Final

Site Investigation Report
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)

Fort McClellan
Calhoun County, Alabama

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation (IT) completed site investigations (SI) at the Former Fire Training Pit, Parcel 77(7); underground storage tanks at Building 350, Parcel 7(7); and at the Washrack, Building 351, Parcel 170(7) at Fort McClellan (FTMC), Calhoun County, Alabama. This report summarizes SI activities conducted at the Former Fire Training Pit, Parcel 77(7); the underground storage tanks at Building 350, Parcel 7(7); and the Washrack, Building 351, Parcel 170(7) at FTMC. The SIs were performed under separate work plans, however, because of the close proximity of the parcels, the sites are addressed together in this SI report and are collectively referred to as the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The SI was conducted to determine whether chemical constituents are present at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7) and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7) consisted of the sampling and analyses of surface soil samples, subsurface soil samples, groundwater samples, surface water samples, and sediment samples. In addition, seven groundwater monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

IT collected seven surface soil samples, twelve subsurface soil samples, seven groundwater samples, and three surface water and sediment samples during the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The analytical results indicate that metals, volatile organic compounds, semivolatile organic compounds (SVOC), and pesticides were detected in the environmental media sampled. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, detected constituent concentrations were compared to the human health site-specific screening levels (SSSL) and ecological screening values (ESV) 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 Base Realignment and Closure environmental restoration program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values, and SVOC concentrations exceeding SSSLs and ESVs in surface soils were compared to polynuclear aromatic hydrocarbon background screening values where available.

The potential impact to human receptors is also expected to be minimal. Iron (one subsurface soil sample), antimony (one subsurface soil sample), vanadium (four groundwater samples), and thallium (one groundwater sample) were detected at concentrations exceeding SSSLs and slightly above background values. The remaining metals concentrations were within background concentrations or the range of background values. The SVOC benzo(a)pyrene was detected in one surface soil sample at a concentration exceeding residential human health SSSLs. However, the benzo(a)pyrene concentration was below the polynuclear aromatic hydrocarbon background screening value. Although the site is projected for industrial land use, screening soils and groundwater analytical results against the more conservative residential human health SSSLs indicate the potential threat to human health to be very low in the residential scenario, as well, should the land use change. In the industrial land use scenario, the potential threat to human health is reasonably expected to be negligible.

Two metals (aluminum and zinc) were detected in site media at concentrations exceeding ESVs and background concentrations. In addition, six SVOCs and one pesticide were detected in site media at concentrations exceeding ESVs. However, the potential impact to ecological receptors is expected to be minimal in the future industrial land use scenario. Under this land use scenario, substantial ecological habitat is not expected to be present and, consequently, is reasonably expected to be minimally impacted.

Based on the results of the SI, past operations at Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health and the environment in either the industrial or residential land use scenario. Therefore, IT recommends "No Further Action" and unrestricted reuse with regards to hazardous, toxic, and radiological waste at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7).

1.0 Introduction

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 has contracted with IT Corporation (IT) to perform the site investigations (SI) at the Former Fire Training Pit, Parcel 77(7); underground storage tanks (UST) at Building 350, Parcel 7(7); and at the Washrack, Building 351, Parcel 170(7) through Prime Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from both SIs, including field sampling and analysis and monitoring well installation activities, conducted at the Former Fire Training Pit, Parcels 77(7); the USTs at Building 350, Parcel 7(7); and the Washrack, Building 351, Parcel 170(7). Although the SIs were performed under separate work plans, because of the close proximity of the parcels, the sites are addressed together in this SI report and are collectively referred to as the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7).

1.1 Project Description

The Former Fire Training Pit was identified as an area to be investigated prior to property transfer. The Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), was identified 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 and a site-specific safety and health plan (SSHP) attachment for Parcels 77(7) and 7(7) were finalized in August 1998 (IT, 1998a). The SFSP and SSHP for Parcel 170(7) were finalized in September 1999 (IT, 1999). The SFSPs and SSHPs were prepared to provide technical guidance for sample collection and analysis at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The SFSPs were used in conjunction with the SSHPs as attachments to the installation-wide work plan (IT, 1998b) and the

installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan (SHP) and quality assurance plan (QAP).

The SI included field work to collect seven surface soil samples, twelve subsurface soil samples, three surface water samples, three sediment samples, and seven groundwater samples to determine whether potential site-specific chemicals are present at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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 Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), at concentrations that would present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with site investigations 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 Closure 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 Former Fire Training Pit is located in the north-central portion of the Main Post (Figure 1-1). The site is south of the corner of 2nd Avenue and 18th Street where the Consolidated Maintenance Facility (Building 350) is located (Figure 1-2). The facility was reportedly used approximately once a year to train firefighters. Waste oil and other fluids, which were stored across the street in a fenced compound, were spread on the ground at the pit, ignited, and then

extinguished during the training exercise. U.S. Army Environmental Hygiene Agency records stated that the pit was concrete-lined (with an overflow drain) and that runoff from rainwater posed a small threat. According to a personal interview in 1995 with Mr. Moore at the FTMC Fire Department, the training pit was not lined until 1978. Rainwater runoff was drained to a nearby storm sewer, which discharged to Cane Creek.

Although the dates of operation are unknown, use of the pit was discontinued prior to 1986 (U.S. Army Environmental Hygiene Agency, 1986). The entire area (pad and soil) was excavated when Building 350 was constructed because the new facility required a separate drainage system (ESE, 1998). The excavation was backfilled with clean soil. The present area encompassing the parcels is well developed and consists of buildings, concrete pavement, and a small lawn adjacent to 18th Street (Figure 1-2).

Parcel 7(7) represents two UST locations at Building 350: a 10,000-gallon diesel fuel UST installed in 1991, and a 2,500-gallon waste oil UST installed in 1995. These USTs are located on opposite sides of Building 350 (Figure 1-2). The USTs have met all Alabama Department of Environmental Management (ADEM) requirements and have been tightness tested within the last 5 years.

The Washrack, Building 351, Parcel 170(7), is located in the north-central area of the Main Post (Figure 1-1), in the southern corner of the Consolidated Maintenance Facility (Building 350). The Washrack, Building 351, is a steam-generated washrack used to remove oil and grease from vehicles and was built around 1991. The washrack has a settling basin attached to a coalescing plate oil/water separator that discharges to the sanitary sewer system (ESE, 1998).

Building 352 is located southeast and adjacent to the Washrack, Building 351. The building is a temperature-controlled storage area for paints and oils (ESE, 1998). The containers stored in the building are well marked. The building has a drain to the adjacent facility oil/water separator. There have not been any documented releases at Building 352.

An intermittent stream is adjacent to the northwest boundary of the parcel. The stream flows northwest for approximately 2.5 miles and disappears near Weaver Cave. A tributary stream enters the parcel along the southeast boundary of the parcel through large drainpipes and travels across the site under Building 350. The tributary stream exits at the northwest corner of the parcel, flows into the other unnamed stream farther north, and eventually joins Cave Creek.

Railroad tracks cross the stream before it enters the parcel. A pond of water several feet deep is located along the railroad tracks and under the building adjacent to the tracks on the southwest corner of the parcel. Site elevation is approximately 780 feet and appears mostly level.

Soils at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), fall into the Rarden silty clay loams (ReB3) (U.S. Department of Agriculture, 1961). The Rarden Series are described as moderately well drained, strongly acid to very strongly acid, and occur in large areas on wide shale ridges with slopes of 2 to 10 percent. They have developed from the residuum of shale and fine-grained platy sandstone or limestone. Concretions and fragments of sandstone, (up to 0.5-inch diameter) are common on and in the soil. The specific soil type for this site is Rarden silty clay loam, shallow, 2 to 6 percent slopes, severely eroded which has mild slopes, more erosion, and thinner solum. Erosion has removed all or nearly all the original brown silt loam surface soil. There are a few shallow gullies. Capacity for available moisture is low. Erosion is a serious hazard.

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 (including migration) has occurred
2. Areas where only release or disposal of petroleum products has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken
7. Areas that are not evaluated or require further evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, 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 Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), was identified as a Category 7 CERFA site: areas that are not evaluated or require further evaluation. Previous studies to document site environmental conditions have not been conducted.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), including environmental sampling and analysis and groundwater monitoring well installation.

3.1 Environmental Sampling

The environmental sampling performed during the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), included the collection of surface soil samples, subsurface soil samples, surface water and sediment samples, and groundwater samples for chemical analysis. The sample locations were determined by observing site physical characteristics noted during a site visit and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.3.

3.1.1 Surface Soil Sampling

Surface soil samples were collected from seven locations at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), as shown on Figure 3-1. Surface soil sampling locations and rationale are presented in Table 3-1. Surface soil sample designations, depths, 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 and overhead utilities.

Sample Collection. Surface soil samples were collected from the upper 1 foot of soil by either direct-push technology or with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9 of the SAP (IT, 2000a). Surface soil samples in unpaved areas were collected by first removing surface debris, such as rocks and vegetation, from the immediate sample area. Surface soil samples in paved areas were collected by removing a small section of pavement and subpavement above the immediate sample area. The soil was collected with the sampling device and screened using a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP (IT, 2000a). Samples for volatile organic compound (VOC) analyses were collected directly from the sampler using 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. 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.

Table 3-1

Sampling Locations and Rationale
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
FTP-77-GP01(SS) FTP-77-GP01(W)	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected at the north corner of the parcel near the north front offset between the building and the road (downgradient) to determine if potential contamination is present.
FTP-77-GP02(SS) FTP-77-GP02(W)	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the site to determine if contamination is present.
FTP-77-GP03(SS) FTP-77-GP03(W)	Surface Soil Subsurface Soil Groundwater	Subsurface soil and groundwater samples were collected downgradient of the washrack and oil/water separator to determine if contamination is present.
FTP-77-GP04	Subsurface Soil Groundwater	Surface soil and groundwater samples were collected adjacent to the west side of Building 350 near the diesel fuel underground storage tank (UST) and close to Building 350 to determine if contamination is present beyond the building foundation and tank site.
FTP-77-GP05	Subsurface Soil	A Subsurface soil sample was collected adjacent to the rear center of Building 350 to determine if contamination is present.
FTP-77-GP06	Subsurface Soil	A Subsurface soil sample was collected adjacent to the north side of Building 350 closer to the front to determine if contamination is present.
FTP-77-GP07	Subsurface Soil	A subsurface soil sample was collected adjacent to the front of Building 350 at the offset corner to determine if contamination is present.
FTP-77-GP08	Subsurface Soil	A subsurface soil sample was collected near the waste oil UST location on the northeast corner of Building 350 to determine if contamination is present.
FTP-77-SW/SD02	Surface Water Sediment	Surface water and sediment samples were collected from a small upgradient stream along the southeast boundary of parcel near the railroad tracks outside fence to determine if contamination was transported via the stream from offsite.
FTP-77-SW/SD03	Surface Water Sediment	Surface water and sediment samples were collected from a stream across the street along the northwest boundary of the parcel, downgradient, where the stream exits the parcel to determine if contamination was transported beyond site by the stream.

Table 3-1

Sampling Locations and Rationale
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
FTA-170-MW01	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected just north of the Building 351 washrack to determine if contamination is present.
FTA-170-MW02	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected at the north end of the truck ramp near the Building 351 washrack to determine if contamination is present.
FTA-170-MW03	Surface Soil Subsurface Soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected approximately 100 feet west of the oil/water separator near the Building 351 washrack to determine if contamination is present.
FTA-170-GP01	Surface Soil Subsurface Soil	Surface soil and subsurface soil samples were collected at the northwest corner of Building 352, next to the sanitary sewer from the building to determine if contamination is present.
PPMP-75-SW/SD09	Surface Water Sediment	Surface water and sediment samples were collected from a drainage feature southeast of Building 350. This location replaces proposed location FTP-77-SW/SD01.

3.1.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 12 soil borings at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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 at Parcels 77(7) and 7(7), and Miller Drilling, Inc. to assist in subsurface soil collection at Parcel 170(7).

Sample Collection. Subsurface soil samples were collected from soil borings at a depth greater than 1 foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3.

Soil samples were collected continuously to 12 feet bgs or until direct-push or split spoon sampler refusal was encountered. Subsurface soil 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 showing 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 groundwater was submitted for analyses. 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 logging each borehole constructed a detailed lithological log. The lithological log for each borehole is included in Appendix B.

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

Table 3-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Samples
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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	
FTP-77-GP01(SS)	FTP-77-GP01-SS-HK0001-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
	FTP-77-GP01-DS-HK0004-REG	1-5				Organophosphorus Pesticides
FTP-77-GP02(SS)	FTP-77-GP02-SS-HK0005-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
	FTP-77-GP02-DS-HK0006-REG	5-9				Organophosphorus Pesticides
FTP-77-GP03(SS)	FTP-77-GP03-SS-HK0007-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
	FTP-77-GP03-DS-HK0008-REG	9-12				Organophosphorus Pesticides
FTP-77-GP04	FTP-77-GP04-DS-HK0009-REG	8-12				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
						Organophosphorus Pesticides
FTP-77-GP05	FTP-77-GP05-DS-HK0010-REG	4-8				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
						Organophosphorus Pesticides
FTP-77-GP06	FTP-77-GP06-DS-HK0011-REG	4-8	FTP-77-GP06-DS-HK0002-FD	FTP-77-GP06-DS-HK0003-FS		TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
						Organophosphorus Pesticides
FTP-77-GP07	FTP-77-GP07-DS-HK0012-REG	5-9			FTP-77-GP07-DS-HK0012-MS FTP-77-GP07-DS-HK0012-MSD	TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
						Organophosphorus Pesticides
FTP-77-GP08	FTP-77-GP08-DS-HK0013-REG	1-3				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides
						Organophosphorus Pesticides
FTA-170-MW01	FTA-170-MW01-SS-CE0001-REG	0-1			FTA-170-MW01-SS-CE0001-MS FTA-170-MW01-SS-CE0001-MSD	TCL VOCs, TCL SVOCs, TAL Metals
	FTA-170-MW01-DS-CE0002-REG	10-12				
FTA-170-MW02	FTA-170-MW02-SS-CE0003-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-170-MW02-DS-CE0004-REG	10-12	FTA-170-MW02-DS-CE0005-FD	FTA-170-MW02-DS-CE0006-FS		
FTA-170-MW03	FTA-170-MW03-SS-CE0007-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-170-MW03-DS-CE0008-REG	9-11				
FTA-170-GP01	FTA-170-GP01-SS-CE0009-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-170-GP01-DS-CE0010-REG	10-11				

FD - Field duplicate. REG - Field sample.

Table 3-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Samples
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

FS - Field split.
ft bgs - Feet below ground surface.
MS/MSD - Matrix spike/matrix spike duplicate.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

3.1.3 Well Installation

Four temporary wells and three permanent wells were installed in the residuum groundwater zone at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), to collect groundwater samples for laboratory analyses. The well/groundwater sample locations are shown on Figure 3-1. Table 3-3 summarizes construction details of the wells installed at Parcels 77(7), 7(7), and 170(7). The well construction logs are included in Appendix B.

The temporary well at sample location FTP-77-GP04 was installed with a direct-push sample rig by TEG, Inc. in October 1998 following procedures outlined in Section 4.7 of the SAP (IT, 2000a). The direct-push temporary well was installed by advancing a 2-inch outside diameter direct-push sampler to 12 feet bgs. The direct-push sampler was removed from the borehole and a 5-foot length of 1-inch inside diameter (ID), 0.010-inch, factory-slotted Schedule 40 polyvinyl chloride (PVC) screen was placed at the bottom of the borehole and attached to 1-inch ID, flush-threaded Schedule 40 PVC riser. A number 1 filter sand was placed in the annular space of the borehole around the screen from the bottom of the borehole to approximately 1 foot above the top of the screen. A bentonite seal, consisting of hydrated bentonite chips, was placed immediately on top of the sand pack.

The direct-push temporary well at FTP-77-GP04 was subsequently abandoned in December 1998 following groundwater sampling. Temporary well abandonment was performed by removing the PVC riser and screen from the borehole and adding hydrated bentonite chips to ground surface. Well abandonment procedures followed guidelines outlined in Appendix C of the SAP (IT, 2000a).

IT contracted Miller Drilling, Inc. to install three temporary wells (FTP-77-GP01, FTP-77-GP02, FTP-77-GP03) and the three permanent wells (designated FTA-170-MW01, FTA-170-MW02, and FTA-170-MW03) with a hollow-stem auger rig at the locations shown on Figure 3-1. IT attempted to install temporary wells at the locations where direct-push soil samples were collected. However, at locations where this was not possible due to rig access issues and overhead and underground utilities, the temporary well location was offset from the soil boring location. The soil sampling location was identified with "(SS)" and the associated temporary well location was identified with "(W)". The wells were installed following procedures outlined in Section 4.7 and Appendix C of the SAP (IT, 2000a). The boreholes at these locations were advanced with a 4.25-inch ID hollow-stem auger from ground surface to the first water-bearing zone in residuum at the well location. At temporary well locations, the borehole was augered to the depth of direct-push sampler refusal and samples were collected at the depth of direct-push

Table 3-3

Well Construction Summary
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Well	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Sump Interval (ft bgs)	Well Material
FTP-77-GP01(W)	1172410.272	672440.086	789.56	789.66	30	10	19.75 - 29.75	29.75 - 30	2" ID Sch. 40 PVC
FTP-77-GP02(W)	1172227.277	672251.933	787.78	789.79	30	10	19.75 - 29.75	29.75 - 30	2" ID Sch. 40 PVC
FTP-77-GP03(W)	1172155.811	672137.287	787.78	788.77	29	10	18.75 - 28.75	28.75 - 29	2" ID Sch. 40 PVC
FTP-77-GP04 *	1172065.192	672426.73	790.92	790.92	12	5	7 - 12	NA - NA	1" ID Sch. 40 PVC
FTA-170-MW01	1171929.587	672337.862	790.10	789.87	24	15	8 - 23	23 - 24	2" ID Sch. 40 PVC
FTA-170-MW02	1171887.483	672319.825	790.68	790.49	20.5	15	4.5 - 19.5	19.5 - 20.5	2" ID Sch. 40 PVC
FTA-170-MW03	1171925.485	672229.368	786.03	785.85	30	15	15 - 30	30 - 30	2" ID Sch. 40 PVC

Wells installed with an auger drill rig using a 4.25-inch inside diameter hollow stem auger, except as noted by *.
* Temporary well installed with a direct-push rig. Well was subsequently abandoned after collection of groundwater sample.
Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum (NAD83), 1983.
Elevations were referenced to the North American Vertical Datum of 1988 (NAVD88).
1" ID Sch. 40 PVC - 1-inch inside diameter, Schedule 40, polyvinyl chloride.
2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
bgs - Below ground surface.
ft - Feet.
msl - Mean sea level.
NA - Not applicable.
TOC - Top of casing.

refusal to the bottom of the borehole. At the permanent well locations, the borehole was augered to 12 feet bgs. 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 direct-push sampler refusal to the bottom of the auger hole 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 geological and hydrogeological information. The lithological log for each borehole is included in Appendix B.

Upon reaching the target depth at the temporary well locations, a 10- to 15-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 PVC screen with a 3-inch PVC end cap was placed through the auger to the bottom of the borehole. The well screen material for the permanent wells consisted of 15-foot length of 2-inch ID, 0.010-inch, machine-slotted Schedule 40 PVC. The bottom portion of the screen was attached to a minimum 1-foot length Schedule 40 PVC sump. The screen and end cap (or sump) were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A number 1 filter sand was tremied around the well screen to approximately 2 feet above the top of the well screen as the augers were removed. The wells were surged approximately 10 minutes, or until no more settling of the filter sand occurred inside the borehole. A bentonite seal, consisting of approximately 2 feet of bentonite chips, 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 chips were allowed to hydrate in the groundwater. The 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.

At permanent well locations, cement grout was tremied in the annular space from the top of the bentonite seal to ground surface. A bolt-down, drive-over, flush-to-grade, protective steel casing was installed over the PVC well casing and the well head was completed with a 2-foot by 2-foot by 4-inch-thick concrete well pad. At these wells, a locking well cap was placed on the PVC riser.

Monitoring wells were developed by surging and pumping with a 2-inch Grundfos® Redi-Flo II® submersible pump in accordance with methodology outlined in Section 4.8 and Appendix C of the SAP (IT, 2000a). Development continued until the water turbidity was equal to or less than 20 nephelometric turbidity units or for a maximum of 4 hours for temporary wells. Permanent wells were developed until water turbidity was equal to or less than 20 nephelometric turbidity units or for a maximum of 8 hours. Well development logs are included in Appendix C.

3.1.4 Water Level Measurements

The depth to groundwater was measured in monitoring wells installed at Parcels 77(7), 7(7), and 170(7) on March 13 and 14, 2000 following procedures outlined in Section 4.18 of the SAP (IT, 2000a). Water levels from 11 temporary wells at adjacent parcels were also measured to establish groundwater elevations across the parcel. The water level at FTP-77-GP04 was not measured because the well had been previously abandoned.

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 (IT, 2000a). Measurements were referenced to the top of the PVC stickup. A summary of groundwater level measurements is presented in Table 3-4.

3.1.5 Groundwater Sampling

Groundwater was sampled from the seven monitoring wells installed at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The well/groundwater sampling locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and QA/QC sample quantities are listed in Table 3-5.

Sample Collection. Groundwater sampling was completed at FTP-77-GP04 in October 1998 following methodology outlined in Section 4.7 of the SAP (IT, 2000a). At this location, groundwater was sampled using a Geotech® Dual Head peristaltic pump with 0.25-inch ID Teflon™ tubing. Groundwater sampling was performed at the remaining well locations following procedures outlined in Section 4.9 of the SAP (IT, 2000a). Groundwater was sampled after purging a minimum three well volumes and after field parameters including temperature, pH, specific conductivity, oxidation-reduction potential, and turbidity had stabilized. Purging and sampling were performed with a Fultz® positive gear displacement pump equipped with Teflon™ tubing. Field parameters were measured using either a Hydrolab® water quality unit or a Horiba® U-10 water quality unit. Field parameter readings are summarized in Table 3-6. Sample

Table 3-4

Groundwater Elevations
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)	Groundwater Elevation (ft msl)
FTP-77-GP01(W)	13-Mar-00	6.20	789.56	789.66	783.46
FTP-77-GP02(W)	13-Mar-00	8.83	787.78	789.79	780.96
FTP-77-GP03(W)	13-Mar-00	8.47	787.78	788.77	780.30
FTA-170-MW01	13-Mar-00	6.74	790.10	789.87	783.13
FTA-170-MW02	13-Mar-00	7.28	790.68	790.49	783.21
FTA-170-MW03	13-Mar-00	4.53	786.03	785.85	781.32
PPMP-75-GP25	14-Mar-00	3.54	785.41	784.91	781.37
PPMP-75-GP27	14-Mar-00	4.28	784.61	784.45	780.17
PPMP-75-GP28	14-Mar-00	2.97	785.61	785.30	782.33
PPMP-75-GP30	14-Mar-00	2.86	789.16	789.59	786.73
PPMP-75-GP50	14-Mar-00	3.77	793.73	795.33	791.56
PPMP-85-GP01	13-Mar-00	11.44	800.06	801.59	790.15
PPMP-85-GP03	13-Mar-00	12.80	797.76	798.71	785.91
PPMP-85-GP04	13-Mar-00	8.18	796.07	798.25	790.07
PPMP-85-GP09	13-Mar-00	19.81	801.75	804.54	784.73
FTA-149-GP12	13-Mar-00	6.25	788.04	789.93	783.68
FTA-149-GP13	13-Mar-00	4.71	782.32	784.57	779.86

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).
BTOC - Below top of casing
ft - Feet.
msl - Mean sea level.

Table 3-5

Groundwater Sample Designations and QA/QC Samples
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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	
FTP-77-GP01(W)	FTP-77-GP01-GW-HK3001-REG	19.75 - 29.75	FTP-77-GP01-GW-HK3002-FD	FTP-77-GP01-GW-HK3003-FS		TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides, Organophosphorus Pesticides
FTP-77-GP02(W)	FTP-77-GP02-GW-HK3004-REG	19.75 - 29.75			FTP-77-GP02-GW-HK3004-MS FTP-77-GP02-GW-HK3004-MSD	TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides, Organophosphorus Pesticides
FTP-77-GP03(W)	FTP-77-GP03-GW-HK3006-REG	18.75 - 28.75				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides, Organophosphorus Pesticides
FTP-77-GP04	FTP-77-GP04-GW-HK3005-REG	7 - 12				TCL VOCs, TCL SVOCs, TAL Metals, PCBs, Chlorinated Pesticides/Herbicides, Organophosphorus Pesticides
FTA-170-MW01	FTA-170-MW01-GW-CE3001-REG	13.57 - 23	FTA-170-MW01-GW-CE3002-FD	FTA-170-MW01-GW-CE3003-FS		TCL VOCs, TCL SVOCs, TAL Metals
FTA-170-MW02	FTA-170-MW02-GW-CE3004-REG	10.95 - 19.5			FTA-170-MW02-GW-CE3004-MS FTA-170-MW02-GW-CE3004-MSD	TCL VOCs, TCL SVOCs, TAL Metals
FTA-170-MW03	FTA-170-MW03-GW-CE3005-REG	15 - 30				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.
PCB - Polychlorinated biphenyl.
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.

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

Three surface water samples were collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), at the locations shown on Figure 3-1. The surface water sampling locations and rationale are listed in Table 3-1. Surface water sample locations FTP-77-SW/SD01 and PPMP-75-SW/SD09 (from nearby Parcel 75) were inadvertently placed at the same location. Consequently, sample location FTP-77-SW/SD01 was eliminated and sample location PPMP-75-SW/SD09 was sampled and the data are included in this report. The surface water sample designations and QA/QC samples are listed in Table 3-7. The sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. Surface water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Surface water samples were collected by dipping a clean stainless-steel pitcher in the water and pouring the water into the appropriate sample containers. Surface water samples were collected after field parameters had been measured using a Hydrolab® water quality unit. Surface water field parameters are listed in Table 3-6. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.3.

3.1.7 Sediment Sampling

Three sediment samples were collected at the same locations as the surface water samples presented in Section 3.1.6. The locations of the sediment samples are shown on Figure 3-1. Sediment sampling locations and rationale are presented in Table 3-1. Sediment sample locations FTP-77-SW/SD01 and PPMP-75-SW/SD09 (from nearby Parcel 75) were inadvertently placed at the same location. Consequently, sample location FTP-77-SW/SD01 was eliminated and sample location PPMP-75-SW/SD09 was sampled and the data are included in this report. The sediment sample designations and QA/QC sample quantities are listed in Table 3-7. The actual sediment sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. Sediment samples were collected with a stainless-steel trowel in accordance with the procedures specified in Section 4.9.1.2 of the SAP (IT, 2000a). Samples to be analyzed for VOCs were collected directly from the trowel with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized,

Table 3-6

Groundwater and Surface Water Field Parameters
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Date	Media	Specific Conductivity (µmhos/cm)	Dissolved Oxygen (ppm)	Redox Potential (mV)	Temperature (°C)	Turbidity (NTUs)	pH (Std units)
FTP-77-GP01(W)	09-Dec-98	GW	1850	0.11	-37	20.36	39.4	6.56
FTP-77-GP02(W)	08-Dec-98	GW	2824	0.3	-33	19.93	0	6.69
FTP-77-GP03(W)	09-Dec-98	GW	1715	0.13	-74	18.71	77.6	6.54
FTP-77-GP04	08-Oct-98	GW	590	1.09	26	26.8	NR	7.32
FTP-77-SW/SD02	26-Jan-99	SW	529	9.94	NR	12.45	4.7	6.95
FTP-77-SW/SD03	26-Jan-99	SW	348	11.2	183	12.73	7.3	7.61
FTA-170-MW01	03-Jan-00	GW	2.24	1.39	NR	23.1	29.4	6.77
FTA-170-MW02	03-Jan-00	GW	1.64	0.74	NR	21	5.7	6.84
FTA-170-MW03	03-Jan-00	GW	2.43	0.44	NR	20.6	18.8	6.77
PPMP-75-SW/SD09	25-Jan-99	SW	226	4.19	NR	10.42	71.1	7.16

°C - Degrees Celsius.
GW - Groundwater.
µmhos/cm - Micromhos per centimeter.
mV - Millivolts.
NR - Reading not recorded.
NTUs - Nephelometric turbidity units.
ppm - Parts per million.
Std units - Standard units.
SW - Surface water.

Table 3-7

Surface Water and Sediment Sample Designations and QA/QC Samples
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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	
FTP-77-SW/SD02	FTP-77-SW/SD02-SW-HK2002-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals PCBs, Chlorinated Pesticides/Herbicides,
	FTP-77-SW/SD02-SD-HK1002-REG	0-0.5				Organophosphorus Pesticides TOC, Grain size (sediment only)
FTP-77-SW/SD03	FTP-77-SW/SD03-SW-HK2003-REG	NA	FTP-77-SW/SD03-SW-HK2004-FD	FTP-77-SW/SD03-SW-HK2005-FS		TCL VOCs, TCL SVOCs, TAL Metals PCBs, Chlorinated Pesticides/Herbicides,
	FTP-77-SW/SD03-SD-HK1003-REG	0-0.5	FTP-77-SW/SD03-SD-HK1004-FD	FTP-77-SW/SD03-SD-HK1005-FS		Organophosphorus Pesticides TOC, Grain size (sediment only)
PPMP-75-SW/SD09	PPMP-75-SW/SD09-SW-KJ2010-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals PCBs, Chlorinated Pesticides/Herbicides,
	PPMP-75-SW/SD09-SD-KJ1011-REG	0-0.5				Organophosphorus Pesticides TOC, Grain size (sediment only)

FD - Field duplicate.
FS - Field split.
ft bgs - Feet below ground surface.
MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
PCB - Polychlorinated biphenyl.
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.

and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The sediment samples were 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 (IT, 2000a). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System (Alabama East Zone, North American Datum 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 properties. The specific suite of analyses performed is based on the potential site-specific chemicals historically at the site and EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), included the following:

- Target compound list VOCs - Method 5035/8260B
- Target compound list semivolatile organic compounds (SVOC) - Method 8270C
- Target analyte list metals - Method 6010B/7000
- Polychlorinated biphenyls (PCB) - Method 8082
- Chlorinated pesticides - Method 8081A
- Organophosphorus pesticides - Method 8141A
- Chlorinated herbicides - Method 8151A
- Total organic carbon - 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 [IT, 2000a]). Chemical data were reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated data is included in Appendix E. Data validation summary reports are included in 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 (IT, 2000a). Sample documentation and chain of custody were recorded as specified in Section 4.13 of the SAP (IT, 2000a).

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 Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), was segregated as follows:

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

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined rolloff bins prior to final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, drill cuttings, spent well materials, and personal protective equipment generated during the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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

3.6.1 Variances

Seven variances to the SFSP were recorded during completion of the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The variances did not alter the scope of the investigation or the sampling rationale presented in Table 4.2 of the SFSPs (IT, 1998a; IT, 1999). Variances to the SFSP are summarized in Table 3-8 and included in Appendix G.

3.6.2 Nonconformances

There were not any nonconformances to the SFSP recorded during completion of the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7).

3.7 Data Quality

The field sample results 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 QAP; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A. As discussed in Section 3.6, there were not any variances or nonconformances identified either in the field or during the review of the sample collection logs that may have impacted 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 data validation summary reports that were 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 during the validation effort. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the draft SSSLs and ESVs developed by IT. Rejected data (assigned an "R" data qualifier) were not used in the comparison to the draft SSSLs and ESVs.

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

Table 3-8

Variances to the Site-Specific Field Sampling Plan
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Sample location FTP-77-GP08 was moved from the southern end of Building 350 to the northern end of Building 350 next to the 2,500-gallon waste oil underground storage tank.	The new location will accurately determine the presence or absence of contamination.	The variance enhanced the Site Investigation by moving the sample location closer to a potential contaminant source.
A direct-push temporary well was installed at sample location FTP-77-GP04.	The decision was made to install a direct-push temporary well at FTP-77-GP04 in October 1998 because groundwater was not encountered at any other location at the Parcel. This decision was made prior to decision to install temporary wells with auger rig.	The variance provided additional groundwater sample data from the site.
Temporary wells at sample locations FTP-77-GP01, FTP-77-GP02 and FTP-77-GP03 were installed using hollow-stem auger drill rig. Temporary wells at these sample locations were proposed to be installed using direct-push technology (DPT).	The hollow-stem auger rig was used to install temporary wells at locations where DPT encountered refusal prior to encountering groundwater. The intent was to drill deeper than DPT refusal to install wells into the upper (first) groundwater-bearing zone at locations proposed in the site-specific field sampling plan (SFSP).	The variance assured that groundwater samples could be collected from all proposed groundwater sample locations in the SFSP.
Temporary well location FTP-77-GP01 was offset approximately 20 feet to the east of the surface and subsurface sample location.	The hollow-stem auger drill rig could not access the surface/subsurface sample location due to overhead and underground utilities.	None.
Temporary well location FTP-77-GP02 was offset approximately 60 feet to the southeast of the surface and subsurface sample location.	The hollow-stem auger drill rig could not access the surface/subsurface sample location due to overhead and underground utilities.	None.
Temporary well location FTP-77-GP03 was offset approximately 60 feet to the southeast of the surface and subsurface sample location.	The hollow-stem auger drill rig could not access the surface/subsurface sample location due to overhead and underground utilities.	None.
Sample location FTP-77-SW/SD01 was deleted from the field sampling program.	FTP-77-SW/SD01 and PPMP-75-SW/SD09 were inadvertently placed at the same location due to the proximity of Parcel 77 and Parcel 75. Sample location PPMP-75-SW/SD09 was sampled.	None. Analytical results from PPMP-75-SW/SD09 have been used to assess offsite conditions from Parcel 77 and Parcel 75.

4.0 Site Characterization

Subsurface investigations performed at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), provided soil, bedrock, and groundwater data. These data were 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 undifferentiated unit is comprised of coarse-grained and fine-grained units. 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, personal communication).

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 FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence 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

Soils underlying the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), are mapped as Rarden Series (U.S. Department of Agriculture, 1961). These soils are characterized as silty clay loam with concretions and sandstone fragments and a thin solum. The Rarden series soils are developed from the residuum of shale and fine-grained platy sandstone or limestone.

Bedrock beneath the Main Post of FTMC, including the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), is mapped as Ordovician limestone and shale formations, including the Newala and Longview Limestones, Lenoir Limestone, Athens Shale, Little Oak Limestone, and Chickamauga Limestone. These units occur within the eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post. The Mississippian Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, was reassigned to the Ordovician Athens Shale by Osborne and Szabo in 1984, on the basis of fossil data (SAIC, 1993).

Based on direct-push and hollow-stem auger boring data collected during the SI, sediments beneath the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), consist of predominantly thin silts and clays with some thin zones of sand and gravel-sized fragments of shale and sandstone. Organic matter is not prominent. Soils are firmer and develop sedimentary or

bedding structures with depth, suggesting the occurrence of severely weathered shale. The degree of weathering varies vertically and horizontally over the parcel. The severely weathered shale has a variable color, ranging from yellowish-gray to reddish-gray to yellowish-red. Severely weathered shale was encountered from about 4 feet bgs in FTP-77-GP07 to about 9 feet bgs in FTP-77-GP01. Beneath the severely weathered shale is medium- to dark-gray to olive-gray weathered shale. The change in color of the severely weathered shale to the weathered shale is interpreted as a result of oxidation of minerals in the severely weathered shale. A geologic cross section was constructed with boring log data obtained from Parcels 77(7), 7(7), and 170(7), and is shown on Figure 4-1.

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. The major surface water features at 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.

Surface runoff at the Former Fire Training Pit follows site topography and generally flows to the west-northwest. A surface drainage feature along 3rd Avenue diverts surface water to the northwest into an unnamed tributary of Cave Creek (Figure 3-1). During initial investigations performed in September 1998, ephemeral surface drainage features in the vicinity of the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), were observed to be dry. Rainfall recorded in the area between September and December 1998 resulted in surface water flow in the drainage features.

4.2.2 Hydrogeology

During soil boring and well installation activities, groundwater was encountered in the weathered shale at depths ranging from about 22 feet bgs in FTP-77-GP01 to approximately 25 feet bgs in FTP-77-GP03 (Appendix B). Dry zones were also observed in the weathered shale below the wet zones, indicating that groundwater is encountered in discrete zones or fractures.

Static groundwater levels were measured in monitoring wells at Parcels 77(7), 7(7), and 170(7) and adjacent parcels in March 2000. Groundwater elevations were calculated by measuring the depth to groundwater relative to the surveyed top-of-casing elevations. Table 3-4 summarizes

measured groundwater elevations. Groundwater elevations from March 13 and 14, 2000, are shown on Figure 4-2. Based on the groundwater levels, horizontal groundwater flow across the parcel is to the west-northwest, towards the unnamed tributary of Cave Creek, with a gradient of approximately 0.02 feet per foot. This groundwater flow direction follows the general slope of the topography.

Static groundwater levels summarized in Table 3-4 are at shallower depths than depth to water data from the drilling logs (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 Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), indicate that metals, VOCs, SVOCs, and pesticides have been detected in the various site media. Herbicides and PCBs were not detected in any of the samples collected. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, detected constituent concentrations were compared to the draft human health SSSLs and ESVs for FTMC. The draft 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 draft SSSLs and ESVs were subsequently compared to two times (2x) the arithmetic mean of background metals concentrations (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 soils that exceeded the draft SSSLs and ESVs were compared to PAH background screening values. The PAH background screening values are 2x the arithmetic mean of PAH analytical data from 18 parcels that were determined to represent anthropogenic activity at FTMC (IT, 2000b). PAH background screening values were developed for two categories of surface soils: beneath asphalt and adjacent to asphalt.

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 concentrations. Complete analytical results are presented in Appendix E.

5.1 Surface Soil Sample Results

Seven surface soil samples were collected for chemical analyses at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Surface 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 concentrations, as presented in Table 5-1.

Table 5-1

Surface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		Ecological Screening Values (ESV)[b]		FTP-77 FTP-77-GP01 HK0001 23-Sep-98 Start Depth = 0 End Depth = 1					FTP-77 FTP-77-GP02 HK0005 24-Sep-98 Start Depth = 0 End Depth = 1					FTP-77 FTP-77-GP03 HK0007 24-Sep-98 Start Depth = 0 End Depth = 1				
			Noncancer SSSL	Cancer SSSL	USEPA Region IV Values	Supp. Values	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	NA	5.00E+01	- -	1.14E+04			YES	YES	1.04E+04			YES	YES	7.07E+03				YES
Arsenic	mg/kg	1.37E+01	2.34E+00	4.26E-01	1.00E+01	- -	5.00E+00			YES		6.40E+00			YES		4.00E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	NA	1.65E+02	- -	1.13E+02					1.10E+02					7.55E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	NA	1.10E+00	- -	1.00E+00	J	YES			9.60E-01	J	YES			6.30E-01	J			
Calcium	mg/kg	1.72E+03	Essential Nutrient		no data	no data	4.32E+03		YES			1.81E+04		YES			4.33E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	NA	4.00E-01	- -	2.26E+01				YES	2.37E+01			YES	YES	1.31E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	NA	2.00E+01	- -	1.17E+01	J				1.22E+01	J				5.80E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	NA	4.00E+01	- -	2.07E+01		YES			2.74E+01		YES			1.50E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	NA	2.00E+02	- -	2.83E+04			YES	YES	2.57E+04			YES	YES	1.56E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	NA	5.00E+01	- -	1.71E+01	J				1.65E+01	J				8.32E+01	J	YES		YES
Magnesium	mg/kg	1.03E+03	Essential Nutrient		no data	4.40E+05	4.04E+03		YES			1.19E+04		YES			1.80E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	NA	1.00E+02	- -	2.67E+02				YES	4.15E+02			YES	YES	1.65E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	NA	1.00E-01	- -	ND					ND					ND				
Nickel	mg/kg	1.03E+01	1.54E+02	NA	3.00E+01	- -	2.19E+01		YES			2.51E+01		YES			8.30E+00				
Potassium	mg/kg	8.00E+02	Essential Nutrient		no data	no data	ND					ND					ND				
Selenium	mg/kg	4.80E-01	3.91E+01	NA	8.10E-01	- -	7.20E-01		YES			6.00E-01		YES			ND				
Sodium	mg/kg	6.34E+02	Essential Nutrient		no data	no data	ND					ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	NA	1.00E+00	- -	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	NA	2.00E+00	- -	9.70E+00				YES	1.27E+01				YES	9.90E+00				YES
Zinc	mg/kg	4.06E+01	2.34E+03	NA	5.00E+01	- -	6.54E+01		YES		YES	6.45E+01		YES		YES	4.86E+01		YES		
Volatile Organic Compounds																					
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	1.00E-01	- -	ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	NA	no data	8.96E+01	ND					4.80E-03	B				7.40E-03	B			
Acetone	mg/kg	NA	7.76E+02	NA	no data	2.50E+00	3.60E-02	B				6.30E-02	B				5.50E-02	B			
Benzene	mg/kg	NA	2.33E+01	2.17E+01	5.00E-02	- -	ND					ND					ND				
Carbon disulfide	mg/kg	NA	7.77E+02	NA	no data	9.40E-02	ND					7.40E-03					ND				
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	2.00E+00	- -	3.50E-03	B				3.50E-03	B				7.50E-03	B			
Toluene	mg/kg	NA	1.55E+03	NA	5.00E-02	- -	ND					1.80E-03	J				1.80E-03	J			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	NA	1.00E-01	- -	ND					ND					ND				
Semivolatile Organic Compounds																					
Anthracene	mg/kg	9.35E-01	2.33E+03	NA	1.00E-01	- -	ND					ND					3.30E-02	J			
Benzo(a)anthracene	mg/kg	1.19E+00	NA	8.51E-01	no data	5.21E+00	ND					ND					8.60E-02	J			
Benzo(a)pyrene	mg/kg	1.42E+00	NA	8.51E-02	1.00E-01	- -	ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	NA	8.51E-01	no data	5.98E+01	ND					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	NA	no data	1.19E+02	ND					ND					8.60E-02	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	NA	8.51E+00	no data	1.48E+02	ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	no data	9.26E-01	ND					5.90E-02	J				4.40E-02	J			
Chrysene	mg/kg	1.40E+00	NA	8.61E+01	no data	4.73E+00	ND					ND					1.00E-01	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	NA	8.61E-02	no data	1.84E+01	ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	NA	1.00E-01	- -	ND					3.80E-02	J				1.20E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	NA	8.51E-01	no data	1.09E+02	ND					ND					6.20E-02	J			
Isophorone	mg/kg	NA	1.54E+03	6.54E+02	no data	1.39E+02	ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	NA	1.00E-01	- -	4.30E-02	J				ND					4.30E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	NA	1.00E-01	- -	ND					3.20E-02	J				1.00E-01	J			

Table 5-1

Surface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		Ecological Screening Values (ESV)[b]		FTA-170 FTA-170-GP01 CE0009 15-Nov-99 Start Depth = 0 End Depth = 1					FTA-170 FTA-170-MW01 CE0001 15-Nov-99 Start Depth = 0 End Depth = 1					FTA-170 FTA-170-MW02 CE0003 15-Nov-99 Start Depth = 0 End Depth = 1				
			Noncancer SSSL	Cancer SSSL	USEPA Region IV Values	Supp. Values	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	NA	5.00E+01	- -	1.16E+04			YES	YES	1.03E+04			YES	YES	4.44E+03				YES
Arsenic	mg/kg	1.37E+01	2.34E+00	4.26E-01	1.00E+01	- -	6.70E+00			YES		5.30E+00			YES		4.50E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	NA	1.65E+02	- -	1.01E+02	J				8.21E+01	J				6.66E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	NA	1.10E+00	- -	8.30E-01	J	YES			5.40E-01	J				5.30E-01	J			
Calcium	mg/kg	1.72E+03	Essential Nutrient		no data	no data	7.04E+03	J	YES			4.73E+03	J	YES			8.32E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	NA	4.00E-01	- -	1.87E+01	J			YES	1.17E+01	J			YES	9.80E+00	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	NA	2.00E+01	- -	9.30E+00					5.30E+00	J				2.30E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	NA	4.00E+01	- -	2.61E+01	J	YES			1.52E+01	J	YES			8.20E+00	J			
Iron	mg/kg	3.42E+04	2.34E+03	NA	2.00E+02	- -	2.89E+04			YES	YES	2.71E+04			YES	YES	1.63E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	NA	5.00E+01	- -	1.76E+01					1.30E+01					8.90E+00				
Magnesium	mg/kg	1.03E+03	Essential Nutrient		no data	4.40E+05	6.72E+03	J	YES			3.38E+03	J	YES			4.22E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	NA	1.00E+02	- -	1.80E+02	J			YES	8.75E+01	J				1.12E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	NA	1.00E-01	- -	4.60E-02	B				4.90E-02	B				4.10E-02	B			
Nickel	mg/kg	1.03E+01	1.54E+02	NA	3.00E+01	- -	2.24E+01		YES			8.60E+00					7.00E+00				
Potassium	mg/kg	8.00E+02	Essential Nutrient		no data	no data	7.00E+02	J				5.66E+02	J				4.49E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	NA	8.10E-01	- -	ND					ND					ND				
Sodium	mg/kg	6.34E+02	Essential Nutrient		no data	no data	8.09E+01	J				1.08E+02	J				ND				
Thallium	mg/kg	3.43E+00	5.08E-01	NA	1.00E+00	- -	ND					8.20E-01	B		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	NA	2.00E+00	- -	2.79E+01	J			YES	3.49E+01	J			YES	2.12E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	NA	5.00E+01	- -	6.75E+01	J	YES		YES	1.91E+01	J				2.23E+01	J			
Volatile Organic Compounds																					
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	1.00E-01	- -	1.30E-03	B				7.30E-04	B				2.60E-03	B			
2-Butanone	mg/kg	NA	4.66E+03	NA	no data	8.96E+01	ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	NA	no data	2.50E+00	7.90E-03	B				1.10E-02	B				9.10E-03	B			
Benzene	mg/kg	NA	2.33E+01	2.17E+01	5.00E-02	- -	8.10E-04	J				ND					ND				
Carbon disulfide	mg/kg	NA	7.77E+02	NA	no data	9.40E-02	ND					ND					ND				
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	2.00E+00	- -	3.50E-03	B				2.00E-03	B				2.90E-03	B			
Toluene	mg/kg	NA	1.55E+03	NA	5.00E-02	- -	9.10E-04	J				ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	NA	1.00E-01	- -	ND					ND					1.80E-03	J			
Semivolatile Organic Compounds																					
Anthracene	mg/kg	9.35E-01	2.33E+03	NA	1.00E-01	- -	ND					ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	NA	8.51E-01	no data	5.21E+00	ND					ND					ND				
Benzo(a)pyrene	mg/kg	1.42E+00	NA	8.51E-02	1.00E-01	- -	2.70E-02	J				ND					3.20E-02	J			
Benzo(b)fluoranthene	mg/kg	1.66E+00	NA	8.51E-01	no data	5.98E+01	3.80E-02	J				ND					4.10E-02	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	NA	no data	1.19E+02	ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	NA	8.51E+00	no data	1.48E+02	ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	no data	9.26E-01	5.60E-02	B				ND					8.10E-02	B			
Chrysene	mg/kg	1.40E+00	NA	8.61E+01	no data	4.73E+00	ND					ND					4.10E-02	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	NA	8.61E-02	no data	1.84E+01	ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	NA	1.00E-01	- -	4.10E-02	J				ND					4.80E-02	J			
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	NA	8.51E-01	no data	1.09E+02	ND					ND					ND				
Isophorone	mg/kg	NA	1.54E+03	6.54E+02	no data	1.39E+02	4.50E-02	J				ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	NA	1.00E-01	- -	ND					ND					5.60E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	NA	1.00E-01	- -	3.90E-02	J				ND					4.90E-02	J			

Table 5-1

Surface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		Ecological Screening Values (ESV)[b]		FTA-170 FTA-170-MW03 CE0007 16-Nov-99 Start Depth = 0 End Depth = 1				
			Noncancer SSSL	Cancer SSSL	USEPA Region IV Values	Supp. Values	Result	Qual	>Bkg	>SSSL	>ESV
Metals											
Aluminum	mg/kg	1.63E+04	7.80E+03	NA	5.00E+01	- -	2.03E+04		YES	YES	YES
Arsenic	mg/kg	1.37E+01	2.34E+00	4.26E-01	1.00E+01	- -	6.60E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	NA	1.65E+02	- -	9.71E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	NA	1.10E+00	- -	8.60E-01	J	YES		
Calcium	mg/kg	1.72E+03	Essential Nutrient		no data	no data	2.45E+03	J	YES		
Chromium	mg/kg	3.70E+01	2.32E+01	NA	4.00E-01	- -	2.39E+01	J		YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	NA	2.00E+01	- -	5.90E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	NA	4.00E+01	- -	2.27E+01	J	YES		
Iron	mg/kg	3.42E+04	2.34E+03	NA	2.00E+02	- -	3.08E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	NA	5.00E+01	- -	4.19E+01		YES		
Magnesium	mg/kg	1.03E+03	Essential Nutrient		no data	4.40E+05	1.38E+03	J	YES		
Manganese	mg/kg	1.58E+03	3.63E+02	NA	1.00E+02	- -	9.42E+01	J			
Mercury	mg/kg	8.00E-02	2.33E+00	NA	1.00E-01	- -	5.10E-02	B			
Nickel	mg/kg	1.03E+01	1.54E+02	NA	3.00E+01	- -	1.25E+01		YES		
Potassium	mg/kg	8.00E+02	Essential Nutrient		no data	no data	1.17E+03	J	YES		
Selenium	mg/kg	4.80E-01	3.91E+01	NA	8.10E-01	- -	ND				
Sodium	mg/kg	6.34E+02	Essential Nutrient		no data	no data	1.04E+02	J			
Thallium	mg/kg	3.43E+00	5.08E-01	NA	1.00E+00	- -	ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	NA	2.00E+00	- -	4.31E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	NA	5.00E+01	- -	1.33E+02	J	YES		YES
Volatile Organic Compounds											
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	1.00E-01	- -	1.60E-03	B			
2-Butanone	mg/kg	NA	4.66E+03	NA	no data	8.96E+01	ND				
Acetone	mg/kg	NA	7.76E+02	NA	no data	2.50E+00	ND				
Benzene	mg/kg	NA	2.33E+01	2.17E+01	5.00E-02	- -	ND				
Carbon disulfide	mg/kg	NA	7.77E+02	NA	no data	9.40E-02	ND				
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	2.00E+00	- -	2.70E-03	B			
Toluene	mg/kg	NA	1.55E+03	NA	5.00E-02	- -	ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	NA	1.00E-01	- -	ND				
Semivolatile Organic Compounds											
Anthracene	mg/kg	9.35E-01	2.33E+03	NA	1.00E-01	- -	ND				
Benzo(a)anthracene	mg/kg	1.19E+00	NA	8.51E-01	no data	5.21E+00	1.10E-01	J			
Benzo(a)pyrene	mg/kg	1.42E+00	NA	8.51E-02	1.00E-01	- -	1.70E-01	J		YES	YES
Benzo(b)fluoranthene	mg/kg	1.66E+00	NA	8.51E-01	no data	5.98E+01	2.10E-01	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	NA	no data	1.19E+02	1.60E-01	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	NA	8.51E+00	no data	1.48E+02	1.80E-01	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	no data	9.26E-01	6.50E-02	B			
Chrysene	mg/kg	1.40E+00	NA	8.61E+01	no data	4.73E+00	1.50E-01	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	NA	8.61E-02	no data	1.84E+01	7.00E-02	J			
Fluoranthene	mg/kg	2.03E+00	3.09E+02	NA	1.00E-01	- -	1.90E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	NA	8.51E-01	no data	1.09E+02	1.60E-01	J			
Isophorone	mg/kg	NA	1.54E+03	6.54E+02	no data	1.39E+02	ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	NA	1.00E-01	- -	5.70E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	NA	1.00E-01	- -	1.80E-01	J			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. For metals, the 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 PAHs, value listed is the background screening criterion given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

[b] 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 stated method detection limit but less than or equal to specified reporting limit.
mg/kg = Milligrams per kilogram.
NA - Not Available
ND - Not detected
Qual - Data validation qualifier

Table 5-2

Subsurface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Cancer SSSL	FTP-77 FTP-77-GP01 HK0004 23-Sep-98 Start Depth = 1 End Depth = 5 Result	Qual	>Bkg	>SSSL	FTP-77 FTP-77-GP02 HK0006 24-Sep-98 Start Depth = 5 End Depth = 9 Result	Qual	>Bkg	>SSSL	FTP-77 FTP-77-GP03 HK0008 24-Sep-98 Start Depth = 9 End Depth = 12 Result	Qual	>Bkg	>SSSL
Metals																
Aluminum	mg/kg	1.36E+04	7.80E+03	NA	1.14E+04			YES	1.75E+04		YES	YES	2.11E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	NA	ND				ND				ND			
Arsenic	mg/kg	1.83E+01	2.34E+00	4.26E-01	4.60E+00			YES	4.30E+00			YES	5.60E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	NA	8.57E+01				3.18E+02		YES		2.35E+02		YES	
Beryllium	mg/kg	8.60E-01	9.60E+00	NA	8.20E-01	J			1.80E+00	J	YES		1.60E+00	J	YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	NA	ND				5.60E-01		YES		ND			
Calcium	mg/kg	6.37E+02	Essential Nutrient		5.86E+03		YES		2.64E+03		YES		2.36E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	NA	2.08E+01				2.74E+01			YES	3.22E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	NA	7.70E+00	J			1.67E+01	J			3.65E+01	J	YES	
Copper	mg/kg	1.94E+01	3.13E+02	NA	1.66E+01				4.40E+01		YES		6.23E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	NA	2.83E+04			YES	4.28E+04			YES	5.23E+04		YES	YES
Lead	mg/kg	3.85E+01	4.00E+02	NA	1.45E+01	J			1.81E+01	J			2.01E+01	J		
Magnesium	mg/kg	7.66E+02	Essential Nutrient		4.29E+03		YES		8.04E+03		YES		9.44E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	NA	1.82E+02				2.12E+02				1.20E+03			YES
Mercury	mg/kg	7.00E-02	2.33E+00	NA	ND				ND				ND			
Nickel	mg/kg	1.29E+01	1.54E+02	NA	1.43E+01		YES		5.49E+01		YES		5.93E+01		YES	
Potassium	mg/kg	7.11E+02	Essential Nutrient		ND				ND				6.35E+02			
Selenium	mg/kg	4.70E-01	3.91E+01	NA	7.80E-01		YES		6.20E-01		YES		6.70E-01		YES	
Sodium	mg/kg	7.02E+02	Essential Nutrient		ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	NA	1.29E+01				ND				ND			
Zinc	mg/kg	3.49E+01	2.34E+03	NA	7.30E+01		YES		1.08E+02		YES		1.53E+02		YES	
Volatile Organic Compounds																
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	ND				ND				ND			
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	NA	ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	NA	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	NA	4.40E-02	B			ND				ND			
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	1.20E-02	B			3.20E-03	B			4.40E-03	B		
Toluene	mg/kg	NA	1.55E+03	NA	ND				ND				ND			
Semivolatile Organic Compounds																
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	ND				5.10E-02	J			ND			
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	NA	ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Cancer SSSL	FTP-77 FTP-77-GP04 HK0009 05-Oct-98 Start Depth = 8 End Depth = 12 Result	Qual	>Bkg	>SSSL	FTP-77 FTP-77-GP05 HK0010 05-Oct-98 Start Depth = 4 End Depth = 8 Result	Qual	>Bkg	>SSSL	FTP-77 FTP-77-GP06 HK0011 06-Oct-98 Start Depth = 4 End Depth = 8 Result	Qual	>Bkg	>SSSL
Metals																
Aluminum	mg/kg	1.36E+04	7.80E+03	NA	1.30E+04			YES	9.80E+03			YES	2.10E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	NA	ND				ND				7.30E+00		YES	YES
Arsenic	mg/kg	1.83E+01	2.34E+00	4.26E-01	3.50E+00			YES	8.50E+00			YES	4.70E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	NA	9.06E+01				1.09E+02				4.21E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	NA	7.60E-01				1.10E+00		YES		1.70E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	NA	ND				ND				ND			
Calcium	mg/kg	6.37E+02	Essential Nutrient		3.65E+04		YES		8.92E+03		YES		2.70E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	NA	1.83E+01				1.60E+01				2.68E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	NA	1.40E+01				1.60E+01				1.74E+01			
Copper	mg/kg	1.94E+01	3.13E+02	NA	3.01E+01		YES		2.38E+01		YES		4.70E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	NA	2.68E+04			YES	4.28E+04			YES	4.48E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	NA	1.39E+01				1.99E+01				1.97E+01			
Magnesium	mg/kg	7.66E+02	Essential Nutrient		2.78E+04		YES		7.49E+03		YES		6.86E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	NA	2.87E+02				3.03E+02				2.10E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	NA	ND				ND				ND			
Nickel	mg/kg	1.29E+01	1.54E+02	NA	2.91E+01		YES		2.29E+01		YES		3.89E+01		YES	
Potassium	mg/kg	7.11E+02	Essential Nutrient		8.19E+02		YES		ND				9.31E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	NA	ND				7.80E-01		YES		8.00E-01		YES	
Sodium	mg/kg	7.02E+02	Essential Nutrient		ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	NA	2.14E+01				3.34E+01				3.17E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	NA	7.02E+01		YES		4.32E+01		YES		1.42E+02		YES	
Volatile Organic Compounds																
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	ND				ND				ND			
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	NA	ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	NA	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	NA	ND				2.10E-02	B			ND			
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	2.00E-03	B			2.30E-03	B			4.80E-03	B		
Toluene	mg/kg	NA	1.55E+03	NA	ND				ND				ND			
Semivolatile Organic Compounds																
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	ND				7.50E-02	J			ND			
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	NA	ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Cancer SSSL	FTP-77 FTP-77-GP07 HK0012 24-Sep-98 Start Depth = 5 End Depth = 9 Result	Qual	>Bkg	>SSSL	FTP-77 FTP-77-GP08 HK0013 05-Oct-98 Start Depth = 1 End Depth = 3 Result	Qual	>Bkg	>SSSL	FTA-170 FTA-170-GP01 CE0010 15-Nov-99 Start Depth =10 End Depth = 11 Result	Qual	>Bkg	>SSSL
Metals																
Aluminum	mg/kg	1.36E+04	7.80E+03	NA	1.95E+04		YES	YES	1.19E+04			YES	1.10E+04			YES
Antimony	mg/kg	1.31E+00	3.11E+00	NA	ND				ND				9.30E-01	J		
Arsenic	mg/kg	1.83E+01	2.34E+00	4.26E-01	4.30E+00			YES	4.40E+00			YES	9.40E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	NA	6.16E+01				6.87E+01				6.96E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	NA	1.40E+00	J	YES		6.10E-01				8.20E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	NA	5.60E-01		YES		ND				ND			
Calcium	mg/kg	6.37E+02	Essential Nutrient		1.43E+03		YES		5.00E+04		YES		8.96E+02	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	NA	2.84E+01			YES	1.56E+01				1.23E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	NA	1.89E+01	J	YES		1.15E+01				1.41E+01			
Copper	mg/kg	1.94E+01	3.13E+02	NA	4.54E+01		YES		3.37E+01		YES		4.96E+01	J	YES	
Iron	mg/kg	4.48E+04	2.34E+03	NA	4.27E+04			YES	2.61E+04			YES	3.19E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	NA	1.90E+01	J			1.40E+01				2.06E+01			
Magnesium	mg/kg	7.66E+02	Essential Nutrient		1.08E+04		YES		3.06E+04		YES		6.09E+03	J	YES	
Manganese	mg/kg	1.36E+03	3.63E+02	NA	2.97E+02				2.86E+02				3.27E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	NA	ND				ND				5.70E-02	B		
Nickel	mg/kg	1.29E+01	1.54E+02	NA	5.67E+01		YES		3.48E+01		YES		4.54E+01		YES	
Potassium	mg/kg	7.11E+02	Essential Nutrient		ND				6.29E+02				8.21E+02	J	YES	
Selenium	mg/kg	4.70E-01	3.91E+01	NA	5.70E-01		YES		ND				ND			
Sodium	mg/kg	7.02E+02	Essential Nutrient		ND				ND				1.21E+02	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	NA	ND				1.97E+01				2.33E+01	J		
Zinc	mg/kg	3.49E+01	2.34E+03	NA	1.28E+02		YES		9.62E+01		YES		1.06E+02	J	YES	
Volatile Organic Compounds																
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	ND				ND				8.40E-04	B		
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	NA	ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	NA	3.40E-03	B			ND				ND			
Acetone	mg/kg	NA	7.76E+02	NA	8.10E-03	B			ND				8.60E-03	B		
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	4.40E-03	B			5.10E-03	B			2.80E-03	B		
Toluene	mg/kg	NA	1.55E+03	NA	ND				ND				ND			
Semivolatile Organic Compounds																
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	ND				ND				4.60E-02	B		
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	NA	ND				6.40E-02	J			ND			

Table 5-2

Subsurface Soil Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Resident Cancer SSSL	FTA-170 FTA-170-MW01 CE0002 15-Nov-99 Start Depth = 10 End Depth = 12 Result	Qual	>Bkg	>SSSL	FTA-170 FTA-170-MW02 CE0004 15-Nov-99 Start Depth = 10 End Depth = 12 Result	Qual	>Bkg	>SSSL	FTA-170 FTA-170-MW03 CE0008 16-Nov-99 Start Depth = 9 End Depth = 11 Result	Qual	>Bkg	>SSSL
Metals																
Aluminum	mg/kg	1.36E+04	7.80E+03	NA	1.27E+04			YES	1.66E+04		YES	YES	1.75E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	NA	ND				ND				ND			
Arsenic	mg/kg	1.83E+01	2.34E+00	4.26E-01	6.50E+00			YES	4.70E+00			YES	4.30E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	NA	3.72E+01	J			2.23E+02	J			6.29E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	NA	1.80E+00	J	YES		1.20E+00	J	YES		1.20E+00	J	YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	NA	ND				ND				ND			
Calcium	mg/kg	6.37E+02	Essential Nutrient		1.13E+03	J	YES		1.17E+03	J	YES		1.41E+03	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	NA	2.09E+01	J			1.79E+01	J			2.35E+01	J		YES
Cobalt	mg/kg	1.75E+01	4.68E+02	NA	2.24E+01		YES		1.45E+01				2.02E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	NA	2.41E+01	J	YES		2.68E+01	J	YES		4.58E+01	J	YES	
Iron	mg/kg	4.48E+04	2.34E+03	NA	4.63E+04		YES	YES	3.93E+04			YES	3.94E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	NA	1.74E+01				1.96E+01				2.16E+01			
Magnesium	mg/kg	7.66E+02	Essential Nutrient		1.99E+03	J	YES		2.85E+03	J	YES		8.77E+03	J	YES	
Manganese	mg/kg	1.36E+03	3.63E+02	NA	1.81E+02	J			2.97E+02	J			4.55E+02	J		YES
Mercury	mg/kg	7.00E-02	2.33E+00	NA	4.50E-02	B			4.90E-02	B			4.40E-02	B		
Nickel	mg/kg	1.29E+01	1.54E+02	NA	2.57E+01		YES		2.56E+01		YES		4.80E+01		YES	
Potassium	mg/kg	7.11E+02	Essential Nutrient		5.75E+02	J			1.07E+03	J	YES		1.21E+03	J	YES	
Selenium	mg/kg	4.70E-01	3.91E+01	NA	ND				ND				ND			
Sodium	mg/kg	7.02E+02	Essential Nutrient		1.19E+02	J			1.93E+02	J			2.11E+02	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	NA	3.38E+01	J			3.33E+01	J			2.86E+01	J		
Zinc	mg/kg	3.49E+01	2.34E+03	NA	6.40E+01	J	YES		5.49E+01	J	YES		1.24E+02	J	YES	
Volatile Organic Compounds																
1,1,1-Trichloroethane	mg/kg	NA	1.55E+03	NA	1.00E-03	B			8.80E-04	B			1.30E-03	B		
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	NA	ND				4.50E-03	J			ND			
2-Butanone	mg/kg	NA	4.66E+03	NA	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	NA	1.30E-02	B			1.00E-02	B			ND			
Methylene chloride	mg/kg	NA	4.66E+02	8.41E+01	2.90E-03	B			3.70E-03	B			2.10E-03	B		
Toluene	mg/kg	NA	1.55E+03	NA	ND				1.00E-03	J			ND			
Semivolatile Organic Compounds																
bis(2-Ethylhexyl)phthalate	mg/kg	NA	1.56E+02	4.52E+01	ND				8.20E-02	B			3.90E-02	B		
Butyl benzyl phthalate	mg/kg	NA	1.56E+03	NA	ND				ND				ND			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (E analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals con Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort Mc Alabama,* July.

[b] IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Sum Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greate
J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.
mg/kg - Milligrams per kilogram.
NA - Not available
ND - Not detected
Qual - Data validation qualifier

Table 5-3

Groundwater Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		FTP-77 FTP-77-GP01 HK3001 09-Dec-98				FTP-77 FTP-77-GP02 HK3004 08-Dec-98				FTP-77 FTP-77-GP03 HK3006 09-Dec-98			
			Noncancer SSSL	Cancer SSSL	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL
Metals																
Aluminum	mg/L	2.34E+00	1.56E+00	NA	4.16E-01	J			4.15E-02	J			1.65E+00			YES
Barium	mg/L	1.27E-01	1.10E-01	NA	4.32E-02	J			2.90E-02	J			3.67E-02	J		
Calcium	mg/L	5.65E+01	NA	NA	2.29E+02		YES		2.91E+02		YES		1.92E+02		YES	
Chromium	mg/L	NA	4.69E-03	NA	ND				ND				ND			
Cobalt	mg/L	2.34E-02	9.39E-02	NA	ND				ND				ND			
Copper	mg/L	2.55E-02	6.26E-02	NA	ND				ND				8.40E-03	J		
Iron	mg/L	7.04E+00	4.69E-01	NA	9.73E-01	J		YES	5.28E-01			YES	2.87E+00			YES
Lead	mg/L	8.00E-03	1.50E-02	NA	ND				ND				ND			
Magnesium	mg/L	2.13E+01	NA	NA	1.12E+02		YES		1.73E+02		YES		1.15E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	NA	3.55E-01			YES	6.18E-01		YES	YES	4.10E-01			YES
Nickel	mg/L	NA	3.13E-02	NA	ND				ND				ND			
Potassium	mg/L	7.20E+00	NA	NA	4.20E+00	J			3.67E+00	J			2.74E+00	J		
Sodium	mg/L	1.48E+01	NA	NA	8.54E+01		YES		1.09E+02		YES		8.83E+01		YES	
Thallium	mg/L	1.46E-03	1.02E-04	NA	4.20E-03	B	YES	YES	5.70E-03	B	YES	YES	ND			
Vanadium	mg/L	1.70E-02	1.10E-02	NA	5.97E-02		YES	YES	7.24E-02		YES	YES	5.73E-02		YES	YES
Zinc	mg/L	2.20E-01	4.69E-01	NA	ND				ND				1.10E-02	J		
Volatile Organic Compounds																
1,1-Dichloroethane	mg/L	NA	1.54E-01	NA	ND				ND				ND			
Acetone	mg/L	NA	1.56E-01	NA	ND				1.60E-03	B			ND			
Chloromethane	mg/L	NA	6.22E-03	3.93E-03	ND				ND				ND			
Hexachlorobutadiene	mg/L	NA	3.07E-04	8.40E-04	ND				2.00E-04	J			ND			
Semivolatile Organic Compounds																
bis(2-Ethylhexyl)phthalate	mg/L	NA	2.85E-02	4.31E-03	ND				ND				3.30E-03	J		
Di-n-butyl phthalate	mg/L	NA	1.48E-01	NA	ND				4.80E-03	J			1.20E-03	J		
Phenol	mg/L	NA	9.31E-01	NA	6.10E-03	B			7.90E-03	B			1.00E-02	B		

Table 5-3

Groundwater Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		FTP-77 FTP-77-GP04 HK3005 08-Oct-98				FTA-170 FTA-170-MW01 CE3001 03-Jan-00			
			Noncancer SSSL	Cancer SSSL	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL
Metals												
Aluminum	mg/L	2.34E+00	1.56E+00	NA	3.44E+00		YES	YES	8.54E-01			
Barium	mg/L	1.27E-01	1.10E-01	NA	ND				6.07E-02	J		
Calcium	mg/L	5.65E+01	NA	NA	1.18E+02		YES		2.16E+02		YES	
Chromium	mg/L	NA	4.69E-03	NA	ND				3.20E-03	J		
Cobalt	mg/L	2.34E-02	9.39E-02	NA	ND				3.10E-03	J		
Copper	mg/L	2.55E-02	6.26E-02	NA	ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	NA	3.70E+00			YES	1.22E+00			YES
Lead	mg/L	8.00E-03	1.50E-02	NA	8.00E-03		YES		ND			
Magnesium	mg/L	2.13E+01	NA	NA	6.22E+01		YES		1.32E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	NA	1.67E-01			YES	2.30E-01			YES
Nickel	mg/L	NA	3.13E-02	NA	ND				5.40E-03	J		
Potassium	mg/L	7.20E+00	NA	NA	6.31E+00				4.05E+00	J		
Sodium	mg/L	1.48E+01	NA	NA	2.09E+01		YES		7.36E+01		YES	
Thallium	mg/L	1.46E-03	1.02E-04	NA	ND				ND			
Vanadium	mg/L	1.70E-02	1.10E-02	NA	6.02E-02	B	YES	YES	ND			
Zinc	mg/L	2.20E-01	4.69E-01	NA	2.38E-02				ND			
Volatile Organic Compounds												
1,1-Dichloroethane	mg/L	NA	1.54E-01	NA	1.40E-04	J			ND			
Acetone	mg/L	NA	1.56E-01	NA	1.80E-03	B			ND			
Chloromethane	mg/L	NA	6.22E-03	3.93E-03	ND				1.70E-04	J		
Hexachlorobutadiene	mg/L	NA	3.07E-04	8.40E-04	ND				ND			
Semivolatile Organic Compounds												
bis(2-Ethylhexyl)phthalate	mg/L	NA	2.85E-02	4.31E-03	ND				ND			
Di-n-butyl phthalate	mg/L	NA	1.48E-01	NA	ND				ND			
Phenol	mg/L	NA	9.31E-01	NA	2.90E-03	B			ND			

Table 5-3

Groundwater Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Resident		FTA-170 FTA-170-MW02 CE3004 03-Jan-00				FTA-170 FTA-170-MW03 CE3005 03-Jan-00			
			Noncancer SSSL	Cancer SSSL	Result	Qual	>Bkg	>SSSL	Result	Qual	>Bkg	>SSSL
Metals												
Aluminum	mg/L	2.34E+00	1.56E+00	NA	2.15E-01	B			5.12E-01			
Barium	mg/L	1.27E-01	1.10E-01	NA	3.16E-02	J			2.99E-02	J		
Calcium	mg/L	5.65E+01	NA	NA	1.49E+02		YES		2.47E+02		YES	
Chromium	mg/L	NA	4.69E-03	NA	2.00E-03	J			ND			
Cobalt	mg/L	2.34E-02	9.39E-02	NA	ND				ND			
Copper	mg/L	2.55E-02	6.26E-02	NA	ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	NA	5.44E-01			YES	1.01E+00			YES
Lead	mg/L	8.00E-03	1.50E-02	NA	ND				ND			
Magnesium	mg/L	2.13E+01	NA	NA	8.67E+01		YES		1.32E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	NA	3.42E-01			YES	4.88E-01			YES
Nickel	mg/L	NA	3.13E-02	NA	2.10E-03	J			2.30E-03	J		
Potassium	mg/L	7.20E+00	NA	NA	4.36E+00	J			4.10E+00	J		
Sodium	mg/L	1.48E+01	NA	NA	5.99E+01		YES		9.25E+01		YES	
Thallium	mg/L	1.46E-03	1.02E-04	NA	ND				ND			
Vanadium	mg/L	1.70E-02	1.10E-02	NA	ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	NA	ND				6.90E-03	J		
Volatile Organic Compounds												
1,1-Dichloroethane	mg/L	NA	1.54E-01	NA	ND				ND			
Acetone	mg/L	NA	1.56E-01	NA	9.50E-04	B			ND			
Chloromethane	mg/L	NA	6.22E-03	3.93E-03	1.20E-04	J			ND			
Hexachlorobutadiene	mg/L	NA	3.07E-04	8.40E-04	ND				ND			
Semivolatile Organic Compounds												
bis(2-Ethylhexyl)phthalate	mg/L	NA	2.85E-02	4.31E-03	ND				ND			
Di-n-butyl phthalate	mg/L	NA	1.48E-01	NA	ND				ND			
Phenol	mg/L	NA	9.31E-01	NA	ND				ND			

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

[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] 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 stated method detection limit but less than or equal to specified reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not Detected.

Qual - Data Validation Qualifier.

Table 5-4

Surface Water Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Recreational Site Use Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Recreational Site Use Cancer SSSL	Ecological Screening Values (ESV)[b] USEPA Region IV Values	Ecological Screening Values (ESV)[b] Supp. Values	FTP-77 FTP-77-SW/SD02 HK2002 26-Jan-99 Result	Qual	>Bkg	>SSSL	>ESV	FTP-77 FTP-77-SW/SD03 HK2003 26-Jan-99 Result	Qual	>Bkg	>SSSL	>ESV	PPMP-75 PPMP-75-SW/SD09 KJ2010 25-Jan-99 Result	Qual	>Bkg	>SSSL	>ESV
Metals																					
Aluminum	mg/L	5.26E+00	1.53E+01	NA	8.70E-02	- -	3.26E-01				YES	2.95E-01				YES	6.88E-01				YES
Barium	mg/L	7.54E-02	1.10E+00	NA	no data	3.90E-03	4.03E-02	J			YES	3.89E-02	J			YES	3.21E-02	J			YES
Beryllium	mg/L	3.90E-04	1.75E-02	NA	5.30E-04	- -	ND					ND					1.50E-04	B			
Cadmium	mg/L	1.13E-03	6.81E-03	NA	6.60E-04	- -	2.10E-04	J				ND					ND				
Calcium	mg/L	2.52E+01	Essential Nutrient		no data	1.16E+02	4.01E+01		YES			4.53E+01		YES			2.11E+01				
Chromium	mg/L	1.11E-02	4.08E-02	NA	1.10E-02	- -	1.10E-03	J				ND					1.50E-03	B			
Copper	mg/L	1.27E-02	6.23E-01	NA	6.54E-03	- -	ND					ND					1.30E-03	J			
Iron	mg/L	1.96E+01	4.70E+00	NA	1.00E+00	- -	3.93E-01					3.41E-01					8.58E-01				
Lead	mg/L	8.67E-03	1.50E-02	NA	1.32E-03	- -	ND					ND					1.90E-03	B			YES
Magnesium	mg/L	1.10E+01	Essential Nutrient		no data	8.20E+01	1.43E+01		YES			1.83E+01		YES			5.55E+00				
Manganese	mg/L	5.65E-01	6.40E-01	NA	no data	8.00E-02	2.66E-02					1.36E-02	J				2.95E-02				
Potassium	mg/L	2.56E+00	Essential Nutrient		no data	5.30E+01	1.65E+00	B				1.50E+00	B				1.91E+00	J			
Selenium	mg/L	NA	7.82E-02	NA	5.00E-03	- -	ND					2.60E-03	B				ND				
Silver	mg/L	NA	7.90E-02	NA	1.20E-05	- -	5.30E-04	J			YES	ND					ND				
Sodium	mg/L	3.44E+00	Essential Nutrient		no data	6.80E+02	5.79E+00		YES			8.17E+00		YES			1.65E+00	J			
Vanadium	mg/L	1.52E-02	7.90E-02	NA	no data	1.90E-02	2.50E-03	J				ND					2.50E-03	B			
Zinc	mg/L	4.04E-02	4.65E+00	NA	5.89E-02	- -	1.37E-02	J				1.53E-02	J				8.50E-03	J			
Semivolatile Organic Compounds																					
bis(2-Ethylhexyl)phthalate	mg/L	NA	2.07E-01	5.17E-02	3.00E-04	- -	ND					4.80E-03	B			YES	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.

[b] 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 stated method detection limit but less than or equal to specified reporting limit.
mg/L - Milligrams per liter.
NA - Not available
ND - Not detected
Qual - Data validation qualifier

Table 5-5

Sediment Analytical Results
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Chemical	Units	Bkg[a]	Human Health Site-Specific Screening Levels (SSSL)[b] Recreational Site User Noncancer SSSL	Human Health Site-Specific Screening Levels (SSSL)[b] Recreational Site User Cancer SSSL	Ecological Screening Values (ESV)[b] USEPA Region IV Values	Ecological Screening Values (ESV)[b] Supp. Values	FTP-77 FTP-77-SW/SD02 HK1002 26-Jan-99 Start Depth = 0 End Depth = 0.5 Result	Qual	>Bkg	>SSSL	>ESV	FTP-77 FTP-77-SW/SD03 HK1003 26-Jan-99 Start Depth = 0 End Depth = 0.5 Result	Qual	>Bkg	>SSSL	>ESV	PPMP-75 PPMP-75-SW/SD09 KJ1011 25-Jan-99 Start Depth = 0 End Depth = 2.5 Result	Qual	>Bkg	>SSSL	>ESV
Metals																					
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	no data	no data	4.71E+03					5.94E+03					6.02E+03	J			
Antimony	mg/kg	7.30E-01	4.22E+02	NA	1.20E+01	- -	1.20E+00	J	YES			6.40E-01	J				4.70E-01	J			
Arsenic	mg/kg	1.13E+01	3.59E+02	5.58E+01	7.24E+00	- -	1.02E+01				YES	6.00E+00	J				3.70E+00				
Barium	mg/kg	9.89E+01	8.36E+04	NA	no data	no data	4.16E+01					2.89E+01	J				4.52E+01				
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	no data	no data	7.40E-01					7.40E-01					4.80E-01	J			
Cadmium	mg/kg	4.30E-01	1.71E+02	NA	1.00E+00	- -	ND					1.00E+00	J	YES			1.10E-01	J			
Calcium	mg/kg	1.11E+03	Essential Nutrient		no data	no data	1.30E+04	J	YES			1.99E+04	J	YES			1.29E+03	J	YES		
Chromium	mg/kg	3.12E+01	2.79E+03	NA	5.23E+01	- -	4.53E+01	J	YES			1.57E+01	J				1.05E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	NA	no data	5.00E+01	1.47E+01		YES			1.05E+01	J				6.30E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	NA	1.87E+01	- -	1.49E+01	J				1.84E+01	J	YES			1.37E+01				
Iron	mg/kg	3.53E+04	3.59E+05	NA	no data	no data	3.18E+04	J				2.44E+04	J				1.39E+04	J			
Lead	mg/kg	3.78E+01	4.00E+02	NA	3.02E+01	- -	2.24E+01					1.66E+01	J				2.34E+01	J			
Magnesium	mg/kg	9.06E+02	Essential Nutrient		no data	no data	7.75E+03	J	YES			1.31E+04	J	YES			7.84E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	no data	no data	5.84E+02					3.49E+02	J				5.25E+01	J			
Mercury	mg/kg	1.10E-01	2.99E+02	NA	1.30E-01	- -	ND					ND					7.00E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	NA	1.59E+01	- -	9.30E+00					1.47E+01		YES			7.60E+00				
Potassium	mg/kg	1.01E+03	Essential Nutrient		no data	no data	2.45E+02	J				2.54E+02	J				5.82E+02	J			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	no data	no data	1.40E+00		YES			8.00E-01	J	YES			8.60E-01		YES		
Sodium	mg/kg	6.92E+02	Essential Nutrient		no data	no data	3.45E+01	B				4.64E+01	B				3.62E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	no data	no data	2.75E+01					1.87E+01					1.84E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	NA	1.24E+02	- -	7.90E+01	J	YES			1.60E+02	J	YES		YES	4.48E+01	J			
Volatile Organic Compounds																					
Acetone	mg/kg	NA	1.03E+05	NA	no data	4.53E-01	ND					ND					1.60E-02	J			
Methylene chloride	mg/kg	NA	6.33E+04	9.84E+03	no data	1.26E+00	3.60E-03	B				3.10E-03	B				2.40E-03	B			
Semivolatile Organic Compounds																					
Anthracene	mg/kg	NA	2.99E+05	NA	3.30E-01	- -	ND					ND					7.50E-02	J			
Benzo(a)anthracene	mg/kg	NA	NA	8.93E+01	3.30E-01	- -	ND					8.80E-02	J				4.40E-01	J			YES
Benzo(a)pyrene	mg/kg	NA	NA	8.93E+00	3.30E-01	- -	ND					6.90E-02	J				6.40E-01				YES
Benzo(b)fluoranthene	mg/kg	NA	NA	8.93E+01	6.55E-01	- -	5.50E-02	J				9.70E-02	J				8.00E-01				YES
Benzo(ghi)perylene	mg/kg	NA	2.79E+04	NA	6.55E-01	- -	ND					ND					4.00E-01	J			
Benzo(k)fluoranthene	mg/kg	NA	NA	8.93E+02	6.55E-01	- -	ND					ND					3.20E-01	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	2.17E+04	5.41E+03	1.82E-01	- -	6.10E-02	B				1.00E-01	B				ND				
Chrysene	mg/kg	NA	NA	9.79E+03	3.30E-01	- -	ND					1.00E-01	J				4.80E-01	J			YES
Dibenz(a,h)anthracene	mg/kg	NA	NA	9.79E+00	3.30E-01	- -	ND					ND					1.10E-01	J			
Fluoranthene	mg/kg	NA	3.73E+04	NA	3.30E-01	- -	ND					2.20E-01	J				5.90E-01				YES
Fluorene	mg/kg	NA	3.73E+04	NA	3.30E-01	- -	ND					4.80E-02	J				ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	NA	8.93E+01	6.55E-01	- -	ND					ND					3.70E-01	J			
Phenanthrene	mg/kg	NA	2.79E+05	NA	3.30E-01	- -	ND					2.40E-01	J				2.00E-01	J			
Pyrene	mg/kg	NA	3.06E+04	NA	3.30E-01	- -	ND					1.80E-01	J				5.30E-01	J			YES
Pesticides																					
4,4'-DDD	mg/kg	NA	NA	2.35E+02	3.30E-03	- -	2.50E-03	J				ND					ND				
4,4' DDE	mg/kg	NA	NA	1.66E+02	3.30E-03	- -	ND					ND					4.50E-03				YES
4,4'-DDT	mg/kg	NA	4.03E+02	1.66E+02	3.30E-03	- -	3.10E-03	J				ND					ND				

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

[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] 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 stated method detection limit but less than or equal to specified reporting limit.
mg/kg = Milligrams per kilogram.
NA - Not Analyzed
ND - Not Detected
Qual - Data Validation Qualifier

Metals. Twenty metals were detected in surface soil samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). All of the detected metals except selenium were present in the sample collected from location FTA-170-MW01.

The concentrations of six metals (aluminum, arsenic, chromium, iron, manganese, and thallium) exceeded residential human health SSSLs. However, with the exception of aluminum in one sample (FTA-170-MW03), the concentrations of these metals were within background concentrations. The aluminum concentration at sample location FTA-170-MW03 exceeded human health SSSLs, ESVs, and background concentrations but was within the range of background values determined by SAIC (1998). Aluminum (one location), lead (one location), and zinc (four locations) were detected at concentrations exceeding ESVs and background concentrations; however, these metals concentrations were within the range of background values.

Volatile Organic Compounds. Eight VOCs, including 1,1,1-trichloroethane, 2-butanone, acetone, benzene, carbon disulfide, methylene chloride, toluene, and trichlorofluoromethane, were detected in surface soil samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The 1,1,1-trichloroethane, acetone, 2-butanone, and methylene chloride results were flagged with a "B" data qualifier signifying that these compounds were also detected in an associated laboratory or field blank. In addition, the toluene results were flagged with a "J" data qualifier signifying that the result is greater than the method detection limit but less than the specified reporting limit. Benzene (FTA-170-GP01), carbon disulfide (FTP-77-GP02), and trichlorofluoromethane (FTA-170-MW02) were each detected in only one sample.

None of the VOCs detected in surface soils was present at a concentration exceeding residential human health SSSLs or ESVs.

Semivolatile Organic Compounds. Fourteen SVOCs were detected in surface soil samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Three of the bis(2-ethylhexyl)phthalate results were flagged with a "B" data qualifier signifying that the compound was also detected in an associated laboratory or field blank. The remaining SVOC analytical results were flagged with a "J" data qualifier signifying that the result is greater than the method detection limit but less than the specified reporting limit. Sample location FTP-170-MW03 contained 12 of the 14 detected SVOCs. SVOCs were not detected at sample location FTP-170-MW01.

The concentration of benzo(a)pyrene exceeded residential human health SSSLs and ESVs at sample location FTA-170-MW03. Fluoranthene (FTP-77-GP03 and FTA-170-MW03) and pyrene (FTA-170-MW03) concentrations exceeded ESVs but were below residential human health SSSLs. However, none of these SVOCs was present at a concentration exceeding PAH background screening values for soils collected adjacent to asphalt.

5.2 Subsurface Soil Sample Results

Twelve subsurface soil samples were collected for chemical analyses at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(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 background concentrations, as presented in Table 5-2.

Metals. Twenty-one metals were detected in subsurface soils at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The concentrations of six metals (aluminum, antimony, arsenic, chromium, iron, and manganese) exceeded residential human health SSSLs in subsurface soils. Of these metals, aluminum (six locations), antimony (one location), and iron (two locations) concentrations also exceeded background concentrations. However, the aluminum concentrations were within the range of background values; the iron and antimony concentrations slightly exceeded the range of background values but were within the same order of magnitude.

Volatile Organic Compounds. Six VOCs, including 1,1,1-trichloroethane, 4-methyl-2-pentanone, 2-butanone, acetone, methylene chloride, and toluene, were detected in subsurface soil samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The acetone, 2-butanone, methylene chloride, and 1,1,1-trichloroethane analytical results were flagged with a "B" data qualifier signifying that these compounds were also detected in an associated laboratory or field blank. Toluene (FTA-170-MW02), 2-butanone (FTP-77-GP07), and 4-methyl-2-pentanone (FTA-170-MW02) were each detected in only one of the samples. Sample location FTA-170-MW02 contained five of the six detected VOCs.

None of the detected VOCs was present at a concentration exceeding residential human health SSSLs.

Semivolatile Organic Compounds. The SVOCs bis(2-ethylhexyl)phthalate (five locations) and butyl benzyl phthalate (one location) were detected in subsurface soils. The bis(2-ethylhexyl)phthalate and butyl benzyl phthalate concentrations were below residential human

health SSSLs.

5.3 Groundwater Sample Results

Four temporary monitoring wells and three permanent monitoring wells were sampled at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Sample locations are shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and background concentrations, as presented in Table 5-3.

Metals. Sixteen metals were detected in unfiltered groundwater samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Cobalt (FTA-170-MW01), copper (FTP-77-GP03), and lead (FTP-77-GP04) were each detected in only one of the samples. Thallium was detected in the samples from FTP-77-GP01 and FTP-77-GP02 but the results were flagged with a "B" data qualifier signifying that thallium was also detected in an associated laboratory or field blank.

The concentrations of five metals (aluminum, iron, manganese, thallium, and vanadium) exceeded residential human health SSSLs in groundwater. With the exception of vanadium (four locations) and thallium (one location), the concentrations of these metals were within the range of background values determined by SAIC (1998). The vanadium and thallium results were within the same order of magnitude as background concentrations.

Volatile Organic Compounds. Acetone, chloromethane, hexachlorobutadiene, and 1,1-dichloroethane were detected in groundwater samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Acetone was detected in the samples from FTP-77-GP02 and FTP-77-GP04; however, the analytical results were flagged with a "B" data qualifier signifying the acetone was also detected in an associated laboratory or field blank. Hexachlorobutadiene (FTP-77-GP02) and 1,1-dichloroethane (FTP-77-GP04) were each detected in only one of the samples.

None of the detected VOCs was present at a concentration exceeding residential human health SSSLs.

Semivolatile Organic Compounds. The SVOCs bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, and phenol were detected in groundwater samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The phenol results were flagged with a "B" data qualifier signifying that phenol was also detected in an associated laboratory or field blank.

Bis(2-ethylhexyl)phthalate was detected at only one sample location (FTP-77-GP03). The sample collected at location FTP-77-GP03 contained all of the detected SVOCs.

None of the detected SVOCs was present at a concentration exceeding residential human health SSSLs.

5.4 Surface Water Sample Results

Three surface water samples were collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and background concentrations, as presented in Table 5-4.

Metals. Seventeen metals were detected in unfiltered surface water samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Beryllium (PPMP-75-SW/SD09), cadmium (FTP-77-SW/SD02), copper (PPMP-75-SW/SD09), lead (PPMP-75-SW/SD09), selenium (FTP-77-SW/SD03), and silver (FTP-77-SW/SD02) were each detected in only one of the samples. The beryllium, lead, and selenium results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank.

None of the metals detected in surface water samples was present at a concentration exceeding recreational site user human health SSSLs. The concentrations of aluminum (three locations), barium (three locations), lead (one location), and silver (one location) exceeded ESVs but were below recreational site user human health SSSLs and background concentrations.

Volatile Organic Compounds. VOCs were not detected in the surface water samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7).

Semivolatile Organic Compounds. The SVOC bis(2-ethylhexyl)phthalate was detected in the surface water sample from FTP-77-SW/SD03. The analytical result was flagged with a "B" data qualifier signifying that bis(2-ethylhexyl)phthalate was also detected in an associated laboratory or field blank.

The bis(2-ethylhexyl)phthalate concentration at sample location FTP-77-SW/SD03 exceeded the ESV but was below recreational site user human health SSSLs.

5.5 Sediment Sample Results

Three sediment samples were collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and background concentrations, as presented in Table 5-5.

Metals. Twenty-one metals were detected in sediment samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The sodium analytical results were flagged with a "B" data qualifier signifying that sodium was also detected in an associated laboratory or field blank. The sample collected at location PPMP-75-SW/SD09 contained all of the detected metals.

None of the metals detected in sediment samples was present at a concentration exceeding recreational site user human health SSSLs. Arsenic (one location) and zinc (one location) concentrations exceeded ESVs. The arsenic concentration was within the background concentration. The zinc concentration (160 milligrams per kilogram [mg/kg]) exceeded the range of background values (6 mg/kg to 111 mg/kg) but was within the same order of magnitude.

Volatile Organic Compounds. Acetone and methylene chloride were detected in the sediment samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). Acetone was detected in only one sample (PPMP-75-SW/SD09) and the analytical result was flagged with a "J" data qualifier signifying that the result is greater than the method detection limit but less than the specified reporting limit. Methylene chloride was detected in each of the sediment samples; however, the results were flagged with a "B" data qualifier signifying that methylene chloride was also detected in an associated laboratory or field blank.

The acetone and methylene chloride concentrations were below recreational site user human health SSSLs and ESVs.

Semivolatile Organic Compounds. Fourteen SVOCs were detected in the sediment samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The SVOC bis(2-ethylhexyl)phthalate was detected in the samples from FTP-77-SW/SD02 and FTP-77-SW/SD03; however, the analytical results were flagged with a "B" data qualifier signifying that bis(2-ethylhexyl)phthalate was also detected in an associated laboratory or field blank. The sample collected at location PPMP-75-SW/SD09 contained twelve of the fourteen detected SVOCs.

The concentrations of six SVOCs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, chrysene, fluorene, and pyrene) at sample location PPMP-75-SW/SD09 exceeded ESVs but were below recreational site user human health SSSLs.

Pesticides. The pesticides 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected in sediment samples collected at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The 4,4'-DDD and 4,4'-DDT concentrations were below recreational site user SSSLs and ESVs. The 4,4'-DDE concentration at sample location PPMP-75-SW/SD09 exceeded the ESV but was below the recreational site user human health SSSL.

6.0 Summary and Conclusions and Recommendations

IT, under contract with USACE, completed an SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7) at FTMC, Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7) and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7) consisted of the sampling and analyses of surface soil samples, subsurface soil samples, and groundwater samples. In addition, four temporary and three permanent monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

IT collected seven surface soil samples, twelve subsurface soil samples, seven groundwater samples, and three surface water and sediment samples during the SI at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7). The analytical results indicate that metals, VOCs, SVOCs, and pesticides were detected in the environmental media sampled. Analytical results were compared to the draft human health SSSLs and ESVs for FTMC. The draft 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 soils were compared to PAH background screening values (IT, 2000b). The results are summarized as follows:

- Aluminum, arsenic, chromium, iron, manganese, and thallium were detected in surface soils at concentrations exceeding residential human health SSSLs. Several metals were detected in surface soils at concentrations exceeding ESVs. However, the metals concentrations that exceeded SSSLs and ESVs were within background concentrations or the range of background values. The SVOC benzo(a)pyrene was detected in one surface soil sample at a concentration exceeding residential human health and ESVs but below the PAH background value. The SVOCs fluoranthene and pyrene were detected at concentrations exceeding ESVs but below residential human health SSSLs.

- Aluminum, antimony, arsenic, chromium, iron, and manganese were detected in subsurface soils at concentrations exceeding residential human health SSSLs. With the exception of iron and antimony in one sample each, these metals concentrations

were within the range of background concentrations. VOCs and SVOCs were not detected in subsurface soils at concentrations exceeding residential human health SSSLs.

- Aluminum, manganese, thallium, and vanadium were detected in groundwater samples at concentrations exceeding residential human health SSSLs and background concentrations. VOCs and SVOCs were not detected in groundwater at concentrations exceeding residential human health SSSLs.

- None of the metals detected in surface water was present at a concentration exceeding recreational site user human health SSSLs. Aluminum, barium, lead, and silver concentrations exceeded ESVs but were within background concentrations. The SVOC bis(2-ethylhexyl)phthalate was detected in one surface water sample at a concentration exceeding the ESV.

- None of the metals detected in sediment was present at a concentration exceeding residential human health SSSLs. Arsenic and zinc concentrations exceeded ESVs. Six SVOCs and the pesticide 4,4'-DDE were detected in one sediment sample at concentrations exceeding ESVs but below residential human health SSSLs.

The potential impact to human receptors is also expected to be minimal. Iron (one subsurface soil sample), antimony (one subsurface soil sample), vanadium (four groundwater samples), and thallium (one groundwater sample) were detected at concentrations exceeding SSSLs and slightly above background values. The remaining metals concentrations were within background concentrations or the range of background values determined by SAIC (1998). The SVOC benzo(a)pyrene was detected in one surface soil sample at a concentration exceeding residential human health SSSLs. However, the benzo(a)pyrene concentration was below the PAH background screening value. Although the site is projected for industrial land use, screening soils and groundwater analytical results against the more conservative residential human health SSSLs indicates the potential threat to human health to be very low in the residential scenario, as well, should the land use change. In the industrial land use scenario, the potential threat to human health is reasonably expected to be negligible.

Aluminum and zinc were detected in site media at concentrations exceeding ESVs and background concentrations. In addition, six SVOCs and the pesticide 4,4'-DDE were detected in site media at concentrations exceeding ESVs. However, the potential impact to ecological receptors is expected to be minimal based on the existing viable habitat. The site is a well-developed area and is projected for continued industrial use. Consequently, viable ecological habitat is not expected to increase. Under the industrial land use scenario, substantial ecological

habitat is not expected to be present and, consequently, is reasonably expected to be minimally impacted.

Based on the results of the SI, past operations at Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health and the environment in either the industrial or residential land use scenario. Therefore, IT recommends "No Further Action" and unrestricted use with regards to hazardous, toxic, and radiological waste at the Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7).

7.0 References

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APPENDIX A

SAMPLE COLLECTION LOGS

APPENDIX B

BORING LOGS AND WELL LOGS

APPENDIX C

WELL DEVELOPMENT LOGS

APPENDIX D

SURVEY DATA

Appendix D

Survey Data
Former Fire Training Pit, Parcels 77(7), 7(7), and 170(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)
FTP-77-GP01(W)	1172410.272	672440.086	789.560	789.66
FTP-77-GP01(SS)	1172416.535	672409.041	789.012	NA
FTP-77-GP02(W)	1172227.277	672251.933	787.780	789.79
FTP-77-GP02(SS)	1172283.528	672212.157	784.645	NA
FTP-77-GP03(W)	1172155.811	672137.287	787.780	788.77
FTP-77-GP03(SS)	1172197.241	672099.353	786.032	NA
FTP-77-GP04	1172065.192	672426.730	790.920	790.92
FTP-77-GP05	1172071.266	672667.565	790.428	NA
FTP-77-GP06	1172271.345	672573.165	790.148	NA
FTP-77-GP07	1172286.315	672329.665	789.568	NA
FTP-77-GP08	1172155.466	672694.915	789.998	NA
FTP-77-SW/SD02	1171928.656	672659.485	786.598	NA
FTP-77-SW/SD03	1172312.600	672152.210	778.240	NA
FTA-170-MW01	1171929.587	672337.862	790.095	789.87
FTA-170-MW02	1171887.483	672319.825	790.677	790.49
FTA-170-MW03	1171925.485	672229.368	786.030	785.85
FTA-170-GP01	1171869.568	672338.176	790.655	NA
PPMP-75-SW/SD09	1171875.666	672605.725	789.718	NA

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

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

ft msl - Feet mean sea level
NA - Not available, temporary well not installed.

APPENDIX E

SUMMARY OF VALIDATED ANALYTICAL DATA

APPENDIX F

DATA VALIDATION SUMMARY REPORTS

APPENDIX G

VARIANCES/NONCONFORMANCES

APPENDIX H

SUMMARY STATISTICS FOR BACKGROUND MEDIA, FORT MCCLELLAN, ALABAMA

ATTACHMENT I

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	Amber
ANAD	Anniston Army Depot
APT	armor piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report, July 1999
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare materials, clear wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300 Site
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	fire training area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion

List of Abbreviations and Acronyms (Continued)

Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
IT	IT Corporation
ITEMS	IT Environmental Management System ™
J	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimer
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	milliSiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchlorethene
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
R	rejected
RCRA	Resource Conservation and Recovery Act
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone
SEMS	Southern Environmental Management & Specialties
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
sm	silty sands; sand-silt mixtures
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list

TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisoproplaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards