Final

Site Investigation Report
Former Toxic Gas Area – Pelham Range, Parcel 211(7) and Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK05
Contract No. DACA21-96-D-0018
Shaw Project No. 774645

September 2004

Revision 1

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, Shaw Environmental, Inc. completed a site investigation (SI) at the Former Toxic Gas Area – Pelham Range, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7) at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of a geophysical survey and the collection and analysis of 31 surface and depositional soil samples, 25 subsurface soil samples, 14 groundwater samples, and 1 drum sample. In addition, 18 permanent monitoring wells were installed at the site to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information. However, four of the wells did not produce sufficient groundwater for sampling.

The geophysical survey, conducted over an approximately 10,000-square-foot area in the southwestern portion of Parcel 211(7), did not reveal evidence of buried metal or waste disposal pits or trenches.

Chemical analysis of samples collected at the site indicates that metals, volatile organic compounds (VOC), and one semivolatile organic compound were detected in site media. Explosive compounds and chemical warfare material breakdown products were not detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as chemicals of potential concern in site media. Only metals were identified as chemicals of potential concern in soil, including seven metals in surface and depositional soil and 11 metals in subsurface soil. Chemicals of potential concern identified in groundwater were four metals and five chlorinated VOCs.

Constituents detected at concentrations exceeding ESVs and background (where available) were identified as constituents of potential ecological concern in surface and depositional soils. Several metals were identified as constituents of potential ecological concern.

Based on the results of the SI, past operations at Parcels 211(7) and 207(7) have impacted the environment. Therefore, Shaw recommends that a remedial investigation be conducted to determine the extent of soil and groundwater contamination at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw) (formerly IT Corporation [IT]) to perform the site investigation (SI) at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This report presents specific information and results compiled from the SI, including geophysical survey, field sampling and analysis, and monitoring well installation activities conducted at Parcels 211(7) and 207(7).

1.1 Project Description

Parcels 211(7) and 207(7) were identified as areas to be investigated prior to property transfer. The parcels were classified as Category 7 parcels in the *Final Environmental Baseline Survey, Fort McClellan, Alabama* (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 parcels are areas that have not been evaluated or that require additional evaluation to determine their environmental condition.

Site-specific work plans for Parcels 207(7) and 211(7) were finalized in July and August 2002, respectively (IT, 2002a; IT, 2002b). The site-specific work plans, each comprised of a field sampling plan (SFSP), a safety and health plan, and an unexploded ordnance (UXO) safety plan, provided technical guidance for SI field activities at Parcels 207(7) and 211(7). The site-specific work plans were used as attachments to the installation-wide work plan (IT, 1998) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a; IT, 2002c). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI consisted of a geophysical survey and the collection and analysis of 29 surface soil samples, 2 depositional soil samples, 25 subsurface soil samples, 14 groundwater samples, and 1 drum sample to determine whether potential site-specific chemicals are present at the site.

1.2 Purpose and Objectives

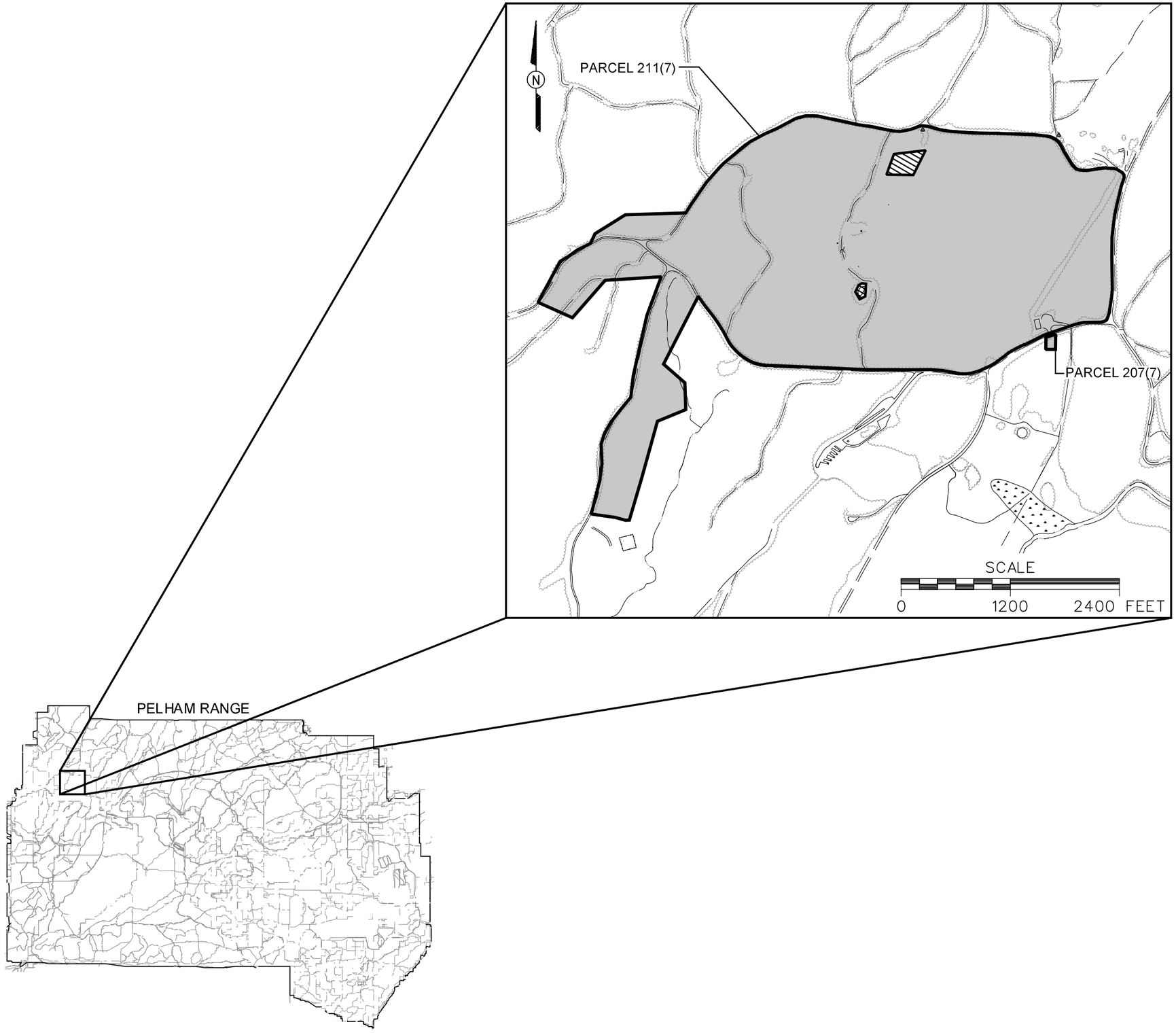
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Parcels 211(7) and 207(7) at concentrations that pose an unacceptable risk to human health or the environment. 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 Shaw 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" or to conduct additional work at the site.

1.3 Site Description and History

The Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7) are located in the northwestern portion of Pelham Range (Figure 1-1). Parcel 211(7) covers approximately 300 acres. Parcel 207(7) is an approximately 1-acre area located southeast of the Former Toxic Gas Area and Rideout Hall (Building 8801). Pelham Range is currently used for military training by the Alabama Army National Guard (ALARNG). Pelham Range is projected for transfer to the ALARNG in accordance with provisions specified in a memorandum of agreement between the U.S. Army and ALARNG.

Parcel 211(7). The Former Toxic Gas Area is oval-shaped site that encompasses all of Training Area 10B and extends into parts of Training Areas 9A, 9B, and 10A (Figure 1-2). The Toxic Gas Area was delineated on a 1958 maneuver area map of Pelham Range (U.S. Army Center for Health Promotion and Preventative Medicine [CHPPM], 1999). Training Area 10B is



LEGEND

- UNIMPROVED ROADS
- BUILDING
- TREES / TREELINE
- MARSH / WETLANDS
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- SURFACE DRAINAGE / CREEK

FIGURE 1-1
SITE LOCATION MAP
FORMER TOXIC GAS AREA
PARCEL 211(7) AND
FORMER DECONTAMINATION
TRAINING AREA , PARCEL 207(7)

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

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INITIATOR: J. REMO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
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TRAINING AREA 9B

TRAINING AREA 10B

TRAINING AREA 9A

TRAINING AREA 10A

PARCEL 211(7)

RANGE K - PARCEL 203(7)

RANGE L - PARCEL 204(7)

RANGE I - PARCEL 201(7)

GEOPHYSICAL SURVEY AREA

ORIENTATION AREA

STATION NO.1

STATION NO.2

STATION NO.3 (IMPACT AREA)

STATION NO.4 (DEPOT)

STATION NO.5 (A-BOMB)

STATION NO.6 (MINES)

STATION NO.7 (DEMONSTRATION AREA)

CONTROL CENTER AID STATION

RIDEOUT HALL BUILDING 8801

BURIAL MOUND AT RIDEOUT FIELD

RJ28

RJ29

RJ30

TO GATE 10

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE
0 400 800 FEET

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ ROAD JUNCTION

APPROXIMATE LOCATION OF OBSERVED FEATURES

1. U-SHAPED DIRT MOUND
2. 10' x 10' x 3' MOUND
3. 8' x 5' x 2' MOUND WITH SMALL-ARMS BLANK CASINGS
4. 6' x 2' x 1' DEPRESSIONS (SEVERAL IN AREA), AND 5' x 3' x 2' CRESCENT SHAPED MOUNDS
5. 10' x 4' x 5' DEPRESSION (METAL IN BOTTOM)
6. THREE 10' x 10' x 2' DEPRESSIONS
7. CONVERGENCE OF TWO UNIMPROVED ROADS
8. 5' x 5' x 1' CIRCULAR AND RECTANGULAR DEPRESSIONS
9. FOUR DROP (SPRAY) TANKS 5' x 3' (DIAMETER), LABELED: SMOKE, CHEMICAL WARFARE SERVICE USA, NO. M33A1 TANK, AIRPLANE, EDGEWOOD ARSENAL MARYLAND. TWO ARE TORN APART, TWO ARE STILL INTACT, ALL ARE RUSTED AND EMPTY
10. 15' x 10' x 4' U-SHAPED MOUND WITH TWO 10'x4'x3' RECTANGULAR DEPRESSIONS TO THE NORTH
11. 15' x 5' x 4' DEPRESSION, WITH ONE METAL POST TO THE SOUTH
12. TWO WWII ERA TANKS
13. 20' x 10' x 2' DEPRESSION
14. 15' x 15' x 6' DEPRESSION
15. WOODEN PALLET
16. EMPTY STB BARREL LABELED: 3lbs BLEACH/1 GALLON WATER. BARREL APPROXIMATELY 1.5' x 3' (DIAMETER), OPEN AND RUSTED
17. RUSTED SMOKE POT AND MACHINE GUN AMMUNITION BELT: SEVERAL SLAP FLARES
18. FOG OIL DRUM LID / NEARBY TRENCH AND MOUNDS
19. 5' x 2' x 1' FIGHTING POSITIONS WITH SMOKE GRENADE CANISTER AND EXPENDED SMALL-ARMS BLANK CASINGS
20. 5' x 10' x 5' MANHOLE WITH EXPENDED SMOKE GRENADE
21. 70' x 30' x 5' MANMADE DEPRESSION
22. EXPENDED 81mm ILLUMINATION MORTAR
23. RUSTED MUNITIONS CANISTER
24. UNLABELED 55-GALLON DRUM APPROXIMATELY HALF FULL OF LIQUID
25. U-SHAPED FIGHTING POSITION (IN SIDE OF HILL)
26. EMPTY 55-GALLON DRUM LABELED: FOG OIL SGFT2 (ON LID)
27. 5' x 2' x 1' FIGHTING POSITIONS WITH SMALL-ARMS BLANK CASINGS
28. OLD WOODEN FENCE POST
29. DRUM LID CLAMP (NO DRUM)
30. EMPTY 55-GALLON DRUM, APPARENTLY USED AS A FIRE PIT
31. 7' x 4' x 3' FIGHTING POSITIONS WITH SMALL-ARMS BLANK CASINGS
32. CONCRETE PADS WITH METAL TIE DOWNS. BASE OF FORMER OBSERVATION TOWER
33. FOUR FIGHTING POSITIONS, LARGEST IN U-SHAPE WITH EXTENDED BACK SIDE, APPROXIMATELY 10' x 10' x 4', OTHERS ARE CIRCULAR APPROXIMATELY 5' x 5' x 2'. SMALL ARMS BLANK CASINGS AND EXPENDED SLAP FLARES ALSO FOUND IN AREA
34. 25' x 25' GROUND SCAR BETWEEN FENCE POSTS
35. SERIES OF SMALL DEPRESSIONS 1' x 4' x ½' (APPEAR TO BE FOXHOLES)
36. 55-GALLON DRUM (EMPTY)
37. L-SHAPE TRENCH APPROXIMATELY 4' TO 6' (WIDE) x 3' (DEEP)
38. POSSIBLE GROUND SCAR
39. GROUND SCAR
40. TWO SHERMAN TANKS
41. EMPTY RUSTED METAL CANISTERS
42. ONE EMPTY RUSTED METAL CANISTER
43. 12' x 5' x 5' DEPRESSION WITH RUSTED METAL AND CROSS TIES, POSSIBLY BUNKER
44. FOUR CIRCULAR DEPRESSIONS APPROXIMATELY 8' x 4' x 4'
45. ONE BUILDING (BUNKER) MADE OF CINDER BLOCKS, TWO CINDER BLOCK FOUNDATIONS WITH 150' LONG TRENCH IN BETWEEN (IN HILLSIDE)
46. THREE DEPRESSIONS 3' x 4' x 2'

NOTE:

1. PHYSICAL FEATURES OBSERVED DURING SITE RECONNAISSANCE CONDUCTED BY SHAW IN JULY/AUGUST 2001 AND JANUARY 2002.

FIGURE 1-2
SITE MAP
FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

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shown as a chemical area on Plate 2 of the *Archives Search Report, Ordnance Ammunition and Explosives Chemical Warfare Materials, Pelham Range, Anniston Alabama* (ASR) (USACE, 2001a). The area was used for training exercises involving tear gas (chloroacetophenone [CN] and chlorobenzylidenemalononitrile [CS]), chlorine gas, and smoke (ESE, 1998).

The EBS extended the boundaries of Parcel 211(7) to the west and southwest of Training Area 10B to include areas of suspected chemical agent storage and disposal in Training Areas 9A and 10A (Figure 1-2). Storage and disposal sites were reportedly located in fenced areas near the road leading to Gate 10 (west of the Toxic Gas Area) and on the east side of the road leading towards Range I. Little is known about the actual locations of the disposal areas. However, it is believed that chemical agents were stored and/or disposed at these locations because of restrictions on transporting chemical agents (ESE, 1998).

Range K (Parcel 203[7]), Range L (Parcel 204[7]), and a chemical obstacle course are all located within the Former Toxic Gas Area (Figure 1-2). The EBS also reported a personnel decontamination area and an identification/decontamination training station in the southern portion of the Toxic Gas Area (ESE, 1998). Range K and Range L are being investigated separately and are not included in this SI.

The ASR states that in the 1950s the Chemical Corps School at FTMC constructed a chemical, biological, and radiological tactical training exercise course, or "chemical obstacle course," within the Toxic Gas Area (USACE, 2001a). Soldiers trained at a designated field course involving the use of various materials at the following seven stations (Figure 1-2):

- Station No. 1 – Simulated machine-gun fire, blocks of nitrostarch, blasting caps, shell simulators, and CN-adamsite (DM) grenades.
- Station No. 2 – CN-DM grenades and simulator shell bursts.
- Station No. 3 – Electric blasting caps, dud chemical shells, shell simulators, simulated machine-gun fire, and tubes of chloropicrin (PS) and phosgene (CG).
- Station No. 4 – Blasting caps, M117 booby-trap simulators, shell simulators, and PS.
- Station No. 5 (Range L) – Radioactive sources placed in a man-made crater (Lima Pond) to simulate the residue from an atomic bomb.

- Station No. 6 – Electric blasting caps, detonating cord, molasses residuum mustard (MR), distilled mustard (HD), and simulated armor-piercing mines.

- Station No. 7 included white phosphorous, M-15 smoke grenades, HC (mixture of hexachloroethane, aluminum powder, and zinc oxide) smoke grenades, blocks of nitrostarch, M2 flame throwers, electric blasting caps, M5 smoke pots, shell simulators, and pentaerythritol tetranitrate (PETN) detonating cord.

The obstacle course concluded with a truck-mounted personnel decontamination station for face and hand washing. The chemical obstacle course was used from approximately 1955 to 1963 (CHPPM, 1999).

A personnel decontamination station was established on the south side of the Toxic Gas Area (north of the burial mound at Rideout Field) and was used in conjunction with the Former Decontamination Training Area South of the Toxic Gas Area (Parcel 207[7]). A detection and identification/decontamination training station was also located within the southern portion of the Toxic Gas Area. At this station, training exercises consisted of contaminating two World War II-era motorized tanks with the chemical agent mustard (H) and allowing trainees to perform detection tests. A second group of trainees would decontaminate the tanks using decontamination agent noncorrosive (DANC). The EBS indicates that H was the only chemical agent used at this station (ESE, 1998).

Shaw conducted site reconnaissance of Parcel 211(7) in July/August 2001 and January 2002. In Training Areas 9A and 9B, both sides of the road leading to Gate 10 were surveyed; however, no apparent storage and/or disposal sites were observed. In addition, site reconnaissance was conducted within Training Area 10B from Range I to the intersection of the road south of Training Area 10B. North of Range I, a ground scar measuring approximately 25 feet by 25 feet was noted between two metal fence posts (physical feature 34, Figure 1-2).

Training Area 10B was inspected for evidence of chemical warfare material (CWM). In the northwestern portion, three 55-gallon drums were found in various conditions, one labeled as a fog oil storage drum (empty), an empty unlabelled drum, and the third turned on its side and approximately half full of liquid (physical features 24, 26, and 36; Figure 1-2). West of Station No. 6, four 5- by 3-foot spray tanks, labeled "Chemical Warfare Service USA, No. M33A1," were observed (physical feature 9, Figure 1-2). Two of the spray tanks were breached and two were intact. Two World War II-era motorized tanks were noted in the south-central portion of Training Area 10B, east of the unimproved road leading to Lima Pond (physical feature 12,

Figure 1-2). Two additional motorized tanks were noted on a hillside, east-northeast of the aforementioned tanks (physical feature 40, Figure 1-2). Both sets of tanks were intact and one had a sign reading "Contaminated, Keep Off." An empty supertropical bleach (STB) drum (physical feature 16, Figure 1-2) was observed in the southern portion of the site near a decontamination station described in the EBS. Two bunkers, separated by a large trench, were observed on a hillside near the former location of Station No. 7 (physical feature 45, Figure 1-2). A fragment of an M2 flame-thrower was also noted at this location and several circular depressions were observed east of the bunkers (physical feature 44, Figure 1-2). Several metal canisters were found east of Station No. 6, in and around depressions that appear to be former bunkers or foxholes (physical features 41, 42, and 43; Figure 1-2). Blank bullet casings, foxholes, depressions, and discarded training materials were found throughout the Former Toxic Gas Area.

Parcel 207(7). The Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7) is an approximately 1-acre parcel located south of the Former Toxic Gas Area (Figure 1-2). Reportedly, this training site measured approximately 75 meters by 50 meters and was located just south of the unnamed road south of Rideout Hall (Figure 1-2). Training exercises involved pouring one gallon of chemical agent H onto the ground, followed by area decontamination using STB slurry (ESE, 1998). The area where decontamination training occurred may have been two different sites (CHPPM, 1999). One site was reportedly located within the Toxic Gas Area, and the other site (Parcel 207[7]) was located south of the Toxic Gas Area along the northern perimeter of the Rideout radiological field. The period these areas were used is unknown, but an individual who was involved with training in the area was stationed at FTMC in the 1960s (CHPPM, 1999).

According to CHPPM, an interviewee described an end-of-course test for chemical staff specialists near Road Junction 29 (Figure 1-2); however, based on site descriptions and review of Pelham Range maps, the field personnel decontamination station may have been located near Road Junction 28 instead of 29. A half-track truck was contaminated with H or HD and then decontaminated during training activities. The vehicle and the ground were decontaminated with STB slurry. Training exercises were conducted 10 to 12 times a year. Excess agent was buried and, typically, decontaminants were applied to agent when it was buried. However, it has been reported that not all agent burials included the application of decontaminants (CHPPM, 1999).

2.0 Previous Investigations

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

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).

2. Areas where only release or disposal of petroleum products has occurred.

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken.

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.

7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with protocols of the Community Environmental Response Facilitation Act (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 4, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-regulated substances, petroleum products; and Resource Conservation and Recovery Act-regulated facilities. Available maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC

employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels. Previous investigations have been conducted at Parcels 211(7) and 207(7), as summarized in the following paragraphs.

Parcel 211(7). Portions of the Former Toxic Gas Area, Parcel 211(7) have been or are currently being investigated by Shaw, including Range K (Parcel 203[7]), Range L (Parcel 204[7]), and Station No. 6. Range K and Range L are being investigated separately and are not included in this SI report. Station No. 6 was originally investigated independently of Parcel 211(7) but is included in this report.

Parcel 207(7). Parsons conducted an SI for CWM at three Pelham Range sites, including the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7). The purpose of the SI was to determine the presence or absence of CWM that may have resulted from historical training activities (Parsons, 2002).

Initially, Parsons conducted a geophysical survey to determine if buried metal objects were present at the site. Survey data were collected along a grid with a high-sensitivity EM61 time-domain metal detector and a cesium vapor G-858 magnetometer. Seven subsurface anomalies were identified and selected for intrusive investigation. The recovered items consisted of an ordnance fragment, pieces of wire, a fence post, and a steel rod. No CWM-related items were encountered during the subsurface investigation of the anomalies (Parsons, 2002).

Twenty-four soil samples were collected from 12 borings to determine if CWM or breakdown products were present in the soil. Two samples were collected from each boring. The samples were initially submitted for onsite headspace analysis for HD. Following headspace analysis, the samples were shipped to an offsite laboratory and analyzed for HD and chemical agent breakdown products. The soil analytical results did not indicate the presence of CWM or breakdown products (Parsons, 2002).

Field screening for CWM was conducted during intrusive SI activities using a miniature continuous air monitoring system and open-path fourier transform infrared spectrometry. In addition, 16 depot area air monitoring system tube samples were collected from monitoring stations at the site and were analyzed for HD. CWM was not detected using any of the aforementioned air monitoring methods (Parsons, 2002).

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by Shaw at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7), including UXO avoidance, geophysical survey, environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 UXO Avoidance

UXO avoidance was performed at Parcels 207(7) and 211(7), following methodology outlined in the SAP. Shaw UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the monitoring well and sample locations prior to site access. After the site was cleared for access, sample locations were monitored by UXO personnel following procedures outlined in the SAP.

3.2 Geophysical Survey

A geophysical survey was conducted at Parcel 211(7) to locate buried metal debris and delineate a potential waste disposal site. The geophysical survey was conducted over an approximately 10,000-square-foot area in the southwestern portion of Parcel 211(7), as shown on Figure 3-1. A detailed discussion of the geophysical investigation, including theory of instruments operation, field procedures, data processing, and interpreted results, is presented as Appendix A.

The survey was conducted using ground-penetrating radar (GPR), magnetic, and electromagnetic (EM) techniques. An initial survey grid was established at the site to encompass the disposal site. A detailed site map was drawn in the field. The map included any surface cultural features within the survey area or near its perimeter that could potentially affect the geophysical data (e.g., surface metal debris, fencing, and monitoring wells).

Preliminary color contour maps of the data were analyzed and compared with the site sketch to differentiate between anomalies caused by surface and subsurface source materials. The geophysical survey results are summarized in Section 4.1.

3.3 Environmental Sampling

Environmental sampling performed during the SI at Parcels 211(7) and 207(7) included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, and a drum sample for chemical analysis. Sample locations were determined by

STARTING DATE: 06/17/03 | DRAWN BY: D. BOMAR | DATE LAST REV.: | DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN | INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB | PROJ. NO.: 774645 | DWG. NO.: ...\774645aa.011

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E 602,800

E 609,300

N 1,179,000

N 1,173,400

TRAINING AREA 9B

TRAINING AREA 10B

TRAINING AREA 9A

TRAINING AREA 10A

PARCEL 211(7)

PARCEL 207(7)

RANGE K - PARCEL 203(7)

RANGE L - PARCEL 204(7)

RANGE I - PARCEL 201(7)

ORIENTATION AREA

STATION NO.1

STATION NO.2

STATION NO.3 (IMPACT AREA)

STATION NO.4 (DEPOT)

STATION NO.5 (A-BOMB)

STATION NO.6 (MINES)

STATION NO.7 (DEMONSTRATION AREA)

CONTROL CENTER AID STATION

RIDEOUT HALL BUILDING 8801

BURIAL MOUND AT RIDEOUT FIELD

GEOPHYSICAL SURVEY AREA

TO GATE 10

RJ28 RJ29 RJ30

PR-211-GP11
PR-211-DR01
PR-211-GP03
PR-211-GP10
PR-211-GP05
PR-211-MW08
PR-211-MW09
PR-211-MW01
PR-211-MW02
PR-211-GP02
PR-211-GP01
PR-211-MW03
PR-211-MW04
PR-211-DEP01
PR-211-DEP02
PR-211-MW07
PR-211-MW06
PR-211-GP04
PR-211-GP09
PR-211-GP06
PR-211-GP08
PR-211-MW12 (WELL DRY)
PR-211-MW13 (WELL DRY)
PR-211-MW10
PR-211-MW11
PR-211-MW14
PR-211-MW15 (WELL DRY)
PR-211-GP07
DTA-207-GP01
DTA-207-MW01
DTA-207-GP02
DTA-207-MW03 (WELL DRY)
DTA-207-MW02

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ ROAD JUNCTION
- ▲ DEPOSITIONAL SOIL SAMPLE LOCATION
- ◪ SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ■ SURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- D DRUM SAMPLE LOCATION

NOTE:

1. SEE FIGURE 1-2 FOR DESCRIPTION OF SITE FEATURES.

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE
0 400 800 FEET

FIGURE 3-1
SAMPLE LOCATION MAP FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

Shaw™ Shaw Environmental, Inc.

observing site physical characteristics during a site walk 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 3.5.

3.3.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from 29 locations and depositional soil samples were collected from 2 locations at Parcels 207(7) and 211(7), as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. 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 soil samples were collected from the uppermost foot of soil using either a stainless-steel hand auger or a direct-push technology (DPT) sampling system, following methodology specified in the SAP. The depositional soil samples were collected from the uppermost foot of soil with a stainless-steel hand auger. Surface and depositional soil samples were collected by first removing surface debris (e.g., rocks and vegetation) from the immediate sample area. The sample was then collected with the sampling device and was screened with a photoionization detector (PID) in accordance with procedures outlined in the SAP. The soil fraction for volatile organic compound (VOC) analysis was collected directly from the sample device using three EnCore® samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.5.

3.3.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 25 soil borings at Parcels 207(7) and 211(7), as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and analytical parameters are listed in Table 3-2. Soil boring 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. Subsurface soil samples were collected from soil borings at depths greater than one foot below ground surface (bgs) in the unsaturated zone. The soil borings were

Table 3-1

Sampling Locations and Rationale
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PR-211-DEP01	Depositional soil	A depositional soil sample was collected near Station 6 in a dry creek bed to determine if potential site-specific chemicals (PSSC) are present.
PR-211-DEP02	Depositional soil	A depositional soil sample was collected in a dry creek bed near Station 6 to determine the presence of PSSC.
PR-211-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected adjacent to drop (spray) tanks in the western central area of Parcel 211(7) to determine if PSSC were present.
PR-211-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected adjacent to drop (spray) tanks in the western central area of Parcel 211(7) to determine if PSSC were present.
PR-211-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples were collected at the location of a fog oil storage drum (observed feature 26, Figure 1-2) to determine the presence of PSSC.
PR-211-GP04	Surface Soil	A surface soil sample was collected near a rusted metal canister (observed feature 41, Figure 1-2) to determine if PSSC are present.
PR-211-GP05	Surface Soil	A surface soil sample was collected in a depression east of Range K (observed feature 44, Figure 1-2) to determine if PSSC are present.
PR-211-GP06	Surface Soil	A surface soil sample was collected at the location of an 81-mm illumination mortar (observed feature 22, Figure 1-2) to determine if PSSC are present.
PR-211-GP07	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near a cleared area (observed feature 34, Figure 1-2) to determine in PSSC are present.
PR-211-GP08	Surface soil	A surface soil sample was collected near a ground scar (observed feature 39, Figure 1-2) to determine if PSSC are present.
PR-211-GP09	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in a depression northeast of Lima Pond (observed feature 14, Figure 1-2) to determine if PSSC are present.
PR-211-GP10	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in a depression in the northwestern portion of the site (observed feature 5, Figure 1-2) to determine if PSSC are present.
PR-211-GP11	Surface and subsurface soil	Surface and subsurface soil samples were collected at the location of a 55-gallon drum (observed feature 24, Figure 1-2) to determine if PSSC are present.
PR-211-MW01	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the central portion of Parcel 211(7) to determine if PSSC are present.
PR-211-MW02	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected near four M33A1 drop tanks to determine if PSSC are present.

Table 3-1

Sampling Locations and Rationale
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PR-211-MW03	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the center of the Station 6 parcel to determine the presence of PSSC.
PR-211-MW04	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected downslope of Station 6 to determine if PSSC are present.
PR-211-MW05	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected near Station 6 downslope of noted depressions to determine if PSSC are present.
PR-211-MW06	Groundwater	Groundwater sample was collected in the central area of the Parcel 211 near four M33A1 drop tanks (observed feature 9, Figure 1-2) to determine if PSSC are present.
PR-211-MW07	Groundwater	Groundwater sample was collected in the central area of the Parcel 211(7) near four M33A1 drop tanks (observed feature 9, Figure 1-2) to determine if PSSC are present.
PR-211-MW08	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected from the circular depressions (observed feature 44, Figure 1-2) downslope of a trench and bunkers to determine if PSSC are present.
PR-211-MW09	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected downslope of observed feature 45 (Figure 1-2) to determine if PSSC are present.
PR-211-MW10	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected near WWII-era tanks possibly used for CWM training (observed feature 12, Figure 1-2) to determine the presence of PSSC.
PR-211-MW11	Groundwater, surface soil, and subsurface soil	Surface soil, subsurface soil, and groundwater samples were collected downslope of two WWII-era tanks possibly used for CWM training (observed feature 12, Figure 1-2) to determine if PSSC are present.
PR-211-MW12	Surface and subsurface soil	Surface and subsurface soil samples were collected near two WWII-era tanks (observed feature 40, Figure 1-2) to determine the presence of PSSC.
PR-211-MW13	Surface and subsurface soil	Surface and subsurface soil samples were collected near two WWII-era tanks (observed feature 40, Figure 1-2) to determine the presence of PSSC.
PR-211-MW14	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected near an empty STB drum (observed feature 16, Figure 1-2) to determine if PSSC are present.

Table 3-1

Sampling Locations and Rationale
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PR-211-MW15	Surface and subsurface soil	Surface and subsurface soil samples were collected in a cleared area (observed feature 34, Figure 1-2) at the southwest end of the Parcel 211 to determine the if PSSC are present
PR-211-DR01	Drum	Sample collected from drum to determine the contents of the drum.
DTA-207-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the northwestern portion of the parcel to determine if PSSC are present.
DTA-207-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the southeastern portion of the parcel to determine if PSSC are present.
DTA-207-MW01	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the northeastern corner of the parcel to determine if PSSC are present.
DTA-207-MW02	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the central area of the parcel to determine if PSSC are present.
DTA-207-MW03	Surface soil and subsurface soil	Surface and subsurface soil groundwater samples were collected in the southwestern corner of the parcel to determine if PSSC are present.

Table 3-2

Soil Sample Designations and Analytical Parameters
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
DTA-207-GP01	DTA-207-GP01-SS-MN0001-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	DTA-207-GP01-DS-MN0002-REG	9-11		DTA-207-GP01-DS-MN0002-MS/MSD	
DTA-207-GP02	DTA-207-GP02-SS-MN0003-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	DTA-207-GP02-DS-MN0004-REG	11-12			
DTA-207-MW01	DTA-207-MW01-SS-MN0005-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	DTA-207-MW01-DS-MN0006-REG	9-10			
DTA-207-MW02	DTA-207-MW02-SS-MN0007-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	DTA-207-MW02-DS-MN0008-REG	10-12	DTA-207-MW02-DS-MN0009-FD		
DTA-207-MW03	DTA-207-MW03-SS-MN0010-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	DTA-207-MW03-DS-MN0011-REG	11-12			
PR-211-GP01	PR-211-GP01-SS-NQ0014-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-GP01-DS-NQ0015-REG	6-8			
PR-211-GP02	PR-211-GP02-SS-NQ0016-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-GP02-DS-NQ0017-REG	8-10			
PR-211-GP03	PR-211-GP03-SS-NQ0018-REG	0-1	PR-211-GP03-SS-NQ0019-FD		Metals, VOCs, SVOCs, and Explosives
	PR-211-GP03-DS-NQ0020-REG	11-12			
PR-211-GP04	PR-211-GP04-SS-NQ0021-REG	0-1		PR-211-GP04-SS-NQ0021-MS/MSD	Metals, VOCs, SVOCs, and Explosives
PR-211-GP05	PR-211-GP05-SS-NQ0022-REG	0-1			Metals, VOCs, SVOCs, and Explosives
PR-211-GP06	PR-211-GP06-SS-NQ0023-REG	0-1			Metals, VOCs, SVOCs, and Explosives
PR-211-GP07	PR-211-GP07-SS-NQ0024-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-GP07-DS-NQ0025-REG	10-12			
PR-211-GP08	PR-211-GP08-SS-NQ0026-REG	0-1			Metals, VOCs, SVOCs, and Explosives
PR-211-GP09	PR-211-GP09-SS-NQ0027-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	PR-211-GP09-DS-NQ0028-REG	2-3			
PR-211-GP10	PR-211-GP10-SS-NQ0029-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	PR-211-GP10-DS-NQ0030-REG	3-4			
PR-211-GP11	PR-211-GP11-SS-NQ0031-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	PR-211-GP11-DS-NQ0032-REG	8-8.5			
PR-211-DEP01	PR-211-DEP01-DEP-NQ0012-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-DEP02	PR-211-DEP02-DEP-NQ0013-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products

Table 3-2

Soil Sample Designations and Analytical Parameters
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
PR-211-MW01	PR-211-MW01-SS-NQ0001-REG	0-1		PR-211-MW01-SS-NQ0001-MS/MSD	Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW01-DS-NQ0002-REG	6-8			
PR-211-MW02	PR-211-MW02-SS-NQ0003-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW02-DS-NQ0004-REG	3-5			
PR-211-MW03	PR-211-MW03-SS-NQ0005-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW03-DS-NQ0006-REG	8-10			
PR-211-MW04	PR-211-MW04-SS-NQ0007-REG	0-1	PR-211-MW04-SS-NQ0008-FD		Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW04-DS-NQ0009-REG	2-4			
PR-211-MW05	PR-211-MW05-SS-NQ0010-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW05-DS-NQ0011-REG	10-12			
PR-211-MW08	PR-211-MW08-SS-NQ0033-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	PR-211-MW08-DS-NQ0034-REG	10-12			
PR-211-MW09	PR-211-MW09-SS-NQ0035-REG	0-1			Metals, VOCs, SVOCs, and Explosives
	PR-211-MW09-DS-NQ0036-REG	10-12		PR-211-MW09-DS-NQ0036-MS/MSD	
PR-211-MW10	PR-211-MW10-SS-NQ0037-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW10-DS-NQ0038-REG	10-12			
PR-211-MW11	PR-211-MW11-SS-NQ0039-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW11-DS-NQ0040-REG	10-12			
PR-211-MW12	PR-211-MW12-SS-NQ0041-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW12-DS-NQ0042-REG	10-12			
PR-211-MW13	PR-211-MW13-SS-NQ0043-REG	0-1			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW13-DS-NQ0044-REG	3-4			
PR-211-MW14	PR-211-MW14-SS-NQ0045-REG	0-1	PR-211-MW14-SS-NQ0046-FD		Metals, VOCs, SVOCs, and Explosives
	PR-211-MW14-DS-NQ0047-REG	10-12			
PR-211-MW15	PR-211-MW15-SS-NQ0048-REG	0-1	PR-211-MW15-SS-NQ0049-FD		Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
	PR-211-MW15-DS-NQ0050-REG	10-12			

CWM - Chemical warfare material.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

advanced and the samples were collected using a DPT sampling system, following procedures specified in the SAP. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.5.

Subsurface soil samples were collected continuously to 12 feet bgs or until DPT sampler refusal was encountered. Samples were field screened using a PID to measure 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 below background, the deepest sample interval was submitted for analysis. The soil fraction for VOC analysis was collected directly from the sample device using three EnCore samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for each soil boring. The boring logs are included in Appendix C.

3.3.3 Drum Sampling

One liquid sample was collected from an intact, unlabelled 55-gallon drum located in the northwestern area of Parcel 211(7) (Figure 3-1). The drum sample was collected using a drum thief and placed into sample containers, following procedures presented in the SAP. The sample collection log is included in Appendix B. The sample was analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.5.

3.3.4 Monitoring Well Installation

Eighteen permanent monitoring wells were installed at Parcels 207(7) and 211(7) to collect groundwater samples for laboratory analysis. However, four of the wells (DTA-207-MW03, PR-211-MW12, PR-211-MW13, and PR-211-MW15) did not produce sufficient water for sampling. The well locations are shown on Figure 3-1. Table 3-4 summarizes construction details of the monitoring wells installed at the site. The well construction logs are included in Appendix C.

Shaw contracted Miller Drilling Company to install the permanent wells using either a hollow-stem auger or air-rotary drill rig. The wells were installed following procedures outlined in the SAP. The boreholes for monitoring wells at Parcel 207(7) and nine boreholes for monitoring wells at Parcel 211(7) were advanced using a 4-1/4-inch inside diameter (ID) hollow-stem auger to the first water bearing zone or to the depth of auger refusal. The boreholes at four monitoring well locations (PR-211-MW09, PR-211-MW10, PR-211-MW11, and PR-211-MW12) at Parcel 211(7) were advanced using an air-rotary method implementing a 7-7/8-inch carbide steel tricone

Table 3-3

Drum Sample Designation and Analytical Parameters
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples		Analytical Parameters
		Field Duplicates	MS/MSD	
PR-211-DR01	PR-211-DR01-DR-NQ4001-REG			Metals, VOCs, and SVOCs

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

Table 3-4

Monitoring Well Construction Summary
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7) and Vicinity
Fort McClellan, Calhoun County, Alabama

Well Location	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
DTA-207-MW01	1176297.17	608150.66	538.50	540.70	20	10	10 - 20	2" ID Sch. 40 PVC
DTA-207-MW02	1176246.18	608100.20	540.24	542.44	20.9	10	9.5 - 19.5	2" ID Sch. 40 PVC
DTA-207-MW03	1176173.45	608076.53	545.62	547.61	19.2	10	7.7 - 17.7	2" ID Sch. 40 PVC
PR-211-MW01	1177603.79	605940.14	584.66	586.88	20	10	10 - 20	2" ID Sch. 40 PVC
PR-211-MW02	1177253.01	605643.52	575.05	577.36	17	10	7 - 17	2" ID Sch. 40 PVC
PR-211-MW03	1177348.65	606046.31	567.34	569.41	22	15	7 - 22	2" ID Sch. 40 PVC
PR-211-MW04	1177245.94	605809.26	573.11	575.11	21	10	11 - 21	2" ID Sch. 40 PVC
PR-211-MW05	1177233.14	605951.52	565.06	567.16	22	10	12 - 22	2" ID Sch. 40 PVC
PR-211-MW06	1177211.04	605579.91	570.39	572.42	14	5	9 - 14	2" ID Sch. 40 PVC
PR-211-MW07	1177208.98	605554.51	572.39	574.50	18	5	13 - 18	2" ID Sch. 40 PVC
PR-211-MW08	1177879.04	607329.73	615.02	616.85	73	20	53 - 73	2" ID Sch. 40 PVC
PR-211-MW09	1177696.21	607475.38	638.43	640.46	96	20	75.4 - 95.4	2" ID Sch. 40 PVC
PR-211-MW10	1176152.15	606133.15	597.33	599.24	100	30	70 - 100	2" ID Sch. 40 PVC
PR-211-MW11	1176127.86	606123.99	599.40	601.19	105*	20	82.9 - 102.9	2" ID Sch. 40 PVC
PR-211-MW12	1176271.59	606654.06	648.54	650.58	110	30	79.2 - 109.2	2" ID Sch. 40 PVC
PR-211-MW13	1176238.19	606648.29	643.68	645.91	62.5	20	42.5 - 62.5	2" ID Sch. 40 PVC
PR-211-MW14	1176113.66	606795.66	614.73	616.91	63.3	20	43.3 - 63.3	2" ID Sch. 40 PVC
PR-211-MW15	1174491.90	603220.77	552.98	554.80	43.5	15	28.5 - 43.5	2" ID Sch. 40 PVC

*During subsequent well development and sampling, the well depth was measured to be ~95 ft. below top of casing. The cause of the discrepancy is unknown but is likely due to: borehole collapse during well construction, blockage from a foreign object, or an exposed seam in the PVC pipe.

Permanent wells installed using hollow-stem auger or air-rotary drilling.

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
Elevations referenced to the North American Vertical Datum of 1988.

2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
amsl - Above mean sea level.
bgs - Below ground surface.
ft - Feet.

roller bit equipped with 20-foot-long, 4-1/4-inch ID drill rods. Beginning within three feet of the DPT boring depth, a 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology to total depth of the well or until auger refusal. In the borings installed using air-rotary drilling, the drill cuttings were described from the depth of hollow-stem auger refusal to the total depth of the boring. The samples and cuttings were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geological and hydrogeological information. Soil characteristics were described using the "Burmeister Identification System" described in Hunt (1986) and the Unified Soil Classification System as outlined in the American Society for Testing and Materials Method D2488. The boring logs are included in Appendix C.

Upon reaching the target depth in each borehole, a 5- to 20-foot length of 2-inch ID, 0.010-inch continuous slot, Schedule 40 polyvinyl chloride (PVC) screen with a PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of Number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 5 feet above the top of the well screen. In wells deeper than 70 feet bgs, a fine sand seal (30/70 silica sand), approximately five feet thick, was placed over the filter pack. A bentonite seal, consisting of approximately 5 feet of bentonite pellets, was placed immediately on top of the filter pack or sand seal and hydrated with potable water. The bentonite seal placement and hydration followed procedures in the SAP. Bentonite-cement grout was tremied into the remaining annular space of the well from the top of the bentonite seal to ground surface. A well cap was placed on the PVC well riser. A locking protective steel casing was placed over the PVC well riser and a concrete pad was constructed around the wellhead. Four protective steel posts were installed around the well pad.

The monitoring wells that produced water were developed by surging and pumping with a submersible pump and/or by using a Teflon™ bailer in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was less than or equal to 20 nephelometric

turbidity units (NTU), for a maximum of 8 hours, or until the well was pumped dry and allowed to recharge three successive times. The well development logs are included in Appendix D.

3.3.5 Water Level Measurements

The depth to groundwater was measured in the permanent wells at the site and in wells at adjacent Parcel 204(7) (Range L) and Parcel 203(7) (Range K) on February 12 and 13, 2003, following procedures outlined in the SAP. The Range L wells begin with the prefix "RL" and the Range K wells begin with the prefix "RNG-203" (Table 3-5). Depth to groundwater was measured using an electronic water-level meter. The meter probe and cable were cleaned before use at each well following decontamination methodology presented in the SAP. Measurements were referenced to the top of the PVC well casing, as summarized in Table 3-5.

3.3.6 Groundwater Sampling

Groundwater samples were collected from 14 of the 18 monitoring wells installed at Parcels 207(7) and 211(7). Monitoring wells DTA-207-MW03, PR-211-MW12, PR-211-MW13, and PR-211-MW15 were not sampled because they did not produce sufficient water. The groundwater sample locations are shown on Figure 3-1. Groundwater sampling locations and rationale are listed in Table 3-1. Groundwater sample designations and analytical parameters are listed in Table 3-6.

Sample Collection. The groundwater samples were collected using either a Teflon™ bailer or a mechanical pump (i.e., peristaltic or bladder pump) equipped with Teflon™ tubing, following the procedures outlined in the SAP. Samples for VOC analysis were collected using either a Teflon™ bailer or via the "tube evacuation" method described in the SAP (IT, 2002c). Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Field parameters were measured using a calibrated water-quality meter, as summarized in Table 3-7. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-6 using methods outlined in Section 3.5.

3.4 Surveying of Sample Locations

Sample locations were surveyed using global positioning system and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were

Table 3-5

Groundwater Elevations
Former Toxic Gas Area, Parcel 211(7) and
Former Decontamination Training Area, Parcel 207(7) and Vicinity
Fort McClellan, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
DTA-207-MW01	12-Feb-03	4.62	540.70	538.50	536.08
DTA-207-MW02	12-Feb-03	4.60	542.44	540.24	537.84
DTA-207-MW03	12-Feb-03	14.29	547.61	545.62	533.32
PR-211-MW01	12-Feb-03	9.07	586.88	584.66	577.81
PR-211-MW02	12-Feb-03	5.60	577.36	575.05	571.76
PR-211-MW03	12-Feb-03	1.56	569.41	567.34	567.85
PR-211-MW04	12-Feb-03	5.69	575.11	573.11	569.42
PR-211-MW05	12-Feb-03	0.75	567.16	565.06	566.41
PR-211-MW06	12-Feb-03	2.01	572.42	570.39	570.41
PR-211-MW07	12-Feb-03	4.98	574.50	572.39	569.52
PR-211-MW08	12-Feb-03	50.93	616.85	615.02	565.92
PR-211-MW09	12-Feb-03	81.55	640.46	638.43	558.91
PR-211-MW10	12-Feb-03	67.19	599.24	597.33	532.05
PR-211-MW11	12-Feb-03	69.36	601.19	599.40	531.83
PR-211-MW12	12-Feb-03	NA	650.58	648.54	NA
PR-211-MW13	12-Feb-03	NA	645.91	643.68	NA
PR-211-MW14	12-Feb-03	61.02	616.91	614.73	555.89
PR-211-MW15	12-Feb-03	40.29	554.80	552.98	514.51
RL-G01	13-Feb-03	17.30	590.54	588.63	573.24
RL-G02	13-Feb-03	1.31	566.89	564.92	565.58
RL-G03	13-Feb-03	16.84	586.52	584.25	569.68
RL-G04	13-Feb-03	5.26	570.97	568.80	565.71
RL-G05	13-Feb-03	19.97	580.94	578.94	560.97
RL-G06	13-Feb-03	15.56	577.76	575.93	562.20
RL-G07	13-Feb-03	12.64	573.88	571.96	561.24
RNG-203-MW02	13-Feb-03	9.78	596.75	593.90	586.97
RNG-203-MW03	13-Feb-03	14.99	601.16	598.26	586.17
RNG-203-MW04	13-Feb-03	3.04	589.80	586.73	586.76
RNG-203-MW05	13-Feb-03	3.15	590.97	589.00	587.82
RNG-203-MW06	13-Feb-03	3.00	582.04	580.02	579.04

Table 3-5

Groundwater Elevations
Former Toxic Gas Area, Parcel 211(7) and
Former Decontamination Training Area, Parcel 207(7) and Vicinity
Fort McClellan, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
RNG-203-MW07	13-Feb-03	4.54	580.94	578.87	576.40
RNG-203-MW08	13-Feb-03	2.26	584.77	582.85	582.51
RNG-203-MW09	13-Feb-03	3.34	584.53	582.56	581.19
RNG-203-MW10	13-Feb-03	2.14	577.69	575.65	575.55
RNG-203-MW11	13-Feb-03	1.49	577.99	575.98	576.50
RNG-203-MW12	13-Feb-03	3.14	578.97	577.08	575.83
RNG-203-MW13	13-Feb-03	3.03	578.85	576.74	575.82
RNG-203-MW14	13-Feb-03	3.29	584.55	582.37	581.26
RNG-203-MW15	13-Feb-03	3.09	585.04	582.93	581.95
RNG-203-MW16	13-Feb-03	8.48	591.56	589.63	583.08
RNG-203-MW17	13-Feb-03	7.30	590.85	589.01	583.55
RNG-203-MW18	13-Feb-03	1.15	576.80	574.69	575.65
RNG-203-MW19	13-Feb-03	3.60	576.43	576.22	572.83
RNG-203-MW20	13-Feb-03	0.00	571.77	569.53	571.77
RNG-203-MW21	13-Feb-03	5.97	581.14	578.92	575.17

Elevations referenced to the North American Vertical Datum of 1988.

amsl - Above mean sea level.
BTOC - Below top of casing.
ft - Feet.
NA - Not available; well was dry.

Table 3-6

Groundwater Sample Designations and Analytical Parameters
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples		Analytical Parameters
		Field Duplicates	MS/MSD	
DTA-207-MW01	DTA-207-MW01-GW-MN3001-REG		DTA-207-MW01-GW-MN3001-MS/MSD	Metals, VOCs, SVOCs, and Explosives
DTA-207-MW02	DTA-207-MW02-GW-MN3002-REG	DTA-207-MW02-GW-MN3003-FD		Metals, VOCs, SVOCs, and Explosives
PR-211-MW01	PR-211-MW01-GW-NQ3001-REG		PR-211-MW01-GW-NQ3001-MS/MSD	Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW02	PR-211-MW02-GW-NQ3002-REG			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW03	PR-211-MW03-GW-NQ3003-REG			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW04	PR-211-MW04-GW-NQ3004-REG	PR-211-MW04-GW-NQ3005-FD		Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW05	PR-211-MW05-GW-NQ3006-REG			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW06	PR-211-MW06-GW-NQ3007-REG	PR-211-MW06-GW-NQ3008-FD		Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW07	PR-211-MW07-GW-NQ3009-REG		PR-211-MW07-GW-NQ3009-MS/MSD	Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW08	PR-211-MW08-GW-NQ3010-REG			Metals, VOCs, SVOCs, and Explosives
PR-211-MW09	PR-211-MW09-GW-NQ3011-REG			Metals, VOCs, SVOCs, and Explosives
PR-211-MW10	PR-211-MW10-GW-NQ3012-REG			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW11	PR-211-MW11-GW-NQ3013-REG			Metals, VOCs, SVOCs, Explosives, and CWM Breakdown Products
PR-211-MW14	PR-211-MW14-GW-NQ3016-REG			Metals, VOCs, SVOCs, and Explosives

CWM - Chemical warfare material.
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Regular field sample.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

Table 3-7

Groundwater Field Parameters
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
DTA-207-MW01	4-Nov-02	0.501	7.12	369	18.9	1.4	7.05
DTA-207-MW02	6-Nov-02	0.405	3.09	242	15.5	13	6.42
PR-211-MW01	17-Jun-02	0.022	2.43	50	24.1	7.4	6.65
PR-211-MW02	13-Jun-02	0.767	2.42	125	19.0	7.6	7.01
PR-211-MW03	13-Jun-02	0.554	2.12	110	18.4	7.1	7.17
PR-211-MW04	13-Jun-02	0.021	0.59	17	18.0	7.2	6.89
PR-211-MW05	13-Jun-02	0.419	0.43	-146	17.0	2.0	7.38
PR-211-MW06	12-Nov-02	0.801	5.27	180	18.0	6.3	6.87
PR-211-MW07	13-Nov-02	0.653	6.80	25	14.5	8.3	6.89
PR-211-MW08	15-Nov-02	0.257	9.21	135	15.9	27	6.32
PR-211-MW09	19-Nov-02	0.283	9.47	150	15.8	26	7.44
PR-211-MW10	3-Dec-02	0.028	8.87	406	15.0	249	4.49
PR-211-MW11	3-Dec-02	0.047	8.95	383	13.3	29	5.51
PR-211-MW14	5-Dec-02	0.300	9.53	245	14.8	80	6.59

°C - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.

referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix E.

3.5 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters based on potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected at Parcels 207(7) and 211(7) were analyzed for the following parameters using EPA SW-846 methods, including Update III methods where applicable:

- Target analyte list metals – EPA Method 6010B/7000
- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL SVOCs – EPA Method 8270C
- Nitroaromatic/nitramine explosives – EPA Method 8330.

Approximately 50 percent of the samples collected at Parcel 211(7) were also analyzed for CWM breakdown products (including orthosulfur compounds) using EPA Methods 8321 and 8270M.

The drum sample was analyzed for the following parameters:

- Target analyte list metals – EPA Methods 6010B/7000
- TCL VOCs – EPA Method 8260B
- TCL SVOCs – EPA Method 8270C.

3.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain-of-custody records were completed as specified in the SAP.

Completed analysis request and chain-of-custody records (Appendix B) were included with each shipment of sample coolers to EMAX Laboratories, Inc. in Torrance, California.

3.7 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated during the SI at Parcels 207(7) and 211(7) was segregated as follows:

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

Solid IDW was staged on-site in lined rolloff bins prior to waste characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, excavated soil, spent well materials, and personal protective equipment generated during the SI were disposed as nonregulated waste at the Three Corners Landfill located in Piedmont, Alabama.

Liquid IDW was staged on-site pending the results of waste characterization. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on the Main Post.

3.8 Variances/Nonconformances

Four variances to the SFSPs were recorded during completion of the SI at Parcels 207(7) and 211(7). The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP. The variances are summarized in Table 3-8 and the variance reports are included in Appendix F.

No nonconformances to the SFSPs were recorded during completion of the SI at Parcels 207(7) and 211(7).

Proposed SI field activities for Parcel 211(7) were discussed by the BCT at the May 2002 project team meeting. During that meeting, the BCT concurred with the approach regarding monitoring well and sampling locations and analytical parameters. Shaw issued the draft-final work plan in August 2002 and began fieldwork shortly thereafter. Following the initiation of fieldwork, Shaw received comments on the work plan from EPA (dated September 11, 2002) and from ADEM (dated March 28, 2003) after the fieldwork was complete. Therefore, Shaw addressed the comments in the SI Report wherever possible, rather than revising the work plan. Responses to comments are provided in a table in Appendix F.

3.9 Data Quality

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

Table 3-8

Variances to the Site-Specific Field Sampling Plans
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Two additional surface and subsurface soil samples were collected near chemical warfare smoke tanks located along the western boundary of Parcel 211(7).	The soil samples provided additional data used to determine the presence or absence of soil contamination at Parcel 211(7).	None.
A groundwater sample was not collected from monitoring well DTA-207-MW03.	During drilling groundwater was not encountered. Based upon previous well installation activities groundwater tends to migrate along the soil\bedrock interface. Hence, the well was installed at the soil/bedrock interface. Groundwater has been present in the monitoring well during periods of heavy rainfall. However, the well has not produced sufficient water for sampling.	Minimal. Data from the other two wells installed at Parcel 207(7), which showed no contamination, provided sufficient information to characterize groundwater at the site.
Groundwater samples were not collected from monitoring wells PR-211-MW12 and PR-211-MW13.	During installation of PR-211-MW12, groundwater was apparently encountered at 79 feet below ground surface. However, after successful installation, the well did not yield sufficient groundwater to sample. During drilling at PR-211-MW13, groundwater was not encountered. Based upon previous well installation activities, groundwater tends to migrate along the soil\bedrock interface. Hence, PR-211-MW13 was installed at the soil/bedrock interface. Although groundwater has been present in both PR-211-MW12 and PR-211-MW13 during periods of heavy rainfall, neither well has produced sufficient groundwater for sampling.	Moderate. The wells were installed near a potential source area. However, sufficient data were gathered during the SI to indicate that groundwater contamination is present at Parcel 211(7). Further investigation of the site is warranted and will provide additional data to determine the extent of contamination.
A groundwater sample was not collected from monitoring well PR-211-MW15.	During drilling groundwater was not encountered. Based upon previous well installation activities groundwater tends to migrate along the soil\bedrock interface. Hence, the well was installed at the soil/bedrock interface. Groundwater has been present in the monitoring well during periods of heavy rainfall. However, the well has not produced sufficient water for sampling.	Moderate. The well was installed near a potential source area. However, sufficient data were gathered during the SI to indicate that groundwater contamination is present at Parcel 211(7). Further investigation of the site is warranted and will provide additional data to determine the extent of contamination.

procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001b) and the stipulated requirements for the generation of definitive data presented in the SAP. Chemical data were reported by the laboratory via hard-copy data packages 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 H). Selected results were 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 Shaw Environmental Management System database for tracking and reporting. The qualified data were used in comparisons to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparisons to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

This chapter summarizes the geophysical survey results and drum removal activities and provides information on the geology and hydrology at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7).

4.1 Geophysical Survey Results

The surface geophysical survey conducted over an approximately 10,000-square-foot area in the southwestern portion of Parcel 211(7) indicated no geophysical anomalies potentially representing waste disposal pits or trenches. The anomalies observed in the magnetic data were caused by two metal posts. The EM-31 conductivity data showed an increase in conductivity caused by subtle changes in the geology toward the south. The GPR profiles showed no disturbance of the subsurface of the site. The geophysical interpretation map of the site (Figure 4-1) shows the anomaly locations and contains information on site reference features to aid in relocating these anomalies. The anomalies shown on Figure 4-1 correspond to those shown in the magnetic and EM data contour maps presented in the geophysical survey report (Appendix A). A detailed discussion of the data interpretation is included in the geophysical survey report.

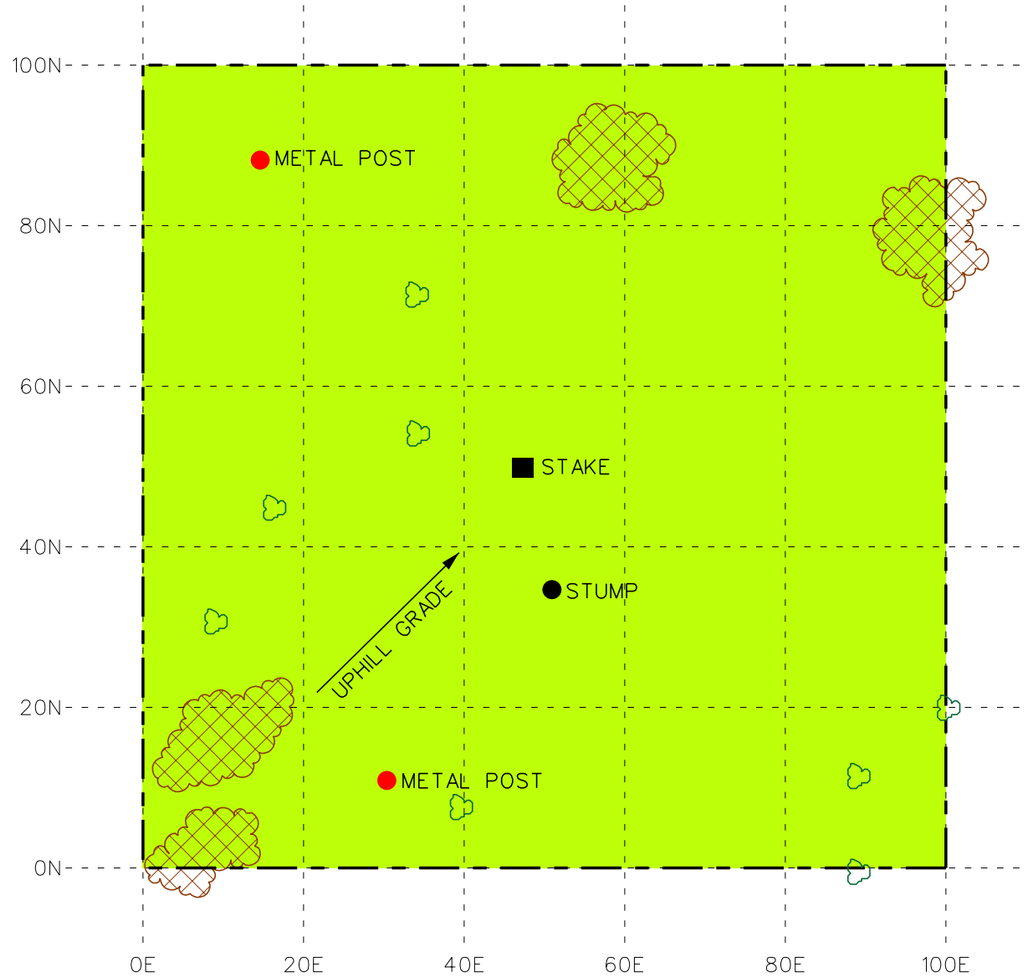
4.2 Drum Removal

Following sampling and analysis, which indicated that the contents were nonhazardous, the drum in the northwestern area of Parcel 211(7) was placed in an overpack container, pending completion of waste manifest documentation (Appendix I). The overpacked drum was removed from the site on December 3, 2002, by C-MAC Environmental Group, Inc. and transported to their facility in Glencoe, Alabama for disposal as nonhazardous waste.

4.3 Regional and Site Geology

4.3.1 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.



LEGEND

- GEOPHYSICAL SURVEY AREA
- WOOD DEBRIS
- TREES

FIGURE 4-1
GEOPHYSICAL INTERPRETATION MAP
FORMER TOXIC GAS AREA,
PARCEL 211(7) AND
FORMER DECONTAMINATION
TRAINING AREA , PARCEL 207(7)

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

SCALE
0 20 40 FEET

Shaw Environmental, Inc.

DWG. NO.: ...\774645aa.012 | PROJ. NO.: 774645
INITIATOR: Ji. Ma | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY:
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 05/06/03 | DRAWN BY: D. BOMAR
1/14/2004 4:52:40 PM
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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 it 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 consists primarily of coarse-grained, vitreous quartzite and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

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

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post, as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated, thinly interbedded grayish red-purple mudstone, shale, siltstone, and greenish red and light gray sandstone, with locally occurring limestone and dolomite. Weaver Cave, located approximately one mile west of the northwest boundary of the Main Post, is situated in gray dolomite and limestone mapped as the Rome Formation (Osborne et al., 1997). 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 in 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 towards 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 geological 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 Range 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; Osborne et al., 1988). The Coosa deformed belt is a narrow northeast-to-southwest-trending linear zone of complex structure (approximately 5 to 20 miles wide and approximately 90 miles in length) 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).

4.3.2 Site Geology

Soil mapped at Parcel 207(7) is the Rarden Gravelly Loam. Eight soil types and one miscellaneous land type are mapped at Parcel 211(7). In the western half of Parcel 211(7), the soils on the uplands and footslopes are mapped as the Montevallo shaly, silt clay, loam, the Montevallo shale, silt, loam or Rarden gravelly loam. The soils mapped within the drainageways are the Tyler silt loam or Lobelville silt loam and cherty silt loam. In the eastern portion of Parcel 211(7), the soil mapped on the uplands is the Stony Rough Land sandstone, Linker gravelly fine sandy loam, and the Rarden gravelly loam. The soil mapped on the footslopes is the Anniston gravelly clay loam. The soils mapped in the drainageways are the Lee silt loam and Lobelville silt loam and cherty silt loam (U.S. Department of Agriculture [USDA], 1961).

The Rarden gravelly loam generally develops from the residuum of shale and fine-grained sandstone or limestone on wide ridges with gentle slopes. The surface soil is generally brown in color. The subsoil is yellowish-red mottled brown clay or silt clay. Pieces of sandstone or chert gravel up to 3 inches are commonly found throughout the soil (USDA, 1961).

The Montevallo shaly silty loam and Montevallo Shaly silt clay loam develops in the residuum of interbedded shale and limestone. The surface soil ranges from very dark grayish brown and very dark brown to brown. The subsoil is yellowish-brown shaly silt loam. Fragments of shale are commonly found throughout the soil. (USDA, 1961).

The Tyler silt loam has developed in old alluvium that washed from residual soils derived from sandstone, shale, and to a lesser extent, limestone. The surface soil commonly consists of a grayish-brown silt loam. The subsoil is a light yellowish-brown mottled gray fine sandy clay loam (USDA, 1961).

Lobelville cherty silt loam is developed from local alluvium that is washed from cherty limestone. The surface soil is commonly a dark grayish-brown silt loam and cherty silt loam. The subsurface soil is generally pale-brown to light yellowish-brown silt loam or cherty silt loam. Fragments of chert up to 2-inches in diameter are commonly found throughout the soil (USDA, 1961).

The Stony Rough Land sandstone miscellaneous land type is found in rugged areas with steep relief where outcrops of sandstone bedrock are common. The soil material consists of only a thin veneer of loose rock fragments and scattered patches of sandy soil (USDA, 1961).

Linker gravelly fine sandy loam develops on hill or ridge tops and is derived from the residuum of sandstone and shale. The surface soil is generally dark grayish-brown fine sandy loam. The subsoil is red to yellowish-red fine sandy loam. Fragments of sandstone up to 2-inches in diameter are found through out the soil (USDA, 1961).

The Anniston gravelly clay loam develops in old alluvium on the footslopes or colluvial fans at the base of larger hills in the region. The surface soil ranges in color from very dark grayish brown to dark reddish gray and dark reddish brown. The subsoil consists of a dark reddish gray and dark reddish brown clay or silty clay loam (USDA, 1961).

Lee silt loam is developed mainly from alluvium derived from the wash of cherty limestone. The surface soil is commonly dark gray to very dark-gray silt loam and cherty silt loam. The subsurface soil is mottled light brownish gray to light gray cherty silt loam. Fragments of chert up to 2-inches in diameter are commonly found throughout the soil (USDA, 1961).

Parcels 207(7) and 211(7) are located within the structurally complex Coosa deformed belt. These sites are underlain by a series of imbricate thrust slices that contain four mapped geologic units. The geologic units are the Pennsylvania/Mississippian Parkwood and Floyd Shale Undifferentiated, Mississippian Tuscumbia Limestone and Fort Payne Chert Undifferentiated, Devonian Frog Mountain Sandstone, and Ordovician Athens Shale (Thomas and Neathery, 1974; Osborne et al., 1988) (Figure 4-2).

A geologic cross section was constructed and the geologic map from Osborne et al. (1988) was revised to reflect recent data collected during drilling and bedrock coring activities undertaken for the SI at Parcels 207(7) and 211(7) and investigations at nearby Parcels 201(7), 203(7), and 204(7). The cross section location is shown on Figure 4-2 and the cross section is presented on Figure 4-3.

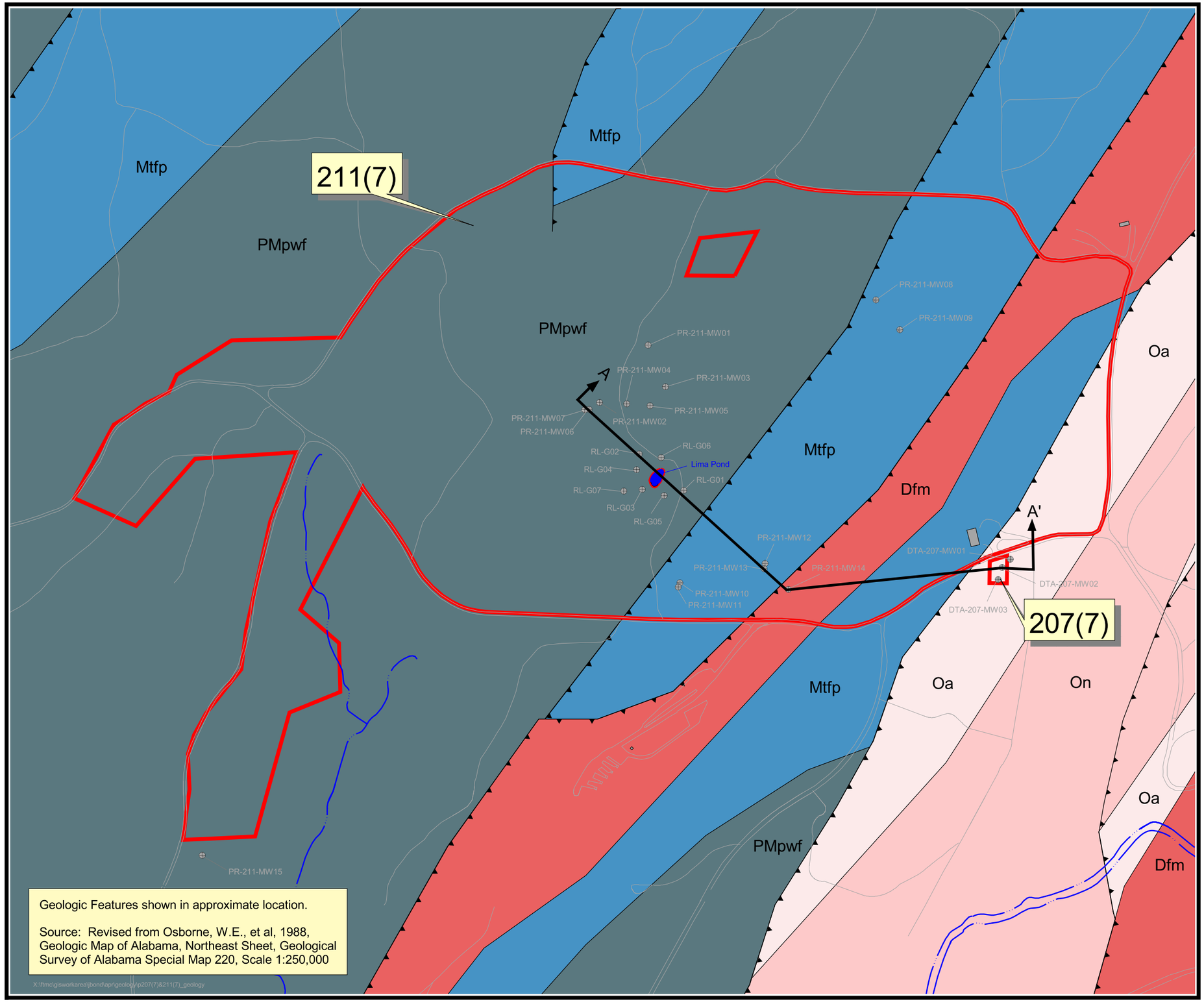


Figure 4-2

Site Geologic Map

Parcels 211(7) and 207(7)
Fort McClellan, Alabama

Legend

- Parcel Boundary
- Roads
- Surface Drainage Feature (dashed where intermittent)
- Surface Water Feature
- Building
- Monitoring Well

Geology

- PMpwf — Pennsylvanian/Mississippian - Parkwood Formation and Floyd Shale, undifferentiated
- Mtfp — Mississippian - Tuscumbia Limestone and Fort Payne Chert, undifferentiated
- Dfm — Devonian - Frog Mountain Sandstone
- Oa — Ordovician - Athens Shale
- On — Ordovician - Newala Limestone
- Thrust Fault (dashed where inferred; barbs on upper sheet)
- A A' — Cross Section Location

600 0 600 Feet

NAD83 State Plane Coordinates

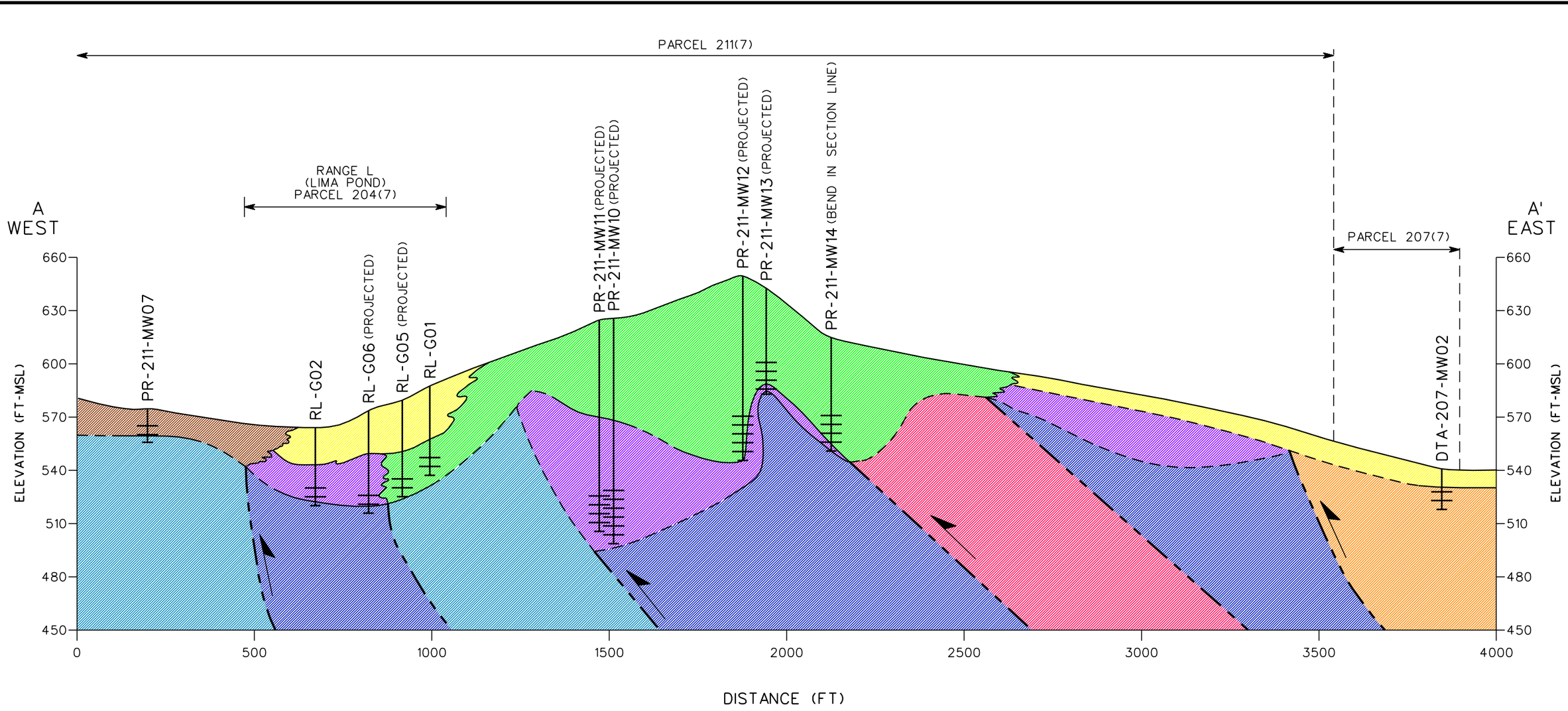
N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: J. REMO
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\774645aa.013
PROJ. NO.: 774645
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 05/08/03
DRAWN BY: D. BOMAR
1/14/2004 4:55:18 PM
lstout
c:\cadd\Design\774645aa.013



LEGEND:

- SCREEN INTERVAL
- INFERRED THRUST FAULT
- GEOLOGIC CONTACT (DASHED WHERE INFERRED)
- PENNSYLVANIAN/MISSISSIPPIAN PARKWOOD FORMATION AND FLOYD SHALE UNDIFFERENTIATED
- MISSISSIPPIAN TUSCUMBIA LIMESTONE AND FORT PAYNE CHERT UNDIFFERENTIATED
- DEVONIAN FROG MOUNTAIN SANDSTONE
- ORDOVICIAN ATHENS SHALE
- SILT AND CLAY
- SANDY SILTY CLAY
- GRAVELLY, SANDY SILT CLAY
- GRAVELLY (CHERT, SANDSTONE) CLAY

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. CROSS SECTION LOCATION SHOWN ON FIGURE 4-2.

HORIZONTAL
0 300 600 FEET

VERTICAL
0 60 120 FEET

FIGURE 4-3
GEOLOGIC CROSS SECTION FORMER TOXIC GAS AREA, PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA , PARCEL 207(7)

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

Shaw Environmental, Inc.

The data collected show the soils underlying Parcel 207(7) and the western half of Parcel 211(7) are predominantly residual soils that ranged in color from black to gray to brown to yellowish orange. These soils were comprised of primarily silt and clay, with lesser amounts of sand and gravel. The gravel found in the soil consists of angular to sub-rounded pieces of sandstone, limestone, siltstone, or chert.

The soils located in the eastern portion of Parcel 211(7) consist primarily of alluvial and colluvial soils with lesser amounts of residual soils. The majority of the alluvial and colluvial soils are found on and along the ridge that occupies the majority of the eastern half of Parcel 211(7). Based on the lithological descriptions recorded during DPT and monitoring well installation, the ridge consists of a combination of alluvium, colluvium, and residuum that range from approximately 60 to over 110 feet thick. The soil and other unconsolidated materials found in this portion of the parcel range in color from light brown to yellowish orange to gray to black and consist of a gravelly, sandy, silty clay. The gravel consists of angular to sub-rounded pieces of sandstone, limestone, siltstone, or chert. The soils encountered during the investigation are consistent with the soils mapped in USDA (1961).

Bedrock was encountered during the installation of 12 of the 18 monitoring wells at Parcels 207(7) and 211(7). Depth to bedrock varied from 14 feet bgs to greater than 110 feet bgs. During installation of the three monitoring wells at Parcel 207(7), gray to black shale with calcite veins consistent with the Athens Shale was encountered. Black, carbonaceous shale, consistent with the undifferentiated Parkwood Formation and Floyd Shale, was encountered during the installation of monitoring wells PR-211-MW01, PR-211-MW02, PR-211-MW04, PR-211-MW06, and PR-211-MW07. Light-gray limestone, that may be consistent with the undifferentiated Tuscumbia Limestone and Fort Payne chert, was encountered during the installation of monitoring wells PR-211-MW09, PR-211-MW13, PR-211-MW14, and PR-211-MW15 (Figure 4-2). Appendix C contains the boring logs and well completion diagrams.

4.4 Site Hydrology

4.4.1 Surface Hydrology

Precipitation in the form of rainfall averages about 53 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, 1998). The major surface-water feature at Pelham Range is Cane Creek, which

flows west through the central area of Pelham Range. All of Parcel 207(7) and most of Parcel 211(7) are located within the Cane Creek Drainage Basin. Approximately 10 acres located in the northwestern corner of Parcel 211(7) are within the Tallasseehatchee Creek Drainage Basin. Overland flow at Parcels 207(7) and 211(7) (with the exception of the northwest corner) collects in interconnecting drainages that eventually form intermittent streams, which flow south towards Cane Creek. The overland flow in the northwest corner of Parcel 211(7) collects in drainages that flow northwest toward a tributary to Tallaseehatchee Creek. Ultimately, Cane and Tallaseehatchee Creeks empty into the Coosa River located approximately 10 miles west of Pelham Range.

4.4.2 Hydrogeology

Static groundwater levels were measured in monitoring wells at Parcels 207(7) and 211(7) and in wells at adjacent Parcel 204(7) (Range L) and Parcel 203(7) (Range K) on February 12 and 13, 2003, as summarized in Table 3-5. The Range L wells begin with the prefix "RL" and the Range K wells begin with the prefix "RNG-203" (Table 3-5). Groundwater elevations were calculated by measuring the depth to groundwater relative to the surveyed top-of-casing elevations. A potentiometric surface map was constructed using the February 2003 data, as shown on Figure 4-4. Based on the water level data, net groundwater flow is to the south-southwest in the central portion of Parcel 211(7). A southeast component of flow towards Cane Creek is present in the eastern portion of the parcel.

STARTING DATE: 06/17/03 | DATE LAST REV.: | DRAFT. CHCK. BY: | INITIATOR: T. WINTON | DWG. NO.:...\774645ap.007
DRAWN BY: D. BOMAR | DRAWN BY: | ENGR. CHCK. BY: S. MORAN | PROJ. MGR.: J. YACOUB | PROJ. NO.: 774645

1/14/2004 1st cut
4:27:42 PM
c:\civil3d\Design\774645ap.007

N

E 602,800

N 1,179,000

E 609,300

N 1,173,400

TRAINING AREA 9B

TRAINING AREA 10B

TRAINING AREA 9A

TRAINING AREA 10A

PARCEL 211(7)

PARCEL 207(7)

RJ30

TO GATE 10

RANGE I - PARCEL 201(7)

BURIAL MOUND AT RIDEOUT FIELD

RNG-203-MW02 (586.97)
RNG-203-MW03 (586.17)
RNG-203-MW04 (586.76)
RNG-203-MW05 (587.82)
RNG-203-MW15 (581.95)
RNG-203-MW14 (581.26)
RNG-203-MW01 (582.74)
RNG-203-MW16 (583.08)
RNG-203-MW06 (579.04)
RNG-203-MW10 (575.55)
RNG-203-MW08 (582.51)
RNG-203-MW08 (565.92)
RNG-203-MW12 (575.83)
RNG-203-MW09 (558.91)
PR-211-MW01 (577.61)
PR-211-MW02 (571.76)
PR-211-MW03 (567.85)
PR-211-MW07 (569.52)
PR-211-MW05 (566.41)
PR-211-MW06 (570.41)
PR-211-MW04 (569.42)
RL-G02 (565.58)
RL-G06 (562.20)
RL-G04 (565.71)
RL-G01 (573.24)
RL-G07 (561.24)
RL-G05 (560.97)
RL-G03 (559.68)
PR-211-MW13 (DRY)
PR-211-MW12 (DRY)
PR-211-MW10 (552.00)
PR-211-MW14 (555.69)
PR-211-MW11 (552.00)
PR-211-MW15 (514.51)
DTA-207-MW01 (536.08)
DTA-207-MW03 (533.32)
DTA-207-MW02 (537.84)
G.W. FLOW

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- 600 — TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- 580 — GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- (587.82) GROUNDWATER ELEVATION (FT MSL) (FEBRUARY 13, 2003)
- G.W. FLOW — GROUNDWATER FLOW DIRECTION
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- RESIDUUM MONITORING WELL LOCATION

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE
0 400 800 FEET

FIGURE 4-4
POTENTIOMETRIC SURFACE MAP FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

Shaw™ Shaw Environmental, Inc.

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7) indicate that metals, VOCs, and SVOCs were detected in site media. Explosive compounds and CWM breakdown products were not detected in site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by Shaw for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metals results exceeding the SSSLs and ESVs were subsequently compared to background screening values to determine if the metals concentrations are within natural background concentrations (SAIC, 1998).

The following sections and Tables 5-1 through 5-3 summarize the results of the comparison of detected constituent concentrations to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix G.

5.1 Surface and Depositional Soil Analytical Results

Twenty-nine surface soil samples and two depositional soil samples were collected for chemical analysis at Parcels 207(7) and 211(7). Surface and depositional soil samples were collected from the uppermost 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. A total of 22 metals were detected in the surface and depositional soil samples. The concentrations of eight metals (aluminum, antimony, arsenic, chromium, iron, manganese thallium, and vanadium) exceeded their respective SSSLs. Of these, the following metals also exceeded their respective background values in two or more samples:

- Aluminum (16,700 to 26,100 milligrams per kilogram [mg/kg]) exceeded its SSSL (7,803 mg/kg) and background (16,306 mg/kg) at four sample locations.

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					DTA-207-GP01					DTA-207-GP02					DTA-207-MW01					DTA-207-MW02				
Sample Number					MN0001					MN0003					MN0005					MN0007				
Sample Date					27-Aug-02					27-Aug-02					27-Aug-02					27-Aug-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.27E+04		YES	YES	YES	1.09E+04			YES	YES	8.22E+03			YES	YES	7.98E+03			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.78E+00	J		YES		8.79E+00	J		YES		7.03E+00	J		YES		6.81E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	6.93E+01	J				3.05E+01	J				3.12E+01	J				4.43E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.73E+00		YES		YES	ND					ND					4.36E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	7.20E+01	J				2.36E+02					1.21E+02					2.13E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.57E+01			YES	YES	1.33E+01				YES	2.71E+01			YES	YES	2.98E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.09E+00					2.60E+01		YES		YES	1.30E+01					1.36E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	4.55E+01		YES		YES	9.80E+00					8.09E+00					1.12E+01				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	4.19E+04		YES	YES	YES	1.11E+04			YES	YES	2.21E+04			YES	YES	1.69E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.39E+01					3.45E+01					1.67E+01					2.08E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.17E+03		YES			5.63E+02					4.27E+02					4.81E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	4.80E+01					3.24E+02				YES	3.41E+02				YES	5.03E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	ND					3.41E-02	J				ND					ND				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	2.48E+01		YES			1.20E+01		YES			6.39E+00					1.10E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	1.45E+03		YES			3.82E+02	B				5.28E+02	J				5.91E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.89E+00	B	YES		YES	ND					1.10E+00	B	YES		YES	7.55E-01	B	YES		
Sodium	mg/kg	6.34E+02	NA	NA	1.19E+02					2.07E+01	J				2.16E+01	J				2.34E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.71E+01				YES	2.01E+01				YES	2.72E+01				YES	2.14E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	9.36E+01		YES		YES	3.97E+01					2.06E+01					3.52E+01				
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					2.00E-02	J			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					1.20E-01	B				1.70E-01	J				2.10E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	ND					ND					ND					ND				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					DTA-207-MW03					PR-211-DEP01					PR-211-DEP02					PR-211-GP01				
Sample Number					MN0010					NQ0012					NQ0013					NQ0014				
Sample Date					27-Aug-02					25-Apr-02					25-Apr-02					24-Apr-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.17E+04			YES	YES	9.16E+03			YES	YES	1.09E+04			YES	YES	6.02E+03				YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.62E+01	J	YES	YES	YES	7.38E+00			YES		4.16E+00			YES		3.00E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.39E+01	J				6.13E+01					1.17E+02					2.83E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	8.09E-01	J	YES			8.93E-01	J	YES			7.35E-01	J				ND				
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	1.37E+02					1.24E+03					1.81E+03		YES			5.34E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.63E+01				YES	2.75E+01			YES	YES	2.48E+01			YES	YES	1.44E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.20E+01		YES		YES	4.21E+00					3.39E+00					ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.37E+01		YES			1.88E+01		YES			5.33E+00					6.18E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.89E+04			YES	YES	2.11E+04			YES	YES	2.24E+04			YES	YES	9.70E+03			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	7.08E+01		YES		YES	1.54E+01					1.77E+01					1.05E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	7.82E+02					5.00E+02					5.57E+02					2.63E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	4.46E+02			YES	YES	1.45E+02	J			YES	6.75E+01	J				6.26E+01	J			
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.27E-02	J				ND					4.35E-02	J				ND				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	2.93E+01		YES			9.50E+00	J				6.22E+00	J				4.15E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	8.15E+02		YES			7.12E+02	J				5.15E+02	J				2.33E+02	B			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.17E+00	B	YES		YES	ND					ND					8.78E-01	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	2.10E+01	J				7.62E+01	J				9.09E+01	J				ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.40E+01				YES	3.76E+01				YES	3.30E+01				YES	1.83E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.36E+02		YES		YES	5.17E+01	J	YES		YES	2.91E+01	J				2.21E+01	J			
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	6.40E-02	B				2.40E-01	J				1.10E-01	J				2.00E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	ND					2.40E-03	B				ND					ND				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					2.40E-03	J				ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-GP02					PR-211-GP03					PR-211-GP04					PR-211-GP05				
Sample Number					NQ0016					NQ0018					NQ0021					NQ0022				
Sample Date					24-Apr-02					16-Sep-02					18-Sep-02					17-Dec-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	7.36E+03				YES	7.54E+03				YES	8.58E+03			YES	YES	1.05E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					5.19E+00	J	YES	YES	YES	ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.75E+00			YES		5.81E+00			YES		5.81E+00			YES		8.25E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.29E+01					4.23E+01					6.25E+01					7.79E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.32E-01	J				5.02E-01	J				6.27E-01	J				5.43E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	8.50E+02					8.63E+01	J				3.17E+02					1.07E+02	B			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.86E+01				YES	2.78E+01	J		YES	YES	1.33E+01				YES	2.53E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.76E+00	J				3.37E+00					1.95E+01		YES			2.01E+01		YES		YES
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	9.79E+00					9.19E+00					5.55E+00					7.90E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.78E+04			YES	YES	1.83E+04	J		YES	YES	9.92E+03			YES	YES	1.54E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.36E+01					1.48E+01					1.85E+01					1.60E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.52E+02					1.94E+02					3.33E+02					4.12E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.19E+02	J			YES	1.19E+02	J			YES	1.81E+03		YES	YES	YES	1.42E+03			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.91E-02	J				4.67E-02	J				9.03E-02	J	YES			4.14E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.56E+00	J				2.25E+00	B				6.69E+00					1.01E+01				
Potassium	mg/kg	8.00E+02	NA	NA	4.81E+02	J				5.04E+02	J				3.92E+02	J				3.89E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	2.63E+00	J	YES		YES	2.34E+00	J	YES		YES	9.68E-01	J	YES		YES	ND				
Sodium	mg/kg	6.34E+02	NA	NA	4.34E+01	J				5.82E+01	B				5.22E+01	B				2.25E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					7.85E-01	J		YES		ND					2.33E+00	J		YES	YES
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.80E+01				YES	2.38E+01				YES	1.77E+01				YES	2.84E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.05E+01	J				1.18E+01	J				1.60E+01	J				2.13E+01	J			
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					3.70E-02	J				3.00E-02					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.50E-01	J				2.90E-01	J				3.00E-01					1.40E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	ND					2.30E-03	B				2.10E-03	B				3.30E-03	B			
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	2.20E-03	J				ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-GP06					PR-211-GP07					PR-211-GP08					PR-211-GP09				
Sample Number					NQ0023					NQ0024					NQ0026					NQ0027				
Sample Date					18-Sep-02					31-Oct-02					17-Sep-02					18-Sep-02				
Sample Depth (Feet)					0-1					0-1					0-1					0-1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.07E+04			YES	YES	2.61E+04		YES	YES	YES	7.17E+03				YES	9.16E+03			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.05E+01			YES	YES	1.37E+01			YES	YES	3.25E+00			YES		5.65E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	2.89E+01					4.35E+01					7.22E+01					5.21E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	ND					ND					4.30E-01	J				1.20E+00	J	YES		YES
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	3.34E+02					2.03E+02					7.20E+02					1.24E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	3.91E+01		YES	YES	YES	7.71E+01		YES	YES	YES	9.63E+00				YES	2.27E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.58E+00					3.54E+00					9.30E+00					4.92E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.23E+00					1.52E+01		YES			4.54E+00					1.46E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.79E+04		YES	YES	YES	3.06E+04			YES	YES	7.47E+03			YES	YES	2.26E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.49E+01					2.35E+01					1.59E+01					5.12E+01		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.25E+02					1.17E+03		YES			3.15E+02					3.29E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	4.60E+02			YES	YES	1.29E+02				YES	1.51E+03			YES	YES	5.23E+01				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.02E-02	J				6.83E-02	J				7.00E-02	J				8.41E-02	J	YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.35E+00					1.39E+01		YES			9.79E+00					4.14E+01		YES		YES
Potassium	mg/kg	8.00E+02	NA	NA	2.90E+02	J				1.38E+03		YES			2.54E+02	J				6.52E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	2.40E+00		YES		YES	3.02E+00		YES		YES	6.76E-01	J	YES			1.92E+00		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	5.81E+01	B				2.81E+01	J				6.80E+01	J				6.05E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					7.72E-01	J		YES		ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	8.56E+01		YES	YES	YES	9.20E+01		YES	YES	YES	1.51E+01				YES	2.53E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.71E+01	J				7.08E+01		YES		YES	1.59E+01					1.98E+02	J	YES		YES
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					3.50E-02					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	1.10E-01					1.60E-01	J				5.60E-01	J				6.50E-02				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	ND					ND					ND					2.30E-03	B			
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	3.80E-03	J				ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-GP10					PR-211-GP11					PR-211-MW01					PR-211-MW02				
Sample Number					NQ0029					NQ0031					NQ0001					NQ0003				
Sample Date					18-Sep-02					17-Sep-02					24-Apr-02					25-Apr-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.03E+04			YES	YES	1.06E+04			YES	YES	1.30E+04			YES	YES	1.06E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	8.38E+00			YES		5.27E+00			YES		7.04E+00			YES		4.57E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	9.97E+01					2.44E+01					3.18E+01					7.49E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.19E-01	J				ND					7.41E-01	J				7.63E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	1.63E+03					5.32E+01	J				4.26E+02					8.35E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	8.25E+01		YES	YES	YES	2.54E+01			YES	YES	2.45E+01			YES	YES	1.78E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	2.70E+00					1.83E+00	J				3.37E+00					7.13E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.28E+01		YES			6.96E+00					2.23E+01		YES			2.74E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.81E+04			YES	YES	1.64E+04			YES	YES	3.26E+04			YES	YES	2.47E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.89E+01					1.05E+01					1.75E+01					1.77E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	3.42E+02					3.20E+02					9.73E+02					1.58E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.34E+03			YES	YES	6.95E+01					3.93E+01	J				2.25E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.11E-01	J	YES		YES	4.06E-02	J				8.40E-02	J	YES			3.17E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.09E+01		YES			4.25E+00					1.44E+01	J	YES			1.91E+01	J	YES		
Potassium	mg/kg	8.00E+02	NA	NA	4.13E+02	J				1.81E+02	J				8.93E+02		YES			7.76E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	2.65E+00		YES		YES	1.83E+00		YES		YES	4.84E+00	J	YES		YES	1.43E+00	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	5.78E+01	B				5.45E+01	B				5.07E+01	J				4.77E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	6.41E+01		YES	YES	YES	3.24E+01				YES	3.29E+01				YES	2.19E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.50E+02	J	YES		YES	1.85E+01					5.85E+01	J	YES		YES	7.97E+01	J	YES		YES
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	5.00E-02					ND					2.60E-02	J				ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	5.40E-01					1.00E-01					5.70E-01	J				2.70E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.70E-03	B				ND					1.80E-03	B				ND				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-MW03					PR-211-MW04					PR-211-MW05					PR-211-MW08				
Sample Number					NQ0005					NQ0007					NQ0010					NQ0033				
Sample Date					24-Apr-02					25-Apr-02					25-Apr-02					16-Sep-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.04E+04			YES	YES	9.44E+03			YES	YES	6.59E+03				YES	8.29E+03			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					4.49E+00	J	YES	YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	2.88E+00			YES		1.30E+01			YES	YES	2.91E+00			YES		1.19E+01			YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.58E+01					9.89E+01					2.74E+01					3.19E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	ND					9.91E-01	J	YES			ND					4.28E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	4.00E+02					7.59E+02					6.41E+02					2.66E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.24E+01				YES	2.40E+01			YES	YES	1.90E+01				YES	2.79E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.48E+00	J				4.10E+00					1.42E+00	J				9.26E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	4.96E+00					4.70E+01		YES		YES	3.51E+00					1.09E+01				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.60E+04			YES	YES	2.86E+04			YES	YES	1.39E+04			YES	YES	1.68E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.11E+01		YES		YES	2.47E+01					1.11E+01					1.59E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.22E+02					9.69E+02					2.78E+02					3.25E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.71E+01	J				1.05E+02	J			YES	1.03E+02	J			YES	4.10E+02	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.91E-02	J				4.35E-02	J				3.75E-02	J				6.49E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	3.93E+00	J				3.12E+01	J	YES		YES	3.21E+00	J				3.92E+00	B			
Potassium	mg/kg	8.00E+02	NA	NA	4.02E+02	J				8.23E+02		YES			3.35E+02	B				2.47E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	8.68E-01	J	YES		YES	2.96E+00	J	YES		YES	5.93E-01	J	YES			8.46E-01	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	6.59E+01	J				4.63E+01	J				5.68E+01	J				5.66E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.94E+01				YES	4.19E+01				YES	2.19E+01				YES	3.02E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.75E+01	J				1.66E+02	J	YES		YES	1.43E+01	J				1.64E+01	J			
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	1.60E-01	J				2.50E-01	J				7.70E-02	J				2.60E-01				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	1.90E-03	B				ND					ND					1.90E-03	B			
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	4.30E-03	J				ND					ND					1.10E-03	J			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-MW09					PR-211-MW10					PR-211-MW11					PR-211-MW12				
Sample Number					NQ0035					NQ0037					NQ0039					NQ0041				
Sample Date					16-Sep-02					16-Sep-02					16-Sep-02					17-Sep-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.67E+04		YES	YES	YES	1.36E+04			YES	YES	9.55E+03			YES	YES	1.19E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.41E+00			YES		1.67E+01		YES	YES	YES	1.22E+01			YES	YES	6.30E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.33E+02		YES			4.04E+02		YES		YES	2.33E+02		YES		YES	2.68E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	9.50E-01	J	YES			1.08E+00	J	YES			1.11E+00	J	YES		YES	5.07E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					1.45E+00		YES			ND				
Calcium	mg/kg	1.72E+03	NA	NA	3.05E+02					2.24E+02					1.01E+02	J				2.49E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.07E+01				YES	1.67E+01				YES	2.70E+01			YES	YES	3.68E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.39E+01		YES		YES	1.98E+02		YES		YES	7.77E+01		YES		YES	1.80E+01		YES		
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.12E+01					2.23E+01		YES			2.38E+01		YES			1.09E+01				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.47E+04			YES	YES	3.20E+04			YES	YES	2.31E+04			YES	YES	2.17E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.50E+01					6.88E+01		YES		YES	3.13E+01					2.54E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	5.59E+02					4.77E+02					4.92E+02					3.62E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	4.85E+03	J	YES	YES	YES	5.85E+03	J	YES	YES	YES	3.36E+03	J	YES	YES	YES	1.05E+03			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.32E-02	J				1.00E-01	J	YES		YES	7.77E-02	J				1.10E-01	J	YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	2.38E+01		YES			1.21E+02		YES		YES	1.35E+02		YES		YES	2.42E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	4.30E+02	J				8.07E+02	J	YES			1.37E+03	J	YES			4.37E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.16E+00	J	YES		YES	2.16E+00	J	YES		YES	1.43E+00	J	YES		YES	1.18E+00	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	6.85E+01	J				6.17E+01	J				6.62E+01	J				5.86E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					2.24E+00	J		YES	YES	8.76E-01	J		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.57E+01				YES	4.76E+01				YES	2.56E+01				YES	4.74E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.80E+01	J				6.82E+01	J	YES		YES	8.68E+01	J	YES		YES	2.77E+01				
VOLATILE ORGANIC COMPOUNDS																								
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	4.00E-02					2.40E-02					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	1.90E-01					2.10E-01					1.00E-01					2.00E-01				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.10E-03	B				2.50E-03	B				2.20E-03	B				ND				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					1.20E-03	J				ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					3.50E-03	J				ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																								
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PR-211-MW13					PR-211-MW14					PR-211-MW15				
Sample Number					NQ0043					NQ0045					NQ0048				
Sample Date					17-Sep-02					17-Sep-02					31-Oct-02				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.31E+04			YES	YES	1.45E+04			YES	YES	1.76E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.52E+00			YES		5.83E+00			YES		7.46E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.12E+01					8.68E+01					5.02E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	ND					5.60E-01	J				4.77E-01	J			
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	7.15E+02					4.62E+02					2.49E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	3.55E+01			YES	YES	1.42E+01				YES	5.39E+01		YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	6.79E+00					1.02E+01					6.86E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.06E+01					6.76E+00					8.25E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.80E+04			YES	YES	1.74E+04			YES	YES	1.83E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.56E+01					2.05E+01					1.83E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.14E+02					3.73E+02					8.45E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.63E+02				YES	2.28E+03		YES	YES	YES	4.99E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	9.60E-02	J	YES			6.12E-02	J				5.20E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.09E+01		YES			1.02E+01					1.17E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	4.46E+02	J				3.68E+02	J				9.60E+02		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.36E-01	J	YES		YES	8.32E-01	J	YES		YES	1.62E+00		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	6.50E+01	J				7.36E+01	J				7.48E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.04E+01				YES	3.63E+01				YES	5.43E+01			YES	YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.42E+01					1.90E+01					6.50E+01		YES		YES
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					2.50E-02					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.80E-01					3.90E-01					1.90E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	ND					ND					ND				
Styrene	mg/kg	NA	1.55E+03	1.00E-01	ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					2.30E-03	J			
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					2.70E-02				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.50E-01	J				ND					ND				

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

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 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.

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
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				DTA-207-GP01				DTA-207-GP02				DTA-207-MW01				DTA-207-MW02				DTA-207-MW03			
Sample Number				MN0002				MN0004				MN0006				MN0008				MN0011			
Sample Date				27-Aug-02				27-Aug-02				27-Aug-02				27-Aug-02				27-Aug-02			
Sample Depth (Feet)				9 - 11				11 - 12				9 - 10				10 - 12				11 - 12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	2.16E+04		YES	YES	3.48E+04		YES	YES	2.27E+04		YES	YES	2.17E+04		YES	YES	2.15E+04		YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	5.24E+00	J		YES	3.02E+01	J	YES	YES	4.90E+00	J		YES	3.90E+00	J		YES	4.86E+01	J	YES	YES
Barium	mg/kg	2.34E+02	5.47E+02	1.97E+02	J			4.30E+01	J			1.78E+02	J			1.52E+02	J			4.71E+02	J	YES	
Beryllium	mg/kg	8.60E-01	9.60E+00	1.25E+00		YES		1.44E+00		YES		1.33E+00		YES		1.23E+00		YES		2.14E+01		YES	YES
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND				ND				2.53E+00		YES	
Calcium	mg/kg	6.37E+02	NA	1.32E+02				5.95E+02				2.43E+02				4.66E+02				1.16E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	2.68E+01			YES	2.99E+01			YES	2.59E+01			YES	2.61E+01			YES	2.23E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	1.52E+01				3.36E+02		YES		2.22E+01		YES		9.02E+00				1.34E+02		YES	
Copper	mg/kg	1.94E+01	3.13E+02	5.42E+01		YES		4.37E+01		YES		4.53E+01		YES		4.46E+01		YES		4.74E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	4.02E+04			YES	4.60E+04		YES	YES	3.68E+04			YES	3.53E+04			YES	9.17E+04		YES	YES
Lead	mg/kg	3.85E+01	4.00E+02	2.30E+01				6.56E+02		YES	YES	1.98E+01				1.87E+01				1.58E+02		YES	
Magnesium	mg/kg	7.66E+02	NA	5.37E+03		YES		1.40E+03		YES		7.85E+03		YES		7.06E+03		YES		1.08E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	8.00E+01				1.95E+03		YES	YES	2.79E+02				9.31E+01				6.14E+03		YES	YES
Mercury	mg/kg	7.00E-02	2.33E+00	3.74E-02	J			2.35E-01		YES		ND				ND				1.38E-01	J	YES	
Nickel	mg/kg	1.29E+01	1.54E+02	3.30E+01		YES		7.12E+01		YES		5.71E+01		YES		3.33E+01		YES		3.26E+02		YES	YES
Potassium	mg/kg	7.11E+02	NA	1.74E+03		YES		1.81E+03		YES		2.57E+03		YES		2.02E+03		YES		1.81E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	1.60E+00	B	YES		2.21E+00	B	YES		1.77E+00	B	YES		2.03E+00	B	YES		2.46E+00	B	YES	
Silver	mg/kg	2.40E-01	3.91E+01	1.51E+00	J	YES		ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	9.87E+01	J			3.57E+01	J			9.66E+01	J			1.66E+02				3.72E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				1.56E+00	J	YES	YES	ND				ND				1.87E+00	J	YES	YES
Vanadium	mg/kg	6.49E+01	5.31E+01	3.73E+01				6.60E+01		YES	YES	3.21E+01				3.29E+01				4.05E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.28E+02		YES		2.41E+02		YES		1.42E+02		YES		1.10E+02		YES		9.00E+02		YES	
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	ND				2.20E-02	B			ND				ND				3.50E-02	B		
Carbon disulfide	mg/kg	NA	7.77E+02	ND				ND				ND				ND				ND			
Chloroform	mg/kg	NA	1.03E+02	ND				ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	ND				ND				ND				ND				ND			
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND				ND				ND			
m,p-Xylenes	mg/kg	NA	1.55E+04	ND				ND				ND				ND				ND			
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND				ND				ND			
sec-Butylbenzene	mg/kg	NA	7.77E+01	ND				ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-GP01				PR-211-GP02				PR-211-GP03				PR-211-GP07				PR-211-GP09			
Sample Number				NQ0015				NQ0017				NQ0020				NQ0025				NQ0028			
Sample Date				24-Apr-02				24-Apr-02				16-Sep-02				31-Oct-02				18-Sep-02			
Sample Depth (Feet)				6 - 8				8 - 10				11 - 12				10 - 12				2 - 3			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	1.23E+04			YES	7.35E+03				6.45E+03				3.41E+04		YES	YES	9.87E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	5.21E+00			YES	1.42E+01			YES	9.46E+00			YES	2.58E+01		YES	YES	1.31E+01			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.02E+02				1.64E+02				3.13E+01				4.21E+01				5.27E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	8.27E-01	J			7.62E-01	J			4.34E-01	J			4.88E-01	J			8.21E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	1.21E+00	J	YES		1.97E+01		YES	YES	ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	1.03E+04		YES		1.01E+04		YES		1.60E+01	J			7.48E+01	J			9.06E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	2.36E+01			YES	1.56E+01				2.66E+01			YES	8.52E+01		YES	YES	2.27E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	6.21E+00				5.03E+00				ND				3.29E+00				5.83E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	2.34E+01		YES		4.74E+01		YES		3.67E+01		YES		2.38E+01		YES		1.91E+01			
Iron	mg/kg	4.48E+04	2.34E+03	2.25E+04			YES	1.74E+04			YES	2.01E+04			YES	4.93E+04		YES	YES	3.59E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.38E+01				1.53E+01				1.80E+01				3.92E+01		YES		2.89E+01			
Magnesium	mg/kg	7.66E+02	NA	1.99E+03		YES		4.96E+02				3.92E+01	J			1.09E+03		YES		3.58E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	4.60E+01	J			3.11E+01	J			ND				7.00E+01				2.83E+03		YES	YES
Mercury	mg/kg	7.00E-02	2.33E+00	5.54E-02	J			9.47E-02	J	YES		2.87E-02	J			8.59E-02	J	YES		3.22E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	3.04E+01	J	YES		3.43E+01	J	YES		ND				3.00E+01		YES		1.34E+01		YES	
Potassium	mg/kg	7.11E+02	NA	9.84E+02		YES		8.67E+02		YES		1.09E+03	J	YES		1.86E+03		YES		5.76E+02			
Selenium	mg/kg	4.70E-01	3.91E+01	2.10E+00	J	YES		5.80E+00	J	YES		3.60E+00	J	YES		3.59E+00		YES		2.98E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				2.06E+00	J	YES		ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	8.75E+01	J			8.52E+01	J			7.80E+01	J			9.70E+01	J			7.22E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.97E+01				3.73E+01				2.75E+01				1.10E+02		YES	YES	3.21E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.19E+02	J	YES		1.27E+02	J	YES		1.98E+01	J			1.07E+02		YES		5.14E+01	J	YES	
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND				1.80E-02	J		
Acetone	mg/kg	NA	7.76E+02	ND				4.10E-02	J			ND				ND				1.40E-01			
Carbon disulfide	mg/kg	NA	7.77E+02	ND				ND				ND				ND				ND			
Chloroform	mg/kg	NA	1.03E+02	ND				ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	ND				ND				2.00E-03	B			ND				2.50E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				1.60E-03	J			ND				ND			
m,p-Xylenes	mg/kg	NA	1.55E+04	ND				ND				ND				ND				ND			
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND				ND				ND			
sec-Butylbenzene	mg/kg	NA	7.77E+01	ND				ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-GP10				PR-211-GP11				PR-211-MW01				PR-211-MW02				PR-211-MW03			
Sample Number				NQ0030				NQ0032				NQ0002				NQ0004				NQ0006			
Sample Date				18-Sep-02				17-Sep-02				24-Apr-02				25-Apr-02				24-Apr-02			
Sample Depth (Feet)				3 - 4				8 - 8.5				6 - 8				3 - 5				8 - 10			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	6.44E+03				9.87E+03			YES	1.68E+04		YES	YES	1.55E+04		YES	YES	9.20E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	7.25E+00			YES	1.35E+01			YES	8.36E+00			YES	3.28E+00			YES	6.61E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.13E+02				3.42E+02		YES		1.27E+02				3.13E+02		YES		8.31E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				1.29E+00		YES		1.29E+00		YES		1.14E+00		YES		1.44E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	1.63E+00	J	YES		ND				ND				1.04E+00	J	YES		1.25E+00		YES	
Calcium	mg/kg	6.37E+02	NA	1.77E+04		YES		7.96E+01	J			2.01E+03		YES		1.20E+04		YES		1.47E+04		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	4.03E+01		YES	YES	5.57E+01		YES	YES	2.44E+01			YES	1.96E+01				1.82E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				ND				1.57E+01				1.66E+01				7.44E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.04E+02		YES		6.49E+01		YES		3.17E+01		YES		2.64E+01		YES		1.48E+01			
Iron	mg/kg	4.48E+04	2.34E+03	2.87E+04			YES	2.45E+04			YES	3.23E+04			YES	2.96E+04			YES	1.94E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	3.62E+02		YES		2.01E+01				1.40E+01				1.58E+01				1.07E+01			
Magnesium	mg/kg	7.66E+02	NA	4.49E+02				5.86E+02				4.09E+03		YES		5.18E+03		YES		6.06E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	2.79E+02				1.32E+01				1.88E+02	J			2.82E+02	J			2.38E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	1.05E+00		YES		1.02E-01	J	YES		4.60E-02	J			ND				ND			
Nickel	mg/kg	1.29E+01	1.54E+02	1.18E+01				2.84E+00				4.94E+01	J	YES		4.11E+01	J	YES		2.73E+01	J	YES	
Potassium	mg/kg	7.11E+02	NA	3.24E+02	J			1.31E+03		YES		1.19E+03		YES		7.76E+02		YES		5.74E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	4.16E+00		YES		1.26E+01		YES		1.45E+00	J	YES		ND				ND			
Silver	mg/kg	2.40E-01	3.91E+01	3.96E+00	J	YES		ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	1.57E+02	J			8.14E+01	J			4.14E+02				1.59E+02				8.60E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				7.36E-01	J		YES	ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	3.24E+01				2.56E+01				2.49E+01				1.87E+01				2.00E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	9.01E+02	J	YES		9.73E+00				1.29E+02	J	YES		9.47E+01	J	YES		8.81E+01	J	YES	
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	5.20E-02	J			ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg	NA	3.88E+02	3.60E-02	J			ND				ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	2.40E-01				ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	1.10E+00				1.20E-01				2.30E-02	J			ND				ND			
Carbon disulfide	mg/kg	NA	7.77E+02	7.60E-02				ND				ND				ND				ND			
Chloroform	mg/kg	NA	1.03E+02	1.00E-02	J			ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	9.00E-03	B			ND				ND				ND				ND			
Naphthalene	mg/kg	NA	1.55E+02	6.60E-02	J			ND				ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND				ND				ND			
m,p-Xylenes	mg/kg	NA	1.55E+04	4.60E-03	J			ND				ND				ND				ND			
p-Cymene	mg/kg	NA	1.55E+03	8.90E-03	J			ND				ND				ND				ND			
sec-Butylbenzene	mg/kg	NA	7.77E+01	5.40E-03	J			ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-MW04				PR-211-MW05				PR-211-MW08				PR-211-MW09				PR-211-MW10			
Sample Number				NQ0009				NQ0011				NQ0034				NQ0036				NQ0038			
Sample Date				25-Apr-02				25-Apr-02				16-Sep-02				16-Sep-02				16-Sep-02			
Sample Depth (Feet)				2 - 4				10 - 12				10 - 12				10 - 12				10 - 12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	1.96E+04		YES	YES	8.12E+03			YES	8.78E+03			YES	1.12E+04			YES	7.85E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	1.45E+01			YES	5.98E+00			YES	2.41E+01		YES	YES	8.81E+00			YES	7.17E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	1.01E+02				6.64E+01				9.80E+00				3.17E+01				4.02E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.23E+00	J	YES		9.22E-01	J	YES		6.09E-01	J			5.79E-01	J			7.95E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	6.46E-01	J	YES		5.95E-01	J	YES		ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	6.01E+02				5.43E+03		YES		4.48E+01	J			3.54E+02				3.62E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	3.34E+01			YES	1.67E+01				1.28E+01				1.24E+01				1.52E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	4.85E+00				1.27E+01				5.19E+01		YES		6.99E+00				3.05E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	3.98E+01		YES		1.15E+01				3.21E+01		YES		1.81E+01				1.53E+01			
Iron	mg/kg	4.48E+04	2.34E+03	3.92E+04			YES	2.49E+04			YES	2.48E+04			YES	1.99E+04			YES	1.89E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	2.15E+01				1.18E+01				1.67E+01				7.86E+00				6.12E+00			
Magnesium	mg/kg	7.66E+02	NA	2.71E+03		YES		5.15E+02				3.64E+02				6.47E+02				3.74E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	9.98E+01	J			3.57E+02	J			2.73E+02	J			8.17E+01	J			7.96E+02	J		YES
Mercury	mg/kg	7.00E-02	2.33E+00	ND				ND				5.05E-02	J			ND				6.48E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	5.26E+01	J	YES		1.94E+01	J	YES		2.17E+01		YES		1.37E+01		YES		2.93E+01		YES	
Potassium	mg/kg	7.11E+02	NA	1.03E+03		YES		5.51E+02	J			8.19E+02	J	YES		1.35E+03	J	YES		1.67E+03	J	YES	
Selenium	mg/kg	4.70E-01	3.91E+01	3.12E+00	J	YES		ND				1.48E+00	J	YES		9.33E-01	J	YES		8.23E-01	J	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	6.52E+01	J			7.87E+01	J			8.25E+01	J			7.21E+01	J			7.24E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				ND				9.66E-01	J		YES
Vanadium	mg/kg	6.49E+01	5.31E+01	4.95E+01				2.37E+01				4.08E+01				2.90E+01				3.70E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.95E+02	J	YES		6.25E+01	J	YES		4.65E+01	J	YES		2.59E+01	J			2.47E+01	J		
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	4.80E-02	J			ND				ND				1.80E-02	J			4.00E-02			
Carbon disulfide	mg/kg	NA	7.77E+02	ND				ND				ND				ND				ND			
Chloroform	mg/kg	NA	1.03E+02	ND				ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	ND				2.60E-03	B			2.30E-03	B			2.10E-03	B			2.20E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND				ND				ND			
m,p-Xylenes	mg/kg	NA	1.55E+04	ND				ND				ND				ND				ND			
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND				ND				ND			
sec-Butylbenzene	mg/kg	NA	7.77E+01	ND				ND				ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-MW11				PR-211-MW12				PR-211-MW13				PR-211-MW14				PR-211-MW15			
Sample Number				NQ0040				NQ0042				NQ0044				NQ0047				NQ0050			
Sample Date				16-Sep-02				17-Sep-02				17-Sep-02				17-Sep-02				31-Oct-02			
Sample Depth (Feet)				10 - 12				10 - 12				3 - 4				10 - 12				10 - 12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	1.06E+04			YES	6.40E+03				1.10E+04			YES	1.66E+04		YES	YES	4.11E+04		YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	1.19E+01			YES	5.97E+00			YES	6.79E+00			YES	4.48E+00			YES	2.76E+01		YES	YES
Barium	mg/kg	2.34E+02	5.47E+02	3.47E+01				6.89E+00				2.15E+01				4.83E+01				6.19E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	7.70E-01	J			ND				ND				4.58E-01	J			7.60E-01	J		
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	8.91E+01	J			4.91E+01	J			5.38E+02				5.97E+01	J			1.44E+02			
Chromium	mg/kg	3.83E+01	2.32E+01	1.26E+01				2.80E+01			YES	3.61E+01			YES	1.17E+01				8.30E+01		YES	YES
Cobalt	mg/kg	1.75E+01	4.68E+02	4.46E+01		YES		ND				5.28E+00				8.89E+00				4.24E+00			
Copper	mg/kg	1.94E+01	3.13E+02	2.32E+01		YES		1.16E+01				9.64E+00				7.23E+00				3.23E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.97E+04			YES	1.87E+04			YES	1.97E+04			YES	1.54E+04			YES	4.80E+04		YES	YES
Lead	mg/kg	3.85E+01	4.00E+02	1.76E+01				1.12E+01				1.37E+01				1.76E+01				5.75E+01		YES	
Magnesium	mg/kg	7.66E+02	NA	1.62E+02				8.35E+01	J			2.79E+02				3.61E+02				1.79E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	9.88E+02	J		YES	1.24E+01				3.85E+02			YES	2.28E+03		YES	YES	9.18E+01			
Mercury	mg/kg	7.00E-02	2.33E+00	6.89E-02	J			4.18E-02	J			4.43E-02	J			1.51E-01		YES		1.31E-01	J	YES	
Nickel	mg/kg	1.29E+01	1.54E+02	1.00E+02		YES		7.07E+00				8.58E+00				1.19E+01				5.63E+01		YES	
Potassium	mg/kg	7.11E+02	NA	5.62E+02	J			4.76E+02	J			2.86E+02	J			3.94E+02	J			3.41E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	1.16E+00	J	YES		1.05E+00	J	YES		1.40E+00		YES		7.36E-01	J	YES		3.47E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	6.86E+01	J			7.36E+01	J			6.01E+01	B			6.99E+01	J			1.10E+02	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				ND				8.67E-01	J		YES
Vanadium	mg/kg	6.49E+01	5.31E+01	3.10E+01				5.21E+01				4.76E+01				2.86E+01				1.09E+02		YES	YES
Zinc	mg/kg	3.49E+01	2.34E+03	8.54E+01	J	YES		1.90E+01				1.98E+01				2.24E+01				2.24E+02		YES	
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	ND				ND				1.00E-01				1.10E-02	J			ND			
Carbon disulfide	mg/kg	NA	7.77E+02	ND				ND				ND				ND				ND			
Chloroform	mg/kg	NA	1.03E+02	ND				ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	2.70E-03	B			ND				ND				ND				ND			
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	4.10E-03	J			ND				ND				ND				ND			
m,p-Xylenes	mg/kg	NA	1.55E+04	ND				ND				ND				ND				ND			
p-Cymene	mg/kg	NA	1.55E+03	ND				ND				ND				ND				ND			
sec-Butylbenzene	mg/kg	NA	7.77E+01	ND				ND				ND				ND				ND			

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

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) 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.

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

Groundwater Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				DTA-207-MW01				DTA-207-MW02				PR-211-MW01				PR-211-MW02				PR-211-MW03			
Sample Number				MN3001				MN3002				NQ3001				NQ3002				NQ3003			
Sample Date				4-Nov-02				6-Nov-02				17-Jun-02				13-Jun-02				13-Jun-02			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/L	2.34E+00	1.56E+00	5.14E-02	J			1.77E-01	J			ND				ND				ND			
Arsenic	mg/L	1.78E-02	4.46E-05	ND				2.64E-03	J		YES	4.21E-03	B		YES	ND				ND			
Barium	mg/L	1.27E-01	1.10E-01	1.10E-01			YES	6.55E-02				3.76E-02				8.86E-02				1.37E-01		YES	YES
Calcium	mg/L	5.65E+01	NA	6.34E+01		YES		2.88E+01	B			3.68E+02		YES		1.69E+02		YES		1.21E+02		YES	
Chromium	mg/L	NA	4.69E-03	ND				ND				ND				ND				ND			
Copper	mg/L	2.55E-02	6.26E-02	ND				ND				ND				ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	6.16E-02	J			4.71E-01	J		YES	7.05E-02	J			5.89E-02	J			5.55E-02	J		
Magnesium	mg/L	2.13E+01	NA	3.85E+01	B	YES		4.07E+01	B	YES		6.26E+01		YES		1.32E+01				6.20E+00			
Manganese	mg/L	5.81E-01	7.35E-02	4.13E-01			YES	1.63E+00		YES	YES	3.55E-01			YES	1.14E-01			YES	2.03E-01			YES
Potassium	mg/L	7.20E+00	NA	6.96E+00				7.25E+00		YES		4.11E+00	J			1.10E+00	J			ND			
Selenium	mg/L	NA	7.82E-03	ND				4.46E-03	B			5.55E-03	J			8.78E-03	J		YES	ND			
Sodium	mg/L	1.48E+01	NA	2.11E+01	J	YES		1.49E+01		YES		9.57E+01		YES		1.71E+01		YES		1.66E+01		YES	
Thallium	mg/L	1.46E-03	1.02E-04	ND				ND				ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				ND				ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																							
1,1,1-Trichloroethane	mg/L	NA	3.05E-01	ND				ND				ND				ND				ND			
1,1,2,2-Tetrachloroethane	mg/L	NA	2.04E-04	ND				ND				ND				ND				ND			
1,1-Dichloroethene	mg/L	NA	9.36E-05	ND				ND				ND				ND				ND			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				ND				ND			
Bromodichloromethane	mg/L	NA	1.08E-03	ND				ND				ND				ND				ND			
Carbon disulfide	mg/L	NA	1.51E-01	ND				ND				ND				5.90E-04	J			ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				ND				ND				ND			
Dibromochloromethane	mg/L	NA	7.92E-04	ND				ND				ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	ND				ND				ND				2.20E-04	B			ND			
Tetrachloroethene	mg/L	NA	1.26E-03	ND				ND				ND				ND				ND			
Trichloroethene	mg/L	NA	4.51E-03	ND				ND				ND				ND				ND			

Table 5-3

Groundwater Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-MW04				PR-211-MW05				PR-211-MW06				PR-211-MW07				PR-211-MW08			
Sample Number				NQ3004				NQ3006				NQ3007				NQ3009				NQ3010			
Sample Date				13-Jun-02				13-Jun-02				12-Nov-02				13-Nov-02				15-Nov-02			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/L	2.34E+00	1.56E+00	ND				5.07E-02	J			ND				6.10E-02	B			5.17E-01			
Arsenic	mg/L	1.78E-02	4.46E-05	ND				ND				ND				ND				2.24E-03	J		YES
Barium	mg/L	1.27E-01	1.10E-01	2.60E-02				1.46E-01		YES	YES	7.73E-02				6.07E-02				9.66E-03	B		
Calcium	mg/L	5.65E+01	NA	3.54E+02		YES		9.45E+01		YES		1.56E+02		YES		1.16E+02		YES		3.97E+01	B		
Chromium	mg/L	NA	4.69E-03	ND				ND				ND				ND				1.16E-02	J		YES
Copper	mg/L	2.55E-02	6.26E-02	ND				ND				ND				ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	1.94E-01	J			1.10E+00			YES	1.25E-01	B			6.07E-01	J		YES	8.67E-01	J		YES
Magnesium	mg/L	2.13E+01	NA	8.47E+01		YES		6.55E+00				1.32E+01	B			4.72E+00	B			2.19E+00	B		
Manganese	mg/L	5.81E-01	7.35E-02	3.48E-01			YES	1.23E-01			YES	4.47E-01			YES	5.58E-02	J			1.22E-01			YES
Potassium	mg/L	7.20E+00	NA	3.38E+00	J			ND				3.00E+00	B			3.67E+00	B			1.81E+00	B		
Selenium	mg/L	NA	7.82E-03	1.62E-02			YES	ND				ND				3.07E-03	J			ND			
Sodium	mg/L	1.48E+01	NA	6.07E+01		YES		6.30E+00				1.20E+01	J			9.53E+00				5.34E+00	B		
Thallium	mg/L	1.46E-03	1.02E-04	ND				ND				ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				ND				ND				ND				4.14E-02	B		
VOLATILE ORGANIC COMPOUNDS																							
1,1,1-Trichloroethane	mg/L	NA	3.05E-01	ND				3.70E-04	J			ND				ND				ND			
1,1,2,2-Tetrachloroethane	mg/L	NA	2.04E-04	ND				ND				ND				ND				ND			
1,1-Dichloroethene	mg/L	NA	9.36E-05	ND				2.00E-04	J		YES	ND				ND				ND			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				5.10E-03	J			ND			
Bromodichloromethane	mg/L	NA	1.08E-03	ND				ND				ND				ND				9.90E-04	J		
Carbon disulfide	mg/L	NA	1.51E-01	ND				ND				ND				ND				ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				ND				ND				1.40E-03			YES
Dibromochloromethane	mg/L	NA	7.92E-04	ND				ND				ND				ND				1.20E-03			YES
Methylene chloride	mg/L	NA	7.85E-03	ND				ND				2.40E-04	B			3.70E-04	B			4.80E-04	B		
Tetrachloroethene	mg/L	NA	1.26E-03	ND				ND				ND				ND				ND			
Trichloroethene	mg/L	NA	4.51E-03	ND				ND				ND				ND				2.10E-04	J		

Table 5-3

Groundwater Analytical Results
Former Toxic Gas Area, Parcel 211(7) and Former Decontamination Training Area, Parcel 207(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PR-211-MW09				PR-211-MW10				PR-211-MW11				PR-211-MW14			
Sample Number				NQ3011				NQ3012				NQ3013				NQ3016			
Sample Date				19-Nov-02				3-Dec-02				3-Dec-02				5-Dec-02			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/L	2.34E+00	1.56E+00	3.88E-01				2.18E-01				1.77E-01	J			1.13E+00			
Arsenic	mg/L	1.78E-02	4.46E-05	3.21E-03	J		YES	ND				ND				ND			
Barium	mg/L	1.27E-01	1.10E-01	1.20E-02	B			2.05E-02	B			1.14E-02	B			2.06E-02	B		
Calcium	mg/L	5.65E+01	NA	4.46E+01	B			1.15E+00	B			1.93E+00	B			6.93E+01	B	YES	
Chromium	mg/L	NA	4.69E-03	ND				ND				ND				ND			
Copper	mg/L	2.55E-02	6.26E-02	ND				8.69E-03	J			ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	2.33E-01	J			1.62E-01	J			3.94E-01	J			1.74E+00			YES
Magnesium	mg/L	2.13E+01	NA	3.56E+00	B			5.10E-01	B			5.45E-01	B			3.32E+00	B		
Manganese	mg/L	5.81E-01	7.35E-02	2.40E-02	J			2.05E-01			YES	2.95E-01			YES	5.82E-02	J		
Potassium	mg/L	7.20E+00	NA	1.07E+00	B			1.21E+00	B			5.83E+00	B			2.70E+00	B		
Selenium	mg/L	NA	7.82E-03	ND				ND				ND				ND			
Sodium	mg/L	1.48E+01	NA	1.17E+00	B			2.02E+00	B			2.73E+00	B			3.18E+00	B		
Thallium	mg/L	1.46E-03	1.02E-04	4.77E-03	B	YES	YES	ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				2.84E-02	J			ND				ND			
VOLATILE ORGANIC COMPOUNDS																			
1,1,1-Trichloroethane	mg/L	NA	3.05E-01	ND				ND				ND				ND			
1,1,2,2-Tetrachloroethane	mg/L	NA	2.04E-04	ND				4.70E-02			YES	4.20E-02			YES	2.20E-03			YES
1,1-Dichloroethene	mg/L	NA	9.36E-05	ND				ND				ND				ND			
Acetone	mg/L	NA	1.56E-01	ND				ND				ND				ND			
Bromodichloromethane	mg/L	NA	1.08E-03	ND				ND				ND				ND			
Carbon disulfide	mg/L	NA	1.51E-01	ND				ND				ND				ND			
Chloroform	mg/L	NA	1.15E-03	2.40E-04	J			ND				5.80E-04	J			5.30E-03			YES
Dibromochloromethane	mg/L	NA	7.92E-04	ND				ND				ND				ND			
Methylene chloride	mg/L	NA	7.85E-03	4.00E-04	B			ND				ND				ND			
Tetrachloroethene	mg/L	NA	1.26E-03	ND				ND				3.10E-04	J			ND			
Trichloroethene	mg/L	NA	4.51E-03	ND				8.60E-03			YES	1.20E-02			YES	4.50E-03			

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

[a] BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) 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.

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.

- Antimony (4.49 and 5.19 mg/kg) exceeded its SSSL (3.11 mg/kg) and background (1.99 mg/kg) at two sample locations. Both of the antimony results were flagged with a "J" data qualifier, indicating that the results were estimated.

- Arsenic (16.2 and 16.7 mg/kg) exceeded its SSSL (0.4 mg/kg) and background (13.7 mg/kg) at two sample locations.

- Chromium (39.1 to 82.5 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (37 mg/kg) at sample four sample locations.

- Iron (37,900 and 41,900 mg/kg) exceeded its SSSL (2,345 mg/kg) and background (34,154 mg/kg) at two sample locations.

- Manganese (1,810 to 5,850 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,579 mg/kg) at five sample locations.

- Vanadium (64.1 to 92 mg/kg) exceeded its SSSL (53.1 mg/kg) and background (58.8 mg/kg) at three sample locations.

Figure 5-1 shows metals results exceeding SSSLs and background in surface and depositional soil.

Seventeen metals were detected at concentrations exceeding ESVs: aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, vanadium, and zinc. Of these metals, all except thallium also exceeded their respective background values in two or more samples:

- Aluminum (16,700 to 26,100 mg/kg) exceeded its ESV (50 mg/kg) and background (16,306 mg/kg) at four sample locations.

- Antimony (4.49 and 5.19 mg/kg) exceeded its ESV (3.5 mg/kg) and background (1.99 mg/kg) at two sample locations.

- Arsenic (16.2 and 16.7 mg/kg) exceeded its ESV (10 mg/kg) and background (13.7 mg/kg) at two sample locations.

- Barium (233 and 404 mg/kg) exceeded its ESV (165 mg/kg) and background (124 mg/kg) at two sample locations.

- Beryllium (1.11 to 1.73 mg/kg) exceeded its ESV (1.1 mg/kg) and background (0.8 mg/kg) at three sample locations.

STARTING DATE: 06/17/03 | DRAWN BY: D. BOMAR | DATE LAST REV.: | DRAWN BY: | DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN | INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB | PROJ. NO.: 774645 | DWG. NO.: ...\774645aa.014

1/14/2004 4:33:03 PM lstout

c:\cadd\Design\774645aa.014

E 602,800

E 609,300

N 1,179,000

N 1,173,400

Sample Identification		BKG	SSLS	PR-211-GP10
Sample Number				NQ0029
Sample Date				18-Sep-02
Chromium	mg/kg	3.70E+01	2.32E+01	8.25E+01
Vanadium	mg/kg	5.88E+01	5.31E+01	6.41E+01

Sample Identification		BKG	SSLS	PR-211-GP04
Sample Number				NQ0021
Sample Date				18-Sep-02
Manganese	mg/kg	1.58E+03	3.63E+02	1.81E+03

Sample Identification		BKG	SSLS	PR-211-MW08
Sample Number				NQ0033
Sample Date				16-Sep-02
Antimony	mg/kg	1.99E+00	3.11E+00	4.49E+00 J

Sample Identification		BKG	SSLS	PR-211-MW09
Sample Number				NQ0035
Sample Date				16-Sep-02
Aluminum	mg/kg	1.63E+04	7.80E+03	1.67E+04
Manganese	mg/kg	1.58E+03	3.63E+02	4.85E+03 J

Sample Identification		BKG	SSLS	PR-211-GP03
Sample Number				NQ0018
Sample Date				16-Sep-02
Antimony	mg/kg	1.99E+00	3.11E+00	5.19E+00 J

Sample Identification		BKG	SSLS	PR-211-GP06
Sample Number				NQ0023
Sample Date				18-Sep-02
Chromium	mg/kg	3.70E+01	2.32E+01	3.91E+01
Iron	mg/kg	3.42E+04	2.34E+03	3.79E+04
Vanadium	mg/kg	5.88E+01	5.31E+01	8.56E+01

Sample Identification		BKG	SSLS	PR-211-MW10
Sample Number				NQ0037
Sample Date				16-Sep-02
Arsenic	mg/kg	1.37E+01	4.26E-01	1.67E+01
Manganese	mg/kg	1.58E+03	3.63E+02	5.85E+03 J

Sample Identification		BKG	SSLS	PR-211-MW15
Sample Number				NQ0048
Sample Date				31-Oct-02
Aluminum	mg/kg	1.63E+04	7.80E+03	1.76E+04
Chromium	mg/kg	3.70E+01	2.32E+01	5.39E+01

Sample Identification		BKG	SSLS	PR-211-MW11
Sample Number				NQ0039
Sample Date				16-Sep-02
Manganese	mg/kg	1.58E+03	3.63E+02	3.36E+03 J

Sample Identification		BKG	SSLS	PR-211-MW14
Sample Number				NQ0045
Sample Date				17-Sep-02
Manganese	mg/kg	1.58E+03	3.63E+02	2.28E+03

Sample Identification		BKG	SSLS	DTA-207-GP01
Sample Number				MN0001
Sample Date				27-Aug-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.27E+04
Iron	mg/kg	3.42E+04	2.34E+03	4.19E+04

Sample Identification		BKG	SSLS	DTA-207-MW03
Sample Number				MN0010
Sample Date				27-Aug-02
Arsenic	mg/kg	1.37E+01	4.26E-01	1.62E+01 J

Sample Identification		BKG	SSLS	PR-211-GP07
Sample Number				NQ0024
Sample Date				31-Oct-02
Aluminum	mg/kg	1.63E+04	7.80E+03	2.61E+04
Chromium	mg/kg	3.70E+01	2.32E+01	7.71E+01
Vanadium	mg/kg	5.88E+01	5.31E+01	9.20E+01

TRAINING AREA 9B
TRAINING AREA 9A
TRAINING AREA 10B
TRAINING AREA 10A
PARCEL 211(7)
RANGE K - PARCEL 203(7)
RANGE L - PARCEL 204(7)
RANGE I - PARCEL 201(7)
ORIENTATION AREA
STATION NO.7 (DEMONSTRATION AREA)
STATION NO.6 (MINES)
STATION NO.5 (A-BOMB)
STATION NO.4 (DEPOT)
STATION NO.3 (IMPACT AREA)
STATION NO.2
STATION NO.1
CONTROL CENTER AID STATION
RIDEOUT HALL BUILDING 8801
BURIAL MOUND AT RIDEOUT FIELD
GEOPHYSICAL SURVEY AREA
TO GATE 10
RJ30
RJ29
RJ28
PR-211-DR01
PR-211-GP11
PR-211-GP03
PR-211-GP10
PR-211-GP05
PR-211-MW08
PR-211-MW09
PR-211-MW01
PR-211-MW02
PR-211-GP02
PR-211-GP01
PR-211-MW03
PR-211-MW04
PR-211-DEP01
PR-211-DEP02
PR-211-MW07
PR-211-MW06
PR-211-GP04
PR-211-GP09
PR-211-GP06
PR-211-GP08
PR-211-MW12 (WELL DRY)
PR-211-MW13 (WELL DRY)
PR-211-MW10
PR-211-MW11
PR-211-MW14
DTA-207-GP01
DTA-207-MW01
DTA-207-GP02
DTA-207-MW03 (WELL DRY)
DTA-207-MW02
PR-211-MW15 (WELL DRY)
PR-211-GP07

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ — ROAD JUNCTION
- ▲ — DEPOSITIONAL SOIL SAMPLE LOCATION
- ◪ — SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ■ — SURFACE SOIL SAMPLE LOCATION
- ◉ — MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- ◭ — MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ◉ — MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- D — DRUM SAMPLE LOCATION
- J — COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- BKG — BACKGROUND
- SSLS — SITE-SPECIFIC SCREENING LEVEL
- mg/kg — MILLIGRAMS PER KILOGRAM

NOTE:

1. SEE FIGURE 1-2 FOR DESCRIPTION OF SITE FEATURES.

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE
0 400 800 FEET

FIGURE 5-1
METALS EXCEEDING SSSLs AND BACKGROUND IN SURFACE SOIL FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

Shaw™ Shaw Environmental, Inc.

- Chromium (39.1 to 82.5. mg/kg) exceeded its ESV (0.4 mg/kg) and background (37 mg/kg) at sample four locations.

- Cobalt (20.1 to 198 mg/kg) exceeded its ESV (20 mg/kg) and background (15.2 mg/kg) at six sample locations.

- Copper (45.5 and 47 mg/kg) exceeded its ESV (40 mg/kg) and background (12.7 mg/kg) at two sample locations.

- Iron (37,900 and 41,900 mg/kg) exceeded its ESV (200 mg/kg) and background (34,154 mg/kg) at two sample locations.

- Lead (51.1 to 70.8 mg/kg) exceeded its ESV (50 mg/kg) and background (40.1 mg/kg) at four sample locations.

- Manganese (1,810 to 5,850 mg/kg) exceeded its ESV (100 mg/kg) and background (1,579 mg/kg) at five sample locations.

- Mercury (0.1 to 0.11 mg/kg) equaled or exceeded its ESV (0.1 mg/kg) and background (0.08 mg/kg) at three sample locations. The mercury results were "J" flagged, indicating that the concentrations were estimated.

- Nickel (31.2 to 135 mg/kg) exceeded its ESV (30 mg/kg) and background (10.3 mg/kg) at four sample locations.

- Selenium (0.83 to 4.84 mg/kg) exceeded its ESV (0.81 mg/kg) and background (0.48 mg/kg) at 24 sample locations. Three of the selenium results were "B" flagged, indicating that selenium was also detected in an associated laboratory or field blank sample. The majority of the remaining selenium results were "J" flagged, indicating that the concentrations were estimated.

- Vanadium (64.1 to 92 mg/kg) exceeded its ESV (2 mg/kg) and background (58.8 mg/kg) at 3 sample locations.

- Zinc (51.7 to 198 mg/kg) exceeded its ESV (50 mg/kg) and background (40.6 mg/kg) at 12 sample locations. The majority of the zinc results were "J" flagged, indicating that the concentrations were estimated.

Figure 5-2 shows the surface and depositional soil sample locations with metals results exceeding ESVs and background.

STARTING DATE: 06/17/03 | DATE LAST REV.: | DRAFT. CHCK. BY: | INITIATOR: T. WINTON | DWG. NO.: ...\774645aa.015
DRAWN BY: D. BOMAR | DRAWN BY: | ENGR. CHCK. BY: S. MORAN | PROJ. MGR.: J. YACOUB | PROJ. NO.: 774645

E 602,800

E 609,300

N

N 1,173,400

TO GATE 10

TRAINING AREA 9A

TRAINING AREA 9B

TRAINING AREA 10B

ORIENTATION AREA

STATION NO.7 (DEMONSTRATION AREA)

STATION NO.6 (MINES)

STATION NO.5 (A-BOMB)

STATION NO.4 (DEPOT)

STATION NO.3 (IMPACT AREA)

STATION NO.2

STATION NO.1

CONTROL CENTER AID STATION

RIDEOUT BUILDING 8801

HALL

RJ28

RJ29

RJ30

PR-211-DR01

PR-211-GP03

PR-211-GP11

PR-211-GP10

PR-211-GP05

PR-211-MW08

PR-211-MW09

PR-211-MW01

PR-211-MW02

PR-211-GP02

PR-211-GP01

PR-211-MW07

PR-211-MW06

PR-211-MW03

PR-211-MW04

PR-211-DEP01

PR-211-DEP02

PR-211-GP04

PR-211-GP09

PR-211-GP06

PR-211-GP08

PR-211-MW12 (WELL DRY)

PR-211-MW13 (WELL DRY)

PR-211-MW10

PR-211-MW11

PR-211-MW14

PR-211-MW15 (WELL DRY)

PR-211-GP07

DTA-207-GP01

DTA-207-MW01

DTA-207-GP02

DTA-207-MW03 (WELL DRY)

DTA-207-MW02

GEOPHYSICAL SURVEY AREA

RANGE I - PARCEL 201(7)

Sample Identification		BKG		ESV	PR-211-MW01
Sample Number					NQ0001
Sample Date					24-Apr-02
Selenium	mg/kg	4.80E-01		8.10E-01	4.84E+00 J
Zinc	mg/kg	4.06E+01		5.00E+01	5.85E+01 J

Sample Identification		BKG		ESV	PR-211-MW03
Sample Number					NQ0005
Sample Date					24-Apr-02
Lead	mg/kg	4.01E+01		5.00E+01	5.1E+01
Selenium	mg/kg	4.80E-01		8.10E-01	8.68E-01 J

Sample Identification		BKG		ESV	PR-211-GP05
Sample Number					NQ0022
Sample Date					17-Sep-02
Cobalt	mg/kg	1.52E+01		2.00E+01	2.01E+01

Sample Identification		BKG		ESV	PR-211-DEP01
Sample Number					NQ0012
Sample Date					25-Apr-02
Zinc	mg/kg	4.06E+01		5.00E+01	5.17E+01 J

Sample Identification		BKG		ESV	PR-211-GP09
Sample Number					NQ0027
Sample Date					18-Sep-02
Beryllium	mg/kg	8.00E-01		1.10E+00	1.20E+00 J
Lead	mg/kg	4.01E+01		5.00E+01	5.12E+01
Nickel	mg/kg	1.03E+01		3.00E+01	4.14E+01
Selenium	mg/kg	4.80E-01		8.10E-01	1.92E+00
Zinc	mg/kg	4.06E+01		5.00E+01	1.98E+02 J

Sample Identification		BKG		ESV	PR-211-GP04
Sample Number					NQ0021
Sample Date					18-Sep-02
Manganese	mg/kg	1.58E+03		1.00E+02	1.81E+03
Selenium	mg/kg	4.80E-01		8.10E-01	9.68E-01 J

Sample Identification		BKG		ESV	PR-211-MW02
Sample Number					NQ0003
Sample Date					25-Apr-02
Selenium	mg/kg	4.80E-01		8.10E-01	7.97E+01 J
Zinc	mg/kg	4.06E+01		5.00E+01	1.43E+00 J

Sample Identification		BKG		ESV	PR-211-GP10
Sample Number					NQ0029
Sample Date					18-Sep-02
Chromium	mg/kg	3.70E+01		4.00E-01	8.25E+01
Mercury	mg/kg	8.00E-02		1.00E-01	1.11E-01 J
Selenium	mg/kg	4.80E-01		8.10E-01	2.65E+00
Vanadium	mg/kg	5.88E+01		2.00E+00	6.41E+01
Zinc	mg/kg	4.06E+01		5.00E+01	1.50E+02 J

Sample Identification		BKG		ESV	PR-211-MW08
Sample Number					NQ0033
Sample Date					16-Sep-02
Antimony	mg/kg	1.99E+00		3.50E+00	4.49E+00 J
Selenium	mg/kg	4.80E-01		8.10E-01	8.46E-01 J

Sample Identification		BKG		ESV	PR-211-GP11
Sample Number					NQ0031
Sample Date					17-Sep-02
Selenium	mg/kg	4.80E-01		8.10E-01	1.83E+00

Sample Identification		BKG		ESV	PR-211-MW09
Sample Number					NQ0035
Sample Date					16-Sep-02
Aluminum	mg/kg	1.63E+04		5.00E+01	1.67E+04
Cobalt	mg/kg	1.52E+01		2.00E+01	3.39E+01
Manganese	mg/kg	1.58E+03		1.00E+02	4.85E+03 J
Selenium	mg/kg	4.80E-01		8.10E-01	1.16E+00 J

Sample Identification		BKG		ESV	PR-211-GP03
Sample Number					NQ0018
Sample Date					16-Sep-02
Antimony	mg/kg	1.99E+00		3.50E+00	5.19E+00 J
Selenium	mg/kg	4.80E-01		8.10E-01	2.34E+00 J

Sample Identification		BKG		ESV	PR-211-GP06
Sample Number					NQ0023
Sample Date					18-Sep-02
Chromium	mg/kg	3.70E+01		4.00E-01	3.91E+01
Iron	mg/kg	3.42E+04		2.00E+02	3.79E+04
Selenium	mg/kg	4.80E-01		8.10E-01	2.40E+00
Vanadium	mg/kg	5.88E+01		2.00E+00	8.56E+01

Sample Identification		BKG		ESV	DTA-207-GP01
Sample Number					MN0001
Sample Date					27-Aug-02
Aluminum	mg/kg	1.63E+04		5.00E+01	2.27E+04
Beryllium	mg/kg	8.00E-01		1.10E+00	1.73E+00
Copper	mg/kg	1.27E+01		4.00E+01	4.55E+01
Iron	mg/kg	3.42E+04		2.00E+02	4.19E+04
Selenium	mg/kg	4.80E-01		8.10E-01	1.89E+00
Zinc	mg/kg	4.06E+01		5.00E+01	9.36E+01

Sample Identification		BKG		ESV	DTA-207-MW01
Sample Number					MN0005
Sample Date					27-Aug-02
Selenium	mg/kg	4.80E-01		8.10E-01	1.10E+00 B

Sample Identification		BKG		ESV	DTA-207-GP02
Sample Number					MN0003
Sample Date					27-Aug-02
Cobalt	mg/kg	1.52E+01		2.00E+01	2.60E+01

Sample Identification		BKG		ESV	PR-211-GP02
Sample Number					NQ0016
Sample Date					24-Apr-02
Selenium	mg/kg	4.80E-01		8.10E-01	2.63E+00 J

Sample Identification		BKG		ESV	PR-211-GP01
Sample Number					NQ0014
Sample Date					24-Apr-02
Selenium	mg/kg	4.80E-01		8.10E-01	8.78E-01 J

Sample Identification		BKG		ESV	PR-211-MW15
Sample Number					NQ0048
Sample Date					31-Oct-02
Aluminum	mg/kg	1.63E+04		5.00E+01	1.76E+04
Chromium	mg/kg	3.70E+01		4.00E-01	5.39E+01
Selenium	mg/kg	4.80E-01		8.10E-01	1.62E+00
Zinc	mg/kg	4.06E+01		5.00E+01	6.50E+01

Sample Identification		BKG		ESV	PR-211-MW04
Sample Number					NQ0007
Sample Date					25-Apr-02
Copper	mg/kg	1.27E+01		4.00E+01	4.70E+01
Nickel	mg/kg	1.03E+01		3.00E+01	3.12E+01 J
Selenium	mg/kg	4.80E-01		8.10E-01	2.96E+00 J
Zinc	mg/kg	4.06E+01		5.00E+01	1.66E+02 J

Sample Identification		BKG		ESV	PR-211-GP07
Sample Number					NQ0024
Sample Date					31-Oct-02
Aluminum	mg/kg	1.63E+04		5.00E+01	2.61E+04
Chromium	mg/kg	3.70E+01		4.00E-01	7.71E+01
Selenium	mg/kg	4.80E-01		8.10E-01	3.02E+00
Vanadium	mg/kg	5.88E+01		2.00E+00	9.20E+01
Zinc	mg/kg	4.06E+01		5.00E+01	7.08E+01

Sample Identification		BKG		ESV	PR-211-MW11
Sample Number					NQ0039
Sample Date					16-Sep-02
Barium	mg/kg	1.24E+02		1.65E+02	2.33E+02
Beryllium	mg/kg	8.00E-01		1.10E+00	1.11E+00 J
Cobalt	mg/kg	1.52E+01		2.00E+01	7.77E+01
Manganese	mg/kg	1.58E+03		1.00E+02	3.36E+03 J
Nickel	mg/kg	1.03E+01		3.00E+01	1.35E+02
Selenium	mg/kg	4.80E-01		8.10E-01	1.43E+00 J
Zinc	mg/kg	4.06E+01		5.00E+01	8.68E+01 J

Sample Identification		BKG		ESV	PR-211-MW14
Sample Number					NQ0045
Sample Date					17-Sep-02
Manganese	mg/kg	1.58E+03		1.00E+02	2.28E+03
Selenium	mg/kg	4.80E-01		8.10E-01	8.32E-01 J

Sample Identification		BKG		ESV	PR-211-MW12
Sample Number					NQ0041
Sample Date					17-Sep-02
Mercury	mg/kg	8.00E-02		1.00E-01	1.10E-01 J
Selenium	mg/kg	4.80E-01		8.10E-01	1.18E+00 J

Sample Identification		BKG		ESV	PR-211-MW13
Sample Number					NQ0043
Sample Date					17-Sep-02
Selenium	mg/kg	4.80E-01		8.10E-01	9.36E-01 J

Sample Identification		BKG		ESV	PR-211-MW10
Sample Number					NQ0037
Sample Date					16-Sep-02
Arsenic	mg/kg	1.37E+01		1.00E+01	1.67E+01
Barium	mg/kg	1.24E+02		1.65E+02	4.04E+02
Cobalt	mg/kg	1.52E+01		2.00E+01	1.98E+02
Manganese	mg/kg	1.58E+03		1.00E+02	5.85E+03 J
Mercury	mg/kg	8.00E-02		1.00E-01	1.00E-01 J
Nickel	mg/kg	1.03E+01		3.00E+01	1.21E+02
Selenium	mg/kg	4.80E-01		8.10E-01	2.16E+00 J
Zinc	mg/kg	4.06E+01		5.00E+01	6.82E+01 J
Lead	mg/kg	4.01E+01		5.00E+01	6.88E+01

Sample Identification		BKG		ESV	DTA-207-MW03
Sample Number					MN0010
Sample Date					27-Aug-02
Arsenic	mg/kg	1.37E+01		1.00E+01	1.62E+01 J
Cobalt	mg/kg	1.52E+01		2.00E+01	3.20E+01
Lead	mg/kg	4.01E+01		5.00E+01	7.08E+01
Selenium	mg/kg	4.80E-01		8.10E-01	1.17E+00 B
Zinc	mg/kg	4.06E+01		5.00E+01	1.36E+02

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ — ROAD JUNCTION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- SURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- D — DRUM SAMPLE LOCATION
- J — COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- B — ANALYTE DETECTED IN LABORATORY OR FIELD BLANK AT CONCENTRATION GREATER THAN THE REPORTING LIMIT (AND GREATER THAN ZERO)
- BKG — BACKGROUND
- ESV — ECOLOGICAL SCREENING VALUE
- mg/kg — MILLIGRAMS PER KILOGRAM

NOTE:

1. SEE FIGURE 1-2 FOR DESCRIPTION OF SITE FEATURES.

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE

0 400 800 FEET

FIGURE 5-2
METALS EXCEEDING ESVs AND BACKGROUND IN SURFACE SOIL FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

Shaw™ Shaw Environmental, Inc.

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Volatile Organic Compounds. A total of six VOCs (2-butanone, acetone, methylene chloride, p-cymene, styrene, and trichlorofluoromethane) were detected in the surface and depositional soil samples. Two acetone results and all of the methylene chloride results were flagged with a "B" data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The majority of the remaining results were flagged with a "J" data qualifier, signifying that these VOCs were positively identified but the concentrations were estimated. The VOC concentrations in surface and depositional soil ranged from 0.001 to 0.57 mg/kg and were all below SSSLs and ESVs.

Semivolatile Organic Compounds. Only one SVOC (bis[2-ethylhexyl]phthalate) was detected at one sample location (PR-211-MW13). The bis(2-ethylhexyl)phthalate result was flagged with a "J" data qualifier, indicating that the compound was detected at an estimated concentration below the method reporting limit. The bis(2-ethylhexyl)phthalate result was below its SSSL and ESV.

Explosives. Explosive compounds were not detected in the surface and depositional soil samples.

CWM Breakdown Products. Fifteen surface and depositional soil samples were analyzed for CWM breakdown products. CWM breakdown products were not detected in the samples.

5.2 Subsurface Soil Analytical Results

Twenty-five subsurface soil samples were collected for chemical analysis at Parcels 207(7) and 211(7). Subsurface soil samples were collected at depths greater than 1-foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-2.

Metals. A total of 22 metals were detected in the subsurface soil samples. The concentrations of eleven metals (aluminum, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, nickel, thallium, and vanadium) exceeded their respective SSSLs and background concentrations in one or more samples:

- Aluminum (15,500 to 41,100 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (13,591 mg/kg) at 11 sample locations.

- Arsenic (24.1 to 48.6 mg/kg) exceeded its SSSL (0.4 mg/kg) and background (18.3 mg/kg) at five sample locations.

- Beryllium (21.4 mg/kg) exceeded its SSSL (9.6 mg/kg) and background (0.86 mg/kg) at one sample location.

- Cadmium (19.7 mg/kg) exceeded its SSSL (6.25 mg/kg) and background (0.22 mg/kg) at one sample location.

- Chromium (40.3 to 85.2 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (38.3 mg/kg) at four sample locations.

- Iron (46,000 to 91,700 mg/kg) exceeded its SSSL (2,345 mg/kg) and background (44,817 mg/kg) at four sample locations.

- Lead (656 mg/kg) exceeded its SSSL (400 mg/kg) and background (38.5 mg/kg) at one sample location.

- Manganese (1,950 to 6,140 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,355 mg/kg) at four sample locations.

- Nickel (326 mg/kg) exceeded its SSSL (154 mg/kg) and background (12.9 mg/kg) at one sample location.

- Thallium (1.56 and 1.87 mg/kg) exceeded its SSSL (0.51 mg/kg) and background (1.4 mg/kg) at two sample locations.

- Vanadium (66 to 110 mg/kg) exceeded its SSSL (53.1 mg/kg) and background (64.9 mg/kg) at three sample locations.

Figure 5-3 shows the subsurface soil sample locations with metals results exceeding SSSLs and background.

Volatile Organic Compounds. A total of twelve VOCs were detected in the subsurface soil samples collected at Parcels 207(7) and 211(7). Seven of the twelve VOCs detected in subsurface soil were exclusively found at one sample location (PR-211-GP10). Of the remaining detected VOCs, two of the acetone results and all of the methylene chloride results were flagged with a "B" data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The majority of the remaining VOCs were "J" flagged,

DRAWN BY: D. BOMAR | STARTING DATE: 06/17/03 | DRAWN BY: | DATE LAST REV.: | DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN | PROJ. MGR.: J. YACOUB | INITIATOR: T. WINTON | PROJ. NO.: 774645 | DWG. NO.: ...\774645aa.016

N

E 602,800

N 1,179,000

E 609,300

N 1,173,400

Sample Identification		BKG	SSSL	PR-211-MW02
Sample Number				NQ0004
Sample Date				25-Apr-02
Sample Depth (feet)				3 - 5
Aluminum	mg/kg	1.36E+04	7.80E+03	1.55E+04

Sample Identification		BKG	SSSL	PR-211-MW04
Sample Number				NQ0009
Sample Date				25-Apr-02
Sample Depth (feet)				2 - 4
Aluminum	mg/kg	1.36E+04	7.80E+03	1.96E+04

Sample Identification		BKG	SSSL	PR-211-GP10
Sample Number				NQ0030
Sample Date				18-Sep-02
Sample Depth (feet)				3 - 4
Chromium	mg/kg	3.83E+01	2.32E+01	4.03E+01

Sample Identification		BKG	SSSL	PR-211-MW01
Sample Number				NQ0002
Sample Date				24-Apr-02
Sample Depth (feet)				6 - 8
Aluminum	mg/kg	1.36E+04	7.80E+03	1.68E+04

Sample Identification		BKG	SSSL	PR-211-GP11
Sample Number				NQ0032
Sample Date				17-Sep-02
Sample Depth (feet)				8 - 8.5
Chromium	mg/kg	3.83E+01	2.32E+01	5.57E+01

Sample Identification		BKG	SSSL	PR-211-MW08
Sample Number				NQ0034
Sample Date				16-Sep-02
Sample Depth (feet)				10 - 12
Arsenic	mg/kg	1.83E+01	4.26E-01	2.41E+01

Sample Identification		BKG	SSSL	PR-211-GP02
Sample Number				NQ0017
Sample Date				24-Apr-02
Sample Depth (feet)				8 - 10
Cadmium	mg/kg	2.20E-01	6.25E+00	1.97E+01

Sample Identification		BKG	SSSL	PR-211-MW15
Sample Number				NQ0050
Sample Date				31-Oct-02
Sample Depth (feet)				10 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	4.11E+04
Arsenic	mg/kg	1.83E+01	4.26E-01	2.76E+01
Chromium	mg/kg	3.83E+01	2.32E+01	8.30E+01
Iron	mg/kg	4.48E+04	2.34E+03	4.80E+04
Vanadium	mg/kg	6.49E+01	5.31E+01	1.09E+02

Sample Identification		BKG	SSSL	PR-211-GP09
Sample Number				NQ0028
Sample Date				18-Sep-02
Sample Depth (feet)				2 - 3
Manganese	mg/kg	1.36E+03	3.63E+02	2.83E+03

Sample Identification		BKG	SSSL	PR-211-MW14
Sample Number				NQ0047
Sample Date				17-Sep-02
Sample Depth (feet)				10 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	1.66E+04
Manganese	mg/kg	1.36E+03	3.63E+02	2.28E+03

Sample Identification		BKG	SSSL	DTA-207-GP01
Sample Number				MN0002
Sample Date				27-Aug-02
Sample Depth (feet)				9 - 11
Aluminum	mg/kg	1.36E+04	7.80E+03	2.16E+04

Sample Identification		BKG	SSSL	DTA-207-MW03
Sample Number				MN0011
Sample Date				27-Aug-02
Sample Depth (feet)				11 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	2.15E+04
Arsenic	mg/kg	1.83E+01	4.26E-01	4.86E+01 J
Beryllium	mg/kg	8.60E-01	9.60E+00	2.14E+01
Iron	mg/kg	4.48E+04	2.34E+03	9.17E+04
Manganese	mg/kg	1.36E+03	3.63E+02	6.14E+03
Nickel	mg/kg	1.29E+01	1.54E+02	3.26E+02
Thallium	mg/kg	1.40E+00	5.08E-01	1.87E+00 J

Sample Identification		BKG	SSSL	DTA-207-MW01
Sample Number				MN0006
Sample Date				27-Aug-02
Sample Depth (feet)				9 - 10
Aluminum	mg/kg	1.36E+04	7.80E+03	2.27E+04

Sample Identification		BKG	SSSL	DTA-207-GP02
Sample Number				MN0004
Sample Date				27-Aug-02
Sample Depth (feet)				11 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	3.48E+04
Arsenic	mg/kg	1.83E+01	4.26E-01	3.02E+01 J
Iron	mg/kg	4.48E+04	2.34E+03	4.60E+04
Lead	mg/kg	3.85E+01	4.00E+02	6.56E+02
Manganese	mg/kg	1.36E+03	3.63E+02	1.95E+03
Thallium	mg/kg	1.40E+00	5.08E-01	1.56E+00 J
Vanadium	mg/kg	6.49E+01	5.31E+01	6.60E+01

Sample Identification		BKG	SSSL	DTA-207-MW02
Sample Number				MN0008
Sample Date				27-Aug-02
Sample Depth (feet)				10 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	2.17E+04

Sample Identification		BKG	SSSL	PR-211-GP07
Sample Number				NQ0025
Sample Date				31-Oct-02
Sample Depth (feet)				10 - 12
Aluminum	mg/kg	1.36E+04	7.80E+03	3.41E+04
Arsenic	mg/kg	1.83E+01	4.26E-01	2.58E+01
Chromium	mg/kg	3.83E+01	2.32E+01	8.52E+01
Iron	mg/kg	4.48E+04	2.34E+03	4.93E+04
Vanadium	mg/kg	6.49E+01	5.31E+01	1.10E+02

TRAINING AREA 9B
TRAINING AREA 10B
TRAINING AREA 9A
PARCEL 211(7)
RANGE K - PARCEL 203(7)
RANGE L - PARCEL 204(7)
RANGE I - PARCEL 201(7)
ORIENTATION AREA
STATION NO.7 (DEMONSTRATION AREA)
STATION NO.6 (MINES)
STATION NO.5 (A-BOMB)
STATION NO.4 (DEPOT)
STATION NO.3 (IMPACT AREA)
STATION NO.2
STATION NO.1
CONTROL CENTER AID STATION
RIDEOUT HALL BUILDING 8801
BURIAL MOUND AT RIDEOUT FIELD
GEOPHYSICAL SURVEY AREA
TO GATE 10
RJ30
RJ29
RJ28

PR-211-DR01 PR-211-GP11 PR-211-GP03 PR-211-GP10 PR-211-MW01 PR-211-MW08 PR-211-GP05 PR-211-MW09 PR-211-MW02 PR-211-MW03 PR-211-MW04 PR-211-DEP01 PR-211-DEP02 PR-211-GP02 PR-211-GP01 PR-211-MW07 PR-211-MW06 PR-211-GP04 PR-211-GP09 PR-211-GP06 PR-211-GP08 PR-211-MW12 (WELL DRY) PR-211-MW13 (WELL DRY) PR-211-MW10 PR-211-MW11 PR-211-MW14 PR-211-MW15 (WELL DRY) PR-211-GP07 DTA-207-GP01 DTA-207-MW01 DTA-207-GP02 DTA-207-MW03 (WELL DRY) DTA-207-MW02

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ ROAD JUNCTION
- ▲ DEPOSITIONAL SOIL SAMPLE LOCATION
- ◪ SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ■ SURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- D DRUM SAMPLE LOCATION
- J COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- BKG BACKGROUND
- SSSL SITE-SPECIFIC SCREENING LEVEL
- mg/kg MILLIGRAMS PER KILOGRAM

NOTE:

1. SEE FIGURE 1-2 FOR DESCRIPTION OF SITE FEATURES.

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE
0 400 800 FEET

FIGURE 5-3
METALS EXCEEDING SSSLs AND BACKGROUND IN SUBSURFACE SOIL FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

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indicating that the concentrations were estimated. The VOC concentrations in subsurface soils ranged from 0.0016 to 1.1 mg/kg and were all below SSSLs.

Semivolatile Organic Compounds. SVOCs were not detected in the subsurface soil samples.

Explosives. Explosive compounds were not detected in the subsurface soil samples.

CWM Breakdown Products. Thirteen subsurface soil samples at Parcel 211(7) were analyzed for CWM breakdown products. CWM breakdown products were not detected in the samples.

5.3 Groundwater Analytical Results

Fourteen groundwater samples were collected for chemical analysis at Parcels 207(7) and 211(7) at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background concentrations, as presented in Table 5-3.

Metals. A total of 14 metals were detected in the groundwater samples. The concentrations of seven metals (arsenic, barium, chromium, iron, manganese, selenium, and thallium) exceeded SSSLs in one or more samples. Of these metals, only barium, manganese, and thallium also exceeded their background concentrations:

- Barium (0.137 and 0.146 mg/L) exceeded its SSSL (0.110 mg/L) and background (0.127 mg/L) at two sample locations (PR-211-MW03 and PR-211-MW05).
- Manganese (1.63 mg/L) exceeded its SSSL (0.07 mg/L) and background (0.58 mg/L) at DTA-207-MW02.
- Thallium (0.0048 mg/L) exceeded its SSSL (0.0001 mg/L) and background (0.0015 mg/L) at PR-211-MW09. However, the thallium result was flagged with a "B" data qualifier, signifying that thallium was also detected in an associated laboratory or field blank sample.

Background values were not available for chromium and selenium, which exceeded their respective SSSLs in one sample and two samples, respectively.

Volatile Organic Compounds. A total of 11 VOCs were detected in the groundwater samples. All of the methylene chloride results were flagged with a "B" data qualifier, signifying that this compound was also detected in an associated laboratory or field blank samples. VOC concentrations in groundwater ranged from 0.0002 to 0.047 mg/L. The concentrations of five VOCs exceeded their respective SSSLs in one or more samples:

- 1,1,2,2-Tetrachloroethane (0.0022 to 0.047 mg/L) exceeded its SSSL (0.0002 mg/L) at three sample locations.
- 1,1-Dichloroethene (0.0002 mg/L) exceeded its SSSL (0.00009 mg/L) at one sample location.
- Chloroform (0.0014 and 0.0053 mg/L) exceeded its SSSL (0.0012 mg/L) at two sample locations.
- Dibromochloromethane (0.0012 mg/L) exceeded its SSSL (0.0008 mg/L) at one sample location.
- Trichloroethene (0.0086 mg/L and 0.012 mg/L) exceeded its SSSL (0.0045 mg/L) at two sample locations.

Figure 5-4 shows the spatial distribution of VOCs detected in groundwater at the site.

Semivolatile Organic Compounds. SVOCs were not detected in the groundwater samples.

Explosives. Explosive compounds were not detected in the groundwater samples.

CWM Breakdown Products. Nine groundwater samples from Parcel 211(7) were analyzed for CWM breakdown products. CWM breakdown products were not detected in the samples.

5.4 Drum Sample Analytical Results

One sample of liquid was collected from an unmarked 55-gallon drum located in the northwest area of Parcel 211(7). The drum sample was analyzed for metals, VOCs, and SVOCs, as summarized below. The analytical results are included in Appendix G.

Metals. Seven metals were detected in the drum sample collected at Parcel 211(7).

STARTING DATE: 06/17/03	DRAWN BY: D. BOMAR
DATE LAST REV.:	DRAWN BY:
DRAFT. CHCK. BY:	ENGR. CHCK. BY: S. MORAN
INITIATOR: T. WINTON	PROJ. MGR.: J. YACOUB
DWG. NO.: ...\774645aa.017	PROJ. NO.: 774645

E 602,800

N 1,179,000

E 609,300

N 1,173,400

Sample Identification		SSSL	PR-211-MW05
Sample Number			NQ3006
Sample Date			13-Jun-02
1,1,1-Trichloroethane	mg/L	3.05E-01	3.70E-04 J
1,1-Dichloroethene	mg/L	9.36E-05	2.00E-04 J

Sample Identification		SSSL	PR-211-MW02
Sample Number			NQ3002
Sample Date			13-Jun-02
Carbon disulfide	mg/L	1.51E-01	5.90E-04 J

Sample Identification		SSSL	PR-211-MW07
Sample Number			NQ3009
Sample Date			13-Nov-02
Acetone	mg/L	1.56E-01	5.10E-03 J

Sample Identification		SSSL	PR-211-MW08
Sample Number			NQ3010
Sample Date			15-Nov-02
Bromodichloromethane	mg/L	1.08E-03	9.90E-04 J
Chloroform	mg/L	1.15E-03	1.40E-03
Dibromochloromethane	mg/L	7.92E-04	1.20E-03
Trichloroethene	mg/L	4.51E-03	2.10E-04 J

Sample Identification		SSSL	PR-211-MW09
Sample Number			NQ3011
Sample Date			19-Nov-02
Chloroform	mg/L	1.15E-03	2.40E-04 J

Sample Identification		SSSL	PR-211-MW11
Sample Number			NQ3013
Sample Date			03-Dec-02
1,1,2,2-Tetrachloroethane	mg/L	2.04E-04	4.20E-02
Chloroform	mg/L	1.15E-03	5.80E-04 J
Tetrachloroethene	mg/L	1.26E-03	3.10E-04 J
Trichloroethene	mg/L	4.51E-03	1.20E-02

Sample Identification		SSSL	PR-211-MW14
Sample Number			NQ3016
Sample Date			05-Dec-02
1,1,2,2-Tetrachloroethane	mg/L	2.04E-04	2.20E-03
Chloroform	mg/L	1.15E-03	5.30E-03
Trichloroethene	mg/L	4.51E-03	4.50E-03

Sample Identification		SSSL	PR-211-MW10
Sample Number			NQ3012
Sample Date			03-Dec-02
1,1,2,2-Tetrachloroethane	mg/L	2.04E-04	4.70E-02
Trichloroethene	mg/L	4.51E-03	8.60E-03

TRAINING AREA 9B

TRAINING AREA 10B

TRAINING AREA 9A

TRAINING AREA 10A

PARCEL 211(7)

PARCEL 207(7)

RANGE K - PARCEL 203(7)

RANGE L - PARCEL 204(7)

RANGE I - PARCEL 201(7)

ORIENTATION AREA

CONTROL CENTER AID STATION

STATION NO.1

STATION NO.2

STATION NO.3 (IMPACT AREA)

STATION NO.4 (DEPOT)

STATION NO.5 (A-BOMB)

STATION NO.6 (MINES)

STATION NO.7 (DEMONSTRATION AREA)

RIDEOUT HALL BUILDING 8801

BURIAL MOUND AT RIDEOUT FIELD

GEOPHYSICAL SURVEY AREA

TO GATE 10

RJ28 RJ29 RJ30

PR-211-GP11 PR-211-DR01 PR-211-GP03 PR-211-GP10 PR-211-GP05 PR-211-MW08 PR-211-MW09 PR-211-MW01 PR-211-MW02 PR-211-GP02 PR-211-GP01 PR-211-MW03 PR-211-MW04 PR-211-DEP01 PR-211-DEP02 PR-211-MW07 PR-211-MW06 PR-211-GP04 PR-211-GP09 PR-211-GP06 PR-211-GP08 PR-211-MW12 (WELL DRY) PR-211-MW13 (WELL DRY) PR-211-MW10 PR-211-MW11 PR-211-MW14 DTA-207-GP01 DTA-207-MW01 DTA-207-GP02 DTA-207-MW03 (WELL DRY) DTA-207-MW02 PR-211-MW15 (WELL DRY) PR-211-GP07

LEGEND:

- UNIMPROVED ROADS
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY
- AREA INVESTIGATED SEPARATELY
- TREES / TREELINE
- MARSH / WETLANDS
- SURFACE DRAINAGE / CREEK
- FENCE
- CHEMICAL OBSTACLE COURSE
- RJ — ROAD JUNCTION
- ▲ — DEPOSITIONAL SOIL SAMPLE LOCATION
- ◪ — SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ■ — SURFACE SOIL SAMPLE LOCATION
- ◉ — MONITORING WELL / GROUNDWATER SAMPLE LOCATION
- ◭ — MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- ◉ — MONITORING WELL / SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- D — DRUM SAMPLE LOCATION
- J — COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- SSSL — SITE-SPECIFIC SCREENING LEVEL
- VOC — VOLATILE ORGANIC COMPOUND
- mg/L — MILLIGRAMS PER LITER
- CONCENTRATION EXCEEDS SSSL

NOTES:

1. SEE FIGURE 1-2 FOR DESCRIPTION OF SITE FEATURES.
2. "B"-FLAGGED DATA NOT SHOWN.

SOURCE: U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTATIVE MEDICINE, "PRELIMINARY ASSESSMENT NO. 38-EH-1775-99, FORT McCLELLAN ARMY NATIONAL GUARD TRAINING CENTER, FORT McCLELLAN, ALABAMA MAY 28 - JUNE 17, 1999."

SCALE 0 400 800 FEET

FIGURE 5-4
VOCs DETECTED IN GROUNDWATER FORMER TOXIC GAS AREA PARCEL 211(7) AND FORMER DECONTAMINATION TRAINING AREA, PARCEL 207(7)

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

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Volatile Organic Compounds. VOCs were not detected in the drum sample.

Semivolatile Organic Compounds. SVOCs were not detected in the drum sample.

6.0 Summary, Conclusions, and Recommendations

Shaw completed an SI at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7) at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of a geophysical survey and the collection and analysis of 31 surface and depositional soil samples, 25 subsurface soil samples, 14 groundwater samples, and 1 drum sample. In addition, 18 permanent monitoring wells were installed to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information. However, four of the wells did not produce sufficient groundwater for sampling.

The geophysical survey conducted over an approximately 10,000-square-foot area in the southwestern area of Parcel 211(7) did not reveal evidence of buried metal or a waste disposal site.

Chemical analysis of samples collected at the site indicates that metals and VOCs were detected in the various site media. In addition, one SVOC was detected in one soil sample. Explosive compounds and CWM breakdown products were not detected in any of the samples collected. Analytical results were compared to SSSLs, ESVs, and background screening values developed for human health and ecological risk evaluations as part of investigations being performed under the BRAC Environmental Restoration Program at FTMC.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as chemicals of potential concern in site media. Seven metals (aluminum, antimony, arsenic, chromium, iron, manganese, and vanadium) were identified as chemicals of potential concern in surface and depositional soil. Eleven metals (aluminum, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, nickel, thallium, and vanadium) were identified as chemicals of potential concern in subsurface soil. Groundwater chemicals of potential concern were four metals (barium, chromium, manganese, and selenium) and five VOCs (1,1,2,2-tetrachloroethane, 1,1-dichloroethene, chloroform, dibromochloromethane, and trichloroethene).

Sixteen metals were detected at concentrations exceeding ESVs and background in surface and depositional soil: aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper,

iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc. Thus, these metals were identified as constituents of potential ecological concern in site media.

Based on the results of the SI, past operations at Parcels 211(7) and 207(7) have impacted the environment. Therefore, Shaw recommends that a remedial investigation be conducted to determine the extent of soil and groundwater contamination at the Former Toxic Gas Area, Parcel 211(7) and the Former Decontamination Training Area South of the Toxic Gas Area, Parcel 207(7).

7.0 References

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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	2,4,5-trichlorophenoxypropionic acid
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
AEDA	ammunition, explosives, and other dangerous articles
AEL	airborne exposure limit
AET	adverse effect threshold
AF	soil-to-skin adherence factor
AHA	ammunition holding area
AL	Alabama
ALARNG	Alabama Army National Guard
ALAD	δ-aminolevulinic acid dehydratase
ALDOT	Alabama Department of Transportation
amb.	amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
AP	armor piercing
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
AS/SVE	air sparging/soil vapor extraction
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
AUF	area use factor
AWARE	Associated Water and Air Resources Engineers, Inc.
AWQC	ambient water quality criteria
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
BGR	Bains Gap Road
bgs	below ground surface
BHC	hexachlorocyclohexane
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
$CaCO_3$	calcium carbonate
CAA	Clean Air Act
CAB	chemical warfare agent breakdown products
CACM	Chemical Agent Contaminated Media
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	phosgene (carbonyl chloride)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CIH	Certified Industrial Hygienist
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_2	carbon dioxide
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; chemical of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	chemical of potential concern
COPEC	constituent 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; Clean Water Act
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
'D'	duplicate; dilution
D&I	detection and identification
DAAMS	depot area agent monitoring station
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius

List of Abbreviations and Acronyms *(Continued)*

ºF	degrees Fahrenheit
DCA	dichloroethane
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; adamsite
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DO	dissolved oxygen
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
DSERTS	Defense Site Environmental Restoration Tracking System
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 Center
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
FDC	Former Decontamination Complex
FDA	U.S. Food and Drug Administration
Fe^{+3}	ferric iron
Fe^{+2}	ferrous iron
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
f_{oc}	fraction organic carbon
FOMRA	Former Ordnance Motor Repair Area
FOST	Finding of Suitability to Transfer
Foster Wheeler	Foster Wheeler Environmental Corporation
FR	Federal Register
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
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 (isopropyl methylphosphonofluoridate)
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
GRA	general response action
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
H&S	health and safety
HA	hand auger
HC	mixture of hexachloroethane, aluminum powder, and zinc oxide (smoke producer)
HCl	hydrochloric acid
HD	distilled mustard (bis-[dichloroethyl]sulfide)
HDPE	high-density polyethylene
HE	high explosive
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
H_2O_2	hydrogen peroxide
HPLC	high-performance liquid chromatography
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
HRC	hydrogen releasing compound
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
‘I’	out of control, data rejected due to low recovery

IASPOW	Impact Area South of POW Training Facility
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_d	soil-water distribution coefficient
kg	kilogram
KeV	kilo electron volt
K_{oc}	organic carbon partioning coefficient
K_{ow}	octonal-water partition coefficient
$KMnO_4$	potassium permanganate
L	liter; Lewisite (dichloro-[2-chloroethyl]sulfide)
L/kg/day	liters per kilogram per day
l	liter
LAW	light anti-tank weapon
lb	pound
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-adverse-effects-level
LRA	land redevelopment authority
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
MCPP	2-(2-methyl-4-chlorophenoxy)propionic 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
MeV	mega electron volt
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
MNA	monitored natural attenuation
MnO_4-	permanganate ion
MOA	Memorandum of Agreement
MOGAS	motor vehicle gasoline
MOUT	Military Operations in Urban Terrain
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&MP	Monitoring Well Installation and Management Plan
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
$NaMnO_4$	sodium permanganate
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
NO_3^-	nitrate
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
NRT	near real time
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_3	ozone
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
OH•	hydroxyl radical
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORC	Oxygen Releasing Compound
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
PERA	preliminary ecological risk assessment
PES	potential explosive site
Pest.	pesticides
PETN	pentaerythritoltetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
ppbv	parts per billion by volume
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
PS	chloropicrin
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; retardation factor
R&A	relevant and appropriate
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration; red blood cell
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RD	remedial design
RDX	cyclotrimethylenetrinitramine
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
RR	Range residue
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
RWIMR	Ranges West of Iron Mountain Road
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
SARA	Superfund Amendments and Reauthorization Act
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDWA	Safe Drinking Water Act
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
Shaw	Shaw Environmental, Inc.
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
SO_4^{-2}	sulfate
SOD	soil oxidant demand
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
TEA	triethylaluminum
Tetryl	trinitrophenylmethylnitramine
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
UIC	underground injection control
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
VC	vinyl chloride
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