

Final

Site Investigation Report
Former Smoke Area S, Parcel 106(6)

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 completed a site investigation (SI) at Former Smoke Area S, Parcel 106(6), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at Former Smoke Area S, Parcel 106(6), consisted of the sampling and analysis of two surface soil samples, four depositional soil samples, two subsurface soil samples, and four surface water and sediment samples.

Chemical analysis of samples collected at Former Smoke Area S, Parcel 106(6), indicates that metals, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) were detected in the environmental media sampled. To evaluate whether the detected constituents present an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

The potential threat to human receptors is expected to be low. Although the site is located within an undeveloped area of the Main Post and is projected for passive recreational use, the soils data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. With the exception of thallium in one surface water sample, the metals results that exceeded SSSLs were below their respective background concentration or within the range of background values determined by Science Applications International Corporation in the 1998 *Final Background Metals Survey Report*. Thallium was not detected in any of the other samples collected at the site and is not known to have been used in operations conducted at the site. Consequently, thallium is probably not a site-related contaminant. VOC and SVOC concentrations in site media were below SSSLs.

The potential impact to ecological receptors is also expected to be minimal. The concentrations of six metals (beryllium, lead, manganese, mercury, selenium, and zinc) exceeded ESVs and their respective background concentrations in surface and depositional soil samples at Parcel 106(6). With the exception of beryllium (at two locations) and zinc (at one location), these metals concentrations were within the range of background values determined by Science Applications International Corporation.

The VOCs trichlorofluoromethane (in two sediment samples) and acetone (in one sediment sample) were detected at concentrations exceeding ESVs. The SVOCs fluoranthene and pentachlorophenol were detected in one surface soil sample at concentrations exceeding the ESVs. However, the low levels and limited distribution of the VOCs and SVOCs detected are not expected to pose a substantial threat to ecological receptors.

Groundwater was not investigated at Former Smoke Area S, Parcel 106(6); impacts to groundwater are not anticipated from site-related smoke training activities. However, a groundwater contamination has been detected at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), located approximately 1,600 feet northwest of Former Smoke Area S. This contamination is being addressed as part of a remedial investigation currently being conducted at that site.

Although site-related impacts to groundwater are not anticipated at Former Smoke Area S, Parcel 106(6), off-site contamination from Training Area T-38 could impact groundwater at the site. Therefore, potential impacts to Former Smoke Area S, Parcel 106(6), cannot be positively identified until the completion of the remedial investigation at Parcel 186(6).

Based on the results of the SI, past operations at Former Smoke Area S, Parcel 106(6), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT Corporation recommends “No Further Action” and unrestricted reuse with regard to hazardous, toxic, and radioactive waste at Former Smoke Area S, Parcel 106(6).

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 contracted with IT Corporation (IT) to perform the site investigation (SI) at Former Smoke Area S, Parcel 106(6), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from the SI, including field sampling and analysis, conducted at Former Smoke Area S, Parcel 106(6).

1.1 Project Description

Former Smoke Area S was identified as an area to be investigated prior to property transfer. The site was classified as a Category 6 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 6 sites are areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in October 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at Former Smoke Area S, Parcel 106(6). The SFSP was used in conjunction with the SSHP as an attachment to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included fieldwork to collect two surface soil samples, four depositional soil samples, two subsurface soil samples, and four surface water and sediment samples to determine whether potential site-specific chemicals are present at the site and to provide data useful for supporting any future corrective measures and closure activities.

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Former Smoke Area S, Parcel 106(6), at concentrations that present an unacceptable risk to human health or the environment. The conclusions in Chapter 6.0 of this report are based on comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide either to propose “No Further Action” at the site or to conduct additional work at the site.

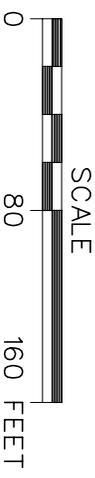
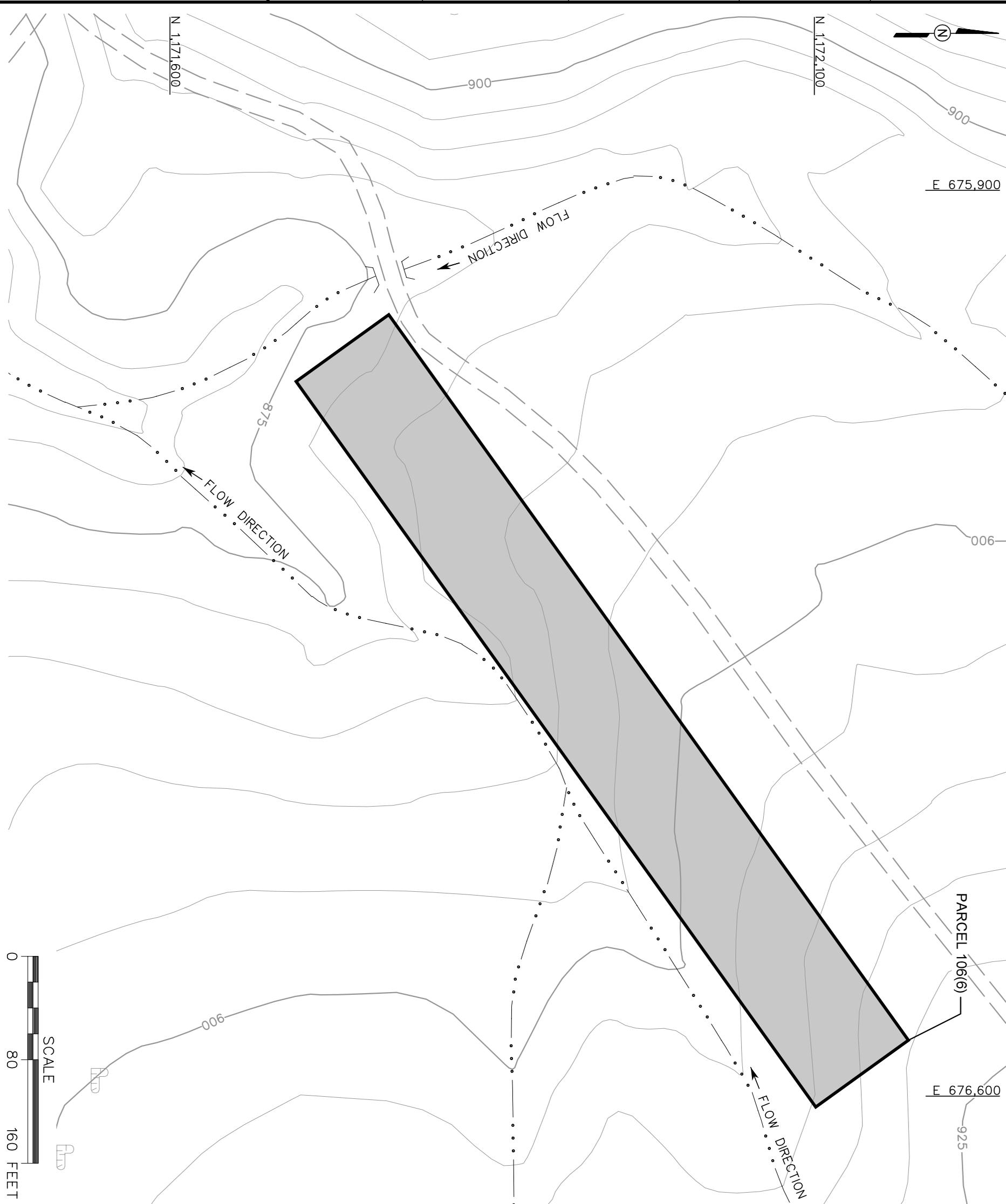
1.3 Site Description and History

Former Smoke Area S is located in the north-central part of the Main Post of FTMC (Figure 1-1). The parcel, which covers slightly more than 1 acre, is approximately 80 feet wide (southeast to northwest) and 700 feet long (northeast to southwest). The site and surrounding area are mostly undeveloped or wooded.

Former Smoke Area S was used from 1952 to 1970. Training activities conducted at the site involved the use of smoke-generating equipment and fog oil. Smoke Areas R and S are evident on historical aerial photographs from September 1964. Smoke Area S was the primary training ground; nearby Smoke Area R was only used when Smoke Area S was occupied. Several old and new oil filters (for vehicles) were observed on the ground during the EBS site visit. Several smoke canisters were observed on the ground by IT during a site visit in April 1998. There are no buildings or structures at the site; however, pieces of cinder block and metal were visible around the site and may have been previously used as fog oil drum racks.

An unnamed intermittent stream flows from northeast to southwest along the southeast border of the site. Another unnamed intermittent stream flows from north to south near the northwestern border of the site. Shallow groundwater at the site is probably controlled by surface drainage

and/or topography. Site elevation is approximately 880 to 915 feet above mean sea level. Figure 1-2 is a site map showing topographic features and site boundaries.



- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK

FIGURE 1-2
SITE MAP
FORMER SMOKE AREA S
PARCEL 106(6)

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



2.0 Previous Investigations

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

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

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management, 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 historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and

military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Former Smoke Area S was identified as a CERFA Category 6 site: areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented. There have not been any other investigations identified for Former Smoke Area S.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at Former Smoke Area S, Parcel 106(6), including unexploded ordnance (UXO) avoidance and environmental sampling and analysis activities.

3.1 UXO Avoidance

Because Former Smoke Area S falls within the “Possible Explosive Ordnance Impact Area” (USACE, 1998), IT performed UXO avoidance at the site following methodology outlined in Section 4.1.7 of the SAP (IT, 2000a). IT UXO personnel used a Schonstedt Heliflux Magnetic Locator to perform a surface sweep of the parcel prior to site access. After the parcel was cleared for access, sample locations were cleared using a Foerster Ferex Electromagnetic Detector following procedures outlined in Section 4.1.7.3 of the SAP (IT, 2000a).

3.2 Environmental Sampling

The environmental sampling performed during the SI at Former Smoke Area S, Parcel 106(6), included the collection of surface and depositional soil samples, subsurface soil samples, and surface water and sediment samples for chemical analysis. The sample locations were determined by observing site physical characteristics during a site walkover, by reviewing historical documents pertaining to activities conducted at the site, and based on UXO avoidance activities. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from two locations, and depositional soil samples were collected from four locations at Former Smoke Area S, Parcel 106(6), as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, site topography, and buried utilities.

Sample Collection. Surface and depositional soil samples were collected from the upper 1 foot of soil with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). Surface and depositional soil samples were collected by

Table 3-1

**Sampling Locations and Rationale
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

Sample Designation	Media Sampled	Sample Location Rationale
FTA-106-GP01	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected at the middle of the parcel along the foot trail and near the stream, and near probable former smoke generator or fog oil storage points. Smoke canisters observed at this location.
FTA-106-GP02	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected along the southeast boundary of the study parcel, near probable former smoke generator or fog oil storage points. Smoke canisters observed at this location.
FTA-106-SW/SD01	Surface Water Sediment	Surface water and sediment samples were collected from the intermittent stream along the southeast parcel boundary, hydrologically upgradient of the site.
FTA-106-SW/SD02	Surface Water Sediment	Surface water and sediment samples were collected from the intermittent stream along the southeast parcel boundary.
FTA-106-SW/SD03	Surface Water Sediment	Surface water and sediment samples were collected from the intermittent stream along the southeast parcel boundary, hydrologically downgradient of the parcel.
FTA-106-SW/SD04	Surface Water Sediment	Surface water and sediment samples were collected from the intermittent stream along the southeast parcel boundary near the intermittent streams confluence, downgradient of the parcel.
FTA-106-DEP01	Depositional Soil	A depositional soil sample was collected downslope of the entrance point of the access road to the parcel. Sampling location represents the most likely location for deposition of material eroded from the access road or road embankment.
FTA-106-DEP02	Depositional Soil	A depositional soil sample was collected downslope of the site, near the confluence of two intermittent streams.
FTA-106-DEP03	Depositional Soil	A depositional soil sample was collected downslope of the parcel near the intermittent stream along the southeast parcel boundary.
FTA-106-DEP04	Depositional Soil	A depositional soil sample was collected just to the east of the intermittent stream outside the parcel boundary.

Table 3-2

**Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Samples
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-106-GP01	FTA-106-GP01-SS-FV0001-REG FTA-106-GP01-DS-FV0002-REG	0-1 1-3			FTA-106-GP01-DS-FV0002-MS FTA-106-GP01-DS-FV0002-MSD	TCL VOCs, TCL SVOCs, TAL Metals
FTA-106-GP02	FTA-106-GP02-SS-FV0003-REG FTA-106-GP02-DS-FV0006-REG	0-1 7-8.5	FTA-106-GP02-SS-FV0004-FD	FTA-106-GP02-SS-FV0005-FS		TCL VOCs, TCL SVOCs, TAL Metals
FTA-106-DEP01	FTA-106-DEP01-DEP-FV0007-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
FTA-106-DEP02	FTA-106-DEP02-DEP-FV0008-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
FTA-106-DEP03	FTA-106-DEP03-DEP-FV0009-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
FTA-106-DEP04	FTA-106-DEP04-DEP-FV0010-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals

FD - Field duplicate.

FS - Field split.

ft. bgs - Feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

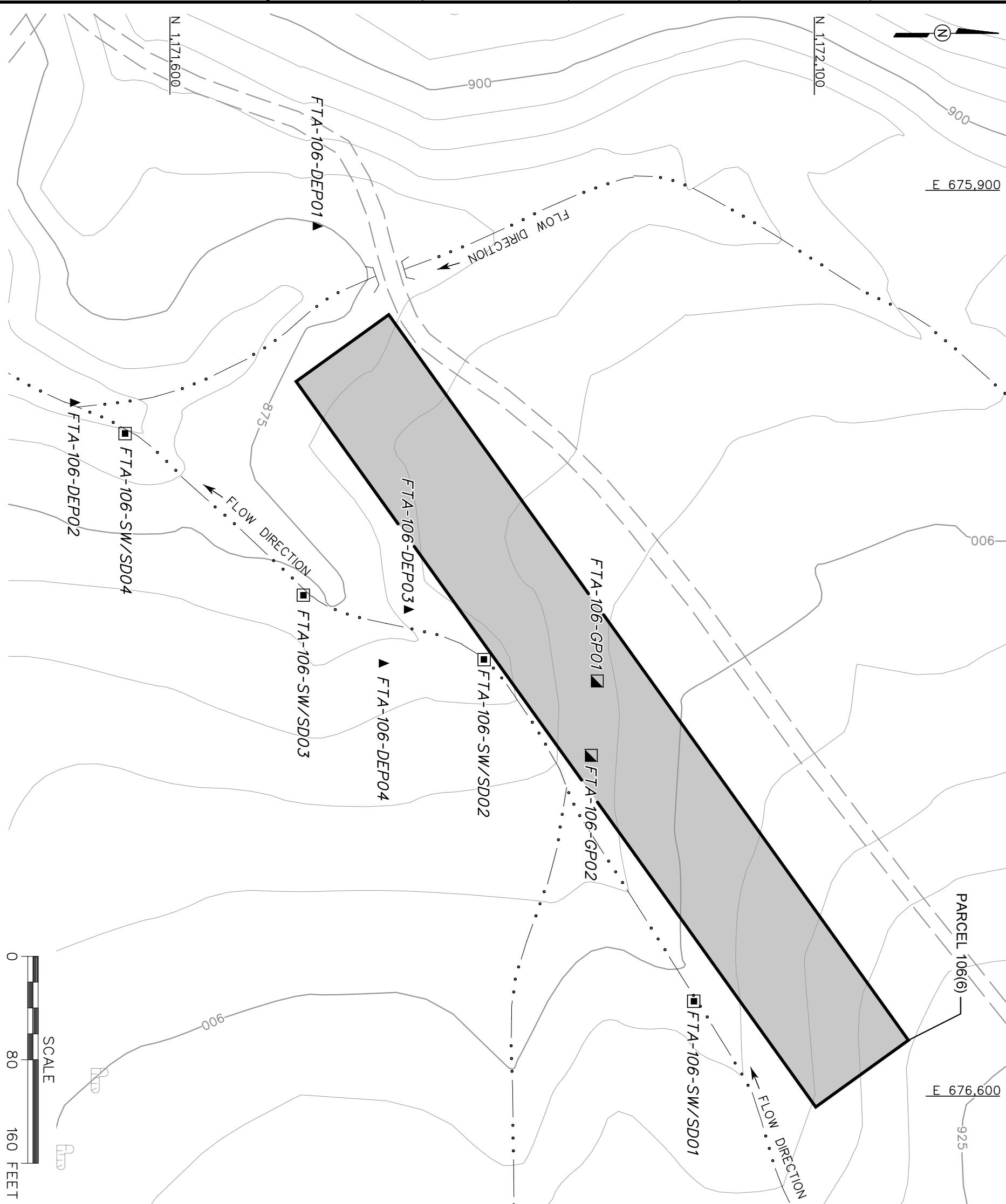
QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.



- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK
 - SURFACE WATER/SEDIMENT SAMPLE LOCATION
 - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - DEPOSITIONAL SOIL SAMPLE LOCATION

FIGURE 3-1
SAMPLE LOCATION MAP
FORMER SMOKE AREA S
PARCEL 106(6)

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



first removing surface debris, such as rocks or vegetation, from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP (IT, 2000a). Samples for volatile organic compound (VOC) 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. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4. Sample collection logs are included in Appendix A.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from two soil borings at Former Smoke Area S, Parcel 106(6), 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 UXO avoidance activities, sampling rationale, presence of surface structures, site topography, and buried and overhead utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from soil borings at depths 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 3.4.

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

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

3.2.3 Surface Water Sampling

Four surface water samples were collected at Former Smoke Area S, Parcel 106(6), at the locations shown on Figure 3-1. The surface water sampling locations and rationale are listed in Table 3-1. Surface water sample designations and QA/QC samples are listed in Table 3-3. 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). The surface water samples were collected by dipping a stainless-steel pitcher in the water and pouring the water into the sample containers or by dipping the sample containers in the water and allowing the water to fill the sample containers. Surface water samples were collected after field parameters (specific conductivity, dissolved oxygen, oxidation-reduction potential, temperature, turbidity, and pH) had been measured using a calibrated water-quality unit. Surface water field parameters are listed in Table 3-4. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.4.

3.2.4 Sediment Sampling

Four sediment samples were collected at the same locations as the surface water samples presented in Section 3.2.3, as shown on Figure 3-1. Sediment sampling locations and rationale are presented in Table 3-1. The sediment sample designations and QA/QC samples are listed in Table 3-3. The actual sediment sampling locations were determined in the field, based on drainage pathways and actual field observations.

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

Table 3-3

**Surface Water and Sediment Sample Designations and QA/QC Samples
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
FTA-106-SW/SD01	FTA-106-SW/SD01-SW-FV2001-REG	NA	FTA-106-SW/SD01-SW-FV2002-FD	FTA-106-SW/SD01-SW-FV2003-FS		TCL VOCs, TCL SVOCs, TAL Metals
	FTA-106-SW/SD01-SD-FV1001-REG	0-0.5				TCL VOCs, SVOCs, TAL Metals, TOC, Grain size
FTA-106-SW/SD02	FTA-106-SW/SD02-SW-FV2004-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-106-SW/SD02-SD-FV1002-REG	0-0.5				TCL VOCs, SVOCs, TAL Metals, TOC, Grain size
FTA-106-SW/SD03	FTA-106-SW/SD03-SW-FV2005-REG	NA			FTA-106-SW/SD03-SW-FV2005-MS	TCL VOCs, TCL SVOCs, TAL Metals
	FTA-106-SW/SD03-SD-FV1003-REG	0-0.5			FTA-106-SW/SD03-SW-FV2005-MSD	TCL VOCs, SVOCs, TAL Metals, TOC, Grain size
FTA-106-SW/SD04	FTA-106-SW/SD04-SW-FV2006-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals
	FTA-106-SW/SD04-SD-FV1004-REG	0-0.5				TCL VOCs, SVOCs, TAL Metals, TOC, Grain size

FD -Field duplicate.

FS - Field split.

ft. bgs - Feet below ground surface.

MS/MSD - Matrix spike/matrix spike duplicate.

NA - Not applicable.

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.

Table 3-4

**Surface Water Field Parameters
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Date	Specific Conductivity (mS/cm)^a	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
FTA-106-SW/SD01	15-Feb-99	0.019	8.38	274.7	13.81	0.2	4.98
FTA-106-SW/SD03	15-Feb-99	0.020	7.24	325.4	11.96	1.2	4.53
FTA-106-SW/SD04	11-Feb-99	0.020	7.09	341.0	14.53	20.5	4.31

^a Specific conductivity values standardized to milliSiemens per centimeter.

°C - Degrees Celsius.

mg/L - Milligrams per liter.

mS/cm - MilliSiemens per centimeter.

mV - Millivolts.

NTU - Nephelometric turbidity unit.

ORP - Oxidation-reduction potential.

SU - Standard unit.

3.3 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 of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix C.

3.4 Analytical Program

Samples collected during the SI were analyzed for various chemical and physical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the site and EPA, Alabama Department of Environmental Management, FTMC, and USACE requirements. The samples collected at Former Smoke Area S, Parcel 106(6) were analyzed for the following parameters:

- Target compound list VOCs – EPA Method 5035/8260B
- Target compound list semivolatile organic compounds (SVOC) – EPA Method 8270C
- Target analyte list metals – EPA Method 6010B/7000
- Total organic carbon (TOC) – EPA Method 9060 (sediment only)
- Grain size – American Society for Testing and Materials Method D421/D422 (sediment only).

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

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Section 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custody records 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 the USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated during the SI at Former Smoke Area S, Parcel 106(6) was segregated as follows:

- Soil boring cuttings
- Personal protective equipment
- Decontamination fluids.

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

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

3.7 Variances/Nonconformances

There were not any variances or nonconformances to the SFSP recorded during completion of the SI at Former Smoke Area S, Parcel 106(6).

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix D. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and quality assurance plan; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix E consists of a data validation summary report that was prepared to discuss the results of the validation. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparisons to the SSSLs and ESVs. Rejected data (assigned an ‘R’ qualifier) were not used in comparisons to the SSSLs and ESVs.

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

4.0 Site Characterization

Subsurface investigations performed at Former Smoke Area S, Parcel 106(6), provided soil data used to characterize the geology of the site. Because there were not any wells installed at Parcel 106(6), a hydrogeological characterization was not performed.

4.1 Regional and Site Geology

4.1.1 Regional Geology

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

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

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

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

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

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

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

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

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

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

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

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

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

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

the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

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

4.1.2 Site Geology

Soils at Former Smoke Area S, Parcel 106(6), fall into the Montevallo series. Montevallo series soils are severely eroded, shaly, silty clay soils that have been formed by erosional forces, surface runoff, or natural reworking processes. These soils have a high erosion hazard and low capacity for available moisture (U.S. Department of Agriculture, 1961).

Former Smoke Area S, Parcel 106(6), is situated to the east of the Ordovician window in the uppermost thrust sheet, with the Jacksonville Fault just west of the site and a splay fault just east of the site (Figure 4-1). Bedrock beneath the site is mapped as Cambrian Shady Dolomite.

Based on direct-push soil boring data collected during the SI, residuum beneath the site consists predominantly of clay and silt overlying variegated weathered shale. Direct-push refusal was encountered at depths ranging from 3 to 8.5 feet bgs. Competent bedrock was not encountered during direct-push sampling.

4.2 Site Hydrology

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

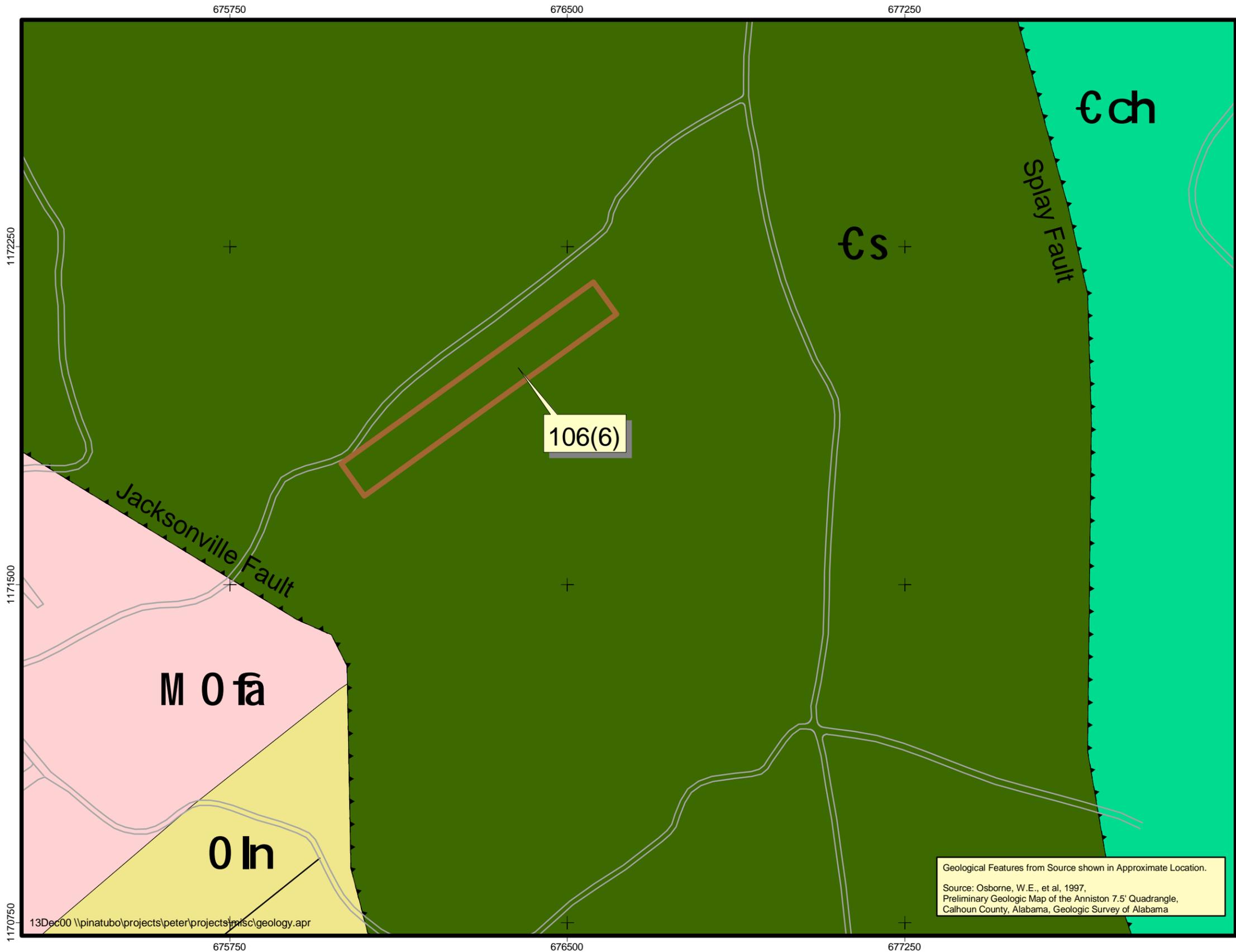


Figure 4-1
Site Geologic Map
Former Smoke Area S,
Parcel 106(6)

Legend

-  CERFA Parcel 106(3)
-  Roads
-  Fault

Geology

-  **Cch** Cambrian - Chilhowee Group
-  **Cs** Cambrian - Shady Dolomite
-  **MOfa** Mississippian/Ordovician - Floyd & Athens Shale, Undifferentiated
-  **Oln** Ordovician - Little Oak and Newala Limestones

0 200 400
State Plane feet, NAD 83

December 2000

N



Fort McClellan
Environmental Office

Geological Features from Source shown in Approximate Location.
 Source: Osborne, W.E., et al, 1997,
 Preliminary Geologic Map of the Anniston 7.5' Quadrangle,
 Calhoun County, Alabama, Geologic Survey of Alabama

U.S. Army Corps of Engineers
 Mobile District
 Fort McClellan
 Calhoun County, Alabama
 Contract No. DACA21-96-D-0018



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features on the Main Post of FTMC include Remount Creek, Cane Creek, South Branch of Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Surface runoff at Former Smoke Area S, Parcel 106(6), follows the general topography and flows to the south/southwest toward the unnamed intermittent stream that flows along the southeast parcel boundary. The intermittent stream flows to the south/southwest, where it converges with Cane Creek.

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at Former Smoke Area S, Parcel 106(6), indicate that metals, VOCs, and SVOCs were detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix F.

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

The following sections and Tables 5-1 through 5-4 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix D.

Table 5-1

**Surface and Depositional Soil Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-106 FTA-106-DEP01 FV0007 9-Mar-99 0- 1					FTA-106 FTA-106-DEP02 FV0008 9-Mar-99 0- 1					FTA-106 FTA-106-DEP03 FV0009 9-Mar-99 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	5.35E+03				YES	2.14E+03				YES	3.49E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.20E+00			YES		1.70E+00			YES		2.60E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.29E+02		YES			6.18E+01					6.58E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.30E+00		YES		YES	4.80E-01	J				3.80E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					4.00E-01	J	YES			6.10E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	7.84E+02					3.24E+02	J				2.94E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	5.70E+00				YES	3.90E+00				YES	7.70E+00				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.40E+01					3.30E+00	J				2.80E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	5.60E+00					4.40E+00					6.00E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	9.57E+03			YES	YES	5.49E+03			YES	YES	1.11E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.34E+01					1.84E+01					2.66E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.02E+02	J				1.26E+02	J				2.78E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.62E+03	J	YES	YES	YES	5.22E+02	J		YES	YES	5.12E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.40E-02	B				4.40E-02	B				4.70E-02	B			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.80E+00					3.60E+00	J				4.00E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	5.11E+02	J				1.72E+02	J				2.72E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.00E+00		YES		YES	ND					9.20E-01		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	1.05E+02	B				6.82E+01	B				1.30E+02	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.06E+01				YES	6.40E+00				YES	1.21E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	5.80E+01	J	YES		YES	1.18E+02	J	YES		YES	3.35E+02	J	YES		YES
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	3.13E+00	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	4.10E-03	J				5.40E-03	J				ND				
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	4.43E+02	ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	1.10E-01	J				1.30E-01	J				6.80E-02	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.30E-03	B				3.70E-03	B				4.60E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	ND					ND					ND				
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	ND					ND					ND				
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					ND					ND				
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	ND					ND					ND				
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					ND					ND				
Pentachlorophenol	mg/kg	NA	5.25E+00	2.00E-03	ND					ND					ND				
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.30E-01	J				ND					ND				

Table 5-1

**Surface and Depositional Soil Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-106 FTA-106-DEP04 FV0010 9-Mar-99 0- 1					FTA-106 FTA-106-GP01 FV0001 5-Nov-98 0- 1					FTA-106 FTA-106-GP02 FV0003 5-Nov-98 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	4.89E+03				YES	5.45E+03				YES	8.10E+03			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	2.40E+00			YES		1.90E+00			YES		2.70E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.01E+02					3.20E+01					4.63E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.20E+00		YES		YES	ND					9.30E-01		YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	2.63E+02	J				ND					ND				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	4.60E+00				YES	1.23E+01				YES	1.39E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	6.70E+00	J				ND					ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.33E+01		YES			5.50E+00					2.04E+01	J	YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	5.39E+03			YES	YES	8.05E+03			YES	YES	1.27E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.33E+01					5.01E+01		YES		YES	1.90E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.88E+02	J				ND					ND				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.08E+03	J		YES	YES	7.85E+01					8.51E+01				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.00E-01		YES		YES	ND					5.70E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.10E+00	J				ND					4.50E+00				
Potassium	mg/kg	8.00E+02	NA	NA	2.19E+02	J				ND					ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.00E-01	J	YES		YES	8.80E-01		YES		YES	1.00E+00		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	8.65E+01	B				ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	8.20E+00	J			YES	7.40E+00				YES	8.20E+00				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.51E+01	J				4.48E+01	J	YES			1.82E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	3.13E+00	1.00E-01	ND					ND					4.00E-03	J			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	2.50E-02	J				6.40E-03	B				6.20E-03	B			
4-Methyl-2-pentanone	mg/kg	NA	6.21E+02	4.43E+02	ND					ND					3.70E-03	J			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	7.30E-01	J				9.30E-02	J				9.50E-02	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	9.20E-03	B				5.00E-03	B				5.00E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					2.50E-03	J				ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	3.50E-02	J				ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	ND					7.00E-02	J				ND				
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	ND					5.90E-02	J				ND				
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	ND					6.00E-02	J				ND				
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					4.00E-02	J				ND				
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					7.50E-02	J				ND				
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	ND					7.90E-02	J				ND				
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	ND					1.00E-01	J			YES	ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					3.70E-02	J				ND				
Pentachlorophenol	mg/kg	NA	5.25E+00	2.00E-03	ND					1.40E-01	J			YES	ND				
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	ND					7.80E-02	J				ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND				

Table 5-1

**Surface and Depositional Soil Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

Analyses performed by Quanterra Environmental Services using EPA SW-846 analytical methods, including Update III methods where available.

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

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

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

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

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

**Subsurface Soil Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)				FTA-106 FTA-106-GP01 FV0002 5-Nov-98 1-3				FTA-106 FTA-106-GP02 FV0006 5-Nov-98 7 - 8.5			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS											
Aluminum	mg/kg	1.36E+04	7.80E+03	5.16E+03				6.34E+03			
Arsenic	mg/kg	1.83E+01	4.26E-01	1.80E+00			YES	2.90E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.48E+01				7.04E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				1.90E+00		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	9.30E+00				1.29E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				1.94E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	5.90E+00				5.25E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	9.81E+03			YES	1.74E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	5.40E+00				9.00E+00			
Magnesium	mg/kg	7.66E+02	NA	ND				2.92E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	2.76E+01				3.16E+02			
Nickel	mg/kg	1.29E+01	1.54E+02	ND				2.45E+01		YES	
Potassium	mg/kg	7.11E+02	NA	ND				3.72E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	5.90E-01		YES		ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	7.80E+00				ND			
Zinc	mg/kg	3.49E+01	2.34E+03	1.28E+01	J			5.96E+01	J	YES	
VOLATILE ORGANIC COMPOUNDS											
Acetone	mg/kg	NA	7.76E+02	1.50E-01	J			1.40E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	2.40E-03	J			ND			
Methylene chloride	mg/kg	NA	8.41E+01	5.50E-03	B			4.20E-03	B		

Analyses performed by Quanterra Environmental Services using EPA SW-846 analytical methods, including Update III methods where available.

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

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

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

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

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Surface Water Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date					FTA-106 FTA-106-SW/SD01 FV2001 15-Feb-99					FTA-106 FTA-106-SW/SD02 FV2004 15-Feb-99					FTA-106 FTA-106-SW/SD03 FV2005 15-Feb-99					FTA-106 FTA-106-SW/SD04 FV2006 11-Feb-99				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	1.00E-01	B			YES	9.44E-02	B			YES	1.14E-01	B			YES	1.16E-01	B			YES
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	2.72E-02	J			YES	3.45E-02	J			YES	3.36E-02	J			YES	3.26E-02	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	6.60E-01	J				7.69E-01	J				7.10E-01	J				7.01E-01	J			
Magnesium	mg/L	1.10E+01	NA	8.20E+01	5.21E-01	J				6.29E-01	J				5.66E-01	J				5.93E-01	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	1.40E-02	J				2.50E-02					1.71E-02					1.39E-02	J			
Potassium	mg/L	2.56E+00	NA	5.30E+01	ND					ND					ND					8.97E-01	B			
Sodium	mg/L	3.44E+00	NA	6.80E+02	6.95E-01	B				8.66E-01	B				6.71E-01	B				1.39E+00	B			
Thallium	mg/L	2.40E-03	1.01E-03	4.00E-03	ND					ND					ND					4.70E-03	J	YES	YES	YES
VOLATILE ORGANIC COMPOUNDS																								
Acetone	mg/L	NA	1.57E+00	7.80E+01	1.30E-03	B				ND					ND					ND				

Analyses performed by Quanterra Environmental Services using EPA SW-846 analytical methods, including Update III methods where available.

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

^b Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

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

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

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

**Sediment Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-106 FTA-106-SW/SD01 FV1001 15-Feb-99 0- .5					FTA-106 FTA-106-SW/SD02 FV1002 15-Feb-99 0- .5				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	5.43E+03					3.32E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	1.80E+00					1.30E+00	J			
Barium	mg/kg	9.89E+01	8.36E+04	NA	3.61E+01	J				3.31E+01	J			
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	6.80E-01	J				6.10E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	9.06E+01	J				1.33E+02	J			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	5.10E+00	J				5.60E+00	J			
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	8.10E+00					2.00E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	3.20E+00	J				2.70E+00	J			
Iron	mg/kg	3.53E+04	3.59E+05	NA	6.49E+03					5.30E+03				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	9.60E+00	J				8.80E+00	J			
Magnesium	mg/kg	9.06E+02	NA	NA	1.49E+02	J				1.11E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	3.90E+02	J				9.49E+01	J			
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	4.70E-02					3.50E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	2.50E+00	J				2.10E+00	J			
Potassium	mg/kg	1.01E+03	NA	NA	ND					ND				
Selenium	mg/kg	7.20E-01	5.96E+03	NA	7.40E-01		YES			7.60E-01	J	YES		
Sodium	mg/kg	6.92E+02	NA	NA	3.27E+01	B				2.98E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	1.00E+01					8.30E+00				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	7.80E+00	J				1.16E+01	J			
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg	NA	6.23E+05	1.37E-01	9.40E-03	J				9.40E-02	J			
Acetone	mg/kg	NA	1.03E+05	4.53E-01	2.60E-01	J				1.00E+00	B			YES
Cumene	mg/kg	NA	1.04E+05	NA	ND					ND				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	6.40E-03	B				7.70E-03	B			
Trichlorofluoromethane	mg/kg	NA	3.06E+05	3.07E-03	ND					4.80E-03	J			YES

Table 5-4

**Sediment Analytical Results
Former Smoke Area S, Parcel 106(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					FTA-106 FTA-106-SW/SD03 FV1003 15-Feb-99 0- .5					FTA-106 FTA-106-SW/SD04 FV1004 11-Feb-99 0- .5				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	4.52E+03					3.12E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	1.50E+00					1.50E+00				
Barium	mg/kg	9.89E+01	8.36E+04	NA	3.57E+01	J				4.34E+01	J			
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	4.90E-01	J				6.90E-01	J			
Calcium	mg/kg	1.11E+03	NA	NA	8.85E+01	J				1.48E+02	J			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	4.10E+00	J				3.70E+00	J			
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	3.60E+00	J				9.70E+00				
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	2.50E+00	J				3.60E+00				
Iron	mg/kg	3.53E+04	3.59E+05	NA	5.42E+03					4.89E+03				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	7.00E+00	J				1.34E+01	J			
Magnesium	mg/kg	9.06E+02	NA	NA	1.82E+02	J				1.51E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	2.11E+02	J				6.17E+02	J			
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	3.40E-02	J				3.40E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	2.50E+00	J				2.40E+00	J			
Potassium	mg/kg	1.01E+03	NA	NA	1.63E+02	J				1.08E+02	J			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	6.30E-01	J				6.30E-01	J			
Sodium	mg/kg	6.92E+02	NA	NA	3.94E+01	B				5.46E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	8.50E+00					6.90E+00	J			
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	1.11E+01	J				1.74E+01	J			
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg	NA	6.23E+05	1.37E-01	ND					8.70E-03	J			
Acetone	mg/kg	NA	1.03E+05	4.53E-01	4.80E-02	J				2.00E-01	J			
Cumene	mg/kg	NA	1.04E+05	NA	ND					5.80E-03	J			
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	4.40E-03	B				4.10E-03	B			
Trichlorofluoromethane	mg/kg	NA	3.06E+05	3.07E-03	ND					4.00E-03	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. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama, July*. For SVOCs, value listed is the background screening criterion for soils adjacent to asphalt as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

^b Recreational user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July*.

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

J - Result is greater than 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.

5.1 Surface and Depositional Soil Analytical Results

Two surface soil samples and four depositional soil samples were collected for chemical analysis at Former Smoke Area S, Parcel 106(6). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and metals background concentrations, as presented in Table 5-1.

Metals. Twenty metals were detected in surface and depositional soil samples collected at Former Smoke Area S, Parcel 106(6). Sample location FTA-106-DEP03 contained all of the detected metals, and three other locations (FTA-106-DEP01, FTA-106-DEP02, and FTA-106-DEP04) each contained 19 of the 20 detected metals. The sodium results and three of the mercury results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The concentrations of aluminum (in sample FTA-106-GP02), arsenic (at six locations), iron (at six locations), and manganese (at four locations) exceeded SSSLs. With the exception of manganese at one location (FTA-106-DEP01), the concentrations of these metals were below the respective background concentrations. Although the manganese result exceeded its respective background concentration, it was within the range of background values determined by SAIC (1998) (Appendix F).

The concentrations of aluminum (at six locations), beryllium (in samples FTA-106-DEP01 and FTA-106-DEP04), chromium (six locations), iron (six locations), lead (FTA-106-GP01), manganese (four locations), mercury (FTA-106-DEP04), selenium (five locations), vanadium (six locations), and zinc (three locations) exceeded ESVs. With the exception of beryllium (two locations) and zinc (one location), the concentrations of these metals were either below their respective background concentrations or within the range of background values; however, both zinc and beryllium were below their SSSLs.

Volatile Organic Compounds. Seven VOCs, namely, 1,1,2,2-tetrachloroethane, 2-butanone, 4-methyl-2-pentanone, acetone, methylene chloride, naphthalene, and p-cymene, were detected in surface and depositional soil samples collected at Former Smoke Area S, Parcel 106(6). The methylene chloride results and two of the 2-butanone results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field

blank sample. The remaining VOC results were flagged with a 'J' data qualifier, indicating that the results were greater than the method detection limit but less than the reporting limit.

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

Semivolatile Organic Compounds. Eleven SVOCs were detected in surface and depositional soil samples collected at Former Smoke Area S, Parcel 106(6). Sample location FTA-106-GP01 contained ten of the eleven detected SVOCs, and sample location FTA-106-DEP01 contained one of the eleven detected SVOCs. SVOCs were not detected at the remaining four sample locations.

The SVOC concentrations in surface and depositional soils were below SSSLs. Fluoranthene and pentachlorophenol concentrations exceeded ESVs at sample location FTA-106-GP01.

5.2 Subsurface Soil Analytical Results

Two subsurface soil samples were collected for chemical analysis at Former Smoke Area S, Parcel 106(6). Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-2.

Metals. Sixteen metals were detected in subsurface soil samples collected at Former Smoke Area S, Parcel 106(6). The sample collected from location FTA-106-GP02 contained 14 of the 16 detected metals.

The concentrations of two metals (arsenic and iron) exceeded SSSLs. However, the concentrations of these metals were below their respective background concentrations.

Volatile Organic Compounds. Three VOCs (acetone, bromomethane, and methylene chloride) were detected in subsurface soil samples collected at Former Smoke Area S, Parcel 106(6). The methylene chloride results were flagged with a 'B' data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample.

The VOC concentrations in subsurface soils were below SSSLs.

Semivolatile Organic Compounds. SVOCs were not detected in subsurface soil samples collected at Former Smoke Area S, Parcel 106(6).

5.3 Surface Water Analytical Results

Four surface water samples were collected for chemical analyses at Former Smoke Area S, Parcel 106(6), at the locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background concentrations, as presented in Table 5-3.

Metals. Eight metals were detected in surface water samples collected at Former Smoke Area S, Parcel 106(6). Sample location FTA-106-SW/SD04 contained all of the detected metals. The aluminum, sodium, and potassium results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The thallium concentration at FTA-106-SW/SD04 exceeded the SSSL, its respective background concentration, and the range of background values as determined by SAIC (1998) (Appendix F).

The concentrations of aluminum (at four locations), barium (at four locations), and thallium (at one location) exceeded ESVs. With the exception of the thallium result, the concentrations of these metals were below their respective background concentrations.

Volatile Organic Compounds. Acetone was detected in one of the surface water samples (FTA-106-SW/SD01) collected at Former Smoke Area S, Parcel 106(6). The acetone result was flagged with a 'B' data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample.

The acetone concentration was below the SSSL and ESV.

Semivolatile Organic Compounds. SVOCs were not detected in the surface water samples collected at Former Smoke Area S, Parcel 106(6).

5.4 Sediment Analytical Results

Four sediment samples were collected for chemical and physical analyses at Former Smoke Area S, Parcel 106(6). Sediment samples were collected from the upper 0.5 foot of sediment at the

locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background concentrations, as presented in Table 5-4.

Metals. Nineteen metals were detected in sediment samples collected at Former Smoke Area S, Parcel 106(6). Sample locations FTA-106-SW/SD03 and FTA-106-SW/SD04 each contained all 19 of the detected metals. The sodium results were flagged with a 'B' data qualifier, signifying that this metal was also detected in an associated laboratory or field blank sample.

The metals concentrations in sediments were below SSSLs and ESVs.

Volatile Organic Compounds. Five VOCs, namely, 2-butanone, acetone, cumene, methylene chloride, and trichlorofluoromethane, were detected in sediment samples collected at Former Smoke Area S, Parcel 106(6). Sample location FTA-106-SW/SD04 contained 24 of the detected VOCs. The methylene chloride results and one of the acetone results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample.

The VOC concentrations in sediments were below SSSLs. Concentrations of acetone (at one location) and trichlorofluoromethane (at two locations) exceeded ESVs.

Semivolatile Organic Compounds. SVOCs were not detected in the sediment samples collected at Former Smoke Area S, Parcel 106(6).

Total Organic Carbon. TOC was detected in each of the sediment samples. TOC concentrations ranged from 7,710 to 26,400 mg/kg in the sediment samples. The TOC results are summarized in Appendix D.

Grain Size. The results of grain size analysis for sediment samples are included in Appendix D.

6.0 Summary, Conclusions, and Recommendations

IT, under contract with USACE, completed an SI at Former Smoke Area S, Parcel 106(6), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site in concentrations that present an unacceptable risk to human health or the environment. The SI at Former Smoke Area S, Parcel 106(6), consisted of the sampling and analysis of two surface soil samples, four depositional soil samples, two subsurface soil samples, and four surface water and sediment samples.

Chemical analysis of samples collected at Former Smoke Area S, Parcel 106(6), indicates that metals, VOCs, and SVOCs were detected in the various site media. Analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998).

The potential threat to human receptors is expected to be low. Although the site is located within an undeveloped area of the Main Post and is projected for passive recreational use, the soils data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future land use. With the exception of thallium in one surface water sample, the metals results that exceeded SSSLs were below their respective background concentrations or within the range of background values determined by SAIC (1998). Thallium was not detected in any of the other samples collected at the site and is not known to have been used in operations conducted at the site. Consequently, thallium is probably not a site-related contaminant. VOC and SVOC concentrations in site media were below SSSLs.

The potential impact to ecological receptors is also expected to be minimal. The concentrations of six metals (beryllium, lead, manganese, mercury, selenium, and zinc) exceeded ESVs and their respective background concentrations in surface and depositional soil samples at Parcel 106(6). With the exception of beryllium (at two locations) and zinc (at one location), these metals concentrations were within the range of background values determined by SAIC.

The VOCs trichlorofluoromethane (in two sediment samples) and acetone (in one sediment sample) were detected at concentrations exceeding ESVs. Acetone is a common laboratory

contaminant, and the result was flagged with a 'B' data qualifier, indicating that acetone is probably not a site-related contaminant. The trichlorofluoromethane results (0.0048 mg/kg and 0.004 mg/kg) marginally exceeded the ESV (0.00307 mg/kg). The SVOCs fluoranthene (0.1 mg/kg) and pentachlorophenol (0.14 mg/kg) were detected in one surface soil sample at concentrations exceeding ESVs. The low levels and limited distribution of the VOCs and SVOCs detected are not expected to pose a substantial threat to ecological receptors.

Groundwater was not investigated at Former Smoke Area S, Parcel 106(6); impacts to groundwater are not anticipated from site-related smoke training activities. However, a groundwater contamination has been detected at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), located approximately 1,600 feet northwest of Former Smoke Area S. This contamination is being addressed as part of a remedial investigation currently being conducted at that site.

Although site-related impacts to groundwater are not anticipated at Former Smoke Area S, Parcel 106(6), offsite contamination from Training Area T-38 could impact groundwater at the site. Therefore, potential impacts to Former Smoke Area S, Parcel 106(6), cannot be positively identified until the completion of the remedial investigation at Parcel 186(6).

Based on the results of the SI, past operations at Former Smoke Area S, Parcel 106(6), do not appear to have adversely impacted the environment. The metals and chemical constituents detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT Corporation recommends "No Further Action" and unrestricted land reuse with regard to hazardous, toxic, and radioactive waste at Former Smoke Area S, Parcel 106(6).

7.0 References

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

APPENDIX A

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

SAMPLE COLLECTION LOGS

ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS

APPENDIX B
BORING LOGS

APPENDIX C
SURVEY DATA

APPENDIX D

SUMMARY OF VALIDATED ANALYTICAL DATA

APPENDIX E

DATA VALIDATION SUMMARY REPORT

APPENDIX F

SUMMARY STATISTICS FOR BACKGROUND MEDIA, FORT McCLELLAN, ALABAMA