic Hydrocarbons
SAV	Savannah District
SI	Site Investigation
SIP	Site Investigation Plan
SSI	Site Investigation
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
μg/L	micrograms per liter
UST	Underground Storage Tank
USACE	United States Army Corps of Engineers

LIST OF REFERENCES

Anderson-Columbia, Inc., June 27, 1995, Field Report, submitted to the Georgia EPD in January 1996.

Burroughs Quadrangle, Georgia, 7.5 Minute Series Topographic Map, 1988.

Clarke, John S., Hacke, Charles M. and Peck, Michael F., 1990, Geology and Ground Water Resources of the Coastal Area of Georgia, Department of Natural Resources, Bulletin 113, 106p.

Georgia Department of Natural Resources, Environmental Protection Division, October 23, 1995, Rules and Regulations for Water Quality Control, Chapter 391-3-6.

Georgia Department of Natural Resources, Environmental Protection Division, February 1995, Underground Storage Tank Management, Chapter 391-3-15.

Georgia Department of Natural Resources, Environmental Protection Division, November 1995, Guidance Document - Underground Storage Tank Release: Corrective Action Plan (CAP) Part A, GUST - CAPA.GUI

Garden City Quadrangle, Georgia, 7.5 Minute Series Topographic Map, 1980.

Isle of Hope Quadrangle, Georgia, 7.5 Minute Series Topographic Map, 1988.

Metcalf & Eddy, Inc., 1996 Final Corrective Action Plan - Part B, DAACG Facility Area.

Metcalf & Eddy, Inc., 1996, Final Work Plan for Phase I and Phase II Site Investigation at Pumphouses #1, #2, and #6.

Savannah Quadrangle, Georgia 7.5 Minute Series Topographic Map, 1978.

U.S. Army Corps of Engineers, Savannah District, March 11, 1996, Scope of Work, Phase I and Phase II Site Investigations at Pump Houses #1, #2, and #6, Hunter Army Airfield, Georgia.

The State of Georgia, 1995, Georgia Underground Storage Tank Act, Section 12-b.

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CORRECTIVE ACTION PLAN - PART A
SUPPORTING DOCUMENTATION

PUMPHOUSE #6 - BUILDING 8070
EPD FACILITY I.D. #9025090
HUNTER ARMY AIRFIELD
SAVANNAH, GEORGIA

INTRODUCTION

Under Contract DACA 21-93-D-0049 Delivery Order No. 22, with the United States Army Corps of Engineers (USACE) Savannah District (SAV), Metcalf & Eddy, Inc. (M&E) performed a Phase I Site Investigation (SI) at Pumphouses #1 (Building 8060), #2 (Building 8065), and #6 (Building 8070) at Hunter Army Airfield (HAAF) in Savannah, Georgia **(Figure 1)**.

Metcalf & Eddy, Inc. has prepared this Corrective Action Plan (CAP) Part A following guidelines provided by the State of Georgia, Department of Natural Resources (DNR), Environmental Protection Division (EPD). The appropriate Georgia underground storage tank form (GUST-CAPA.FOR, November 1995) was completed for Pumphouse #6 as directed in the EPD Guidance Document, GUST-CAPA.GUI, November 1995. Information provided in the following sections of this Supporting Documentation is presented in sequence with the CAP-Part A form. Pertinent information necessary to support the CAP-Part A form is contained herein.

II.C. Tank History

Pumphouse #6 was a JP-4 fuel island that was used from about 1953 until the 1970s. The pumphouse has been inactive from the 1970s to present. Ten underground storage tanks (USTs) (50,000 gallon) remain in place, two are partially under the pumphouse structure **(Figure 2)**. Tank removal activities are awaiting funding and removal design.

II.D. Initial Site Characterization

A methodical approach was utilized for the field investigation to increase the effectiveness of the sampling program. A thorough review of available historical information was conducted prior to any field activities. Initial field work consisted of collecting soil vapor samples from 167 locations placed on a 70 foot by 70 foot grid over the Pumphouse #6 area. Passive soil vapor modules (GORE-SORBER®) manufactured by W. L. Gore and Associates, Inc. (Gore) were used to collect soil vapor samples for laboratory analysis. The soil vapor survey was initiated by installing the Gore-Sorber module in a 4-foot-deep, 5/8-inch-diameter soil boring that was advanced using an impact hammer. After a 3 week exposure time, the modules were retrieved and analyzed using a Gore-developed method of thermal desorption, gas chromatography, and mass selective detection. Portions of the Gore report and a petroleum hydrocarbon color contour map are presented in **Appendix A**. Parameters analyzed included BTEX (the sum of benzene, toluene, ethyl benzene, and xylene), undecane (C11), tridecane (C13), pentadecane (C15), PAHs and petroleum hydrocarbons. The soil vapor survey indicated that three small areas along the East-West Taxiway were potentially impacted.

Three groundwater monitoring wells were installed to assess both soil and groundwater quality in potentially impacted areas of the site and to define groundwater flow direction and gradient. Six soil samples were collected from 3 soil borings in addition to the 6 soil samples collected from the 3 well borings installed in the Pumphouse #6 area. Two soil samples were collected from different depths at each monitoring well/soil boring location to assess soil quality. Two sediment and surface water samples were also collected from a nearby drainage canal. The results of the field effort are discussed in the following sections.

Facility plans received after completing the CAP-Part A fieldwork indicate that an additional fueling pit (6-E) associated with Pumphouse #6 is located beyond the original study area toward the east (**Figure 2**). No subsurface investigation was conducted in proximity to fueling pit 6-E. Additional investigation including soil and groundwater sampling will be performed in this area during the CAP-Part B phase of this project.

II.D.1. Regulated Substance Released

There have been no reported releases at this site. Quality matching, a process in which GORE-SORBER® chromatograms are compared to chromatograms of standards for selected fuel types in GORE's fluids library, indicated a release of a heavy fuel (JP-4/kerosene based) may have occurred.

II.D.2 Source of Contamination

The GORE data suggests that fueling pits and piping rather than the pumphouse tank area are the sources of contamination based on the soil vapor results. Three monitoring wells and three soil borings were drilled in suspected contaminated areas (**Figure 2**) to confirm the presence of contamination.

II.D.3. Impacted Environmental Media

Groundwater

Groundwater samples were collected from three monitoring wells (MW07, MW08, and MW09) and analyzed for BTEX/Methyl Tert-Butyl Ether (MTBE) (Method 8020) and PAH (Method 8310) analyses. The analytical data, presented in **Table 1**, indicated that although BTEX components were identified, none exceeded any EPD In-Stream Water Quality Standards (IWQS). PAHs were identified, but none are regulated by the EPD. EPD-regulated PAHs including benzo(a)pyrene, benzo(b,k)fluoranthene, chrysene, benzo(a)anthracene, indeno(1,2,3-cd) pyrene, and dibenzo(a,h)anthracene were not identified although the detection limits for these compounds exceeded the EPD criteria due to matrix interferences. **Figure 3** shows petroleum hydrocarbons detected in groundwater. Monitoring well schematics are presented in **Appendix B** and the development sheets and photographs are presented in **Appendix C.** Laboratory analytical results are provided in **Appendix D.**

Soils

Two soil samples were collected from each of the three monitoring wells and three soil boring locations. The 12 soil samples were analyzed for BTEX/MTBE (Method 8020), PAHs (Method 8100), gasoline range organics (GRO) - Modified Method 8015, and diesel range organics (DRO) - Modified Method 8100. The soil analytical data is presented in **Table 2** and **Appendix D**. Geologic logs are provided in **Appendix E**. Analytical data indicated that the soil samples were below EPD screening criteria for BTEX. However, the benzene detection limit was higher than the EPD screening criteria of 0.12 mg/kg at location SB16 due to sample dilution required to avoid interferences. Alternate Threshold Limits (ATLs) were calculated for benzene at this location using the detection limit as the sample value. The calculated ATL was also below the detection limit at this location. **Figure 4** shows petroleum hydrocarbons detected in soil.

PAHs were not detected in any sample except SB16 (8 - 10 ft). However, the PAHs detected are not regulated by the EPD.

Surface Water and Sediments

Two surface water samples (SWE01 and SWE02) were collected from the drainage ditch south of the site and analyzed for BTEX/MTBE and PAHs (**Table 3**). Analytical results indicate minimal impact by BTEX components (only one xylene detection) and no IWQS exceedances. PAHs were not detected in either surface water sample. However, the detection limits for the EPD regulated PAHs were exceeded because of sample dilution, much like the groundwater samples. **Figure 5** shows petroleum hydrocarbons detected in surface water. The laboratory data and chain-of-custodies are presented in **Appendix D.**

Two sediment samples, SWE01 and SWE02, were collected and analyzed for the same parameters as the soil. The analytical data **(Table 4)** indicated no impact by BTEX or PAH compounds **(Figure 5)**.

II.D.4 Local Water Resources

Drinking Water Supplies

No potable water supply wells were identified within a 1/2 mile radius of the site. Nine water supply wells were identified within a 2-mile radius of the site. The wells within the 2-mile radius for public water supply are screened at a minimum depth of 90 feet bls **(Table 5)**, and they are not hydraulically connected to the surficial aquifer due to several interbedded clay layers at depth. The closest of these public wells (Hunter 2) is located approximately 3200 feet north-northeast (upgradient) of the site. Clarke et al, 1990, documents two confining units, Miocene unit A (15-90 feet thick) and Miocene unit B (10-50 feet thick), separating the surficial aquifer from the deeper aquifers. Miocene unit A is typically encountered within 60 feet of the surface in the Savannah area. The Miocene unit B is located directly below Miocene unit A. Thus, the water supply wells are not considered as potential receptors during this investigation.

Surface Water Bodies

The nearest surface water body is the drainage ditch approximately 610 feet south of the pumphouse. The open ditch, about 10 feet deep, is part of the stormwater drainage system on the base. The ditch contains water for the majority of the year and drains toward the east. **Figure 1** shows surface water bodies within a 1-mile radius of the site.

II.D.5. Other Hydrogeologic Data

Water level measurements were collected at Pumphouse #6 on December 9, 1996. Groundwater in the study area is under water table conditions and is encountered between 5.84 to 7.36 feet bls, averaging 6.81 feet bls. The groundwater elevations **(Table 6)** were used to construct a potentiometric surface map **(Figure 6)**. From **Figure 6**, it appears that groundwater flow is generally to the south or southeast with an approximate gradient of 0.007.

II.D.7. Conclusions and Recommendations

The 10 USTs remain in place but removals are being planned. The Phase I field work identified three small areas of potential contamination using a soil vapor survey. Three soil borings and three monitoring wells were installed in these areas to assess soil and groundwater quality in and around the potentially contaminated areas. A survey of potential receptors identified potable wells and a surface water body in proximity to the investigation area. Potable well records indicated that they were cased to a significant distance below ground surface and are separated from the shallow aquifer by two confining units. The potable wells are therefore not considered potential receptors of shallow aquifer contamination. One surface water body was located approximately 610 feet south of Pumphouse #6 which is most likely hydraulically connected to the shallow aquifer. The two surface water and sediment samples collected from this drainage feature show no signs of petroleum impact. No other potential receptors were identified during the investigation.

The GUST Rule, 391-3-15-.09, provides soil threshold levels for a number of petroleum compounds depending on groundwater susceptibility and location to potential receptors. Since the receptor survey indicated that the surface water body is greater than 500 feet from Pumphouse #6, the less stringent soil threshold levels listed in Table B of the GUST Rule were used to evaluate soil contamination at Pumphouse #6. Concentrations of volatile and semivolatile hydrocarbons in soil did not exceed threshold limits. However, the method detection limit for samples at SB16 exceeded the regulatory limit for benzene due to sample dilutions required by the analytical method. The two soil samples at SB16 also exceeded ATLs when the detection limit was used as the sample concentration value.

Concentrations of organic contaminants in groundwater and surface water samples collected from the Pumphouse #6 area did not exceed State IWQS levels. Sediment samples indicated no impact by petroleum hydrocarbons.

M&E recommends that additional soil borings and monitoring wells be installed to define the vertical and horizontal extent of possible contamination in the Pumphouse #6 area. An additional fuel pit east of the investigation area was discovered after the CAP-A activities were completed. This fuel pit should be investigated to assess both soil and groundwater quality. A Site Investigation Plan (SIP) is provided in Section III of this CAP-Part A Supporting Documentation which outlines additional proposed activities. The objectives of the expanded investigation will be to: (1) fully define the horizontal extent of subsurface hydrocarbon contamination, (2) define the vertical extent of contamination hydraulically downgradient of source areas, (3) evaluate the potential existence of preferred subsurface migration pathways, (4) determine shallow aquifer hydraulic characteristics, and (5) evaluate possible remedial responses. Information obtained from these additional investigative activities will be summarized in a CAP-Part B as specified in Georgia Rule 391-3-15 and submitted to the Georgia DNR EPD for review.

II.D.8. Site Ranking

The Pumphouse #6 site has an Environmental Sensitivity Score of 900. The calculation of this score is provided in **Appendix F.**

III. Site Investigation Plan

The primary purpose for continued site investigation is to define the horizontal and vertical extent of possible petroleum contamination in the vicinity of Pumphouse #6 and the fuel pit identified after completing the first phase of the investigation. The following SIP outlines proposed sampling locations, investigative methodologies, and sample location rationale. A figure illustrating proposed sampling locations is also provided in the SIP. A proposed schedule for SIP implementation is provided in **Table 7.**

Soil Investigation

Additional subsurface investigation is required at Pumphouse #6 to define the extent of hydrocarbon compounds in soil, specifically around SB16 and the eastmost fuel pit (pit 6-E). Additional monitoring wells will also be required to define the horizontal extent of contamination in groundwater. Soil samples will be collected from both soil boring and groundwater monitoring well locations. **Figure 7** provides an illustration of all proposed soil and groundwater sampling points.

A total of nine soil borings are proposed at the Pumphouse #6 site. Two soil samples will be collected from each boring. The samples will be collected from the intervals exhibiting the highest OVA readings above the water table provided adequate vertical delineation (at least 2 feet between sampling intervals) is achieved. Soil samples can be collected from the saturated zone over the range of water table fluctuation (i.e. "smear zone") at the discretion of the geologist to accomplish vertical delineation of contamination. The soil boring installation and sampling procedures are outlined in the Work Plan prepared by Metcalf & Eddy (1996) for Pumphouses #1, #2, and #6.

Each soil sample will be analyzed using EPA methods 8020, 8100, Modified 8100 DRO, and Modified 8015 GRO analysis. Analytical results will be evaluated along with existing data to determine if the horizontal and vertical extent of petroleum contamination has been defined. These analytical results will also be used to evaluate potential soil treatment alternatives.

Aquifer characteristic parameters will be obtained from direct measurements performed on four Shelby tube samples collected at Pumphouse #6. The Shelby tubes will be analyzed for permeability, falling head permeability, specific gravity, particle size, and moisture content. Saturated hydraulic conductivity, effective porosity, and seepage velocity will be determined after reviewing direct measurement results and literature values. These aquifer coefficients will be used in developing the objectives of corrective action.

Groundwater Monitoring Well Installation

A total of two shallow wells and one deep well will be installed downgradient of the Pumphouse/fuel pit area and at the eastmost fuel pit (pit 6-E) to define the horizontal and vertical extent of soluble hydrocarbons in groundwater. Proposed well locations are provided on **Figure 7.** The deep well will be installed between Pumphouse #6 and the drainage ditch located toward the south (nearest receptor). The deep well may be installed at an alternate location, downgradient of Fuel Pit 6-E, if soil sample headspace analysis using the OVA indicates elevated levels of hydrocarbon vapors exist near this fuel pit. A shallow well will then be installed at the original location for the deep well (near Pumphouse #6) if the alternate location is selected. The shallow groundwater monitoring wells will be constructed using similar methodologies employed during the CAP-Part A investigation. Each shallow well will be installed into the upper 15 feet of the unconfined aquifer. Each deep well will be installed with an approximate ten foot vertical separation in screen intervals with respect to shallow monitoring wells. A five foot section of machine slotted PVC screen will be installed at the base of each deep well. The bentonite seal will be hydrated with foundation water since it will be below the static water table. The bentonite will be allowed to hydrate for one hour before grouting with a tremie pipe.

Two soil samples will be collected from each monitoring well location. The samples will be collected from the intervals exhibiting the highest OVA readings above the water table provided adequate vertical delineation (at least 2 feet between sampling intervals) is achieved. Soil samples can be collected from the saturated zone over the range of water table fluctuation (i.e. "smear zone") at the discretion of the geologist to accomplish vertical delineation of contamination. The soil boring installation and sampling procedures are outlined in the Work Plan prepared by Metcalf & Eddy (1996) for Pumphouses #1, #2, and #6. Each soil sample will be analyzed for BTEX/MTBE, PAH, GRO, and DRO. Analytical results will be used to define the extent of potential contamination in soil.

Each monitoring well will be developed following procedures outlined in the Work Plan

prepared by Metcalf & Eddy (1996) for the Pumphouses #1, #2, and #6 Site Investigation. Groundwater samples will be collected from all newly installed monitoring wells following the development and stabilization periods. Each sample will be analyzed for soluble hydrocarbons using EPA methods 8020 and 8100. Analytical results of these samples will be plotted on site maps along with previous groundwater sample results to evaluate the vertical and horizontal extent of contamination. Groundwater analytical results will also be used to evaluate appropriate remedial alternatives for contaminated groundwater.

IV. Public Notice

The site is located within the boundaries of HAAF, with the closest property boundary being 0.67 mile away. Since no private property is contiguous to the study area, public notification is not required.

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TABLE 1

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
CONSTITUENTS DETECTED IN GROUNDWATER

SITE:	GA EPD	MW07	MW08	MW08	MW09
SAMPLE ID:	INSTREAM	HT4-MW07	HT4-MW08	HT4-MW51	HT4-MW09
SAMPLE DATE:	WQS [1]	12/9/96	12/9/96	12/9/96	12/10/96
UNITS:	ug/L	ug/L	ug/L	ug/L DUPLICATE	ug/L
CONSTITUENT (METHOD)					
VOLATILES (8020) [2]					
Benzene	**71.28**	1.3	< 1.1	< 1.1	3.6J
Ethylbenzene	**28,718**	7.7	46	64	47
Toluene	**200,000**	5.2	< 5	< 5	5
Xylene (total)	**10,000** [3]	8.4	530	710	330
POLYNUCLEAR AROMATICS (8310)					
Fluoranthene	**370**	4.9 J	< 1	< 1	< 2.6
Fluorene	**14,000**	2.2 J	< 1	< 1	0.76 J
Naphthalene	-	1.8	20	20	66
Phenanthrene + Anthracene [4]	**- / 110000**	11 J	< 0.4	< 0.4	1.5 J
Pyrene	**11,000**	2.4 J	< 1	< 1	< 2.6
1-Methylnaphthalene	-	1.9	12	12	26
2-Methylnaphthalene	-	< 1	29	30	53

J=Result is Estimated < = Less than detection limit
(1) - GA EPD INSTREAM WQS - GA DNR EPD, Water Quality Control, Instream Water Quality Standards, Chapter 391-3-6-.03, section 5 (d)(ii) & (iii), 10/23/95.
(-) - WQS not listed
(2) - Volatiles analysis includes MTBE
(3) - The MCL is given since no WQS exists
(4) - PAH compounds co-elute and can not be individually confirmed.

TABLE 2

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
CONSTITUENTS DETECTED IN SOIL BORINGS

SITE ID:		MW07	MW07	MW07	MW08	MW08	MW09	MW09
SAMPLE ID:	SOIL	WB0701	WB5601	WB0702	WB0801	WB0802	WB0901	WB0902
SAMPLE DATE:	THRESHOLD	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96
DEPTH (ft):	LEVELS [1]	11	11	16	10	15	10	15
UNITS:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CONSTITUENTS (METHOD)								
VOLATILES (8020) [2]								
Benzene	0.12	< 0.0061	< 0.0061	< 0.0064	< 0.0061	< 0.0064	< 0.0061	< 0.0061
Ethylbenzene	140	< 0.0061	< 0.0061	< 0.0064	< 0.0061	< 0.0064	0.022	< 0.0061
Toluene	500	< 0.0061	< 0.0061	< 0.0064	0.017	< 0.0064	0.0069	< 0.0061
Xylene (total)	700	< 0.0061	< 0.0061	< 0.0064	0.02	0.025	0.17	0.012
POLYNUCLEAR AROMATICS (8100)								
1-Methylnaphthalene	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
2-Methylnaphthalene	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
PETROLEUM HYDROCARBONS (8015M)								
GRO	-	< 0.3	< 0.3	< 0.32	< 0.3	< 0.3	1.5 J	< 0.3
DRO	-	5.7	5.2	< 4.2	4.7	< 4	8.5	4.7

J = Result is Estimated. < = Less than detection limit
(1) - Soil Threshold Levels-GA DNR EPD, Chapter 391-3-15-.09, UST Management, Table B, for an Average of Higher Groundwater Pollution Susceptibility Area based on a distance of > 500 feet to a surface water body.
(-) Level not listed.
(2) - Volatiles analysis includes MTBE

TABLE 2, CONTINUED.

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
CONSTITUENTS DETECTED IN SOIL BORINGS

SITE ID:		SB16	SB16	SB16	SB17	SB17	SB18	SB18
SAMPLE ID:	SOIL	SB1601	SB5301	SB1602	SB1701	SB1702	SB1801	SB1802
SAMPLE DATE:	THRESHOLD	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96
DEPTH (ft):	LEVELS [1]	6	6	10	6	8	3	7
UNITS:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CONSTITUENTS (METHOD)								
VOLATILES (8020) [2]								
Benzene	0.12	< 0.57 *	< 0.57 *	< 6.1 *	< 0.0054	< 0.056	< 0.0056	< 0.0058
Ethylbenzene	140	2.1	1.4	39	< 0.0054	0.056	< 0.0056	< 0.0058
Toluene	500	< 0.57	< 0.57	8.6	< 0.0054	0.0077	0.0086	< 0.0058
Xylene (total)	700	3.1	1.1	76	< 0.0054	0.04	0.019	< 0.0058
POLYNUCLEAR AROMATICS (8100)								
1-Methylnaphthalene	-	< 30	< 30	12 J	< 0.36	< 0.38	< 0.38	< 0.38
2-Methylnaphthalene	-	< 30	< 30	16 J	< 0.36	< 0.38	< 0.38	< 0.38
PETROLEUM HYDROCARBONS (8015M)								
GRO	-	95 J	80 J	1700 J	< 0.28	1.6	< 0.28	< 0.3
DRO	-	4800 J	4300 J	2500 J	6.9	18	24	< 3.8

J = Result is Estimated. < = Less than detection limit
* = Detection limit exceeds soil threshold level due to dilutions.
(1) - Soil Threshold Levels-GA DNR EPD, Chapter 391-3-15-.09, UST Management, Table B, for an Average of Higher Groundwater Pollution Susceptibility Area based on a distance of > 500 feet to a surface water body.
(-) Level not listed.
(2) - Volatiles analysis includes MTBE

TABLE 3

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
CONSTITUENTS DETECTED IN SURFACE WATER

SITE:	GA EPD		SWE01	SWE02
SAMPLE ID:	INSTREAM		HT4-SW01	HT4-SW02
SAMPLE DATE:	WQS [1]		12/10/96	12/10/96
UNITS:	ug/L		ug/L	ug/L
CONSTITUENT (METHOD)				
VOLATILES (8020) [2]				
Xylene	**10,000** [3]	<	2	1.1 J
POLYNUCLEAR AROMATICS (8310)			**ND**	**ND**

ND - Constituents Not Detected above the detection limits, see Appendix D, Analytical Data.
(1) - GA EPD INSTREAM WQS - GA DNR EPD, Water Quality Control, Instream Water Quality Standards, Chapter 391-3-6-.03, section 5 (d)(ii) & (iii), 10/23/95.
(-) WQS not listed
(2) - Volatiles analysis includes MTBE
(3) - The MCL is given since no WQS exists

TABLE 4

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
CONSTITUENTS DETECTED IN SEDIMENTS

SITE ID:		SWE01	SWE02
SAMPLE ID:	SOIL	HT4-SE01	HT4-SE02
SAMPLE DATE:	THRESHOLD	12/10/96	12/10/96
DEPTH (ft):	LEVELS [1]	0	0
UNITS:	mg/kg	mg/kg	mg/kg
CONSTITUENTS (METHOD)			
VOLATILES (8020) [2]		ND	ND
POLYNUCLEAR AROMATICS (8100)		ND	ND
PETROLEUM HYDROCARBONS (8015M)			
GRO	-	ND	ND
DRO	-	ND	ND

ND = Constituents not detected above detection limit, see Appendix H, Analytical Data.
(1) - Soil Threshold Levels-GA DNR EPD, Chapter 391-3-15-.09, UST Management, Table B, for an Average of Higher Groundwater Pollution Susceptibility Area based on a distance of > 500 feet to a surface water body.
(-) Level not listed.
(2) - Volatiles analysis includes MTBE

TABLE 5
WATER SUPPLY WELLS WITHIN A 2-MILE RADIUS OF PUMPHOUSE #6

Well I.D.	Quad.	Owner	Total Depth	Casing Depth	Use
290	36Q	U.S. Army, Hunter 4	300	90	Institutional
112	36Q	SCL RR, Shops	508	275	Commercial
285	36Q	U.S. Army, Hunter 1	504	259	Public
286	36Q	U.S. Army, Hunter 2	555	260	Public
036	36P	City of Savannah 36	414	252	Public
287	36Q	U.S. Army, Hunter 3	370	324	Public
078	37P	Rivers End Subdiv. 01	440	200	Public
079	37P	Rivers End Subdiv. 02	400	227	Public
006	37P	City of Savannah 13	1000	270	Public

Quad: Georgia Grid System. The full well name as in Bulletin 113 is 37Q034.

Sources: Hunter AAF in AT&E, 1993.
GA Geologic Survey, Bulletin 113, 1990.
U.S.G.S. Well Listing, 1996.
City of Savannah Well Listing, 1996.

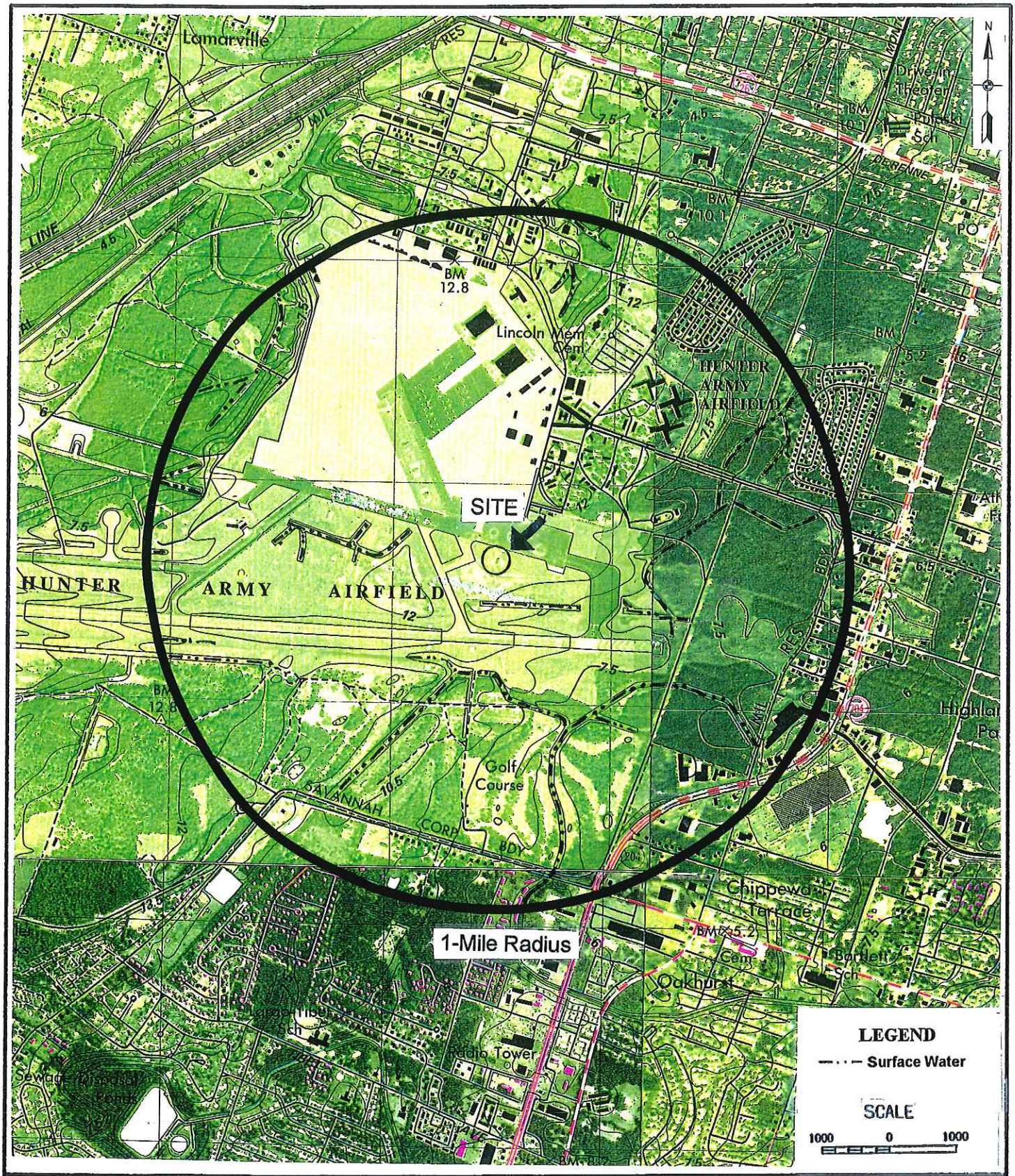
TABLE 6
PUMPHOUSE #6 AREA MONITORING WELL SUMMARY

Location	Screen Interval ft, bgs	Depth to Water TOC	TOC Elevation	Water Level Elevation	Ground Elevation
MW07	6.5 - 16.5	7.36	38.17	30.81	38.4
MW08	3.0 - 13.0	5.84	37.60	31.76	37.7
MW09	5.0 - 15.0	7.22	38.97	31.75	39.1

Date of static gauging - 12/9/96
TOC - Top of Casing

TABLE 7
PROPOSED SIP IMPLEMENTATION SCHEDULE

Task No.	Task Description	Estimated Start Date	Estimated Completion Date	Calendar Days After NTP
1	USACE Approval of Final CAP Part A	March 6, 1997	April 28, 1997	0
2	Mobilize for Phase II	April 28, 1997	May 2, 1997	5
3	Complete Phase II SI	May 5, 1997	May 28, 1997	30
4	Prepare Draft CAP Part B	May 29, 1997	July 28, 1997	90
5	Review Draft CAP Part B	July 29, 1997	Aug. 28, 1997	120
6	Prepare Final CAP Part B	Aug. 29, 1997	Sept. 12, 1997	134
7	Submit Final CAP Part B	Sept. 15, 1997	Sept. 15, 1997	137



U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

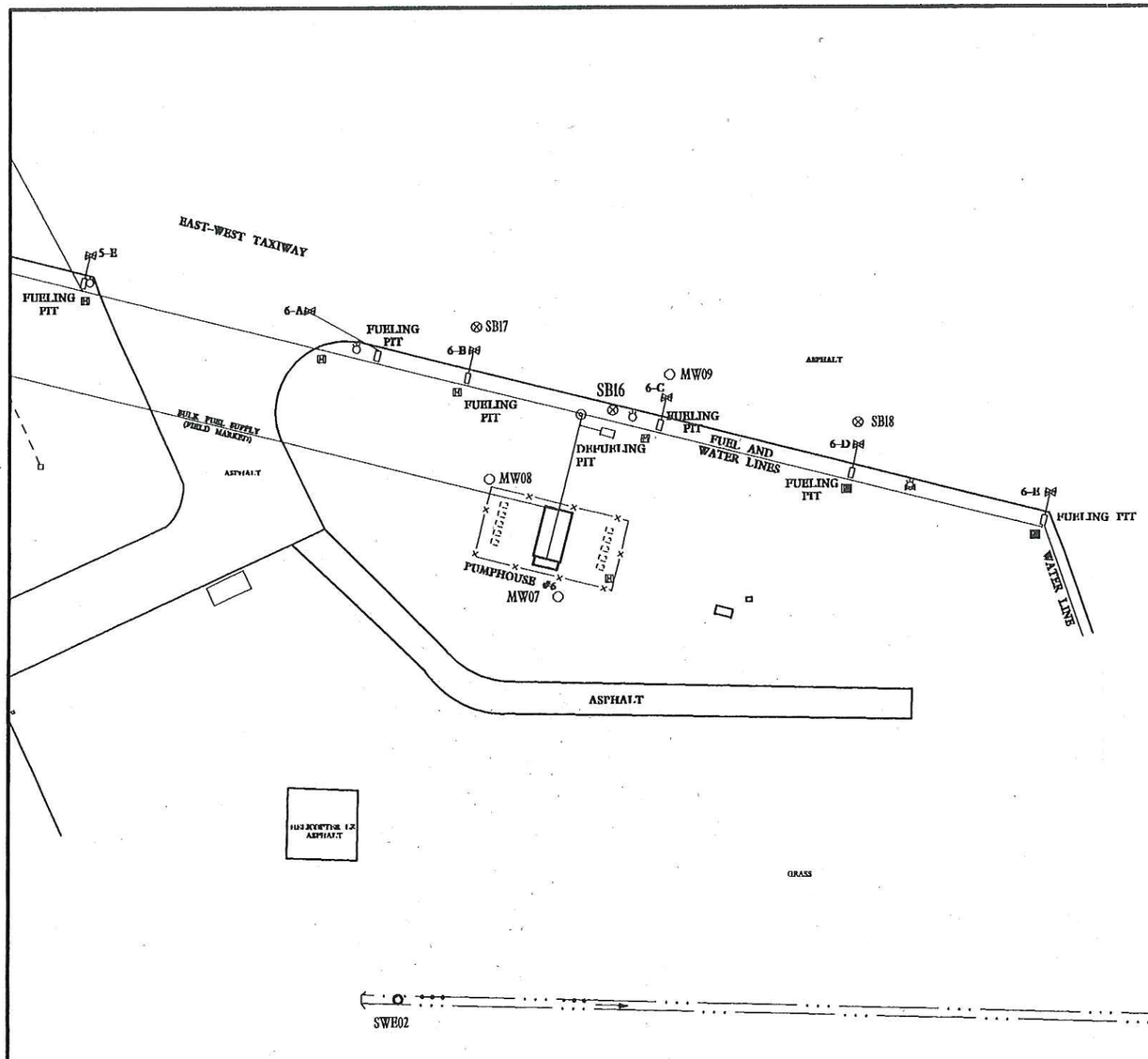
SITE LOCATION and SURFACE WATER WITHIN A 1-MILE RADIUS

PUMPHOUSE #6
HUNTER army AIRFIELD, SAVANNAH GEORGIA

FIGURE 1

METCALF & EDDY

SCALE:	DATE:	APPROVED:	



N

LEGEND:

○ SWE02	SURFACE WATER/ SEDIMENT LOCATION
○ MW07	MONITORING WELL LOCATION
⊗ SB16	SOIL BORING LOCATION
— · · · —	DITCH
⟶	FLOW DIRECTION
▭	PRESENT UST LOCATION
-X—X-	FENCE
	FIRE HYDRANT
⋈	FUEL VALVE
□	DROP INLET
Ⓜ ▣	ELECTRIC MANHOLE/JUNCTION BOX

SCALE

200 100 0 200 400FT

FIGURE 2

U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PUMPHOUSE #6 SAMPLING LOCATIONS AND UTILITIES

HUNTER army AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC. p:\proj\ 19457HAF\C\CHHAF010.DGN DATED: 04-02-97 BY: M.A. FRANK

EAST-WEST TAXIWAY

5-E

FUELING PIT

6-A

FUELING PIT

6-B

FUELING PIT

MW09

3.6J	66
380.6J	147.26J

6-C

FUELING PIT

DEFUELING PIT

FUEL AND WATER LINES

6-D

FUELING PIT

6-E

FUELING PIT

WATER LINE

ASPHALT

BULK FUEL SUPPLY (FIELD MARKED)

ASPHALT

GRASS

MW08

<1.1	20
576	61

8070

PUMPHOUSE #6

MW07

1.3	1.8
22.6	24.2J

8071

GRASS

8078

ASPHALT

GRASS

HELICOPTER LZ ASPHALT

N

SCALE

100 50 0 100 200FT

LEGEND:

○ MW07 MONITORING WELL LOCATION

BENZENE	NAPHTHALENE
TOTAL BTEX	TOTAL PAHS

UNITS IN ug/L

J - ESTIMATED

PRESENT UST LOCATION

FENCE

FIRE HYDRANT

FUEL VALVE

DROP INLET

M JB ELECTRIC MANHOLE/JUNCTION BOX

DATE SAMPLED 12-9-96 THROUGH 12-10-96

FIGURE 3

U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PUMPHOUSE #6
PETROLEUM HYDROCARBONS DETECTED IN GROUNDWATER SAMPLES

HUNTER army AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC. p:\proj\ 19457HAF\C\CHHAF008.DGN DATED: 04-02-97 BY: M.A. FRANK

EAST-WEST TAXIWAY

5-E

FUELING PIT

6-A

FUELING PIT

SB17 | BDL | BDL | 8' | 0.103 | BDL

6-B

FUELING PIT

<4.9 | 16J | 10' | 123.6 | 28J

MW09 | BDL | BDL | 10' | 0.198 | BDL

ASPHALT

6-C

SB16

FUELING PIT

FUEL AND WATER LINES

SB18 | BDL | BDL | 3' | 0.027 | BDL

6-D

FUELING PIT

6-E

FUELING PIT

WATER LINE

BULK FUEL SUPPLY (FIELD MARKED)

ASPHALT

BDL | BDL | 10' | 0.037 | BDL

MW08

DEFUELING PIT

GRASS

8070

PUMPHOUSE #6

MW07 | BDL | BDL | BDL | BDL

8078

8071

GRASS

ASPHALT

GRASS

HELICOPTER LZ ASPHALT

N

LEGEND:

- ○ MW07 MONITORING WELL LOCATION
- ⊗ SB16 SOIL BORING LOCATION

BENZENE	2-METHYLNAPHTHALENE	SAMPLE DEPTH
TOTAL BTEX	TOTAL PAH	

UNITS IN mg/kg

J - ESTIMATED

BDL - BELOW DETECTION LEVEL

- PRESENT UST LOCATION
- FENCE
- FIRE HYDRANT
- FUEL VALVE
- DROP INLET
- ELECTRIC MANHOLE/JUNCTION BOX

NOTE:
ALL VALUES PRESENTED ON THIS MAP REPRESENT DEPTHS WHERE THE MOST ELEVATED CONCENTRATIONS WERE ENCOUNTERED.

SCALE

100 50 0 100 200FT

FIGURE 4

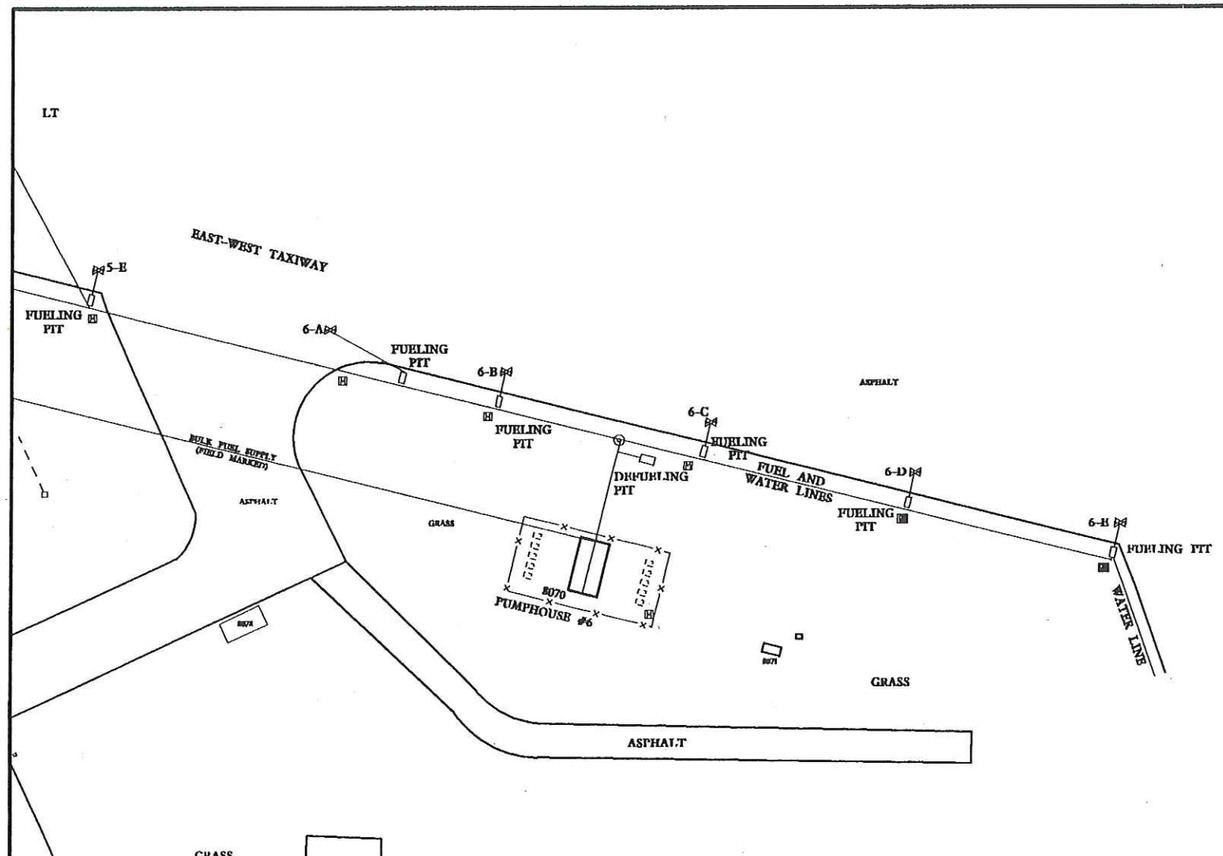
U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

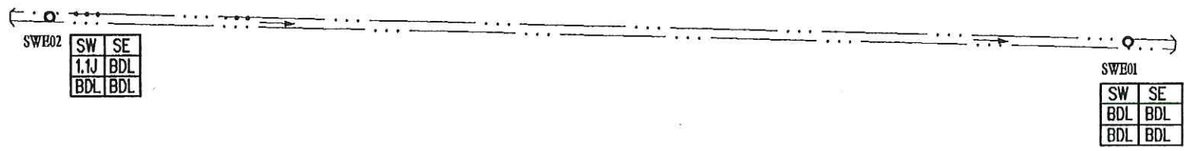
PUMPHOUSE #6
PETROLEUM HYDROCARBONS DETECTED IN SOIL SAMPLES

HUNTER army AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC. p:\proj\ 19457HAF\C\CHHAF006.DGN DATED: 04-02-97 BY: M.A. FRANK





SCALE

200 100 0 200 400FT

N

LEGEND:

o SWE02 SURFACE WATER/ SEDIMENT LOCATION

SURFACE WATER	SEDIMENT
TOTAL BTEX	TOTAL BTEX
TOTAL PAHS	TOTAL PAHS

BDL - BELOW DETECTION LIMIT
J - ESTIMATED
SURFACE WATER UNITS IN ug/L
SEDIMENT UNITS IN mg/kg

PRESENT UST LOCATION
FENCE
FIRE HYDRANT
FUEL VALVE
DROP INLET
ELECTRIC MANHOLE/JUNCTION BOX

DATE SAMPLED: 12-10-96

FIGURE 5

U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PUMPHOUSE #6

PETROLEUM HYDROCARBONS DETECTED IN SURFACE WATER AND SEDIMENT SAMPLES

HUNTER ARMY AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC: p:\proj\ 19457HAF\C\CHHAF009.DGN DATED: 04-02-97 BY: M.A. FRANK

EAST-WEST TAXIWAY

N

ASPHALT

MW09
31.75

ASPHALT

MW08
31.76

GRASS

31

8070

PUMPHOUSE #6

MW07
30.81

8078

8071

GRASS

ASPHALT

GRASS

HELICOPTER LZ
ASPHALT

GRASS

LEGEND:

○ MW07	MONITORING WELL LOCATION
▭	PRESENT UST LOCATION
~26~	POTENTIOMETRIC CONTOUR (ft.)
□	DROP INLET
→	FLOW DIRECTION

LEVELS MEASURED 12-9-96

SCALE

100 50 0 100 200FT

FIGURE 6

U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PUMPHOUSE #6 POTENTIOMETRIC SURFACE

HUNTER army AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC. p:\proj\ 19457HAF\C\CHHAF014.DGN DATED: 04-02-97 BY: M.A. FRANK

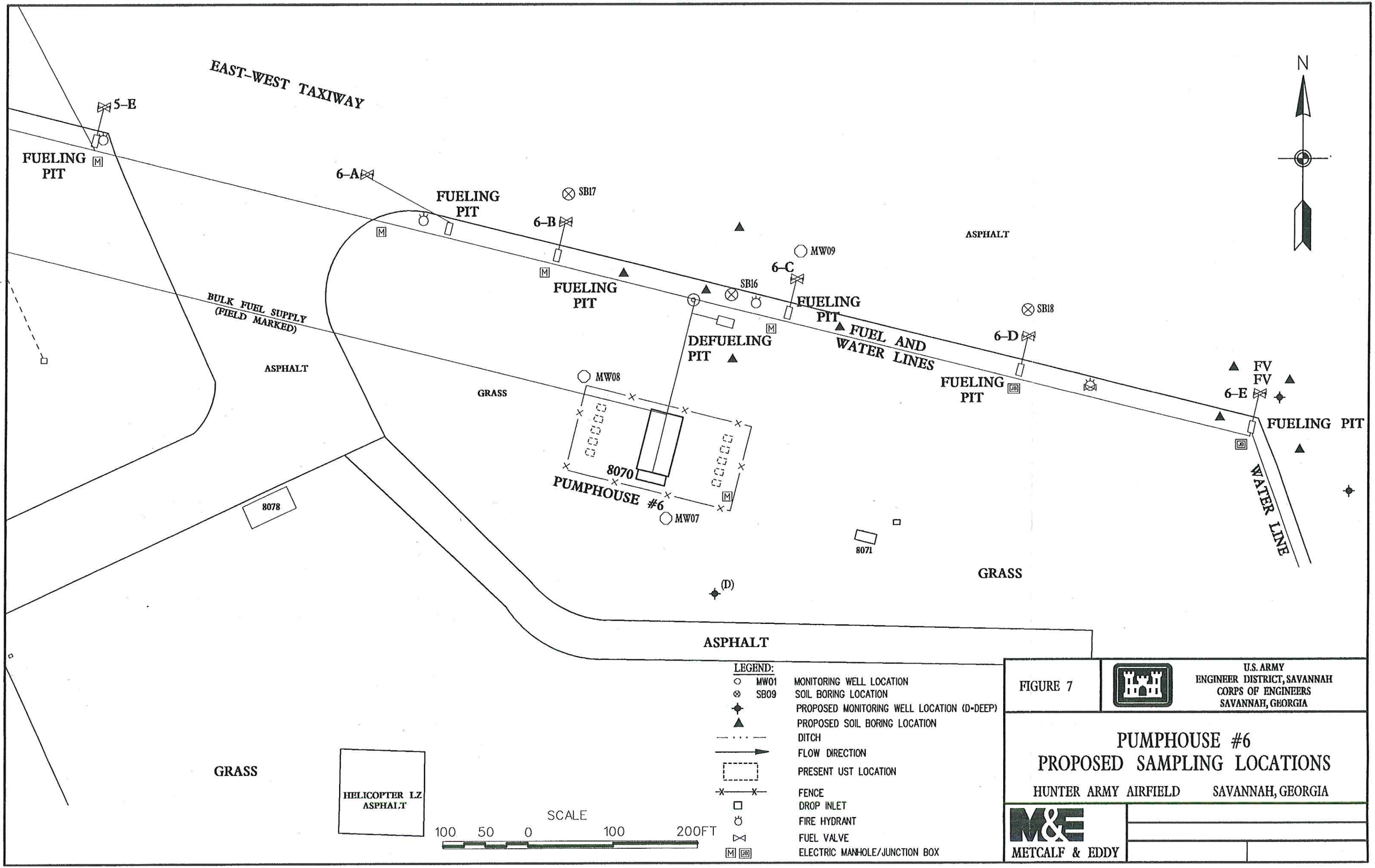


FIGURE 7

U.S. ARMY
ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PUMPHOUSE #6
PROPOSED SAMPLING LOCATIONS

HUNTER army AIRFIELD SAVANNAH, GEORGIA

METCALF & EDDY

LOC: p:\proj\ 19457HAF\C\CHHAF020.DGN DATED: 04-09-97 BY: M.A. FRANK

APPENDIX A

PASSIVE SOIL VAPOR SURVEY

DESCRIPTION OF PASSIVE SOIL VAPOR MODULES AND MODULE INSTALLATION AND RETRIEVAL PROCESSES

Each soil vapor module consists of four separate GORE-SORBER® Passive Sorbent Collection Devices (sorbers). A sorber is 40 millimeters (mm) long, with a 3 mm inside diameter (ID), and contains 40 milligrams (mg) of granular adsorbent material. Two Tenax-TA® resin and two carbonaceous resin sorbers are sheathed in the bottom of a 4-foot length of vapor-permeable insertion and retrieval cord. Both the retrieval cord and sorbent container are constructed solely of inert, hydrophobic, microporous GORE-TEX® expanded polytetrafluoroethylene.

The hydrophobic nature of the material means that liquid water will be excluded yet they do not retard vapor transfer, thus allowing VOC and SVOC vapors to freely penetrate the module and collect on the adsorbent material. This ability to protect the sorbent media from contact with ground and soil pore water without retarding soil vapor adsorption facilitates the use of the modules in saturated and very low permeability, poorly drained soils.

Installation of the modules was performed by utilizing a slam bar and an electric rotary hammer-drill to create a 5/8-inch-diameter pilot hole for the deployment of the modules to an average depth of 4 feet below grade. Modules were inserted into the completed boreholes using a stainless steel insertion rod after the pilot hole was completed. The top of each cord was fastened to a cork, which was tamped flush with the ground surface to assist in retrieval of the module, and to seal the annulus of the boring.

The modules were left in place for the recommended 3-week screening period. Module retrieval required field personnel to remove the cork, grasp the retrieval cord and manually pull the module from each location. Corks were separated from the module and discarded. The exposed modules were resealed in their respective designated shipping vials and placed immediately on ice in coolers, along with trip blanks and water temperature control blanks (provided by GORE). Coolers were returned along with the chain-of-custody (COC) form to GORE's laboratory in Elkton, Maryland via overnight carrier. Sorber analysis consists of thermal desorption, gas chromatography, and mass selective detection. The results of the Screening Survey are summarized in a brief report which includes the chain of custody, laboratory analytical data summary tables, and color contour maps. Excerpts from Gore's report and the petroleum hydrocarbons contour map are provided in this Appendix.

W. L. GORE & ASSOCIATES, INC.
101 LEWISVILLE ROAD • P.O. BOX 1100 • ELKTON, MARYLAND 21922-1100 PHONE: 410/392-3300
FAX: 410/996-3325 • TELEX 467637 GORE FB ELKT
ENVIRONMENTAL PRODUCTS GROUP

GORE-SORBER℠ Screening Survey
Final Report

Pumphouses 1, 2 & 6, Hunter Army Airfield
Savannah, GA

November 19, 1996

Prepared For:
Metcalf & Eddy, Inc.
1201 Peachtree Street, NE
400 Colony Square, Suite 1101
Atlanta, GA 30361

W.L. Gore & Associates, Inc.
Written/Submitted by

Jay W. Hodny, M.S.
Associate

W.L. Gore & Associates, Inc.
Reviewed/Approved by

Mark J. Wrigley, P.G.
Associate

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GORE-SORBER[sm] Screening Survey
Final Report

REPORT DATE: November 19, 1996 **AUTHOR:** JWH

SITE INFORMATION

Site Reference: Pumphouses 1, 2, & 6, Hunter Army Airfield, Savannah, GA
Customer Purchase Order Number: 155834
Customer Project Number: Job #019457-4102
Gore Production Order Number: 069711 **Gore Site Code:** TP

FIELD PROCEDURES

 # Modules shipped: 684
 # Modules Installed: 651
 # Modules Lost in Field: 6
 # Unused Modules Returned: 4
Exposure Time: 21, 22 **[days]**

#Modules Retrieved: 645
#Trip Blanks Returned: 29

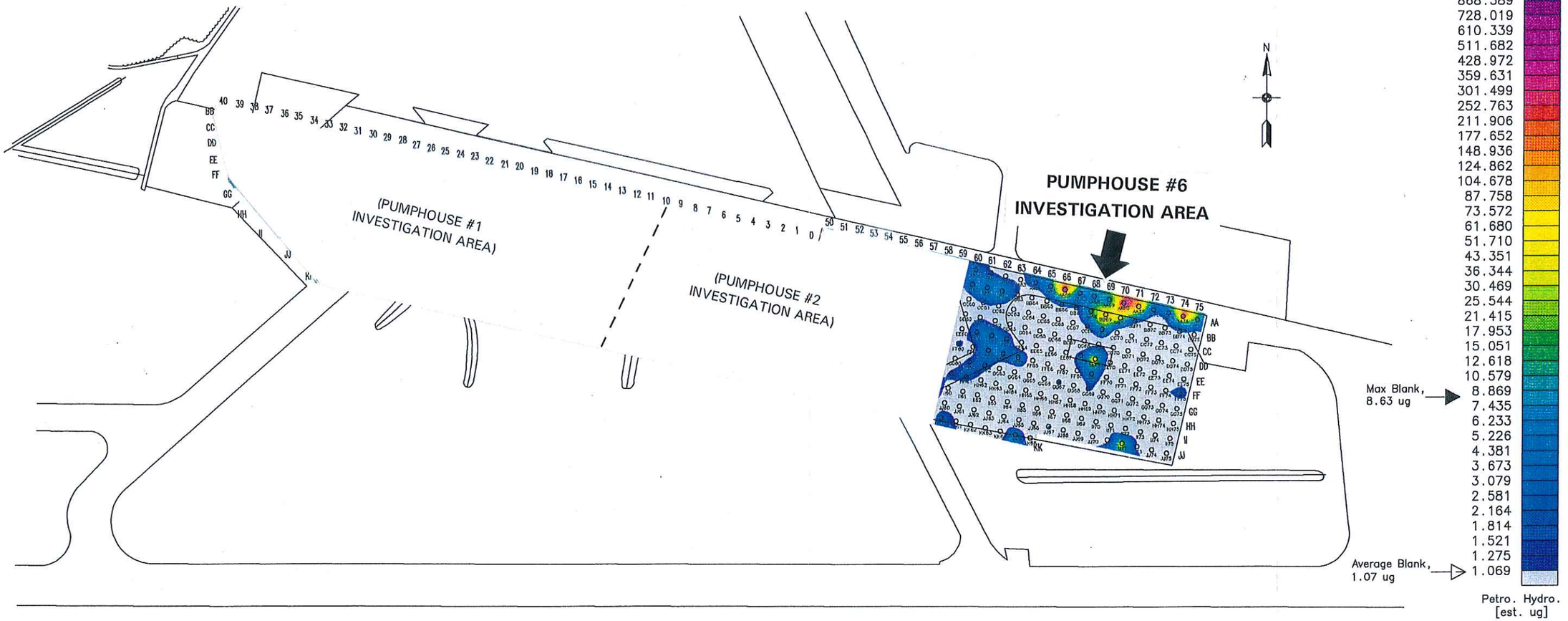
Field work performed by: Metcalf & Eddy

Coolers/Modules Received by: CJF (Gore), October 16,17, & 18, 1996 @ 12:00pm
Chain of Custody Form attached: √
Chain of Custody discrepancies: Page 1 of the COCs for Coolers #8 and #9 appeared to have been switched (i.e., Cooler #8 and #9 COCs are mismatched to the Installation/Retrieval logs for these two coolers).
Comments: Temperature of the water control blanks for seven coolers, exceeded the generally accepted criteria for preservation of environmental samples, 4.0±2.0 °C.

GORE-SORBER[sm] Screening Survey
Final Report

FIELD PROCEDURES SUMMARY

Cooler #	# Modules Shipped	# Installed	# Trip Blanks	# Retrieved	# Lost	# Returned Unused	Installation Dates	Retrieval Dates	Water Control Blank Temp °C
1	68	65	3	64	1	0	9/25/96	10/17/96	6.8
2	68	65	3	62	3	0	9/25/96	10/17/96	5.7
3	68	65	3	65	0	0	9/25/96	10/16,17/96	6.1
4	68	61	3	60	1	4	9/25/96	10/16,17/96	3.7
5	69	69	0	69	0	0	9/24/96	10/16/96	7.3
6	68	65	3	65	0	0	9/24/96	10/16/96	7.0
7	68	65	3	65	0	0	9/24/96	10/15,16/96	10.1
8	69	65	3	65	0	0	9/23/96	10/15/96	7.0
9	69	66	4	65	1	0	9/23/96	10/15/96	8.5
10	69	65	4	65	0	0	9/24,25/96	10/16/97	2.9



75 O AA 126414
GORE-SORBER Screening Module Location

Scale 1:6000
250 0 250 500
(feet)

NOTE: CONTOUR PLOT REPRESENTS MASS OF COMPOUND DESORBED FROM GORE-SORBER SCREENING MODULES, IDENTIFIED AND QUANTIFIED BY GAS CHROMATOGRAPH MASS SELECTIVE DETECTION.

ORIG. CAD: HUNTER4.DWG

GORE-SORBER SCREENING SURVEY

W.L. GORE & ASSOCIATES, INC.
P.O. BOX 1100
101 LEWISVILLE ROAD
ELKTON, MD 21922-1100
(410) 392-3300

PUMPHOUSES #1, #2 AND #6, HUNTER ARMY AIRFIELD, SAVANNAH, GA

PETROLEUM HYDROCARBONS

METCALF & EDDY, INC., ATLANTA, GA

REV. #: 0
REV. DATE:

DATE DRAWN:	1 NOV 1996	GRID FILE:	B101.GRD
DRAWN BY:	JH	PLOT FILE:	B1C.PLT
DATE GRIDDED:	11 nov 1996	PROJECT NUMBER:	069711
GRIDDED BY:	JH	SITE CODE:	TP

GORE-SORBER[sm] Screening Survey Final Report

ANALYTICAL PROCEDURES

W.L. Gore & Associates' Screening Module Laboratory operates under the guidelines of its Quality Assurance Manual, Operating Procedures and Methods. The quality assurance program is consistent with Good Laboratory Practices (GLP) and ISO Guide 25, "General Requirements for the Competence of Calibration and Testing Laboratories", third edition, 1990. The Laboratory is audited regularly by a quality system design, development and auditing company.

Instrumentation consists of Hewlett-Packard 5890 gas chromatographs and 5971 mass selective detectors, as well as Perkin-Elmer ATD 400 automated thermal desorption units. Sample preparation simply involves cutting the tip off the bottom of the sample module and transferring one or more exposed sorbent containers (sorbers, each containing 40mg of a suitable granular adsorbent) to a thermal desorption tube for analysis. Sorbers remain clean and protected from dirt, soil, and ground water by the insertion/retrieval cord, and require no further sample preparation.

Screening Method Quality Assurance:

Before each run sequence, two instrument blanks, a sorber containing 5µg BFB (Bromofluorobenzene), and a method blank are analyzed. The BFB mass spectra must meet the criteria set forth in our methods before samples can be analyzed. A sorber containing BFB is also analyzed after every 30 samples and/or trip blanks, as is a method blank. Standards containing the selected target compounds at three calibration levels of 5, 20, and 50µg are analyzed at the beginning of each run. The criterion for each target compound is less than 35% RSD (relative standard deviation). If this criterion is not met for any target compound, the analyst has the option of generating second- or third-order standard curves, as appropriate. A second-source reference standard, at a level of 20µg per target compound, is analyzed after every ten samples and/or trip blanks, and at the end of the run sequence. Positive identification of target compounds is determined by the presence of the target ion and at least two secondary ions, retention time versus reference standard, and the analyst's judgment.

NOTE: All data have been archived. Any replicate sorbers not used in the initial analysis will be discarded fifteen (15) days from the date of analysis.

Laboratory analysis: thermal desorption, gas chromatography, mass selective detection
Quality Assurance Level: 2 (ANA-4/GS3)
Instrument ID: # 2, 3 **Chemist:** JW/WW **Data Subdirectory:** 069711
Compounds/mixtures requested: Expanded VOCs and SVOCs Target List (A4)
Deviations from Standard Method: For analytical run 069711E, MtBE, Octane, and Pentadecane 50 µg standard dropped due to non-linearity.
Comments: Soil vapor analytes and abbreviations are tabulated in the Data Table Key (page 7).

GORE-SORBER[sm] Screening Survey Final Report

DATA TABULATION

 # CONTOUR MAPS ENCLOSED: Four (4) B-size color contour maps
LIST OF MAPS ENCLOSED:

- Benzene, Toluene, Ethylbenzene, m,p,o-Xylenes (BTEX)
- Undecane, Tridecane, & Pentadecane (C11, C13, & C15)
- Combined PAHs (PAHs)
- Petroleum Hydrocarbons (Petro. Hydro.)

Compound Name	Method Detection Limit [µg]	Low Map (gray) Limit [µg]	Highest Detect Level [µg]	Upper Map (purple) Limit [µg]
BTEX	0.02	0.02	719.64	719.64
C11, C13, & C15	0.02	0.02	36.75	36.75
PAHs	0.03	0.03	17.94	17.94
Petro. Hydro.	*	1.07	1,755.96	1,755.96

* - No method detection limit is available.

NOTE: All data values presented in Appendix A represent masses of compound(s) desorbed from the GORE-SORBER Screening Modules received and analyzed by W.L. Gore, as identified in the Chain of Custody (Appendix A). The measurement traceability and instrument performance are reproducible and accurate for the measurement process documented. Semi-quantitation of the compound mass is based on either a single-level (QA Level 1) or three-level (QA Level 2) standard calibration.

Comments:

- At the request of Metcalf & Eddy, the minimum (gray) contour level, for each mapped analyte or group of analytes, was set at the method detection limit. No method detection limit exists for the Petroleum Hydrocarbons data; therefore, the gray level was set at the average blank level for these data. The maximum contour level was set at the maximum value observed. The maximum blank levels and average blank levels reported were posted on each map along the color scale bar.
- Stacked total ion chromatograms (TIC's) are included in Appendix A. The last three digits of each module number are incorporated into the TIC identification (e.g.: TP370TC.D represents module #127370).
- Elevated levels of several target analytes were reported in trip blank #127386.
- During the analysis of module #126998, the masses of hydrocarbons eluting from the instrumentation caused an instrument detector overload (under maximum dilution conditions). Therefore, values reported in the data table are indicated with a ">" sign. This indicates that the microgram levels were at least this high. Quantification of these compounds is integrated up to a point of confidence in the chromatograms. For mapping

purposes, those values reported with a ">" sign were set equal to that value. For example, with module #126998, toluene was reported as >377.34 µg. Thus, this level was set at 377.34 µg for mapping purposes.

- Modules exhibiting unresolved peak envelopes (UPEs) were tentatively identified by matching the UPE to fluids in Gore's fluids library. Metcalf & Eddy, Inc. were interested in tentative matches indicating fluids in the range of aviation fuel products. A similar tentative fluids match was performed on this dataset, using the same chemist judgment criteria as that reported in the GORE-SORBER Screening Survey Final Report, Stormwater Drainage System, Hunter Army Airfield, Savannah, GA, dated February 12, 1996. The results are summarized in Appendix A, Tentative Fluid Matching Results.

GORE-SORBER[sm] Screening Survey
Final Report

KEY TO DATA TABLE

Pumphouses 1, 2 & 6, Hunter Army Airfield, Savannah, GA

UNITS

µg	micrograms (per sorber), reported for compounds using external standards.
MDL	method detection limit

ANALYTES

BTEX	combined masses of benzene, toluene, ethylbenzene and total xylenes (Gasoline Range Aromatics)
C11,C13&C15	combined masses of undecane, tridecane, and pentadecane (C11+C13+C15) (Diesel Range Alkanes)
MTBE	methyl t-butyl ether
t12DCE	trans-1,2-dichloroethene
11DCA	1,1-dichloroethane
c12DCE	cis-1,2-dichloroethene
$CHC1_3$	chloroform
111TCA	1,1,1-trichloroethane
12DCA	1,2-dichloroethane
BENZ	benzene
$CC1_4$	carbon tetrachloride
TCE	trichloroethene
TOL	toluene
OCT	octane
PCE	tetrachloroethene
ClBENZ	chlorobenzene
EtBENZ	ethylbenzene
mpXYL	m-, p-xylene
oXYL	o-xylene
135TMB	1,3,5-trimethylbenzene
124TMB	1,2,4-trimethylbenzene
TMBs	1,2,4- & 1,3,5-trimethylbenzene
14DCB	1,4-dichlorobenzene
UNDEC	undecane
NAPH	naphthalene
TRIDEC	tridecane
2MeNAPH	2-methyl naphthalene
PENTADEC	pentadecane
5 PAHs	naphthalene, 2-methynaphthalene, acenaphthene, acenaphthylene, and fluorene

BLANKS

TBn	unexposed trip blanks, which traveled with the exposed modules
method blankn	method blank, retained at Gore

APPENDIX B

MONITORING WELL SCHEMATICS

GROUND WATER INSTALLATION

PROJECT: Pumphouse 1,2,6 JOB NO. 019457 WELL NO. MW07

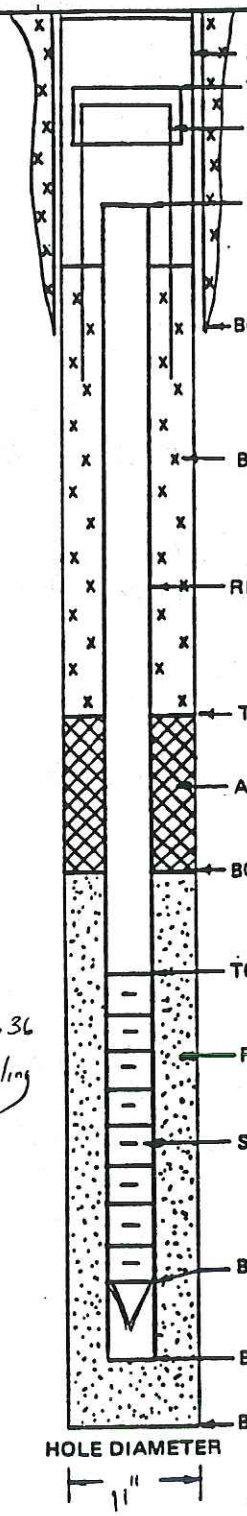
DRILLING CONTRACTOR: PSI COORDINATES:

BEGUN: 11/20/96 FINISHED: 11/20/96 SUPERVISOR: D. Humphries DRILLER: M. Gribble WELL SITE:

WATER LEVEL: 7.36 DEPTH/ELEV. 30.81

REFERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG



Flush mount 8"

▽ 7.36 at sampling

DEPTH IN	ELEV. IN
0	38.4
—	—
0.2	38.17
—	—
3.3	35.1
5.3	33.1
6.5	31.9
16.5	21.9
—	—
18.0	20.4

METHOD DRILLED: 6 1/4" ID HSA

METHOD DEVELOPED: See Develop Log

TIME DEVELOPED:

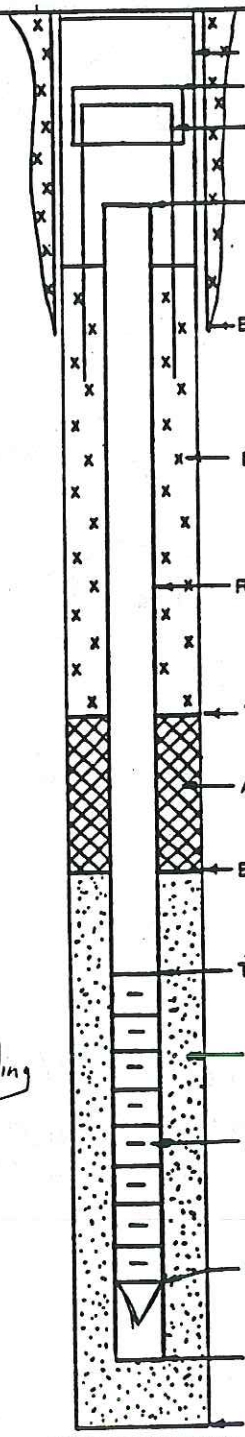
COMMENTS:

M&E Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: Pumphouse 1, 2, 6	JOB NO. 019457	WELL NO. MW08
DRILLING CONTRACTOR: PST	COORDINATES:	
BEGUN: 11/20/96 FINISHED: 11/20/96	SUPERVISOR: D. Humphris DRILLER: M. Gribble	WELL SITE:
WATER LEVEL: 5.84	DEPTH/ELEV.: 31.76	

REFERENCE POINT & ELEVATION:



Flush mount
8"
Grout
Portland
2"
PVC sch 40
bentonite
▽ 5.84 at sampling
Silica Sand
30/45
2" PVC sch 40
0.010 in
slotted

	DEPTH IN	ELEV. IN
GROUND SURFACE	0	37.7
SURFACE CASING / TOP OF PROTECTIVE CASING	—	—
PROTECTIVE CASING / TOP OF RISER CASING	0.1	37.60
BOTTOM OF SURFACE CASING	—	—
BACKFILL / RISER CASING	1.0	36.7
TOP OF SEAL / ANNULAR SEAL	2.0	35.7
BOTTOM OF SEAL	3.0	34.7
TOP OF SCREEN / FILTER MATERIAL / SCREEN	13.0	24.7
BOTTOM OF SCREEN	—	—
BOTTOM OF SUMP / BOTTOM OF HOLE	14.0	23.7

METHOD DRILLED: 6 1/4" ID HSA

METHOD DEVELOPED: See Develop Log

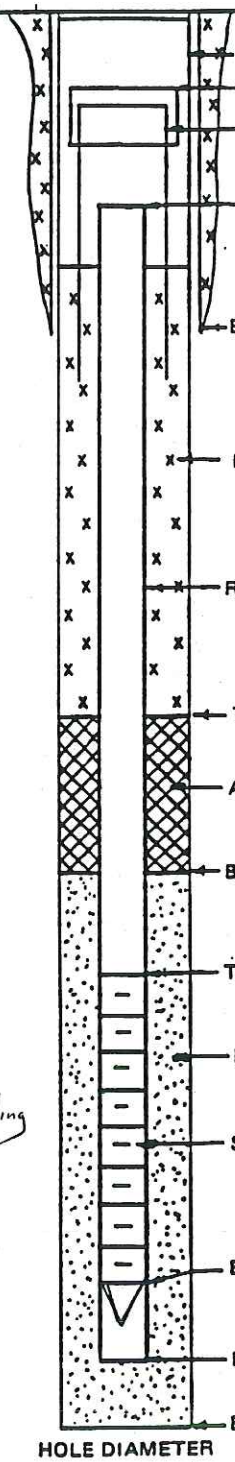
TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION	PROJECT: Pumphouse 1,2,6	JOB NO. 019457	WELL NO. MW09
DRILLING CONTRACTOR: PSI	COORDINATES:		
BEGUN: 11/20/96 FINISHED: 11/20/96	SUPERVISOR: D. Humphris DRILLER: M. Gribble	WELL SITE:	WATER LEVEL: 7.22 DEPTH/ELEV.: 31.75

REFERENCE POINT & ELEVATION:



Flush mount 6"

▽ 7.22 at sampling

	DEPTH IN	ELEV. IN
GROUND SURFACE	0	39.1
SURFACE CASING: DIA.: TYPE:	—	—
TOP OF PROTECTIVE CASING / PROTECTIVE CASING: DIA.: TYPE:	0.1	38.97
TOP OF RISER CASING	—	—
BOTTOM OF SURFACE CASING		
BACKFILL: Quickcrete TYPE: 5000psi		
RISER CASING: DIA.: 2" TYPE: PVC sch 40		
TOP OF SEAL	1.5	37.6
ANNULAR SEAL: TYPE: bentonite		
BOTTOM OF SEAL	3.0	36.1
TOP OF SCREEN	5.0	34.1
FILTER MATERIAL: TYPE: 30/45 Silica Sand		
SCREEN: DIA.: 2" TYPE: PVC sch 40 OPENING WIDTH: 0.010" TYPE: slotted		
BOTTOM OF SCREEN	15.0	24.1
BOTTOM OF SUMP	—	—
BOTTOM OF HOLE	16.0	23.1

GENERALIZED GEOLOGIC LOG

METHOD DRILLED: 6 1/4" ID HSA

METHOD DEVELOPED: See Develop Log

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

APPENDIX C

MONITORING WELL DEVELOPMENT SHEETS

AND PHOTOGRAPHS

MONITORING WELL DEVELOPMENT

M&E Metcalf & Eddy

WELL I.D. NO.: MW07

DATE: 11/25/96

LOGGED BY: D. Humphrey

METHOD OF DEVELOPMENT: 12 V DC Whale Pump

STATIC WATER LEVEL: 7.0' TOC 7.15' bgs

TD = 16.5 8.85' x 6.9 = 61.1 (5 vol)

SAMPLE NO.	TIME 1113	PARAMETERS				PUMPING RATE (gpm)	VOLUME PUMPED (gal)	PHOTO TAKEN	OBSERVATIONS
		TEMP (°F)	pH	COND'Y (umhos)	TURBIDITY (NTU)				
1	1119	80.2	5.21	95.3		1-1.2	2.5		Surge @ 0, 2.5
2	1124	78.5	5.88	89.7			5		Surge @ 5, 7.5
3	1132	77.5	6.13	98.7			10		Surge @ 10
4	1138	77.0	6.27	97.4			15		Surge @ 15
5	1144	77.3	6.30	89.0			20		Surge @ 20
6	1149	76.9	6.30	84.7			25		clearing - sl. gray
7	1154	76.5	6.28	77.3			30		
8	1158	76.0	6.28	79.8			35		clearing
9	1202	75.6	6.30	75.4			40		
10	1210	74.9	6.31	74.4			50		
11	1214	74.6	6.30	73.9			~~55~~		clear
12	1218	74.3	6.32	74.9			60		
13	1226	73.8	6.37	73.7			70	Y	clear

TOTAL DEVELOPMENT TIME: 1:13

TOTAL VOLUME PURGED: 70 Gal

COMMENTS

MONITORING WELL DEVELOPMENT

M&E Metcalf & Eddy

WELL I.D. NO.: MW08

DATE: 11/25/96

LOGGED BY: D. Humphrey

METHOD OF DEVELOPMENT: 12V DC Whale Pump

STATIC WATER LEVEL: 5.6' TOC 5.7' bgs

TD = 13.0 7.3' x 6.9 = 50.4 gal = 5 vol

SAMPLE NO.	TIME 1254	PARAMETERS				PUMPING RATE (gpm)	VOLUME PUMPED (gal)	PHOTO TAKEN	OBSERVATIONS
		TEMP (°F)	pH	COND'Y (umhos)	TURBIDITY (NTU)				
1	1255	73.5	6.43	42.2		1-1.2	2.5		Surge @ 0, 2.5,
2	1259	73.6	5.98	36.6			5		Surge @ 5, 7.5
3	1308	73.6	5.85	37.2			10		Surge @ 10
4	1312	73.5	5.87	37.8			15		Surge @ 15
5	1318	73.5	5.82	34.9			20		Surge @ 20, clearing
6	1327	73.4	5.77	29.2			30		clear, no sediment
7	1335	73.4	5.71	27.2			40		Tapwater clear
8	1337	73.5	5.66	25.3			45		"
9	1340	73.3	5.73	23.7			50		"
10	1344	73.3	5.63	22.9			55	Y	clear - no sediment
11									
12									
13									

TOTAL DEVELOPMENT TIME: 50 min

TOTAL VOLUME PURGED: 55 gal

COMMENTS: Clear.

MONITORING WELL DEVELOPMENT

Metcalf & Eddy

WELL I.D. NO.: MW 09

DATE: 11/25/96

LOGGED BY: D. Humphris

METHOD OF DEVELOPMENT: 12V DC Whale Pump

STATIC WATER LEVEL: 6.8' TOC 6.9' bgs

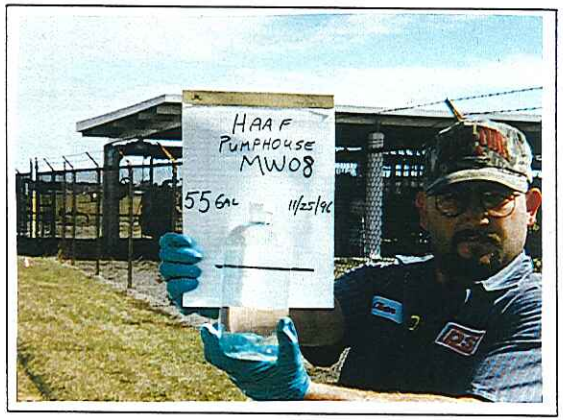
TD = 15.0 8.1' x 6.9 = 55.9 Gal = 5 vol

SAMPLE NO.	TIME 1436	PARAMETERS				PUMPING RATE (gpm)	VOLUME PUMPED (gal)	PHOTO TAKEN	OBSERVATIONS
		TEMP (°F)	pH	COND'Y (umhos)	TURBIDITY (NTU)				
1	1441	79.5	5.60	104.4		1-1.2	2.5		Surge @ 0, 2.5.
2	1445	79.9	5.76	106.1			5.0		Surge @ 5, 7.5
3	1452	79.3	5.77	104.6			10		Surge @ 10
4	1459	79.1	5.77	106.8			15		Surge @ 15 clearing
5	1504	79.0	5.76	106.0			20		Surge @ 20, clearing
6	1510	79.1	5.79	105.7			25		clearing
7	1514	79.1	5.76	103.4			30		clear
8	1533	77.3	5.79	97.2			40		- 1515 Stop 5 min clear
9	1539	79.0	5.83	95.9			50		clear
10	1546	78.9	5.75	94.5			60	Y	clear
11									
12									
13									
14									
15									

TOTAL DEVELOPMENT TIME: 1:10

TOTAL VOLUME PURGED: 60 Gal.

COMMENTS



MONITORING WELL DEVELOPMENT PHOTOS

APPENDIX D

ANALYTICAL DATA

* The analytical data presented in this appendix is obtained from the Subcontractor Analytical Laboratory in a direct download from the laboratory LIMS System. The analytical data is loaded into M&E's analytical Database, printed in a specified format, validated and checked for accuracy against the hard copy report submitted by the Subcontractor Lab. M&E maintains the Original Analytical Report as part of the Project Files. A copy of the Original Analytical Report is available on request.

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSES # 6
PRIMARY ANALYTICAL RESULTS FOR GROUNDWATER

CONSTITUENT (Units in ug/l)	SITE	MW07	MW08	MW08	MW09
	SAMPLE ID	HT4-MW07	HT4-MW08	HT4-MW51	HT4-MW09
	DATE	12/09/96	12/09/96	12/09/96	12/10/96
	RESULT TYPE	Primary	Primary	Duplicate	Primary
MTBE		<10	<50	<50	<50
Benzene		1.3	<1.1	<1.1	3.6 J
Ethylbenzene		7.7	46	64	47
Toluene		5.2	<5	<5	<5
Xylene (total)		8.4	530	710	330
		---	---	---	---
Acenaphthene		<1	<2	<2	<5
Acenaphthylene		<1	<2	<2	<5
Benzo(a)pyrene		<0.2	<0.4	<0.4	<1
Benzo(b,k)fluoranthene		<0.2	<0.4	<0.4	<1
Benzo(ghi)perylene		<0.5	<1	<1	<2.6
Chrysene + Benzo(a)anthracene		<0.2	<0.4	<0.4	<1
Fluoranthene		4.9 J	<1	<1	<2.6
Fluorene		2.2 J	<1	<1	0.76 J
Indeno(1,2,3-cd)pyrene + Dibenzo(a,h)anthr		<0.5	<1	<1	<2.6
Naphthalene		1.8	20	20	66
Phenanthrene + Anthracene		11 J	<0.4	<0.4	1.5 J
Pyrene		2.4 J	<1	<1	<2.6
1-Methylnaphthalene		1.9	12	12	26
2-Methylnaphthalene		<1	29	30	53

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

EPA Methods: 8020, 8100 & MTBE RCL 8000MSLS J = Result is Estimated R = Result is Rejected

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
PRIMARY ANALYTICAL RESULTS FOR SOILS

CONSTITUENT (Units in mg/kg)	SITE	MW07	MW07	MW07	MW08	MW08	MW09
	SAMPLE ID	WB0701	WB5601	WB0702	WB0801	WB0802	WB0901
	DATE	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96
	DEPTH (ft)	11.00	11.00	16.00	10.00	15.00	10.00
	RESULT TYPE	Primary	Duplicate	Primary	Primary	Primary	Primary
MTBE		<0.061	<0.061	<0.064	<0.061	<0.064	<0.061
Benzene		<0.0061	<0.0061	<0.0064	<0.0061	<0.0064	<0.0061
Ethylbenzene		<0.0061	<0.0061	<0.0064	<0.0061	<0.0064	0.022
Toluene		<0.0061	<0.0061	<0.0064	0.017	<0.0064	0.0069
Xylene (total)		<0.0061	<0.0061	<0.0064	0.020	0.025	0.17
		---	---	---	---	---	---
Acenaphthene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Acenaphthylene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Benzo(a)pyrene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Benzo(b,k)fluoranthene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Benzo(ghi)perylene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Chrysene + Benzo(a)anthracene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Fluoranthene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Fluorene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthr		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Naphthalene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Phenanthrene + Anthracene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
Pyrene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
1-Methylnaphthalene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
2-Methylnaphthalene		<0.40	<0.40	<0.42	<0.40	<0.40	<0.40
		---	---	---	---	---	---
GRO		<0.3	<0.3	<0.32	<0.3	<0.3	1.5 J
DRO		5.7	5.2	<4.2	4.7	<4	8.5

Values represent total concentrations unless noted < =Not detected at indicated reporting limit ---=Not analyzed

EPA METHODS:8020,8100,8015M,8100M. For RCL 8000LSLS J = RESULT IS ESTIMATED. R = RESULT IS REJECTED.

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
PRIMARY ANALYTICAL RESULTS FOR SOILS

CONSTITUENT (Units in mg/kg)	SITE	MW09	SB16	SB16	SB16	SB17	SB17
	SAMPLE ID	WB0902	SB1601	SB5301	SB1602	SB1701	SB1702
	DATE	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96
	DEPTH (ft)	15.00	6.00	6.00	10.00	6.00	8.00
	RESULT TYPE	Primary	Primary	Duplicate	Primary	Primary	Primary
MTBE		<0.061	<5.7	<5.7	<61	<0.054	<0.058
Benzene		<0.0061	<0.57	<0.57	<6.1	<0.0054	<0.0058
Ethylbenzene		<0.0061	2.1	1.4	39	<0.0054	0.056
Toluene		<0.0061	<0.57	<0.57	8.6	<0.0054	0.0077
Xylene (total)		0.012	3.1	1.1	76	<0.0054	0.040
		---	---	---	---	---	---
Acenaphthene		<0.40	<30	<30	<8.1	<0.36	<0.38
Acenaphthylene		<0.40	<30	<30	<8.1	<0.36	<0.38
Benzo(a)pyrene		<0.40	<30	<30	<8.1	<0.36	<0.38
Benzo(b,k)fluoranthene		<0.40	<30	<30	<8.1	<0.36	<0.38
Benzo(ghi)perylene		<0.40	<30	<30	<8.1	<0.36	<0.38
Chrysene + Benzo(a)anthracene		<0.40	<30	<30	<8.1	<0.36	<0.38
Fluoranthene		<0.40	<30	<30	<8.1	<0.36	<0.38
Fluorene		<0.40	<30	<30	<8.1	<0.36	<0.38
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthr		<0.40	<30	<30	<8.1	<0.36	<0.38
Naphthalene		<0.40	<30	<30	<8.1	<0.36	<0.38
Phenanthrene + Anthracene		<0.40	<30	<30	<8.1	<0.36	<0.38
Pyrene		<0.40	<30	<30	<8.1	<0.36	<0.38
1-Methylnaphthalene		<0.40	<30	<30	12 J	<0.36	<0.38
2-Methylnaphthalene		<0.40	<30	<30	16 J	<0.36	<0.38
		---	---	---	---	---	---
GRO		<0.3	95 J	80 J	1700 J	<0.28	1.6
DRO		4.7	4800 J	4300 J	2500 J	6.9	18

Values represent total concentrations unless noted < =Not detected at indicated reporting limit ---=Not analyzed

EPA METHODS:8020,8100,8015M,8100M. For RCL 8000LSLS J = RESULT IS ESTIMATED. R = RESULT IS REJECTED.

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
PRIMARY ANALYTICAL RESULTS FOR SOILS

CONSTITUENT (Units in mg/kg)	SITE	SB18	SB18
	SAMPLE ID	SB1801	SB1802
	DATE	11/20/96	11/20/96
	DEPTH (ft)	3.00	7.00
	RESULT TYPE	Primary	Primary
MTBE		<0.056	<0.058
Benzene		<0.0056	<0.0058
Ethylbenzene		<0.0056	<0.0058
Toluene		0.0086	<0.0058
Xylene (total)		0.019	<0.0058
		---	---
Acenaphthene		<0.38	<0.38
Acenaphthylene		<0.38	<0.38
Benzo(a)pyrene		<0.38	<0.38
Benzo(b,k)fluoranthene		<0.38	<0.38
Benzo(ghi)perylene		<0.38	<0.38
Chrysene + Benzo(a)anthracene		<0.38	<0.38
Fluoranthene		<0.38	<0.38
Fluorene		<0.38	<0.38
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthr		<0.38	<0.38
Naphthalene		<0.38	<0.38
Phenanthrene + Anthracene		<0.38	<0.38
Pyrene		<0.38	<0.38
1-Methylnaphthalene		<0.38	<0.38
2-Methylnaphthalene		<0.38	<0.38
		---	---
GRO		<0.28	<0.3
DRO		24	<3.8

Values represent total concentrations unless noted < =Not detected at indicated reporting limit ---=Not analyzed

EPA METHODS:8020,8100,8015M,8100M. For RCL 8000LSLS J = RESULT IS ESTIMATED. R = RESULT IS REJECTED.

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSES # 6
PRIMARY ANALYTICAL RESULTS FOR SURFACE WATER

CONSTITUENT (Units in ug/l)	SITE	SWE01	SWE02
	SAMPLE ID	HT4-SW01	HT4-SW02
	DATE	12/10/96	12/10/96
	RESULT TYPE	Primary	Primary
MTBE		<10	<10
Benzene		<1	<1
Ethylbenzene		<1	<1
Toluene		<1	<1
Xylene (total)		<2	1.1 J
		---	---
Acenaphthene		<1	<1
Acenaphthylene		<1	<1
Benzo(a)pyrene		<0.2	<0.2
Benzo(b,k)fluoranthene		<0.2	<0.2
Benzo(ghi)perylene		<0.5	<0.5
Chrysene + Benzo(a)anthracene		<0.2	<0.2
Fluoranthene		<0.5	<0.5
Fluorene		<0.5	<0.5
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthr		<0.5	<0.5
Naphthalene		<1	<1
Phenanthrene + Anthracene		<0.2	<0.2
Pyrene		<0.5	<0.5
1-Methylnaphthalene		<1	<1
2-Methylnaphthalene		<1	<1

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

EPA Methods: 8020, 8100 & MTBE RCL 8000MSLS J = Result is Estimated R = Result is Rejected

HUNTER ARMY AIRFIELD
CAP-A PUMPHOUSE # 6
PRIMARY ANALYTICAL RESULTS FOR SEDIMENTS

CONSTITUENT (Units in mg/kg)	SITE	SWE01	SWE02
	SAMPLE ID	HT4-SE01	HT4-SE02
	DATE	12/10/96	12/10/96
	DEPTH (ft)	0.00	0.00
	RESULT TYPE	Primary	Primary
MTBE		<0.076	<0.072
Benzene		<0.0076	<0.0072
Ethylbenzene		<0.0076	<0.0072
Toluene		<0.0076	<0.0072
Xylene (total)		<0.0076	<0.0072
		---	---
Acenaphthene		<0.50	<0.48
Acenaphthylene		<0.50	<0.48
Benzo(a)pyrene		<0.50	<0.48
Benzo(b,k)fluoranthene		<0.50	<0.48
Benzo(ghi)perylene		<0.50	<0.48
Chrysene + Benzo(a)anthracene		<0.50	<0.48
Fluoranthene		<0.50	<0.48
Fluorene		<0.50	<0.48
Indeno(1,2,3-cd)pyrene + Dibenzo(a,h)anthr		<0.50	<0.48
Naphthalene		<0.50	<0.48
Phenanthrene + Anthracene		<0.50	<0.48
Pyrene		<0.50	<0.48
1-Methylnaphthalene		<0.50	<0.48
2-Methylnaphthalene		<0.50	<0.48
		---	---
GRO		<0.28	<0.26
DRO		<15	<14

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

EPA METHODS:8020,8100,8015M,8100M. For RCL 8000LSLS J = RESULT IS ESTIMATED. R = RESULT IS REJECTED.

CHAIN - OF - CUSTOD - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter 4

PROJECT NO: 019457 4102

LABORATORY ID: SLS

SAMPLER(S) NAME: G. Rowell

TASK ORDER NO.

SAMPLE EVENT: Well Sampling

PROGRAM TYPE:

SAMPLER(S) SIGNATURE: G. Rowell

DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F) FIELD
12-10		W	Temp Blank						
	0805	W	HT4-MW09	MW09	PP01		2	N	N
	0830	W	HT4-MW10	MW10 ~~DUP~~ OR	PP01		2	N	N
	0850	W	HT4-MW11	MW11 ~~DUP~~ OR	PP01		2	N	N
↓	0910	W	HT4-MW12	MW12	PP01		2	N	N
12-9	1730	W	HT4-MW51	MW08	PD01		2	N	N
12-10	1030	W	HT4-SW01	SW01	PP01		2	N	N

ANALYTICAL PARAMETERS / METHODS

Method No.	VOCS	SVOC	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO	GRO	
		8310							
		X							
		X							
		X							
		X							
		X							
		X							

Relinquished by: (Signature) G. Rowell

Date/Time: 12-10-96/1810

Received by: SG 87284 Campbell

Date/Time: 12/10/96 1810

Cooler Temperature:

Remarks:

AIRBILL CO.

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER

STORED/SHIPPED IN ICE (Y)/N

M&E Metcalf & Eddy

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT.

METCALF & EDDY Representative C. Hettinger FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS PROJECT # Hunter 4

SAMPLE CUSTODIAN [illegible] 810-87284 TODAY'S DATE 12/10/96

DATE/TIME SAMPLES RECEIVED 12/10/96 6:10

AIRBILL NUMBER ______ NO. OF COOLERS IN SHIPMENT 7

COOLER OPENED: DATE ______ TIME ______

CHAIN OF CUSTODY SEAL INTACT? YES ☑ NO ☐

CHAIN OF CUSTODY PROVIDED? YES ☑ NO ☐

SAMPLE LABELS PRESENT? YES ☑ NO ☐

BOTTLE LABELS CORRESPOND W/COC? YES ☑ NO ☐

TYPE OF COLLANT USED ______

COOLANT CONDITION: MELTED ______ PARTIALLY MELTED/FROZEN ✓

FROZEN ______

COOLER NUMBER # Cooler #4 TEMP INSIDE COOLER 2.8

\# ______

\# ______

\# ______

\# ______

RECORD TEMPERATURE BLANK (1) 2.8 (2) ______ (3) ______

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, INTACT?) [INTACT circled]

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: HT4-MW09, HT4-MW10, HT4-MW11, HT4-MW12, HT4-MW51, HT4-SW01.

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter 4 | TASK ORDER NO.

PROJECT NO: 019457 4102 | SAMPLE EVENT: Well Sampling

LABORATORY ID: SLS | PROGRAM TYPE:

SAMPLER(S) NAME: G. Rowell | SAMPLER(S) SIGNATURE: G. Rowell

	DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANRDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F) FIELD
	12-9	1615	W	HT4-MW05	MW05	PP01		2	N	N
		1630	W	HT4-MW06	MW06	PP01		2	N	N
*		1710	W	HT4-MW07	MW07	PP01		6	N	N
		1730	W	HT4-MW08	MW08	PP01		2	N	N
				Temp Blank						

ANALYTICAL PARAMETER METHODS

Method No.	VOCS	SVOC	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO	GRO	
		8310							
		X							
		X							
		X							
		X							

Relinquished by: (Signature) G. Rowell | Date/Time: 12-10-96/1810 | Received by: SLS 87284 Campbell (A) | Date/Time: 12/10/96 6:10

Cooler Temperature:

Remarks: * - MS/MSD

AIRBILL CO.

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER _____

STORED/SHIPPED IN ICE (Y)/N

SC-87284

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

Metcalf & Eddy

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT

METCALF & EDDY Representative C. Hettinger — FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS — PROJECT # Hunter 4

SAMPLE CUSTODIAN A. Campbell (A) SC-87284 — TODAY'S DATE 12/10/96

DATE/TIME SAMPLES RECEIVED 12/10/96 10:10

AIRBILL NUMBER — NO. OF COOLERS IN SHIPMENT 7

COOLER OPENED: DATE 12/10/96 TIME 10:10

CHAIN OF CUSTODY SEAL INTACT?	YES ☑	NO ☐
CHAIN OF CUSTODY PROVIDED?	YES ☑	NO ☐
SAMPLE LABELS PRESENT?	YES ☑	NO ☐
BOTTLE LABELS CORRESPOND W/COC?	YES ☑	NO ☐

TYPE OF COLLANT USED

COOLANT CONDITION: MELTED — PARTIALLY MELTED/FROZEN ✓

FROZEN

COOLER NUMBER		TEMP INSIDE COOLER
#	Cooler #1	4.4
#		
#		
#		
#		

RECORD TEMPERATURE BLANK (1) 4.6 (2) (3)

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, INTACT?)

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: HTN-MW05, HTN-MW06, HTN-MW07, ~~HTN-MW07AS~~ HTN-MW07MS, HTN-MW07MSD, HTN-MW08.

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter 4 | TASK ORDER NO.

PROJECT NO: 019457 4102 | SAMPLE EVENT: Well Sampling

LABORATORY ID: SLS | PROGRAM TYPE:

SAMPLER(S) NAME: G. Rowell | SAMPLER(S) SIGNATURE: G. Rowell

DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANRDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F) FIELD
12-9	1445	W	HT4-TB01	MW01	BT01		3	Y	N
	1445	W	HT4-EB01	MW01	BR01		3	Y	N
	1445	W	HT4-MW01	MW01	PP01		3	Y	N
	1510	W	HT4-MW02	MW02	PP01		3	Y	N
	1525	W	HT4-MW03	MW03	PP01		3	Y	N
	1600	W	HT4-MW04	MW04	PP01		3	Y	N
	1600	W	HT4-MW50	MW04	PD01		3	Y	N
	1615	W	HT4-MW05	MW05	PP01		3	Y	N
	1630	W	HT4-MW06	MW06	PP01		3	Y	N
*	1710	W	HT4-MW07	MW07	PP01		9 ~~3~~	Y	N
	1730	W	HT4-MW08	MW08	PP01		3	Y	N
	1730	W	HT4-MW51	MW08	PD01		3	Y	N

ANALYTICAL PARAMETERS / METHODS

Method No.	VOCS 8020	SVOC	METALS ICP / Hg CVAA / GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO	GRO	
	X								
	X								
	X								
	X								
	X								
	X								
	X								
	X								
	X								
	X								
	X								
	X								

Relinquished by: (Signature) G. Rowell | Date/Time: 12-10-96/1610 | Received by: 56857841 (F) | Date/Time: 12/10/96 6:10

Cooler Temperature:

Remarks: * MS/MSD

AIRBILL CO.

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER _____

STORED/SHIPPED IN ICE (Y)/N

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter 4 | TASK ORDER NO.

PROJECT NO: 019457 4102 | SAMPLE EVENT: well Sampling

LABORATORY ID: SLS | PROGRAM TYPE:

SAMPLER(S) NAME: G. Rowell | SAMPLER(S) SIGNATURE: G. Rowell

DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANRDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F) FIELD	VOCS	SVOC	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO	GRO	
										Method No.								
		W	TEMP Blank							8020								
12-10	0805	W	HT4-MW09	MW09	PP01		3	Y	N	X								
	0830	W	HT4-MW10	MW10	PP01		3	Y	N	X								
	0850	W	HT4-MW11	MW11	PP01		3	Y	N	X								
	0910	W	HT4-MW12	MW12	PP01		3	Y	N	X								
	1030	W	HT4-SW01	SW01	PP01		3	Y	N	X								
	1100	W	HT4-SW10	SW10	PP01		3	Y	N	X								
	1115	W	HT4-SW09	SW09	PP01		3	Y	N	X								
*	1315	W	HT4-SW02	SW02	PP01		9	Y	~~N~~	X								
	1350	W	HT4-SW08	SW08	PP01		3	Y	~~N~~	X								
	1415	W	HT4-SW07	SW07	PP01		3	Y	N	X								
	1430	W	HT4-SW52	SW06	PD01		3	Y	N	X								

Relinquished by: (Signature) G. Rowell | Date/Time: 12-10-96/1810 | Received by: 56-57284 (F) | Date/Time: 12/10/96 6:10

Cooler Temperature:

Remarks: * MS/MSD

AIRBILL CO.

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER _____

STORED/SHIPPED IN ICE (Y) N

SO 87284

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

Metcalf & Eddy

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT.

METCALF & EDDY Representative C. Hettinger — FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS — PROJECT # Hunter 4

SAMPLE CUSTODIAN A. Campbell (F) SO-87284 — TODAY'S DATE 12/10/96

DATE/TIME SAMPLES RECEIVED 12/10/96 10:10

AIRBILL NUMBER _____ — NO. OF COOLERS IN SHIPMENT 1

COOLER OPENED: DATE 12/10/96 TIME 10:10

CHAIN OF CUSTODY SEAL INTACT? YES ☑ NO ☐

CHAIN OF CUSTODY PROVIDED? YES ☑ NO ☐

SAMPLE LABELS PRESENT? YES ☑ NO ☐

BOTTLE LABELS CORRESPOND W/COC? YES ☑ NO ☐

TYPE OF COLLANT USED Wet Ice

COOLANT CONDITION: MELTED _____ PARTIALLY MELTED/FROZEN ✓

FROZEN 1.5

COOLER NUMBER #	Cooler #6	TEMP INSIDE COOLER
#		
#		
#		
#		

RECORD TEMPERATURE BLANK (1) 1.5 (2) _____ (3) _____

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, (INTACT?))

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: HTH-SW06, HTH-SW04, HTH-SW03, HTH-SW05, HTH-MW09, ~~HTH~~ HTH-MW10, HTH-MW11, HTH-MW12, HTH-SW01, HTH-SW10, HTH-SW09, HTH-SW02, HTH-SW02MS, HTH-SW02MSD, HTH-SW08, HTH-SW07, HTH-SW52, HTH-TB01, HTH-EB01, HTH-MW01, HTH-MW02, HTH-MW03, HTH-MW04, HTH-MW50, HTH-MW05, HTH-MW06, HTH-MW07, HTH-MW07MS, HTH-MW07MSD, HTH-MW08, HTH-MW51.

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter IR

PROJECT NO: 019457-4102

LABORATORY ID: SLS

SAMPLER(S) NAME: Daniel Howard

TASK ORDER NO.

SAMPLE EVENT:

PROGRAM TYPE:

SAMPLER(S) SIGNATURE: Daniel Howard

DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANRDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F)FIELD
11/20/96	0845	S	WB0701	MW07	PP01	9/11	2	N	—
	0845	S	WB5601	MW07	PD1	9/11	2	N	—
	0855	S	WB0702	MW07	PP01	14/16	2	N	—
	1010	S	WB0801	MW08	PP01	8/10	2	N	—
*	1018	S	WB0802	MW08	PP01	13/15	2	N	—
	1418	S	WB0901	MW09	PP01	8/10	2	N	—
	1430	S	WB0902	MW09	PP01	13/15	2	N	—
	1546	S	WB1001	MW10	PP01	8/10	2	N	—
	1554	S	WB1002	MW10	PP01	13/15	2	N	—
↓	—	-	TEMP	Blank	—		1	—	—

ANALYTICAL PARAMETERS/METHODS

VOCs BTEX+MTBE	SVOC PAH	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	T/H/DRO	GRO	
Method No. 8020	8100					8100M	8015M	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	
X	X					X	X	

Relinquished by: (Signature) Daniel Howard Date/Time: 11/20/96/1751 Received by: ~~O.Campbell~~ (A) ~~508855~~ Date/Time: 11/20/96 5:51

Remarks: * MS/MSD M Bassett T613380 11/26/96 0930

Cooler Temperature: 0.6 °C

AIRBILL CO. Hand Delivered by M+E

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER _____

STORED/SHIPPED IN ICE (Y)/N

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

Metcalf & Eddy

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT.

METCALF & EDDY Representative C. Hettinger
FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS
PROJECT # Hunter 4

SAMPLE CUSTODIAN A. Campbell (A) SA-810855
TODAY'S DATE 11/20/96

DATE/TIME SAMPLES RECEIVED 11/20/96 · 5:51

AIRBILL NUMBER
NO. OF COOLERS IN SHIPMENT 2

COOLER OPENED: DATE 11/20/96 TIME 5:51

CHAIN OF CUSTODY SEAL INTACT? YES [✓] NO [ ]
CHAIN OF CUSTODY PROVIDED? YES [✓] NO [ ]
SAMPLE LABELS PRESENT? YES [✓] NO [ ]
BOTTLE LABELS CORRESPOND W/COC? YES [✓] NO [ ]

TYPE OF COLLANT USED Wet Ice

COOLANT CONDITION: MELTED
PARTIALLY MELTED/FROZEN ✓
FROZEN

COOLER NUMBER		TEMP INSIDE COOLER
#	Cooler A	0.6°C
#	Cooler B	1.4°C
#		
#		
#		

RECORD TEMPERATURE BLANK (1) 0.6°C (2) 1.4°C (3)

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, (INTACT?))

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: WB0701, WB5L001, WB0702, WB0801, WB0802, WB0901, WB0902, WB1001, WB1002.

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter IV
PROJECT NO: 019457-4102
LABORATORY ID: SLS
SAMPLER(S) NAME: Daniel Howard

TASK ORDER NO.
SAMPLE EVENT:
PROGRAM TYPE:
SAMPLER(S) SIGNATURE: Daniel Howard

DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANRDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F) FIELD
11/20/96	0815	S	SB1501	SB15	PP01	0/2	2	N	—
	0825	S	SB1502	SB15	PP01	4/6	2	N	—
	0855	S	SB1601	SB16	PP01	4/6	2	N	—
	0900	S	SB1602	SB16	PP01	8/10	2	N	—
	0855	S	SB5301	SB16	PD2	4/6	2	N	—
	1000	S	SB1701	SB17	PP01	4/6	2	N	—
	1005	S	SB1702	SB17	PP01	6/8	2	N	—
	1025	S	SB1801	SB18	PP01	1/3	2	N	—
	1035	S	SB1802	SB18	PP01	5/7	2	N	—
	1350	S	SB1901	SB19	PP01	4/6	2	N	—
	1355	S	SB1902	SB19	PP01	6/8	2	N	—
*	1420	S	SB2001	SB20	PP01	4/6	2	N	—

ANALYTICAL PARAMETERS/METHODS

Method No.	VOCs BTEX/MTBE 8020	SVOC DH BNA PAH 8100	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO 8100M	GRO 8015M	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	
	X	X					X	X	

Relinquished by: (Signature) Daniel Howard
Date/Time: 11/20/96/1750
Received by: ~~Dimple Patel 04855~~ (B)
Date/Time: 5:50
Cooler Temperature: 1.4°C

Remarks: * Use sample SB2001 as MS/MSD also MBassad (T613380) 11/26/96 0930

AIRBILL CO. Hand Delivered by M+E
TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):
(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER _____
STORED/SHIPPED IN ICE (Y)/N

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

Metcalf & Eddy

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT.

METCALF & EDDY Representative C. Hettinger
FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS
PROJECT # Hunter 4

SAMPLE CUSTODIAN A. Campbell (B)26-86855
TODAY'S DATE 11/20/96

DATE/TIME SAMPLES RECEIVED 11/20/96 5:50

AIRBILL NUMBER
NO. OF COOLERS IN SHIPMENT 2

COOLER OPENED: DATE 11/20/96 TIME 5:50

CHAIN OF CUSTODY SEAL INTACT? YES ☑ NO ☐
CHAIN OF CUSTODY PROVIDED? YES ☑ NO ☐
SAMPLE LABELS PRESENT? YES ☑ NO ☐
BOTTLE LABELS CORRESPOND W/COC? YES ☑ NO ☐

TYPE OF COLLANT USED Wet Ice.

COOLANT CONDITION: MELTED
PARTIALLY MELTED/FROZEN ✓
FROZEN

COOLER NUMBER	TEMP INSIDE COOLER
# Cooler A	0.6°C
# Cooler B	1.4°C
#	
#	
#	

RECORD TEMPERATURE BLANK (1) 0.6°C (2) 1.4°C (3)

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, INTACT?)

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: SB1501, SB1502, SB1601, SB1602, SB5301, SB1701, SB1702, SB1801, SB1802, SB1901, SB1902, SB2001, SB2002, SB9101, SB2102, SB2201, SB2202, SB5401.

CHAIN - OF - CUSTODY - RECORD

Metcalf & Eddy

PROJECT NAME: Hunter 9

PROJECT NO: 01945.74102

LABORATORY ID: SLS

SAMPLER(S) NAME: G. Rowell

TASK ORDER NO.

SAMPLE EVENT: Well Sampling

PROGRAM TYPE:

SAMPLER(S) SIGNATURE: G. Rowell

	DATE	TIME MILITARY	MATRIX (S/W)	FIELD SAMPLE ID	SITE ID	RES CODE	DEPTH (FT.)	NO. OF CONTS.	STANDARD PRESERV. (Y/N)*	FILTERED (L) LAB (F)FIELD
	12-10	1030	S	HT4-SE01	SE 01	PP01		2	N	N
		1100	S	HT4-SE10	SE 10	PP01		2	N	N
		1100	W	HT4-SW10	SW10	PP01		2	N	N
		1115	S	HT4-SE09	SW09	PP01		2	N	N
		1115	W	HT4-SW09	SW09	PP01		2	N	N
			W	Temp Blank						
*		1315	W	HT4-SW02	SW02	PP01		6	N	N
		1315	S	HT4-SE02	SE02	PP01		2	N	N

Method No.	VOCS	SVOC	METALS ICP Hg CVAA GFAA	HERBICIDES	PESTICIDES	PCB	TPH/DRO	GRO	PAH
	8020	8100					8100m	8015m	8310
	X	X					X	X	
	X	X					X	X	X GR
									X
	X	X					X	X	
									X
						GR			
GR	X	X				GR	X	X	X
	X	X					X	X	X GR

Relinquished by: (Signature) A. Rowell

Date/Time: 12-10-96 / 1810

Received by: SC-87184 J. Campbell (C)

Date/Time: 12/10/96 18:10

Cooler Temperature:

Remarks: * MS/MSD

AIRBILL CO.

TRACKING NO:

Send Results to:

Christine Hettinger c/o METCALF & EDDY, INC.
1201 Peachtree St., N.E., 400 Colony Square, Suite 1101
Atlanta, Georgia 30361
(404) 881-8010, FAX (404) 872-3161

STANDARD PRESERVATION (Y):

(H) HCl/VOC,
(N) HNO_3/METALS
(S) H_2SO_4/
(O) OTHER

STORED/SHIPPED IN ICE (Y)/N

SC-87284

SAMPLE RECEIPT CONFIRMATION SUMMARY REPORT

Metcalf & Eddy

TO BE COMPLETED BY SUBCONTRACTOR SAMPLE CUSTODIAN FOR EACH SHIPMENT RECEIVED FROM METCALF & EDDY.
UPON COMPLETION, FAX TO THE DESIGNATED M&E REPRESENTATIVE LISTED BELOW SAME DAY AS SHIPMENT.

METCALF & EDDY Representative C. Hettinger — FAX # (404) 872-3161

SUBCONTRACTOR SAV. LABS — PROJECT # Hunter 4

SAMPLE CUSTODIAN G. Campbell (C) SC-87284 — TODAY'S DATE 12/10/96

DATE/TIME SAMPLES RECEIVED 12/10/96 6:10

AIRBILL NUMBER _____ — NO. OF COOLERS IN SHIPMENT 7

COOLER OPENED: DATE 12/10/96 TIME 6:10

CHAIN OF CUSTODY SEAL INTACT?	YES ☑	NO ☐
CHAIN OF CUSTODY PROVIDED?	YES ☑	NO ☐
SAMPLE LABELS PRESENT?	YES ☑	NO ☐
BOTTLE LABELS CORRESPOND W/COC?	YES ☑	NO ☐

TYPE OF COLLANT USED Wet Ice

COOLANT CONDITION: MELTED _____ PARTIALLY MELTED/FROZEN ✓

FROZEN _____

COOLER NUMBER	TEMP INSIDE COOLER
# Cooler #3	2.3
#	
#	
#	
#	

RECORD TEMPERATURE BLANK (1) 2.3 (2) _____ (3) _____

CONDITION OF BOTTLES IN SHIPMENT: (BROKEN, LEAKING, INTACT?)

IF BROKEN OR LEAKING LIST SAMPLE ID#'S AND BOTTLE TYPES AFFECTED

LIST SAMPLE ID'S IN EACH SHIPMENT: HTH-SE01, HTH-SE10, HTH-SW10, HTH-SE09, HTH-SW09, HTH-SW02, HTH-SW02MS, HTH-SW02MSD, HTH-SE02

APPENDIX E

GEOLOGIC LOGS

Hole No. SB16

DRILLING LOG	DIVISION SAV.	INSTALLATION HAAF	SHEET 1 OF 1 SHEETS

1. PROJECT: Pump Houses 1, 2, & 6
2. LOCATION (Coordinates or Station): SAV. GA.
3. DRILLING AGENCY: PSI
4. HOLE NO. (As shown on drawing title and file number): SB16
5. NAME OF DRILLER: K. Durham
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 10.0'
8. DEPTH DRILLED INTO ROCK: —
9. TOTAL DEPTH OF HOLE: 10.0'
10. SIZE AND TYPE OF BIT: 4¼" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED Ø
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 9.0' BGS
16. DATE HOLE: STARTED 11-20-96; COMPLETED 11-20-96
17. ELEVATION TOP OF HOLE: 38.5'
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR: D. Rowell

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		Sand, brown, 10YR5/3, fine, 5-10% silt, moist (SM)	HAND AUGER	1	Blows: 0845 — OVA, ppm: HS-0, BZ-0
	4		Sand, pink, 10YR7/3, fine <5% silt, moist (SP)	HAND AUGER	2	0850 — HS-2, BZ-0
	6		Sand, pale brown, 10YR6/3, V. fine, 5-10% silt, moist. (SM)	80	3	3-7-6-6, 3" Spoon, 0855, Lab — HS->1000, BZ-0
	8		As Above	AUGER		
	10		As Above <5% silt, saturated (SP)	80	4	9-10-10-11, ▽, 0900, Lab — HS->1000, BZ-0
			EOB @ 10.0' BGS			

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

Hole No. SB17

DRILLING LOG | DIVISION: SAV. | INSTALLATION: HAAF | SHEET 1 OF 1 SHEETS

1. PROJECT: Pump Houses 1, 2, +6	10. SIZE AND TYPE OF BIT: 4 1/4" I.D. HSA
2. LOCATION (Coordinates or Station): SAV. GA.	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: PSI	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
4. HOLE NO. (As shown on drawing title and file number): SB17	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED Ø
5. NAME OF DRILLER: K. Durham	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 7.6' BGS
	16. DATE HOLE: STARTED 11-20-96; COMPLETED 11-20-96
7. THICKNESS OF OVERBURDEN: 10.0'	17. ELEVATION TOP OF HOLE: 39.3'
8. DEPTH DRILLED INTO ROCK: —	18. TOTAL CORE RECOVERY FOR BORING: — %
9. TOTAL DEPTH OF HOLE: 10.0'	19. SIGNATURE OF INSPECTOR: G. Rowell

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–2		2.0' Concrete core			Blows / OVA, ppm
	2–4		Sand, brownish yellow, 10YR 6/8, fine, 5-10% silt, dry. (SM)	45	1	4-6-8-10; 0955 / HS-62; BZ-0
	4–6		Sand, v. pale brown, 10YR 8/2, v. fine, <5% silt, moist. (SP)	85	2	10-10-10-10; 1000; Lab / HS-180; BZ-0
	6–8		Sand, lt. brownish gray, 10YR 6/2, v. fine, 5% silt, saturated. (SP)	80	3	6-8-8-8; 1005; Lab ▽ / HS->1000; BZ-0
	8–10		As above. No lab sample retained. (SP)	80	4	6-8-8-8; 1010 / BZ-0
			EOB @ 10.0' BGS			

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

Hole No. SB 18

DRILLING LOG	DIVISION SAV.	INSTALLATION HAAF	SHEET 1 OF 1 SHEETS

1. PROJECT	Pump Houses 1, 2, + 6	10. SIZE AND TYPE OF BIT	4¼" I.D. HSA
2. LOCATION (Coordinates or Station)	SAV. GA.	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
3. DRILLING AGENCY	PSI	12. MANUFACTURER'S DESIGNATION OF DRILL	CME 75
4. HOLE NO. (As shown on drawing title and file number)	SB 18	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	4 / Ø
5. NAME OF DRILLER	K. Durham	14. TOTAL NUMBER CORE BOXES	—
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER	7.0' BGS
		16. DATE HOLE: STARTED / COMPLETED	11-20-96 / 11-20-96
7. THICKNESS OF OVERBURDEN	7.3'	17. ELEVATION TOP OF HOLE	38.8'
8. DEPTH DRILLED INTO ROCK	—	18. TOTAL CORE RECOVERY FOR BORING	— %
9. TOTAL DEPTH OF HOLE	7.3'	19. SIGNATURE OF INSPECTOR	D. Rowell

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			1.3' concrete core			Blows / OVA, ppm
	2		Sand, brown, 10YR4/3, v. fine, 5-10% silt, dry (SM)	75	1	5-4-5-4 Lab HS-26 BZ-0 1025
	4		Sand, yellowish brown, 10YR5/4, v. fine 5-10% silt, dry. (SM)	75	2	5-5-4-6 HS-12 BZ-0 1030
	6		Sand, pale brown, 10YR6/3, v. fine, <5% silt, saturated. (SP)	75	3	6-22-27-28 3" spoon HS-96 BZ-0 1035 ▽ Lab
	8		EOB @ 7.3' BGS			

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

Hole No. MW07

DRILLING LOG | DIVISION: SAV | INSTALLATION: HAAF | SHEET 1 OF , SHEETS

1. PROJECT: Pumphouse 1, 2, 6
2. LOCATION (Coordinates or Station): SAV
3. DRILLING AGENCY: PSI
4. HOLE NO. (As shown on drawing title and file number): MW07
5. NAME OF DRILLER: M. Gribble
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 18.0'
8. DEPTH DRILLED INTO ROCK: 0
9. TOTAL DEPTH OF HOLE: 18.0'
10. SIZE AND TYPE OF BIT: 6 1/4" ID HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 | UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 30.81 (12/9/96)
16. DATE HOLE: STARTED 11/20/96 | COMPLETED 11/20/96
17. ELEVATION TOP OF HOLE: 38.17 TOC
18. TOTAL CORE RECOVERY FOR BORING: \ %
19. SIGNATURE OF INSPECTOR: D. Humphris

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		SAND: fine-med, pale Br 10YR6/3, silty 5-10%, dry, well sorted, tr. glauconite (SW/SM)	100	1	Blows / Hand auger — OVA, ppm: BZ-0, HS-0
	4		as above, v. loose-firm, dry white 10YR8/1 (SW)	63	2	3-4-12-17 — BZ-0, HS-0
	6		as above, v. loose-firm, well sorted, tr. mica + glauconite. Yell Br 10YR5/4, moist (SW)	75	3	4-5-8-11 — BZ-0, HS-0
	8		Cuttings as above	—	Auger	▽ in well at install; Lab + Geotech
	10		Gray 10YR6/1, wet, firm. clean sand - tr. glauconite. well sorted (SW)	29	4	3" spoon 19-14-11-16 — ▽ initial wet sample BZ-0, HS-2
	12		Cuttings - runny sands	—	Auger	
	14		as above: v. loose-v. firm. wet. well sorted, silty 5%. tr. glauconite (clean sand) SW	50	5	3" spoon 4-11-20-22 — Lab — BZ-0, HS-62
	16		Cuttings as above	—	—	
	18		E.O.B. @ 18.0' bgs			
	20					

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

Hole No. MW-08

DRILLING LOG | DIVISION: SAV. | INSTALLATION: HAAF | SHEET 1 OF 1 SHEETS

1. PROJECT: Pumphouse 1, 2, 6
2. LOCATION (Coordinates or Station): SAV. GA
3. DRILLING AGENCY: PSI
4. HOLE NO. (As shown on drawing title and file number): MW08
5. NAME OF DRILLER: M. Gribble
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 14.0'
8. DEPTH DRILLED INTO ROCK: 0
9. TOTAL DEPTH OF HOLE: 14.0'
10. SIZE AND TYPE OF BIT: 6 1/4" ID HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 | UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 31.76 (12/9/96)
16. DATE HOLE: STARTED 11/20/96 | COMPLETED 11/20/96
17. ELEVATION TOP OF HOLE: 37.60 TOC
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR: D. Humphries

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	OVA ppm
	0–2		SAND: fine-med; Pale Br 10YR 6/3 to white 8/1. silty 5%. tr. glauconite. well sorted. dry. (SW)	100	1	BLOWS: Hand Auger	BZ-0 HS-0
	2–4		: as above, white. v. loose-firm	42	2	4-10-11-16	BZ-0 HS-0.5
	4–6		: as above, v. loose-firm. – wet – darker gray due to wetness (SW)	75	3	4-5-6-11 ⊠ initial well wet sample at install	BZ-0 HS-0
	6–8		Cuttings mix of above	–	Auger		
	8–10		: as above : Pale Br 10YR 6/3, v. loose-firm, well sorted, silty 5%, tr. glauconite, wet. (SW)	50	4	8-2-3-12 lab + geotech	BZ-0 HS-2.8
	10–12		Cuttings as above.		Auger		
	12–14		: as above Pale Br to Gy 6/1 v. loose-loose, wet, well sorted, silty 5% (SW)	67	5	10-6-4-8 Lab	BZ-0 HS-42
	14–16		Auger to 14.0' bgs. (E.O.B)				
	16–18						
	18–20						

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

Hole No. MW09

DRILLING LOG	DIVISION SAV.	INSTALLATION HAAF	SHEET 1 OF 1 SHEETS

1. PROJECT: Pumphouse 1, 2, 6
2. LOCATION (Coordinates or Station): SAV 6A
3. DRILLING AGENCY: PSI
4. HOLE NO. (As shown on drawing title and file number): MW09
5. NAME OF DRILLER: M. Gribble
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 16.0'
8. DEPTH DRILLED INTO ROCK: Ø
9. TOTAL DEPTH OF HOLE: 16.0'
10. SIZE AND TYPE OF BIT: 6 1/4" ID HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 31.75 (12/9/96)
16. DATE HOLE: STARTED 11/20/96; COMPLETED 11/20/96
17. ELEVATION TOP OF HOLE: 38.97 TOC
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: D. Humphus

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		Concrete/Asphalt 16"			Blows / OVA, ppm
	2		SAND: fine-med, L4 6y 7.5YR 6/3, well sorted silty 5% dry (SW)	—	1	Hand Auger — BZ-0, HS-82
	4		as above, dk 6y 10YR 4/1, v. loose-loose, well sorted tr. glauconite (SW)	100	2	2-8-9-6 — BZ-0, HS-40
	6		: as above, silt 5-20%, v. loose-loose. black 10YR 2/1, moist, organics, well sorted SI Hy 20% SM-Pt (SW)	75	3	2-3-3-9 — BZ-0, HS-200
	8		Cuttings as above	—	Auger	▽ in well at install
	10		Large Root/organics w/ dk 13 r. sand 10YR 3/3, wet. loose-firm. (?)	50	4	3" spoon 8-9-11-8 Lab initial wet sample — BZ-0, HS-200
	12		Cuttings as above	—	Auger	
	14		Sand as above, 6y 10YR 6/1, well sorted, silty 5%, tr. glauconite (SW)	21	5	3" spoon 5-8-12-18 Lab + bentech — BZ-0, HS-400
	16		As above	—	Auger	
	18		E.O.B. @ 16.0' bgs			
	20					

Split-spoon samples for lithologic definition and/or chemical analysis were collected from 3 to 5 feet below ground surface (BGS) and every 5 feet or lithologic change thereafter (unless otherwise noted).

APPENDIX F

ENVIRONMENTAL SENSITIVITY SCORE

Pumphouse #6

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 (Nonaqueous-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 µg/L =	250
☐	1,000 - 10,000 µg/L=	100
☐	100 - 1,000 µg/L =	50
☐	5 - 100 µg/L =	10
■	<5 µg/L = (3.6 ug/L at MW9)	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.

Pumphouse #6

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	0 x 0.5 x	10=	0	500' - 1/4 mi	0 x 0.5 x	6 =	0
1 mi - 2 mi	0 x 0.5 x	6 =	0	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	0			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' - 1,000' = 6
- ☐ > 1,000 = 1

5. Susceptibility Area Multiplier

- ☐ If site is located in a Low Ground Water Pollution Susceptibility Area, and no points of withdrawal for water supply lie within 500' and no surface water bodies or submerged utility trenches lie within 500' of the source: = 0.5
- ■ All other sites = 1

SUMMARY

[(1.a. + 1.b.) X (1.c.) + (2.a. + 2.b.) X (3.a. + 3.b. + 4.)] X [(5.)] = 900 / Environmental Sensitivity Score

[(50 + 40) x 10 + (0 + 0) x (0 + 0 + 6)] x 1
[90 x 10 + (0 x 6)] x 1
[900] x 10 = 1
900

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