

**Final**

**Site Investigation Report  
Former Washrack, Building 1740, Soldier's Chapel  
Parcel 127(7)**

**Fort McClellan  
Calhoun County, Alabama**

**Prepared for:**

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**Task Order CK10  
Contract No. DACA21-96-D-0018  
Shaw Project No. 796887**

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**Revision 0**

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## ***Executive Summary***

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In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, Shaw Environmental, Inc. (Shaw) completed a site investigation (SI) at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7) at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The initial SI activities included the collection of 16 surface and depositional soil samples, 13 subsurface soil samples, and 3 groundwater samples from 3 temporary monitoring wells. Based on the analytical data from the initial SI, supplemental sampling was conducted to define the extent of soil and groundwater contamination at the site. Supplemental SI activities consisted of the collection and analysis of 14 surface and depositional soil samples, 6 subsurface soil samples, and 13 groundwater samples. In addition, 6 permanent groundwater monitoring wells were installed at the site to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

The analytical results from investigations at Parcel 127(7) indicate that metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) were detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to residential human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan. A preliminary risk assessment (PRA) was also performed to further characterize the potential threat to human health from exposure to groundwater at the site.

Comparison of the analytical data to the SSSLs and background screening values indicated the presence of metals contamination in soils. Specifically, four metals (antimony, copper, lead, and mercury) were detected in one or more surface soil samples at concentrations exceeding their respective SSSLs and upper background ranges. At the request of the U.S. Environmental Protection Agency and the Alabama Department of Environmental Management, an interim removal action was performed on two areas of contaminated soil. The areas of contaminated soil were removed and confirmatory soil sampling verified that levels were below SSSLs.

Comparison of the analytical data to the SSSLs also indicated the presence of VOCs in groundwater at the site. The horizontal and vertical extent of VOCs was delineated during supplemental sampling and was limited to carbon tetrachloride and chloroform in a two-well cluster just north of Building 1740. The groundwater chemicals of concern were evaluated in the PRA to determine if these chemicals pose an unacceptable risk to human health. The PRA

concluded that site groundwater developed as a source of potable water is unlikely to cause adverse human health effects.

Constituents detected at concentrations exceeding ESVs and background were identified as constituents of potential ecological concern (COPEC) in surface and depositional soil. COPECs were limited to metals. The concentrations of 11 metals exceeded ESVs and background in one or more surface and depositional soil samples. However, the surface soil sample locations with the highest metals results were excavated as part of the soil removal action and replaced with clean fill material. COPECs at locations outside of the soil removal areas were judged unlikely to pose risks to potential ecological receptors based on the conservative nature of the ESVs, the relatively low calculated hazard quotient screening values, and the infrequency of detection for certain constituents. Although Parcel 127(7) may support certain types of ecological receptors with small home ranges (e.g., earthworm), the site's location within the developed area of the Main Post, its small size, and the projected reuse (mixed-business) greatly limit the potential ecological exposures at this parcel.

Based on the results of the SI, past operations at Parcel 127(7) resulted in soil and groundwater contamination. However, metals-contaminated soils were removed from the site. Therefore, no further action is required with regard to soils at this site. Although the PRA determined that the chemicals of concern in groundwater were unlikely to cause adverse human health effects, as a conservative measure, Shaw recommends implementing land-use controls to restrict groundwater use at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7).

## **1.0 Introduction**

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The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE), Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw), formerly IT Corporation (IT), to perform the site investigation (SI) at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7) under Contract Number DACA21-96-D-0018, Task Order CK10. Based on the results of initial sampling, a supplemental investigation was performed to delineate the extent of groundwater and surface soil contamination. This SI report presents analytical results from both phases of the investigation. In addition, this report describes the activities and results of an interim soil removal action conducted at Parcel 127(7).

### **1.1 Project Description**

The Former Washrack, Building 1740, Soldier's Chapel was identified as an area to be investigated prior to property transfer. The site was classified as a Category 7 parcel in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 parcels are areas that have not been evaluated and/or that require additional evaluation.

The scope of the SI was outlined in the *Final Site-Specific Field Sampling Plan (SFSP) Attachment for the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)* (IT, 1998a). The SI work plan includes the SFSP and the site-specific safety and health plan (SSHP), which were prepared to provide technical guidance for sample collection and analysis at Parcel 127(7). The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 1998c) and subsequent revisions (IT, 2000a; IT, 2002). The SAP includes the installation wide-safety and health plan and quality assurance plan.

The initial SI included fieldwork to collect 3 depositional soil samples, 13 surface soil samples, 13 subsurface soil samples, and 3 groundwater samples. After review of the analytical results,

the BRAC Cleanup Team (BCT) decided that additional sampling was needed to delineate surface soil contamination and to confirm the presence of groundwater contamination. An SFSP addendum was prepared to provide technical guidance for sample collection and analysis during the supplemental SI at Parcel 127(7) (IT, 2000b). The supplemental sampling included fieldwork to collect 13 surface soil samples, 1 depositional soil sample, 6 subsurface soil samples, and 13 groundwater samples.

Based on the analytical results presented, the BCT requested the removal of two areas of contaminated soil at Parcel 127(7). A work plan for removal of the contaminated soil was prepared in October 2001 to provide technical guidance for soil removal activities and confirmatory sampling and analysis (IT, 2001). Appendix A documents the interim soil removal activities.

## **1.2 Purpose and Objectives**

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are presented at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), at concentrations that present an unacceptable risk to human health or the environment. The SI was conducted to collect additional data to determine if areas with elevated metals concentrations in the soil and detect constituents in the groundwater posed an acceptable risk to human health or the environment. The conclusions of this SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and polynuclear aromatic hydrocarbon (PAH) background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000c). The PAH background screening values were developed by Shaw at the direction of the BRAC Cleanup Team to address the occurrence of PAH compounds in surface soils as a result of anthropogenic activities at FTMC. Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BCT will select one of the following courses of action for the site: "No Further Action," additional investigation, or land-use controls.

### **1.3 Site Description and History**

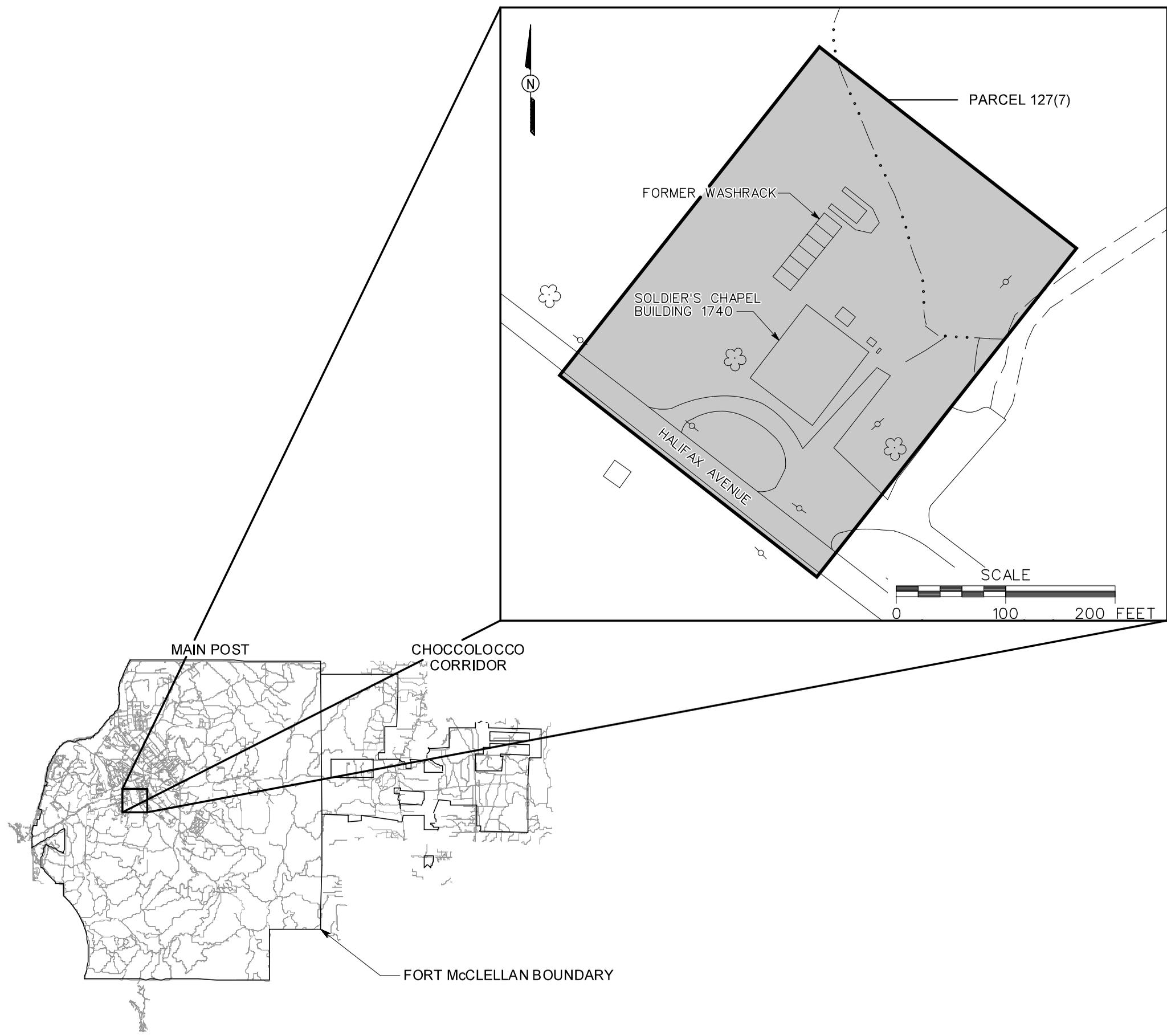
The Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), is an approximately 2.7-acre site located off Halifax Avenue in the western-central portion of the FTMC Main Post. Building 1740 (Soldier's Chapel) is located near the center of the parcel and faces Halifax Avenue (Figure 1-1). A paved driveway and parking area are located southeast of Building 1740. Trees cover the northern portion of the parcel while grass covers the southern portion of the parcel. A small building and concrete pad, which appears to be the foundation of a former smaller building, are located behind Building 1740. Immediately adjacent to the eastern corner of Building 1740 is a large rectangular metal cover that protects an underground concrete grease trap. This grease trap appears to connect to the sewer system (Figure 1-2).

Six washracks and a grease pit are located just north of Building 1740. Each washrack measures approximately 12 feet by 20 feet. The grease pit was so overgrown with vegetation it was not possible to get an accurate measurement; however, it appears to be about 25 feet by 30 feet by 6 to 8 feet deep. During an SI site visit in June 1998, the grease pit appeared to contain about 1 foot of standing water. Terra cotta tile drains reportedly discharged downslope (north) of the washracks (ESE, 1998). These drains were not observed during the site visit in 1998.

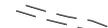
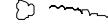
Building 1740 was reportedly used as a vehicle maintenance facility during the 1950s and 1960s. Vehicle maintenance was conducted inside Building 1740 and at the washracks and grease pit located behind the building (ESE, 1998).

Parcel 127(7) is approximately 810 feet above mean sea level and is relatively flat. However, the eastern portion of the parcel has slight slope to the northeast. The washracks and grease pit are located upslope (southwest) of a natural surface drainage that transects the northeastern portion of the parcel (Figure 1-2).

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 PROJ. NO.: 774645  
 INITIATOR: J. JENKINS  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHCK. BY:  
 ENGR. CHCK. BY: J. JENKINS  
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**LEGEND**

-  UNIMPROVED ROAD
-  PAVED ROAD AND PARKING
-  BUILDING
-  TREES / TREELINE
-  PARCEL BOUNDARY
-  SURFACE DRAINAGE / CREEK
-  UTILITY POLE

**FIGURE 1-1**  
**SITE LOCATION MAP**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



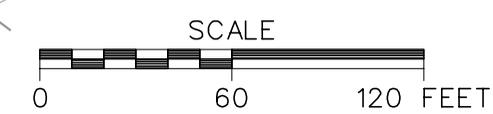
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LEGEND	
	UNIMPROVED ROAD
	PAVED ROAD AND PARKING
	BUILDING
	TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
	TREES / TREELINE
	PARCEL BOUNDARY
	SURFACE DRAINAGE / CREEK
	UTILITY POLE
	SANITARY SEWER LINE

**FIGURE 1-2**  
**SITE MAP**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



N 1,167,550  
 E 671,850  
 N 1,167,100  
 E 672,450

## **2.0 Previous Investigations**

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An EBS was conducted by ESE to document the environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA) Region 4, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7) was identified as a Category 7 CERFA parcel: areas that are not evaluated or that require additional investigation. The parcel required additional evaluation to determine its environmental condition.

## **3.0 Current Site Investigation Activities**

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This chapter summarizes SI activities conducted at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), including environmental sampling and analysis and monitoring well installation.

### **3.1 Environmental Sampling**

The environmental sampling performed during the SI at Parcel 127(7) included the collection of soil and groundwater samples for chemical analysis. The initial SI sample locations were determined by observing physical features during site reconnaissance and by reviewing historical documents pertaining to activities conducted at the site. Supplemental SI sample locations were determined based on the analytical results from the initial sampling. The sample locations, media, and rationale are summarized in Table 3-1. Sample locations are shown on Figures 3-1 and 3-2. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.3.

#### **3.1.1 Surface and Depositional Soil Sampling**

A total of 26 surface soil samples and 4 depositional soil samples were collected for chemical analysis during the SI at Parcel 127(7). Soil sampling locations are shown on Figure 3-1 and the sampling rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-2. Sampling locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, and proximity to buried utilities.

**Sample Collection.** Surface and depositional soil samples were collected from the uppermost foot of soil using either a direct-push technology (DPT) sampling system or a stainless-steel hand auger, following methodology specified in the SAP. Prior to sample collection, surface debris (e.g., rocks or vegetation) was removed from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with the SAP. Samples for VOC analysis were collected directly from the sample device using three EnCore<sup>®</sup> samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix B.

**Table 3-1**

**Sampling Locations and Rationale  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

<b>Sample Location</b>	<b>Media</b>	<b>Rationale</b>
PPMP-127-DEP01	Depositional soil	A depositional soil sample was collected from a natural drainage upslope of most of the parcel to determine if PSSC are present.
PPMP-127-DEP02	Depositional soil	A depositional soil sample was collected from the drainage/stream at an upslope location to determine if PSSC are present.
PPMP-127-DEP03	Depositional soil	A depositional soil sample was collected downslope (north) of the parcel to determine if PSSC are present.
PPMP-127-GP01	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected approximately 30 feet northeast of Building 1740 and the grease trap to determine if PSSC are present.
PPMP-127-GP02	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected near the south end of the grease pit to determine if PSSC are present.
PPMP-127-GP03	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the washrack and the grease pit to determine if PSSC are present.
PPMP-127-GP04	Surface soil Subsurface soil	Surface and subsurface soil samples were collected near the small building behind Building 1740 to determine if PSSC are present.
PPMP-127-GP05	Surface soil Subsurface soil	Surface and subsurface soil samples were collected downslope (north) of the grease pit to determine if PSSC are present.
PPMP-127-GP06	Surface soil Subsurface soil	Surface and subsurface soil samples were collected downslope (west) of the grease pit (near the opening) to determine if PSSC are present.
PPMP-127-GP07	Surface soil Subsurface soil	Surface and subsurface soil samples were collected on the northwestern side (downslope) of the washrack to determine if PSSC are present.
PPMP-127-GP08	Surface soil Subsurface soil	Surface and subsurface soil samples were collected at the southwestern end of the washrack to determine if PSSC are present.
PPMP-127-GP09	Surface soil Subsurface soil	Surface and subsurface soil samples were collected on the southeastern side (upslope) of the washrack to determine if PSSC are present.
PPMP127-GP10	Surface soil Subsurface soil	Surface and subsurface soil samples were collected near the front door (southwest) of Building 1740 to determine if PSSC are present.

**Table 3-1**

**Sampling Locations and Rationale  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

<b>Sample Location</b>	<b>Media</b>	<b>Rationale</b>
PPMP-127-GP11	Surface soil Subsurface soil	Surface and subsurface soil samples were collected near the doors on the southeastern side of Building 1740 to determine if PSSC are present.
PPMP-127-GP12	Surface soil Subsurface soil	Surface and subsurface soil samples were collected west of Building 1740 to determine if PSSC are present.
PPMP-127-GP13	Surface soil Subsurface soil	Surface and subsurface soil samples were collected near the northeastern corner of Building 1740 to determine if PSSC are present.
PPMP-127-GP14	Surface soil Subsurface soil	Surface and subsurface soil samples were collected approximately five feet west of sample location PPMP-127-DEP02 to delineate the extent of copper and mercury in soil.
PPMP-127-GP15	Surface soil Subsurface soil	Surface and subsurface soil samples were collected approximately five feet north of PPMP-127-DEP02 to delineate the extent of copper and mercury in soil.
PPMP-127-GP16	Surface soil Subsurface soil	Surface and subsurface soil samples were collected approximately five feet east of PPMP-127-DEP02 to delineate the extent of copper and mercury in soil.
PPMP-127-GP17	Surface soil Subsurface soil	Surface and subsurface soil samples were collected approximately ten feet south of PPMP-127-DEP02 to delineate the extent of copper and mercury in soil.
PPMP-127-GP18	Subsurface soil	A subsurface soil sample was collected at the same location as PPMP-127-DEP02 to delineate the vertical extent of metals in the subsurface soil.
PPMP-127-GP19	Surface Soil	A surface soil sample collected was upslope of PPMP-127-DEP02 to determine the extent of metals in the surface soil.
PPMP-127-GP20	Surface Soil	A surface soil sample was collected upslope of PPMP-127-DEP02 to determine the extent of metals in the surface soil.
PPMP-127-GP21	Surface Soil	A surface soil sample was collected upslope of PPMP-127-DEP02 to determine the extent of metals in the surface soil.
PPMP-127-GP22	Surface Soil	A surface soil sample was collected approximately 50 feet downslope of PPMP-127-DEP02 to determine the extent of metals concentrations that exceeded SSSLs in surface soil.
PPMP-127-GP23	Surface Soil	A surface soil sample was collected approximately 90 feet downslope of PPMP-127-DEP02 to determine the extent of metals concentrations that exceeded SSSLs in the surface soil.
PPMP-127-GP24	Surface Soil	A surface soil sample was collected approximately 50 feet downslope of PPMP-127-GP06 to determine the extent of lead in the surface soil.

**Table 3-1**

**Sampling Locations and Rationale  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

<b>Sample Location</b>	<b>Media</b>	<b>Rationale</b>
PPMP-127-GP25	Surface Soil	A surface soil sample was collected approximately 60 feet downslope of PPMP-127-GP06 to determine the extent of lead in the surface soil.
PPMP-127-GP26	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected approximately 40 feet west of PPMP-127-GP07 to determine the extent of chromium in surface and subsurface soil.
PPMP-127-MW01	Groundwater	A permanent residuum groundwater monitoring well was installed to replace temporary well PPMP-127-GP01. Three rounds of groundwater samples were collected and analyzed for VOCs.
PPMP-127-MW02	Groundwater	A permanent residuum groundwater monitoring well was installed to replace temporary well PPMP-127-GP02. Two rounds of groundwater samples were collected and analyzed for VOCs.
PPMP-127-MW03	Groundwater	A permanent residuum groundwater monitoring well was installed to replace temporary well PPMP-127-GP03. Two rounds of groundwater samples were collected and analyzed for VOCs.
PPMP-127-MW04	Groundwater	A permanent residuum groundwater monitoring well was installed approximately 120 feet north (downgradient) of monitoring well PPMP-127-MW02. Two rounds of groundwater samples were collected and analyzed for VOCs.
PPMP-127-MW05	Groundwater	A permanent residuum groundwater monitoring well was installed approximately 85 feet east-northeast (downgradient) of monitoring well PPMP-127-MW02. Two rounds of groundwater samples were collected and analyzed for VOCs.
PPMP-127-MW06	Groundwater	A permanent bedrock groundwater monitoring well was installed adjacent to monitoring well PPMP-127-MW02. Two rounds of groundwater samples were collected and analyzed for VOCs.

PSSC - Potential site-specific chemicals.

SSSL - Site-specific screening levels.

VOC - Volatile organic compound.

Table 3-2

Surface Soil Sample Designations and Analytical Parameters  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

Sample Location	Sample Designation	QA/QC Samples			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-127-DEP01	PPMP-127-DEP01-DEP-KR0029-REG				VOCs, SVOCs, TAL Metals
PPMP-127-DEP02	PPMP-127-DEP02-DEP-KR0030-REG				VOCs, SVOCs, TAL Metals
	PPMP-127-DEP02-DEP-KR0030R-REG				Mercury
PPMP-127-DEP03	PPMP-127-DEP03-DEP-KR0031-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP01	PPMP-127-GP01-SS-KR0001-REG			PPMP-127-GP01-SS-KR0001-MS PPMP-127-GP01-SS-KR0001-MSD	VOCs, SVOCs, TAL Metals
PPMP-127-GP02	PPMP-127-GP02-SS-KR0003-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP03	PPMP-127-GP03-SS-KR0005-REG	PPMP-127-GP03-SS-KR0006-FD	PPMP-127-GP03-SS-KR0007-FS		VOCs, SVOCs, TAL Metals
PPMP-127-GP04	PPMP-127-GP04-SS-KR0009-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP05	PPMP-127-GP05-SS-KR0011-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP06	PPMP-127-GP06-SS-KR0013-REG				VOCs, SVOCs, TAL Metals
	PPMP-127-GP06-SS-KR0013R-REG				Lead
PPMP-127-GP07	PPMP-127-GP07-SS-KR0015-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP08	PPMP-127-GP08-SS-KR0017-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP09	PPMP-127-GP09-SS-KR0019-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP10	PPMP-127-GP10-SS-KR0021-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP11	PPMP-127-GP11-SS-KR0023-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP12	PPMP-127-GP12-SS-KR0025-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP13	PPMP-127-GP13-SS-KR0027-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP14	PPMP-127-GP14-SS-KR0032-REG				Copper and Mercury
PPMP-127-GP15	PPMP-127-GP15-SS-KR0034-REG				Copper and Mercury
PPMP-127-GP16	PPMP-127-GP16-SS-KR0036-REG				Copper and Mercury

Table 3-2

**Surface Soil Sample Designations and Analytical Parameters  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Sample Location	Sample Designation	QA/QC Samples			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-127-GP17	PPMP-127-GP17-SS-KR0038-REG				Copper and Mercury
PPMP-127-GP19	PPMP-127-GP19-SS-KR0041-REG				TAL Metals
PPMP-127-GP20	PPMP-127-GP20-SS-KR0042-REG				TAL Metals
PPMP-127-GP21	PPMP-127-GP21-SS-KR0043-REG				TAL Metals
PPMP-127-GP22	PPMP-127-GP22-SS-KR0044-REG				TAL Metals
PPMP-127-GP23	PPMP-127-GP23-SS-KR0045-REG				TAL Metals
PPMP-127-GP24	PPMP-127-GP24-SS-KR0046-REG				Lead
PPMP-127-GP25	PPMP-127-GP25-SS-KR0047-REG				Lead
PPMP-127-GP26	PPMP-127-GP26-SS-KR0071-REG				Chromium

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Regular field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

VOC - Volatile organic compound.

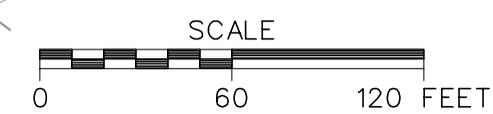
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 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOB  
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 ENGR. CHECK. BY: S. MORAN  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 04/24/01  
 DRAWN BY: D. BOMAR  
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- LEGEND**
- UNIMPROVED ROAD
  - PAVED ROAD AND PARKING
  - BUILDING
  - TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE / CREEK
  - UTILITY POLE
  - SANITARY SEWER LINE
  - SURFACE SOIL SAMPLE LOCATION
  - SUBSURFACE SOIL SAMPLE LOCATION
  - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
  - GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
  - DEPOSITIONAL SOIL SAMPLE LOCATION

**FIGURE 3-1**  
**SOIL SAMPLE LOCATION MAP**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



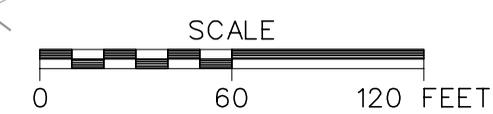
DWG. NO.: ... \774645es.928  
 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHECK. BY:  
 ENGR. CHECK. BY: J. JENKINS  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 04/24/01  
 DRAWN BY: D. BOMAR  
 9/27/2004 11:54:05 AM  
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**LEGEND**

- UNIMPROVED ROAD
- PAVED ROAD AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- SANITARY SEWER LINE
- BEDROCK MONITORING WELL LOCATION
- RESIDUUM MONITORING WELL LOCATION
- TEMPORARY WELL LOCATION
- CROSS SECTION LOCATION

**FIGURE 3-2**  
**GROUNDWATER SAMPLE**  
**LOCATION MAP**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**  
 U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



### **3.1.2 Subsurface Soil Sampling**

A total of 19 subsurface soil samples were collected during the SI at Parcel 127(7), as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and analytical parameters are listed in Table 3-3. Soil boring locations were determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, and proximity to utilities.

**Sample Collection.** Subsurface soil samples were collected from soil borings at depths greater than 1 foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and soil samples collected using either a DPT sampling system or a stainless-steel hand auger following methodology specified in the SAP. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3.

Subsurface soil samples for the SI were collected continuously to 12 feet bgs or until DPT sampler refusal was encountered. The SI samples were field-screened using a PID to measure for volatile organic vapors following procedures outlined in the SAP. The soil sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest soil sample interval above the saturated zone was submitted for analysis. Samples for VOC analysis were collected directly from the sampler using three EnCore<sup>®</sup> samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3.

Subsurface soil samples for the supplemental SI were collected to a maximum depth of 2.5 feet bgs using a stainless-steel hand auger. The samples were transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.3. The on-site geologist constructed a detailed boring log for each of the initial borings. However, boring logs were not constructed during the supplemental sampling because their locations were in close proximity to the initial borings. The boring logs are included in Appendix C.

At the completion of soil sampling, boreholes were abandoned with bentonite pellets and hydrated with potable water following borehole abandonment procedures summarized in the SAP.

Table 3-3

**Subsurface Soil Sample Designations and Analytical Parameters  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples <sup>a</sup>			Analytical Parameters
			Field Duplicates	Field Splits	MS/MSD	
PPMP-127-GP01	PPMP-127-GP01-DS-KR0002-REG	1-4				VOCs, SVOCs, TAL Metals
PPMP-127-GP02	PPMP-127-GP02-DS-KR0004-REG	3-6				VOCs, SVOCs, TAL Metals
PPMP-127-GP03	PPMP-127-GP03-DS-KR0008-REG	3-6				VOCs, SVOCs, TAL Metals
PPMP-127-GP04	PPMP-127-GP04-DS-KR0010-REG	6-9				VOCs, SVOCs, TAL Metals
PPMP-127-GP05	PPMP-127-GP05-DS-KR0012-REG	3-6				VOCs, SVOCs, TAL Metals
PPMP-127-GP06	PPMP-127-GP06-DS-KR0014-REG	1-3				VOCs, SVOCs, TAL Metals
PPMP-127-GP07	PPMP-127-GP07-DS-KR0016-REG	1-3				VOCs, SVOCs, TAL Metals
PPMP-127-GP08	PPMP-127-GP08-DS-KR0018-REG	2-5				VOCs, SVOCs, TAL Metals
PPMP-127-GP09	PPMP-127-GP09-DS-KR0020-REG	3-6				VOCs, SVOCs, TAL Metals
PPMP-127-GP10	PPMP-127-GP10-DS-KR0022-REG	6-9				VOCs, SVOCs, TAL Metals
PPMP-127-GP11	PPMP-127-GP11-DS-KR0024-REG	6-9				VOCs, SVOCs, TAL Metals
PPMP-127-GP12	PPMP-127-GP12-DS-KR0026-REG	3-5				VOCs, SVOCs, TAL Metals
PPMP-127-GP13	PPMP-127-GP13-DS-KR0028-REG	6-9				VOCs, SVOCs, TAL Metals
PPMP-127-GP14	PPMP-127-GP14-DS-KR0033-REG	2-2.5				Copper and Mercury
PPMP-127-GP15	PPMP-127-GP15-DS-KR0035-REG	2-2.5				Copper and Mercury
PPMP-127-GP16	PPMP-127-GP16-DS-KR0037-REG	2-2.5				Copper and Mercury
PPMP-127-GP17	PPMP-127-GP17-DS-KR0039-REG	2-2.5				Copper and Mercury
PPMP-127-GP18	PPMP-127-GP18-DS-KR0040-REG	2-2.5				Copper and Mercury
PPMP-127-GP26	PPMP-127-GP26-DS-KR0072-REG	1-2				Chromium

<sup>a</sup> No QA/QC samples specified in site-specific field sampling plan.

FD - Field duplicate.

FS - Field sample.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Regular.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

VOC - Volatile organic compound.

### **3.1.3 Monitoring Well Installation**

Nine monitoring wells, including three temporary wells, five permanent residuum wells, and one permanent bedrock monitoring well, were installed at Parcel 127(7) to collect groundwater samples for laboratory analysis. The well locations are shown on Figure 3-2. Table 3-4 summarizes construction details of the monitoring wells installed at the site. The well construction logs are included in Appendix C

#### **3.1.3.1 Temporary Monitoring Wells**

The three temporary wells (PPMP-127-GP01, PPMP-127-GP02, and PPMP-127-GP03) were to be installed by TEG, Inc. using DPT. However, groundwater was not encountered in any of the DPT borings. Therefore, Shaw contracted Miller Drilling Company to install the temporary wells using a hollow-stem auger drill rig at the locations shown on Figure 3-2. Shaw attempted to install the temporary wells at the DPT soil boring locations. However, at two locations (PPMP-127-GP01 and PPMP-127-GP02) this was not possible because of underground utilities. Consequently, temporary wells PPMP-127-GP01 and PPMP-127-GP02 were installed approximately 6 or 7 feet south of their respective soil boring locations. The wells were installed following procedures outlined in the SAP. The boreholes at these locations were advanced with a 4¼-inch inside diameter (ID) hollow-stem auger from ground surface to the first water-bearing zone in residuum. The borehole was augered to the depth of DPT sampler refusal, and samples were collected from that depth to the bottom of the borehole. A 2-foot-long, 2-inch ID carbon steel, split-spoon sampler was driven at 5-foot intervals to collect soil for observing and describing lithology. Where split-spoon refusal was encountered, the auger was advanced until the first water-bearing zone was encountered. The on-site geologist logging the auger boreholes continued the lithological log for each borehole from the depth of split-spoon sampler refusal to the bottom of the auger borehole by logging the auger drill cuttings. The drill cuttings were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geologic and hydrogeologic information. Soil characteristics were described using the “Burmeister Identification System” presented in Hunt (1986) and the Unified Soil Classification System (USCS) as outlined in American Society for Testing and Materials (ASTM) Method D 2488 (ASTM, 2000). The boring logs are included in Appendix C.

Upon reaching the target depth of the well, a 15-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 polyvinyl chloride (PVC) screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID,

**Table 3-4**

**Monitoring Well Construction Summary  
Former Washrack Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

Monitoring Well	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
PPMP-127-GP01	1167339.38	672206.33	814.72	815.46	35	15	19.8 - 34.8	2" ID Sch. 40 PVC
PPMP-127-GP02	1167426.64	672182.06	814.45	815.72	35	15	19.8 - 34.8	2" ID Sch. 40 PVC
PPMP-127-GP03	1167485.20	672133.53	805.67	806.15	30	15	14.8 - 29.8	2" ID Sch. 40 PVC
PPMP-127-MW01	1167346.64	672205.45	814.82	814.56	50	20	29.5 - 49.5	2" ID Sch. 40 PVC
PPMP-127-MW02	1167420.73	672183.81	814.91	814.64	39	15	23.6 - 38.6	2" ID Sch. 40 PVC
PPMP-127-MW03	1167509.12	672127.47	805.39	807.64	26.5	10	16.0 - 26.0	2" ID Sch. 40 PVC
PPMP-127-MW04	1167532.29	672215.65	805.66	807.64	31	15	15.5 - 30.5	2" ID Sch. 40 PVC
PPMP-127-MW05	1167447.51	672265.44	807.02	809.02	35.5	15	20.0 - 35.0	2" ID Sch. 40 PVC
PPMP-127-MW06	1167427.81	672173.27	815.17	814.90	51.6	4.5	46.0 - 50.5	4" ID Sch. 80 PVC

Temporary wells and permanent residuum wells installed using hollow-stem auger. Bedrock well (PPMP-127-MW06) installed using air rotary and rock coring techniques.

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD83).

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.

4" ID Sch. 80 PVC - 4-inch inside diameter, Schedule 80, polyvinyl chloride.

bgs - Below ground surface.

ft - Feet.

msl - Mean sea level.

flush-threaded Schedule 40 PVC riser. A sand pack consisting of number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 2 feet above the top of the well screen as the augers were removed. A bentonite seal, consisting of approximately 2 feet of bentonite pellets, was placed immediately on top of the sand pack and hydrated with potable water. If the bentonite seal was installed below the water table surface, the bentonite pellets were allowed to hydrate in the groundwater. Bentonite seal placement and hydration followed procedures in the SAP. At each of the temporary well locations, the surface completion included attaching plastic sheeting around the PVC riser using duct tape. Additionally, sand bags were used to secure the sheeting to the ground surface around the temporary well. A locking well cap was placed on the PVC well casing.

### **3.1.3.2 Residuum Monitoring Wells**

Shaw contracted Miller Drilling Company to install the permanent monitoring wells using a hollow-stem auger drill rig. The wells were installed following procedures outlined in the SAP. The borehole at each well location was advanced with a 4¼-inch ID hollow-stem auger from ground surface to the first water-bearing zone in the residuum. A 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. Where split-spoon refusal was encountered, the auger was advanced until the first water-bearing zone was encountered. The on-site geologist logging the auger boreholes continued the lithological log for each borehole from the depth of split-spoon sampler refusal to the bottom of the auger borehole by logging the auger drill cuttings. The drill cuttings were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geologic and hydrogeologic information. Soil characteristics were described using the “Burmeister Identification System” presented in Hunt (1986) and the USCS as outlined in ASTM Method D 2488. The lithological logs are included in Appendix C.

Upon reaching the target depth in each borehole, a 10- to 20-foot-length of 2-inch ID, 0.010-inch continuous slot, Schedule 40 PVC screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 5 feet above the top of the well screen as the augers were removed. A bentonite seal, consisting of approximately 5 feet of bentonite pellets, was placed immediately on top of the filter pack and hydrated with potable water. In wells where the bentonite seal was installed below the water table surface, the bentonite pellets were allowed to hydrate in the groundwater. Bentonite seal

placement and hydration followed procedures in the SAP. Bentonite-cement grout was tremied into the remaining annular space of the well from the top of the bentonite seal to approximately ground surface. A locking well cap was placed on top of the PVC well casing. The well surface completion included installing a protective steel casing and concrete surface pad around the wellhead.

### **3.1.3.3 Bedrock Monitoring Well**

One permanent bedrock monitoring was installed at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), adjacent to residuum well PPMP-127-MW02. The bedrock monitoring well location is shown on Figure 3-2.

The bedrock monitoring well (PPMP-127-MW06) borehole was drilled using a combination of air-rotary drilling and rock coring techniques following procedures specified in the SAP. The monitoring well was installed as a double-cased well, with the outer casing installed to a depth of approximately 42 feet bgs and the inner casing installed to depth of approximately 52 feet bgs.

An air-rotary drill rig with a 12-inch percussion bit or rotary bit was used to drill the borehole from ground surface to 3 feet into competent bedrock. An 8-inch ID carbon steel International Pipe Standard (IPS) outer casing was then installed into the borehole from ground surface to 3 feet into bedrock. A minimum of 2 inches of annular space was maintained between the outer casing and the borehole wall. The 8-inch outer casing was grouted in-place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout was mixed using approximately 6 to 7 gallons of water and 5 pounds of bentonite per 94-pound bag of Type I Portland cement. The grout cured for a minimum of 48 hours before drilling continued. A PQ wireline core barrel was used to collect an approximately 0.6-foot core sample when a void was encountered. After encountering the void, a 7/8-inch air percussion bit was used to ream the hole to a depth of 51.6 feet bgs.

A 4-inch monitoring well was installed through the outer casing. The well casing consisted of 4-inch ID, Schedule 80, threaded, flush-joint PVC pipe. Because a void was encountered at a depth of approximately 43 feet bgs, a prepacked screen was installed at the bottom of the borehole. The 4.5-foot screen was constructed of another screen made of Schedule 40 PVC (with 0.010-inch factory slots) and an inner screen made of Schedule 80 PVC (continuous wrap). A filter pack of 20/40 silica sand was present between the well screens. An additional 20/40 silica sand filter pack was tremied into place from the bottom of the borehole to approximately 4 feet above the top of the prepack screen. A 5-foot bentonite seal was placed above the filter pack. A bentonite-cement mixture (described above) was tremied into the remaining annular

space from the top of the bentonite seal to approximately ground surface. A steel flush-mount monitoring well cover was placed over the riser and locking cap and secured in place with a concrete pad.

#### **3.1.3.4 Well Development**

The wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was equal to or less than 20 nephelometric turbidity units (NTU), for a maximum of 4 hours for the temporary monitoring wells, a maximum of 8 hours for the permanent residuum monitoring wells, or a maximum of 12 hours for the permanent bedrock monitoring well. The well development logs are included in Appendix D.

#### **3.1.3.5 Temporary Monitoring Well Abandonment**

Temporary monitoring wells PPMP-127-GP01, PPMP-127-GP02, and PPMP-127-GP03 were abandoned in November 2000, according to procedures outlined in the SAP. The well abandonment forms are included in Appendix E.

#### **3.1.4 Groundwater Sampling**

A total of 16 groundwater samples were collected from the monitoring wells installed at Parcel 127(7). The groundwater sample locations are shown on Figure 3-2. The groundwater sampling locations and rationale are listed in Table 3-1. Groundwater sample designations and analytical parameters are listed in Table 3-5.

**Sample Collection.** Groundwater sampling was performed following procedures outlined in the SAP. Groundwater was sampled after purging a minimum of three well volumes and after field parameters (i.e., temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Purging was performed with a mechanical pump (i.e., a peristaltic, submersible, or bladder pump) equipped with Teflon™ tubing. Sampling was performed with either the pump or a Teflon bailer. In instances where a peristaltic pump was used for sampling, the sample was collected using the “tube evacuation” method described in the SAP (IT, 2002). Field parameters were measured using a calibrated water-quality meter, as summarized in Table 3-6. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.3.

Table 3-5

Groundwater Sample Designations and Analytical Parameters  
 Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

Sample Location	Sample Designation	QA/QC Samples			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-127-GP01	PPMP-127-GP01-GW-KR3001-REG			PPMP-127-GP01-GW-KR3001-MS PPMP-127-GP01-GW-KR3001-MSD	VOCs, SVOCs, TAL Metals
PPMP-127-GP02	PPMP-127-GP02-GW-KR3002-REG				VOCs, SVOCs, TAL Metals
PPMP-127-GP03	PPMP-127-GP03-GW-KR3003-REG	PPMP-127-GP03-GW-KR3004-FD	PPMP-127-GP03-GW-KR3005-FS		VOCs, SVOCs, TAL Metals
PPMP-127-MW01	PPMP-127-MW01-GW-KRR3001-REG			PPMP-127-MW01-GW-KRR3001-MS PPMP-127-MW01-GW-KRR3001-MD	VOCs
	PPMP-127-MW01-GW-KRR3009-REG	PPMP-127-MW01-GW-KRR3011-FD			VOCs
	PPMP-127-MW01-GW-KRR3001R-REG				VOCs
PPMP-127-MW02	PPMP-127-MW02-GW-KRR3002-REG				VOCs
	PPMP-127-MW02-GW-CSM3008-REG				VOCs
PPMP-127-MW03	PPMP-127-MW03-GW-KRR3003-REG	PPMP-127-MW03-GW-KRR3004-FD			VOCs
	PPMP-127-MW03-GW-KRR3012-REG				VOCs
PPMP-127-MW04	PPMP-127-MW04-GW-KRR3006-REG				VOCs
	PPMP-127-MW04-GW-KRR3013-REG				VOCs

Table 3-5

**Groundwater Sample Designations and Analytical Parameters  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Sample Location	Sample Designation	QA/QC Samples			Analytical Parameters
		Field Duplicates	Field Splits	MS/MSD	
PPMP-127-MW05	PPMP-127-MW05-GW-KRR3007-REG				VOCs
	PPMP-127-MW05-GW-KRR3014-REG				VOCs
PPMP-127-MW06	PPMP-127-MW06-GW-KRR3008-REG				VOCs
	PPMP-127-MW06-GW-CSM3009-REG			PPMP-127-MW06-GW-CSM3009-MS PPMP-127-MW06-GW-CSM3009-MSD	VOCs

Groundwater samples were collected from the approximate midpoint of the saturated screened interval of the monitoring well.

FD - Field duplicate.

FS - Field sample.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Regular.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

VOC - Volatile organic compound.

Table 3-6

**Groundwater Field Parameters  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Date	Specific Conductivity (mS/cm) <sup>a</sup>	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
PPMP-127-GP01	29-Jan-99	0.308	5.54	229	17.7	30	6.51
PPMP-127-GP02	1-Feb-99	0.138	0.69	0.43	17.1	46	5.73
PPMP-127-GP03	4-Feb-99	0.391	4.75	186	16.7	>1000	6.75
PPMP-127-MW01	2-Nov-00	0.467	3.87	500	21.7	18	5.87
	5-Mar-02	0.161	12.00 <sup>b</sup>	160	20.1	19	6.01
	8-Apr-02	1.190	13.24 <sup>b</sup>	289	19.0	13.6	5.96
PPMP-127-MW02	2-Nov-00	0.249	1.12	515	21.4	13	5.19
	21-Feb-02	0.187	5.51	224	21.3	19	5.66
PPMP-127-MW03	18-Dec-00	0.587	2.17	105	14.6	4.0	6.86
	8-Mar-02	0.508	19.22 <sup>b</sup>	90	16.4	138	6.48
PPMP-127-MW04	7-Nov-00	0.436	3.06	NR	19.5	740	6.21
	7-Mar-02	0.572	11.98 <sup>b</sup>	120	20.2	13	7.07
PPMP-127-MW05	19-Dec-00	0.462	NR	200	12.7	13	5.75
	6-Mar-02	0.604	11.41 <sup>b</sup>	70	20.3	6.1	6.99
PPMP-127-MW06	15-Jan-01	0.288	2.72	190	16.3	5.0	9.13
	25-Feb-02	0.232	6.22	-31	17.8	6.3	10.20

<sup>a</sup> Specific conductivity values standardized to millisiemen per centimeter.

<sup>b</sup> Elevated reading due to air in sampling equipment.

°C - Degrees Celsius.

mg/L - Milligrams per liter.

mS/cm - Millisiemen per centimeter.

mV - Millivolt.

NR - Not recorded.

NTU - Nephelometric turbidity units.

ORP - Oxidation-reduction potential.

SU - Standard units.

### **3.1.5 Water Level Measurements**

The depth to groundwater was measured in the permanent wells at Parcel 127(7) on January 8, 2002, following procedures outlined in the SAP. Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned before use at each well following decontamination methodology presented in the SAP. Measurements were referenced to the top of the PVC well casing. A summary of groundwater level measurements for Parcel 127(7) is presented in Table 3-7.

### **3.2 Surveying of Sample Locations**

Sample locations were surveyed using global positioning system survey and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix F.

### **3.3 Analytical Program**

Samples collected during the field investigations at Parcel 127(7) were analyzed for various chemical parameters based on the potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected during the SI at Parcel 127(7) were analyzed for the following parameters:

- Target analyte list metals – EPA Method 6010B/7000
- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL semivolatile organic compounds (SVOC) – EPA Method 8270C.

Soil samples collected during the supplemental SI were analyzed for one or more of the following parameters:

- Target analyte list metals – EPA Method 6010B/7471A
- Chromium – EPA Method 6010B
- Copper – EPA Method 6010B
- Lead – EPA Method 6010B
- Mercury – EPA Method 7471A.

Groundwater samples collected during the supplemental SI were analyzed for VOCs only using EPA Method 8260B. All samples were analyzed using EPA SW-846 methods, including Update III methods where applicable, as presented in the SAP.

**Table 3-7**

**Groundwater Elevations  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Well Location</b>	<b>Date</b>	<b>Depth to Water (ft BTOC)</b>	<b>Top of Casing Elevation (ft amsl)</b>	<b>Ground Elevation (ft amsl)</b>	<b>Groundwater Elevation (ft amsl)</b>
PPMP-127-MW01	8-Jan-02	30.54	814.56	814.82	784.02
PPMP-127-MW02	8-Jan-02	31.17	814.64	814.91	783.47
PPMP-127-MW03	8-Jan-02	24.57	807.64	805.39	783.07
PPMP-127-MW04	8-Jan-02	24.89	807.64	805.66	782.75
PPMP-127-MW05	8-Jan-02	24.41	809.02	807.02	784.61
PPMP-127-MW06	8-Jan-02	31.41	814.90	815.17	783.49

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

amsl - Above mean sea level.

BTOC - Below top of casing.

ft - Feet.

### **3.4 Sample Preservation, Packaging, and Shipping**

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain-of-custody records were recorded as specified in the SAP.

For the initial sampling, completed analysis request and chain-of-custody records (Appendix B) were included with each shipment of sample coolers to Quanterra Environmental Services of Knoxville, Tennessee. Split samples were shipped to the USACE South Atlantic Division Laboratory in Marietta, Georgia.

For the supplemental sampling, completed analysis request and chain-of-custody records (Appendix B) were included with each shipment of sample coolers to EMAX Laboratories, Inc. in Torrance, California.

### **3.5 Investigation-Derived Waste Management and Disposal**

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated during the SI at Parcel 127(7) was segregated as follows:

- Drill cuttings
- Purge water from well development, sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined roll-off bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, spent well materials, and personal protective equipment generated during field activities were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the 20,000-gallon sump associated with Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on Main Post.

**Table 3-8**

**Variations to the Site-Specific Field Sampling Plans  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Variance to the SFSP</b>	<b>Justification for Variance</b>	<b>Impact to Site Investigation</b>
Temporary well PPMP-127-GP01 was moved approximately 7 feet south of the direct-push boring location PPMP-127-GP01.	Temporary well PPMP-127-GP01 was moved because of underground obstructions.	None.
Temporary well PPMP-127-GP02 was moved approximately 6 feet south of the direct-push boring location PPMP-127-GP02.	Temporary well PPMP-127-GP02 was moved because of underground obstructions.	None.
The Site-Specific Field Sampling Plan proposed collection of surface water and sediment samples at PPMP-127-SW/SD01 and PPMP-127-SW/SD02. Surface water and sediment samples were not collected from these two locations. Depositional soil samples PPMP-127-DEP02 and PPMP-127-DEP03 were collected at these locations.	Surface water and sediment samples were not collected from these two locations because surface water and sediment were not present in the creek at the time of sample collection. Several attempts were made to collect the samples from the creek, but all attempts were unsuccessful.	None. Depositional soil samples collected from these locations are representative samples.
Permanent bedrock monitoring well PPMP-127-MW06 was installed with an 8-inch outer casing and a 10-foot prepacked, factory-slotted PVC screen.	A void was encountered below the bottom of the 8-inch outer casing and within the proposed well screen. Due to the presence of this void or cavity, the possibility existed that the 20/40-silica sand filter pack would not remain in place, thus jeopardizing the structural integrity of the well.	None. Use of a double-cased well and prepacked screen allowed for successful installation of the well inside of the void.

### **3.6 Variances/Nonconformances**

Four variances to the SFSPs were recorded during completion of the SI at Parcel 127(7). The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP (IT, 1998a) or the SFSP addendum (IT, 2000b). The variances are summarized in Table 3-8 and the variance reports are included in Appendix G.

No nonconformances were recorded during completion of field activities at Parcel 127(7).

### **3.7 Data Quality**

The field sample analytical data are presented in tabular form in Appendix H. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the site-specific work plans; the FTMC SAP and quality assurance plan; and standard, accepted methods and procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001) and the stipulated requirements for the generation of definitive data (IT, 2002). Chemical data were reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms.

**Data Validation.** The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. Appendix I includes data validation summary reports that discuss the results of the validation. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the reports. The validation-assigned qualifiers were added to the ShawView™ database for tracking and reporting. The qualified data were used in comparisons to the SSSLs and ESVs. Rejected data (assigned an “R” qualifier) were not used in the comparison to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this investigation.

## **4.0 Site Characterization**

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Subsurface investigations performed at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7) provided soil, bedrock, and groundwater data used to characterize the geology and hydrogeology of the site.

### **4.1 Regional and Site Geology**

#### **4.1.1 Regional Geology**

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold-and-thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold-and-thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted, with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults, and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992) and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group consists of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984) but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper, undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish gray siltstone and mudstone. Massive to laminated

greenish gray and black mudstone makes up the Nichols Formation, with thin interbeds of siltstone and very fine-grained sandstone (Osborne et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appears to dominate the unit and consist primarily of coarse-grained, vitreous quartzite and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consist of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post and consists of interlayered bluish gray or pale yellowish gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline, porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post, as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated, thinly interbedded grayish red-purple mudstone, shale, siltstone, and greenish red and light gray sandstone, with locally occurring limestone and dolomite. Weaver Cave, located approximately 1 mile west of the northwest boundary of the Main Post, is situated in gray dolomite and limestone mapped as the Rome formation (Osborne et al., 1997). The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962; Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark gray, finely to coarsely crystalline, medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in

Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weather to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped as undifferentiated at FTMC and in other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites, and limestones and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Osborne et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark to light gray limestone with abundant chert nodules and greenish gray to grayish red phosphatic shale, with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale based on fossil data.

The Pennsylvanian Parkwood Formation overlies the Floyd Shale and consists of a medium to dark gray, silty, clay shale and mudstone with interbedded light to medium gray, very fine to fine grained, argillaceous, micaceous sandstone. Locally the Parkwood Formation also contains beds of medium to dark gray argillaceous, bioclastic to cherty limestone and beds of clayey coal up to a few inches thick (Raymond et. al., 1988). The Parkwood Formation in Calhoun County is generally found within a structurally complex area known as the Coosa deformed belt. In the deformed belt, the Parkwood Formation and Floyd Shale are mapped as undifferentiated because their lithologic similarity and significant deformation make it impractical to map the contact (Thomas and Drahovzal, 1974; Osborne et al., 1988). The undifferentiated Parkwood Formation and Floyd Shale are found throughout the western quarter of Pelham Range.

The Jacksonville thrust fault is the most significant structural geologic feature in the vicinity of the Main Post of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama, and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City fault (Osborne and Szabo, 1984). The Ordovician sequence that makes up the Eden thrust sheet is exposed at FTMC through an eroded window, or fenster, in the overlying thrust sheet. Rocks within the window display complex folding, with the folds being overturned and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation; north by the Conasauga Formation; northeast, east, and southwest by the Shady Dolomite; and southeast and southwest by the Chilhowee Group (Osborne et al., 1997). Two small klippen of the Shady Dolomite, bounded by the Jacksonville fault, have been recognized adjacent to the Pell City fault at the FTMC window (Osborne et al., 1997).

The Pell City fault serves as a fault contact between the bedrock within the FTMC window and the Rome and Conasauga Formations. The trace of the Pell City fault is also exposed approximately nine miles west of the FTMC window on Pelham Range, where it traverses northeast to southwest across the western quarter of Pelham Range. Here, the trace of the Pell City fault marks the boundary between the Pell City thrust sheet and the Coosa deformed belt.

The eastern three-quarters of Pelham Range is located within the Pell City thrust sheet, while the remaining western quarter of Pelham Range is located within the Coosa deformed belt. The Pell City thrust sheet is a large-scale thrust sheet containing Cambrian and Ordovician rocks and is relatively less structurally complex than the Coosa deformed belt (Thomas and Neathery, 1982). The Pell City thrust sheet is exposed between the traces of the Jacksonville and Pell City faults along the western boundary of the FTMC window and along the trace of the Pell City fault on

Pelham Range (Thomas and Neathery, 1982; Osborne et al., 1988). The Coosa deformed belt is a narrow northeast-to-southwest-trending linear zone of complex structure (approximately 5 to 20 miles wide and approximately 90 miles long) consisting mainly of thin imbricate thrust slices. The structure within these imbricate thrust slices is often internally complicated by small-scale folding and additional thrust faults (Thomas and Drahovzal, 1974).

#### **4.1.2 Site Geology**

The soil type mapped at Parcel 127(7) is the Anniston and Allen gravelly loam. This soil type is typically developed in old alluvium found along the foot slopes and alluvial fans of the larger hills in the region. The color of the surface soil ranges from dark brown to reddish brown and the subsurface soil is generally reddish brown. The soil consists of a gravelly, clay loam to clay or silty clay loam. (U.S. Department of Agriculture, 1961).

Parcel 127(7) is located within the eroded geologic “window” in the uppermost structural thrust sheet at FTMC. Two mapping units encountered at Parcel 127(7) are the undifferentiated Mississippian/Ordovician Floyd and Athens Shale and the undifferentiated Ordovician Little Oak and Newala Limestones. The majority of the parcel is underlain by the undifferentiated Floyd and Athens Shale with only the eastern corner of the parcel underlain by the undifferentiated Ordovician Little Oak and Newala Limestones (Osborne et al., 1997) (Figure 4-1). Floyd Shale consists of thin-bedded, fissile, brown to black shale with thin intercalated limestone layers and interbedded sandstone. The Athens Shale consists of dark gray to black shale and graptolitic shale with localized interbedded dark gray limestone. The Newala Limestone consists of light to dark gray, micritic, thick bedded limestone with minor dolomite. The little Oak Limestone is comprised of dark gray medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules (Osborne et al., 1989).

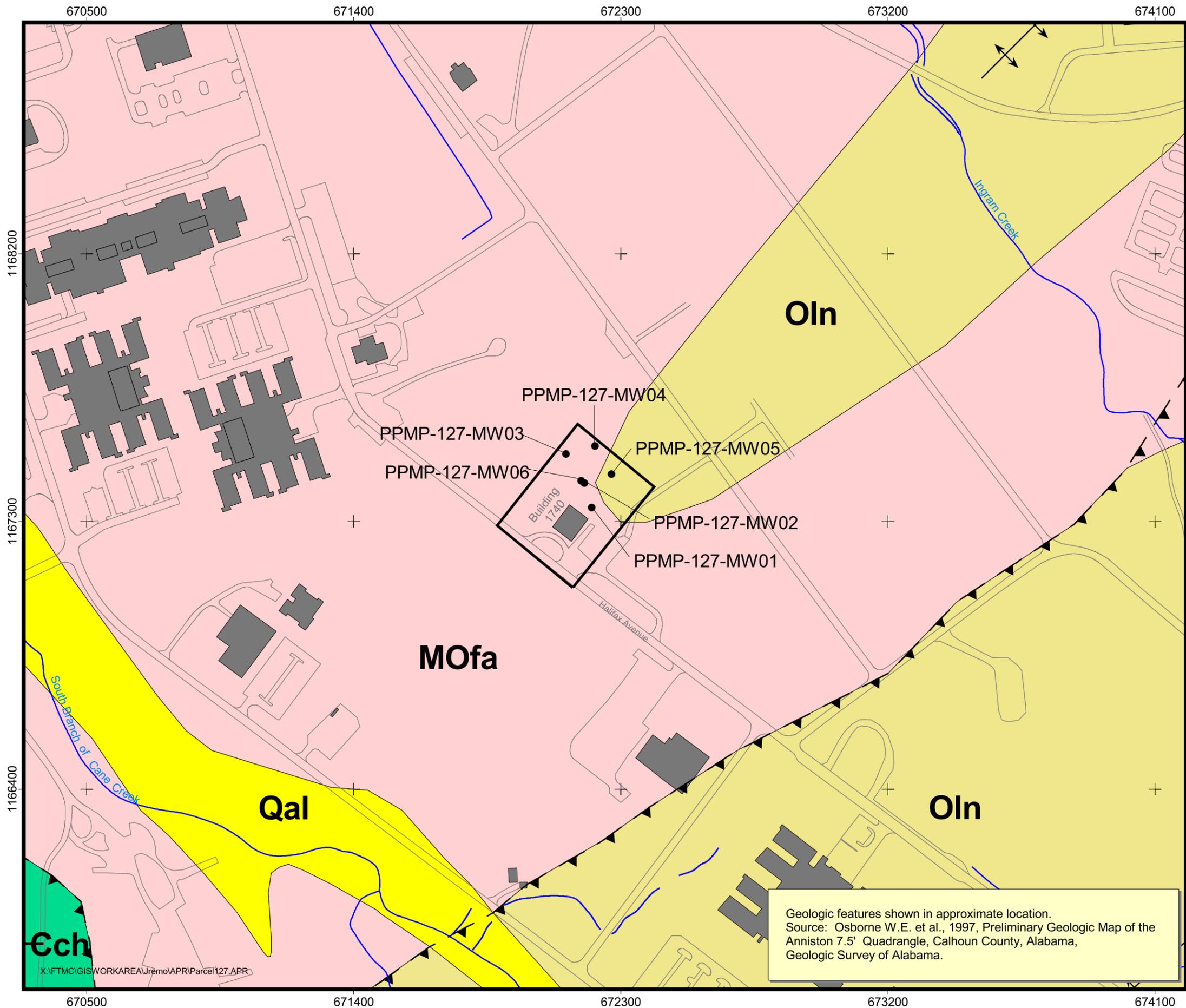
A geologic cross section was constructed using the hollow-stem auger and bedrock coring data collected during the SI, as shown on Figure 4-2. The geologic cross section location is shown on Figure 3-2. The soil encountered from ground surface to a depth of approximately 4 to 6 feet bgs consisted of a brown to yellowish brown clayey, gravelly, sandy silt. Underlying this interval was yellowish-orange to yellowish-brown clay with some gravel, sand, and silt, which extends to a depth between 26.5 and 39.0 feet bgs. Highly weathered, calcareous black shale was encountered during the installation of monitoring wells PPMP-127-MW01 and PPMP-127-MW02 at depths of 30 and 35 feet bgs, respectively. Competent grayish-black limestone was encountered during the installation of PPMP-127-MW03, PPMP-127-MW04, and PPMP-127-MW06 at depths of 26.5, 31.0, and 39.0 feet bgs, respectively. The rock core collected at PPMP-127-MW06 revealed limestone underlying the site to be slightly weathered, microcrystalline, and

# Figure 4-1

## Site Geologic Map

### Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)

Fort McClellan  
Calhoun County, Alabama



### Legend

- Parcel Boundary
- Buildings
- Permanent Monitoring Well Location
- Streams
- Roads

### Geology

- Quaternary - Alluvium
- Mississippian/Ordovician - Floyd & Athens Shale, Undifferentiated
- Ordovician - Little Oak and Newala Limestones, Undifferentiated
- Cambrian Chilhowee Group, Undifferentiated

- Thrust Fault (dashed where inferred; barbs on upper plate)
- Anticline

300 0 300 Feet  
NAD 83 State Plane Feet

N

Shaw Environmental, Inc.

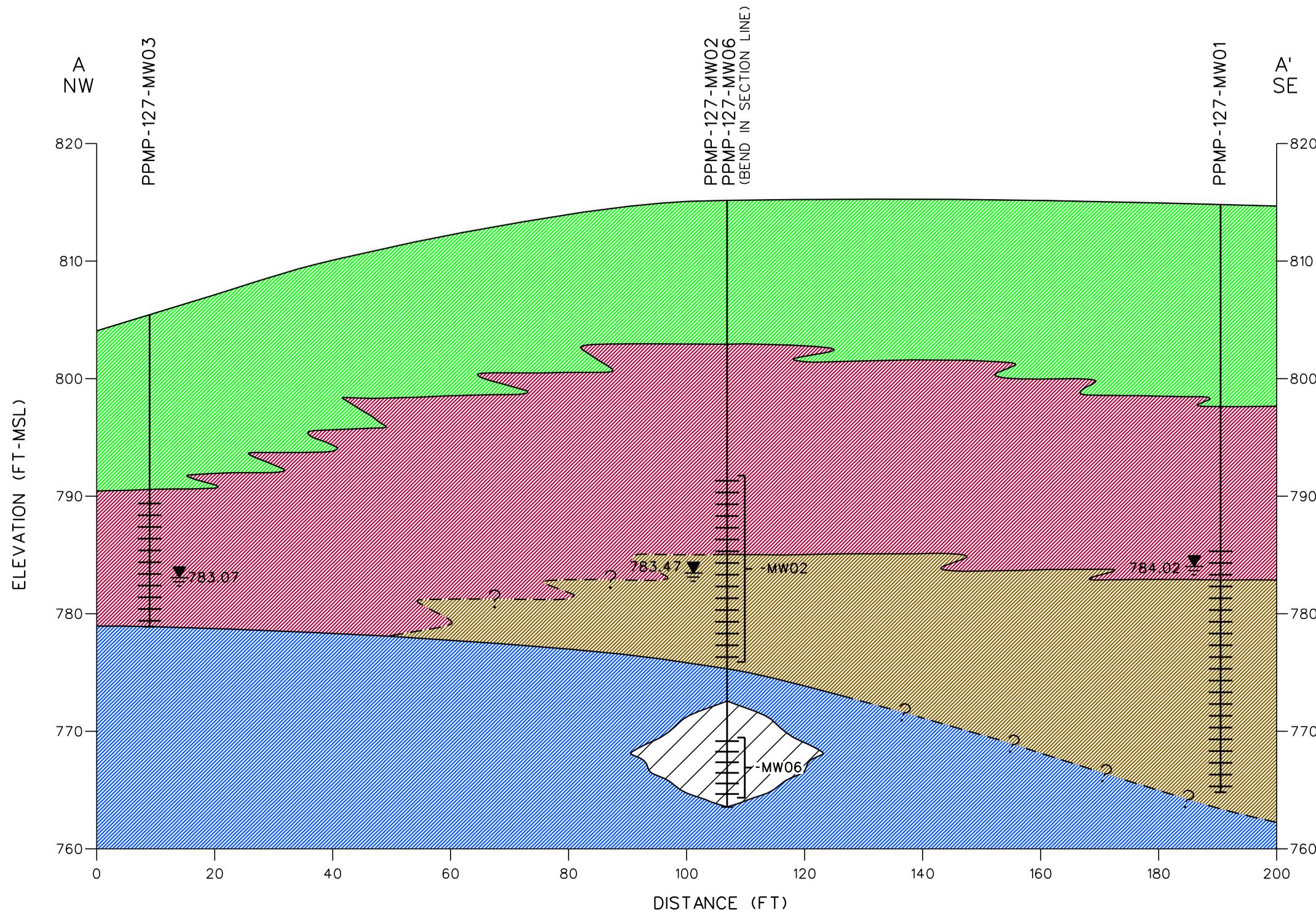
U.S. Army Corps of Engineers  
Mobile District

Contract No. DACA21-96-D-0018

Geologic features shown in approximate location.  
Source: Osborne W.E. et al., 1997, Preliminary Geologic Map of the Anniston 7.5' Quadrangle, Calhoun County, Alabama, Geologic Survey of Alabama.

X:\FTMCGIS\WORKAREA\Jremo\APR\Parcel127.APR

DWG. NO.: \774645es.760  
 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHCK. BY:  
 ENGR. CHCK. BY: J. JENKINS  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 04/26/01  
 DRAWN BY: D. BOMAR  
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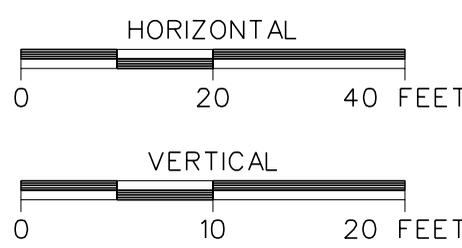


**LEGEND**

- SCREEN INTERVAL
- WATER TABLE
- 783.07 GROUNDWATER ELEVATION (FT AMSL) (JANUARY 8, 2002)
- ? -- CONTACT DASHED WHERE INFERRED
- VOID
- CLAY, SOME GRAVEL, SAND, SILT
- SILTY CLAY
- WEATHERED SHALE
- LIMESTONE

**NOTES:**

- ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- SEE FIGURE 3-2 FOR CROSS SECTION LOCATION.



**FIGURE 4-2**  
**GEOLOGIC CROSS SECTION A-A'**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**  
 U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018

containing veins of calcite. The weathered, calcareous black shale encountered thins from the southeast to the northwest beneath the site and pinches out between PPMP-127-MW06 and PPMP-127-MW03.

Based on geologic data collected during the drilling activities, the location of the undifferentiated Little Oak and Newala Limestones is situated slightly farther north than indicated on Figure 4-1. The reason for this discrepancy is the scale at which the data are presented. Because the scale of Figure 4-1 is greater than the accuracy of the data source, a margin of error results. Therefore, the locations of the geologic features are approximate.

## **4.2 Site Hydrology**

### **4.2.1 Surface Hydrology**

Precipitation in the form of rainfall averages about 53 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, 1998). The major surface water features at the Main Post of FTMC include Cane Creek, Cave Creek, South Branch of Cane Creek, and Remount Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Parcel 127(7) lies at approximately 810 feet above mean sea level and is relatively flat. However, the eastern portion of the parcel has a slight slope to the north. Surface water runoff from the western portion of the site collects in storm drains, which eventually empty into Cane Creek approximately 2,000 feet north of the site. Surface water runoff from the eastern portion of the parcel collects in a natural surface drainage that flows to the north and then east, eventually emptying into Cane Creek.

### **4.2.2 Hydrogeology**

Static groundwater levels were measured in the permanent monitoring wells at Parcel 127(7) on January 8, 2002 (Table 3-7). A potentiometric surface map (Figure 4-3) was constructed for the residuum water-bearing zone at Parcel 127(7). As shown on Figure 4-3, horizontal groundwater flow across the site is generally to the north. The horizontal hydraulic gradient within the residuum water-bearing zone is low, indicating a relatively flat water table. An arithmetic mean of 0.01 feet per foot (ft/ft) was calculated using the January 2002 data (Table 4-1). The vertical hydraulic gradient of -0.001 ft/ft (Table 4-2), calculated from wells PPMP-127-MW02 and PPMP-127-MW06, suggests the residuum and bedrock groundwater-bearing zones are interconnected.

**Table 4-1**

**Horizontal Hydraulic Gradient  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Upgradient Well</b>	<b>Groundwater Elevation January 2002 (ft above msl)</b>	<b>Downgradient Well</b>	<b>Groundwater Elevation January 2002 (ft above msl)</b>	<b>Groundwater Elevation Difference (ft)</b>	<b>Distance Between Wells (ft)</b>	<b>Horizontal Hydraulic Gradient (ft/ft)</b>
PPMP-127-MW01	784.02	PPMP-127-MW02	783.47	0.55	77	0.007
PPMP-127-MW02	783.47	PPMP-127-MW03	783.07	0.43	105	0.004
PPMP-127-MW05	784.61	PPMP-127-MW04	782.75	1.86	98	0.019
<b>Arithmetic Mean</b>						<b>0.011</b>

ft = Feet.

msl = Mean sea level.

**Table 4-2**

**Vertical Hydraulic Gradient  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Well Cluster</b>	<b>Midpoint of Screen (ft below bgs)</b>	<b>Groundwater Elevation January 2002 (ft above msl)</b>	<b>dH (ft)</b>	<b>dL Mid. Screen (ft)</b>	<b>Vertical Hydraulic Gradient</b>
PPMP-127-MW02	31.10	783.47	-0.02	17.15	-0.001
PPMP-127-MW06	48.25	783.49			

I, Vertical hydraulic gradient =  $dH / dL$ , + if downward gradient, - if upward gradient.

dH = head of shallower well - head of deeper well.

dL = vertical distance between midpoint of screens.

bgs - below ground surface.

ft - feet.

msl - mean sea level.

DWG. NO.: ... \774645es.759  
 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOB  
 DRAFT. CHK. BY:  
 ENGR. CHK. BY: J. JENKINS  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 04/24/01  
 DRAWN BY: D. BOMAR  
 9/23/2004  
 2:13:59 PM  
 dbomar  
 c:\cadd\design\774645es.759



- LEGEND**
- UNIMPROVED ROAD
  - PAVED ROAD AND PARKING
  - BUILDING
  - TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
  - GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
  - (783.07) GROUNDWATER ELEVATION (FT AMSL) (JANUARY 8, 2002)
  - G.W. FLOW GROUNDWATER FLOW DIRECTION
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE / CREEK
  - UTILITY POLE
  - RESIDUUM MONITORING WELL LOCATION

**FIGURE 4-3**  
**POTENTIOMETRIC SURFACE MAP**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



## 5.0 Summary of Analytical Results

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The results of the chemical analyses of samples collected at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), indicate that metals, VOCs, and SVOCs were detected in the various site media. The analytical results were compared to human health SSSLs, ESVs, and background screening values for FTMC. The SSSLs and ESVs were developed as part of the human health and ecological risk evaluations associated with investigations performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and PAH background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000c). The PAH background screening values were developed at the direction of the BRAC Cleanup Team to address the occurrence of PAH compounds in surface soils as a result of anthropogenic activities at FTMC. Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (SAIC, 1998).

The following sections and Tables 5-1 through 5-3 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. A summary of validated analytical data is presented in Appendix H.

### 5.1 Surface and Depositional Soil Analytical Results

Twenty-six surface soil samples and four depositional soil samples were collected for chemical analysis at Parcel 127(7). Surface and depositional soil samples were collected from the uppermost foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals and PAHs), as presented in Table 5-1.

**Metals.** A total of 23 metals were detected in the surface and depositional soil samples. The concentrations of ten metals (aluminum, antimony, arsenic, chromium, copper, iron, lead, manganese, mercury, and thallium) exceeded SSSLs. Of these, the following metals also exceeded their respective background concentrations:

- Aluminum (17,000 to 23,200 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (16,306 mg/kg) at four sample locations (PPMP-127-GP11, PPMP-127-GP20, PPMP-127-GP21, and PPMP-127-GP23).
- Antimony (53.2 and 5.8 mg/kg) exceeded its SSSL (3.11 mg/kg) and background (1.99 mg/kg) at two sample locations (PPMP-127-DEP02 and PPMP-127-GP22).

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-DEP01 KR0029 8-Mar-99 0-1					PPMP-127-DEP02 KR0030 8-Mar-99 0-1					PPMP-127-DEP02 KR0030R 16-May-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>c</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	8.14E+03			YES	YES	6.98E+03				YES	NR				
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					5.32E+01		YES	YES	YES	NR				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.90E+00			YES		7.80E+00			YES		NR				
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.17E+02					5.56E+01					NR				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.00E+00			YES		6.80E-01 J					NR				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					NR				
Calcium	mg/kg	1.72E+03	NA	NA	7.87E+03			YES		2.93E+03		YES			NR				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	8.40E+00				YES	1.50E+01				YES	NR				
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	8.80E+00					6.60E+00 J					NR				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	7.70E+00					4.24E+03		YES	YES	YES	NR				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.18E+04			YES	YES	1.41E+04			YES	YES	NR				
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.59E+01			YES	YES	1.65E+02		YES		YES	NR				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.47E+03			YES		1.48E+03		YES			NR				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.94E+03			YES	YES	9.25E+02			YES	YES	NR				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.10E-02					2.10E+01		YES	YES	YES	3.24E+01		YES	YES	YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.30E+00 J					1.06E+01		YES			NR				
Potassium	mg/kg	8.00E+02	NA	NA	5.06E+02 J					3.04E+02 J					NR				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.00E+00			YES	YES	1.40E+00		YES		YES	NR				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					NR				
Sodium	mg/kg	6.34E+02	NA	NA	1.17E+02 B					1.26E+02 B					NR				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					NR				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.29E+01				YES	2.47E+01				YES	NR				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.97E+01					7.18E+01		YES		YES	NR				

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-DEP01 KR0029 8-Mar-99 0-1					PPMP-127-DEP02 KR0030 8-Mar-99 0-1					PPMP-127-DEP02 KR0030R 16-May-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					ND					NR				
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					NR				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					ND					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	5.00E-03	B				7.80E-03	B				NR				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	3.10E-03	J				4.90E-03	J				NR				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					NR				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					ND					NR				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					NR				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					NR				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	7.30E-02	J				ND					NR				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	9.60E-02	J		YES		ND					NR				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	1.60E-01	J				ND					NR				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	6.30E-02	J				ND					NR				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	8.00E-02	J				ND					NR				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	ND					ND					NR				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					NR				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	1.00E-01	J				ND					NR				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					NR				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					ND					NR				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					NR				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	1.40E-01	J		YES		ND					NR				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					NR				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					NR				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	8.90E-02	J				ND					NR				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	1.10E-01	J		YES		ND					NR				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 3 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-DEP03 KR0031 8-Mar-99 0-1					PPMP-127-GP01 KR0001 13-Jan-99 0-1					PPMP-127-GP02 KR0003 13-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	5.48E+03				YES	8.94E+03			YES	YES	1.39E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.30E+00		YES			3.30E+00			YES		4.60E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	5.65E+01					7.98E+01					1.29E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	5.20E-01	J				8.90E-01		YES			1.10E+00		YES		YES
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	2.17E+03		YES			4.05E+04		YES			3.41E+04		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.08E+01				YES	9.10E+00				YES	2.77E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.10E+00	J				ND					ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.78E+01		YES			1.60E+01		YES			1.50E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.45E+04			YES	YES	1.01E+04			YES	YES	1.70E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.23E+01		YES		YES	6.44E+01	J	YES		YES	1.57E+02	J		YES	YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.81E+02	J				1.76E+04	J	YES			2.77E+03	J	YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	5.03E+02			YES	YES	8.39E+02			YES	YES	7.01E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.10E-01		YES		YES	5.20E-02					9.80E-02		YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	3.60E+00	J				4.00E+00	J				1.30E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	3.33E+02	J				7.10E+02					1.27E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	8.50E-01		YES		YES	ND					9.70E-01	J	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					5.30E-01	J	YES			1.30E+00	J	YES		
Sodium	mg/kg	6.34E+02	NA	NA	9.83E+01	B				1.04E+02	J				2.32E+02	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.22E+01				YES	1.85E+01				YES	1.54E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.91E+01					4.20E+01		YES			1.20E+02		YES		YES

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 4 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-DEP03 KR0031 8-Mar-99 0-1					PPMP-127-GP01 KR0001 13-Jan-99 0-1					PPMP-127-GP02 KR0003 13-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.00E-02	J				ND					1.10E-02	B			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					2.60E-03	B				2.00E-03	B			
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					1.90E-03	J				ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	5.40E-03	B				2.40E-03	B				2.90E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	3.30E-03	J				ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					4.10E-02	J				ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					7.80E-02	J				4.30E-02	J			
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					4.70E-02	J				3.80E-02	J			
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	1.20E-01	J				5.90E-02	J				8.50E-02	J			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	1.50E-01	J	YES	YES		7.40E-02	J				9.50E-02	J		YES	
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	2.20E-01	J				9.70E-02	J				1.00E-01	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	9.10E-02	J				9.00E-02	J				7.60E-02	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	1.30E-01	J				6.50E-02	J				1.00E-01	J			
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	ND					6.00E-02	J				ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	1.30E-01	J				6.60E-02	J				9.10E-02	J			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					ND				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	1.70E-01	J		YES		7.80E-02	J				1.10E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	8.20E-02	J				6.30E-02	J				5.60E-02	J			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	5.70E-02	J				4.00E-02	J				5.60E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	1.40E-01	J		YES		8.00E-02	J				1.10E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					6.00E-02	B				8.10E-02	B			

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 5 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP03 KR0005 13-Jan-99 0-1					PPMP-127-GP04 KR0009 28-Jan-99 0-1					PPMP-127-GP05 KR0011 13-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	7.44E+03				YES	1.11E+04	J		YES	YES	7.03E+03				YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.90E+00		YES			4.20E+00			YES		7.10E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.87E+01					8.71E+01	J				9.84E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.10E-01	J				6.80E-01	J				7.20E-01				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					3.00E+00		YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	2.02E+03		YES			1.32E+03	J				4.04E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.68E+01				YES	8.10E+00	J			YES	3.08E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	ND					4.60E+00	J				1.60E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	7.50E+00					2.02E+01	J	YES			1.76E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.78E+04		YES	YES		1.04E+04	J		YES	YES	1.47E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.60E+01	J				7.93E+01	J	YES		YES	2.42E+02	J	YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	5.08E+02	J				4.86E+02	J				8.94E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.71E+02				YES	1.42E+03	J		YES	YES	4.90E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	8.30E-02		YES			5.80E-02					8.80E-02		YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.20E+00	J				5.80E+00					5.50E+00				
Potassium	mg/kg	8.00E+02	NA	NA	3.95E+02	J				2.67E+02	J				5.12E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.10E-01	J	YES		YES	8.10E-01		YES		YES	7.80E-01	J	YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	1.30E+00	J	YES			ND					8.60E-01	J	YES		
Sodium	mg/kg	6.34E+02	NA	NA	2.51E+01	J				6.89E+01	B				3.34E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	4.80E-01	J				ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.39E+01				YES	2.00E+01				YES	1.02E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.39E+01					1.76E+01	J				1.33E+02		YES		YES

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 6 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP03 KR0005 13-Jan-99 0-1					PPMP-127-GP04 KR0009 28-Jan-99 0-1					PPMP-127-GP05 KR0011 13-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>c</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	3.60E-02	J				ND					1.60E-02	B			
Bromomethane	mg/kg	NA	1.09E+01	NA	2.00E-03	B				ND					2.70E-03	B			
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.70E-03	B				3.10E-03	B				2.70E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					ND				
p-Cymene	mg/kg	NA	1.56E+03	NA	5.00E-03	J				ND					ND				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	3.50E-02	J				ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	5.60E-02	J				ND					3.80E-02	J			
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	4.20E-02	J				ND					4.50E-02	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	5.00E-02	J				ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	6.80E-02	J				ND					ND				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	4.10E-02	J				ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					5.70E-02	B				ND				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	5.30E-02	J				ND					4.40E-02	J			
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	4.70E-02	J				ND					ND				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					ND					ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	4.30E-02	J				ND					3.80E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	5.20E-02	B				ND					1.40E-01	B			

Table 5-1

Surface and Depositional Soil Analytical Results  
 Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
 Fort McClellan, Calhoun County, Alabama

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP06 KR0013 13-Jan-99 0-1					PPMP-127-GP06 KR0013R 8-Oct-01 0-.5					PPMP-127-GP07 KR0015 28-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.47E+03			YES	YES	NR					6.61E+03	J			YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					NR					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.80E+00			YES		NR					3.50E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.48E+02		YES		YES	NR					1.15E+02	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	9.80E-01		YES			NR					9.20E-01		YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	1.20E+00		YES			NR					4.10E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	8.29E+03		YES			NR					1.60E+04	J	YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.98E+01			YES	YES	NR					1.28E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	9.50E-01	J				NR					4.60E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.17E+01		YES			NR					1.18E+01	J			
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.88E+04			YES	YES	NR					1.13E+04	J		YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.64E+03	J	YES	YES	YES	2.06E+01					7.48E+01	J	YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.62E+03	J	YES			NR					2.25E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	9.05E+02			YES	YES	NR					6.43E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.40E-02					NR					6.70E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	6.60E+00					NR					5.30E+00				
Potassium	mg/kg	8.00E+02	NA	NA	7.32E+02					NR					6.49E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.00E+00	J	YES		YES	NR					5.70E-01	J	YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	1.10E+00	J	YES			NR					ND				
Sodium	mg/kg	6.34E+02	NA	NA	5.19E+01	J				NR					1.18E+02	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					NR					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.48E+01				YES	NR					1.65E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.36E+02		YES		YES	NR					7.05E+01	J	YES		YES

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP06 KR0013 13-Jan-99 0-1					PPMP-127-GP06 KR0013R 8-Oct-01 0-.5					PPMP-127-GP07 KR0015 28-Jan-99 0-1				
Parameter	Units	BKG <sup>d</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.40E-02	B				NR					ND				
Bromomethane	mg/kg	NA	1.09E+01	NA	2.10E-03	B				NR					ND				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					NR					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.20E-03	B				NR					3.10E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					NR					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					NR					ND				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					NR					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					NR					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					NR					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					NR					6.80E-02	J			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					NR					8.80E-02	J		YES	
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					NR					8.30E-02	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					NR					5.20E-02	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					NR					1.00E-01	J			
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	ND					NR					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					NR					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					NR					8.20E-02	J			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					NR					ND				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					NR					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					NR					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					NR					1.40E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					NR					4.70E-02	J			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					NR					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					NR					4.80E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					NR					1.10E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					NR					ND				

Table 5-1

**Surface and Depositional Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP08 KR0017 28-Jan-99 0-1					PPMP-127-GP09 KR0019 28-Jan-99 0-1					PPMP-127-GP10 KR0021 29-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	8.52E+03	J		YES	YES	9.62E+03	J		YES	YES	1.24E+04	J		YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.80E+00		YES			3.70E+00		YES			6.80E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	8.97E+01	J				7.62E+01	J				2.27E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.70E-01					8.50E-01		YES			3.40E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	5.11E+03	J	YES			1.65E+04	J	YES			1.45E+03	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.08E+01	J			YES	1.36E+01	J			YES	2.26E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.00E+00	J				3.80E+00	J				1.90E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	9.60E+00	J				1.03E+01	J				1.02E+01	J			
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.17E+04	J		YES	YES	9.18E+03	J		YES	YES	3.12E+04	J		YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	3.86E+01	J				7.04E+01	J	YES		YES	1.31E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.09E+03		YES			2.67E+03		YES			2.74E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	9.61E+02	J		YES	YES	4.79E+02	J		YES	YES	1.12E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	5.70E-02					5.10E-02					1.10E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	6.30E+00					6.20E+00					6.10E+00				
Potassium	mg/kg	8.00E+02	NA	NA	3.99E+02	J				5.35E+02	J				3.06E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	8.50E-01		YES		YES	5.40E-01	J	YES			1.00E+00		YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	6.74E+01	B				1.07E+02	B				7.30E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					4.40E-01	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.83E+01				YES	1.56E+01				YES	4.46E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.24E+01	J	YES			5.71E+01	J	YES		YES	1.96E+01	J			

Table 5-1

**Surface and Depositional Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP08 KR0017 28-Jan-99 0-1					PPMP-127-GP09 KR0019 28-Jan-99 0-1					PPMP-127-GP10 KR0021 29-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	3.30E-02	J				ND					ND				
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					ND				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.30E-03	B				2.80E-03	B				3.20E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	2.10E-01	J				ND					2.70E-01	J			
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	2.00E-01	J			YES	ND					1.30E-01	J			YES
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	2.60E-01	J				3.60E-02	J				3.70E-01	J			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	4.10E-01			YES	YES	4.60E-02	J				7.00E-01			YES	YES
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	4.20E-01					4.90E-02	J				4.90E-01				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	2.90E-01	J				ND					3.50E-01	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	5.40E-01					5.90E-02	J				6.50E-01				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	ND					ND					3.60E-01	J			YES
Carbazole	mg/kg	NA	3.11E+01	NA	4.30E-02	J				ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	3.30E-01	J				4.60E-02	J				3.90E-01				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					5.00E-01	B			
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					ND					7.20E-02	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	1.20E-01	J		YES		ND					1.70E-01	J		YES	
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	4.60E-01				YES	ND					3.60E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	2.80E-01	J				ND					3.50E-01	J			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					4.30E-02	J		YES	
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	9.30E-02	J				ND					3.80E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	3.60E-01	J			YES	ND					4.00E-01				YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	5.90E-02	B				6.30E-02	B				1.00E+00	B			YES

Table 5-1

Surface and Depositional Soil Analytical Results  
 Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
 Fort McClellan, Calhoun County, Alabama

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP11 KR0023 29-Jan-99 0-1					PPMP-127-GP12 KR0025 28-Jan-99 0-1					PPMP-127-GP13 KR0027 28-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.99E+04	J	YES	YES	YES	1.05E+04	J		YES	YES	8.33E+03	J		YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.00E+00			YES		3.70E+00			YES		3.30E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.16E+02	J				1.28E+02	J	YES			2.65E+02	J	YES		YES
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	9.40E-01		YES			1.10E+00		YES		YES	1.60E+00		YES		YES
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					4.80E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	4.79E+04	J	YES			6.39E+03	J	YES			3.32E+04	J	YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.96E+01	J		YES	YES	6.10E+00	J			YES	8.30E+00	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.50E+00	J				4.30E+00	J				4.90E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.47E+01	J	YES			7.10E+00	J				1.53E+01	J	YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.06E+04	J		YES	YES	8.58E+03	J		YES	YES	5.85E+03	J		YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.32E+01	J	YES		YES	1.72E+01	J				8.69E+01	J	YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.41E+03		YES			1.52E+03		YES			9.67E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.46E+02	J			YES	2.51E+03	J	YES	YES	YES	5.52E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.50E-01		YES		YES	4.10E-02					8.70E-02		YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.07E+01		YES			5.40E+00					5.90E+00				
Potassium	mg/kg	8.00E+02	NA	NA	1.41E+03		YES		YES	4.26E+02	J				1.31E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.70E-01		YES		YES	6.80E-01		YES			7.30E-01		YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	3.66E+02	J				7.04E+01	B				1.69E+02	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	9.50E-01	B		YES		ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.68E+01				YES	1.55E+01				YES	7.70E+00				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.13E+02	J	YES		YES	1.27E+01	J				2.01E+02	J	YES		YES

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP11 KR0023 29-Jan-99 0-1					PPMP-127-GP12 KR0025 28-Jan-99 0-1					PPMP-127-GP13 KR0027 28-Jan-99 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					ND					1.70E-02	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					ND				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	ND					ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.50E-03	B				2.40E-03	B				2.70E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					ND					8.70E-02	J			
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	4.00E-01	J				ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	3.20E-01	J			YES	ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	5.10E-01					ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	1.00E+00			YES	YES	ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	7.80E-01					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	9.20E-01					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	1.10E+00					ND					ND				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	1.10E-01	J				ND					6.20E-02	J			
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	5.50E-01					ND					4.00E-02	J			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	8.40E-01	B				ND					ND				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	3.70E-01	J		YES		ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	5.10E-01				YES	ND					4.10E-02	J			
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	7.50E-01					ND					ND				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					4.10E-02	J		YES	
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	1.20E-01	J			YES	ND					9.70E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	3.70E-01	J			YES	ND					3.50E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	2.10E-01	B				ND					1.30E-01	B			

Table 5-1

**Surface and Depositional Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP14 KR0032 18-Jun-01 0-1					PPMP-127-GP15 KR0034 18-Jun-01 0-1					PPMP-127-GP16 KR0036 18-Jun-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	NR					NR					NR				
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	NR					NR					NR				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	NR					NR					NR				
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	NR					NR					NR				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	NR					NR					NR				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	NR					NR					NR				
Calcium	mg/kg	1.72E+03	NA	NA	NR					NR					NR				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	NR					NR					NR				
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	NR					NR					NR				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.66E+01		YES			2.30E+03		YES	YES	YES	2.12E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	NR					NR					NR				
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	NR					NR					NR				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	NR					NR					NR				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	NR					NR					NR				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.80E-02					1.36E+01		YES	YES	YES	7.90E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	NR					NR					NR				
Potassium	mg/kg	8.00E+02	NA	NA	NR					NR					NR				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	NR					NR					NR				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	NR					NR					NR				
Sodium	mg/kg	6.34E+02	NA	NA	NR					NR					NR				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	NR					NR					NR				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	NR					NR					NR				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	NR					NR					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 14 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP14 KR0032 18-Jun-01 0-1					PPMP-127-GP15 KR0034 18-Jun-01 0-1					PPMP-127-GP16 KR0036 18-Jun-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Bromomethane	mg/kg	NA	1.09E+01	NA	NR					NR					NR				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	NR					NR					NR				
p-Cymene	mg/kg	NA	1.55E+03	NA	NR					NR					NR				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	NR					NR					NR				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	NR					NR					NR				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	NR					NR					NR				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	NR					NR					NR				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	NR					NR					NR				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	NR					NR					NR				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	NR					NR					NR				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	NR					NR					NR				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	NR					NR					NR				
Carbazole	mg/kg	NA	3.11E+01	NA	NR					NR					NR				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	NR					NR					NR				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	NR					NR					NR				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	NR					NR					NR				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	NR					NR					NR				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	NR					NR					NR				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	NR					NR					NR				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	NR					NR					NR				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	NR					NR					NR				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	NR					NR					NR				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	NR					NR					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP17 KR0038 18-Jun-01 0-1					PPMP-127-GP19 KR0041 11-Jul-01 0-1					PPMP-127-GP20 KR0042 11-Jul-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	NR					1.46E+04			YES	YES	1.70E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	NR					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	NR					3.86E+00			YES		7.72E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	NR					9.10E+01					1.37E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	NR					9.74E-01	J	YES			9.53E-01	B	YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	NR					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	NR					1.29E+04		YES			6.93E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	NR					1.21E+01				YES	1.96E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	NR					5.79E+00					6.43E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.30E+03		YES	YES	YES	1.17E+01					3.74E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	NR					1.09E+04			YES	YES	1.73E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	NR					3.39E+01					1.16E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	NR					3.07E+03		YES			1.87E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	NR					8.53E+02			YES	YES	9.70E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.10E+01		YES	YES	YES	5.00E-02	J				1.70E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	NR					7.38E+00					1.01E+01				
Potassium	mg/kg	8.00E+02	NA	NA	NR					1.05E+03		YES			1.07E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	NR					ND					ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	NR					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	NR					1.06E+02	B				9.60E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	NR					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	NR					2.27E+01				YES	2.89E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	NR					5.44E+01		YES		YES	2.14E+02		YES		YES

Table 5-1

Surface and Depositional Soil Analytical Results  
 Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
 Fort McClellan, Calhoun County, Alabama

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP17 KR0038 18-Jun-01 0-1					PPMP-127-GP19 KR0041 11-Jul-01 0-1					PPMP-127-GP20 KR0042 11-Jul-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Bromomethane	mg/kg	NA	1.09E+01	NA	NR					NR					NR				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	NR					NR					NR				
p-Cymene	mg/kg	NA	1.55E+03	NA	NR					NR					NR				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	NR					NR					NR				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	NR					NR					NR				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	NR					NR					NR				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	NR					NR					NR				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	NR					NR					NR				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	NR					NR					NR				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	NR					NR					NR				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	NR					NR					NR				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	NR					NR					NR				
Carbazole	mg/kg	NA	3.11E+01	NA	NR					NR					NR				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	NR					NR					NR				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	NR					NR					NR				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	NR					NR					NR				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	NR					NR					NR				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	NR					NR					NR				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	NR					NR					NR				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	NR					NR					NR				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	NR					NR					NR				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	NR					NR					NR				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	NR					NR					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP21 KR0043 11-Jul-01 0-1					PPMP-127-GP22 KR0044 11-Jul-01 0-1					PPMP-127-GP23 KR0045 11-Jul-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.15E+04		YES	YES	YES	1.43E+04			YES	YES	2.32E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					5.81E+00	J	YES	YES	YES	ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.33E+00			YES		5.49E+00			YES		6.24E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.18E+02					8.88E+01					1.30E+02			YES	
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	8.73E-01	B	YES			7.50E-01	B				8.75E-01	B	YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	3.36E+03		YES			6.08E+03		YES			2.31E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.01E+01				YES	1.53E+01				YES	2.29E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.22E+00					5.21E+00					7.28E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.49E+01		YES			2.92E+02		YES		YES	1.03E+02		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.99E+04			YES	YES	1.70E+04			YES	YES	2.24E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.18E+02		YES		YES	5.76E+01		YES		YES	1.00E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.33E+03		YES			1.57E+03		YES			1.21E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	9.33E+02			YES	YES	5.66E+02			YES	YES	6.07E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.53E-01		YES		YES	1.14E+00		YES		YES	3.80E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.14E+01		YES			8.06E+00					1.27E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	1.29E+03		YES			1.02E+03		YES			1.38E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	4.77E+01	B				8.95E+01	B				4.52E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.74E+01				YES	2.55E+01				YES	4.09E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.20E+02		YES		YES	6.47E+01		YES		YES	1.12E+02		YES		YES

Table 5-1

Surface and Depositional Soil Analytical Results  
 Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
 Fort McClellan, Calhoun County, Alabama

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP21 KR0043 11-Jul-01 0-1					PPMP-127-GP22 KR0044 11-Jul-01 0-1					PPMP-127-GP23 KR0045 11-Jul-01 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Bromomethane	mg/kg	NA	1.09E+01	NA	NR					NR					NR				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	NR					NR					NR				
p-Cymene	mg/kg	NA	1.55E+03	NA	NR					NR					NR				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	NR					NR					NR				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	NR					NR					NR				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	NR					NR					NR				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	NR					NR					NR				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	NR					NR					NR				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	NR					NR					NR				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	NR					NR					NR				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	NR					NR					NR				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	NR					NR					NR				
Carbazole	mg/kg	NA	3.11E+01	NA	NR					NR					NR				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	NR					NR					NR				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	NR					NR					NR				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	NR					NR					NR				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	NR					NR					NR				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	NR					NR					NR				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	NR					NR					NR				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	NR					NR					NR				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	NR					NR					NR				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	NR					NR					NR				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	NR					NR					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

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Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP24 KR0046 16-Jul-01 0-0.5					PPMP-127-GP25 KR0047 16-Jul-01 0-0.5					PPMP-127-GP26 KR0071 20-Jun-02 0-1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	NR					NR					NR				
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	NR					NR					NR				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	NR					NR					NR				
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	NR					NR					NR				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	NR					NR					NR				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	NR					NR					NR				
Calcium	mg/kg	1.72E+03	NA	NA	NR					NR					NR				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	NR					NR					8.81E+00				
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	NR					NR					NR				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	NR					NR					NR				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	NR					NR					NR				
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.69E+01					2.81E+01					NR				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	NR					NR					NR				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	NR					NR					NR				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	NR					NR					NR				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	NR					NR					NR				
Potassium	mg/kg	8.00E+02	NA	NA	NR					NR					NR				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	NR					NR					NR				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	NR					NR					NR				
Sodium	mg/kg	6.34E+02	NA	NA	NR					NR					NR				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	NR					NR					NR				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	NR					NR					NR				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	NR					NR					NR				

Table 5-1

**Surface and Depositional Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 20 of 20)

Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-127-GP24 KR0046 16-Jul-01 0- 0.5					PPMP-127-GP25 KR0047 16-Jul-01 0- 0.5					PPMP-127-GP26 KR0071 20-Jun-02 0- 1				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Bromomethane	mg/kg	NA	1.09E+01	NA	NR					NR					NR				
Chloromethane	mg/kg	NA	4.85E+01	1.00E-01	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	NR					NR					NR				
p-Cymene	mg/kg	NA	1.55E+03	NA	NR					NR					NR				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	NR					NR					NR				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	NR					NR					NR				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	NR					NR					NR				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	NR					NR					NR				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	NR					NR					NR				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	NR					NR					NR				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	NR					NR					NR				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	NR					NR					NR				
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	2.40E-01	NR					NR					NR				
Carbazole	mg/kg	NA	3.11E+01	NA	NR					NR					NR				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	NR					NR					NR				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	NR					NR					NR				
Di-n-octyl phthalate	mg/kg	NA	1.56E+02	7.09E+02	NR					NR					NR				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	NR					NR					NR				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	NR					NR					NR				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	NR					NR					NR				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	NR					NR					NR				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	NR					NR					NR				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	NR					NR					NR				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	NR					NR					NR				

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

<sup>a</sup> BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama, July*.

For SVOCs, concentration listed is the background screening value for soils adjacent to asphalt as given in IT Corporation (IT), 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

<sup>b</sup> Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-2

**Subsurface Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-127-GP01 KR0002 13-Jan-99 1 - 4				PPMP-127-GP02 KR0004 13-Jan-99 3 - 6				PPMP-127-GP03 KR0008 13-Jan-99 3 - 6				PPMP-127-GP04 KR0010 13-Jan-99 6 - 9			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL												
<b>METALS</b>																			
Aluminum	mg/kg	1.36E+04	7.80E+03	9.77E+03			YES	9.01E+03			YES	8.76E+03			YES	1.22E+04	J		YES
Arsenic	mg/kg	1.83E+01	4.26E-01	5.80E+00			YES	1.11E+01			YES	8.00E+00			YES	6.00E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	7.79E+01				3.35E+01				3.06E+01				2.69E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	8.10E-01				5.70E-01	J			3.20E-01	J			3.70E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	ND															
Calcium	mg/kg	6.37E+02	NA	1.94E+03		YES		2.05E+03		YES		4.52E+02	J			1.13E+03	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	3.63E+01			YES	2.09E+01				1.60E+01				2.26E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				ND				ND				2.10E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	8.20E+00				1.91E+01				8.50E+00				1.08E+01	J		
Iron	mg/kg	4.48E+04	2.34E+03	4.45E+04			YES	3.33E+04		YES		3.45E+04		YES		2.45E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	1.43E+01	J			1.01E+01	J			9.20E+00	J			1.19E+01	J		
Magnesium	mg/kg	7.66E+02	NA	4.01E+02	J			2.57E+02	J			2.78E+02	J			5.05E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	7.78E+02			YES	1.10E+02				4.68E+01				8.61E+01	J		
Mercury	mg/kg	7.00E-02	2.33E+00	5.70E-02				1.10E-01		YES		5.80E-02				5.90E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	6.50E+00				8.70E+00				2.90E+00	J			6.60E+00			
Potassium	mg/kg	7.11E+02	NA	5.54E+02	J			5.12E+02	J			3.09E+02	J			4.21E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.70E+00	J	YES		1.50E+00	J	YES		1.70E+00	J	YES		9.60E-01		YES	
Silver	mg/kg	2.40E-01	3.91E+01	2.90E+00	J	YES		2.10E+00	J	YES		2.40E+00	J	YES		ND			
Sodium	mg/kg	7.02E+02	NA	2.42E+01	J			2.78E+01	J			2.62E+01	J			4.97E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				4.10E-01	J			5.90E-01	B		YES
Vanadium	mg/kg	6.49E+01	5.31E+01	2.50E+00	B			1.58E+01				7.50E+00				3.74E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.01E+01				3.00E+01				1.33E+01				2.01E+01	J		
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	1.40E-01	J			1.00E-01	J			4.10E-02	J			1.10E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	2.30E-03	B			1.80E-03	B			1.70E-03	B			ND			
Methylene chloride	mg/kg	NA	8.41E+01	2.30E-03	B			2.80E-03	B			3.10E-03	B			2.50E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND															
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Acenaphthylene	mg/kg	NA	4.63E+02	4.00E-02	J			ND				ND				ND			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	3.80E-02	J			ND				ND				ND			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	7.20E-02	J			ND				ND				ND			
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	6.20E-02	J			ND				ND				ND			
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	4.60E-02	J			ND				ND				ND			
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	5.70E-02	J			ND				ND				ND			
Chrysene	mg/kg	NA	8.61E+01	4.20E-02	J			ND				ND				ND			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	4.40E-02	J			ND				ND				ND			
Pyrene	mg/kg	NA	2.33E+02	5.20E-02	J			ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	6.80E-02	B			4.90E-02	B			4.80E-02	B			ND			

Table 5-2

**Subsurface Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-127-GP05 KR0012 13-Jan-99 3 - 6				PPMP-127-GP06 KR0014 13-Jan-99 1 - 3				PPMP-127-GP07 KR0016 28-Jan-99 1 - 3				PPMP-127-GP08 KR0018 28-Jan-99 2 - 5			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL												
<b>METALS</b>																			
Aluminum	mg/kg	1.36E+04	7.80E+03	9.86E+03			YES	8.40E+03			YES	9.93E+03	J		YES	1.13E+04	J		YES
Arsenic	mg/kg	1.83E+01	4.26E-01	1.29E+01			YES	3.40E+00			YES	3.90E+00			YES	5.30E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	8.02E+01				9.18E+01				7.02E+01	J			6.43E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	7.00E-01				6.50E-01				6.20E-01				3.40E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	8.50E-01		YES		ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	2.27E+03		YES		1.68E+03		YES		1.43E+03	J	YES		6.38E+02	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	2.00E+01				1.85E+01				5.92E+01	J	YES	YES	3.09E+01	J		YES
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				8.20E-01	J			6.60E+00				2.44E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	3.08E+01		YES		9.00E+00				1.01E+01	J			8.70E+00	J		
Iron	mg/kg	4.48E+04	2.34E+03	3.89E+04			YES	1.66E+04			YES	1.51E+04	J		YES	2.35E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	7.05E+01	J	YES		1.38E+02	J	YES		1.42E+01	J			2.01E+01	J		
Magnesium	mg/kg	7.66E+02	NA	5.04E+02	J			3.12E+02	J			9.02E+02		YES		3.39E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	3.83E+02			YES	6.93E+02			YES	5.23E+02	J		YES	9.49E+02	J		YES
Mercury	mg/kg	7.00E-02	2.33E+00	1.50E-01		YES		5.90E-02				5.30E-02				6.70E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	1.04E+01				5.40E+00				1.01E+01				6.10E+00			
Potassium	mg/kg	7.11E+02	NA	5.26E+02	J			2.59E+02	J			3.13E+02	J			3.86E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	2.00E+00	J	YES		6.80E-01	J	YES		7.10E-01		YES		1.00E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	2.40E+00	J	YES		1.10E+00	J	YES		ND				ND			
Sodium	mg/kg	7.02E+02	NA	3.79E+01	J			2.00E+01	J			5.87E+01	B			3.94E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND															
Vanadium	mg/kg	6.49E+01	5.31E+01	7.90E+00				8.60E+00				2.05E+01				3.48E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	7.94E+01		YES		2.82E+01				3.19E+01	J			2.34E+01	J		
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	5.10E-01	J			2.10E+00	J			1.50E+00	B			2.20E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	2.30E-03	B			2.40E-03	B			2.40E-03	B			ND			
Methylene chloride	mg/kg	NA	8.41E+01	3.00E-03	B			2.90E-03	B			2.50E-03	B			2.40E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				3.00E-03	J			ND				ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Acenaphthylene	mg/kg	NA	4.63E+02	ND															
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND															
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND															
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND															
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND															
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND															
Chrysene	mg/kg	NA	8.61E+01	ND															
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND															
Pyrene	mg/kg	NA	2.33E+02	ND															
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	6.50E-02	B			5.10E-02	B			ND				ND			

Table 5-2

**Subsurface Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 3 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-127-GP09 KR0020 28-Jan-99 3 - 6				PPMP-127-GP10 KR0022 29-Jan-99 6 - 9				PPMP-127-GP11 KR0024 29-Jan-99 6 - 9				PPMP-127-GP12 KR0026 28-Jan-99 3 - 5			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL												
<b>METALS</b>																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.23E+04	J		YES	8.70E+03	J		YES	1.09E+04	J		YES	7.66E+03	J		
Arsenic	mg/kg	1.83E+01	4.26E-01	7.40E+00			YES	5.80E+00			YES	8.40E+00			YES	1.03E+01			YES
Barium	mg/kg	2.34E+02	5.47E+02	4.31E+01	J			1.59E+02	J			2.59E+01	J			2.20E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	5.20E-01	J			8.40E-01				5.40E-01	J			3.90E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				7.20E-01		YES		ND				ND			
Calcium	mg/kg	6.37E+02	NA	2.40E+03	J	YES		1.15E+04	J	YES		1.39E+03	J	YES		6.32E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	2.02E+01	J			1.59E+01	J			2.06E+01	J			1.79E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	2.60E+00	J			3.90E+00	J			2.70E+00	J			1.70E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	1.58E+01	J			1.31E+01	J			1.48E+01	J			1.45E+01	J		
Iron	mg/kg	4.48E+04	2.34E+03	3.71E+04	J		YES	1.19E+04	J		YES	3.63E+04	J		YES	3.18E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	1.08E+01	J			2.07E+02	J	YES		1.02E+01	J			7.30E+00	J		
Magnesium	mg/kg	7.66E+02	NA	4.68E+02	J			1.94E+03		YES		2.66E+02	J			2.07E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	7.05E+01	J			7.07E+02	J		YES	1.10E+02	J			6.40E+01	J		
Mercury	mg/kg	7.00E-02	2.33E+00	8.40E-02		YES		7.00E-02		YES		1.10E-01		YES		4.30E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	7.00E+00				5.70E+00				8.40E+00				4.50E+00	J		
Potassium	mg/kg	7.11E+02	NA	8.51E+02		YES		7.32E+02		YES		4.18E+02	J			4.83E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.50E+00		YES		8.50E-01		YES		1.30E+00		YES		1.50E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND															
Sodium	mg/kg	7.02E+02	NA	6.06E+01	B			1.15E+02	B			5.44E+01	B			3.93E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	5.20E-01	B		YES	ND				6.60E-01	B		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	3.72E+01				1.80E+01				3.83E+01				3.46E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.13E+01	J			3.26E+02	J	YES		2.36E+01	J			1.77E+01	J		
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	4.70E-02	J			3.70E-02	J			8.70E-02	J			1.30E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	ND															
Methylene chloride	mg/kg	NA	8.41E+01	2.60E-03	B			3.50E-03	B			3.10E-03	B			3.80E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND															
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Acenaphthylene	mg/kg	NA	4.63E+02	ND															
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND															
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND															
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND															
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND															
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND															
Chrysene	mg/kg	NA	8.61E+01	ND															
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND															
Pyrene	mg/kg	NA	2.33E+02	ND															
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND															

Table 5-2

**Subsurface Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 4 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-127-GP13 KR0028 28-Jan-99 6 - 9				PPMP-127-GP14 KR0033 18-Jun-01 2 - 2.5				PPMP-127-GP15 KR0035 18-Jun-01 2 - 2.5				PPMP-127-GP16 KR0037 18-Jun-01 2 - 2.5			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.43E+04	J	YES	YES	NR				NR				NR			
Arsenic	mg/kg	1.83E+01	4.26E-01	4.00E+00			YES	NR				NR				NR			
Barium	mg/kg	2.34E+02	5.47E+02	3.71E+01	J			NR				NR				NR			
Beryllium	mg/kg	8.60E-01	9.60E+00	3.10E-01	J			NR				NR				NR			
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				NR				NR				NR			
Calcium	mg/kg	6.37E+02	NA	1.08E+04	J	YES		NR				NR				NR			
Chromium	mg/kg	3.83E+01	2.32E+01	1.27E+01	J			NR				NR				NR			
Cobalt	mg/kg	1.75E+01	4.68E+02	3.20E+00	J			NR				NR				NR			
Copper	mg/kg	1.94E+01	3.13E+02	1.07E+01	J			5.50E+00				1.11E+02		YES		4.80E+00			
Iron	mg/kg	4.48E+04	2.34E+03	1.58E+04	J		YES	NR				NR				NR			
Lead	mg/kg	3.85E+01	4.00E+02	1.73E+01	J			NR				NR				NR			
Magnesium	mg/kg	7.66E+02	NA	5.72E+03		YES		NR				NR				NR			
Manganese	mg/kg	1.36E+03	3.63E+02	1.30E+02	J			NR				NR				NR			
Mercury	mg/kg	7.00E-02	2.33E+00	5.90E-02				2.30E-02	J			1.90E-01		YES		2.60E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	6.80E+00				NR				NR				NR			
Potassium	mg/kg	7.11E+02	NA	4.79E+02	J			NR				NR				NR			
Selenium	mg/kg	4.70E-01	3.91E+01	5.90E-01		YES		NR				NR				NR			
Silver	mg/kg	2.40E-01	3.91E+01	ND				NR				NR				NR			
Sodium	mg/kg	7.02E+02	NA	7.86E+01	B			NR				NR				NR			
Thallium	mg/kg	1.40E+00	5.08E-01	ND				NR				NR				NR			
Vanadium	mg/kg	6.49E+01	5.31E+01	3.00E+01				NR				NR				NR			
Zinc	mg/kg	3.49E+01	2.34E+03	2.51E+01	J			NR				NR				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/kg	NA	7.76E+02	5.60E-02	J			NR				NR				NR			
Bromomethane	mg/kg	NA	1.09E+01	ND				NR				NR				NR			
Methylene chloride	mg/kg	NA	8.41E+01	3.20E-03	B			NR				NR				NR			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				NR				NR				NR			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Acenaphthylene	mg/kg	NA	4.63E+02	ND				NR				NR				NR			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND				NR				NR				NR			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				NR				NR				NR			
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND				NR				NR				NR			
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND				NR				NR				NR			
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND				NR				NR				NR			
Chrysene	mg/kg	NA	8.61E+01	ND				NR				NR				NR			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND				NR				NR				NR			
Pyrene	mg/kg	NA	2.33E+02	ND				NR				NR				NR			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				NR				NR				NR			

Table 5-2

**Subsurface Soil Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 5 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-127-GP17 KR0039 18-Jun-01 2 - 2.5				PPMP-127-GP18 KR0040 18-Jun-01 2 - 2.5				PPMP-127-GP26 KR0072 20-Jun-02 1 - 2			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>															
Aluminum	mg/kg	1.36E+04	7.80E+03	NR				NR				NR			
Arsenic	mg/kg	1.83E+01	4.26E-01	NR				NR				NR			
Barium	mg/kg	2.34E+02	5.47E+02	NR				NR				NR			
Beryllium	mg/kg	8.60E-01	9.60E+00	NR				NR				NR			
Cadmium	mg/kg	2.20E-01	6.25E+00	NR				NR				NR			
Calcium	mg/kg	6.37E+02	NA	NR				NR				NR			
Chromium	mg/kg	3.83E+01	2.32E+01	NR				NR				1.05E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	NR				NR				NR			
Copper	mg/kg	1.94E+01	3.13E+02	4.41E+02		YES	YES	3.92E+01		YES		NR			
Iron	mg/kg	4.48E+04	2.34E+03	NR				NR				NR			
Lead	mg/kg	3.85E+01	4.00E+02	NR				NR				NR			
Magnesium	mg/kg	7.66E+02	NA	NR				NR				NR			
Manganese	mg/kg	1.36E+03	3.63E+02	NR				NR				NR			
Mercury	mg/kg	7.00E-02	2.33E+00	9.70E-01		YES		1.00E-01		YES		NR			
Nickel	mg/kg	1.29E+01	1.54E+02	NR				NR				NR			
Potassium	mg/kg	7.11E+02	NA	NR				NR				NR			
Selenium	mg/kg	4.70E-01	3.91E+01	NR				NR				NR			
Silver	mg/kg	2.40E-01	3.91E+01	NR				NR				NR			
Sodium	mg/kg	7.02E+02	NA	NR				NR				NR			
Thallium	mg/kg	1.40E+00	5.08E-01	NR				NR				NR			
Vanadium	mg/kg	6.49E+01	5.31E+01	NR				NR				NR			
Zinc	mg/kg	3.49E+01	2.34E+03	NR				NR				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>															
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR			
Bromomethane	mg/kg	NA	1.09E+01	NR				NR				NR			
Methylene chloride	mg/kg	NA	8.41E+01	NR				NR				NR			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	NR				NR				NR			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>															
Acenaphthylene	mg/kg	NA	4.63E+02	NR				NR				NR			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	NR				NR				NR			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	NR				NR				NR			
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	NR				NR				NR			
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	NR				NR				NR			
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	NR				NR				NR			
Chrysene	mg/kg	NA	8.61E+01	NR				NR				NR			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	NR				NR				NR			
Pyrene	mg/kg	NA	2.33E+02	NR				NR				NR			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	NR				NR				NR			

**Table 5-2**

**Subsurface Soil Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 6)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

<sup>a</sup> BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

<sup>b</sup> Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Note requested.

Qual - Data validation qualifier.

Table 5-3

**Groundwater Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 4)

Sample Location Sample Number Sample Date				PPMP-127-GP01 KR3001 29-Jan-99				PPMP-127-GP02 KR3002 1-Feb-99				PPMP-127-GP03 KR3003 4-Feb-99				PPMP-127-MW01 KRR3001 2-Nov-00			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/L	2.34E+00	1.56E+00	5.45E-01	J			2.83E+00	J	YES	YES	2.16E+01	J	YES	YES	NR			
Arsenic	mg/L	1.78E-02	4.40E-05	ND				ND				1.68E-02			YES	NR			
Barium	mg/L	1.27E-01	1.10E-01	4.75E-02	J			1.03E-01	J			3.88E-01		YES	YES	NR			
Beryllium	mg/L	1.25E-03	3.13E-03	ND				ND				3.90E-03	J	YES	YES	NR			
Calcium	mg/L	5.65E+01	NA	5.38E+01				1.05E+01				6.05E+01		YES		NR			
Chromium	mg/L	NA	4.69E-03	ND				7.00E-03	J		YES	4.32E-02			YES	NR			
Cobalt	mg/L	2.34E-02	9.39E-02	ND				1.82E-02	J			1.77E-02	J			NR			
Copper	mg/L	2.55E-02	6.26E-02	ND				8.50E-03	J			2.96E-02		YES		NR			
Iron	mg/L	7.04E+00	4.69E-01	1.01E+00	J		YES	5.58E+00	J		YES	4.03E+01	J	YES	YES	NR			
Lead	mg/L	8.00E-03	1.50E-02	ND				5.30E-03				1.88E-02		YES	YES	NR			
Magnesium	mg/L	2.13E+01	NA	5.74E+00				5.10E+00				1.23E+01				NR			
Manganese	mg/L	5.81E-01	7.35E-02	7.43E-02			YES	5.61E-01			YES	5.33E-01			YES	NR			
Mercury	mg/L	NA	4.69E-04	ND				ND				1.30E-04	J			NR			
Nickel	mg/L	NA	3.13E-02	ND				2.78E-02	J			6.35E-02		YES		NR			
Potassium	mg/L	7.20E+00	NA	1.21E+00	J			3.07E+00	J			3.91E+00	J			NR			
Sodium	mg/L	1.48E+01	NA	3.22E+00	J			3.61E+00	J			6.23E+00				NR			
Vanadium	mg/L	1.70E-02	1.10E-02	ND				1.15E-02	J		YES	4.46E-02	J	YES	YES	NR			
Zinc	mg/L	2.20E-01	4.69E-01	3.51E-02				4.94E-01		YES	YES	2.02E-01				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/L	NA	1.56E-01	1.60E-03	J			1.10E-02	B			4.30E-03	B			ND			
Benzene	mg/L	NA	1.41E-03	ND				ND				ND				ND			
Carbon tetrachloride	mg/L	NA	4.08E-04	ND				9.40E-03			YES	ND				ND			
Chloroform	mg/L	NA	1.15E-03	1.40E-04	B			3.00E-03	B		YES	3.60E-04	B			ND			
Chloromethane	mg/L	NA	3.93E-03	2.40E-04	J			ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	ND				1.00E-03	B			1.20E-03	B			1.40E-03	B		
cis-1,2-Dichloroethene	mg/L	NA	1.55E-02	ND				ND				ND				ND			

Table 5-3

**Groundwater Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 4)

Sample Location Sample Number Sample Date				PPMP-127-MW01 KRR3009 5-Mar-02				PPMP-127-MW01 KRR3001R 8-Apr-02				PPMP-127-MW02 KRR3002 2-Nov-00				PPMP-127-MW02 CSM3008 21-Feb-02			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/L	2.34E+00	1.56E+00	NR				NR				NR				NR			
Arsenic	mg/L	1.78E-02	4.40E-05	NR				NR				NR				NR			
Barium	mg/L	1.27E-01	1.10E-01	NR				NR				NR				NR			
Beryllium	mg/L	1.25E-03	3.13E-03	NR				NR				NR				NR			
Calcium	mg/L	5.65E+01	NA	NR				NR				NR				NR			
Chromium	mg/L	NA	4.69E-03	NR				NR				NR				NR			
Cobalt	mg/L	2.34E-02	9.39E-02	NR				NR				NR				NR			
Copper	mg/L	2.55E-02	6.26E-02	NR				NR				NR				NR			
Iron	mg/L	7.04E+00	4.69E-01	NR				NR				NR				NR			
Lead	mg/L	8.00E-03	1.50E-02	NR				NR				NR				NR			
Magnesium	mg/L	2.13E+01	NA	NR				NR				NR				NR			
Manganese	mg/L	5.81E-01	7.35E-02	NR				NR				NR				NR			
Mercury	mg/L	NA	4.69E-04	NR				NR				NR				NR			
Nickel	mg/L	NA	3.13E-02	NR				NR				NR				NR			
Potassium	mg/L	7.20E+00	NA	NR				NR				NR				NR			
Sodium	mg/L	1.48E+01	NA	NR				NR				NR				NR			
Vanadium	mg/L	1.70E-02	1.10E-02	NR				NR				NR				NR			
Zinc	mg/L	2.20E-01	4.69E-01	NR				NR				NR				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				ND			
Benzene	mg/L	NA	1.41E-03	7.60E-03			YES	ND				ND				ND			
Carbon tetrachloride	mg/L	NA	4.08E-04	1.40E-02	J		YES	ND				2.70E-03	J		YES	3.30E-03			YES
Chloroform	mg/L	NA	1.15E-03	2.30E-04	J			ND				ND				8.70E-04	J		
Chloromethane	mg/L	NA	3.93E-03	ND				ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	ND				5.50E-04	B			1.40E-03	B			ND			
cis-1,2-Dichloroethene	mg/L	NA	1.55E-02	ND				3.30E-04	J			ND				ND			

Table 5-3

**Groundwater Analytical Results  
Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 4)

Sample Location Sample Number Sample Date				PPMP-127-MW03 KRR3003 18-Dec-00				PPMP-127-MW03 KRR3012 8-Mar-02				PPMP-127-MW04 KRR3006 7-Nov-00				PPMP-127-MW04 KRR3013 7-Mar-02			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/L	2.34E+00	1.56E+00	NR				NR				NR				NR			
Arsenic	mg/L	1.78E-02	4.40E-05	NR				NR				NR				NR			
Barium	mg/L	1.27E-01	1.10E-01	NR				NR				NR				NR			
Beryllium	mg/L	1.25E-03	3.13E-03	NR				NR				NR				NR			
Calcium	mg/L	5.65E+01	NA	NR				NR				NR				NR			
Chromium	mg/L	NA	4.69E-03	NR				NR				NR				NR			
Cobalt	mg/L	2.34E-02	9.39E-02	NR				NR				NR				NR			
Copper	mg/L	2.55E-02	6.26E-02	NR				NR				NR				NR			
Iron	mg/L	7.04E+00	4.69E-01	NR				NR				NR				NR			
Lead	mg/L	8.00E-03	1.50E-02	NR				NR				NR				NR			
Magnesium	mg/L	2.13E+01	NA	NR				NR				NR				NR			
Manganese	mg/L	5.81E-01	7.35E-02	NR				NR				NR				NR			
Mercury	mg/L	NA	4.69E-04	NR				NR				NR				NR			
Nickel	mg/L	NA	3.13E-02	NR				NR				NR				NR			
Potassium	mg/L	7.20E+00	NA	NR				NR				NR				NR			
Sodium	mg/L	1.48E+01	NA	NR				NR				NR				NR			
Vanadium	mg/L	1.70E-02	1.10E-02	NR				NR				NR				NR			
Zinc	mg/L	2.20E-01	4.69E-01	NR				NR				NR				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				ND			
Benzene	mg/L	NA	1.41E-03	ND				ND				ND				ND			
Carbon tetrachloride	mg/L	NA	4.08E-04	ND				ND				ND				ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				ND				ND			
Chloromethane	mg/L	NA	3.93E-03	ND				ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	ND				ND				ND				ND			
cis-1,2-Dichloroethene	mg/L	NA	1.55E-02	ND				ND				ND				ND			

Table 5-3

**Groundwater Analytical Results**  
**Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 4 of 4)

Sample Location Sample Number Sample Date				PPMP-127-MW05 KRR3007 19-Dec-00				PPMP-127-MW05 KRR3014 6-Mar-02				PPMP-127-MW06 KRR3008 15-Jan-01				PPMP-127-MW06 CSM3009 25-Feb-02			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/L	2.34E+00	1.56E+00	NR				NR				NR				NR			
Arsenic	mg/L	1.78E-02	4.40E-05	NR				NR				NR				NR			
Barium	mg/L	1.27E-01	1.10E-01	NR				NR				NR				NR			
Beryllium	mg/L	1.25E-03	3.13E-03	NR				NR				NR				NR			
Calcium	mg/L	5.65E+01	NA	NR				NR				NR				NR			
Chromium	mg/L	NA	4.69E-03	NR				NR				NR				NR			
Cobalt	mg/L	2.34E-02	9.39E-02	NR				NR				NR				NR			
Copper	mg/L	2.55E-02	6.26E-02	NR				NR				NR				NR			
Iron	mg/L	7.04E+00	4.69E-01	NR				NR				NR				NR			
Lead	mg/L	8.00E-03	1.50E-02	NR				NR				NR				NR			
Magnesium	mg/L	2.13E+01	NA	NR				NR				NR				NR			
Manganese	mg/L	5.81E-01	7.35E-02	NR				NR				NR				NR			
Mercury	mg/L	NA	4.69E-04	NR				NR				NR				NR			
Nickel	mg/L	NA	3.13E-02	NR				NR				NR				NR			
Potassium	mg/L	7.20E+00	NA	NR				NR				NR				NR			
Sodium	mg/L	1.48E+01	NA	NR				NR				NR				NR			
Vanadium	mg/L	1.70E-02	1.10E-02	NR				NR				NR				NR			
Zinc	mg/L	2.20E-01	4.69E-01	NR				NR				NR				NR			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				1.20E-02	J		
Benzene	mg/L	NA	1.41E-03	ND				ND				ND				ND			
Carbon tetrachloride	mg/L	NA	4.08E-04	ND				ND				2.20E-03	J		YES	6.10E-04	J		YES
Chloroform	mg/L	NA	1.15E-03	ND				ND				1.60E-03	J		YES	1.10E-03			
Chloromethane	mg/L	NA	3.93E-03	ND				ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	ND				ND				ND				2.70E-04	B		
cis-1,2-Dichloroethene	mg/L	NA	1.55E-02	ND				ND				ND				ND			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

<sup>a</sup> BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

<sup>b</sup> Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

NR - Not requested.

Qual - Data validation qualifier.

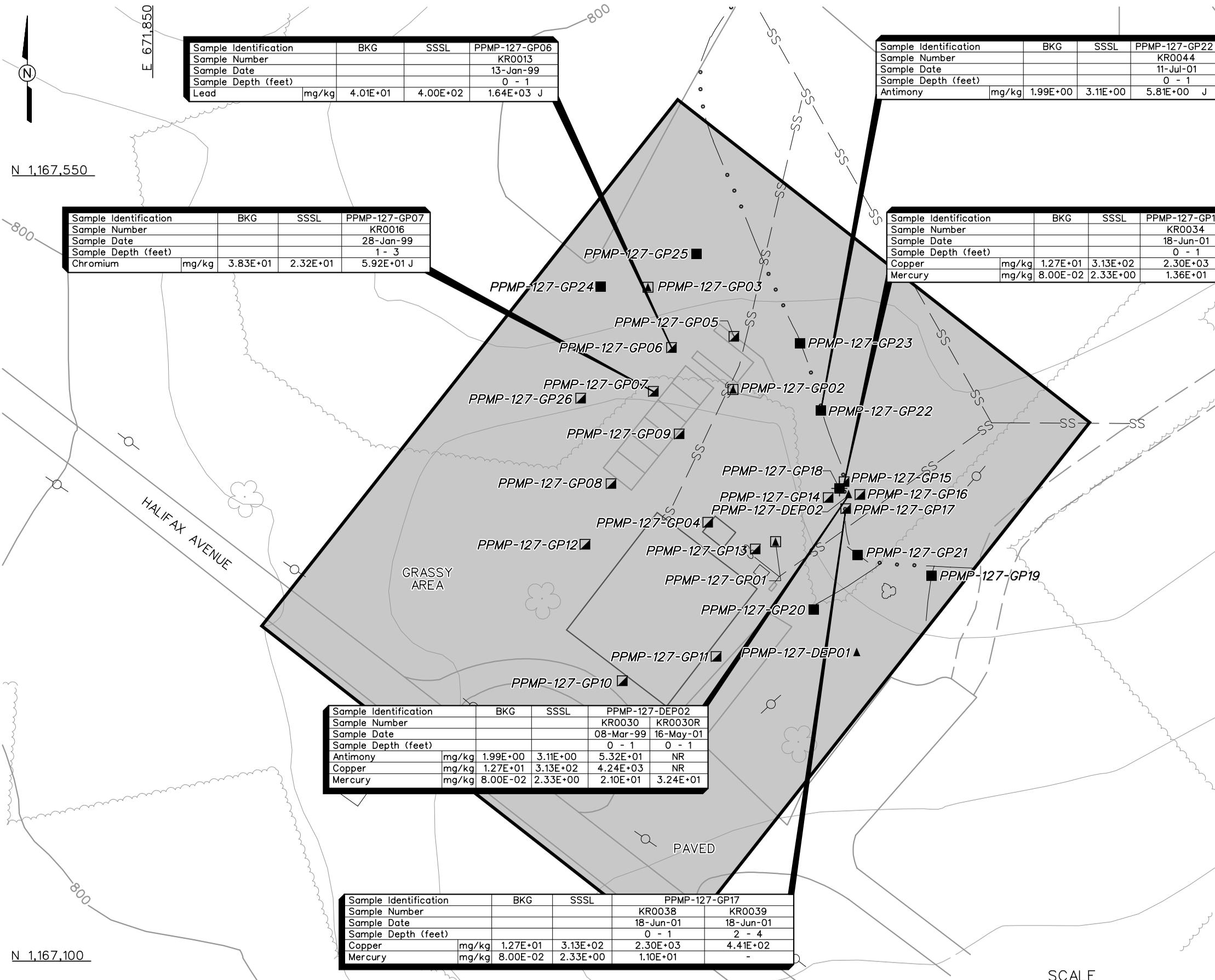
- Copper (2,300 to 4,240 mg/kg) exceeded its SSSL (313 mg/kg) and background (12.7 mg/kg) at three sample locations (PPMP-127-DEP02, PPMP-127-GP15, and PPMP-127-GP17).
- Lead (1,640 mg/kg) exceeded its SSSL (400 mg/kg) and background (40 mg/kg) at sample location PPMP-127-GP06.
- Manganese (1,940 and 2,510 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,579 mg/kg) at two sample locations (PPMP-127-DEP01 and PPMP-127-GP12).
- Mercury (11 to 32.4 mg/kg) exceeded its SSSL (2.33 mg/kg) and background (0.08 mg/kg) in four samples from three locations (PPMP-127-DEP02, PPMP-127-GP15, and PPMP-127-GP17).

Figure 5-1 shows the sample locations with select metals results exceeding SSSLs and background. It should be noted that the aluminum and manganese results are not shown on Figure 5-1 because these metals are common elements in native soils whose concentrations vary over a wide range.

Fourteen metals were detected at concentrations exceeding ESVs. Of these metals, eleven had results exceeding their respective background concentrations:

- Aluminum (17,000 to 23,200 mg/kg) exceeded its ESV (50 mg/kg) and background (16,306 mg/kg) at four sample locations (PPMP-127-GP11, PPMP-127-GP20, PPMP-127-GP21, and PPMP-127-GP23).
- Antimony (53.2 and 5.8 mg/kg) exceeded its ESV (3.5 mg/kg) and background (1.99 mg/kg) at two sample locations (PPMP-127-DEP02 and PPMP-127-GP22).
- Barium (265 and 348 mg/kg) exceeded its ESV (165 mg/kg) and background (124 mg/kg) at two sample locations (PPMP-127-GP13 and PPMP-127-GP06).
- Beryllium (1.1 to 1.6 mg/kg) exceeded its ESV (1.1 mg/kg) and background (0.8 mg/kg) at three sample locations (PPMP-127-GP02, PPMP-127-GP12, and PPMP-127-GP13).
- Cadmium (3 mg/kg) exceeded its ESV (1.6 mg/kg) and background (0.29 mg/kg) at sample location PPMP-127-GP05.
- Copper (103 to 4,240 mg/kg) exceeded its ESV (40 mg/kg) and background (12.7 mg/kg) at five sample locations (PPMP-127-DEP02, PPMP-127-GP15, PPMP-127-GP17, PPMP-127-GP22, and PPMP-127-GP23).

DWG. NO.: 774645es.929  
 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHECK. BY:  
 ENGR. CHECK. BY: S. MORAN  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 06/12/02  
 DRAWN BY: D. BOMAR  
 10/7/2004  
 3:22:49 PM  
 c:\cadd\design\774645es.929



Sample Identification	BKG	SSSL	PPMP-127-GP06
Sample Number			KR0013
Sample Date			13-Jan-99
Sample Depth (feet)			0 - 1
Lead	mg/kg	4.01E+01	4.00E+02
			1.64E+03 J

Sample Identification	BKG	SSSL	PPMP-127-GP22
Sample Number			KR0044
Sample Date			11-Jul-01
Sample Depth (feet)			0 - 1
Antimony	mg/kg	1.99E+00	3.11E+00
			5.81E+00 J

Sample Identification	BKG	SSSL	PPMP-127-GP07
Sample Number			KR0016
Sample Date			28-Jan-99
Sample Depth (feet)			1 - 3
Chromium	mg/kg	3.83E+01	2.32E+01
			5.92E+01 J

Sample Identification	BKG	SSSL	PPMP-127-GP15
Sample Number			KR0034
Sample Date			18-Jun-01
Sample Depth (feet)			0 - 1
Copper	mg/kg	1.27E+01	3.13E+02
			2.30E+03
Mercury	mg/kg	8.00E-02	2.33E+00
			1.36E+01

Sample Identification	BKG	SSSL	PPMP-127-DEPO2
Sample Number			KR0030 KR0030R
Sample Date			08-Mar-99 16-May-01
Sample Depth (feet)			0 - 1 0 - 1
Antimony	mg/kg	1.99E+00	3.11E+00
			5.32E+01 NR
Copper	mg/kg	1.27E+01	3.13E+02
			4.24E+03 NR
Mercury	mg/kg	8.00E-02	2.33E+00
			2.10E+01 3.24E+01

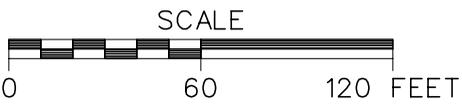
Sample Identification	BKG	SSSL	PPMP-127-GP17
Sample Number			KR0038 KR0039
Sample Date			18-Jun-01 18-Jun-01
Sample Depth (feet)			0 - 1 2 - 4
Copper	mg/kg	1.27E+01	3.13E+02
			2.30E+03 4.41E+02
Mercury	mg/kg	8.00E-02	2.33E+00
			1.10E+01

**LEGEND**

- UNIMPROVED ROAD
- PAVED ROAD AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- SANITARY SEWER LINE
- SURFACE SOIL SAMPLE LOCATION
- SUBSURFACE SOIL SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- SSSL SITE-SPECIFIC SCREENING LEVEL
- mg/kg MILLIGRAMS PER KILOGRAM
- NR NOT REQUESTED
- RESULT LESS THAN SSSL

**FIGURE 5-1**  
 SELECT METALS RESULTS EXCEEDING SSSLs AND BACKGROUND IN SOILS FORMER WASHRACK BUILDING 1740, SOLDIER'S CHAPEL PARCEL 127(7)

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



- Lead (52.3 to 1,640 mg/kg) exceeded its ESV (50 mg/kg) and background (40 mg/kg) at 16 sample locations (PPMP-127-DEP01, PPMP-127-DEP02, PPMP-127-DEP03, PPMP-127-GP01, PPMP-127-GP02, PPMP-127-GP04, PPMP-127-GP05, PPMP-127-GP06, PPMP-127-GP07, PPMP-127-GP09, PPMP-127-GP11, PPMP-127-GP13, PPMP-127-GP20, PPMP-127-GP21, PPMP-127-GP22, and PPMP-127-GP23).
- Manganese (1,940 and 2,510 mg/kg) exceeded its ESV (100 mg/kg) and background (1,579 mg/kg) at two sample locations (PPMP-127-DEP01 and PPMP-127-GP12).
- Mercury (0.11 to 32.4 mg/kg) exceeded its ESV (0.1 mg/kg) and background (0.08 mg/kg) in 11 samples from 10 locations (PPMP-127-DEP02, PPMP-127-DEP03, PPMP-127-GP10, PPMP-127-GP11, PPMP-127-GP15, PPMP-127-GP17, PPMP-127-GP20, PPMP-127-GP21, PPMP-127-GP22, and PPMP-127-GP23).
- Selenium (0.81 to 1.4 mg/kg) equaled or exceeded its ESV (0.81 mg/kg) and background (0.48 mg/kg) at 10 sample locations (PPMP-127-DEP01, PPMP-127-DEP02, PPMP-127-DEP03, PPMP-127-GP02, PPMP-127-GP03, PPMP-127-GP04, PPMP-127-GP06, PPMP-127-GP08, PPMP-127-GP10, and PPMP-127-GP11).
- Zinc (54.4 to 214 mg/kg) exceeded its ESV (50 mg/kg) and background (40.6 mg/kg) at 13 sample locations (PPMP-127-DEP02, PPMP-127-GP02, PPMP-127-GP05, PPMP-127-GP06, PPMP-127-GP07, PPMP-127-GP09, PPMP-127-GP11, PPMP-127-GP13, PPMP-127-GP19, PPMP-127-GP20, PPMP-127-GP21, PPMP-127-GP22, and PPMP-127-GP23).

**Volatile Organic Compounds.** Sixteen surface and depositional soil samples were analyzed for VOCs. A total of six VOCs (acetone, bromomethane, chloromethane, methylene chloride, toluene, and p-cymene) were detected in the samples. The bromomethane results, methylene chloride results, and three of the acetone results were flagged with a “B” data qualifier signifying that these compounds were also detected in an associated laboratory or field blank sample. The remaining VOC results were flagged with a “J” data qualifier, signifying that the compounds were positively identified, but the concentrations were estimated. VOC concentrations in the surface and depositional soil samples ranged from 0.0019 milligrams per kilogram (mg/kg) to 0.036 mg/kg, and all results were below SSSLs and ESVs.

**Semivolatile Organic Compounds.** Sixteen surface and depositional soil samples were analyzed for SVOCs. A total of 20 SVOCs, including 14 PAH compounds, were detected in the samples. The bis(2-ethylhexyl)phthalate and di-n-butylphthalate results were flagged with a “B” data qualifier signifying that these compounds were also detected in an associated laboratory or field blank sample. The majority of the remaining SVOC results were flagged with a “J” data

the reported values are estimated. VOC concentrations in the subsurface soil samples ranged from 0.0017 to 2.1 mg/kg, and all results were below SSSLs.

**Semivolatile Organic Compounds.** Thirteen subsurface soil samples were analyzed for SVOCs. A total of ten SVOCs, including nine PAHs (acenaphthylene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[ghi]perylene, benzo[k]fluoranthene, chrysene, indeno[1,2,3-cd]pyrene, and pyrene) and one non-PAH compound (bis[2-ethylhexyl]phthalate), were detected in the samples. The bis(2-ethylhexyl)phthalate results were flagged with a “B” data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample. All nine PAHs were detected at one location (PPMP-127-GP01) and the results were flagged with a “J” data qualifier, signifying that the compounds were positively identified but the concentrations were estimated. SVOC concentrations in the subsurface soil samples ranged from 0.038 to 0.072 mg/kg, and all results were below SSSLs.

### **5.3 Groundwater Analytical Results**

A total of 16 groundwater samples were collected from the nine temporary and permanent monitoring wells installed at Parcel 127(7). The groundwater sample locations are shown on Figure 3-2. Analytical results were compared to residential human health SSSLs and metals background values, as presented in Table 5-3.

**Metals.** Three groundwater samples (locations PPMP-127-GP01, PPMP-127-GP02, and PPMP-127-GP03) collected during the SI were analyzed for metals. A total of 18 metals were detected in the samples. The concentrations of eleven metals (aluminum, arsenic, barium, beryllium, chromium, iron, lead, manganese, nickel, vanadium, and zinc) exceed SSSLs. Of these metals, seven were detected at concentrations also exceeding their respective background concentrations: aluminum (PPMP-127-GP02 and PPMP-127-GP03), barium (PPMP-127-GP03), beryllium (PPMP-127-GP03), iron (PPMP-127-GP03), lead (PPMP-127-GP03), vanadium (PPMP-127-GP03), and zinc (PPMP-127-GP02). (Note: background values were not available for chromium and nickel). As shown in Table 5-3, the sample from monitoring well PPMP-127-GP03 contained the highest metals concentrations. The high concentrations of metals in the groundwater sample collected from PPMP-127-GP03 are most likely related to the elevated turbidity levels (greater than 1,000 NTUs) in this well during well development and subsequent sampling. The effect of high turbidity on metals concentrations in groundwater has been previously demonstrated in a groundwater resampling study conducted at FTMC (IT, 2000c) (Appendix J).

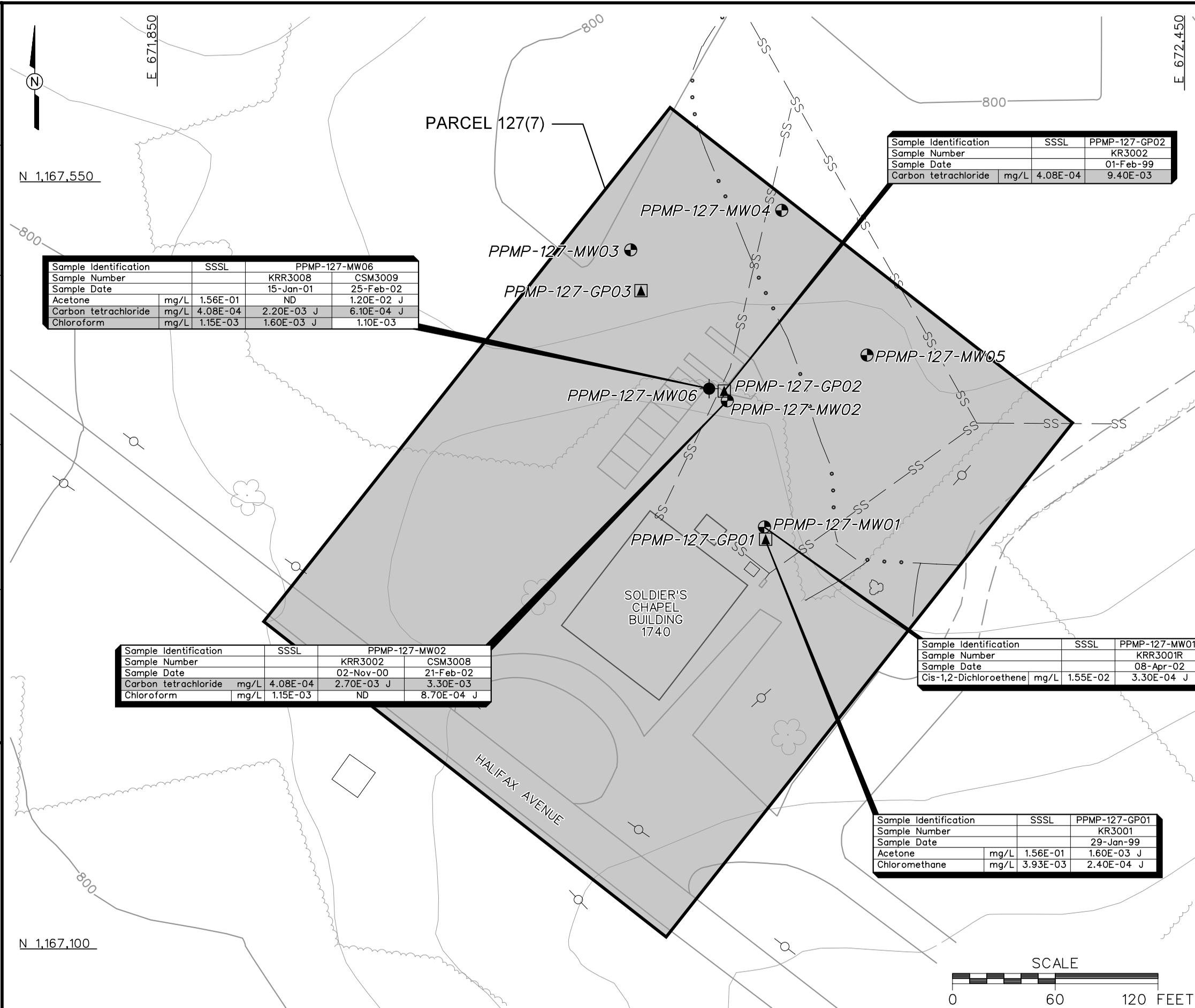
**Volatile Organic Compounds.** All of the groundwater samples were analyzed for VOCs. A total of seven VOCs (acetone, benzene, carbon tetrachloride, chloroform, chloromethane, cis-1,2-dichloroethene, and methylene chloride) were detected in the samples. VOCs were not detected in six of the samples; acetone, chloroform, and/or methylene chloride, all of which are common laboratory contaminants, were the only detected VOCs in two additional samples. VOC concentrations in the groundwater samples ranged from 0.00014 to 0.014 milligrams per liter (mg/L). The concentrations of three VOCs exceeded their respective SSSLs:

- Benzene (0.0076 mg/L) in one well (PPMP-127-MW01).
- Carbon tetrachloride (0.00061 to 0.014 mg/L) in four wells (PPMP-127-GP02, PPMP-127-MW01, PPMP-127-MW02, and PPMP-127-MW06).
- Chloroform (0.003 and 0.0016 mg/L) in two wells (PPMP-127-GP02 and PPMP-127-MW06). The chloroform result at PPMP-127-GP02 was flagged with a “B” data qualifier, indicating that this compound was also detected in an associated laboratory or field blank sample.

Figure 5-2 shows the VOCs detected in groundwater. Three VOCs (benzene, carbon tetrachloride, and chloroform) were detected in a groundwater sample collected from PPMP-127-MW01 in March 2002. The concentrations of benzene (0.0076 mg/L) and carbon tetrachloride (0.014 mg/L) exceeded their respective SSSLs in the sample. However, these results are believed to be the result of cross contamination from an improperly decontaminated sample pump. A day prior to sampling PPMP-127-MW01, the pump was used to purge groundwater from a well at another site known to contain the aforementioned contaminants. Groundwater samples collected from PPMP-127-MW01 prior to (November 2000) and after (April 2002) the March 2002 sampling event did not contain detectable levels of benzene, carbon tetrachloride, or chloroform. The absence of these VOCs in previous and subsequent sampling events and the use of an improperly decontaminated pump suggest that the presence of these VOCs in the March 2002 sample was likely due to cross contamination. Hence, this groundwater sample was excluded from the preliminary risk assessment (PRA) as discussed in Section 5.4.

VOCs detected in groundwater are primarily centered in the area of PPMP-127-MW02, which is located just north of Building 1740 in the northern-central area of the parcel (Figure 5-2). Excluding PPMP-127-MW01, which is believed to have been cross contaminated as discussed previously, VOCs exceeding SSSLs in groundwater are present in two wells: PPMP-127-MW02, which is the permanent residuum well installed to replace the temporary well PPMP-127-GP02; and PPMP-127-MW06, which is the adjacent bedrock well.

DWG. NO.: ... \774645es.927  
 PROJ. NO.: 774645  
 INITIATOR: J. REMO  
 PROJ. MGR.: J. YACOB  
 DRAFT. CHECK. BY:  
 ENGR. CHECK. BY: S. MORAN  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 06/12/02  
 DRAWN BY: D. BOMAR  
 10/7/2004  
 3:19:06 PM  
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Sample Identification	SSSL	PPMP-127-GP02
Sample Number		KR3002
Sample Date		01-Feb-99
Carbon tetrachloride	mg/L	4.08E-04
		9.40E-03

Sample Identification		SSSL	PPMP-127-MW06	
Sample Number			KRR3008	CSM3009
Sample Date			15-Jan-01	25-Feb-02
Acetone	mg/L	1.56E-01	ND	1.20E-02 J
Carbon tetrachloride	mg/L	4.08E-04	2.20E-03 J	6.10E-04 J
Chloroform	mg/L	1.15E-03	1.60E-03 J	1.10E-03

Sample Identification		SSSL	PPMP-127-MW02	
Sample Number			KRR3002	CSM3008
Sample Date			02-Nov-00	21-Feb-02
Carbon tetrachloride	mg/L	4.08E-04	2.70E-03 J	3.30E-03
Chloroform	mg/L	1.15E-03	ND	8.70E-04 J

Sample Identification		SSSL	PPMP-127-MW01
Sample Number			KRR3001R
Sample Date			08-Apr-02
Cis-1,2-Dichloroethene	mg/L	1.55E-02	3.30E-04 J

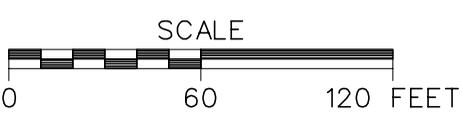
Sample Identification		SSSL	PPMP-127-GP01
Sample Number			KR3001
Sample Date			29-Jan-99
Acetone	mg/L	1.56E-01	1.60E-03 J
Chloromethane	mg/L	3.93E-03	2.40E-04 J

- ### LEGEND
- UNIMPROVED ROAD
  - PAVED ROAD AND PARKING
  - BUILDING
  - TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE / CREEK
  - UTILITY POLE
  - SANITARY SEWER LINE
  - BEDROCK MONITORING WELL LOCATION
  - RESIDUUM MONITORING WELL LOCATION
  - TEMPORARY WELL LOCATION
  - COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
  - SITE-SPECIFIC SCREENING LEVEL
  - VOLATILE ORGANIC COMPOUND
  - MILLIGRAMS PER LITER
  - NOT DETECTED
  - CONCENTRATION EXCEEDS SSSL

- ### NOTES:
- "B" - FLAGGED DATA NOT SHOWN.
  - MARCH 2002 SAMPLE RESULTS FROM PPMP-127-MW01 NOT SHOWN BECAUSE OF CROSS CONTAMINATION (SEE TEXT).

**FIGURE 5-2**  
**VOCs DETECTED IN GROUNDWATER**  
**FORMER WASHRACK**  
**BUILDING 1740, SOLDIER'S CHAPEL**  
**PARCEL 127(7)**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



**Semivolatile Organic Compounds.** Three groundwater samples collected during the SI were analyzed for SVOCs. SVOCs were not detected in the samples.

#### **5.4 Preliminary Risk Assessment**

A PRA was performed to further characterize the potential threat to human health from exposure to groundwater at Parcel 127(7). Issues related to soil contamination are addressed in the interim soil removal action report (Section 5.5) and the weight-of-evidence evaluation (Section 5.6).

The PRA approach was developed at the request of the EPA and ADEM to provide a fast and inexpensive estimation of risk for relatively simple sites. It was derived from the streamlined risk assessment (SRA) protocol developed for FTMC and documented in the installation-wide work plan (IT, 1998b). A PRA is a simplified version of an SRA, differing primarily in that the maximum detected concentration (MDC) rather than an estimate of average is adopted as the source-term concentration (STC) for use in the risk assessment. However, a PRA cannot be less conservative (protective) than an SRA and is generally more protective. The PRA for Parcel 127(7) is included in Appendix K. It discusses the environmental media of interest, selection of site-related chemicals, selection of chemicals of potential concern (COPC), and risk characterization.

The foundation of the PRA is the SSSL, which incorporates all of the exposure and toxicological assumptions and precision of a complete baseline risk assessment. SSSLs are receptor-, medium-, and chemical-specific risk-based concentrations that are used to screen media to select COPCs and to characterize risk (i.e., compute the incremental lifetime cancer risk [ILCR] and hazard index [HI] for noncancer effects associated with exposure to the media at the site).

The SSSLs applied to a given site represent the most highly exposed receptor scenario for each of several plausible uses for the site. Residential and groundskeeper receptor scenarios were evaluated for Parcel 127(7). COPCs were selected from site-related chemicals identified in the previous sections by comparing the MDC of the site-related chemical with the appropriate SSSL. Chemicals that were identified as not being site-related were dropped from further consideration because their presence was not attributed to site activities. The COPCs selected in this manner are chemicals that may contribute significantly to cancer or to the potential for noncancer effects. As noted above, the MDC selected as the STC for use in risk characterization. ILCR and HI values were estimated for each COPC in each medium and were summed to obtain total ILCR and HI values for each receptor. The PRA for Parcel 127(7) was performed in two steps: a first

iteration and a refined assessment to more precisely select site-related chemicals and evaluate the potential for non-cancer effects.

COPCs identified for the groundskeeper included four metals (aluminum, chromium, iron, and lead) and one VOC (carbon tetrachloride). Following the refined assessment, the PRA concluded that exposure to groundwater does not represent a health threat to the groundskeeper.

COPCs identified for the resident included several metals and two VOCs (carbon tetrachloride and chloroform). Following the refined assessment, chloroform and carbon tetrachloride were the only chemicals of concern (COC) identified in groundwater at Parcel 127(7). The total HI for residential exposure to groundwater, when rounded to one significant figure, is equivalent to the threshold level of 1 when the MDC is adopted as the EPC for both COCs. No chloroform detections exceeded the EPA (2000) maximum contaminant level (MCL) of 0.08 mg/L. One carbon tetrachloride detection (0.0094 mg/L in PPMP-127-GP02) exceeded the MCL of 0.005 mg/L, but the more reasonable EPC of 0.0036 mg/L (based on the arithmetic mean) was below the MCL. The PRA concluded that groundwater at Parcel 127(7) developed as a source of potable water is unlikely to cause adverse health effects in human receptors.

### ***5.5 Interim Soil Removal Action and Confirmation Sampling***

At the request of the BCT, an interim removal action was undertaken at Parcel 127(7) to remove soils with antimony, copper, lead, and mercury concentrations exceeding SSSLs. Appendix A of this report contains the Interim Soil Removal Action Report. Soil was excavated from the identified areas to a depth of approximately 2 feet bgs. Following removal of contaminated soil, 20 confirmation samples were collected from the floors and sidewalls of the excavations. Furthermore, five additional confirmation samples were collected below and adjacent to the excavated area near PPMP-127-DEP02 to confirm antimony concentrations. Antimony was not detected in the confirmation samples. Copper, lead, and mercury concentrations in the confirmation samples were all below SSSLs, indicating that no further excavation was required.

### ***5.6 Weight-of-Evidence Evaluation***

This section provides a weight-of-evidence evaluation for metals in soil identified during the process of screening against SSSLs, ESVs, and background values. The intent of this section is to provide additional information to support human health and ecological risk assessment conclusions regarding chemicals of potential concern at Parcel 127(7).

### **5.6.1 Human Health**

As discussed in Section 5.5 and Appendix A, soils containing elevated concentrations of antimony, copper, lead, and mercury were removed from two areas at Parcel 127(7) during the interim soil removal action. However, the removal action did not address aluminum, chromium, and manganese results that also exceeded their SSSLs and background in a limited number of soil samples.

Aluminum (in four surface soil samples and two subsurface soil samples) and manganese (two surface soil samples) are common elements in native soils whose concentrations vary over a wide range. Furthermore, these metals are not known or suspected to have been used in historical site operations. Therefore, aluminum and manganese are not considered further. With regard to chromium, one result (59.2 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (38.3 mg/kg) at subsurface soil sample location PPMP-127-GP07. However, all other chromium results in soil (including surface soil) were below background. Given its limited distribution in soil at levels above background, it is concluded that the isolated chromium detection does not pose a threat to human health.

### **5.6.2 Ecological**

Surface soil is the only environmental medium at Parcel 127(7) with the potential for ecological exposure. There are no surface water bodies in or adjacent to this parcel; therefore, there is no potential exposure to surface water or sediment. Groundwater is not expected to discharge to the surface (through the presence of wetlands or groundwater discharge to surface water) in the vicinity of this parcel because groundwater is at least 15 feet bgs. Therefore, ecological exposures to groundwater are not expected.

Ecological receptors could be exposed to surface soil and several metals in surface soil were detected at concentrations that exceeded their respective ESVs. Although six VOCs were detected in surface and depositional soil samples, all of the detected concentrations were less than their respective SSSLs and ESVs. Seven SVOCs were detected in surface and depositional soil samples at concentrations that exceeded their respective ESVs. The two phthalate compounds that exceeded their respective ESVs were also detected in associated blanks, rendering these results unusable. The five PAH compounds (anthracene, benzo[a]pyrene, fluoranthene, phenanthrene, and pyrene) that exceeded their respective ESVs were all detected at concentrations that were less than their respective PAH background screening values.

As discussed in Section 5.5 and Appendix A, soils containing elevated metals concentrations were removed from two areas at Parcel 127(7) and backfilled with clean fill during the interim

soil removal action. The surface soils that were not excavated exhibited slightly elevated concentrations of several metals (barium, beryllium, copper, lead, mercury, manganese, selenium, and zinc) in one or more samples. Hazard quotient screening values ( $HQ_{\text{screen}}$ ) - the ratio of the maximum detected constituent concentration to the ESV - were calculated to assess the relative magnitude of the exceedances. Barium, beryllium, and copper were only elevated in one sample each with  $HQ_{\text{screen}}$  values of 1.6, 1.4, and 2.6, respectively. Manganese was detected in one sample at a concentration that slightly exceeded the background value. Lead was routinely detected at slightly elevated concentrations with  $HQ_{\text{screen}}$  values ranging from 1.05 to 2.3. Mercury was detected in five samples at slightly elevated concentrations ( $HQ_{\text{screen}}$  values ranging from 1.1 to 3.8). Selenium was also detected in six samples at elevated concentrations, with  $HQ_{\text{screen}}$  values ranging from 1.05 to 1.2. Zinc was detected in seven samples at elevated concentrations, with  $HQ_{\text{screen}}$  values ranging from 1.1 to 4.3.

As described above, several constituents in surface soil are present at slightly elevated concentrations compared to ESVs. However, several of these constituents (barium, beryllium, copper, and manganese) were only sporadically detected at elevated concentrations. Although several of the other inorganic constituents were detected more frequently at elevated concentrations, their concentrations only slightly exceed the ESVs. It is also important to note that Parcel 127(7) is relatively small (less than 3 acres), is located within the developed portion of the Main Post, and is projected for mixed business reuse. Much of the site has been cleared and is devoid of native vegetation (see photographs in Appendix A). Based on the conservative nature of the ESVs, the magnitude of the calculated  $HQ_{\text{screen}}$  values, the infrequency of detection for certain constituents, and the nature of the habitat provided by the site, it is unlikely that the inorganic constituents detected in surface soil at Parcel 127(7) would pose a risk to ecological receptors.

## **6.0 Summary, Conclusions, and Recommendations**

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Shaw completed an SI at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7) at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical site activities. SI activities included the collection of 30 surface and depositional soil samples, 19 subsurface soil samples, and 16 groundwater samples from 9 monitoring wells installed during the SI.

The analytical results from investigations at Parcel 127(7) indicate that metals, VOCs, and SVOCs were detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to residential human health SSSLs, ESVs, and background screening values for FTMC. A PRA was also performed to further characterize the potential threat to human health from exposure to groundwater at the site.

Comparison of the analytical data to the SSSLs and background screening values indicated the presence of metals contamination in soils. Specifically, four metals (antimony, copper, lead, and mercury) were detected in one or more surface soil samples at concentrations exceeding their respective SSSLs and background values. At the request of the EPA and ADEM, an interim removal action was performed on two areas of contaminated soil at the site. The areas of contaminated soil were removed and confirmatory soil sampling verified that levels were below SSSLs.

Comparison of the analytical data to the SSSLs also indicated the presence of VOCs in groundwater at the site. The horizontal and vertical extent of VOCs was delineated during supplemental sampling and was limited to carbon tetrachloride and chloroform in a two-well cluster just north of Building 1740. The groundwater chemicals of concern were evaluated in the PRA to determine if these chemicals pose an unacceptable risk to human health. The PRA concluded that site groundwater developed as a source of potable water is unlikely to cause adverse human health effects.

Constituents detected at concentrations exceeding ESVs and background were identified as constituents of potential ecological concern (COPEC) in surface and depositional soils. COPECs were limited to metals. The concentrations of 11 metals exceeded ESVs and background in one or more surface and depositional soil samples. However, the surface soil sample locations with the highest metals results were excavated as part of the soil removal action and replaced with

clean fill material. COPECs at locations outside of the soil removal areas were judged unlikely to pose risks to potential ecological receptors based on the conservative nature of the ESVs, the relatively low calculated HQ screening values, and the infrequency of detection for certain constituents. Although Parcel 127(7) may support certain types of ecological receptors with small home ranges (e.g., earthworm), the site's location within the developed area of the Main Post, its small size, and the projected reuse (mixed-business) greatly limit the potential ecological exposures at this parcel.

Based on the results of the SI, past operations at Parcel 127(7) resulted in soil and groundwater contamination. However, metals-contaminated soils were removed from the site. Therefore, no further action is required with regard to site soils. Although the PRA determined that groundwater developed as a potable water source is unlikely to cause adverse human health effects, as a conservative measure, Shaw recommends implementing land-use controls to restrict groundwater use at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7).

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qualifier, indicating that the concentrations were estimated. SVOC concentrations in the surface and depositional soil samples ranged from 0.035 to 1.1 mg/kg.

Two PAH compounds, benzo(a)pyrene (seven sample locations) and dibenz(a,h)anthracene (three locations), were detected at concentrations exceeding SSSLs. However, the benzo(a)pyrene and dibenz(a,h)anthracene concentrations were below their respective PAH background screening values.

Seven SVOCs, including five PAH compounds (anthracene, benzo[a]pyrene, fluoranthene, phenanthrene, and pyrene) and two non-PAH compounds (bis[2-ethylhexyl]phthalate and butyl benzyl phthalate), exceeded ESVs. The concentrations of the PAHs exceeding ESVs were all below their respective PAH background screening values.

## **5.2 Subsurface Soil Analytical Results**

Nineteen subsurface soil samples were collected from soil borings at Parcel 127(7), as shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-2.

**Metals.** A total of 22 metals were detected in the subsurface soil samples. The concentrations of seven metals (aluminum, arsenic, chromium, copper, iron, manganese, and thallium) exceeded SSSLs. Of the seven metals that exceeded SSSLs, only the following three metals also exceeded their respective background concentrations in one sample each (Figure 5-1):

- Aluminum (14,300 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (13,591 mg/kg) at sample location PPMP-127-GP13.
- Chromium (59.2 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (38.3 mg/kg) at sample location PPMP-127-GP07.
- Copper (441 mg/kg) exceeded its SSSL (313 mg/kg) and background (19.4 mg/kg) at sample location PPMP-127-GP17.

**Volatile Organic Compounds.** Thirteen subsurface soil samples were analyzed for VOCs. A total of four VOCs (acetone, bromomethane, methylene chloride, and trichlorofluoromethane) were detected in the samples. The bromomethane results, methylene chloride results, and one acetone result were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The remaining VOC results were flagged with a “J” data qualifier, signifying that the compounds were positively identified, but

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**ATTACHMENT 1**  
**LIST OF ABBREVIATIONS AND ACRONYMS**

## List of Abbreviations and Acronyms

2-ADNT	2-amino-4,6-dinitrotoluene	AT	averaging time	CCV	continuing calibration verification
4-ADNT	4-amino-2,6-dinitrotoluene	atm-m <sup>3</sup> /mol	atmospheres per cubic meter per mole	CD	compact disc
2,4-D	2,4-dichlorophenoxyacetic acid	ATSDR	Agency for Toxic Substances and Disease Registry	CDTF	Chemical Defense Training Facility
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	ATV	all-terrain vehicle	CEHNC	U.S. Army Engineering and Support Center, Huntsville
2,4,5-TP	2,4,5-trichlorophenoxypropionic acid	AUF	area use factor	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
3D	3D International Environmental Group	AWARE	Associated Water and Air Resources Engineers, Inc.	CERFA	Community Environmental Response Facilitation Act
AB	ambient blank	AWQC	ambient water quality criteria	CESAS	Corps of Engineers South Atlantic Savannah
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded	AWWSB	Anniston Water Works and Sewer Board	CF	conversion factor
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded	'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	CFC	chlorofluorocarbon
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded	BAF	bioaccumulation factor	CFDP	Center for Domestic Preparedness
ABLM	adult blood lead model	BBGR	Baby Bains Gap Road	CFR	Code of Federal Regulations
Abs	skin absorption	BCF	blank correction factor; bioconcentration factor	CG	phosgene (carbonyl chloride)
ABS	dermal absorption factor	BCT	BRAC Cleanup Team	CGI	combustible gas indicator
AC	hydrogen cyanide	BERA	baseline ecological risk assessment	ch	inorganic clays of high plasticity
ACAD	AutoCadd	BEHP	bis(2-ethylhexyl)phthalate	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	BFB	bromofluorobenzene	CIH	Certified Industrial Hygienist
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	BFE	base flood elevation	CK	cyanogen chloride
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	BG	Bacillus globigii	cl	inorganic clays of low to medium plasticity
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	BGR	Bains Gap Road	Cl	chlorinated
ACGIH	American Conference of Governmental Industrial Hygienists	bgs	below ground surface	CLP	Contract Laboratory Program
AdE	Anniston and Allen stony loam, 10 to 25 percent slope	BHC	hexachlorocyclohexane	cm	centimeter
ADEM	Alabama Department of Environmental Management	BHHRA	baseline human health risk assessment	CN	chloroacetophenone
ADPH	Alabama Department of Public Health	BIRTC	Branch Immaterial Replacement Training Center	CNB	chloroacetophenone, benzene, and carbon tetrachloride
AEC	U.S. Army Environmental Center	bkg	background	CNS	chloroacetophenone, chloropicrin, and chloroform
AEDA	ammunition, explosives, and other dangerous articles	bls	below land surface	CO	carbon monoxide
AEL	airborne exposure limit	BOD	biological oxygen demand	CO <sub>2</sub>	carbon dioxide
AET	adverse effect threshold	Bp	soil-to-plant biotransfer factors	Co-60	cobalt-60
AF	soil-to-skin adherence factor	BRAC	Base Realignment and Closure	CoA	Code of Alabama
AHA	ammunition holding area	Braun	Braun Intertec Corporation	COC	chain of custody; chemical of concern
AL	Alabama	BSAF	biota-to-sediment accumulation factors	COE	Corps of Engineers
ALARNG	Alabama Army National Guard	BSC	background screening criterion	Con	skin or eye contact
ALAD	δ-aminolevulinic acid dehydratase	BTAG	Biological Technical Assistance Group	COPC	chemical of potential concern
ALDOT	Alabama Department of Transportation	BTEX	benzene, toluene, ethyl benzene, and xylenes	COPEC	constituent of potential ecological concern
amb.	amber	BTOC	below top of casing	CPOM	coarse particulate organic matter
amsl	above mean sea level	BTV	background threshold value	CPSS	chemicals present in site samples
ANAD	Anniston Army Depot	BW	biological warfare; body weight	CQCSM	Contract Quality Control System Manager
AOC	area of concern	BZ	breathing zone; 3-quinuclidinyl benzilate	CRDL	contract-required detection limit
AP	armor piercing	C	ceiling limit value	CRL	certified reporting limit
APEC	areas of potential ecological concern	Ca	carcinogen	CRQL	contract-required quantitation limit
APT	armor-piercing tracer	CaCO <sub>3</sub>	calcium carbonate	CRZ	contamination reduction zone
AR	analysis request	CAA	Clean Air Act	Cs-137	cesium-137
ARAR	applicable or relevant and appropriate requirement	CAB	chemical warfare agent breakdown products	CS	ortho-chlorobenzylidene-malononitrile
AREE	area requiring environmental evaluation	CACM	Chemical Agent Contaminated Media	CSEM	conceptual site exposure model
AS/SVE	air sparging/soil vapor extraction	CAMU	corrective action management unit	CSM	conceptual site model
ASP	Ammunition Supply Point	CBR	chemical, biological, and radiological	CT	central tendency
ASR	Archives Search Report	CCAL	continuing calibration	ctr.	container
AST	aboveground storage tank	CCB	continuing calibration blank	CWA	chemical warfare agent; Clean Water Act
ASTM	American Society for Testing and Materials			CWM	chemical warfare material; clear, wide mouth

## List of Abbreviations and Acronyms (Continued)

CX	dichloroformoxime	EE/CA	engineering evaluation and cost analysis	FOMRA	Former Ordnance Motor Repair Area
'D'	duplicate; dilution	Eh	oxidation-reduction potential	FOST	Finding of Suitability to Transfer
D&I	detection and identification	Elev.	elevation	Foster Wheeler	Foster Wheeler Environmental Corporation
DAAMS	depot area agent monitoring station	EM	electromagnetic	FR	Federal Register
DAF	dilution-attenuation factor	EMI	Environmental Management Inc.	Frtn	fraction
DANC	decontamination agent, non-corrosive	EM31	Geonics Limited EM31 Terrain Conductivity Meter	FS	field split; feasibility study
°C	degrees Celsius	EM61	Geonics Limited EM61 High-Resolution Metal Detector	FSP	field sampling plan
°F	degrees Fahrenheit	EOD	explosive ordnance disposal	ft	feet
DCA	dichloroethane	EODT	explosive ordnance disposal team	ft/day	feet per day
DCE	dichloroethene	EPA	U.S. Environmental Protection Agency	ft/ft	feet per foot
DDD	dichlorodiphenyldichloroethane	EPC	exposure point concentration	ft/yr	feet per year
DDE	dichlorodiphenyldichloroethene	EPIC	Environmental Photographic Interpretation Center	FTA	Fire Training Area
DDT	dichlorodiphenyltrichloroethane	EPRI	Electrical Power Research Institute	FTMC	Fort McClellan
DEH	Directorate of Engineering and Housing	EPT	Ephemeroptera, Plecoptera, Trichoptera	FTRRA	FTMC Reuse & Redevelopment Authority
DEHP	di(2-ethylhexyl)phthalate	ER	equipment rinsate	g	gram
DEP	depositional soil	ERA	ecological risk assessment	g/m <sup>3</sup>	gram per cubic meter
DFTPP	decafluorotriphenylphosphine	ER-L	effects range-low	G-856	Geometrics, Inc. G-856 magnetometer
DI	deionized	ER-M	effects range-medium	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
DID	data item description	ESE	Environmental Science and Engineering, Inc.	GAF	gastrointestinal absorption factor
DIMP	di-isopropylmethylphosphonate	ESL	ecological screening level	gal	gallon
DM	dry matter; adamsite	ESMP	Endangered Species Management Plan	gal/min	gallons per minute
DMBA	dimethylbenz(a)anthracene	ESN	Environmental Services Network, Inc.	GB	sarin (isopropyl methylphosphonofluoridate)
DMMP	dimethylmethylphosphonate	ESV	ecological screening value	gc	clay gravels; gravel-sand-clay mixtures
DNAPL	dense nonaqueous-phase liquid	ET	exposure time	GC	gas chromatograph
DNT	dinitrotoluene	EU	exposure unit	GCL	geosynthetic clay liner
DO	dissolved oxygen	Exp.	Explosives	GC/MS	gas chromatograph/mass spectrometer
DOD	U.S. Department of Defense	EXTOXNET	Extension Toxicology Network	GCR	geosynthetic clay liner
DOJ	U.S. Department of Justice	E-W	east to west	GFAA	graphite furnace atomic absorption
DOT	U.S. Department of Transportation	EZ	exclusion zone	GIS	Geographic Information System
DP	direct-push	FAR	Federal Acquisition Regulations	gm	silty gravels; gravel-sand-silt mixtures
DPDO	Defense Property Disposal Office	FB	field blank	gp	poorly graded gravels; gravel-sand mixtures
DPT	direct-push technology	FBI	Family Biotic Index	gpm	gallons per minute
DQO	data quality objective	FD	field duplicate	GPR	ground-penetrating radar
DRMO	Defense Reutilization and Marketing Office	FDC	Former Decontamination Complex	GPS	global positioning system
DRO	diesel range organics	FDA	U.S. Food and Drug Administration	GRA	general response action
DS	deep (subsurface) soil	Fe <sup>+3</sup>	ferric iron	GS	ground scar
DS2	Decontamination Solution Number 2	Fe <sup>+2</sup>	ferrous iron	GSA	General Services Administration; Geologic Survey of Alabama
DSERTS	Defense Site Environmental Restoration Tracking System	FedEx	Federal Express, Inc.	GSBP	Ground Scar Boiler Plant
DWEL	drinking water equivalent level	FEMA	Federal Emergency Management Agency	GSSI	Geophysical Survey Systems, Inc.
E&E	Ecology and Environment, Inc.	FFCA	Federal Facilities Compliance Act	GST	ground stain
EB	equipment blank	FFE	field flame expedient	GW	groundwater
EBS	environmental baseline survey	FFS	focused feasibility study	gw	well-graded gravels; gravel-sand mixtures
EC <sub>20</sub>	effects concentration for 20 percent of a test population	FI	fraction of exposure	H&S	health and safety
EC <sub>50</sub>	effects concentration for 50 percent of a test population	Fil	filtered	HA	hand auger
ECBC	Edgewood Chemical Biological Center	Flt	filtered	HC	mixture of hexachloroethane, aluminum powder, and zinc oxide (smoke producer)
ED	exposure duration	FMDC	Fort McClellan Development Commission	HCl	hydrochloric acid
EDD	electronic data deliverable	FML	flexible membrane liner	HD	distilled mustard (bis-[dichloroethyl]sulfide)
EF	exposure frequency	f <sub>oc</sub>	fraction organic carbon		
EDQL	ecological data quality level				

## List of Abbreviations and Acronyms (Continued)

HDPE	high-density polyethylene	JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	µg/g	micrograms per gram
HE	high explosive	JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	µg/kg	micrograms per kilogram
HEAST	Health Effects Assessment Summary Tables	JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	µg/L	micrograms per liter
Herb.	herbicides	JPA	Joint Powers Authority	µmhos/cm	micromhos per centimeter
HHRA	human health risk assessment	K	conductivity	MeV	mega electron volt
HI	hazard index	K <sub>d</sub>	soil-water distribution coefficient	min	minimum
H <sub>2</sub> O <sub>2</sub>	hydrogen peroxide	kg	kilogram	MINICAMS	miniature continuous air monitoring system
HPLC	high-performance liquid chromatography	KeV	kilo electron volt	ml	inorganic silts and very fine sands
HNO <sub>3</sub>	nitric acid	K <sub>oc</sub>	organic carbon partitioning coefficient	mL	milliliter
HQ	hazard quotient	K <sub>ow</sub>	octonal-water partition coefficient	mm	millimeter
HQ <sub>screen</sub>	screening-level hazard quotient	KMnO <sub>4</sub>	potassium permanganate	MM	mounded material
hr	hour	L	liter; Lewisite (dichloro-[2-chloroethyl]sulfide)	MMBtu/hr	million Btu per hour
HRC	hydrogen releasing compound	L/kg/day	liters per kilogram per day	MNA	monitored natural attenuation
HSA	hollow-stem auger	l	liter	MnO <sub>4</sub> <sup>-</sup>	permanganate ion
HSDB	Hazardous Substance Data Bank	LAW	light anti-tank weapon	MOA	Memorandum of Agreement
HTRW	hazardous, toxic, and radioactive waste	lb	pound	MOGAS	motor vehicle gasoline
'I'	out of control, data rejected due to low recovery	LBP	lead-based paint	MOUT	Military Operations in Urban Terrain
IASPOW	Impact Area South of POW Training Facility	LC	liquid chromatography	MP	Military Police
IATA	International Air Transport Authority	LCS	laboratory control sample	MPA	methyl phosphonic acid
ICAL	initial calibration	LCS <sub>50</sub>	lethal concentration for 50 percent population tested	MPC	maximum permissible concentration
ICB	initial calibration blank	LD <sub>50</sub>	lethal dose for 50 percent population tested	MPM	most probable munition
ICP	inductively-coupled plasma	LEL	lower explosive limit	MQL	method quantitation limit
ICRP	International Commission on Radiological Protection	LOAEL	lowest-observed-adverse-effects-level	MR	molasses residue
ICS	interference check sample	LOEC	lowest-observable-effect-concentration	MRL	method reporting limit
ID	inside diameter	LRA	land redevelopment authority	MS	matrix spike
IDL	instrument detection limit	LT	less than the certified reporting limit	mS/cm	millisiemens per centimeter
IDLH	immediately dangerous to life or health	LUC	land-use control	mS/m	millisiemens per meter
IDM	investigative-derived media	LUCAP	land-use control assurance plan	MSD	matrix spike duplicate
IDW	investigation-derived waste	LUCIP	land-use control implementation plan	MTBE	methyl tertiary butyl ether
IEUBK	Integrated Exposure Uptake Biokinetic	max	maximum	msl	mean sea level
IF	ingestion factor; inhalation factor	MB	method blank	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
ILCR	incremental lifetime cancer risk	MCL	maximum contaminant level	mV	millivolts
IMPA	isopropylmethyl phosphonic acid	MCLG	maximum contaminant level goal	MW	monitoring well
IMR	Iron Mountain Road	MCPA	4-chloro-2-methylphenoxyacetic acid	MWI&MP	Monitoring Well Installation and Management Plan
in.	inch	MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid	Na	sodium
Ing	ingestion	MCS	media cleanup standard	NA	not applicable; not available
Inh	inhalation	MD	matrix duplicate	NAD	North American Datum
IP	ionization potential	MDC	maximum detected concentration	NAD83	North American Datum of 1983
IPS	International Pipe Standard	MDCC	maximum detected constituent concentration	NaMnO <sub>4</sub>	sodium permanganate
IR	ingestion rate	MDL	method detection limit	NAVD88	North American Vertical Datum of 1988
IRDMIS	Installation Restoration Data Management Information System	mg	milligrams	NAS	National Academy of Sciences
IRIS	Integrated Risk Information Service	mg/kg	milligrams per kilogram	NCEA	National Center for Environmental Assessment
IRP	Installation Restoration Program	mg/kg/day	milligram per kilogram per day	NCP	National Contingency Plan
IS	internal standard	mg/kgbw/day	milligrams per kilogram of body weight per day	NCRP	National Council on Radiation Protection and Measurements
ISCP	Installation Spill Contingency Plan	mg/L	milligrams per liter	ND	not detected
IT	IT Corporation	mg/m <sup>3</sup>	milligrams per cubic meter	NE	no evidence; northeast
ITEMS	IT Environmental Management System™	mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	ne	not evaluated
'J'	estimated concentration	MHz	megahertz	NEW	net explosive weight

## List of Abbreviations and Acronyms (Continued)

NFA	No Further Action	PA	preliminary assessment	QAP	installation-wide quality assurance plan
NG	National Guard	PAH	polynuclear aromatic hydrocarbon	QC	quality control
NGP	National Guardsperson	PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity	QST	QST Environmental, Inc.
ng/L	nanograms per liter	Parsons	Parsons Engineering Science, Inc.	qty	quantity
NGVD	National Geodetic Vertical Datum	Pb	lead	Qual	qualifier
Ni	nickel	PBMS	performance-based measurement system	R	rejected data; resample; retardation factor
NIC	notice of intended change	PC	permeability coefficient	R&A	relevant and appropriate
NIOSH	National Institute for Occupational Safety and Health	PCB	polychlorinated biphenyl	RA	remedial action
NIST	National Institute of Standards and Technology	PCDD	polychlorinated dibenzo-p-dioxins	RAO	remedial action objective
NLM	National Library of Medicine	PCDF	polychlorinated dibenzofurans	RBC	risk-based concentration; red blood cell
NO <sub>3</sub> <sup>-</sup>	nitrate	PCE	perchloroethene	RBRG	risk-based remedial goal
NOEC	no-observable-effect-concentration	PCP	pentachlorophenol	RCRA	Resource Conservation and Recovery Act
NPDES	National Pollutant Discharge Elimination System	PDS	Personnel Decontamination Station	RCWM	Recovered Chemical Warfare Material
NPW	net present worth	PEF	particulate emission factor	RD	remedial design
No.	number	PEL	permissible exposure limit	RDX	cyclotrimethylenetrinitramine
NOAA	National Oceanic and Atmospheric Administration	PERA	preliminary ecological risk assessment	ReB3	Rarden silty clay loams
NOAEL	no-observed-adverse-effects-level	PERC	perchloroethene	REG	regular field sample
NR	not requested; not recorded; no risk	PES	potential explosive site	REL	recommended exposure limit
NRC	National Research Council	Pest.	pesticides	RFA	request for analysis
NRCC	National Research Council of Canada	PETN	pentaerythritoltetranitrate	RfC	reference concentration
NRHP	National Register of Historic Places	PFT	portable flamethrower	RfD	reference dose
NRT	near real time	PG	professional geologist	RGO	remedial goal option
ns	nanosecond	PID	photoionization detector	RI	remedial investigation
N-S	north to south	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	RL	reporting limit
NS	not surveyed	PM	project manager	RME	reasonable maximum exposure
NSA	New South Associates, Inc.	POC	point of contact	ROD	Record of Decision
nT	nanotesla	POL	petroleum, oils, and lubricants	RPD	relative percent difference
nT/m	nanoteslas per meter	POTW	publicly owned treatment works	RR	range residue
NTU	nephelometric turbidity unit	POW	prisoner of war	RRF	relative response factor
nv	not validated	PP	peristaltic pump; Proposed Plan	RRSE	Relative Risk Site Evaluation
O <sub>2</sub>	oxygen	ppb	parts per billion	RSD	relative standard deviation
O <sub>3</sub>	ozone	ppbv	parts per billion by volume	RTC	Recruiting Training Center
O&G	oil and grease	PPE	personal protective equipment	RTECS	Registry of Toxic Effects of Chemical Substances
O&M	operation and maintenance	ppm	parts per million	RTK	real-time kinematic
OB/OD	open burning/open detonation	PPMP	Print Plant Motor Pool	RWIMR	Ranges West of Iron Mountain Road
OD	outside diameter	ppt	parts per thousand	SA	exposed skin surface area
OE	ordnance and explosives	PR	potential risk	SAD	South Atlantic Division
oh	organic clays of medium to high plasticity	PRA	preliminary risk assessment	SAE	Society of Automotive Engineers
OH•	hydroxyl radical	PRG	preliminary remediation goal	SAIC	Science Applications International Corporation
ol	organic silts and organic silty clays of low plasticity	PS	chloropicrin	SAP	installation-wide sampling and analysis plan
OP	organophosphorus	PSSC	potential site-specific chemical	SARA	Superfund Amendments and Reauthorization Act
ORC	Oxygen Releasing Compound	pt	peat or other highly organic silts	sc	clayey sands; sand-clay mixtures
ORP	oxidation-reduction potential	PVC	polyvinyl chloride	Sch.	schedule
OSHA	Occupational Safety and Health Administration	QA	quality assurance	SCM	site conceptual model
OSWER	Office of Solid Waste and Emergency Response	QA/QC	quality assurance/quality control	SD	sediment
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector	QAM	quality assurance manual	SDG	sample delivery group
OWS	oil/water separator	QAO	quality assurance officer	SDWA	Safe Drinking Water Act
oz	ounce			SDZ	safe distance zone; surface danger zone

## List of Abbreviations and Acronyms (Continued)

SEMS	Southern Environmental Management & Specialties, Inc.	SWMU	solid waste management unit	USATEU	U.S. Army Technical Escort Unit
SF	cancer slope factor	SWPP	storm water pollution prevention plan	USATHAMA	U.S. Army Toxic and Hazardous Material Agency
SFSP	site-specific field sampling plan	SZ	support zone	USC	United States Code
SGF	standard grade fuels	TAL	target analyte list	USCS	Unified Soil Classification System
Shaw	Shaw Environmental, Inc.	TAT	turn around time	USDA	U.S. Department of Agriculture
SHP	installation-wide safety and health plan	TB	trip blank	USEPA	U.S. Environmental Protection Agency
SI	site investigation	TBC	to be considered	USFWS	U.S. Fish and Wildlife Service
SINA	Special Interest Natural Area	TCA	trichloroethane	USGS	U.S. Geological Survey
SL	standing liquid	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin	UST	underground storage tank
SLERA	screening-level ecological risk assessment	TCDF	tetrachlorodibenzofurans	UTL	upper tolerance level; upper tolerance limit
sm	silty sands; sand-silt mixtures	TCE	trichloroethene	UXO	unexploded ordnance
SM	Serratia marcescens	TCL	target compound list	UXOQCS	UXO Quality Control Supervisor
SMDP	Scientific Management Decision Point	TCLP	toxicity characteristic leaching procedure	UXOSO	UXO safety officer
s/n	signal-to-noise ratio	TDEC	Tennessee Department of Environment and Conservation	V	vanadium
SO <sub>4</sub> <sup>-2</sup>	sulfate	TDGCL	thiodiglycol	VC	vinyl chloride
SOD	soil oxidant demand	TDGCLA	thiodiglycol chloroacetic acid	VOA	volatile organic analyte
SOP	standard operating procedure	TEA	triethylaluminum	VOC	volatile organic compound
SOPQAM	U.S. EPA's <i>Standard Operating Procedure/Quality Assurance Manual</i>	Tetryl	trinitrophenylmethyl nitramine	VOH	volatile organic hydrocarbon
sp	poorly graded sands; gravelly sands	TERC	Total Environmental Restoration Contract	VQlfr	validation qualifier
SP	submersible pump	THI	target hazard index	VQual	validation qualifier
SPCC	system performance calibration compound	TIC	tentatively identified compound	VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
SPCS	State Plane Coordinate System	TLV	threshold limit value	WAC	Women's Army Corps
SPM	sample planning module	TN	Tennessee	Weston	Roy F. Weston, Inc.
SQRT	screening quick reference tables	TNB	trinitrobenzene	WP	installation-wide work plan
Sr-90	strontium-90	TNT	trinitrotoluene	WRS	Wilcoxon rank sum
SRA	streamlined human health risk assessment	TOC	top of casing; total organic carbon	WS	watershed
SRI	supplemental remedial investigation	TPH	total petroleum hydrocarbons	WSA	Watershed Screening Assessment
SRM	standard reference material	TR	target cancer risk	WWI	World War I
Ss	stony rough land, sandstone series	TRADOC	U.S. Army Training and Doctrine Command	WWII	World War II
SS	surface soil	TRPH	total recoverable petroleum hydrocarbons	XRF	x-ray fluorescence
SSC	site-specific chemical	TRV	toxicity reference value	yd <sup>3</sup>	cubic yards
SSHO	site safety and health officer	TSCA	Toxic Substances Control Act		
SSHP	site-specific safety and health plan	TSDF	treatment, storage, and disposal facility		
SSL	soil screening level	TSS	total suspended solids		
SSSL	site-specific screening level	TWA	time-weighted average		
SSSSL	site-specific soil screening level	UCL	upper confidence limit		
STB	supertropical bleach	UCR	upper certified range		
STC	source-term concentration	'U'	not detected above reporting limit		
STD	standard deviation	UIC	underground injection control		
STEL	short-term exposure limit	UF	uncertainty factor		
STL	Severn-Trent Laboratories	URF	unit risk factor		
STOLS	Surface Towed Ordnance Locator System <sup>®</sup>	USACE	U.S. Army Corps of Engineers		
Std. units	standard units	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine		
SU	standard unit	USAEC	U.S. Army Environmental Center		
SUXOS	senior UXO supervisor	USAEHA	U.S. Army Environmental Hygiene Agency		
SVOC	semivolatile organic compound	USACMLS	U.S. Army Chemical School		
SW	surface water	USAMPS	U.S. Army Military Police School		
SW-846	U.S. EPA's <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>	USATCES	U.S. Army Technical Center for Explosive Safety		