

**Final**

**Site Investigation Report**  
**Trenches West of Remount Creek, Parcel 228(7)**

**Fort McClellan**  
**Calhoun County, Alabama**

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## ***Executive Summary***

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In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation completed a site investigation (SI) at the Trenches West of Remount Creek, Parcel 228(7), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at the Trenches West of Remount Creek, Parcel 228(7), consisted of a geophysical survey and the sampling and analysis of five surface soil samples, two depositional soil samples, five subsurface soil samples, three groundwater samples, one surface water sample, and one sediment sample. In addition, three temporary groundwater monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

The geophysical survey results indicated that anomalies at the Trenches West of Remount Creek, Parcel 228(7), were caused by surface metal and cultural features. The geophysical data did not indicate the presence of trenches.

Chemical analysis of samples collected at the Trenches West of Remount Creek, Parcel 228(7), indicates that metals, volatile organic compounds, and semivolatile organic compounds (SVOC) were detected in the various site media. In addition, pesticides were detected in one surface soil sample. Herbicides, polychlorinated biphenyls, and nitroexplosive compounds were not detected in any of the samples collected. To evaluate whether detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

The potential threat to human receptors is expected to be low. In soils, with the exception of iron in one subsurface soil sample, the concentrations of the metals that exceeded SSSLs were below their respective background concentrations or within the range of background values. Additionally, the pesticide chlordane was detected in one surface soil sample at a concentration (1.8 milligrams per kilogram) marginally exceeding the SSSL (1.69 milligrams per kilogram). Given the low concentrations and limited spatial distribution, the iron and chlordane concentrations are not expected to pose an unacceptable risk to human health.

In groundwater, four metals (aluminum, barium, iron, and manganese) were detected at concentrations exceeding SSSLs and their respective background concentrations. However, these metals concentrations were within the range of background values and do not pose an unacceptable risk to human health. The SVOC bis(2-ethylhexyl)phthalate was detected in one groundwater sample at a concentration exceeding the SSSL. However, bis(2-ethylhexyl)phthalate is a common laboratory contaminant and is probably not related to site activities.

Beryllium, copper, and selenium were detected in a limited number of surface soil samples at concentrations exceeding ESVs and the range of background values. Also, three pesticides were detected in one surface soil sample at concentrations exceeding ESVs. However, the potential impact to ecological receptors is expected to be minimal, based on the existing viable habitat and site conditions. The site is located within the developed area of the Main Post, consisting of buildings and paved roads/areas interspersed with grassy areas, and is projected for future use as a retirement community. Viable ecological habitat is presently limited and is not expected to increase in the future land-use scenario.

Based on the results of the SI, past operations at the Trenches West of Remount Creek, Parcel 228(7), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT Corporation recommends “No Further Action” and unrestricted land reuse at the Trenches West of Remount Creek, Parcel 228(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 with IT Corporation (IT) to perform the site investigation (SI) at the Trenches West of Remount Creek, Parcel 228(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from the SI, including geophysical survey, field sampling and analysis, and monitoring well installation activities, conducted at the Trenches West of Remount Creek, Parcel 228(7).

### **1.1 Project Description**

The Trenches West of Remount Creek site was identified as an area to be investigated prior to property transfer. The site was classified as a Category 7 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 sites are areas that are not evaluated and/or that require additional evaluation.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in December 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the Trenches West of Remount Creek, Parcel 228(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, 2000a). The SAP includes the installation-wide safety and health plan (SHP) and quality assurance plan (QAP).

The SI included fieldwork to collect five surface soil samples, two depositional soil samples, five subsurface soil samples, three groundwater samples, one surface water sample, and one sediment sample to determine whether potential site-specific chemicals are present at the site and to provide data useful for supporting any future corrective measures and closure 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 present at the Trenches West of Remount Creek, Parcel 228(7), at concentrations that present an unacceptable risk to human health or the environment. The conclusions of the 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 by IT 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, 2000b). The PAH background screening values were developed by IT 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 BRAC Cleanup Team will decide either to propose “No Further Action” at the site or to conduct additional work at the site.

## **1.3 Site Description and History**

The Trenches West of Remount Creek, Parcel 228(7), are located in the west-central portion of the Main Post of FTMC (Figure 1-1). The parcel, which covers approximately two acres, is located near the intersection of 14th Avenue and 15th Avenue. The 11th Chemical Motor Pool, Parcel 29(7), is located approximately 150 feet to the east of Parcel 228(7). Cane Creek Golf Course is located to the northeast. The site and surrounding area are well-developed, with several inactive buildings present. Building 3210 and Building 3278, a former dining facility and former company headquarters, respectively, are located at the south end of the parcel. Building 3240, a former enlisted personnel barracks, is located south of the parcel. Building 3250, a former religious educational facility, and Building 3244, a former enlisted personnel barracks, are located just north and northwest, respectively.

The Environmental Photographic Interpretation Center report (U.S. Environmental Protection Agency [EPA], 1990) identified a set of three potential trenches located west of Remount Creek near 14th Avenue on the Main Post. The potential trench identified in the northern portion of Parcel 228(7) was approximately 100 feet long, very narrow, and oriented north-south. The potential trench in the center of the site was irregularly shaped, approximately 150 feet long and 75 feet wide, and was oriented northeast-southwest. The potential trench at the southern end of the site was an oval-shaped area, measuring approximately 100 feet long by approximately 50 feet wide, and was oriented northwest-southeast.

The eastern boundary of the parcel is at the top of a sparsely wooded ridge that slopes toward Remount Creek. Surface drainage in the vicinity of the site flows east/northeast towards a tributary of Remount Creek, which is located approximately 100 feet east of the northern portion of the parcel. Site elevation ranges from approximately 760 to 780 feet above mean sea level. Figure 1-2 is a site map showing man-made and topographic features, site boundaries, and potential trench locations.

## **2.0 Previous Investigations**

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An EBS was conducted by ESE to document current 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 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), EPA Region IV, 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 historical 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 Trenches West of Remount Creek, Parcel 228(7), were identified as a Category 7 CERFA site: areas that are not evaluated or require additional evaluation.

## **3.0 Current Site Investigation Activities**

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This chapter summarizes SI activities conducted by IT at the Trenches West of Remount Creek, Parcel 228(7), including geophysical survey, environmental sampling and analysis, and groundwater monitoring well installation activities.

### **3.1 Geophysical Survey**

A geophysical survey was conducted at the Trenches West of Remount Creek, Parcel 228(7), to identify anomalies representing suspected trenches and to select proposed sampling locations within the areas of concern. The area surveyed was approximately 93,600 square feet (2.1 acres), as shown on Figure 3-1. A detailed discussion of the geophysical investigation, including theory of operation of the instruments, field procedures, data processing, and interpreted results of the investigation, is presented as Appendix A.

The survey was conducted using magnetic and electromagnetic techniques. A survey grid was established at the site to encompass suspected trench locations. Survey control was accomplished using a survey-grade total station global positioning system (GPS). The GPS survey data were referenced to the U.S. State Plane Coordinate System (Alabama East Zone, North American Datum of 1983).

A detailed site map was drawn in the field. The map included any surface cultural features within the survey area, or near its perimeter, that could potentially affect the geophysical data (e.g., vehicles, overhead utilities, or manhole covers).

Preliminary color contour maps of the survey data were analyzed and compared with the site sketch to differentiate between anomalies caused by surface and subsurface source materials. Suspected underground utilities were verified with an electromagnetic utility locator, and their locations were placed on the site map. The results of the geophysical survey are summarized in Section 4.1.

### **3.2 Environmental Sampling**

The environmental sampling performed during the SI at the Trenches West of Remount Creek, Parcel 228(7), included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, and a surface water and sediment sample for chemical analysis. The sample locations were determined by observing site physical characteristics during a site

walkover, by reviewing historical documents pertaining to activities conducted at the site, and based on geophysical survey activities. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-2. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.4.

### **3.2.1 Surface and Depositional Soil Sampling**

Five surface soil samples and two depositional soil samples were collected at the Trenches West of Remount Creek, Parcel 228(7), at the locations shown on Figure 3-2. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on geophysical survey activities, sampling rationale, presence of surface structures, site topography, and buried utilities.

**Sample Collection.** Three of the five surface soil samples and the two depositional soil samples were collected from the upper 1 foot of soil with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). Two surface soil samples were collected using split-spoon samplers during hollow-stem auger drilling. Surface and depositional soil samples were collected by first removing surface debris, such as rocks and vegetation, from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP (IT, 2000a). Samples for volatile organic compound (VOC) analysis were collected directly from the sampler with three EnCore<sup>®</sup> samplers. The remaining portion of the sample was 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 3.4. Sample collection logs are included in Appendix B.

### **3.2.2 Subsurface Soil Sampling**

Subsurface soil samples were collected from five soil borings at the Trenches West of Remount Creek, Parcel 228(7), as shown on Figure 3-2. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on geophysical survey activities, sampling rationale, presence of surface structures, site topography, and proximity to utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

**Table 3-1**

**Sampling Locations and Rationale  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Sample Location</b>	<b>Sample Media</b>	<b>Sample Location Rationale</b>
PPMP-228-GP01	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the centrally-located trench area.
PPMP-228-GP02	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected within the northernmost trench area.
PPMP-228-GP03	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the centrally-located trench area.
PPMP-228-GP04	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected within the centrally-located trench area.
PPMP-228-GP05	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected within the southernmost trench area.
PPMP-228-DEP01	Depositional Soil	A depositional soil sample was collected near the northeastern part of the site. This sampling location represents a likely collection point for soils deposited downslope near the tributary of Remount Creek.
PPMP-228-DEP02	Depositional Soil	A depositional soil sample was collected east of the site. This sampling location represents a likely collection point for soils deposited downslope from the parcel.
PPMP-228-SW/SD01	Surface Water Sediment	Surface water and sediment samples were collected from the tributary of Remount Creek located approximately 100 feet east of the northern portion of the parcel.

**Table 3-2**

**Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Samples  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-228-GP01	PPMP-228-GP01-SS-KK0001-REG PPMP-228-GP01-DS-KK0002-REG	0 - 1 1 - 3			PPMP-228-GP01-SS-KK0001-MS PPMP-228-GP01-SS-KK0001-MSD	TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP02	PPMP-228-GP02-SS-KK0003-REG PPMP-228-GP02-DS-KK0004-REG	0 - 1 10 - 12				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP03	PPMP-228-GP03-SS-KK0005-REG PPMP-228-GP03-DS-KK0006-REG	0 - 1 10 - 12				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP04	PPMP-228-GP04-SS-KK0007-REG PPMP-228-GP04-DS-KK0010-REG	0 - 1 6 - 9	PPMP-228-GP04-SS-KK0008-FD	PPMP-228-GP04-SS-KK0009-FS		TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP05	PPMP-228-GP05-SS-KK0011-REG PPMP-228-GP05-DS-KK0012-REG	0 - 1 3 - 6				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-DEP01	PPMP-228-DEP01-DEP-KK0013-REG	0 - 1				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-DEP02	PPMP-228-DEP02-DEP-KK0014-REG	0 - 1				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives

CI - Chlorinated.  
 FD - Field duplicate.  
 FS - Field split.  
 ft. bgs - feet below ground surface.  
 MS/MSD - Matrix spike/matrix spike duplicate.  
 OP - Organophosphorus.

PCB - Polychlorinated biphenyls.  
 QA/QC - Quality assurance/quality control.  
 SVOC - Semivolatile organic compound.  
 TAL - Target analyte list.  
 TCL - Target compound list.  
 VOC - Volatile organic compound.

**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 the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Subsurface soil samples were collected continuously to 12 feet bgs or until direct-push sampler refusal was encountered. Samples were field screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000a) to measure for volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were not greater than background, the deepest sample interval above the saturated zone was submitted for analysis. Samples to be analyzed for VOCs were collected directly from the sampler with three EnCore samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Samples submitted for laboratory analysis are summarized in Table 3-2. The on-site geologist constructed a detailed boring log for each soil boring. The lithological log for each borehole is included in Appendix C.

At the completion of soil sampling, boreholes were abandoned with bentonite chips and hydrated with potable water following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000a).

### **3.2.3 Well Installation**

Three temporary wells were installed in the residuum groundwater zone at the Trenches West of Remount Creek, Parcel 228(7), to collect groundwater samples for laboratory analysis. The well locations are shown on Figure 3-2. Table 3-3 summarizes construction details of the temporary wells installed at the site. The well construction logs are included in Appendix C.

IT contracted Miller Drilling, Inc. to install the temporary wells with a hollow-stem auger rig at the locations shown on Figure 3-2. The wells were installed following procedures outlined in Section 4.7 and Appendix C of the SAP (IT, 2000a). The boreholes at these locations were advanced with a 4.25-inch inside diameter (ID) hollow-stem auger from ground surface to the first water-bearing zone in residuum at the well location. The boreholes were augered to the depth of direct-push sampler refusal, and samples were collected from the depth of direct-push refusal to the bottom of the borehole. A 2-foot-long, 2-inch ID carbon steel split-spoon sampler

**Table 3-3**

**Temporary Well Construction Summary  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Temporary Well</b>	<b>Northing</b>	<b>Easting</b>	<b>Ground Elevation (ft above msl)</b>	<b>TOC Elevation (ft above msl)</b>	<b>Well Depth (ft bgs)</b>	<b>Screen Length (ft)</b>	<b>Screen Interval (ft bgs)</b>	<b>Well Material</b>
PPMP-228-GP01	1169549.70	666210.97	763.60	765.24	24.0	10	13.75 - 23.75	2" ID Sch. 40 PVC
PPMP-228-GP02	1169653.02	666168.77	773.86	775.29	28.55	15	13.30 - 28.30	2" ID Sch. 40 PVC
PPMP-228-GP03	1169422.08	666161.87	774.57	776.54	23.5	15	8.25 - 23.25	2" ID Sch. 40 PVC

Temporary wells installed using hollow-stem auger.

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

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

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

bgs - Below ground surface.

ft - Feet.

msl - Mean sea level.

TOC - Top of casing.

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. The lithological log for each borehole is included in Appendix C.

Upon reaching the target depth at each borehole, a 10- or 15-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 polyvinyl chloride (PVC) screen with 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 2 feet above the top of the well screen as the augers were removed. The wells were surged using a solid PVC surge block for approximately 10 minutes, or until no more settling of the filter sand occurred inside the borehole. A bentonite seal, consisting of approximately 2 feet of bentonite pellets, was placed immediately on top of the filter sand 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 Appendix C of the SAP (IT, 2000a). The temporary well surface completion included attaching plastic sheeting around the PVC riser using duct tape. Additionally, sandbags 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.

The temporary wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in Section 4.8 and Appendix C of the SAP (IT, 2000a). 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 in order to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was equal to or less than 20 nephelometric turbidity units or for a maximum of 4 hours. The well development logs are included in Appendix D.

### **3.2.4 Water Level Measurements**

The depth to groundwater was measured in the temporary wells installed at the Trenches West of Remount Creek, Parcel 228(7), on March 14, 2000 following procedures outlined in Section 4.18 of the SAP (IT, 2000a). 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 Section 4.10 of the SAP (IT, 2000a). Measurements were referenced to the top of the PVC well casing. A summary of groundwater level measurements is presented in Table 3-4.

### **3.2.5 Groundwater Sampling**

Groundwater samples were collected from the three temporary wells installed at the Trenches West of Remount Creek, Parcel 228(7). The well/groundwater sampling locations are shown on Figure 3-2. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and QA/QC samples are listed in Table 3-5.

**Sample Collection.** Groundwater sampling was performed following procedures outlined in Section 4.9.1.4 of the SAP (IT, 2000a). Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Purging and sampling were performed with a submersible pump equipped with Teflon™ tubing. Field parameters were measured using a calibrated water-quality meter. Field parameter readings are 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 3.4.

### **3.2.6 Surface Water Sampling**

One surface water sample was collected at the Trenches West of Remount Creek, Parcel 228(7), at the location shown on Figure 3-2. The surface water sampling location and rationale are listed in Table 3-1. The surface water sample designation is listed in Table 3-7. The sampling location was determined in the field, based on drainage pathways and actual field observations.

**Sample Collection.** The surface water sample was collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). The surface water sample was collected by dipping a clean stainless-steel pitcher in the water and pouring the water in the appropriate sample containers. The sample was collected after field parameters had been measured using a calibrated water-quality meter. Surface water field parameters are listed in Table 3-6. The sample collection log is included in Appendix B. The sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.4.

**Table 3-4**

**Groundwater Elevations  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Well Location</b>	<b>Date</b>	<b>Depth to Water (ft BTOC)</b>	<b>Ground Elevation (ft above msl)</b>	<b>Top of Casing Elevation (ft above msl)</b>	<b>Groundwater Elevation (ft above msl)</b>
PPMP-228-GP01	14-Mar-00	5.15	763.60	765.24	760.09
PPMP-228-GP02	14-Mar-00	9.91	773.86	775.29	765.38
PPMP-228-GP03	14-Mar-00	7.13	774.57	776.54	769.41

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

BTOC - Below top of casing.

ft - Feet.

msl - Mean sea level.

**Table 3-5**

**Groundwater Sample Designations and QA/QC Samples  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	QA/QC Samples			Analytical Suite
		Field Duplicates	Field Splits	MS/MSD	
PPMP-228-GP01	PPMP-228-GP01-GW-KK3001-REG			PPMP-228-GP01-GW-KK3001-MS PPMP-228-GP01-GW-KK3001-MSD	TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP02	PPMP-228-GP02-GW-KK3002-REG				TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives
PPMP-228-GP03	PPMP-228-GP03-GW-KK3003-REG	PPMP-228-GP03-GW-KK3004-FD	PPMP-228-GP03-GW-KK3005-FS		TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives

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

CI - Chlorinated.

FD - Field duplicate.

FS - Field split.

ft. bgs - feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

OP - Organophosphorus.

PCB - Polychlorinated biphenyls.

QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

**Table 3-6**

**Groundwater and Surface Water Field Parameters  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Sample Location</b>	<b>Date</b>	<b>Media</b>	<b>Specific Conductivity (mS/cm)<sup>a</sup></b>	<b>Dissolved Oxygen (mg/L)</b>	<b>ORP (mV)</b>	<b>Temperature (°C)</b>	<b>Turbidity (NTU)</b>	<b>pH (SU)</b>
PPMP-228-GP01	25-Mar-99	GW	0.509	0.45	44	16.12	242.9	7.30
PPMP-228-GP02	29-Mar-99	GW	0.243	0.32	120	17.61	0.0	5.77
PPMP-228-GP03	29-Mar-99	GW	0.184	0.21	87	18.62	18.7	5.67
PPMP-228-SW/SD01	27-Jan-99	SW	0.221	6.71	182	14.40	29.0	7.12

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

°C - Degrees Celsius.

GW - Groundwater.

mg/L - Milligrams per liter.

mS/cm - Millisiemens per centimeter.

mV - Millivolts.

NTU - Nephelometric turbidity unit.

ORP - Oxidation-reduction potential.

SU - Standard units.

SW - Surface water.

**Table 3-7**

**Surface Water and Sediment Sample Designations and QA/QC Samples  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-228-SW/SD01	PPMP-228-SW/SD01-SW-KK2001-REG PPMP-228-SW/SD01-SD-KK1001-REG	NA 0-0.5	PPMP-228-SW/SD01-SD-KK1002-FD	PPMP-228-SW/SD01-SD-KK1003-FS		TCL VOCs, TCL SVOCs, TAL Metals, CI Pesticides/Herbicides, OP Pesticides, PCBs, Nitroexplosives  TOC, Grain size (sediment only)

CI - Chlorinated.  
 FD - Field duplicate.  
 FS - Field split.  
 ft. bgs - feet below ground surface.  
 MS/MSD - Matrix spike/matrix spike duplicate.  
 NA - Not applicable.  
 OP - Organophosphorus.

PCB - Polychlorinated biphenyls.  
 QA/QC - Quality assurance/quality control.  
 SVOC - Semivolatile organic compound.  
 TAL - Target analyte list.  
 TOC - Total organic carbon.  
 TCL - Target compound list.  
 VOC - Volatile organic compound.

### **3.2.7 Sediment Sampling**

One sediment sample was collected at the same location as the surface water sample described in Section 3.2.6, as shown on Figure 3-2. The sediment sampling location and rationale are presented in Table 3-1. The sediment sample designation and QA/QC samples are listed in Table 3-7. The actual sediment sampling location was determined in the field based on drainage pathways and field observations.

**Sample Collection.** The sediment sample was collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP (IT, 2000a). Sediments were collected with a stainless-steel spoon and placed in a clean stainless-steel bowl. Samples for VOC analysis were then immediately collected from the stainless-steel bowl with three EnCore samplers. The remaining portion of the sample was homogenized and placed in the appropriate sample containers. The sample collection log is included in Appendix B. The sediment sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.4.

### **3.3 Surveying of Sample Locations**

Sample locations were surveyed using GPS survey techniques described in Section 4.3 of the SAP (IT, 2000a) and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000a). 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 E.

### **3.4 Analytical Program**

Samples collected during the SI were analyzed for various chemical and physical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the site and EPA, ADEM, FTMC, and USACE requirements. The samples collected at the Trenches West of Remount Creek, Parcel 228(7), were analyzed for the following parameters:

- Target compound list volatile organic compounds - EPA Method 5035/8260B
- Target compound list semivolatile organic compounds (SVOC) - EPA Method 8270C
- Target analyte list metals - EPA Method 6010B/7000

- Polychlorinated biphenyls (PCB) - EPA Method 8082
- Chlorinated herbicides - EPA Method 8151A
- Chlorinated pesticides - EPA Method 8081A
- Organophosphorus pesticides - EPA Method 8141A
- Nitroexplosive compounds - EPA Method 8330
- Total organic carbon (TOC) - EPA Method 9060 (sediment only)
- Grain size - American Society for Testing and Materials Method D421/D422 (sediment only).

The samples were analyzed using EPA SW-846 methods, including Update III methods where applicable, as presented in Table 6-1 in Appendix B of the SAP (IT, 2000a). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000a]). Chemical data were reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated data is included in Appendix F. The Data Validation Summary Report is included as Appendix G.

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

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Chapter 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custody forms were recorded as specified in Section 4.13 of the SAP (IT, 2000a).

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

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

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated during the SI at the Trenches West of Remount Creek, Parcel 228(7), was segregated as follows:

- Drill cuttings
- Purge water from well development and sampling activities, and decontamination fluids
- Personal protective equipment (PPE).

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 analyses. Based on the results, drill cuttings and PPE generated during the SI were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the existing 20,000-gallon sump associated with the 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 the Main Post.

### **3.7 Variances/Nonconformances**

One variance to the SFSP was recorded during completion of the SI. The variance did not alter the intent of the investigation or the sampling rationale presented in Table 4-2 of the SFSP (IT, 1998a). The variance to the SFSP is summarized in Table 3-8 and included in Appendix H. There were not any nonconformances to the SFSP recorded during completion of the SI.

### **3.8 Data Quality**

The field sample analytical data are presented in tabular form in Appendix F. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and QAP; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix B. As discussed in Section 3.7, one variance to the SFSP was recorded during completion of the SI. However, the variance did not impact the usability of the data.

**Data Validation.** A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix G consists of a data validation summary report that was

**Table 3-8**

**Variance to the Site-Specific Field Sampling Plan  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

<b>Variance to the SFSP</b>	<b>Justification for Variance</b>	<b>Impact to Site Investigation</b>
Surface water and sediment sample location PPMP-228-SW/SD01 was moved approximately 100 feet northeast of the location proposed in the site-specific field sampling plan.	The surface water and sediment sample location was moved because surface water and sediment were not present in the tributary at the proposed location.	Relocating the surface water and sediment sample point allowed successful collection of surface water and sediment for chemical analysis.

prepared to 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 report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs. Rejected data (assigned an “R” qualifier) were not used in the comparisons to the SSSLs and ESVs.

The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

## **4.0 Site Characterization**

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IT utilized the results of the geophysical survey to aid in the placement of soil and groundwater sampling locations. Subsurface investigations performed at the Trenches West of Remount Creek, Parcel 228(7), provided soil, bedrock, and groundwater data used to characterize the geology and hydrogeology of the site.

### **4.1 Results of Geophysical Survey**

The geophysical survey results indicated that anomalies at the Trenches West of Remount Creek, Parcel 228(7), were caused by surface metal and cultural features. The geophysical data did not indicate the presence of trenches. The geophysical interpretation map of the site (Figure 4-1) contains detailed information on permanent site reference features as well as GPS coordinates to aid in relocating the survey area.

A detailed discussion of the data interpretation is included in the interpretation chapter of the geophysics report (Chapter A.4.0, Appendix A).

### **4.2 Regional and Site Geology**

#### **4.2.1 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 (Szabo 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 consists primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists 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. 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 together as undifferentiated at FTMC and 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 (Szabo 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 on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity 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).

#### **4.2.2 Site Geology**

Soils at the Trenches West of Remount Creek, Parcel 228(7), fall into the Anniston and Allen gravelly loam. This soil type is a friable, strongly acid, well-drained soil that has developed in old local alluvium by erosional forces, surface runoff, or natural reworking processes. The surface soil is usually a very dark brown loam or dark grayish-brown sandy loam and the subsoil is a dark red sandy clay loam. Sandstone and quartzite gravel and cobbles are found throughout the soil. Although erosion is a problem, this soil type can be productive in areas with little or no slope (U.S. Department of Agriculture, 1961)

The Trenches West of Remount Creek, Parcel 228(7), are situated near the western boundary of

the Ordovician window in the uppermost thrust sheet, with the Jacksonville Fault extending to the west of the site (Figure 4-2). Bedrock beneath the site is mapped as Mississippian/Ordovician Floyd and Athens Shale, undifferentiated. The Cambrian Shady Dolomite underlies the area west of the site and is an area of high relief (Figure 4-2).

A geologic cross section was constructed using direct-push and hollow-stem auger boring data collected during the SI, as presented on Figure 4-3. The geologic cross section location is shown on Figure 3-2. Based on the cross section, residuum beneath the Trenches West of Remount Creek, Parcel 228(7), consists of predominantly clay and silt overlying weathered shale. The weathered shale was encountered at depths ranging from 5 to 17 feet bgs. Competent bedrock was not encountered during drilling.

### **4.3 Site Hydrology**

#### **4.3.1 Surface Hydrology**

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (National Oceanic and Atmospheric Administration, 1998). The major surface water features on the Main Post of FTMC include Remount Creek, Cane Creek, South Branch of Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Surface runoff at the Trenches West of Remount Creek, Parcel 228(7), flows east/northeast towards a tributary of Remount Creek located approximately 100 feet east of the northern end of the parcel.

#### **4.3.2 Hydrogeology**

Static groundwater levels were measured in temporary wells installed at the site on March 14, 2000. Table 3-4 summarizes measured groundwater elevations at the Trenches West of Remount Creek, Parcel 228(7). A groundwater elevation map was constructed from the March 2000 data and is shown on Figure 4-4. Groundwater flow at the site is generally to the east towards a tributary of Remount Creek. The hydraulic gradient across the site is approximately 0.1 foot per foot.

During soil boring and well installation activities, groundwater was generally encountered in the

weathered shale at depths ranging from approximately 20 feet bgs at PPMP-228-GP03 to 26.5 feet bgs at PPMP-228-GP02. Static groundwater levels summarized in Table 3-4 range from approximately 13 to 16 feet above the depth to water recorded in the boring logs for PPMP-228-GP03 and PPMP-228-GP02, respectively (Appendix C). This indicates that the groundwater has an upward hydraulic gradient and is under semiconfined conditions.

## **5.0 Summary of Analytical Results**

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The results of the chemical analyses of samples collected at the Trenches West of Remount Creek, Parcel 228(7), indicate that metals, VOCs, and SVOCs have been detected in the various site media. In addition, pesticides were detected in one surface soil sample. Herbicides, PCBs, and nitroexplosive compounds were not detected in any of the samples collected. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, the analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metals concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC are included in Appendix I. Additionally, PAH concentrations in surface and depositional soils that exceeded SSSLs and ESVs were compared to PAH background screening values. The PAH background screening values were derived from PAH analytical data from 18 parcels at FTMC that were determined to represent anthropogenic activity (IT, 2000b). PAH background screening values were developed for two categories of surface soils: beneath asphalt and adjacent to asphalt. The PAH background screening values for soils adjacent to asphalt are the more conservative (i.e., lower) of the PAH background values and are the values used herein for comparison.

Six compounds were quantified by both SW-846 Method 8260B (as VOC) and Method 8270C (as SVOC), namely, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, and naphthalene. Method 8260B yields a reporting limit (RL) of 0.005 milligrams per kilogram (mg/kg), while Method 8270C has a reporting limit of 0.330 mg/kg, which is typical for a soil matrix sample. Because of the direct nature of the Method 8260B analysis and its resulting lower RL, this method should be considered superior to Method 8270C when quantifying low levels (0.005 to 0.330 mg/kg) of these compounds. Method 8270C and its associated methylene chloride extraction step is superior, however, when dealing with samples that contain higher concentrations (greater than 0.330 mg/kg) of these compounds. Therefore, all data were considered, and none were categorically excluded. Data validation qualifiers were helpful in evaluating the usability of data, especially if calibration,

blank contamination, precision, or accuracy indicator anomalies were encountered. The validation qualifiers and concentrations reported (e.g., whether concentrations were less than or greater than 0.330 mg/kg) were used to determine which analytical method was likely to return the more accurate result.

The following sections and Tables 5-1 through 5-5 summarize the results of the comparisons of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix F.

### **5.1 Surface and Depositional Soil Analytical Results**

Five surface soil samples and two depositional soil samples were collected for chemical analysis at the Trenches West of Remount Creek, Parcel 228(7). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values, as presented in Table 5-1.

**Metals.** Twenty-two metals were detected in surface and depositional soil samples collected at the site. The samples collected at PPMP-228-GP02 and PPMP-228-GP03 each contained all twenty-two detected metals.

The concentrations of five metals (aluminum, arsenic, iron, manganese, and thallium) exceeded SSSLs. Of these metals, aluminum (PPMP-228-GP02), arsenic (PPMP-228-GP03), and iron (PPMP-228-GP02 and PPMP-228-GP03) concentrations also exceeded their respective background concentrations. However, the aluminum, arsenic, and iron results were within the range of background values determined by SAIC (1998) (Appendix I).

Aluminum (PPMP-228-GP02), beryllium (PPMP-228-GP03), copper (PPMP-228-GP02), iron (PPMP-228-GP02 and PPMP-228-GP03), selenium (six locations), and zinc (three locations) were detected at concentrations exceeding ESVs and their respective background concentrations. With the exception of beryllium, copper, and two selenium results, the concentrations of these metals were within the range of background values determined by SAIC (1998).

**Volatile Organic Compounds.** Six VOCs (2-butanone, acetone, methylene chloride, toluene, trichlorofluoromethane, and p-cymene) were detected in surface and depositional soil samples collected at the site. The methylene chloride results and two of the acetone results were

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

(Page 1 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-228 PPMP-228-DEP01 KK0013 8-Mar-99 0- 1					PPMP-228 PPMP-228-DEP02 KK0014 8-Mar-99 0- 1					PPMP-228 PPMP-228-GP01 KK0001 29-Jan-99 0- 1					PPMP-228 PPMP-228-GP02 KK0003 26-Jan-99 0- 2						
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	Result	Qual	>BKG	>SSSL		
<b>METALS</b>																									
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	7.29E+03				YES	4.57E+03				YES	7.02E+03				YES	1.72E+04		YES	YES		
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					4.80E-01	J				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.90E+00			YES		6.90E+00			YES		1.16E+01	J		YES	YES	6.00E+00				YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	6.87E+01					6.04E+01					2.06E+01	J				5.83E+01					
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.30E-01					5.20E-01	J				5.70E-01	J				9.50E-01		YES			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					2.00E-01	J				
Calcium	mg/kg	1.72E+03	NA	NA	1.57E+03					2.12E+03		YES			4.78E+02	J				5.41E+02	J				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.20E+01				YES	1.03E+01				YES	1.54E+01				YES	1.90E+01					
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.20E+00	J				5.90E+00	J				4.60E+00	J				9.00E+00					
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.21E+01		YES			9.90E+00					1.32E+01		YES			4.63E+01		YES			
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.07E+04			YES	YES	1.68E+04			YES	YES	2.75E+04			YES	YES	3.55E+04		YES	YES		
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	3.63E+01					3.03E+01					1.40E+01	J				2.45E+01					
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	2.03E+03		YES			4.37E+02	J				3.02E+02	J				2.92E+03		YES			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.76E+02			YES	YES	6.08E+02			YES	YES	1.83E+02				YES	7.36E+01	J				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.50E-02	B				7.70E-02					5.60E-02					6.00E-02	J				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.28E+01		YES			1.02E+01					8.20E+00					1.36E+01		YES			
Potassium	mg/kg	8.00E+02	NA	NA	3.43E+02	J				4.40E+02	J				4.80E+02	J				9.79E+02		YES			
Selenium	mg/kg	4.80E+01	3.91E+01	8.10E-01	1.30E+00		YES	YES	YES	1.00E+00		YES	YES	YES	1.50E+00	J	YES		YES	1.50E+00		YES			
Sodium	mg/kg	6.34E+02	NA	NA	9.88E+01	B				9.09E+01	B				5.31E+01	B				6.25E+01	B				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					7.60E-01	B			YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.00E+01				YES	1.79E+01				YES	3.05E+01				YES	3.11E+01					
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	5.71E+01		YES	YES	YES	4.26E+01		YES			2.78E+01					7.31E+01		YES			
<b>VOLATILE ORGANIC COMPOUNDS</b>																									
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	8.60E-03	J				ND					ND					ND					
Acetone	mg/kg	NA	7.76E+02	2.50E+00	7.40E-02	J				3.80E-02	B				3.40E-02	J				9.60E-03	J				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	7.80E-03	B				4.30E-03	B				3.50E-03	B				2.50E-03	B				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	6.20E-03	J				2.40E-03	J				ND					ND					
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					3.60E-03	J				3.10E-03	J				ND					
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					5.90E-03	J				ND					

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

(Page 2 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-228 PPMP-228-DEP01 KK0013 8-Mar-99 0- 1					PPMP-228 PPMP-228-DEP02 KK0014 8-Mar-99 0- 1					PPMP-228 PPMP-228-GP01 KK0001 29-Jan-99 0- 1					PPMP-228 PPMP-228-GP02 KK0003 26-Jan-99 0- 2				
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	Result	Qual	>BKG	>SSSL	
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																								
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND					ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					ND					ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	2.30E-01 J					1.80E-01 J					ND					ND				
<b>PESTICIDES</b>																								
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					ND					ND				
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					ND					ND				
Chlordane	mg/kg	NA	1.69E+00	1.00E-01	ND					ND					ND					ND				
Endosulfan II	mg/kg	NA	4.66E+01	1.19E-01	ND					ND					ND					ND				
Heptachlor epoxide	mg/kg	NA	6.91E-02	1.52E-01	ND					ND					ND					ND				
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

(Page 3 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	>ESV	
<b>METALS</b>						
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	YES	
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00		
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01		
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00		
Calcium	mg/kg	1.72E+03	NA	NA		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	YES	
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01		
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	YES	
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	YES	
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01		
Magnesium	mg/kg	1.03E+03	NA	4.40E+05		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02		
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01		
Potassium	mg/kg	8.00E+02	NA	NA		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	YES	
Sodium	mg/kg	6.34E+02	NA	NA		
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00		
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	YES	
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	YES	
<b>VOLATILE ORGANIC COMPOUNDS</b>						
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01		
Acetone	mg/kg	NA	7.76E+02	2.50E+00		
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00		
Toluene	mg/kg	NA	1.55E+03	5.00E-02		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01		
p-Cymene	mg/kg	NA	1.55E+03	NA		

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

(Page 4 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	>ESV
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>					
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	
<b>PESTICIDES</b>					
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	
Chlordane	mg/kg	NA	1.69E+00	1.00E-01	
Endosulfan II	mg/kg	NA	4.66E+01	1.19E-01	
Heptachlor epoxide	mg/kg	NA	6.91E-02	1.52E-01	
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

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Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-228 PPMP-228-GP03 KK0005 26-Jan-99 0- 2					PPMP-228 PPMP-228-GP04 KK0007 3-Feb-99 0- 1					PPMP-228 PPMP-228-GP05 KK0011 3-Feb-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	1.53E+04			YES	YES	7.25E+03				YES	6.23E+03				YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	1.30E+00	J				ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.46E+01		YES	YES	YES	9.70E+00	J		YES		8.20E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	8.56E+01					7.26E+01					5.98E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.10E+00		YES		YES	4.30E-01	J				6.70E-01				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	3.00E-01	J	YES			ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	1.21E+03					6.47E+02	J				1.82E+04		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.22E+01				YES	1.44E+01	J			YES	1.63E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	9.70E+00					2.10E+00	J				4.70E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	3.71E+01		YES			1.30E+01		YES			1.09E+01				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	4.63E+04		YES	YES	YES	2.01E+04			YES	YES	2.01E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.58E+01					1.71E+01					1.68E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.03E+03					4.90E+02	J				1.02E+04		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.83E+02	J			YES	1.41E+02				YES	3.37E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	8.00E-02	J	YES			6.40E-02					5.20E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.85E+01		YES			5.10E+00	J				1.13E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	5.38E+02	J				2.87E+02	J				2.26E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	4.20E-01	B				1.30E+00		YES		YES	9.50E-01		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	6.48E+01	B				5.85E+01	B				5.95E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	8.40E-01	B		YES		ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.18E+01				YES	2.72E+01				YES	1.81E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	5.63E+01		YES		YES	3.60E+01					2.86E+01				
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					2.10E-02	J				7.30E-03	B			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.00E-03	B				4.10E-03	B				4.30E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama

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Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-228 PPMP-228-GP03 KK0005 26-Jan-99 0- 2					PPMP-228 PPMP-228-GP04 KK0007 3-Feb-99 0- 1					PPMP-228 PPMP-228-GP05 KK0011 3-Feb-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>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					4.70E-02	J			
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					7.90E-02	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					8.70E-02	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					5.40E-02	J			
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					ND					4.30E-02	J			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					1.30E-01	B				7.60E-02	B			
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					ND					2.80E-02	J			
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					5.50E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					ND					4.80E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					1.70E-01	B				1.10E-01	B			
<b>PESTICIDES</b>																			
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					1.70E-02	J			YES
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					ND					4.70E-03	J			YES
Chlordane	mg/kg	NA	1.69E+00	1.00E-01	ND					ND					1.80E+00			YES	YES
Endosulfan II	mg/kg	NA	4.66E+01	1.19E-01	ND					ND					6.00E-03	J			
Heptachlor epoxide	mg/kg	NA	6.91E-02	1.52E-01	ND					ND					1.80E-02	J			
delta-BHC	mg/kg	NA	2.33E+00	9.94E+00	ND					ND					7.10E-03	J			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July. For SVOCs, value listed is the background screening value for soils adjacent to asphalt as given in IT Corporation (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 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 (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

**Subsurface Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

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Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-228 PPMP-228-GP01 KK0002 29-Jan-99 1-3				PPMP-228 PPMP-228-GP02 KK0004 26-Jan-99 10-12				PPMP-228 PPMP-228-GP03 KK0006 26-Jan-99 10-12				PPMP-228 PPMP-228-GP04 KK0010 3-Feb-99 6-9				PPMP-228 PPMP-228-GP05 KK0012 3-Feb-99 3-6			
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	Result	Qual	>BKG	>SSSL
<b>METALS</b>																							
Aluminum	mg/kg	1.36E+04	7.80E+03	6.30E+03				2.24E+04		YES	YES	1.52E+04		YES	YES	1.23E+04			YES	1.55E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				5.10E-01	J			8.70E-01	J			ND			YES	ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	3.90E+00	J		YES	5.00E+00			YES	8.00E+00			YES	6.80E+00			YES	4.60E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	3.54E+01				6.17E+01				4.61E+01				3.24E+01				8.02E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	6.90E-01				1.70E+00		YES		1.30E+00		YES		1.80E+00		YES		1.70E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				6.30E-01		YES		3.60E-01	J	YES		ND				ND			
Calcium	mg/kg	6.37E+02	NA	3.68E+02	J			7.31E+01	J			8.86E+01	J			ND				3.90E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.09E+01				2.24E+01				2.02E+01				1.81E+01				1.99E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	1.31E+01				3.18E+01		YES		8.00E+00				3.20E+00	J			8.60E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.62E+01				4.78E+01		YES		5.08E+01		YES		4.12E+01		YES		3.82E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.28E+04			YES	4.98E+04		YES	YES	4.19E+04			YES	3.31E+04			YES	4.10E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.31E+01	J			1.91E+01				2.53E+01				1.70E+01				1.79E+01			
Magnesium	mg/kg	7.66E+02	NA	1.37E+03		YES		8.50E+03		YES		3.80E+03		YES		1.55E+03		YES		4.90E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	4.30E+02			YES	1.47E+02	J			4.83E+01	J			1.96E+01				8.70E+01			
Mercury	mg/kg	7.00E-02	2.33E+00	2.80E-02	J			ND				8.00E-02	J	YES		2.60E-02	J			1.60E-02	B		
Nickel	mg/kg	1.29E+01	1.54E+02	9.80E+00				5.78E+01		YES		2.08E+01		YES		1.09E+01				4.13E+01		YES	
Potassium	mg/kg	7.11E+02	NA	2.78E+02	J			8.80E+02		YES		7.14E+02		YES		6.68E+02				5.06E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.50E+00	J	YES		ND				1.50E+00		YES		2.30E+00		YES		2.10E+00		YES	
Sodium	mg/kg	7.02E+02	NA	5.97E+01	B			8.56E+01	B			6.66E+01	B			6.10E+01	B			8.74E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				7.10E-01	B		YES	6.40E-01	B		YES	ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.11E+01				3.34E+01				3.52E+01				3.06E+01				2.94E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	4.08E+01		YES		1.46E+02		YES		9.47E+01		YES		6.91E+01		YES		1.20E+02		YES	
<b>VOLATILE ORGANIC COMPOUNDS</b>																							
2-Butanone	mg/kg	NA	4.66E+03	3.20E-03	J			ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	5.60E-02	B			ND				ND				6.00E-02	J			1.00E-02	B		
Methylene chloride	mg/kg	NA	8.41E+01	5.20E-03	B			2.60E-03	B			2.90E-03	B			3.70E-03	B			3.80E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	3.80E-03	J			ND				ND				ND				ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																							
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				ND				ND				5.20E-02	B			1.00E-01	B		
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				ND				ND				7.50E-02	B			1.30E-01	B		

**Table 5-2**

**Subsurface Soil Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

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Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (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 (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

**Groundwater Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date		PPMP-228 PPMP-228-GP01 KK3001 25-Feb-99				PPMP-228 PPMP-228-GP02 KK3002 29-Mar-99				PPMP-228 PPMP-228-GP03 KK3003 29-Mar-99					
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/L	2.34E+00	1.56E+00	5.41E+00		YES	YES	1.30E-01	B			3.09E-01			
Arsenic	mg/L	1.78E-02	4.00E-05	3.20E-03	B		YES	ND				ND			
Barium	mg/L	1.27E-01	1.10E-01	1.83E-01	J	YES	YES	2.11E-02	J			5.40E-02	J		
Calcium	mg/L	5.65E+01	NA	5.57E+01				9.44E+00				1.62E+00	J		
Chromium	mg/L	NA	4.69E-03	1.71E-02			YES	ND				ND			
Cobalt	mg/L	2.34E-02	9.39E-02	ND				2.52E-02	J	YES		1.85E-02	J		
Iron	mg/L	7.04E+00	4.69E-01	7.02E+00			YES	2.15E+00			YES	9.23E+00		YES	YES
Lead	mg/L	7.99E-03	1.50E-02	3.20E-03				ND				ND			
Magnesium	mg/L	2.13E+01	NA	2.83E+01		YES		1.80E+01				1.22E+01			
Manganese	mg/L	5.81E-01	7.35E-02	4.09E-01			YES	8.00E-01		YES	YES	4.21E-01			YES
Mercury	mg/L	NA	4.60E-04	1.20E-04	B			8.60E-05	B			9.60E-05	B		
Nickel	mg/L	NA	3.13E-02	1.50E-02	B			1.92E-02	J			1.81E-02	J		
Potassium	mg/L	7.20E+00	NA	5.83E+00				7.42E-01	J			ND			
Sodium	mg/L	1.48E+01	NA	2.42E+01		YES		1.70E+01		YES		1.26E+01			
Vanadium	mg/L	1.70E-02	1.10E-02	9.30E-03	J			ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	1.45E-02	J			ND				1.99E-02	J		
<b>VOLATILE ORGANIC COMPOUNDS</b>															
Acetone	mg/L	NA	1.56E-01	2.40E-03	B			ND				ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>															
bis(2-Ethylhexyl)phthalate	mg/L	NA	4.30E-03	8.70E-02			YES	ND				ND			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (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 (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

**Surface Water Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date					PPMP-228 PPMP-228-SW/SD01 KK2001 26-Jan-99				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>									
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	1.02E+00				YES
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	2.87E-02	J			YES
Beryllium	mg/L	3.00E-04	1.75E-02	5.30E-04	1.00E-04	B			
Calcium	mg/L	2.52E+01	NA	1.16E+02	1.76E+01				
Chromium	mg/L	1.11E-02	4.08E-02	1.10E-02	1.10E-03	J			
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	4.20E-03	J			
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	9.99E-01				
Lead	mg/L	8.60E-03	1.50E-02	1.32E-03	1.20E-03	J			
Magnesium	mg/L	1.10E+01	NA	8.20E+01	9.07E+00				
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	5.80E-03	J			
Potassium	mg/L	2.56E+00	NA	5.30E+01	1.71E+00	B			
Sodium	mg/L	3.44E+00	NA	6.80E+02	3.30E+00	J			
Vanadium	mg/L	1.52E-02	7.90E-02	1.90E-02	4.70E-03	B			
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	7.30E-03	J			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

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

<sup>b</sup> Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) 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 (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-5

**Sediment Analytical Results  
Trenches West of Remount Creek, Parcel 228(7)  
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-228 PPMP-228-SW/SD01 KK1001 26-Jan-99 0- .5				
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	ESV <sup>b</sup>	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>									
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	4.33E+03				
Antimony	mg/kg	7.30E-01	4.22E+02	1.20E+01	2.10E-01	J			
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	3.20E+00	J			
Barium	mg/kg	9.89E+01	8.36E+04	NA	2.94E+01				
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	4.20E-01	J			
Cadmium	mg/kg	4.30E-01	1.71E+02	1.00E+00	2.40E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	1.48E+03		YES		
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	1.00E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	5.00E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	1.39E+01				
Iron	mg/kg	3.53E+04	3.59E+05	NA	1.31E+04	J			
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	3.28E+01				YES
Magnesium	mg/kg	9.06E+02	NA	NA	1.20E+03		YES		
Manganese	mg/kg	7.12E+02	4.38E+04	NA	4.18E+01	J			
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	8.00E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	7.00E+00				
Potassium	mg/kg	1.01E+03	NA	NA	2.81E+02	B			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	7.90E-01		YES		
Silver	mg/kg	3.20E-01	6.07E+03	2.00E+00	9.00E-02	J			
Sodium	mg/kg	6.92E+02	NA	NA	4.01E+01	B			
Thallium	mg/kg	1.30E-01	7.78E+01	NA	5.50E-01	B	YES		
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	1.50E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	4.39E+01				
<b>VOLATILE ORGANIC COMPOUNDS</b>									
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	5.70E-03	B			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>									
bis(2-Ethylhexyl)phthalate	mg/kg	NA	5.41E+03	1.82E-01	6.00E-02	B			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

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

<sup>b</sup> Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) 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 (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The remaining analytical results were flagged with a “J” data qualifier, indicating that the results were greater than the method detection limit (MDL) but less than the RL. The samples collected at PPMP-228-DEP01, PPMP-228-DEP02, and PPMP-228-GP01 each contained four of the six detected VOCs. The VOC concentrations in surface and depositional soils were below SSSLs and ESVs.

**Semivolatile Organic Compounds.** Ten SVOCs, including eight PAH compounds, were detected in surface and depositional soil samples collected at the site. The di-n-butyl phthalate results and two of the four bis(2-ethylhexyl)phthalate 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 analytical results were flagged with a “J” data qualifier, indicating that the results were greater than the MDL but less than the RL. SVOCs were not detected at three sample locations, and di-n-butyl phthalate and/or bis(2-ethylhexyl)phthalate were the only detected SVOCs at three additional locations. The sample collected at PPMP-228-GP05 contained all of the ten detected SVOCs. The SVOC concentrations in surface and depositional soils were below SSSLs and ESVs.

**Pesticides.** Six pesticides, (4,4'-dichlorodiphenyldichloroethene [DDE], 4,4'-dichlorodiphenyltrichloroethane [DDT], chlordane, endosulfan II, heptachlor epoxide, and delta-betahexachlorocyclohexane [BHC]) were detected in the surface soil sample collected at PPMP-228-GP05. Pesticides were not detected in any of the other surface or depositional soil samples. The cumulative pesticide concentration in the sample collected at PPMP-228-GP05 was 1.85 mg/kg. The concentration of chlordane (1.8 mg/kg) exceeded the SSSL (1.69 mg/kg). The concentrations of three pesticides (4,4'- DDE, 4,4'- DDT, and chlordane) exceeded ESVs.

## **5.2 Subsurface Soil Analytical Results**

Five subsurface soil samples were collected for chemical analysis at the Trenches West of Remount Creek, Parcel 228(7). Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

**Metals.** Twenty-two metals were detected in subsurface soil samples collected at the site. The concentrations of five metals (aluminum, arsenic, iron, manganese, and thallium) exceeded SSSLs. With the exception of aluminum (three locations) and iron (PPMP-228-GP02), these

metals concentrations were below their respective background concentrations. The aluminum results were within the range of background values determined by SAIC (1998) (Appendix I). The iron result at PPMP-228-GP02 (49,800 mg/kg) exceeded the range of background iron values (4,480 to 48,000 mg/kg).

***Volatile Organic Compounds.*** Four VOCs (2-butanone, acetone, methylene chloride, and trichlorofluoromethane) were detected in subsurface soil samples collected at the site. The methylene chloride results and two of the three 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, indicating that the results were greater than the MDL but less than the RL. The sample collected at PPMP-228-GP01 contained all of the detected VOCs. The VOC concentrations in subsurface soils were below SSSLs.

***Semivolatile Organic Compounds.*** Di-n-butyl phthalate and bis(2-ethylhexyl)phthalate were detected in two of the subsurface soil samples (PPMP-228-GP04 and PPMP-228-GP05) collected at the site. The SVOC results were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The di-n-butyl phthalate and bis(2-ethylhexyl)phthalate concentrations were below SSSLs.

### ***5.3 Groundwater Analytical Results***

Three groundwater samples were collected for chemical analysis at the Trenches West of Remount Creek, Parcel 228(7), at the locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

***Metals.*** Sixteen metals were detected in groundwater samples collected at the site. The sample collected at PPMP-228-GP01 contained fifteen of the sixteen detected metals. The concentrations of six metals (aluminum, arsenic, barium, chromium, iron, and manganese) exceeded SSSLs. Of these metals, aluminum (PPMP-228-GP01), barium (PPMP-228-GP01), iron (PPMP-228-GP03), and manganese (PPMP-228-GP02) concentrations also exceeded their respective background concentrations. However, the aluminum, barium, iron, and manganese results were within the range of background values determined by SAIC (1998). A background concentration for chromium was not available in the background metals survey (SAIC, 1998).

**Volatile Organic Compounds.** Acetone was detected in the groundwater sample collected at sample location PPMP-228-GP01. The acetone result was flagged with a “B” data qualifier, signifying that acetone was also detected in an associated laboratory or field blank sample. The acetone concentration was below the SSSL.

**Semivolatile Organic Compounds.** Bis(2-ethylhexyl)phthalate was detected in the groundwater sample collected at sample location PPMP-228-GP01 at a concentration (0.087 mg/L) that exceeded the SSSL (0.0043 mg/L).

#### **5.4 Surface Water Analytical Results**

One surface water sample was collected for chemical analysis at the Trenches West of Remount Creek, Parcel 228(7), at the location shown on Figure 3-2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values as presented in Table 5-4.

**Metals.** Fourteen metals were detected in the surface water sample collected at the site. The beryllium, potassium, and vanadium results were flagged with a “B” data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample. The concentrations of the detected metals were below SSSLs. Aluminum and barium concentrations exceeded ESVs but were below their respective background concentrations.

**Volatile Organic Compounds.** VOCs were not detected in surface water at Parcel 228(7).

**Semivolatile Organic Compounds.** SVOCs were not detected in surface water at Parcel 228(7).

#### **5.5 Sediment Analytical Results**

One sediment sample was collected for chemical and physical analyses at the Trenches West of Remount Creek, Parcel 228(7). The sample was collected from the upper 0.5 foot of sediment at the location shown on Figure 3-2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-5.

**Metals.** Twenty-three metals were detected in the sediment sample collected at the site. The potassium, sodium, and thallium results were flagged with a “B” data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample. The

concentrations of the detected metals were below SSSLs. The lead concentration exceeded the ESV but was below the background concentration.

***Volatile Organic Compounds.*** Methylene chloride was detected in the sediment sample collected at the site. The methylene chloride result was flagged with a “B” data qualifier, signifying that the compound was also detected in an associated laboratory or field blank sample. The methylene chloride concentration was below the SSSL and ESV.

***Semivolatile Organic Compounds.*** Bis(2-ethylhexyl)phthalate was detected in the sediment sample collected at the site. The bis(2-ethylhexyl)phthalate result was flagged with a “B” data qualifier, signifying that the compound was also detected in an associated laboratory or field blank sample. The bis(2-ethylhexyl)phthalate concentration was below the SSSL and ESV.

***Total Organic Carbon.*** The sediment sample was analyzed for TOC. The TOC in the sample was 17,800 mg/kg (16,100 mg/kg in a field duplicate collected at the same location). The TOC results are summarized in Appendix F.

***Grain Size.*** The results of the grain size analysis for sediment sample PPMP-228-SW/SD01 (and for a field duplicate collected at this location) are included in Appendix F.

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

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IT, under contract with USACE, completed an SI at the Trenches West of Remount Creek, Parcel 228(7), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site at concentrations that present an unacceptable risk to human health or the environment. The SI at Trenches West of Remount Creek, Parcel 228(7), consisted of a geophysical survey and the sampling and analysis of five surface soil samples, two depositional soil samples, five subsurface soil samples, three groundwater samples, one surface water sample, and one sediment sample. In addition, three temporary monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

The geophysical survey results indicate that anomalies at the Trenches West of Remount Creek, Parcel 228(7), are caused by surface metal and cultural features. The geophysical data do not indicate the presence of trenches.

Chemical analysis of samples collected at the Trenches West of Remount Creek, Parcel 228(7), indicates that metals, VOCs, and SVOCs were detected in the various site media. In addition, pesticides were detected in one surface soil sample. Herbicides, PCBs, and nitroexplosive compounds were not detected in any of the samples collected. Analytical results were compared to the human health SSSLs and ESVs developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metals concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998).

The potential threat to human receptors is expected to be low. In soils, with the exception of iron in one subsurface soil sample, the concentrations of the metals that exceeded SSSLs were below their respective background concentrations or within the range of background values determined by SAIC (1998). The iron result at PPMP-228-GP02 (49,800 mg/kg) marginally exceeded the range of background iron values (4,480 to 48,000 mg/kg). Additionally, the pesticide chlordane was detected in one surface soil sample (PPMP-228-GP05) at a concentration (1.8 mg/kg) marginally exceeding its SSSL (1.69 mg/kg). Given the low concentrations and limited spatial distribution at the site, the iron and chlordane concentrations are not expected to pose an unacceptable risk to human health.

In groundwater, four metals (aluminum, barium, iron, and manganese) were detected at concentrations exceeding SSSLs and their respective background concentrations. However, these metals concentrations were within the range of background values and do not pose an unacceptable risk to human health. The SVOC bis(2-ethylhexyl)phthalate was detected in one groundwater sample at a concentration exceeding the SSSL. However, bis(2-ethylhexyl)phthalate is a common laboratory contaminant is probably not related to site activities.

Beryllium (in one surface soil sample), copper (one surface soil sample), and selenium (two surface soil samples) were detected at concentrations exceeding ESVs and the range of background values. Also, three pesticides were detected in one surface soil sample at concentrations exceeding ESVs. However, the potential impact to ecological receptors is expected to be minimal, based on the existing viable habitat and site conditions. The site is located within the developed area of the Main Post, consisting of buildings and paved roads/areas interspersed with grassy areas, and is projected for future use as a retirement community. Viable ecological habitat is presently limited and is not expected to increase in the future land use scenario.

Based on the results of the SI, past operations at the Trenches West of Remount Creek, Parcel 228(7), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT recommends “No Further Action” and unrestricted land reuse at the Trenches West of Remount Creek, Parcel 228(7).

## 7.0 References

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**ATTACHMENT 1**

**LIST OF ABBREVIATIONS AND ACRONYMS**

**APPENDIX A**  
**GEOPHYSICAL SURVEY REPORT**

**APPENDIX B**

**SAMPLE COLLECTION LOGS  
ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS**

## **APPENDIX C**

### **BORING LOGS AND WELL CONSTRUCTION LOGS**

**APPENDIX D**  
**WELL DEVELOPMENT LOGS**

**APPENDIX E**  
**SURVEY DATA**

## **APPENDIX F**

### **SUMMARY OF VALIDATED ANALYTICAL DATA**

## **APPENDIX G**

### **DATA VALIDATION SUMMARY REPORT**

**APPENDIX H**  
**VARIANCES**

## **APPENDIX I**

### **SUMMARY STATISTICS FOR BACKGROUND MEDIA**