Final

Site Investigation Report
Artillery and Mortar Impact Areas South of Bains Gap Road
Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X

Fort McClellan
Calhoun County, Alabama

Prepared for:

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

May 2002

Revision 0

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) completed a site investigation (SI) at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, at Fort McClellan (FTMC) in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, consisted of the sampling and analysis of 14 surface soil samples, 5 depositional soil samples, 14 subsurface soil samples, 7 surface water samples, 7 sediment samples, and 6 seep water samples.

Chemical analysis of samples collected at the site indicates that metals were detected in the various site media. In addition, perchlorate and one explosive compound were detected in one surface soil sample each. To evaluate whether the detected constituents pose an unacceptable risk to human health and the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. A preliminary risk assessment (PRA) was also performed to further characterize the potential threat to human health.

Although the site is located within an undeveloped area of the Main Post and is projected for passive recreation reuse, the analytical data were evaluated against a residential reuse scenario to determine if the site is suitable for unrestricted land reuse. Chemicals of potential concern for residential exposure to site media included four metals (aluminum, antimony, iron, and manganese) in soils and two metals (barium and lead) in seep water. The PRA concluded that exposure to surface soil, subsurface soil, surface water, and sediment poses no unacceptable risk for the resident. Lead, however, was identified as a chemical of concern in seep water. Based on the PRA results, the seep locations were re-sampled to confirm the lead concentrations. Lead concentrations in the seep re-samples were below the SSSL and the background concentration. Therefore, it is concluded that lead is not a chemical of concern in seep water.

The potential threat to ecological receptors is expected to be low. Constituents of potential ecological concern were limited to three metals (antimony, barium, and beryllium) in a limited number of surface and depositional soil samples. Antimony (8.4 milligrams per kilogram [mg/kg]) exceeded its ESV (3.11 mg/kg) and upper background range (2.6 mg/kg) in one surface soil sample. The antimony result was flagged with a "B" data qualifier indicating that the metal

was detected in an associated laboratory or field blank sample. Antimony was not detected in any of the other surface and depositional soil samples. Barium was detected at an estimated concentration (488 mg/kg) exceeding its ESV (165 mg/kg) and upper background range (288 mg/kg) in one surface soil sample. Barium concentrations in all other soil samples collected at the site were below the background concentration or within the upper background range. Beryllium (1.1 to 3.1 mg/kg) exceeded its ESV (1.1 mg/kg) and upper background range (0.87 mg/kg) in four surface and depositional soil samples. The average beryllium concentration in surface soils at the site is 0.95 mg/kg, which is below the ESV and only marginally exceeds background concentration (0.8 mg/kg). The presence of these metals likely reflects either a laboratory artifact (antimony) or, in the case of barium and beryllium, variations in naturally occurring levels. Therefore, antimony, barium, and beryllium are not expected to pose a threat to ecological receptors.

Based on the results of the SI, past operations at the Impact Areas South of Bains Gap Road do not appear to have adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT recommends "No Further Action" and unrestricted land reuse with regard to hazardous, toxic, and radioactive waste at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

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 IT Corporation (IT) to perform the site investigation (SI) at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X, under Contract Number DACA21-96-D-0018, Task Order CK10.

This SI report presents specific information and results compiled from the SI, including field sampling and analysis activities, conducted at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X. For the sake of brevity, the site is hereinafter referred to as the Impact Areas South of Bains Gap Road and includes all associated parcels unless otherwise specified.

1.1 Project Description

The Impact Areas South of Bains Gap Road were identified as areas to be investigated prior to property transfer. The parcels were classified as Category 1 Qualified parcels in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 1 parcels are areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas). The parcels, however, were qualified "X" because of the potential for unexploded ordnance (UXO).

A site-specific field sampling plan (SFSP) attachment (IT, 2001) and a site-specific safety and health plan (SSHP) attachment were finalized in January 2001. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the Impact Areas South of Bains Gap Road. The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998), 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 14 surface soil samples, 5 depositional soil samples, 14 subsurface soil samples, 7 surface water samples, 7 sediment samples, and 6 seep water samples. Data from the field investigation were used to determine whether potential site-specific chemicals are present at the Impact Areas South of Bains Gap Road.

1.2 Purpose and Objectives

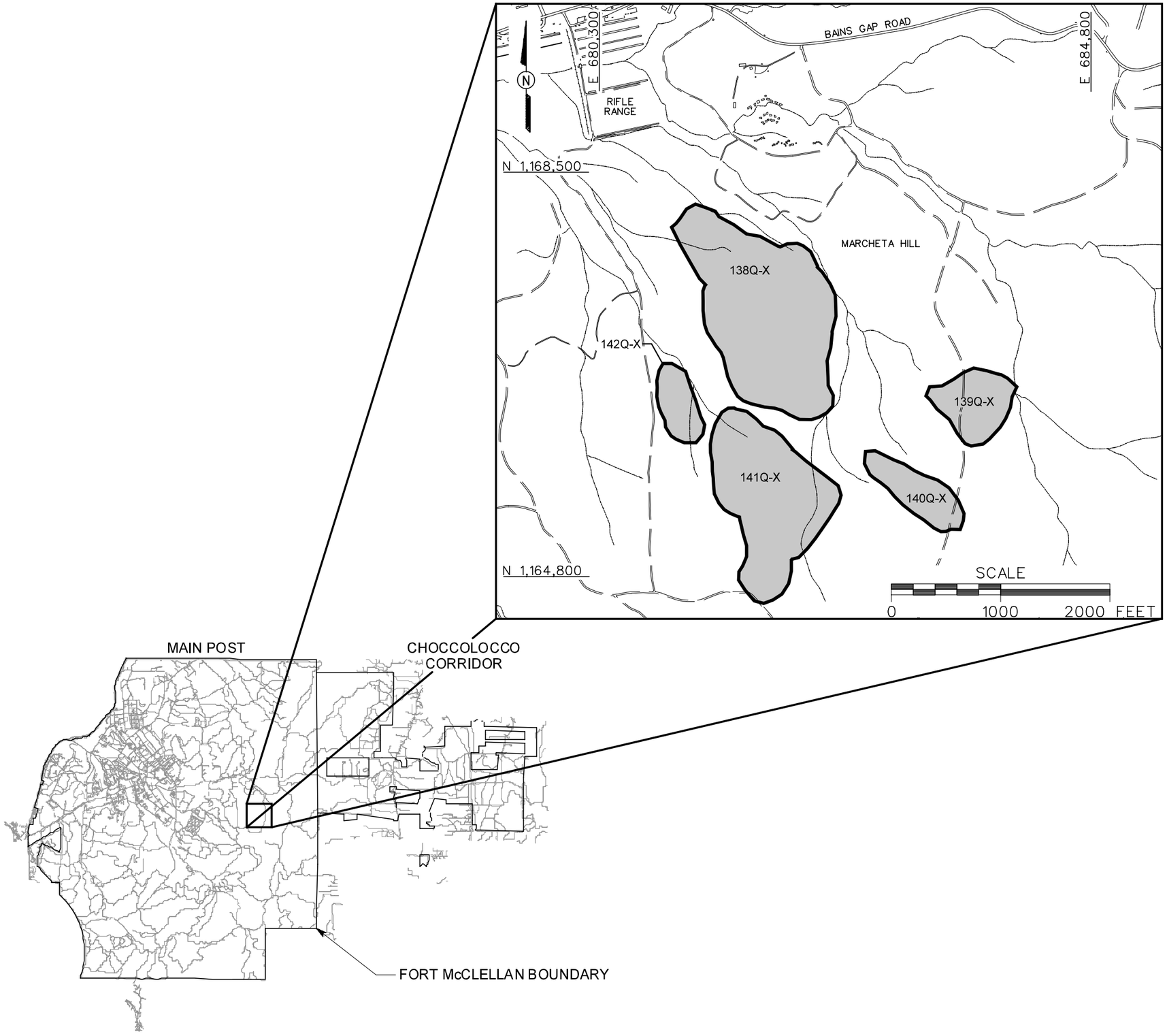
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at the Impact Areas South of Bains Gap Road at concentrations that present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs 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

The Impact Areas South of Bains Gap Road are located in the east-central portion of the FTMC Main Post (Figure 1-1). The parcels are located south of Bains Gap Road and southeast of the Former Mortar Range, Parcel 109Q-X, in the vicinity of Range 21 (Parcel 77Q) and Range 22 (Parcel 78Q) (Figure 1-2). The impact areas were observed on 1949, 1954, and 1961 aerial photograph composites. Artillery and mortars are presumed to have been fired into these impact areas because all other ranges in this vicinity were reported to be exclusively small-arms ranges since the 1940s (ESE, 1998). Shallow depressions, which are probable impact craters, are present throughout each of the parcels.

The impact areas were located near the center of an area marked "Possible Artillery Impact Areas" shown on Plate 3 of the *Archives Search Report, Maps* (USACE, 1999). Maps from the World War I era do not show firing points, firing lines, or artillery and mortar ranges that



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- MARSH / WETLANDS
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK

FIGURE 1-1
SITE LOCATION MAP
ARTILLERY AND MORTAR IMPACT AREAS SOUTH OF BAINS GAP ROAD
PARCELS 138Q-X, 139Q-X, 140Q-X, 141Q-X, AND 142Q-X

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

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E 679,400

E 685,600

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BAINS GAP ROAD

RANGE 22
PARCEL 78Q

RANGE 21
PARCEL 77Q

RIFLE
RANGE

N 1,168,800

FORMER MORTAR RANGE FIRING POINT
PARCEL 109Q-X

FLOW DIRECTION

MARCHETA HILL

138Q-X

142Q-X

139Q-X

141Q-X

140Q-X

N 1,164,800

SCALE
0 600 1200 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE

FIGURE 1-2
SITE MAP
ARTILLERY AND MORTAR IMPACT AREAS SOUTH OF BAINS GAP ROAD
PARCELS 138Q-X, 139Q-X, 140Q-X, 141Q-X, AND 142Q-X

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MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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impacted these areas (USACE, 1999). Based on photographs and correspondence, range distances were approximately 1,500 to 5,000 yards and the Choccolocco Mountains were likely used as a backstop. Documented artillery and mortar use in this area took place from 1912 to the beginning of World War II.

Ground elevation at the Impact Areas South of Bains Gap Road ranges from approximately 975 feet above mean sea level (amsl) (within Parcel 138Q-X) to approximately 1,625 feet amsl (within Parcel 140Q-X). Surface drainage at the site follows the topography and generally flows to the north-northwest into several intermittent streams that eventually empty into Cane Creek approximately northwest of the area.

The Impact Areas South of Bains Gap Road are located within two special interest natural areas (SINA): the Marcheta Hill Orchid Seep and the Marcheta Hill Crow-Poison Seep. These areas are two of 11 SINAs on the Main Post of FTMC. SINAs are locations where the habitat fosters one or more rare, threatened, or endangered species. Because these species are sensitive to environmental degradation, SINAs require management practices that promote the continued well being of these ecosystems (IT, 2002).

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.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number; the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel; and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-Based Paint (in buildings)
- P = Polychlorinated Biphenyls
- R = Radon (in buildings)

- RD = Radionuclides/Radiological Issues
- X = Unexploded Ordnance
- CWM = Chemical Warfare Material.

The EBS was conducted in accordance with CERFA protocols (CERFA-Public Law 102-426) and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of CERCLA-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 Impact Areas South of Bains Gap Road were categorized as CERFA Category 1 Qualified parcels. These CERFA parcels are areas where no known or recorded storage, release, or disposal of hazardous substances or petroleum products has occurred (including migration of these substances from adjacent areas). However, the parcels were qualified ("X") for potential UXO. The Impact Areas South of Bains Gap Road required further evaluation to determine the environmental condition of the parcels.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at the Impact Areas South of Bains Gap Road, including UXO avoidance and environmental sampling and analysis activities.

3.1 UXO Avoidance

UXO avoidance was performed at the Impact Areas South of Bains Gap Road following methodology outlined in Section 4.1.7 of the SAP (IT, 2000a). IT UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the parcels prior to site access. After the parcels were cleared for access, sample locations were monitored 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 the Impact Areas South of Bains Gap Road included the collection of surface and depositional soil samples, subsurface soil samples, surface water/sediment samples, and seep water samples for chemical analysis. The sample locations were determined by observing site physical characteristics during a site walkover, and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

Fourteen surface soil samples and five depositional soil samples were collected at the Impact Areas South of Bains Gap Road, as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Soil sample designations and analytical parameters 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, and site topography.

Sample Collection. Surface and depositional soil samples were collected from the upper 1-foot of soil using either a direct-push technology (DPT) sampling system or a stainless-steel hand auger following the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). Surface and depositional soil samples were collected by first removing surface debris (e.g., rocks, vegetation) from the immediate sample area. The soil was collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the

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E 685,600

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BAINS GAP ROAD

RANGE 22
PARCEL 78Q

RANGE 21
PARCEL 77Q

RIFLE
RANGE

N 1,168,800

FORMER MORTAR RANGE FIRING POINT
PARCEL 109Q-X

HR-138Q-SW/SD05

HR-138Q-SW/SD03

HR-138Q-GP04

HR-138Q-SW/SD04

HR-138Q-SEEP02

HR-138Q-SEEP01

HR-138Q-GP03

HR-138Q-SEEP03

HR-138Q-GP02

HR-138Q-GP01

138Q-X

MARCHETA HILL

HR-142Q-DEP01

HR-138Q-SW/SD02

FLOW DIRECTION

HR-139Q-GP02

HR-139Q-SW/SD01

142Q-X

HR-141Q-DEP01

139Q-X

HR-142Q-GP02

HR-142Q-GP01

HR-139Q-GP01

HR-142Q-DEP02

HR-140Q-SW/SD01

HR-141Q-GP04

HR-140Q-GP02

HR-138Q-DEP01

HR-141Q-GP03

141Q-X

HR-141Q-SW/SD02

140Q-X

HR-140Q-GP01

HR-141Q-GP02

HR-141Q-DEP02

HR-141Q-GP01

N 1,164,800

SCALE

0 600 1200 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SEEP WATER SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION

FIGURE 3-1
SAMPLE LOCATION MAP
ARTILLERY AND MORTAR IMPACT
AREAS SOUTH OF BAINS GAP ROAD
PARCELS 138Q-X, 139Q-X, 140Q-X,
141Q-X, AND 142Q-X

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FORT McCLELLAN
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Contract No. DACA21-96-D-0018

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Table 3-1

Sampling Locations and Rationale
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
138Q-X	HR-138Q-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the western (downslope) portion of Parcel 138Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-138Q-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the northern (downslope) portion of Parcel 138Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-138Q-GP03	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the northwestern (downslope) portion of Parcel 138Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-138Q-GP04	Surface soil Subsurface soil	Surface and subsurface soil samples were collected just northwest (downslope) of Parcel 138Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-138Q-DEP01	Depositional soil	A depositional soil sample was collected downstream of Parcel 140Q-X and upstream of Parcel 138Q-X in a dry intermittent stream bed that flows north along the eastern border of Parcel 138Q-X to determine if contaminant releases have occurred from runoff from the parcel.
	HR-138Q-SW/SD02	Surface water Sediment	Surface water and sediment samples were collected from an intermittent stream east of Parcel 138Q-X that flows north along the eastern border of the parcel to determine if contaminant releases have impacted the creek.
	HR-138Q-SW/SD03	Surface water Sediment	Surface water and sediment samples were collected from an intermittent stream northwest (downslope) of Parcel 138Q-X to determine if potential site-specific chemicals have impacted the creek.
	HR-138Q-SW/SD04	Surface water Sediment	Surface water and sediment samples were collected from an intermittent stream northeast (downslope) of Parcel 138Q-X to determine if potential site-specific chemicals have impacted the creek.
	HR-138Q-SW/SD05	Surface water Sediment	Surface water and sediment samples were collected northwest of Parcel 138Q-X in an intermittent stream that flows northwest from the parcel to determine if potential site-specific chemicals have impacted the creek.
	HR-138Q-SEEP01	Seep water	Seep samples were collected in a wetlands area near the northwestern tip of Parcel 138Q-X (downgradient) to determine if contaminant releases have occurred from runoff from the parcel.
	HR-138Q-SEEP02	Seep water	Seep samples were collected in a wetlands area near the northwestern tip of Parcel 138Q-X (downgradient) to determine if contaminant releases have occurred from runoff from the parcel.
	HR-138Q-SEEP03	Seep water	Seep samples were collected in a wetlands area near the northwestern tip of Parcel 138Q-X (downgradient) to determine if contaminant releases have occurred from runoff from the parcel.
139Q-X	HR-139Q-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the southwestern section of Parcel 139Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-139Q-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected just north (downslope) of Parcel 139Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-139Q-SW/SD01	Surface water Sediment	Surface water and sediment samples were collected just northeast of Parcel 139Q-X from an intermittent stream that flows north along the eastern parcel boundary to determine if potential site-specific chemicals have impacted the creek.

Table 3-1

Sampling Locations and Rationale
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
140Q-X	HR-140Q-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the southeastern (upslope) section of Parcel 140Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-140Q-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the northwestern (downslope) section of Parcel 140Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-140Q-SW/SD01	Surface water Sediment	Surface water and sediment samples were collected from an intermittent stream north (downstream) of Parcel 140Q-X to determine if potential site-specific chemicals have impacted the creek.
141Q-X	HR-141Q-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the southern (upslope) portion of Parcel 141Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-141Q-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the west-central section of Parcel 141Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-141Q-GP03	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the east-central section of Parcel 141Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-141Q-GP04	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in the northwestern (downslope) portion of Parcel 141Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-141Q-DEP01	Depositional soil	A depositional soil sample was collected northwest (downslope) of Parcel 141Q-X in a dry intermittent stream bed that flows northwest from the parcel to determine if potential site-specific chemicals have been transport via runoff from the parcel.
	HR-141Q-DEP02	Depositional soil	A depositional soil sample was collected southeast (upslope) of Parcel 141Q-X in a dry intermittent stream bed that flows north through the eastern portion of the parcel to determine if contaminant releases into the environment have occurred from this area and if contaminated soil exists at this location.
	HR-141Q-SW/SD02	Surface water Sediment	Surface water and sediment samples were collected near the eastern boundary of Parcel 141Q-X in the intermittent stream that flows north through the eastern area of the parcel to determine if potential site-specific chemicals have impacted the creek.
142Q-X	HR-142Q-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected southern (upslope) section of Parcel 142Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-142Q-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected northern (downslope) section of Parcel 142Q-X to determine if contaminant releases into the environment have occurred from this area of the site and if contaminated soil exists at this location.
	HR-142Q-DEP01	Depositional soil	A depositional soil sample was collected north (downslope) of Parcel 142Q-X in a dry intermittent stream bed that flows northwest along the eastern parcel boundary to determine if potential site-specific chemicals have been transport via runoff from the parcel.
	HR-142Q-DEP02	Depositional soil	A depositional soil sample was collected in the southern portion of Parcel 142Q-X in an intermittent stream that flows north through the parcel to determine if contaminant releases into the environment have occurred from this area and if contaminated soil exists at this location.

Table 3-2

Soil Sample Designations and Analytical Parameters
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-138Q-GP01	HR-138Q-GP01-SS-YE0001-REG	0-1		HR-138Q-GP01-SS-YE0001-MS/MSD	TAL Metals, Explosives, and Perchlorate
	HR-138Q-GP01-DS-YE0002-REG	9-11	HR-138Q-GP01-DS-YE0003-FD		
HR-138Q-GP02	HR-138Q-GP02-SS-YE0005-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-138Q-GP02-DS-YE0006-REG	4-5			
HR-138Q-GP03	HR-138Q-GP03-SS-YE0007-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-138Q-GP03-DS-YE0008-REG	7-8			
HR-138Q-GP04	HR-138Q-GP04-SS-YE0009-REG	0-1		HR-138Q-GP04-SS-YE0009-MS/MSD	TAL Metals, Explosives, and Perchlorate
	HR-138Q-GP04-DS-YE0010-REG	10-11			
HR-138Q-DEP01	HR-138Q-DEP01-DEP-YE0011-REG	0-0.5	HR-138Q-DEP01-DEP-YE0012-FD		TAL Metals, Explosives, and Perchlorate
HR-139Q-GP01	HR-139Q-GP01-SS-YG0001-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-139Q-GP01-DS-YG0002-REG	10-11			
HR-139Q-GP02	HR-139Q-GP02-SS-YG0003-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-139Q-GP02-DS-YG0004-REG	9-11	HR-139Q-GP02-DS-YG0005-FD		
HR-140Q-GP01	HR-140Q-GP01-SS-YH0001-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-140Q-GP01-DS-YH0002-REG	7-8			
HR-140Q-GP02	HR-140Q-GP02-SS-YH0003-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-140Q-GP02-DS-YH0004-REG	1-2	HR-140Q-GP02-DS-YH0005-FD		
HR-141Q-GP01	HR-141Q-GP01-SS-YJ0001-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-141Q-GP01-DS-YJ0002-REG	5-6			
HR-141Q-GP02	HR-141Q-GP02-SS-YJ0003-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-141Q-GP02-DS-YJ0004-REG	3-4			
HR-141Q-GP03	HR-141Q-GP03-SS-YJ0005-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-141Q-GP03-DS-YJ0006-REG	2-4			
HR-141Q-GP04	HR-141Q-GP04-SS-YJ0007-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-141Q-GP04-DS-YJ0008-REG	2-4			
HR-141Q-DEP01	HR-141Q-DEP01-DEP-YJ0009-REG	0-0.5			TAL Metals, Explosives, and Perchlorate
HR-141Q-DEP02	HR-141Q-DEP02-DEP-YJ0010-REG	0-0.5			TAL Metals, Explosives, and Perchlorate
HR-142Q-GP01	HR-142Q-GP01-SS-YL0001-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-142Q-GP01-DS-YL0002-REG	1-4			
HR-142Q-GP02	HR-142Q-GP02-SS-YL0003-REG	0-1			TAL Metals, Explosives, and Perchlorate
	HR-142Q-GP02-DS-YL0004-REG	9-10			
HR-142Q-DEP01	HR-142Q-DEP01-DEP-YL0005-REG	0-0.5			TAL Metals, Explosives, and Perchlorate
HR-142Q-DEP02	HR-142Q-DEP02-DEP-YL0006-REG	0-0.5			TAL Metals, Explosives, and Perchlorate

ft bgs - Feet below ground surface.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
TAL - Target analyte list.

SAP (IT, 2000a). The sample was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4. Sample collection logs are included in Appendix A.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 14 soil borings at the Impact Areas South of Bains Gap Road, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and analytical parameters 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, and site topography. IT contracted Environmental Services Network, Inc., a DPT subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from the soil borings at depths greater than 1-foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and samples collected using the DPT 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 DPT sampler refusal was encountered. Samples were field screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000a) to measure for volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were not greater than background, the deepest sample interval above the saturated zone was submitted for analysis. The sample was then 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 boring logs are included in Appendix B. At the completion of soil sampling, boreholes were abandoned with bentonite pellets and hydrated with potable water following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000a).

3.2.3 Surface Water Sampling

Seven surface water samples were collected at the Impact Areas South of Bains Gap Road at the locations shown on Figure 3-1. Surface water sampling locations and rationale are listed in

Table 3-1. Sample designations and analytical parameters are listed in Table 3-3. The sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. The 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 stainless-steel pitcher in the water and pouring the water into the appropriate sample containers, or by dipping the sample containers directly in the water. The samples were collected after field parameters (i.e., temperature, pH, specific conductivity, dissolved oxygen, and turbidity) had been measured using a calibrated water-quality meter. The field parameter readings are presented 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 Seep Water Sampling

Seep water samples were collected from three locations at the Impact Areas South of Bains Gap Road, as shown on Figure 3-1. The seep locations were sampled on two separate occasions: in May 2001 for full-suite analyses, and in January 2002 for lead analysis only. Seep water sampling locations and rationale are listed in Table 3-1. Seep sample designations and analytical parameters are listed in Table 3-3. The sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. The seep water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Seep water samples were collected using a syringe equipped with Teflon tubing. The samples were collected after field parameters (i.e., temperature, pH, specific conductivity, dissolved oxygen, and turbidity) had been measured using a calibrated water-quality meter. The field parameter readings are presented 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.

3.2.5 Sediment Sampling

Seven sediment samples were collected at the same locations as the surface water samples, as shown on Figure 3-1. The sediment sampling locations and rationale are listed in Table 3-1. Sediment sample designations and analytical parameters are listed in Table 3-3. The 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 from the upper

Table 3-3

Surface Water, Seep Water, and Sediment Sample Designations and Analytical Parameters
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples[a]		Analytical Suite
			Field Duplicates	MS/MSD	
HR-138Q-SW/SD02	HR-138Q-SW/SD02-SW-YE2002-REG	Surface Water			TAL Metals, Explosives, Perchlorate,
	HR-138Q-SW/SD02-SD-YE1003-REG	Sediment			TOC, Grain Size (sediment only)
HR-138Q-SW/SD03	HR-138Q-SW/SD03-SW-YE2003-REG	Surface Water			TAL Metals, Explosives, Perchlorate,
	HR-138Q-SW/SD03-SD-YE1004-REG	Sediment			TOC, Grain Size (sediment only)
HR-138Q-SW/SD04	HR-138Q-SW/SD04-SW-YE2004-REG	Surface Water			TAL Metals, Explosives, Perchlorate,
	HR-138Q-SW/SD04-SD-YE1005-REG	Sediment			TOC, Grain Size (sediment only)
HR-138Q-SW/SD05	HR-138Q-SW/SD05-SW-YE2005-REG	Surface Water			TAL Metals, Explosives, Perchlorate,
	HR-138Q-SW/SD05-SD-YE1006-REG	Sediment			TOC, Grain Size (sediment only)
HR-138Q-SEEP01	HR-138Q-SEEP01-SEP-YE2006-REG	Seep Water			TAL Metals, Explosives, Perchlorate
	HR-138Q-SEEP01-SEP-YE2006R-REG	Seep Water			Lead
HR-138Q-SEEP02	HR-138Q-SEEP02-SEP-YE2007-REG	Seep Water			TAL Metals, Explosives, Perchlorate
	HR-138Q-SEEP02-SEP-YE2007R-REG	Seep Water			Lead
HR-138Q-SEEP03	HR-138Q-SEEP03-SEP-YE2008-REG	Seep Water			TAL Metals, Explosives, Perchlorate
	HR-138Q-SEEP03-SEP-YE2008R-REG	Seep Water			Lead
HR-139Q-SW/SD01	HR-139Q-SW/SD01-SW-YG2001-REG	Surface Water			TAL Metals, Explosives,
	HR-139Q-SW/SD01-SD-YG1001-REG	Sediment			Perchlorate, and TOC
HR-140Q-SW/SD01	HR-140Q-SW/SD01-SW-YH2001-REG	Surface Water			TAL Metals, Explosives,
	HR-140Q-SW/SD01-SD-YH1001-REG	Sediment			Perchlorate, and TOC
HR-141Q-SW/SD02	HR-141Q-SW/SD02-SW-YJ2002-REG	Surface Water			TAL Metals, Explosives, Perchlorate,
	HR-141Q-SW/SD02-SD-YJ1002-REG	Sediment			TOC, Grain Size (sediment only)

[a] No QA/QC samples specified in site-specific field sampling plan.

MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
QA/QC - Quality assurance/quality control.
REG - Field sample.
TAL - Target analyte list.
TOC - Total organic carbon.

Table 3-4

Surface Water and Seep Water Field Parameters
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Media	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
HR-138Q-SW/SD02	3-May-01	SW	0.016	8.16	NR	16.3	2	5.76
HR-138Q-SW/SD03	2-May-01	SW	0.017	8.07	NR	16.6	2	5.74
HR-138Q-SW/SD04	25-Apr-01	SW	0.026	7.48	NR	13.6	0	5.01
HR-138Q-SW/SD05	24-Apr-01	SW	0.016	2.70	NR	16.4	26	4.79
HR-138Q-SEEP01	2-May-01	Seep	0.020	5.46	NR	17.9	0	5.79
	10-Jan-02	Seep	0.019	7.47	340	12.1	2.2	5.24
HR-138Q-SEEP02	2-May-01	Seep	0.019	6.92	NR	17.1	0	5.72
	10-Jan-02	Seep	0.019	7.91	245	10.3	6.1	5.08
HR-138Q-SEEP03	2-May-01	Seep	0.026	11.40*	NR	18.4	9	5.61
	10-Jan-02	Seep	0.022	4.57	375	13.6	3.6	5.10
HR-139Q-SW/SD01	25-Apr-01	SW	0.018	8.85	NR	14.7	0	5.51
HR-140Q-SW/SD01	25-Apr-01	SW	0.017	6.79	NR	15.6	4	4.76
HR-141Q-SWSD02	3-May-01	SW	0.029	7.30	NR	15.7	1	5.50

* Result artificially elevated because the dissolved oxygen sensor was not completely immersed in the seep water.

°C - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NR - Not recorded.
NTU - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.
SW - Surface water.

0.5-foot of sediment with a stainless-steel spoon or hand auger and placed in a clean stainless-steel bowl. The sample was then 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 3-3 using methods outlined in Section 3.4.

3.3 Surveying of Sample Locations

Sample locations were surveyed using global positioning system survey techniques described in Section 4.3 of the SAP 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 based on the potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected at the Impact Areas South of Bains Gap Road were analyzed for the following parameters:

- Target analyte list metals – EPA Method 6010B/7000
- Nitroaromatic and nitramine explosives – EPA Method 8330
- Perchlorate – EPA Method 314.0.

The sediment samples were analyzed for the following additional parameters:

- Total organic carbon – EPA Method 9060
- Grain size – American Society for Testing and Materials Method D-422.

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).

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 Table 5-1 of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custody records were completed 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 EMAX Laboratories, Inc. in Torrance, California.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated during the SI at the Impact Areas South of Bains Gap Road was segregated as follows:

- Soil boring cuttings
- Decontamination fluids
- Personal protective equipment (PPE).

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

Liquid IDW was contained in the 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by volatile organic compound, semivolatile organic compound, 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

Five variances to the SFSP were recorded during completion of the SI at the Impact Areas South of Bains Gap Road. The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP (IT, 2001). The variances to the SFSP are summarized in Table 3-5 and the variance reports are included in Appendix D.

No nonconformances to the SFSP were recorded during the completion of the SI at the Impact Areas South of Bains Gap Road.

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix E. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and installation-wide quality assurance plan; and standard, accepted

Table 3-5

Variances to the Site-Specific Field Sampling Plan
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X and 142Q-X
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Surface water and sediment samples were not collected at sample location HR-138Q-SW/SD01. A depositional soil sample (HR-138Q-DEP01) was collected at this location.	Surface water and sediment were not present in the creek.	None. Data from the depositional soil sample were used to characterize the site.
Surface water and sediment samples were not collected at location HR-141Q-SW/SD01. A depositional soil sample (HR-141Q-DEP02) was collected at this location.	Surface water and sediment were not present in the creek.	None. Data from the depositional soil sample were used to characterize the site.
Surface water and sediment samples were not collected at location HR-141Q-SW/SD03. A depositional soil sample (HR-141Q-DEP01) was collected at this location.	Surface water and sediment were not present in the creek.	None. Data from the depositional soil sample were used to characterize the site.
Surface water and sediment samples were not collected at location HR-142Q-SW/SD01. A depositional soil sample (HR-142Q-DEP01) was collected at this location.	Surface water and sediment were not present in the creek.	None. Data from the depositional soil sample were used to characterize the site.
Surface water and sediment samples were not collected at location HR-142Q-SW/SD02. A depositional soil sample (HR-142Q-DEP02) was collected at this location.	Surface water and sediment were not present in the creek.	None. Data from the depositional soil sample were used to characterize the site.

methods and procedures. 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.

Data Validation. The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. The data validation results are summarized by parcel in quality assurance reports, which include the data validation summary reports (Appendix F). 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 (ITEMS™) database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs developed by IT. Rejected data (assigned an "R" qualifier) were not used in comparison to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at the Impact Areas South of Bains Gap Road, provided soil and bedrock data used to characterize the geology of the site. Because no wells were installed at the site, 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 (Osborne et al., 1988). These two formations are mapped only in the eastern part of the county.

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

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

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and 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 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 (Osborne et al., 1988). This unit locally occurs in the western portion of Pelham Range.

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

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

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

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

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

along the western boundary of the FTMC window, and along the trace of the Pell City fault on Pelham Range (Thomas and Neathery, 1982 and Osborne et al., 1988). The Coosa deformed belt is a narrow (approximately 5 to 20 miles wide) northeast- to-southwest-trending linear (approximately 90 miles in length) zone of complex structure consisting mainly of thin imbricate thrust slices. The structure within these imbricate thrust slices is often internally complicated by small-scale folding and additional thrust faults (Thomas and Drahovzal, 1974).

4.1.2 Site Geology

Soils at the Impact Areas South of Bains Gap Road consist mainly of the Stony Rough Land Sandstone series, which are soils of the higher elevations of the Choccolocco Mountains (U.S. Department of Agriculture [USDA], 1961). This miscellaneous land type consists of rough mountainous areas with many outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material. It also includes rock escarpments on higher parts of the mountains where quartzite of the Weisner Formation is common. Slopes are generally more than 25 percent. The soil material is generally shallow over bedrock.

A small area of the northern portion of Parcel 138Q-X consists of the Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded (USDA, 1961). The Jefferson series consists of well-drained, strongly acid soils that occur in small areas on fans and on foot slopes in the Choccolocco, Colvin, and Coldwater Mountains. These soils have developed from old local alluvium that washed or sloughed from ridges of sandstone, shale, and Weisner quartzite. The surface soil is dark grayish-brown fine sandy loam, and the subsoil is yellowish-brown, light fine sandy clay. Fragments of sandstone and quartzite as much as 8 inches in diameter are on the surface and throughout the profile.

The mapping unit, Jefferson stony fine sandy loam, 6 to 10 percent slopes, eroded, has strong slopes with high runoff. A few places are severely eroded and contain gullies. The solum ranges from 24 to 40 inches in thickness. Tilth is good and the root zone is thick. The stones range from 3 to 8 inches in diameter. A few small, scattered areas have moderate erosion.

Soil descriptions from the DPT soil borings revealed that soils beneath the site consist of silts and clays. DPT refusal was encountered at depths ranging from 4 to 11 feet bgs across the parcels. Competent or weathered bedrock was not encountered during DPT activities.

Bedrock beneath the site is mapped as the Cambrian Chilhowee Group (Osborne et al., 1997). 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 undifferentiated Wilson Ridge and Weisner Formations in Calhoun County consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear 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).

4.2 Surface Water Hydrology

Precipitation in the form of rainfall averages about 53 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (National Oceanic and Atmospheric Administration, 1998). 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.

Ground elevation at the Impact Areas South of Bains Gap Road ranges from approximately 975 feet above mean sea level (amsl) (within Parcel 138Q-X) to approximately 1,625 feet amsl (within Parcel 140Q-X). Surface drainage at the site follows the topography and generally flows to the north-northwest into several intermittent streams that eventually empty into Cane Creek northwest of the area. In addition, three seeps are located near the northwestern tip of Parcel 138Q-X and are part of the Marcheta Hill Orchid Seep SINA.

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at the Impact Areas South of Bains Gap Road indicate that metals were detected in the various site media. In addition, perchlorate and one explosive compound were detected in one surface soil sample each. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, the analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the on-going SIs being performed under the BRAC Environmental Restoration Program at FTMC.

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

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

5.1 Surface and Depositional Soil Analytical Results

Fourteen surface soil samples and five depositional soil samples were collected for chemical analysis at the Impact Areas South of Bains Gap Road. 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 screening values as presented in Table 5-1.

Metals. Twenty metals were detected in surface and depositional soil samples collected at the site. The antimony results, seven of the cobalt results, four of the potassium results, and one each of the mercury, nickel, and beryllium results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank.

The concentrations of six metals (aluminum, antimony, arsenic, iron, manganese, and thallium) exceeded SSSLs. Of these metals, only aluminum (three samples), antimony (HR-138Q-GP02), iron (HR-141Q-DEP02 and HR-142Q-DEP02), and manganese (three samples) also exceeded their respective background concentrations. With the exception of one “B”-flagged antimony result (8.4 milligrams per kilogram [mg/kg]), the results were within the range of background

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-DEP01						HR-138Q-GP01						HR-138Q-GP02					
Sample Number						YE0011						YE0001						YE0005					
Sample Date						3-May-01						31-Jan-01						1-Feb-01					
Sample Depth (Feet)						0- 1						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.08E+04				YES	YES	1.89E+04			YES	YES	YES	1.33E+04				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						8.40E+00	B	YES	YES	YES	YES
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	4.18E+00				YES		3.74E+00				YES		3.10E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	1.30E+02			YES			7.41E+01						8.09E+01					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	1.11E+00	J	YES	YES		YES	6.26E-01	J					4.30E-01	J				
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	3.51E+02						1.25E+02						1.42E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	7.53E+00					YES	1.39E+01					YES	1.57E+01					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	2.01E+01			YES		YES	1.84E+00	J					2.59E+00					
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	8.25E+00						5.27E+00						7.53E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	1.63E+04				YES	YES	1.65E+04	J			YES	YES	1.67E+04	J			YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.65E+01						1.12E+01						1.27E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	4.98E+02						4.36E+02						5.01E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	2.94E+02					YES	1.77E+02	J				YES	1.46E+02	J				YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	2.70E-02	J					3.70E-02	J					4.00E-02	J				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	4.49E+00						5.31E+00						4.16E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.91E+03			YES			2.42E+02	J					4.55E+02	J				
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						ND						ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.27E+01					YES	2.31E+01					YES	1.76E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	2.11E+01	J					1.70E+01	J					1.84E+01	J				
EXPLOSIVES																							
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						1.60E-01	J					ND					
PERCHLORATE																							
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-GP03						HR-138Q-GP04						HR-139Q-GP01					
Sample Number						YE0007						YE0009						YG0001					
Sample Date						31-Jan-01						31-Jan-01						8-Feb-01					
Sample Depth (Feet)						0- 1						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	9.78E+03				YES	YES	9.67E+03				YES	YES	7.81E+03				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	3.44E+00				YES		1.33E+00				YES		5.52E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	4.97E+01						7.33E+01						4.31E+01					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	3.29E-01	J					2.71E-01	J					5.65E-01	J				
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	8.61E+01	J					2.41E+02						3.06E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	9.34E+00					YES	6.63E+00					YES	6.03E+00	J				YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	2.32E+00	J					1.54E+00	B					1.63E+00	B				
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	3.38E+00						3.21E+00						8.07E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	1.07E+04	J			YES	YES	5.26E+03	J			YES	YES	8.92E+03				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.93E+01						1.06E+01						6.47E+00					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	3.01E+02						4.43E+02						3.44E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	1.18E+02	J				YES	7.71E+01	J					9.83E+01					
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	3.80E-02	J					ND						2.70E-02	J				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	2.50E+00						3.91E+00						2.82E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	2.53E+02	J					2.05E+02	J					2.89E+03			YES		
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						ND						ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.58E+01					YES	9.63E+00					YES	9.44E+00	J				YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	1.42E+01	J					1.30E+01	J					7.64E+00					
EXPLOSIVES																							
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND						ND					
PERCHLORATE																							
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-139Q-GP02						HR-140Q-GP01						HR-140Q-GP02					
Sample Number						YG0003						YH0001						YH0003					
Sample Date						7-Feb-01						7-Feb-01						8-Feb-01					
Sample Depth (Feet)						0- 1						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	9.25E+03				YES	YES	1.25E+04				YES	YES	2.17E+04			YES	YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	3.97E+00				YES		2.24E+00				YES		3.67E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	8.36E+01						9.57E+01						2.28E+02			YES		YES
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	5.22E-01	J					5.48E-01	J					2.40E+00		YES	YES		YES
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	4.96E+02						3.36E+02						3.64E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	6.31E+00	J				YES	1.09E+01					YES	1.11E+01					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	1.55E+00	B					1.09E+00	B					3.68E+01			YES		YES
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	7.35E+00						3.29E+00						1.18E+01					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	7.90E+03				YES	YES	1.50E+04				YES	YES	1.15E+04				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	3.29E+01						9.05E+00						2.54E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	3.25E+02						5.57E+02						1.23E+03			YES		
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	1.34E+02					YES	1.57E+02					YES	2.29E+03			YES	YES	YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	9.50E-02	J		YES			ND						5.10E-02	B				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	3.07E+00						3.83E+00						9.93E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	3.44E+02	B					1.25E+03			YES			9.71E+02			YES		
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	4.51E+01	J					ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						ND						ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.10E+01	J				YES	1.40E+01					YES	1.81E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	2.66E+01						1.42E+01						3.76E+01					
EXPLOSIVES																							
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND						ND					
PERCHLORATE																							
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-141Q-DEP01						HR-141Q-DEP02						HR-141Q-GP01					
Sample Number						YJ0009						YJ0010						YJ0001					
Sample Date						24-Apr-01						3-May-01						7-Feb-01					
Sample Depth (Feet)						0- 1						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.37E+04				YES	YES	1.17E+04				YES	YES	1.49E+04				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	4.40E+00				YES		6.12E+00				YES		3.14E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	1.67E+02			YES		YES	1.63E+02			YES			6.33E+01					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	1.05E+00	J	YES	YES			1.67E+00		YES	YES		YES	9.10E-01	J	YES	YES		
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	5.02E+02						4.85E+02						6.68E+01	J				
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	7.62E+00					YES	1.22E+01					YES	1.11E+01					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	4.09E+00	B					1.70E+01			YES			2.04E+00	J				
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	9.20E+00						6.32E+00						3.68E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	1.39E+04				YES	YES	3.90E+04			YES	YES	YES	1.49E+04				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	3.77E+01						2.01E+01						1.16E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	6.35E+02						5.64E+02						6.64E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	8.75E+02				YES	YES	1.62E+03			YES	YES	YES	2.37E+01					
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	6.00E-02	J					4.00E-02	J					4.30E-02	J				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	4.13E+00						6.81E+00						4.49E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.54E+03			YES			1.41E+03			YES			5.77E+02	J				
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						1.23E+00	J			YES	YES	ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.25E+01					YES	2.06E+01					YES	1.94E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	2.95E+01						2.54E+01	J					2.09E+01					
EXPLOSIVES																							
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND						ND					
PERCHLORATE																							
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-141Q-GP02						HR-141Q-GP03						HR-141Q-GP04					
Sample Number						YJ0003						YJ0005						YJ0007					
Sample Date						11-Apr-01						9-Feb-01						8-Feb-01					
Sample Depth (Feet)						0- 1						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.65E+04			YES	YES	YES	1.57E+04				YES	YES	8.91E+03				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	2.98E+00				YES		4.58E+00				YES		2.48E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	1.45E+02			YES			4.88E+02	J	YES	YES		YES	1.17E+02	J				
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	9.80E-01	J	YES	YES			3.10E+00		YES	YES		YES	8.67E-01	J		YES		
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	1.88E+02						1.67E+03						4.01E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	9.51E+00					YES	7.98E+00	J				YES	7.62E+00	J				YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	5.34E+00						1.18E+01	J					1.06E+01	J				
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	5.50E+00						1.19E+01						6.32E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	1.32E+04				YES	YES	1.44E+04				YES	YES	1.24E+04				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.05E+01						3.67E+01						1.42E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	8.46E+02						5.80E+02						3.62E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	1.61E+02					YES	2.09E+03			YES	YES	YES	5.43E+02				YES	YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						6.50E-02	J					2.40E-02	J				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	5.45E+00						6.85E+00	J					1.49E+00	B				
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.52E+03			YES			7.26E+02						5.51E+02	J				
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						2.62E+01	J					2.43E+01	J				
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						ND						ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.54E+01					YES	1.32E+01					YES	1.24E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	2.14E+01						5.94E+01	J		YES		YES	1.56E+01	J				
EXPLOSIVES																							
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND						ND					
PERCHLORATE																							
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-142Q-DEP01						HR-142Q-DEP02					
Sample Number						YL0005						YL0006					
Sample Date						24-Apr-01						24-Apr-01					
Sample Depth (Feet)						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.04E+04				YES	YES	1.22E+04				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	4.66E+00				YES		6.50E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	1.09E+02						1.20E+02					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	1.09E+00	J	YES	YES			9.75E-01	B	YES	YES		
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	2.77E+02						2.65E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	9.44E+00					YES	1.72E+01					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	6.48E+00						1.03E+01					
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	1.12E+01						7.57E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	2.80E+04				YES	YES	3.72E+04			YES	YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	2.41E+01						3.06E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	4.68E+02						5.16E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	4.59E+02				YES	YES	8.81E+02				YES	YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						ND					
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	5.60E+00						5.62E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.83E+03			YES			1.07E+03	B		YES		
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	9.00E-01	J			YES		1.01E+00	J			YES	YES
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	1.49E+01					YES	2.49E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	2.65E+01						2.49E+01					
EXPLOSIVES																	
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND					
PERCHLORATE																	
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	ND						ND					

Table 5-1

Surface and Depositional Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-142Q-GP01						HR-142Q-GP02					
Sample Number						YL0001						YL0003					
Sample Date						8-Feb-01						8-Feb-01					
Sample Depth (Feet)						0- 1						0- 1					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	7.09E+03					YES	8.11E+03				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	1.14E+00	J			YES		1.07E+00	J			YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	6.07E+01						4.59E+01					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	3.13E-01	J					2.40E-01	J				
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	1.85E+02						9.58E+01	J				
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	4.05E+00					YES	7.08E+00					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	1.85E+00	B					1.31E+00	B				
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	3.13E+00						3.72E+00					
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	5.90E+03				YES	YES	7.25E+03				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.07E+01						6.70E+00					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	1.84E+02						1.96E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	3.91E+01						3.84E+01					
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	3.50E-02	J					ND					
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	2.20E+00	J					1.98E+00	J				
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	3.42E+02	B					3.45E+02	B				
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	ND						ND					
Thallium	mg/kg	3.40E+01	3.43E+00	5.08E-01	1.00E+00	ND						ND					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	7.80E+00					YES	9.16E+00					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	7.02E+00						6.81E+00					
EXPLOSIVES																	
2-Amino-4,6-dinitrotoluene	mg/kg	NA	NA	4.64E-01	8.00E+01	ND						ND					
PERCHLORATE																	
Perchlorate	mg/kg	NA	NA	7.04E+00	NA	3.19E-02	J					ND					

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

[a] UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

[c] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 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 - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-138Q-GP01					HR-138Q-GP02					HR-138Q-GP03					HR-138Q-GP04				
Sample Number					YE0002					YE0006					YE0008					YE0010				
Sample Date					31-Jan-01					1-Feb-01					31-Jan-01					31-Jan-01				
Sample Depth (Feet)					9 - 11					4 - 5					7 - 8					10 - 11				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																								
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	6.05E+03					2.34E+04			YES	YES	2.51E+04		YES	YES	YES	1.87E+04			YES	YES
Antimony	mg/kg	9.90E-01	1.31E+00	3.11E+00	ND					ND					ND					7.61E+00	B	YES	YES	YES
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	7.12E+00				YES	3.73E+00				YES	7.38E+00				YES	7.34E+00				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	1.40E+01					3.28E+01					2.77E+01					3.80E+01				
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	4.22E-01	J				4.24E-01	J				2.96E-01	J				3.64E-01	J			
Calcium	mg/kg	3.65E+03	6.37E+02	NA	1.51E+01	J				5.39E+01	J				1.75E+01	J				3.08E+01	J			
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	1.01E+01					1.67E+01					3.23E+01				YES	1.65E+01				
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	8.07E-01	B				2.20E+00	J				1.86E+00	J				1.83E+00	J			
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	4.85E+00					1.06E+01					1.02E+01					6.04E+00				
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	1.56E+04	J			YES	3.30E+04	J			YES	2.96E+04	J			YES	3.81E+04	J			YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	5.28E+00					7.38E+00					8.10E+00					7.93E+00				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	1.87E+02					5.51E+02					7.50E+02					3.80E+02				
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	3.26E+00	J				4.79E+01	J				1.48E+01	J				2.58E+01	J			
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					4.20E-02	J				2.60E-02	J				ND				
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	2.60E+00					4.68E+00					4.71E+00					2.33E+00	J			
Potassium	mg/kg	6.15E+03	7.11E+02	NA	1.75E+03			YES		4.61E+02	J				8.38E+02			YES		1.64E+03			YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					ND					ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	ND					ND					ND					ND				
Thallium	mg/kg	2.40E+01	1.40E+00	5.08E-01	ND					8.17E-01	J			YES	7.17E-01	J			YES	ND				
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	1.40E+01					2.66E+01					5.01E+01					2.26E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	1.11E+01	J				2.13E+01	J				1.66E+01	J				1.11E+01	J			

Table 5-2

Subsurface Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-139Q-GP01					HR-139Q-GP02					HR-140Q-GP01					HR-140Q-GP02				
Sample Number					YG0002					YG0004					YH0002					YH0004				
Sample Date					8-Feb-01					7-Feb-01					7-Feb-01					8-Feb-01				
Sample Depth (Feet)					10 - 11					9 - 11					7 - 8					1 - 2				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																								
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	8.64E+03				YES	1.10E+04				YES	1.36E+04			YES	YES	1.81E+04			YES	YES
Antimony	mg/kg	9.90E-01	1.31E+00	3.11E+00	ND					4.86E+00	J	YES	YES	YES	ND					ND				
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	5.01E+00				YES	5.42E+00				YES	3.86E+00				YES	3.23E+00				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	3.36E+01					2.44E+01					3.02E+01					1.27E+02				
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	6.72E-01	J				3.89E-01	J				6.89E-01	J				9.38E-01	J		YES	
Calcium	mg/kg	3.65E+03	6.37E+02	NA	2.81E+01	J				1.70E+01	J				1.35E+01	J				1.19E+02	J			
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	8.39E+00	J				8.17E+00	J				7.38E+00					1.20E+01				
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	8.34E-01	B				ND					ND					2.57E+01			YES	
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	1.21E+01					1.02E+01					6.79E+00					9.82E+00				
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	1.27E+04				YES	6.74E+03				YES	1.29E+04				YES	1.31E+04				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	4.28E+00					6.89E+00					9.58E+00					1.16E+01				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	3.43E+02					3.89E+02					4.98E+02					1.07E+03			YES	
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	6.40E+00					2.75E+00					8.10E+00					7.78E+02				YES
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND					ND					ND				
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	2.68E+00					1.05E+00	J				3.56E+00					8.42E+00				
Potassium	mg/kg	6.15E+03	7.11E+02	NA	3.77E+03			YES		3.30E+03			YES		2.31E+03			YES		1.48E+03			YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	5.06E-01	B		YES		ND					ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	ND					3.75E+01	J				ND					ND				
Thallium	mg/kg	2.40E+01	1.40E+00	5.08E-01	ND					ND					ND					ND				
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	1.06E+01	J				1.57E+01	J				9.18E+00					1.87E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	6.71E+00					4.19E+00					5.43E+00					2.56E+01				

Table 5-2

Subsurface Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-141Q-GP01					HR-141Q-GP02					HR-141Q-GP03					HR-141Q-GP04				
Sample Number					YJ0002					YJ0004					YJ0006					YJ0008				
Sample Date					7-Feb-01					11-Apr-01					9-Feb-01					8-Feb-01				
Sample Depth (Feet)					5 - 6					3 - 4					2 - 4					2 - 4				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																								
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	1.51E+04			YES	YES	1.27E+04				YES	1.19E+04				YES	1.30E+04				YES
Antimony	mg/kg	9.90E-01	1.31E+00	3.11E+00	ND					ND					ND					ND				
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	5.50E+00				YES	5.00E+00				YES	4.70E+00				YES	5.44E+00				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	2.73E+01					7.18E+01					1.05E+02	J				5.75E+01	J			
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	1.08E+00	J		YES		1.14E+00	J		YES		9.33E-01	J		YES		4.82E-01	J			
Calcium	mg/kg	3.65E+03	6.37E+02	NA	1.61E+01	J				4.35E+01	J				1.24E+02					7.10E+01	J			
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	1.17E+01					9.36E+00					2.15E+01	J				1.77E+01	J			
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	8.16E-01	B				1.31E+00	B				6.64E+00	J				2.66E+00	J			
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	5.09E+00					7.86E+00					1.20E+01					9.25E+00				
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	1.37E+04				YES	6.19E+03				YES	3.54E+04				YES	2.55E+04				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	5.02E+00					1.17E+01					9.07E+00					8.41E+00				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	4.33E+02					4.54E+02					4.42E+02					4.65E+02				
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	2.98E+00					8.16E+00					3.02E+02					8.19E+01				
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND					ND					2.30E-02	J			
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	4.12E+00					2.15E+00	J				6.00E+00	J				3.09E+00	B			
Potassium	mg/kg	6.15E+03	7.11E+02	NA	2.75E+03			YES		4.79E+03			YES		8.20E+02			YES		1.34E+03			YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					ND					ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	ND					ND					ND					2.33E+01	J			
Thallium	mg/kg	2.40E+01	1.40E+00	5.08E-01	ND					ND					ND					ND				
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	1.63E+01					1.40E+01					1.83E+01					2.31E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	1.11E+01					1.16E+01					1.77E+01	J				1.73E+01	J			

Table 5-2

Subsurface Soil Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-142Q-GP01					HR-142Q-GP02				
Sample Number					YL0002					YL0004				
Sample Date					8-Feb-01					8-Feb-01				
Sample Depth (Feet)					1 - 4					9 - 10				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS														
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	9.73E+03				YES	7.11E+03				
Antimony	mg/kg	9.90E-01	1.31E+00	3.11E+00	ND					ND				
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	1.43E+00				YES	4.46E+00				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	4.52E+01					3.69E+01				
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	3.81E-01	J				2.27E-01	J			
Calcium	mg/kg	3.65E+03	6.37E+02	NA	1.22E+02					1.45E+01	J			
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	9.59E+00					7.06E+00				
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	1.30E+00	B				ND				
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	4.37E+00					4.81E+00				
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	1.72E+04				YES	6.34E+03				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	9.20E+00					4.48E+00				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	1.93E+02					1.13E+02	J			
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	2.91E+01					1.57E+00				
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND				
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	3.01E+00					1.47E+00	J			
Potassium	mg/kg	6.15E+03	7.11E+02	NA	3.22E+02	B				2.79E+03			YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	ND					ND				
Thallium	mg/kg	2.40E+01	1.40E+00	5.08E-01	ND					ND				
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	1.26E+01					1.03E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	7.92E+00					1.20E+00	B			

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

[a] UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

[c] 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 - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Seep Water Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-138Q-SEEP01					HR-138Q-SEEP01					HR-138Q-SEEP02					HR-138Q-SEEP02				
Sample Number					YE2006					YE2006R					YE2007					YE2007R				
Sample Date					2-May-01					10-Jan-02					2-May-01					10-Jan-02				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																								
Aluminum	mg/L	9.60E+00	2.34E+00	1.56E+00	6.23E-01					NR					2.21E-01					NR				
Barium	mg/L	4.01E-01	1.27E-01	1.10E-01	5.16E-02					NR					2.38E-02					NR				
Beryllium	mg/L	2.40E-03	1.25E-03	3.13E-03	ND					NR					ND					NR				
Calcium	mg/L	4.52E+02	5.65E+01	NA	1.44E-01	B				NR					ND					NR				
Copper	mg/L	2.35E-01	2.55E-02	6.26E-02	ND					NR					5.10E-03	B				NR				
Iron	mg/L	2.58E+01	7.04E+00	4.69E-01	7.09E-01				YES	NR					2.93E-01					NR				
Lead	mg/L	2.70E-02	8.00E-03	1.50E-02	1.94E-02			YES	YES	4.37E-03	J				9.29E-03	J		YES		3.21E-03	J			
Magnesium	mg/L	1.49E+02	2.13E+01	NA	2.35E-01	J				NR					1.55E-01	J				NR				
Manganese	mg/L	5.82E+00	5.81E-01	7.35E-02	1.52E-02					NR					1.03E-02					NR				
Potassium	mg/L	6.85E+01	7.20E+00	NA	2.60E+00	J				NR					2.27E+00	J				NR				
Sodium	mg/L	6.47E+01	1.48E+01	NA	9.21E-01	J				NR					8.68E-01	J				NR				
Vanadium	mg/L	1.10E-02	1.70E-02	1.10E-02	ND					NR					ND					NR				
Zinc	mg/L	1.16E+00	2.20E-01	4.69E-01	ND					NR					ND					NR				

Table 5-3

Seep Water Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-138Q-SEEP03					HR-138Q-SEEP03				
Sample Number					YE2008					YE2008R				
Sample Date					2-May-01					10-Jan-02				
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS														
Aluminum	mg/L	9.60E+00	2.34E+00	1.56E+00	2.19E+00				YES	NR				
Barium	mg/L	4.01E-01	1.27E-01	1.10E-01	1.40E-01			YES	YES	NR				
Beryllium	mg/L	2.40E-03	1.25E-03	3.13E-03	6.50E-04	J				NR				
Calcium	mg/L	4.52E+02	5.65E+01	NA	5.92E-01	J				NR				
Copper	mg/L	2.35E-01	2.55E-02	6.26E-02	1.31E-02	J				NR				
Iron	mg/L	2.58E+01	7.04E+00	4.69E-01	3.78E+00				YES	NR				
Lead	mg/L	2.70E-02	8.00E-03	1.50E-02	4.53E-02		YES	YES	YES	2.00E-03	J			
Magnesium	mg/L	1.49E+02	2.13E+01	NA	3.64E-01	J				NR				
Manganese	mg/L	5.82E+00	5.81E-01	7.35E-02	2.42E-02					NR				
Potassium	mg/L	6.85E+01	7.20E+00	NA	3.25E+00	J				NR				
Sodium	mg/L	6.47E+01	1.48E+01	NA	1.08E+00					NR				
Vanadium	mg/L	1.10E-02	1.70E-02	1.10E-02	4.05E-03	J				NR				
Zinc	mg/L	1.16E+00	2.20E-01	4.69E-01	1.10E-02	J				NR				

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

[a] UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

[c] 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 - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-4

Surface Water Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-SW/SD02						HR-138Q-SW/SD03						HR-138Q-SW/SD04					
Sample Number						YE2002						YE2003						YE2004					
Sample Date						3-May-01						2-May-01						25-Apr-01					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/L	4.78E+01	5.26E+00	1.53E+01	8.70E-02	1.73E-01	J				YES	8.43E-02	J					6.10E-02	J				
Barium	mg/L	2.00E-01	7.54E-02	1.10E+00	3.90E-03	2.28E-02					YES	1.67E-02					YES	2.12E-02					YES
Calcium	mg/L	6.41E+01	2.52E+01	NA	1.16E+02	1.66E-01	B					1.45E-01	B					2.78E-01	J				
Copper	mg/L	7.20E-02	1.27E-02	6.23E-01	6.54E-03	ND						ND						ND					
Iron	mg/L	2.32E+02	1.96E+01	4.70E+00	1.00E+00	2.17E-01						6.36E-02	J					4.00E-02	J				
Lead	mg/L	4.70E-02	8.67E-03	1.50E-02	1.32E-03	2.53E-03	B				YES	3.67E-03	B				YES	ND					
Magnesium	mg/L	2.44E+01	1.10E+01	NA	8.20E+01	2.44E-01	J					2.66E-01	J					2.95E-01	J				
Manganese	mg/L	6.06E+00	5.65E-01	6.40E-01	8.00E-02	1.32E-02						7.33E-03	J					6.51E-03	J				
Nickel	mg/L	7.00E-02	2.25E-02	3.10E-01	8.77E-02	ND						ND						ND					
Potassium	mg/L	7.12E+00	2.56E+00	NA	5.30E+01	ND						2.94E+00	J		YES			2.25E+00	J				
Selenium	mg/L	NA	NA	7.82E-02	5.00E-03	ND						ND						ND					
Sodium	mg/L	1.52E+01	3.44E+00	NA	6.80E+02	9.34E-01	J					1.08E+00						8.50E-01	J				
Zinc	mg/L	1.82E-01	4.04E-02	4.65E+00	5.89E-02	ND						ND						ND					

Table 5-4

Surface Water Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-SW/SD05						HR-139Q-SW/SD01					
Sample Number						YE2005						YG2001					
Sample Date						24-Apr-01						25-Apr-01					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/L	4.78E+01	5.26E+00	1.53E+01	8.70E-02	2.44E-01					YES	3.76E-01					YES
Barium	mg/L	2.00E-01	7.54E-02	1.10E+00	3.90E-03	2.58E-02					YES	3.47E-02					YES
Calcium	mg/L	6.41E+01	2.52E+01	NA	1.16E+02	2.13E-01	J					2.75E-01	J				
Copper	mg/L	7.20E-02	1.27E-02	6.23E-01	6.54E-03	1.08E-02	J				YES	ND					
Iron	mg/L	2.32E+02	1.96E+01	4.70E+00	1.00E+00	6.31E-01						4.06E-01					
Lead	mg/L	4.70E-02	8.67E-03	1.50E-02	1.32E-03	2.08E-02			YES	YES	YES	ND					
Magnesium	mg/L	2.44E+01	1.10E+01	NA	8.20E+01	2.03E-01	J					3.12E-01	J				
Manganese	mg/L	6.06E+00	5.65E-01	6.40E-01	8.00E-02	1.46E-02						4.26E-02					
Nickel	mg/L	7.00E-02	2.25E-02	3.10E-01	8.77E-02	ND						ND					
Potassium	mg/L	7.12E+00	2.56E+00	NA	5.30E+01	ND						2.76E+00	J		YES		
Selenium	mg/L	NA	NA	7.82E-02	5.00E-03	1.75E-03	J					ND					
Sodium	mg/L	1.52E+01	3.44E+00	NA	6.80E+02	8.37E-01	J					8.24E-01	J				
Zinc	mg/L	1.82E-01	4.04E-02	4.65E+00	5.89E-02	8.53E-03	J					8.66E-03	J				

Table 5-4

Surface Water Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-140Q-SW/SD01						HR-141Q-SW/SD02					
Sample Number						YH2001						YJ2002					
Sample Date						25-Apr-01						3-May-01					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/L	4.78E+01	5.26E+00	1.53E+01	8.70E-02	1.19E-01	J				YES	5.96E-01					YES
Barium	mg/L	2.00E-01	7.54E-02	1.10E+00	3.90E-03	2.83E-02					YES	3.55E-02					YES
Calcium	mg/L	6.41E+01	2.52E+01	NA	1.16E+02	3.28E-01	J					1.70E-01	B				
Copper	mg/L	7.20E-02	1.27E-02	6.23E-01	6.54E-03	ND						ND					
Iron	mg/L	2.32E+02	1.96E+01	4.70E+00	1.00E+00	5.70E-02	J					7.79E-01					
Lead	mg/L	4.70E-02	8.67E-03	1.50E-02	1.32E-03	ND						ND					
Magnesium	mg/L	2.44E+01	1.10E+01	NA	8.20E+01	3.73E-01	J					2.33E-01	J				
Manganese	mg/L	6.06E+00	5.65E-01	6.40E-01	8.00E-02	6.08E-03	J					6.45E-02					
Nickel	mg/L	7.00E-02	2.25E-02	3.10E-01	8.77E-02	1.09E-02	B					ND					
Potassium	mg/L	7.12E+00	2.56E+00	NA	5.30E+01	2.75E+00	J		YES			ND					
Selenium	mg/L	NA	NA	7.82E-02	5.00E-03	ND						ND					
Sodium	mg/L	1.52E+01	3.44E+00	NA	6.80E+02	9.02E-01	J					1.01E+00					
Zinc	mg/L	1.82E-01	4.04E-02	4.65E+00	5.89E-02	ND						ND					

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

[a] UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*July.

[b] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

[c] 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 - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-5

Sediment Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-SW/SD02						HR-138Q-SW/SD03						HR-138Q-SW/SD04					
Sample Number						YE1003						YE1004						YE1005					
Sample Date						3-May-01						2-May-01						25-Apr-01					
Sample Depth (Feet)						0- 0.5						0- 0.5						0- 0.5					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	1.74E+04	8.59E+03	1.15E+06	NA	7.06E+03						1.68E+02						7.57E+03					
Arsenic	mg/kg	2.00E+01	1.13E+01	5.58E+01	7.24E+00	6.74E+00						ND						3.88E+00					
Barium	mg/kg	2.72E+02	9.89E+01	8.36E+04	NA	1.26E+02			YES			6.19E+00						7.48E+01					
Beryllium	mg/kg	1.20E+00	9.70E-01	1.50E+02	NA	1.06E+00	J		YES			ND						7.96E-01	B				
Calcium	mg/kg	2.81E+03	1.11E+03	NA	NA	3.59E+02						2.92E+01	J					1.10E+02	J				
Chromium	mg/kg	6.30E+01	3.12E+01	2.79E+03	5.23E+01	2.37E+01						ND						1.42E+01					
Cobalt	mg/kg	2.20E+01	1.10E+01	6.72E+04	5.00E+01	7.04E+00						6.53E-01	J					3.56E+00	B				
Copper	mg/kg	5.90E+01	1.71E+01	4.74E+04	1.87E+01	5.38E+00						ND						4.97E+00					
Iron	mg/kg	5.75E+04	3.53E+04	3.59E+05	NA	3.54E+04			YES			8.95E+01						2.93E+04					
Lead	mg/kg	1.10E+02	3.78E+01	4.00E+02	3.02E+01	1.14E+01						5.62E+00						7.26E+00					
Magnesium	mg/kg	3.27E+03	9.06E+02	NA	NA	3.36E+02						1.38E+01	J					3.15E+02					
Manganese	mg/kg	2.05E+03	7.12E+02	4.38E+04	NA	2.33E+02						1.35E+01						1.39E+02					
Nickel	mg/kg	3.30E+01	1.30E+01	1.76E+04	1.59E+01	5.13E+00						ND						3.97E+00					
Potassium	mg/kg	4.81E+03	1.01E+03	NA	NA	1.62E+03			YES			ND						1.85E+03			YES		
Thallium	mg/kg	2.20E-01	1.30E-01	7.78E+01	NA	ND						ND						8.52E-01	J	YES	YES		
Vanadium	mg/kg	6.70E+01	4.09E+01	4.83E+03	NA	2.02E+01						ND						1.70E+01					
Zinc	mg/kg	1.11E+02	5.27E+01	3.44E+05	1.24E+02	1.75E+01	J					1.01E+00	B					1.39E+01					
TOTAL ORGANIC CARBON																							
Total Organic Carbon	mg/kg	NA	NA	NA	NA	2.37E+01						7.41E+00						4.92E+01					

Table 5-5

Sediment Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-138Q-SW/SD05						HR-139Q-SW/SD01					
Sample Number						YE1006						YG1001					
Sample Date						24-Apr-01						25-Apr-01					
Sample Depth (Feet)						0- 0.5						0- 0.5					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/kg	1.74E+04	8.59E+03	1.15E+06	NA	2.51E+03						6.13E+03					
Arsenic	mg/kg	2.00E+01	1.13E+01	5.58E+01	7.24E+00	7.70E-01	J					3.78E+00					
Barium	mg/kg	2.72E+02	9.89E+01	8.36E+04	NA	4.64E+01						6.42E+01					
Beryllium	mg/kg	1.20E+00	9.70E-01	1.50E+02	NA	ND						7.71E-01	B				
Calcium	mg/kg	2.81E+03	1.11E+03	NA	NA	6.42E+01	B					1.23E+02					
Chromium	mg/kg	6.30E+01	3.12E+01	2.79E+03	5.23E+01	1.10E+00	B					5.99E+00					
Cobalt	mg/kg	2.20E+01	1.10E+01	6.72E+04	5.00E+01	ND						3.78E+00	B				
Copper	mg/kg	5.90E+01	1.71E+01	4.74E+04	1.87E+01	1.17E+01						2.07E+00	J				
Iron	mg/kg	5.75E+04	3.53E+04	3.59E+05	NA	1.59E+03						2.54E+04					
Lead	mg/kg	1.10E+02	3.78E+01	4.00E+02	3.02E+01	8.93E+01			YES		YES	5.09E+00					
Magnesium	mg/kg	3.27E+03	9.06E+02	NA	NA	9.84E+01	J					2.76E+02					
Manganese	mg/kg	2.05E+03	7.12E+02	4.38E+04	NA	5.57E+00						2.67E+02					
Nickel	mg/kg	3.30E+01	1.30E+01	1.76E+04	1.59E+01	ND						3.92E+00					
Potassium	mg/kg	4.81E+03	1.01E+03	NA	NA	ND						1.61E+03			YES		
Thallium	mg/kg	2.20E-01	1.30E-01	7.78E+01	NA	ND						ND					
Vanadium	mg/kg	6.70E+01	4.09E+01	4.83E+03	NA	1.74E+00	B					1.04E+01					
Zinc	mg/kg	1.11E+02	5.27E+01	3.44E+05	1.24E+02	4.78E+00						1.26E+01					
TOTAL ORGANIC CARBON																	
Total Organic Carbon	mg/kg	NA	NA	NA	NA	5.54E+01						3.18E+01					

Table 5-5

Sediment Analytical Results
Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location						HR-140Q-SW/SD01						HR-141Q-SW/SD02					
Sample Number						YH1001						YJ1002					
Sample Date						25-Apr-01						3-May-01					
Sample Depth (Feet)						0- 0.5						0- 0.5					
Parameter	Units	UBR[a]	BKG[b]	SSSL[c]	ESV[c]	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																	
Aluminum	mg/kg	1.74E+04	8.59E+03	1.15E+06	NA	7.18E+03						6.04E+03					
Arsenic	mg/kg	2.00E+01	1.13E+01	5.58E+01	7.24E+00	5.61E+00						1.73E+00					
Barium	mg/kg	2.72E+02	9.89E+01	8.36E+04	NA	9.43E+01						6.80E+01					
Beryllium	mg/kg	1.20E+00	9.70E-01	1.50E+02	NA	7.79E-01	B					7.15E-01	J				
Calcium	mg/kg	2.81E+03	1.11E+03	NA	NA	1.49E+02						1.41E+02	J				
Chromium	mg/kg	6.30E+01	3.12E+01	2.79E+03	5.23E+01	1.76E+01						5.09E+00					
Cobalt	mg/kg	2.20E+01	1.10E+01	6.72E+04	5.00E+01	8.50E+00						4.64E+00					
Copper	mg/kg	5.90E+01	1.71E+01	4.74E+04	1.87E+01	5.83E+00						5.63E+00					
Iron	mg/kg	5.75E+04	3.53E+04	3.59E+05	NA	3.31E+04						8.76E+03					
Lead	mg/kg	1.10E+02	3.78E+01	4.00E+02	3.02E+01	9.19E+00						8.50E+00					
Magnesium	mg/kg	3.27E+03	9.06E+02	NA	NA	3.16E+02						3.01E+02					
Manganese	mg/kg	2.05E+03	7.12E+02	4.38E+04	NA	3.30E+02						6.94E+01					
Nickel	mg/kg	3.30E+01	1.30E+01	1.76E+04	1.59E+01	5.13E+00						3.96E+00					
Potassium	mg/kg	4.81E+03	1.01E+03	NA	NA	2.03E+03			YES			1.64E+03			YES		
Thallium	mg/kg	2.20E-01	1.30E-01	7.78E+01	NA	1.27E+00	J	YES	YES			ND					
Vanadium	mg/kg	6.70E+01	4.09E+01	4.83E+03	NA	1.74E+01						8.39E+00					
Zinc	mg/kg	1.11E+02	5.27E+01	3.44E+05	1.24E+02	1.10E+01						1.58E+01	J				
TOTAL ORGANIC CARBON																	
Total Organic Carbon	mg/kg	NA	NA	NA	NA	2.63E+01						4.05E+01					

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

[a] UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

[c] 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 - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

values determined by SAIC (1998) (Appendix G). Antimony was not detected in any other surface and depositional soil samples.

Eleven metals (aluminum, antimony, barium, beryllium, chromium, cobalt, iron, manganese, thallium, vanadium, and zinc) were detected at concentrations exceeding ESVs. Of these metals, aluminum (three samples), antimony (HR-138Q-GP02), barium (three samples), beryllium (four samples), cobalt (two samples), iron (two samples), manganese (three samples), and zinc (HR-141Q-GP03) also exceeded their respective background concentrations. However, the concentrations of the metals that exceeded ESVs and their respective background concentrations were within the range of background values except for the following:

- Antimony (8.4 mg/kg) exceeded its ESV (3.5 mg/kg) and upper background range (2.6 mg/kg) in one sample (HR-138Q-GP02)
- Barium (488 mg/kg) exceeded its ESV (165 mg/kg) and upper background range (288 mg/kg) in one sample (HR-141Q-GP03);
- Beryllium (1.1 to 3.1 mg/kg) exceeded its ESV (1.1 mg/kg) and upper background range (0.87 mg/kg) in four samples.

Explosives. One explosive compound (2-amino-4,6-dinitrotoluene) was detected in one surface soil sample (HR-138Q-GP01) at a concentration below its SSSL and ESV.

Perchlorate. Perchlorate was detected in one surface soil sample (HR-142Q-GP01) at a concentration below its SSSL (note: an ESV for perchlorate is not available).

5.2 Subsurface Soil Analytical Results

Fourteen subsurface soil samples were collected for chemical analysis at the Impact Areas South of Bains Gap Road. Subsurface soil samples were collected at depths greater than 1-foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Twenty-one metals were detected in subsurface soil samples collected at the Impact Areas South of Bains Gap Road. Five cobalt results and one each of the antimony, silver, and potassium results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank.

The concentrations of seven metals (aluminum, antimony, arsenic, chromium, iron, manganese, and thallium) exceeded SSSLs. Of these metals, only aluminum (six locations) and antimony (two locations) also exceeded their respective background concentrations. With the exception of the antimony results (7.61 and 4.86 mg/kg) and one aluminum result (25,100 mg/kg), the metals that exceeded SSSLs and their respective background concentrations were within the range of background values determined by SAIC (1998) (Appendix G).

Explosives. Explosives were not detected in the subsurface soil samples collected at the site.

Perchlorate. Perchlorate was not detected in the subsurface soil samples collected at the site.

5.3 Seep Water Analytical Results

Seep water samples were collected from three locations for chemical analysis at the Impact Areas South of Bains Gap Road, as shown on Figure 3-1. Analytical results were compared to residential human health SSSLs (groundwater) and metals background screening values, as presented in Table 5-3.

Metals. Thirteen metals were detected in seep water samples collected at the Impact Areas South of Bains Gap Road. The concentrations of four metals (aluminum, barium, iron, and lead) exceeded SSSLs. Of these metals, barium (one sample) and lead (two samples) also exceeded their respective background concentrations. With the exception of one lead result, the metals concentrations were within the range of background values determined by SAIC (1998) (Appendix G). The concentration of lead (0.045 milligrams per liter [mg/L]) exceeded its SSSL (0.015 mg/L), background concentration (0.008 mg/L), and upper background range (0.027 mg/L) in the sample collected at HR-138Q-SEEP03. To confirm the lead results, the seeps were re-sampled in January 2002 and analyzed for lead only. Lead concentrations in the seep re-samples were below the SSSL and the background concentration (Table 5-3).

Explosives. Explosives were not detected in the seep water samples collected at the site.

Perchlorate. Perchlorate was not detected in the seep water samples collected at the site.

5.4 Surface Water Analytical Results

Seven surface water samples were collected for chemical analysis at the Impact Areas South of Bains Gap Road, at the locations shown on Figure 3-1. Analytical results were compared to

recreational site-user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-4.

Metals. Thirteen metals were detected in surface water samples collected at the Impact Areas South of Bains Gap Road. The nickel results, three of the calcium results, and two of the lead results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank sample.

Only lead exceeded its SSSL and respective background concentration in one sample (HR-138Q-SW/SD05). However, the lead concentration (0.0208 mg/L) was within the upper background range (0.047 mg/L).

The concentrations of four metals (aluminum, barium, copper, and lead) exceeded ESVs. With the exception of the aforementioned lead result, the concentrations of these metals were below their respective background concentrations. The lead concentration was within the range of background values determined by SAIC (1998).

Explosives. Explosives were not detected in the surface water samples collected at the site.

Perchlorate. Perchlorate was not detected in the surface water samples collected at the site.

5.5 Sediment Analytical Results

Seven sediment samples were collected for chemical and physical analyses at the Impact Areas South of Bains Gap Road at the locations shown on Figure 3-1. Analytical results were compared to recreational site-user human health SSSLs, ESVs, and background screening values, as presented in Table 5-5.

Metals. Seventeen metals were detected in sediment samples collected at the Impact Areas South of Bains Gap Road. Three of the beryllium results, two of the cobalt results, and one each of the calcium, chromium, vanadium, and zinc results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank sample.

The metals concentrations in sediments were below SSSLs. Only one metal (lead) exceeded its ESV and respective background concentration in one sample (HR-138Q-SW/SD05). However, the lead concentration (89.3 mg/kg) was within the upper background range (110 mg/kg).

Explosives. Explosives were not detected in the sediment samples collected at the site.

Perchlorate. Perchlorate was not detected in the sediment samples collected at the site.

Total Organic Carbon. The sediment samples were analyzed for total organic carbon (TOC). TOC concentrations in the samples ranged from 7.41 mg/kg to 55.4 mg/kg, as summarized in Appendix E.

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

5.6 Preliminary Risk Assessment

A Preliminary Risk Assessment (PRA) was performed to further characterize the potential threat to human health from exposure to environmental media at the Impact Areas South of Bains Gap Road. The PRA approach was developed at the request of EPA and ADEM to provide a fast and inexpensive estimation of risk for relatively simple sites. It was derived from the streamlined risk assessment (SRA) protocol developed for FTMC and documented in the Installation-Wide Work Plan (IT, 1998). A PRA is a simplified version of a SRA, differing primarily in that the maximum detected concentration (MDC) rather than an estimate of average is adopted as the source-term concentration (STC) for use in the risk assessment. However, a PRA cannot be less conservative (protective) than a SRA and is generally more protective. The PRA for the Impact Areas South of Bains Gap Road is included as Appendix H. It discusses the environmental media of interest, selection of site-related chemicals, selection of chemicals of potential concern (COPC), risk characterization and conclusions.

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

The SSSLs applied to a given site represent the most highly exposed receptor scenario for each of several plausible uses for the site. For the Impact Areas South of Bains Gap Road, both the recreational site user and on-site resident receptor scenarios were evaluated. COPCs were selected from the site-related chemicals identified in the previous sections by comparing the MDC of the site-related chemical with the appropriate SSSL. Chemicals that were identified as

not being site-related were dropped from further consideration because their presence was not attributed to site activities. The COPCs selected in this manner are the chemicals in each medium that may contribute significantly to cancer risk or to the potential for non-cancer effects. As noted above, the MDC was selected as the STC for use in risk characterization. ILCR and HI values were estimated for each COPC in each medium and were summed to obtain total ILCR and HI values for each receptor.

Lead in surface water was the only COPC selected for the recreational site user. However, the SSSL, which is the action level for lead in tap water, was deemed too conservative given the incidental nature of exposure to surface water. Therefore, the PRA concluded that recreational site user exposure to site media is unlikely to pose a threat to human health.

COPCs for residential exposure included four metals (aluminum, antimony, iron, and manganese) in soils, and two metals (barium and lead) seep water. The PRA concluded that exposure to surface soil, subsurface soil, surface water, and sediment poses no unacceptable risk for the resident. Lead, however, was identified as a chemical of concern in seep water based on the initial round of sampling. Subsequent re-sampling of the seeps showed that lead is not a chemical of concern in seep water.

6.0 Summary, Conclusions, and Recommendations

IT Corporation, under contract to USACE, completed an SI at the Impact Areas South of Bains Gap Road, at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site, and, if present, whether the concentrations present an unacceptable risk to human health or the environment. The SI at the Impact Areas South of Bains Gap Road consisted of the sampling and analysis of 14 surface soil samples, 5 depositional soil samples, 14 subsurface soil samples, 7 surface water samples, 7 sediment samples, and 6 seep water samples.

Chemical analysis of samples collected at the Impact Areas South of Bains Gap Road indicates that metals were detected in the various site media. In addition, perchlorate and one explosive compound were detected in one surface soil sample each. Analytical results were compared to the 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, metals concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998). A PRA was also performed to further characterize the potential threat to human health.

Although the site is located within an undeveloped area of the Main Post and is projected for passive recreation reuse, the analytical data were evaluated against a residential reuse scenario to determine if the site is suitable for unrestricted land reuse. COPCs for residential exposure to site media included four metals (aluminum, antimony, iron, and manganese) in soils, and two metals (barium and lead) in seep water. The PRA concluded that exposure to surface soil, subsurface soil, surface water, and sediment poses no unacceptable risk for the resident. Lead, however, was identified as a chemical of concern in seep water. Based on the PRA results, the seep locations were re-sampled to confirm the lead concentrations. Lead concentrations in the seep re-samples were below the SSSL and the background concentration indicating that lead is not a chemical of concern in seep water.

The potential threat to ecological receptors is also expected to be low. Constituents of potential ecological concern were limited to three metals (antimony, barium, and beryllium) in a limited number of surface and depositional soil samples. Antimony (8.4 mg/kg) exceeded its ESV (3.11 mg/kg) and upper background range (2.6 mg/kg) in one surface soil sample. The antimony result was flagged with a "B" data qualifier indicating that the metal was detected in an associated laboratory or field blank sample. Antimony was not detected in any of the other surface and

depositional soil samples. Barium was detected at an estimated concentration (488 mg/kg) exceeding its ESV (165 mg/kg) and upper background range (288 mg/kg) in one surface soil sample. Barium concentrations in all other soil samples collected at the site were below the background concentration or within the upper background range. Beryllium (1.1 to 3.1 mg/kg) exceeded its ESV (1.1 mg/kg) and upper background range (0.87 mg/kg) in four surface and depositional soil samples. The average beryllium concentration in surface soils at the site is 0.95 mg/kg, which is below the ESV and only marginally exceeds background concentration (0.8 mg/kg). The presence of these metals likely reflects either a laboratory artifact (antimony) or, in the case of barium and beryllium, variations in naturally occurring levels. Therefore, antimony, barium, and beryllium are not expected to pose a threat to ecological receptors.

Based on the results of the SI, past operations at the Impact Areas South of Bains Gap Road do not appear to have adversely impacted the environment. The metals and chemical compounds detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT recommends "No Further Action" and unrestricted land reuse with regard to hazardous, toxic, and radioactive waste at the Artillery and Mortar Impact Areas South of Bains Gap Road, Parcels 138Q-X, 139Q-X, 140Q-X, 141Q-X, and 142Q-X.

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
AB	ambient blank
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded
Abs	skin absorption
ABS	dermal absorption factor
AC	hydrogen cyanide
ACAD	AutoCadd
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
AdE	Anniston and Allen stony loam, 10 to 25 percent slope
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALAD	-aminolevulinic acid dehydratase
amb.	Amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
APEC	areas of potential ecological concern
APT	armor-piercing tracer
AR	analysis request
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AWARE	Associated Water and Air Resources Engineers, Inc.
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor; bioconcentration factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
BHHRA	baseline human health risk assessment
BIRTC	Branch Immaterial Replacement Training Center
bkg	background
bls	below land surface
BOD	biological oxygen demand
Bp	soil-to-plant biotransfer factors
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BSAF	biota-to-sediment accumulation factors
BSC	background screening criterion
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BTV	background threshold value
BW	biological warfare; body weight
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CAB	chemical warfare agent breakdown products
CAMU	corrective action management unit
CBR	chemical, biological and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	carbonyl chloride (phosgene)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical(s) of potential concern
COPEC	chemical(s) of potential ecological concern
CPSS	chemicals present in site samples
CQCSM	Contract Quality Control System Manager
CRDL	contract-required detection limit
CRL	certified reporting limit
CRQL	contract-required quantitation limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
CSM	conceptual site model
CT	central tendency
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
‘D’	duplicate; dilution
D&I	detection and identification
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate

DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC_{50}	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical/Biological Command
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDA	U.S. Food and Drug Administration
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
FMP 1300	Former Motor Pool 1300
FOMRA	Former Ordnance Motor Repair Area
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
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
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
HPLC	high performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
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
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IF	ingestion factor; inhalation factor
ILCR	incremental lifetime cancer risk
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IR	ingestion rate
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
IS	internal standard
ISCP	Installation Spill Contingency Plan
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
JPA	Joint Powers Authority
K	conductivity
K_{ow}	octonal-water partition coefficient
L	lewisite; liter
l	liter
LBP	lead-based paint
LC	liquid chromatography
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MB	method blank
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCPA	4-chloro-2-methylphenoxyacetic acid
MCS	media cleanup standard
MD	matrix duplicate
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
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 centimeter
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MOGAS	motor vehicle gasoline
MP	Military Police
MPA	methyl phosphonic acid
MPM	most probable munition
MQL	method quantitation limit
MR	molasses residue
MRL	method reporting limit
MS	matrix spike
mS/cm	millisiemens per centimeter
mS/m	millisiemens per meter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
MWI&P	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NCRP	National Council on Radiation Protection and Measurements
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
NRHP	National Register of Historic Places
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated
O_2	oxygen
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
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
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PES	potential explosive site
Pest.	pesticides
PETN	pentarey thritol tetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes

List of Abbreviations and Acronyms *(Continued)*

PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
'R'	rejected data; resample
R&A	relevant and appropriate
RA	remedial action
RAO	removal action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
SA	exposed skin surface area
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
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SF	cancer slope factor
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SINA	Special Interest Natural Area
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SMDP	Scientific Management Decision Point
s/n	signal-to-noise ratio
SOP	standard operating procedure
SOPQAM	U.S. EPA's *Standard Operating Procedure/Quality Assurance Manual*
sp	poorly graded sands; gravelly sands
SP	submersible pump
SPCC	system performance calibration compound
SPCS	State Plane Coordinate System
SPM	sample planning module
SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
SRM	standard reference material
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
SSL	soil screening level
SSSL	site-specific screening level
SSSSL	site-specific soil screening level
STB	supertropical bleach
STC	source-term concentration
STD	standard deviation
STEL	short-term exposure limit
STL	Severn-Trent Laboratories
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SWMU	solid waste management unit
SWPP	storm water pollution prevention plan
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TBC	to be considered
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
THI	target hazard index
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TR	target cancer risk
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
UF	uncertainty factor
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School

USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected