

Final

Site Investigation Report
Washrack, Building 1224, Parcel 168(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation (IT) completed a site investigation (SI) at the Washrack, Building 1224, Parcel 168(7), at Fort McClellan (FTMC) in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the Washrack, Building 1224, Parcel 168(7), consisted of the sampling and analyses of two surface soil samples, one depositional soil sample, two subsurface soil samples, two groundwater samples, and one surface water and sediment sample. In addition, two temporary monitoring wells were installed in the saturated zone to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

Chemical analyses of samples collected at the Washrack, Building 1224, Parcel 168(7), indicate that metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) were detected in the environmental media sampled. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to the human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC.

The potential threat to human receptors is expected to be low. Although the site is projected for use by the Alabama Army National Guard, the soils and groundwater data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. Iron and manganese were detected in site media at concentrations exceeding SSSLs and respective background concentrations. However, the concentrations of these metals were within the range of background values and do not pose an unacceptable risk to human health. VOC and SVOC concentrations in site media were below SSSLs.

Three metals (beryllium, selenium, and silver) were detected in two surface soil samples at concentrations exceeding ESVs, the respective background concentration, and the range of background values. In addition, the SVOC bis(2-ethylhexyl)phthalate was detected in the sediment sample at a concentration exceeding the ESV. However, the bis(2-ethylhexyl)phthalate result was flagged with a “B” data qualifier and the compound is a common laboratory contaminant; therefore the bis(2-ethylhexyl)phthalate is probably not related to site activities. The site is a well-developed area, consisting of buildings, a washrack, paved areas, and roads, interspersed with grass areas, and is projected for continued use by the Alabama National Guard.

Viabile ecological habitat is presently limited, and is not expected to increase in the future land-use scenario. Based on the low levels of metals, VOCs, and SVOCs detected, and site conditions, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at the Washrack, Building 1224, Parcel 168(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 Washrack, Building 1224, Parcel 168(7).

1.0 Project Description

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 Washrack, Building 1224, Parcel 168(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from the SI, including field sampling and analysis, and monitoring well installation activities conducted at the Washrack, Building 1224, Parcel 168(7).

1.1 Introduction

The Washrack, Building 1224 was identified as an area to be investigated prior to property transfer. The Washrack Building 1224, Parcel 168(7), 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 further evaluation.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in November 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the Washrack, Building 1224, Parcel 168(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 and quality assurance plan.

The SI included field work to collect two surface soil samples, one depositional soil sample, two subsurface soil samples, two groundwater samples, one surface water sample, and one sediment sample. Data from the field investigation were used to determine whether potential site-specific

chemicals are present at the Washrack, Building 1224, Parcel 168(7).

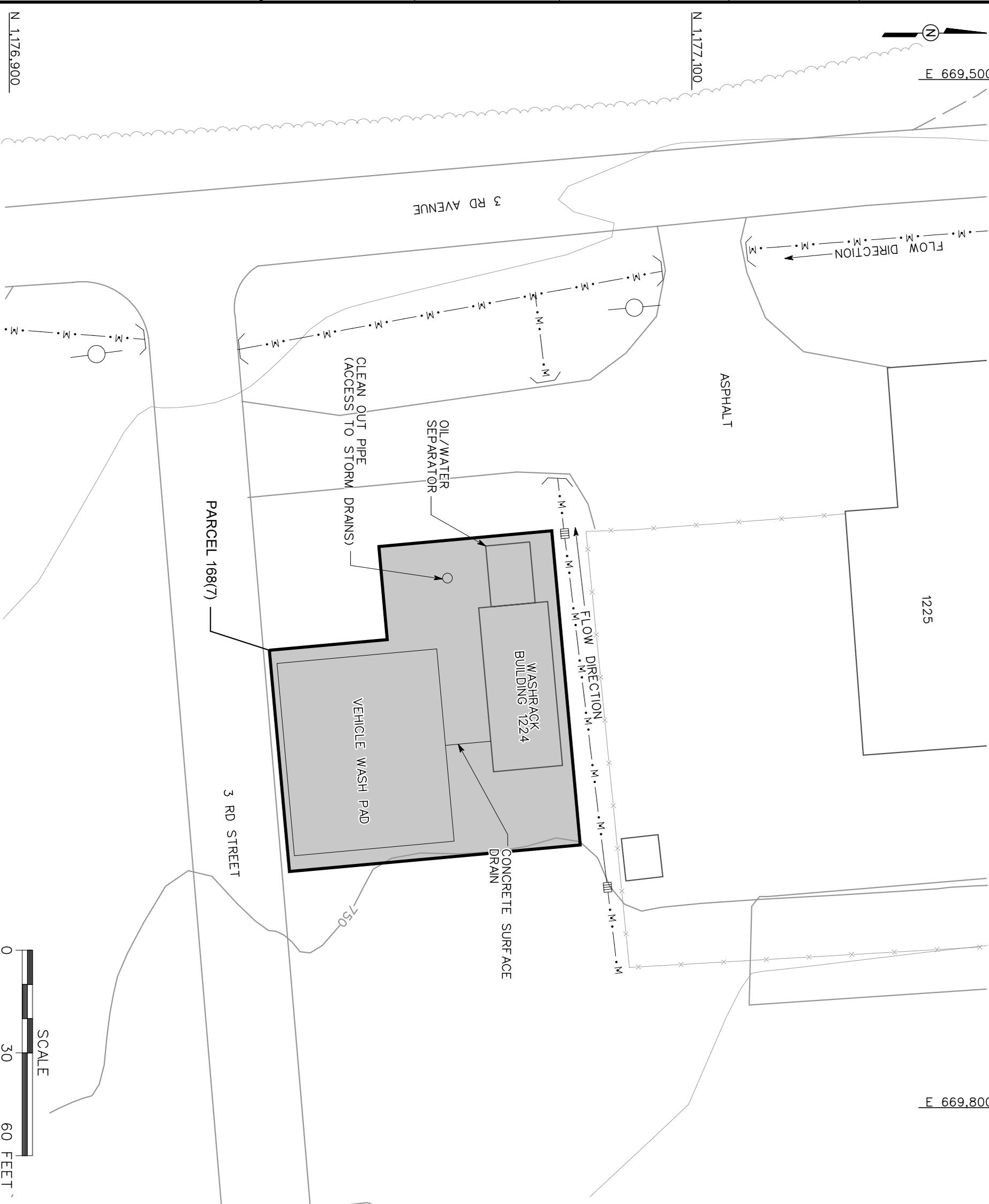
1.2 Purpose and Objectives

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 Washrack, Building 1224, Parcel 168(7) at concentrations that would present an unacceptable risk to human health or the environment. The conclusions of the SI, presented 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 to propose “No Further Action” at the site or to conduct additional work at the site.

1.3 Site Description and History

The Washrack, Building 1224, Parcel 168(7) is located in the northwest part of the Main Post, near the intersection of 3rd Avenue and 3rd Street (Figure 1-1). The Washrack was constructed in 1941 and was rebuilt in 1984. The site consists of a concrete vehicle wash pad and a washrack connected to an oil/water separator (OWS) (Figure 1-2). The wash pad is a flat structure approximately 45 feet long and 30 feet wide. A drain line located around the perimeter of the pad diverts the wash water into the OWS. The Washrack is a concrete structure approximately 45 feet long and 15 feet wide. The OWS discharges to the sanitary sewer. Vehicles are washed on the wash pad, and sediments are allowed to settle in the sediment basin (part of the washrack adjacent to the OWS). The sediment basin slopes from the ground surface at the eastern edge to a depth of 4 feet below ground surface (bgs) at the western edge. The Washrack is currently managed and used by the Alabama Army National Guard. The National Guard maintenance



1225

E 669,800

E 669,500

N 1,177,100

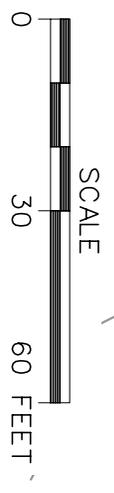
N 1,176,900

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- CULVERT WITH HEADWALL
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE

FIGURE 1-2
SITE MAP
WASHRACK BUILDING 12224
PARCEL 168(7)

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



crew generally checks the OWS at Building 1224 once a month except for the heavy usage months of May and June when the OWS is checked on a weekly basis.

Site elevation at the Washrack, Building 1224 is approximately 755 feet above mean sea level and the land surface slopes gently to the southwest. Runoff not captured by the drain line connected to the OWS is channeled through a man-made surface drainage running east to west approximately 10 feet north of the site, which discharges to the culvert under the asphalt.

2.0 Previous Investigations

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), the U.S. Environmental Protection Agency (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 historic maps and aerial photographs were reviewed to document historic 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 Washrack, Building 1224, Parcel 168(7) was identified as a CERFA Category 7 site: areas that are not evaluated or require further evaluation.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at the Washrack, Building 1224, Parcel 168(7), including environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 Environmental Sampling

The environmental sampling performed during the SI at the Washrack, Building 1224, Parcel 168(7), included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, and surface water and sediment samples for chemical analysis. The sample locations were determined by observing site physical characteristics noted during a site walkover and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.3.

3.1.1 Surface and Depositional Soil Sampling

Two surface soil samples and one depositional soil sample were collected at the Washrack, Building 1224, Parcel 168(7), at the locations shown on Figure 3-1. 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 the sampling rationale, presence of surface structures, site topography, and buried utilities.

Sample Collection. Surface 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). The depositional soil sample was collected from the upper 1 foot of soil with a stainless-steel trowel or spoon. Surface and depositional soil samples were collected by first removing surface debris, such as asphalt, concrete, 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[®] 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 3.3. Sample collection logs are included in Appendix A.

Table 3-1

**Sampling Locations and Rationale
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sample Location Rationale
PPMP-168-GP01	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the concrete vehicle wash pad.
PPMP-168-GP02	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the Washrack and oil/water separator.
PPMP-168-SW/SD01	Surface Water Sediment	Surface water and sediment samples were collected near the point of discharge for the underground drain located adjacent to the Washrack.
PPMP-168-DEP01	Depositional Soil	A depositional soil sample was collected from an upgradient location of the site in the man-made drain, adjacent to 3rd Avenue.

Table 3-2

**Surface Soil, Subsurface Soil, and Depositional Soil Designations and QA/QC Samples
Washrack, Building 1224, Parcel 168(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-168-GP01	PPMP-168-GP01-SS-KQ0001-REG PPMP-168-GP01-DS-KQ0004-REG	0-1 9-12	PPMP-168-GP01-SS-KQ0002-FD	PPMP-168-GP01-SS-KQ0003-FS		TCL VOCs, TCL SVOCs, TAL Metals
PPMP-168-GP02	PPMP-168-GP02-SS-KQ0005-REG PPMP-168-GP02-DS-KQ0006-REG	0-1 9-12			PPMP-168-GP02-DS-KQ0006-MS PPMP-168-GP02-DS-KQ0006-MSD	TCL VOCs, TCL SVOCs, TAL Metals
PPMP-168-DEP01	PPMP-168-DEP01-DEP-KQ0007-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals

FD - Field duplicate.

FS - Field split.

ft. bgs - feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

3.1.2 Subsurface Soil Sampling

Subsurface soil samples were collected from two soil borings at the Washrack, Building 1224, Parcel 168(7), as shown on Figure 3-1. 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 the sampling rationale, presence of surface structures, site topography, and buried and overhead utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from soil borings at depths of 9 to 12 feet bgs in the unsaturated zone. The soil borings were advanced and 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 A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3.

Subsurface soil samples were collected continuously to 12 feet bgs. 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 analyses are summarized in Table 3-2. The on-site geologist constructed a detailed boring log for each soil boring. The boring log for each borehole is included in Appendix B.

3.1.3 Well Installation

Two temporary wells were installed in the saturated zone at the Washrack, Building 1224, Parcel 168(7) to collect groundwater samples for laboratory analysis. The groundwater sampling locations are shown on Figure 3-1. Table 3-3 summarizes construction details of the wells installed at the Washrack, Building 1224, Parcel 168(7). The well construction logs are included in Appendix B.

IT contracted Miller Drilling Inc., to install the temporary wells with a hollow-stem auger rig at the locations shown on Figure 3-1. 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

Table 3-3

**Temporary Well Construction Summary
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Temporary Well	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
PPMP-168-GP01	1177025.04	669663.69	755.34	757.95	14.0	10	3.75 - 13.75	2" ID Sch. 40 PVC
PPMP-168-GP02	1177058.86	669631.50	753.95	753.66	19.5	15	4.25 - 19.25	2" ID Sch. 40 PVC

Temporary wells installed with an auger drill rig using a 4.25-inch inside diameter hollow-stem auger.
Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD83).
Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).
2" ID Sch.40 PVC - Two inch inside diameter, Schedule 40, polyvinyl chloride.
bgs- Below ground surface.
ft- Feet.
msl - mean sea level.
TOC - Top of casing.

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 borehole was 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 was driven at 5-foot intervals to collect residuum for observing and describing lithology. Where 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 boring log for each borehole is included in Appendix B.

Upon reaching the target depth, a 10- or 15-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 polyvinyl chloride (PVC) screen with a 3-inch 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 number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was placed around the well screen to approximately 2 feet above the top of the well screen as the augers were removed. The wells were surged approximately 10 minutes using a solid PVC surge block, 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). A locking well cap was placed on the PVC temporary well stickup. The temporary well surface completion included attaching plastic sheeting around the PVC riser using duct tape. Additionally, sand bags were used to secure the sheeting to the ground surface around the temporary well.

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. The well materials were then pumped out of the well in order to reestablish 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 C.

3.1.4 Water Level Measurements

The depth to groundwater was measured in the two temporary wells at the Washrack, Building 1224, Parcel 168(7), and in wells at adjacent parcels 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 between use at each well following decontamination methodology presented in Section 4.10 of the SAP. Measurements were referenced to the top of the PVC casing. A summary of groundwater level measurements is presented in Table 3-4.

3.1.5 Groundwater Sampling

Groundwater samples were collected from the two temporary wells installed at the Washrack, Building 1224, Parcel 168(7), at the locations shown on Figure 3-1. 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 (i.e., temperature, pH, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Purging and sampling were performed with a peristaltic 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 A. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.3.

3.1.6 Surface Water Sampling

One surface water sample was collected near the point of discharge for the underground drain located adjacent to the Washrack, Building 1224 (Figure 3-1). The surface water sampling location and rationale are listed in Table 3-1. The surface water sample designation is listed in Table 3-7.

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 sample was collected by dipping a stainless-steel pitcher in the water and pouring the water into the appropriate sample

Table 3-4

**Groundwater Elevations
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Well Location	Date	Depth to Water (feet BTOC)	Top of Casing Elevation (ft msl)	Ground Elevation (ft msl)	Groundwater Elevation (ft msl)
PPMP-168-GP01	14-Mar-00	7.80	757.95	755.34	750.15
PPMP-168-GP02	14-Mar-00	3.95	753.66	753.95	749.71
PPMP-174-GP03	14-Mar-00	4.75	749.11	746.52	744.36
PPMP-174-GP04	14-Mar-00	2.58	746.57	746.70	743.99
FTA-93-GP10	14-Mar-00	7.24	748.50	746.55	741.26
FTA-93-GP11	14-Mar-00	4.75	748.98	746.53	744.23
FTA-93-GP23	14-Mar-00	4.96	750.41	747.99	745.45
FTA-93-GP24	14-Mar-00	6.08	751.23	748.58	745.15
FTA-148-GP01	14-Mar-00	4.18	756.15	754.93	751.97
FTA-148-GP02	14-Mar-00	7.13	751.31	750.51	744.18
UST-502-MW01	14-Mar-00	7.60	743.71	743.50	736.11
UST-502-MW02	14-Mar-00	7.29	744.09	744.27	736.80
UST-502-MW03	14-Mar-00	9.25	744.23	744.45	734.98

Elevations referenced to 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
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	QA/QC Samples			Analytical Suite
		Field Duplicates	Field Splits	MS/MSD	
PPMP-168-GP01	PPMP-168-GP01-GW-KQ3001-REG				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-168-GP02	PPMP-168-GP02-GW-KQ3002-REG			PPMP-168-GP02-GW-KQ3002-MS PPMP-168-GP02-GW-KQ3002-MSD	TCL VOCs, TCL SVOCs, TAL Metals

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

FD - Field duplicate.

FS - Field split.

ft. bgs - feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

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
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Date	Media	Specific Conductivity (mS/cm)^a	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
PPMP-168-GP01	16-Feb-99	GW	0.127	0.78	179.9	16.64	17.8	4.58
PPMP-168-GP02	16-Feb-99	GW	0.198	1.55	26.9	16.82	13.4	5.83
PPMP-168-SW/SD01	28-Jan-99	SW	0.514	10.27	NR	15.4	1.6	8.44

^aSpecific conductivity values standardized to millisiemens per centimeter.

°C - Degrees Celsius.

GW - Groundwater.

mg/L - Milligrams per liter.

mS/cm - Millisiemens per centimeter.

mv - Millivolts.

NR - Reading not recorded.

NTU - Nephelometric turbidity units.

ORP - Oxidation reduction potential.

SU - Standard units.

SW - Surface water.

Table 3-7

**Surface Water and Sediment Sample Designations and QA/QC Samples
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples ^a			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-168-SW/SD01	PPMP-168-SW/SD01-SW-KQ2001-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals
	PPMP-168-SW/SD01-SD-KQ1001-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, TOC, Grain size

^aNo QA/QC samples specified in the final site-specific field sampling plan.

ft. bgs - feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

TOC - Total organic carbon.

VOC - Volatile organic compound.

containers. The sample was collected after the field parameters described in Section 3.1.5 had been measured using a calibrated water quality meter. The field parameter readings are presented in Table 3-6. The sample collection log is included in Appendix A. The sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.3.

3.1.7 Sediment Sampling

One sediment sample was collected at the same location as the surface water sample discussed in Section 3.1.6 (Figure 3-1). The sediment sampling location and rationale are listed in Table 3-1. The sediment sample designation is listed in Table 3-7.

Sample Collection. The sediment sample was collected in accordance with the procedures outlined in Section 4.9.1.2 of the SAP (IT, 2000a). The sample was collected from the upper 0.5 foot of sediment with a stainless-steel spoon and placed in a clean stainless-steel bowl. Sediment for VOC analysis was then immediately collected from the bowl using three Encore[®] samplers. The remaining portion of the sediment was homogenized and placed in the appropriate sample containers. The sample collection log is included in Appendix A. The sample was analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.3.

3.2 Surveying of Sample Locations

Sample locations were surveyed using global positioning system 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. 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 D.

3.3 Analytical Program

Samples collected during the SI were analyzed for various physical and chemical 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. Samples collected at the Washrack, Building 1224, Parcel 168(7), were analyzed for the following parameters:

- Target compound list VOCs – EPA Method 5035/8260B
- Target compound list semivolatile organic compounds (SVOC) – EPA Method 8270C

- Target analyte list metals – EPA Method 6010B/7000
- Total organic carbon – EPA Method 9060 (sediment only)
- Grain size – American Society for Testing and Materials 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). 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 E. The Data Validation Summary Report is included as Appendix F.

3.4 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. Sample documentation and chain-of-custodies were recorded as specified in Section 4.13 of the SAP.

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

3.5 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 Washrack, Building 1224, Parcel 168(7), was segregated as follows:

- Drill cuttings
- Purge water from well development and sampling activities, and decontamination fluids

- Personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined roll-off bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, drill cuttings and personal protective equipment generated during the SI at the Washrack, Building 1224, Parcel 168(7), 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.

3.6 Variances/Nonconformances

One variance to the SFSP was recorded during completion of the SI at the Washrack, Building 1224, Parcel 168(7). 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 G. There were not any nonconformances to the SFSP recorded during completion of the SI at the Washrack, Building 1224, Parcel 168(7)

3.7 Data Quality

The field sample analytical data are presented in tabular form in Appendix E. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and quality assurance plan; 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 A. As discussed in Section 3.6, 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 F consists of a data validation summary report that was 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.

Table 3-8

**Variance to the Site-Specific Field Sampling Plan
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Surface water and sediment samples were not collected at PPMP-168-SW/SD02.	The natural drainage feature did not contain surface water and sediment at the time of sample collection.	None. A depositional soil sample (PPMP-168-DEP01) was collected at the PPMP-168-SW/SD02 sample location.

The qualified data were used in the comparison to the SSSLs and ESVs developed by IT. Rejected data (assigned an “R” qualifier) were not used in comparison 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

Subsurface investigations performed at the Washrack, Building 1224, Parcel 168(7), provided soil, bedrock, and groundwater data used to characterize the geology and hydrogeology of the site.

4.1 Regional and Site Geology

4.1.1 Regional Geology

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

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

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

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

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

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southwest of the Main Post as mapped by Warman and Causey (1962) and 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 weathers 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 Fort McClellan, 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 comprising 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).

4.1.2 Site Geology

The specific type of soil series mapped at the Washrack, Building 1224, Parcel 168(7), is the Rarden silty, clay loam. The Rarden silty, clay loam is a shallow soil, generally brown in color, found on gentle grades with 2 to 6 percent slope. These soils generally occur in large areas on wide shale ridges and have developed from the residuum of shale and fine-grained, platy sandstone or limestone. This soil has a slow infiltration rate which results in high runoff making the soil very susceptible to erosion (U.S. Department of Agriculture, 1961).

Description of the soil from the two borings revealed the soil consists of reddish-brown to brown, sandy, silty, clay. This description is consistent with the characteristics of the mapped Rarden silty clay loam.

The bedrock at the site is mapped as the undifferentiated Mississippian/Ordovician Floyd and Athens Shale (Osborne et al., 1997). The Floyd and Athens Shale consists of brown, dark-gray to black shale with localized interbedded limestone and sandstone (Osborne et al., 1989). Gray to reddish-brown weathered shale was encountered in both PPMP-168-GP01 and PPMP-168-GP02 at depths of 16 and 15 feet bgs, respectively. Boring logs for the two temporary wells are located in Appendix B.

4.2 Site Hydrology

4.2.1 Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998). The major surface water features on the Main Post of FTMC include Remount Creek, 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.

The site elevation is approximately 755 feet above mean sea level. The land surface gently slopes to the southwest. Surface runoff from the site is channeled to a storm drain located approximately 10 feet north of the site, and discharges into a man-made surface drainage feature approximately 50 feet east of the site (Figure 1-2). These drainage features discharge into Cave Creek, located approximately 600 feet west of the site.

4.2.2 Hydrogeology

During soil boring and well installation activities, the saturated zone was encountered at approximately 10 feet bgs (Appendix B). Static groundwater levels were measured in temporary, permanent, and existing monitoring wells at FTMC in March 2000 (Table 3-4). Groundwater elevations were calculated by measuring the depth to groundwater relative to the surveyed top-of-casing elevations. Figure 4-1 is a groundwater elevation contour map constructed from the March 2000 data. Based on the groundwater elevation contour map, horizontal groundwater flow in the vicinity of Parcel 168(7) is to the west. The hydraulic gradient across this area is approximately 0.02 feet per foot.

Static groundwater levels summarized in Table 3-4 are at shallower depths than the depth to groundwater encountered during drilling (Appendix B). This indicates that groundwater has an upward vertical hydraulic head.

5.0 Summary of Analytical Results

The results of the chemical analyses of samples collected at the Washrack, Building 1224, Parcel 168(7), indicate that metals, VOCs, and SVOCs have been detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, 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.

Metal 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 (SAIC, 1998) are included in Appendix H. Additionally, SVOC concentrations in surface and depositional soils that exceeded the SSSLs and ESVs were compared to PAH background screening values, where available. 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 2 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), including 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 RL 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 comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix E.

5.1 Surface and Depositional Soil Analytical Results

Two surface soil samples and one depositional soil sample were collected for chemical analyses at the Washrack, Building 1224, Parcel 168(7). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals and PAHs), as presented in Table 5-1.

Metals. Twenty-one metals were detected in surface and depositional soil samples collected at the Washrack, Building 1224, Parcel 168(7). The concentrations of six metals (aluminum, arsenic, chromium, iron, manganese, and thallium) exceeded SSSLs. With the exception of iron at two locations (PPMP-168-GP01 and PPMP-168-GP02), the concentrations of these metals were below their respective background concentration. However, the iron results were within the range of background values determined by SAIC (1998) (Appendix H).

The concentrations of nine metals (aluminum, beryllium, chromium, iron, manganese, selenium, silver, vanadium, and zinc) exceeded ESVs. Of these metals, beryllium (PPMP-168-GP02), iron (PPMP-168-GP01 and PPMP-168-GP02), selenium (all three locations), silver (PPMP-168-GP01 and PPMP-168-GP02), and zinc (PPMP-168-GP02) also exceeded their respective background concentration. The iron, zinc, and one of the selenium results were within the range of background values determined by SAIC (1998).

Volatile Organic Compounds. Four VOCs (acetone, bromomethane, methylene chloride, and toluene) were detected in surface and depositional soil samples collected at the Washrack, Building 1224, Parcel 168(7). All detections of these compounds except toluene were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank. Acetone and methylene chloride are common laboratory contaminants.

The VOC concentrations in surface and depositional soils were below SSSLs and ESVs.

Table 5-1

**Surface and Depositional Soil Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					PPMP-168 PPMP-168-DEP01 KQ0007 9-Mar-99 0-1					PPMP-168 PPMP-168-GP01 KQ0001 14-Jan-99 0-1					PPMP-168 PPMP-168-GP02 KQ0005 13-Jan-99 0-1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	4.66E+03				YES	7.66E+03				YES	1.17E+04			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.60E+00		YES			6.90E+00			YES		5.70E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.23E+01					4.53E+01					3.60E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.20E-01	J				1.00E+00		YES			1.10E+00		YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	1.39E+04		YES			1.46E+03					5.96E+03			YES	
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.39E+01				YES	2.40E+01	J		YES	YES	1.75E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.50E+00	J				1.30E+00	J				ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.49E+01		YES			1.42E+01		YES			2.76E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.08E+04			YES	YES	3.65E+04		YES	YES	YES	3.69E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.41E+01					2.90E+01					2.38E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	7.29E+03		YES			5.79E+02	J				3.80E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.64E+02			YES	YES	4.54E+02			YES	YES	2.58E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.90E-02	B				5.40E-02					4.00E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.50E+00					1.04E+01		YES			1.68E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	2.94E+02	J				3.86E+02	J				6.22E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.30E-01		YES		YES	2.00E+00		YES		YES	1.60E+00		YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					2.30E+00		YES		YES	2.40E+00		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	1.22E+02	B				3.05E+01	J				4.52E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					6.80E-01	J		YES		5.80E-01	J		YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.47E+01				YES	7.60E+00				YES	1.46E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.49E+01		YES			3.07E+01	J				5.54E+01	J	YES		YES
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					6.60E-03	B				2.80E-02	B			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					2.40E-03	B				2.00E-03	B			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.70E-03	B				3.10E-03	B				2.40E-03	B			
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					4.50E-02				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	9.70E-02	J				ND					ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					1.00E-01	B				ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	9.00E-02	J				7.20E-02	B				ND				

Table 5-1

**Surface and Depositional Soil Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

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

- ^a 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, concentration 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.
- ^b 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 method detection limit but less than or equal to reporting limit.
mg/kg - Milligrams per kilogram.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

Table 5-2

**Subsurface Soil Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)				PPMP-168 PPMP-168-GP01 KQ0004 14-Jan-99 9-12				PPMP-168 PPMP-168-GP02 KQ0006 13-Jan-99 9-12			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS											
Aluminum	mg/kg	1.36E+04	7.80E+03	9.87E+03			YES	5.52E+03			
Arsenic	mg/kg	1.83E+01	4.26E-01	4.20E+00			YES	1.10E+00	B		YES
Barium	mg/kg	2.34E+02	5.47E+02	5.06E+01				3.25E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.00E+00		YES		4.60E-01	J		
Calcium	mg/kg	6.37E+02	NA	1.01E+02	J			9.98E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.68E+01	J			1.20E+01	J		
Copper	mg/kg	1.94E+01	3.13E+02	1.45E+01				7.90E+00			
Iron	mg/kg	4.48E+04	2.34E+03	3.20E+04			YES	9.35E+03			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.51E+01				8.80E+00			
Magnesium	mg/kg	7.66E+02	NA	8.24E+02		YES		4.92E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	2.35E+01				1.17E+01			
Mercury	mg/kg	7.00E-02	2.33E+00	3.40E-02	J			2.60E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	6.60E+00				4.70E+00	J		
Potassium	mg/kg	7.11E+02	NA	4.54E+02	J			4.23E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.60E+00		YES		ND			
Silver	mg/kg	2.40E-01	3.91E+01	2.20E+00		YES		7.40E-01	J	YES	
Sodium	mg/kg	7.02E+02	NA	3.19E+01	J			3.11E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	5.70E-01	J		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	1.10E+01				1.36E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.65E+01	J			1.45E+01	J		

Table 5-2

**Subsurface Soil Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel				PPMP-168				PPMP-168			
Sample Location				PPMP-168-GP01				PPMP-168-GP02			
Sample Number				KQ0004				KQ0006			
Sample Date				14-Jan-99				13-Jan-99			
Sample Depth (Feet)				9-12				9-12			
Parameter	Units	BKG ^a	SSSL ^o	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
VOLATILE ORGANIC COMPOUNDS											
Acetone	mg/kg	NA	7.76E+02	2.00E-02	B			5.80E-02	B		
Bromomethane	mg/kg	NA	1.09E+01	2.10E-03	B			2.60E-03	B		
Methylene chloride	mg/kg	NA	8.41E+01	3.00E-03	B			3.40E-03	B		
SEMIVOLATILE ORGANIC COMPOUNDS											
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	9.30E-02	B			ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	8.50E-02	B			ND			

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

^a 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.

^o 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 method detection limit but less than or equal to reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

**Groundwater Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date				PPMP-168 PPMP-168-GP01 KQ3001 16-Feb-99				PPMP-168 PPMP-168-GP02 KQ3002 16-Feb-99			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS											
Aluminum	mg/L	2.34E+00	1.56E+00	1.96E+00			YES	1.34E-01	B		
Barium	mg/L	1.27E-01	1.10E-01	6.25E-02	J			4.88E-02	J		
Calcium	mg/L	5.65E+01	NA	5.12E+00				1.62E+01			
Cobalt	mg/L	2.34E-02	9.39E-02	1.69E-02	J			ND			
Iron	mg/L	7.04E+00	4.69E-01	6.65E+00			YES	1.71E+01		YES	YES
Magnesium	mg/L	2.13E+01	NA	6.34E+00				1.07E+01			
Manganese	mg/L	5.81E-01	7.35E-02	2.52E+00		YES	YES	8.82E-01		YES	YES
Potassium	mg/L	7.20E+00	NA	8.30E-01	J			1.31E+00	J		
Sodium	mg/L	1.48E+01	NA	4.56E+00	J			4.56E+00	J		
Zinc	mg/L	2.20E-01	4.69E-01	1.20E-02	J			ND			
VOLATILE ORGANIC COMPOUNDS											
Toluene	mg/L	NA	2.59E-01	ND				1.50E-04	J		

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

^a 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*.

^b 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 method detection limit but less than or equal to reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

**Surface Water Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date					PPMP-168 PPMP-168-SW/SD01 KQ2001 28-Jan-99				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV
METALS									
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	4.78E-02	B			
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	1.59E-02	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	2.02E+01				
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	8.73E-02	J			
Magnesium	mg/L	1.10E+01	NA	8.20E+01	7.41E+00				
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	1.11E+00		YES	YES	YES
Mercury	mg/L	NA	4.25E-03	1.00E-05	4.50E-05	J			YES
Potassium	mg/L	2.56E+00	NA	5.30E+01	7.78E-01	J			
Sodium	mg/L	3.44E+00	NA	6.80E+02	2.50E+00	J			
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	8.64E-02		YES		YES
VOLATILE ORGANIC COMPOUNDS									
Methylene chloride	mg/L	NA	1.42E-01	1.93E+00	7.70E-04	B			

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

^a 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.

^b Recreational site user 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 method detection limit but less than or equal to reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-5

**Sediment Analytical Results
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						PPMP-168 PPMP-168-SW/SD01 KQ1001 28-Jan-99 0- .5				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	
METALS										
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	4.84E+03	J				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	3.20E+00					
Barium	mg/kg	9.89E+01	8.36E+04	NA	6.77E+01	J				
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	7.30E-01					
Calcium	mg/kg	1.11E+03	NA	NA	9.10E+04		YES			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	3.98E+01	J	YES			
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	3.40E+00	J				
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	6.20E+00					
Iron	mg/kg	3.53E+04	3.59E+05	NA	1.34E+04	J				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	1.28E+01	J				
Magnesium	mg/kg	9.06E+02	NA	NA	5.91E+03		YES			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	4.95E+02	J				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	4.40E-02					
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	3.80E+00	J				
Potassium	mg/kg	1.01E+03	NA	NA	3.23E+02	J				
Sodium	mg/kg	6.92E+02	NA	NA	1.31E+02	B				
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	2.15E+01					
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	5.48E+01	J	YES			
VOLATILE ORGANIC COMPOUNDS										
Acetone	mg/kg	NA	1.03E+05	4.53E-01	6.90E-03	J				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	2.60E-03	B				
SEMIVOLATILE ORGANIC COMPOUNDS										
Anthracene	mg/kg	NA	2.99E+05	3.30E-01	3.50E-02	J				
Benzo(a)anthracene	mg/kg	NA	8.93E+01	3.30E-01	4.90E-02	J				
Benzo(a)pyrene	mg/kg	NA	8.93E+00	3.30E-01	5.20E-02	J				
Benzo(b)fluoranthene	mg/kg	NA	8.93E+01	6.55E-01	6.20E-02	J				
Carbazole	mg/kg	NA	3.26E+03	NA	5.30E-02	J				
Chrysene	mg/kg	NA	9.79E+03	3.30E-01	5.70E-02	J				
Fluoranthene	mg/kg	NA	3.73E+04	3.30E-01	1.00E-01	J				
Phenanthrene	mg/kg	NA	2.79E+05	3.30E-01	5.30E-02	J				
Pyrene	mg/kg	NA	3.06E+04	3.30E-01	8.30E-02	J				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	5.41E+03	1.82E-01	2.20E-01	B			YES	

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

^a 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*.

^b Recreational site user 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 method detection limit but less than or equal to reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Semivolatile Organic Compounds. Three SVOCs, including benzo(b)fluoranthene, di-n-butyl phthalate, and bis(2-ethylhexyl)phthalate, were detected in surface and depositional soil samples collected at the Washrack, Building 1224, Parcel 168(7). The benzo(b)fluoranthene and bis(2-ethylhexyl)phthalate results at sample location PPMP-168-DEP01 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 di-n-butylphthalate and bis(2-ethylhexyl)phthalate results in the sample from PPMP-168-GP01 were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank.

The SVOC concentrations in surface and depositional soils were below SSSLs and ESVs.

5.2 Subsurface Soil Analytical Results

Two subsurface soil samples were collected for chemical analyses at the Washrack, Building 1224, Parcel 168(7). Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Twenty metals were detected in subsurface soil samples collected at the Washrack, Building 1224, Parcel 168(7). The concentrations of four metals (aluminum, arsenic, iron, and thallium) in the subsurface soil samples exceeded SSSLs, but were below their respective background concentration.

Volatile Organic Compounds. Three VOCs (acetone, bromomethane, and methylene chloride) were detected in both subsurface soil samples collected at the Washrack, Building 1224, Parcel 168(7). The VOC results were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank. Acetone, bromomethane, and methylene chloride are common laboratory contaminants. The concentrations of the detected VOCs were below SSSLs.

Semivolatile Organic Compounds. Two SVOCs (di-n-butyl phthalate and bis[2-ethylhexyl]phthalate) were detected in one subsurface soil sample (PPMP-168-GP01). The SVOC results were flagged with a “B” data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank.

The concentrations of the detected SVOCs were below SSSLs.

5.3 Groundwater Analytical Results

Two temporary monitoring wells were sampled at the Washrack, Building 1224, Parcel 168(7) at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

Metals. Ten metals were detected in the groundwater samples collected at the Washrack, Building 1224, Parcel 168(7). The concentrations of three metals (aluminum, iron, and manganese) exceeded SSSLs. Iron (PPMP-168-GP02), and manganese (both locations) also exceeded their respective background concentration. However, the iron and manganese results were within the range of background values determined by SAIC (1998) (Appendix H).

Volatile Organic Compounds. Only one VOC (toluene) at one sample location (PPMP-168-GP02) was detected in the groundwater sampled at the Washrack, Building 1224, Parcel 168(7). The toluene result was flagged with a “J” data qualifier, indicating that the result was greater than the MDL but less than the RL. The toluene concentration was below the SSSL.

Semivolatile Organic Compounds. SVOCs were not detected in the groundwater samples collected at the Washrack, Building 1224, Parcel 168(7).

5.4 Surface Water Analytical Results

One surface water sample was collected at the Washrack, Building 1224, Parcel 168(7). The surface water sample location is shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-4.

Metals. Ten metals were detected in the surface water sample collected at the Washrack, Building 1224, Parcel 168(7). Only manganese was detected at a concentration exceeding the SSSL and the respective background concentration. However, the manganese concentration was within the range of background values determined by SAIC (1998) (Appendix H).

The concentrations of four metals (barium, manganese, mercury, and zinc) exceeded ESVs. The manganese and zinc results also exceeded their respective background concentration. The

manganese and zinc concentrations were within the range of background values determined by SAIC (1998) (Appendix H). A background value for mercury was not available.

Volatile Organic Compounds. Methylene chloride was the only VOC detected in the surface water sample. The reported concentration of methylene chloride was flagged with a “B” data qualifier, indicating that methylene chloride was also detected in an associated laboratory or field blank. Methylene chloride is a common laboratory contaminant. The methylene chloride concentration was below the SSSL and ESV.

Semivolatile Organic Compounds. SVOCs were not detected in the surface water sample collected at the Washrack, Building 1224, Parcel 168(7).

5.5 Sediment Analytical Results

One sediment sample was collected near the point of discharge for the underground drain located adjacent to the Washrack, Building 1224, Parcel 168(7). The sample was collected from the upper 0.5 foot of sediment at the sample location shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-5.

Metals. Eighteen metals were detected in the sediment sample collected at the Washrack, Building 1224, Parcel 168(7). The concentrations of the metals detected in the sediment sample were below SSSLs and ESVs.

Volatile Organic Compounds. Acetone and methylene chloride were detected in the sediment sample. The acetone concentration was flagged with a “J” data qualifier, indicating the result was greater than the MDL but less than the RL. The methylene chloride result was flagged with a “B” data qualifier, indicating that it was also detected in an associated laboratory or field blank. Acetone and methylene chloride are common laboratory contaminants.

The acetone and methylene chloride concentrations were below SSSLs and ESVs.

Semivolatile Organic Compounds. Ten SVOCs were detected in the sediment sample taken at the Washrack, Building 1224, Parcel 168(7). The bis(2-ethylhexyl)phthalate result was flagged with a “B” data qualifier, indicating that this compound was also detected in an associated laboratory or field blank. The remaining SVOC results were flagged with a “J” data

qualifier, indicating that the results were greater than the MDL but less than the RL.

With the exception of bis(2-ethylhexyl)phthalate, the SVOC concentrations in the sediment sample were below SSSLs and ESVs. The bis(2-ethylhexyl)phthalate concentration (0.22 mg/kg) exceeded the ESV (0.182 mg/kg).

Total Organic Carbon. The total organic carbon concentration in the sediment sample was 14,500 mg/kg, as summarized in Appendix E.

Grain Size. The results of grain size analysis for the sediment sample are included in Appendix E.

6.0 Summary and Conclusions and Recommendations

IT, under contract with USACE, completed an SI at the Washrack, Building 1224, Parcel 168(7) at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the Washrack, Building 1224, Parcel 168(7), consisted of the sampling and analyses of two surface soil samples, one depositional soil sample, two subsurface soil samples, two groundwater samples, one surface water sample, and one sediment sample. In addition, two temporary monitoring wells were installed in the saturated zone to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

Chemical analyses of samples collected at the Washrack, Building 1224, Parcel 168(7), indicate that metals, VOCs, and SVOCs were detected in the environmental media sampled. 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. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998), and SVOC concentrations exceeding SSSLs and ESVs in surface and depositional soils were compared to PAH background screening values, where available (IT, 2000b).

The potential threat to human receptors is expected to be low. Although the site is projected for use by the Alabama Army National Guard (FTMC, 1997), the soil and groundwater data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. Iron and manganese were detected in site media at concentrations exceeding SSSLs and their respective background concentration. However, the concentrations of these metals were within the range of background values determined by SAIC (1998) and do not pose an unacceptable risk to human health. VOC and SVOC concentrations in site media were below SSSLs.

Three metals (beryllium, selenium, and silver) were detected in two surface soil samples at concentrations exceeding ESVs, the respective background concentration, and the range of background values. In addition, the SVOC bis(2-ethylhexyl)phthalate was detected in the sediment sample at a concentration (0.22 mg/kg) marginally exceeding the ESV (0.182 mg/kg).

However, the bis(2-ethylhexyl)phthalate result was flagged with a “B” data qualifier, and the compound is a common laboratory contaminant; therefore the bis(2-ethylhexyl)phthalate is probably not related to site activities. The site is a well-developed area, consisting of buildings, a washrack, paved areas, and roads, interspersed with grass areas, and is projected for continued use by the Alabama National Guard. Viable ecological habitat is presently limited and is not expected to increase in the future land-use scenario. Based on the low levels of metals, VOCs, and SVOCs detected and site conditions, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at the Washrack, Building 1224, Parcel 168(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 Washrack, Building 1224, Parcel 168(7).

7.0 References

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

APPENDIX A

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

SAMPLE COLLECTION LOGS

ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS

APPENDIX B

BORING LOGS AND WELL CONSTRUCTION LOGS

BORING LOGS

WELL CONSTRUCTION LOGS

APPENDIX C
WELL DEVELOPMENT LOGS

APPENDIX D
SURVEY DATA

APPENDIX E

SUMMARY OF VALIDATED ANALYTICAL DATA

**Data Validation Summary Report
for the Site Investigation Performed at the
Washrack, Building 1224, Parcel 168(7)
Fort McClellan, Calhoun County, Alabama**

1.0 Introduction

Level III data validation was performed on 100 percent of the environmental samples collected at Parcel PPMP-168. The analytical data consisted of five sample delivery groups (SDG). PK916801 through PK916805, which were analyzed by Quanterra Incorporated. Both soil and water matrices were validated. In addition, an evaluation of the field split (FS) data, which was analyzed by the U.S. Army Corps of Engineers-South Atlantic Division laboratory is included in this report. The chemical parameters for which the samples were analyzed are identified below:

Parameter (Method)
Target Compound List (TCL) Volatile Organics by Gas Chromatography/Mass Spectrometry (GC) SW-846-8260B
Target Compound List Semivolatiles by GC SW-846-8270C
Metals by SW-846-6010B and 7471A/7470A
Wet Chemistry - Total Organic Carbon by SW-846-9060

2.0 Procedure

The sample data were validated following the logic identified in the 1994 U.S. Environmental Protection Agency (EPA) *Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* and the 1994 EPA *Contract Laboratory Program National Functional Guidelines For Organic Review* for all areas except blanks. The EPA 1993 *Region III Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* and EPA 1992 *Region III National Functional Guidelines for Organic Data Review* were applied to the areas associated with blank contamination. Specific quality control (QC) criteria, as identified in the quality assurance plan (QAP), analytical methods, and laboratory standard operating procedures (SOP) were applied to all sample results. As the result of the use of Update III SW-846 test methods for the analytical data and the application of the Contract Laboratory Program (CLP) guidelines during the validation process, there were instances where specific QC requirements for all target compounds were not defined. This primarily occurred in the organic, gas chromatography (GC) and GC/mass spectrometry calibration areas and is due to the fact that

the analytical methods are performance-based, and allows the use of average calibration responses in lieu of individual responses, which are defined by CLP protocol. In light of applying CLP guidelines to SW-846 methods and evaluating the usability of the data during the validation process, specific QC criteria were determined to address all target compounds and are identified in this report for each parameter, as well as, in the validation checklists, which function as worksheets. All completed validation checklists are on file in the Knoxville office. For those analytical methods not addressed by the CLP and Region III guidelines, the validation was based on the method requirements (i.e., SW-846, Code of Federal Regulations, SOPs, QAP) and technical judgement following the logic of the CLP validation guidelines.

3.0 Summary of Data Validation Findings

The overall quality of the data was determined to be acceptable. The only rejected data ('R' qualified) was due to poor performing volatile compounds (e.g., ketones, some halogenated hydrocarbons), which exhibited poor calibration responses in the associated calibration data, semivolatile compounds, which exhibited unacceptable surrogate and laboratory control sample (LCS) recoveries, and samples that were reanalyzed and have more than one result reported. The 'R' qualifier was assigned to the samples with more than one set of results to indicate that a given result should not be used to characterize a particular constituent or an analysis for a given sample.

Individual validation reports have been prepared for each parameter in each SDG and the overall results of the validation findings are summarized in this report. The validation qualifier data entry verification report (Attachment A) is also provided. This is a complete listing of all of the analytical results and the validation qualifiers assigned for PPMP-168 sites. It also identifies the 'use' column, which indicates which result to use in the event of a reanalysis. A listing of the validation qualifiers and the reason codes, along with their definitions is also found in Attachment A. The following section highlights the key findings of the data validation for each analysis.

4.0 Analysis-Specific Data Validation Summaries

4.1 Volatile Organics by GC/Mass Spectrometry SW-846-8260B

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exceptions of the following:

- The following demonstrated relative response factor (RRF) below 0.1 in the ICAL and/or CCAL: Nondetect results were rejected (qualified 'R'). Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination.

SDG/SDGs	Samples Affected	Analyte / Analytes	Validation Qualifier
PK916801	KQ0001, KQ0002, KQ0004, KQ0005, KQ0006	1,2-Dibromo-3-Chloropropane, Acetone, 2-Butanone	*B/**R/J
PK916801	KQ0005, KQ0006	Bromochloromethane, Dibromomethane, Bromomethane	**R/*B
PK916801	KQ0005	1,3-Dichlorobenzene	**R
PK916802	KQ1001	Dibromomethane, 2-Butanone, 1,2-Dibromo-3-Chloropropane, Bromochloromethane, Acetone	J/**R
PK916803	KQ2001	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane	**R
PK916804	KQ3001, KQ3002	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane	**R
PK916805	KQ0007	Acetone, 2-Butanone	**R

* B qualifiers assigned to designate blank contamination, which are identification qualifiers, take

precedence over estimating qualifiers, assigned due to quantitation.

** R qualifiers take precedence over estimating qualifiers.

- The following exhibited individual ICAL %RSD>30 and/or CCAL %D>20: Nondetect results were estimated (qualified 'UJ') unless rejected (qualified 'R') due to ICAL/CCAL minimum RRF criteria not met. Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination.

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK916801	KQ0001 KQ0002 KQ0004	Acetone, Naphthalene, Bromomethane, 1,2,4-Trichlorobenzene, 1,2,3-Trichlorobenzene	*B/**R/UJ/J
PK916801	KQ0005 KQ0006	Dichlorodifluoromethane, 1,2,3-Trichlorobenzene, Bromoform, Carbon Disulfide	UJ
PK916802	KQ1001	2-Hexanone, 4-Methyl-2-Pentanone, 2,2-Dichloropropane, Naphthalene	UJ
PK916803	KQ2001	Methylene Chloride	*B
PK916804	KQ3001 KQ3002	1,2,-Dibromo-3-Chloropropane, Methylene Chloride, Bromoform, Carbon Disulfide, Trans-1,3-Dichloropropene	**R/UJ
PK916805	KQ0007	Acetone, Methylene Chloride, Bromomethane, Dichlorodifluoromethane, Trichlorofluoromethane, 1,2- Dichloroethane, Carbon Tetrachloride, 1,1,1-Trichloroethane	*B/**R/UJ

* B qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

** R qualifiers take precedence over estimating qualifiers.

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable with the exception of the following:

Note: 'B' qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Analyte/Analytes	Associated Blank Contamination
PK916801	KQ0001, KQ0002, KQ0004, KQ0005, KQ0006	Acetone, Bromomethane, Methylene Chloride	Method
PK916802	KQ1001	Methylene Chloride	Method
PK916803	KQ2001	Methylene Chloride	Trip Blank
PK916805	KQ0007	Methylene Chloride	Method

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC limits.

Matrix Spike / Matrix Spike Duplicate

Batch QC, matrix spike/matrix spike duplicate (MS/MSD), and LCS were performed for the project samples and all QC criteria were met.

Field Duplicates

Original and field duplicate (FD) results were evaluated, and no problems were noted.

Internal Standards

All internal standards met criteria with the exception of the following:

- All compounds associated with the internal standards listed in the table below were qualified as indicated.

SDG	Samples Affected	Internal Standard Outside QC Limits	Validation Qualifier
PK916801	KQ0001, KQ0004, KQ0005	1,4-Dichlorobenzene-d4	R/UJ
PK916802	KQ1001	1,4-Dichlorobenzene-d4	R/UJ

SDG	Samples Affected	Internal Standard Outside QC Limits	Validation Qualifier
PK916805	KQ0007	1,4-Dichlorobenzene-d4	UJ/J

Quantitation

Results quantified between the maximum detection limit (MDL) and the reporting limit (RL), which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.2 Target Compound List Semivolatiles by GC/Mass Spectrometry SW-846 8270C

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all project samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria with the exceptions of the following:

The following exhibited individual ICAL %RSD>30 and/or CCAL %D>20:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK916801	KQ0001, KQ0002, KQ0004	Hexachlorocyclopentadiene	UJ
PK916802	KQ1001	3-Nitroaniline, 4-Nitroaniline, 2,4-Dinitrophenol, 4,6-Dinitro-2-Methylphenol, Hexachlorocyclopentadiene, Benzo(B)Fluoranthene	J/UJ
PK916804	KQ3001, KQ3002	Hexachlorocyclopentadiene	UJ

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable with the exception of the following:

Note: 'B' Qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Analyte/Analytes	Associated Blank Contamination
PK916801	KQ0001, KQ0002, KQ0004	Di-N-Butyl Phthalate, Bis(2-Ethylhexyl)Phthalate	Method
PK916802	KQ1001	Bis(2-Ethylhexyl)Phthalate	Method

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

Surrogate Recoveries

All surrogate recoveries met QC criteria.

Matrix Spike / Matrix Spike Duplicate

MS/MSD was performed for the project samples and all QC criteria were met.

Laboratory Control Sample

All QC criteria was met for the LCS associated with the project samples.

Internal Standards

All internal standards met criteria with the exception of the following:

X All compounds associated with the internal standard listed in the table below were qualified as indicated.

SDG	Samples Affected	Internal Standard Outside QC Limits	Validation Qualifier
PK916805	KQ0007	Perylene-d12	UJ

Field Duplicates

Original and FD results were evaluated and no problems were identified.

Quantitation

Results quantified between the maximum detection limit (MDL) and the reporting limit (RL), which the lab qualified as 'J,' were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.3 Metals by SW-846 6010B/7471A/7470A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing calibrations

All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks

The 5X rule for contaminants found in the associated equipment rinse, calibration, and method blanks was applied to all sample results. All were acceptable with the exceptions noted below:

Note: 'B' Qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Element/Elements	Associated Blank Contamination
PK916801	KQ0006	Arsenic	Calibration
PK916802	KQ1001	Sodium	Calibration
PK916803	KQ2001	Aluminum	Method
PK916804	KQ3002	Aluminum	Calibration

PK916805	KQ0007	Mercury, Sodium	Method/ER
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* B qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

Matrix Spike / Matrix Spike Duplicate

Batch QC was performed for the project samples and all QC criteria were met, with the following exceptions:

SDG	Samples Affected	Element/Elements	Validation Qualifier
PK916801	KQ0001, KQ0002, KQ0004, KQ0005, KQ0006	Chromium, Zinc, Antimony	UJ/J

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project sample analyses.

Interference Check Sample

All interference check sample percent recoveries, where applicable, were acceptable.

Inductively Coupled Plasma Serial Dilutions

All QC criteria were met with the following exceptions:

SDG	Samples Affected	Element/Elements	Validation Qualifier
PK916802	KQ1001	Barium, Lead, Iron, Chromium, Aluminum, Manganese, Zinc	J

Field Duplicates

Original and FD results were evaluated and the following exceeded the 50 percent relative percent difference (RPD) criteria for soils.

SDG	Samples Affected	Element/Elements	Validation Qualifier
PK916801	KQ0001 (original), KQ0002 (duplicate)	Cobalt	J

Note: High RPDs are most likely due to matrix interferences and/or sample nonhomogeneity.

Sample Quantitation

Results quantified between the instrument detection limit and the RL ('B' flagged by the laboratory) were qualified as estimated ('J').

4.4 Wet Chemistry - Total Organic Carbon by SW-846-9060

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike / Matrix Spike Duplicate

MS/MSD was performed for the project samples and all QC criteria were met.

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project sample analyses.

Field Duplicates

Original and FD results were evaluated and no problems were noted.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

5.0 Quality Assurance Field Split Sample Data Evaluation

Data from the quality assurance split samples supplied to IT Corporation by the U.S. Army Corps Engineers were reviewed for comparability to the original and FD results. RPDs were calculated and the results are summarized in this section.

Field split data for SDG PK916801

Note: FS Laboratory - Specialized Assays, Inc., Nashville, Tennessee.

Original Sample ID	Field Dup ID	Field Split ID	Units	Compounds / Elements	Original / Field Split RPD	% RSD
KQ0001	KQ0002	KQ0003				
.054	.037	nd	mg/k	Mercury		
7660	8000	8190	mg/k	Aluminum	-6.7%	3.4%
6.9	4.7	3.78	mg/k	Arsenic	58.4%	31.3%
29	nd	18.3	mg/k	Lead	45.2%	
nd	18.3	nd	mg/k	Antimony		
45.3	47.1	41.9	mg/k	Barium	7.8%	5.9%
2	1.4	nd	mg/k	Selenium		
1	.85	nd	mg/k	Beryllium		
.68	.45	nd	mg/k	Thallium		
1460	1350	1170	mg/k	Calcium	22.1%	11.0%
24	19.3	12.9	mg/k	Chromium	60.2%	29.7%
1.3	7.1	10.3	mg/k	Cobalt	-155.2	73.2%
14.2	13.5	6.36	mg/k	Copper	76.3%	38.2%
36500	25800	17600	mg/k	Iron	69.9%	35.6%
579	540	553	mg/k	Magnesium	4.6%	3.6%
454	440	318	mg/k	Manganese	35.2%	18.5%
10.4	7.9	6.56	mg/k	Nickel	45.3%	23.5%
386	420	414	mg/k	Potassium	-7.0%	4.5%
2.3	1.8	nd	mg/k	Silver		
30.5	29.4	203	mg/k	Sodium	-147.8	114.0
7.6	11.7	20.9	mg/k	Vanadium	-93.3%	50.8%
30.7	26.4	29.8	mg/k	Zinc	3.0%	7.8%
6.6	6.6	nd	µg/k	Acetone		

Original Sample ID	Field Dup ID	Field Split ID	Units	Compounds / Elements	Original / Field Split RPD	% RSD
KQ0001	KQ0002	KQ0003				
2.4	1.8	nd	µg/k	Bromomethane		
3.1	3.0	nd	µg/k	Methylene chloride		
72	67	nd	µg/k	bis(2-Ethylhexyl)phthalate		
100	91	nd	µg/k	Di-n-Butyl phthalate		

Metals: Majority of the same elements found in all samples. High RPD values (greater than 50 percent) attributed to lack of homogeneity in soils.

Volatiles: No volatiles reported in the FS. Acetone and bromomethane were detected below the RL in the original and FD sample.

Semivolatiles: No semivolatiles reported in the FS. Two common lab phthalate contaminants were detected below the RL in the original and FD.

ATTACHMENT A

DATA VALIDATION QUALIFIER ENTRY VERIFICATION REPORT

APPENDIX F

DATA VALIDATION SUMMARY REPORT

APPENDIX G

VARIANCES/NONCONFORMANCES

APPENDIX H

SUMMARY STATISTICS FOR BACKGROUND MEDIA, FORT MCCLELLAN, ALABAMA