Final

Landfill Gas Investigation
Field Sampling Plan, Health and Safety Plan, and Unexploded Ordnance Safety Plan
Landfills and Fill Areas
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Prepared for:

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

Prepared by:

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

Task Order CK09
Contract No. DACA21-96-D-0018
Shaw Project No. 796886

May 2003

Revision 0

Final

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Field Sampling Plan
Landfills and Fill Areas
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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK09, Shaw Environmental, Inc. (formerly the IT Corporation) will conduct a landfill gas investigation at seven of the landfills and fill areas located at Fort McClellan (FTMC), Alabama. The landfills and fill areas to be investigated are:

- Landfill No. 1, Parcel 78(6)
- Landfill No. 2, Parcel 79(6)
- Landfill No. 3, Parcel 80(6)
- Fill Area East of Reilly Airfield and Former Post Garbage Dump, Parcels 227(7) and 126(7)
- Fill Area Northwest of Reilly Airfield, Parcel 229(7)
- Stump Dump, Parcel 82(7).

The landfill gas investigation will assess the absence or presence of concentrations of methane and/or subsurface gas containing volatile organic compounds (VOC) at these sites. The purpose of this landfill gas field sampling plan is to provide technical guidance for the screening and sampling activities proposed at the landfills and fill areas.

The assessment of landfill gas will be initiated by performing a soil gas emission screening for landfill gas. A subsurface soil gas screening will be performed along the perimeter and within each of the landfills and fill areas; approximately 150 locations have been identified for landfill gas screening within these landfills and fill areas. Subsurface soil gas will be screened for methane/total hydrocarbons and other major landfill gas components. In addition, surface and subsurface structures within a specified distance from the waste limit of each fill area will be screened for landfill gas and explosive gas accumulations above the regulatory limit (25 percent of the lower explosive limit). A quantification of VOC presence will be performed by collecting and analyzing one subsurface gas sample in each landfill and fill area. The analytical sample for VOC analysis will be collected from the subsurface screening location with the highest methane/total hydrocarbon screening result. The analytical data collected will be used to determine if additional site-specific investigation efforts will be required to evaluate the distribution, extent, and magnitude of landfill gas as well as the availability and production rates of landfill gas.

Unexploded ordnance (UXO) surface sweeps and downhole surveys of bar-holes and/or auger borings will be required to support field activities at one of the sites. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for the landfills and fill areas will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

1.1 Introduction

As requested by the U.S. Army Corps of Engineers (USACE), Mobile District, the Army will conduct landfill gas investigations at seven of the landfills and fill areas located at Fort McClellan (FTMC), Alabama. The landfill and fill areas to be investigated are:

- Landfill No. 1, Parcel 78(6)
- Landfill No. 2, Parcel 79(6)
- Landfill No. 3, Parcel 80(6)
- Fill Area East of Reilly Airfield and Former Post Garbage Dump, Parcels 227(7) and 126(7)
- Fill Area Northwest of Reilly Airfield, Parcel 229(7)
- Stump Dump, Parcel 82(7).

The USACE has contracted Shaw Environmental (Shaw) (formerly the IT Corporation [IT]) to provide environmental services for the landfill gas investigation at the landfills and fill areas, under Task Order CK09, Contract Number DACA21-96-D-0018.

Landfill gas is a by-product of the natural anaerobic decomposition of organic materials in solid waste. Landfill gas typically consists primarily of a mixture of methane and carbon dioxide, with trace concentrations of other gases and volatile organic compounds (VOC), depending on the composition and age of the solid waste. Methane and VOCs are the primary constituents of concern, from both regulatory and environmental health perspectives. Accumulated concentrations of methane over the lower explosive limit of 5 percent by volume will burn or explode when ignited. Extended exposures to levels of some VOCs commonly detected in landfill gas may have health risk impacts. Small landfills containing organic waste may produce significant landfill gas quantities for 30 to 60 years (or more) after the waste is disposed, depending on the configuration of the landfill and the internal moisture conditions.

This landfill gas field sampling plan (LGFSP) has been prepared to provide technical guidance and rationale for surface emissions screening, subsurface soil gas screening, sample collection, and analysis at the landfills and fill areas. The objectives of this investigation are as follows:

- Determine if there are detectable emissions of landfill gas above the fill area surface
- Assess the presence and location of subsurface landfill gas
- Assess if subsurface landfill gas is migrating into surrounding structures
- Quantify VOC concentrations in subsurface landfill gas.

The data collected will also be used to assess if additional site-specific investigation efforts will be required to further evaluate distribution, extent, and magnitude of landfill gas and assess the availability and production rates of landfill gas and/or VOCs that may be detected at specific locations. This LGFSP will be used in conjunction with the site-specific safety and health plan (SSHP), the site-specific unexploded ordnance (UXO) safety plan, the installation-wide sampling and analysis plan (SAP) (IT, 2002a), and the installation-wide work plan (IT, 2002b). The SAP includes the installation-wide safety and health plan, investigation-derived waste (IDW) management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analysis is included in the SSHP and the site-specific UXO safety plan attachments.

1.2 FTMC Site Description and History

Fort McClellan is located in the foothills of the Appalachian Mountains of northeastern Alabama near the cities of Anniston and Weaver in Calhoun County. The post is approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn, and 95 miles west of Atlanta, Georgia. Fort McClellan consists of two main areas of government-owned properties: Main Post and Pelham Range. A third area, designated Choccolocco Corridor, was previously leased from the State of Alabama; however, the lease was terminated in May 1998. The size of each property is presented below:

Main Post	18,929 acres
Pelham Range	22,245 acres
Choccolocco Corridor (formerly leased)	4,488 acres

The Main Post is bounded on the east by the Choccolocco Corridor, which connects the Main Post with the Talladega National Forest. Pelham Range is located approximately 5 miles west of the Main Post and adjoins the Anniston Army Depot on the southwest. Pelham Range is bordered on the east by U.S. Highway 431.

Recent ongoing activities at FTMC can be divided into support activities, academic training, and practical training. Support activities include housing, feeding, and moving individuals during

training. Academic training includes classroom, laboratory, and field instruction. Practical training includes weapons, artillery and explosives, vehicle operation and maintenance, and physical and tactical training activities. In September 1999, FTMC was closed under the Base Realignment and Closure Program.

1.3 Landfill and Fill Area Site Description and History

Landfills and fill areas are located on the Main Post of FTMC (Figure 1-1). The following sections briefly outline the site description and history of each landfill and fill area. In addition, a brief overview of the underground utilities present at each landfill and fill area is included.

1.3.1 Landfill No. 1, Parcel 78(6)

Landfill No. 1 is located in the western part of the Main Post of FTMC, as shown in Figure 1-1. The landfill was the FTMC sanitary landfill from 1945 to 1947. Aerial photographs taken in 1944 document the clearing for the landfill. The Landfill No. 1 parcel boundary covers approximately 6 acres. Currently, the landfill is partially wooded and contains a playground and two residential structures.

Gas, water, sanitary and storm sewer utilities traverse or are located within 100 feet of Landfill No. 1. Figure 1-2 shows the location of these utilities and their associated manholes or subsurface vaults.

1.3.2 Landfill No. 2, Parcel 79(6)

Landfill No. 2 is located in the central part of the Main Post of FTMC, as shown in Figure 1-1. The 5.6-acre landfill was used as a sanitary landfill after the closure of Landfill No. 1 and was active from 1947 to an unknown date. However, landfilling activities were believed to have occurred at Landfill No. 2 as early as 1927 (ESE, 1998).

A forced sanitary sewer main and a gas line are the only underground utilities that traverse or are located within 100 feet of Landfill No. 2. Figure 1-3 shows the location of these utilities. No manholes or subsurface vaults associated with the sewer main or gas line were identified from utility records within 100 feet of Landfill No. 2.

1.3.3 Landfill No. 3, Parcel 80(6)

Landfill No. 3 is located in the northwest corner of the Main Post (Figure 1-1). This site was the Main Post sanitary landfill from 1946 to 1967 (ESE, 1998). The approximately 23-acre landfill was constructed using trenches that extend east-west across the site. The waste was placed in the trenches and subsequently covered with topsoil (Roy F. Weston, Inc., 1990). A complete

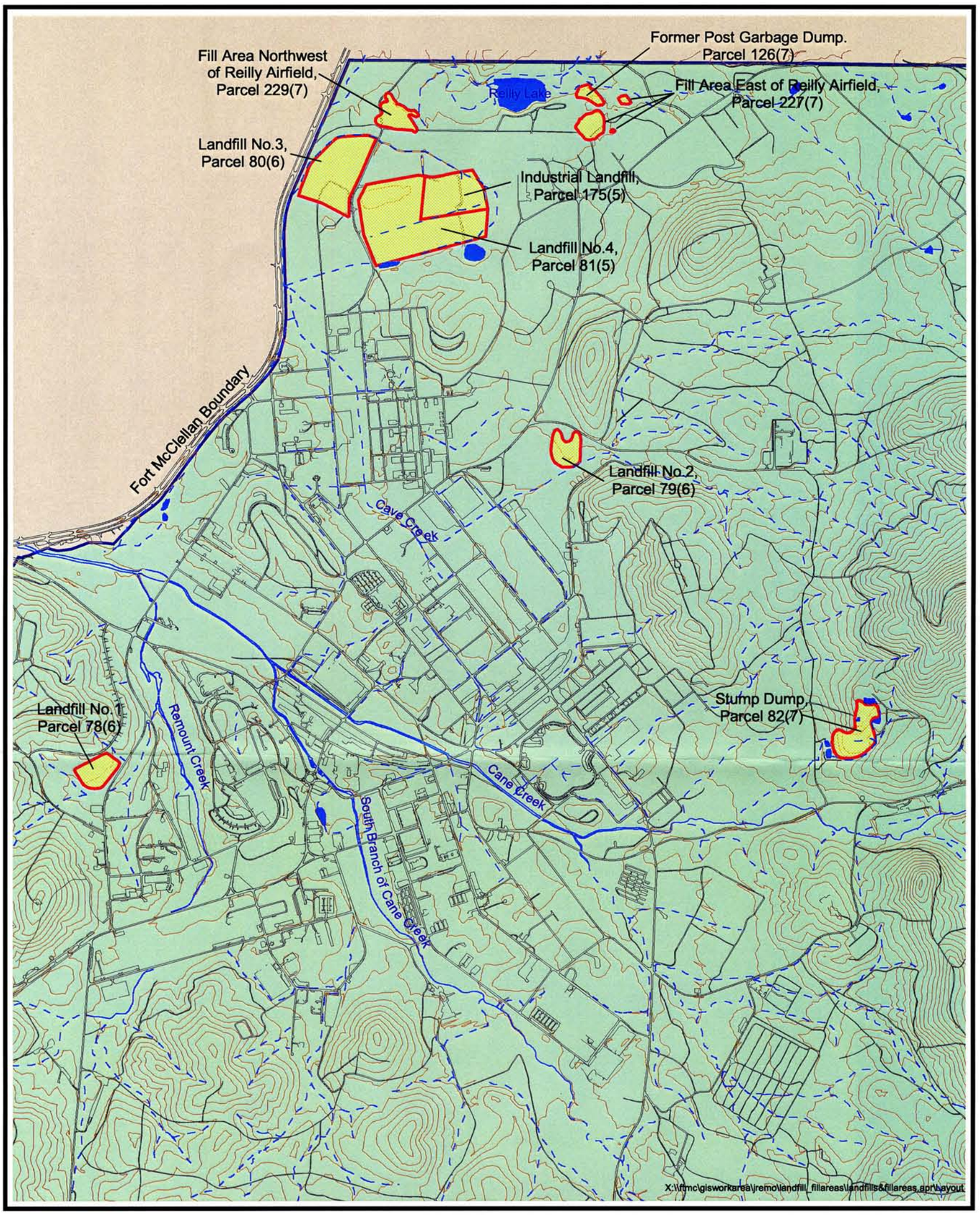


Figure 1-1 **Landfills and Fill Areas Fort McClellan, Alabama**

2000 0 2000 Feet

NAD83 State Plane Coordinates

N

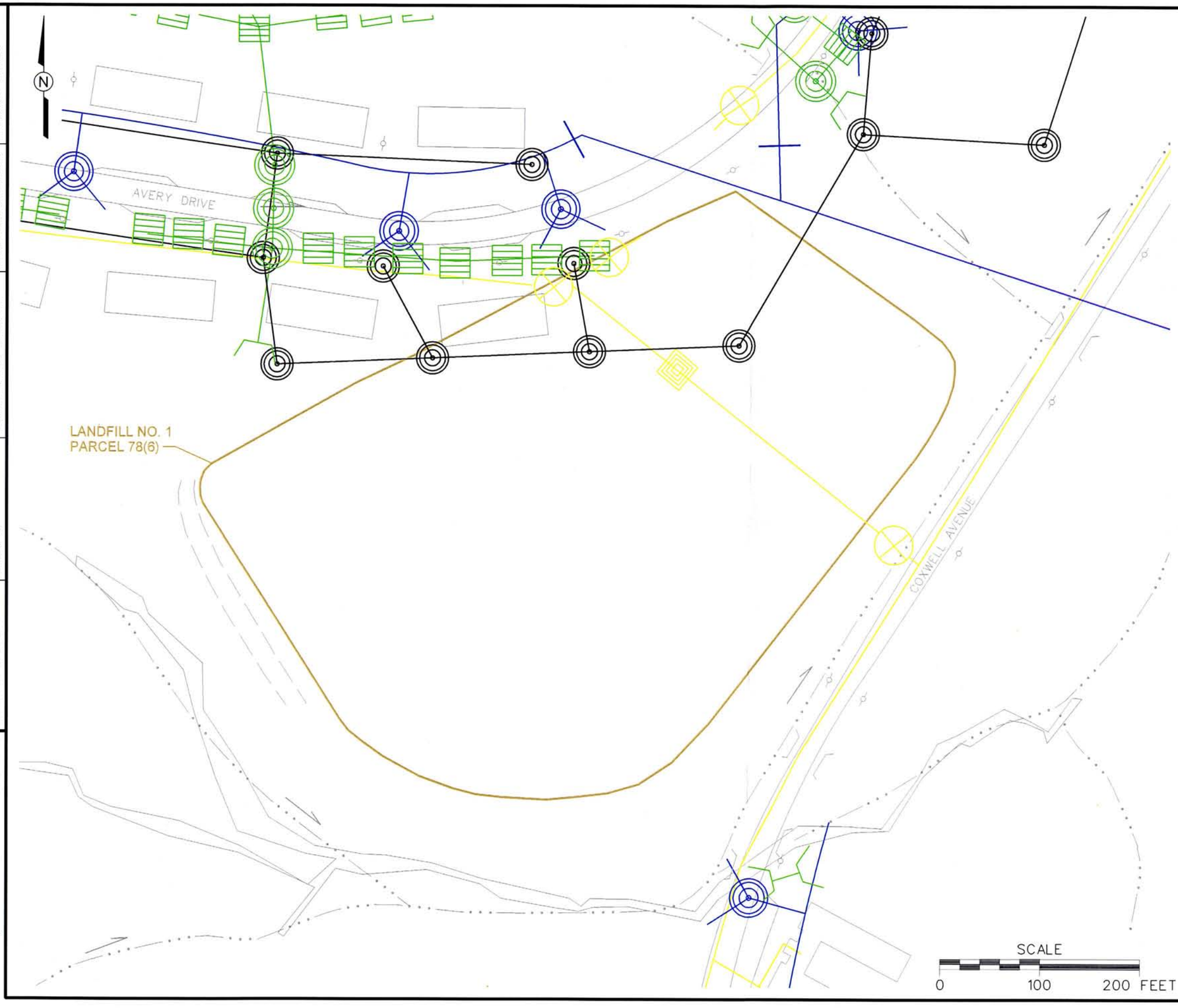
Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No.: DACA21-96-D-0018

Legend

- Surface Water Features (dashed where intermittent)
- Roads
- Topographic Contours (25-foot Interval)
- Surface Water Feature (may be ephemeral)
- Main Post
- Landfill/Fill Area Boundary



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- SURFACE WATER FLOW DIRECTION
- FENCE
- UTILITY POLE
- GAS MAIN
- VALVE
- GAS METER
- PLUG OR CAP
- STORM SEWER MAIN
- DRAINAGE MANHOLE
- CATCH BASIN
- STORM DRAINS
- SANITARY SEWER MAIN
- MANHOLE
- WATER MAIN
- FIRE HYDRANT AND VALVE
- CAPPED OR PLUGGED

FIGURE 1-2
UNDERGROUND UTILITIES MAP
LANDFILL NO. 1
PARCEL 78(6)

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

Shaw Environmental, Inc.

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INITIATOR: J. REMO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
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FIGURE 1-3
UNDERGROUND UTILITIES MAP
LANDFILL NO. 2
PARCEL 79(6)

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

Shaw Environmental, Inc.

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PROJ. NO.: 796886

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manifest of all wastes deposited at the landfill is not available; however, it has been reported that empty pesticide containers and burned ammunition pallets or crates were disposed in this landfill (ESE, 1998). The pesticide containers were reported to have been triple-rinsed prior to disposal. Additionally, there is the potential for disposal of paint containers, fluorescent bulbs and ballasts, waste oil, and construction debris at this site (ESE, 1998). The landfill was not capped when it was closed in 1967, and settling is occurring.

No underground utilities traverse or are located within 200 feet of Landfill No. 3. However, there are three storm drains located on the eastern boundary of Landfill No. 3 that cross beneath Gobbler Road (Figure 1-4).

1.3.4 Fill Area East of Reilly Airfield, Parcel 227(7), and the Former Post Garbage Dump, Parcel 126(7)

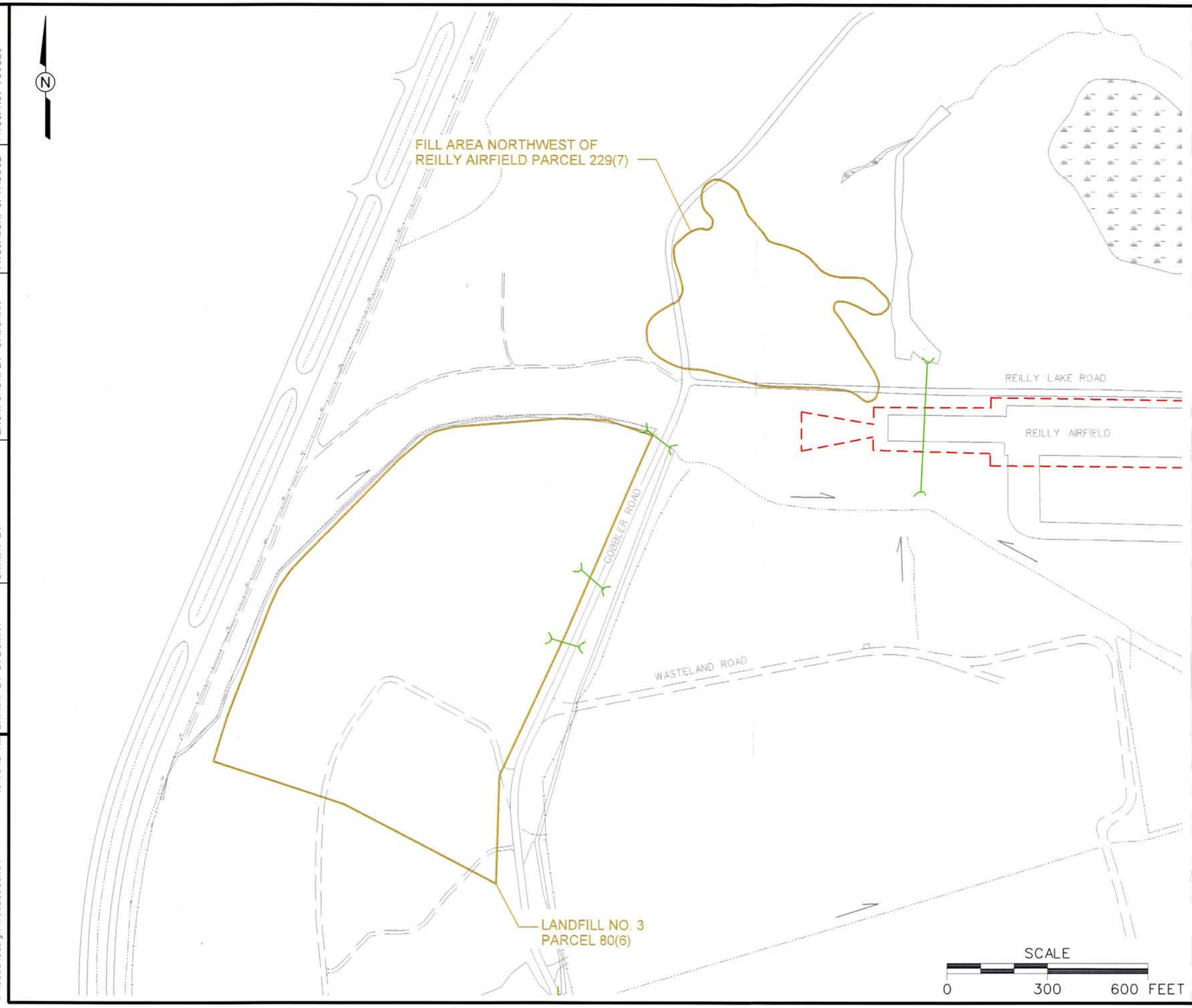
The Fill Area East of Reilly Airfield is located near the northern boundary of the Main Post, adjacent to the Former Post Garbage Dump near Reilly Airfield (Figure 1-1). The site contains several potential disposal areas identified in the Environmental Photographic Interpretation Center (EPIC) report (U.S. Environmental Protection Agency [EPA], 1990). The EPIC aerial photo composite dated 1949 annotates two ground scars with the label "Fill Area." The aerial photo composite dated 1961 annotates one site as "Pit" and another as "TR" (trench). This parcel encompasses four sites identified by EPIC. The parcel also includes an adjacent area of disturbed ground that was not identified in the EPIC report but which appeared to possibly contain mounded material (ESE, 1998). Information is not available regarding operations at this parcel. Combined, the areas total approximately 4.5 acres.

The Former Post Garbage Dump, Parcel 126(7), is located along the northern boundary of the Fill Area East of Reilly Airfield (Figure 1-1). The parcel covers approximately 2 acres. The site consists of a steep north-facing slope that borders a wetland. There are no records of disposal activities at this parcel.

Only a subsurface electric utility (possibly abandoned) traverses the southern portion of Parcel 227(7). Figure 1-5 shows the location of this utility. No manholes or subsurface vaults were identified from utility records.

1.3.5 Fill Area Northwest of Reilly Airfield, Parcel 229(7)

The Fill Area Northwest of Reilly Airfield (Figure 1-1) contains a potential disposal area identified in the EPIC report from the aerial photo composite dated 1954 (EPA, 1990). Linear mounds are visible in aerial photos at the northern margin of a cleared area (ground scar);



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- MARSH / WETLANDS
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- SURFACE WATER FLOW DIRECTION
- FENCE
- UTILITY POLE
- UNDERGROUND ELECTRIC UTILITY
- STORM DRAIN

FIGURE 1-4
UNDERGROUND UTILITIES MAP
LANDFILL NO. 3, PARCEL 80(6)
AND FILL AREA NORTHWEST OF
REILLY AIRFIELD, PARCEL 229(7)

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

Shaw Environmental, Inc.

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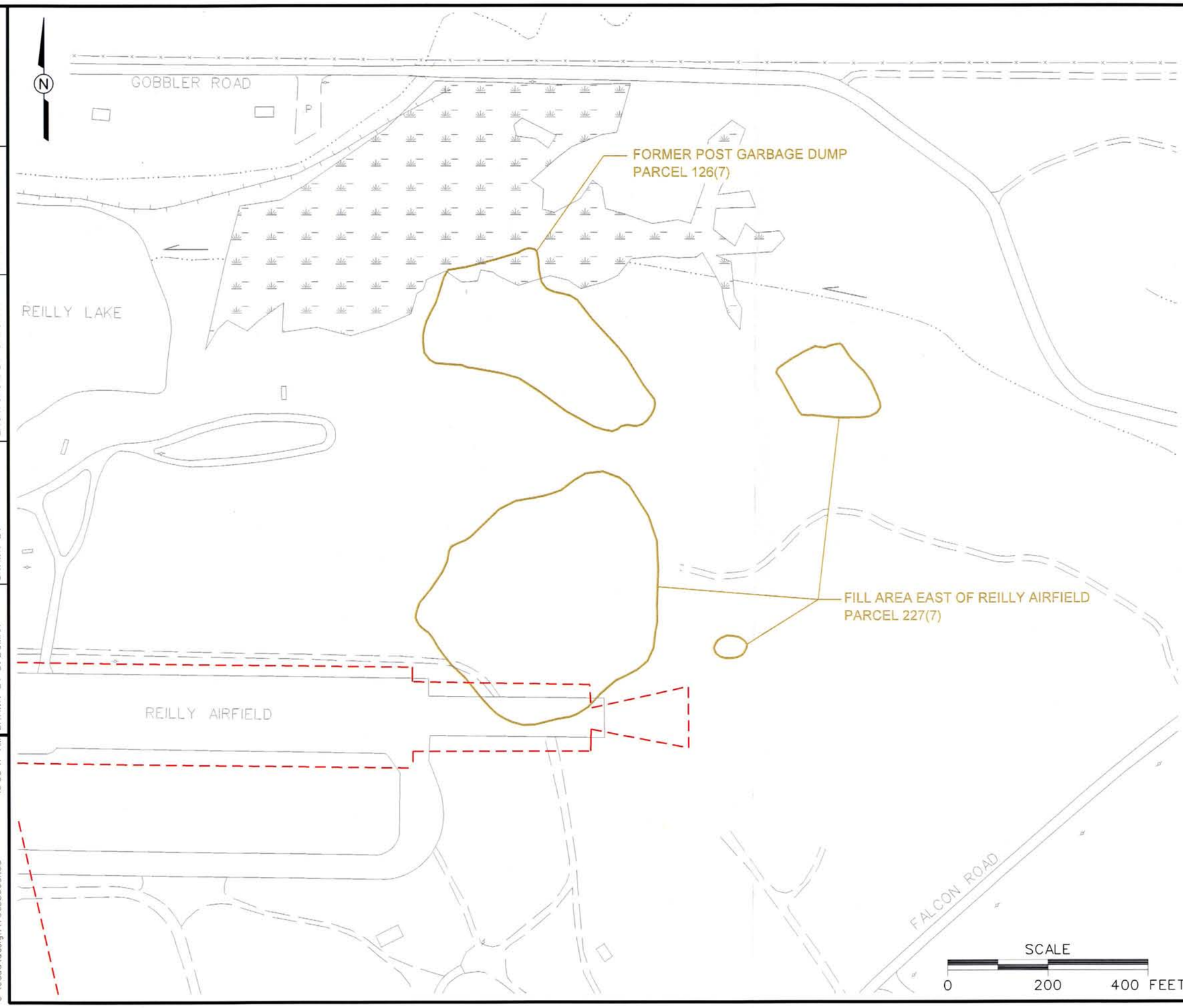

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- MARSH / WETLANDS
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- SURFACE WATER FLOW DIRECTION
- FENCE
- UTILITY POLE
- BERM
- UNDERGROUND ELECTRIC UTILITY

FIGURE 1-5
UNDERGROUND UTILITIES MAP
FILL AREA EAST OF REILLY AIRFIELD
AND FORMER POST GARBAGE DUMP
PARCELS 227(7) AND 126(7)

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

Shaw Environmental, Inc.

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however, IT personnel did not observe these mounds during site visits in 1998. Several oil filters were noted lying on the west bank of the stream. It is unclear precisely which feature or features were interpreted by EPIC as being "Fill"; therefore, this original Community Environmental Response Facilitation Act parcel encompasses the entire cleared area, including the area of the linear mounds. The fill area is approximately 5.9 acres in size. Additional information is not available regarding operations at this parcel.

A subsurface electric utility (possibly abandoned) and a storm drain are located within 200 feet of Parcel 229(7). Figure 1-4 shows the location of these utilities. No manholes or utility vaults associated with the electric utility or storm drain were identified from utility records.

1.3.6 Stump Dump, Parcel 82(7)

The Stump Dump, Parcel 82(7), is located in the central portion of the Main Post (Figure 1-1). The dump is an open area with a soil cover. It has engineered features such as terraced decks and slopes. Surface runoff is controlled by drainage structures that divert surface water from the surface of the fill area. Several detention ponds were constructed around the covered fill area to control the velocity of water leaving the site. The Stump Dump is approximately 10 acres in size.

The Stump Dump is now inactive but was used as a disposal site between 1985 and 1988. The Stump Dump was originally intended to receive storm debris (trees, branches, and flood soil). Uncontrolled and unauthorized dumping of items such as construction debris (sheet rock and concrete), batteries, tires, paint cans, refrigerators, landscaping trash, and other materials also occurred at this location. After its closure the Stump Dump was covered with soil and vegetation and the detention ponds were installed.

No underground utilities or storm drains were identified within 200 feet of the Stump Dump.

1.4 Scope of Work

The scope of work for the landfill gas investigation at the landfills and fill areas includes the following tasks:

- Develop the LGFSP attachment
- Develop the landfill gas investigation SSHP attachment
- Develop the site-specific UXO safety plan attachment

- At parcels that require UXO support, conduct a surface and near-surface UXO survey over the area of investigation

- At parcels that require UXO support, provide downhole UXO support for all intrusive bar-hole and hand auger borings

- Conduct a three-phase investigation approach, including

    1. A surface emissions screening at three inactive landfills and four fill areas

    2. Collect subsurface soil gas screening data at approximately 150 locations over these landfills and fill areas

    3. Collect seven subsurface gas samples and analyze subsurface gas samples for VOCs from locations at each landfill/fill area exhibiting the highest VOC/methane concentrations.

One fill area (Stump Dump, Parcel 82[7]) falls within the "Possible Artillery Impact Area" shown on Plate 10 of the September 2001 *Archives Search Report, Maps, Revision 1, Fort McClellan, Anniston, Alabama*; therefore, UXO surface sweeps and downhole surveys of auger borings and/or bar-holes will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

Oral interim daily reports will be provided to the USACE representative by the senior technician to indicate if any substantial landfill gas has been encountered during the day's investigation. At the completion of the field activities and sample analyses a landfill gas report will be prepared. This report will summarize the results of the investigation activities, evaluate the absence or presence of explosive gas or VOCs in subsurface gas, and to recommend further actions, if appropriate.

2.0 Summary of Investigations

This chapter contains a brief synopsis of investigations conducted at the landfills and fill areas. Detailed information about the investigations performed at the landfills and fill areas can be found in the *Draft Final, Site Investigation and Fill Area Definition Report* (IT, 2002c) and the *Draft Final, Engineering Evaluation/Cost Analysis* (EE/CA) (IT, 2002d). The fill area definition report presents the results of the investigations, including a discussion of the nature and extent of fill material, identifies whether chemicals of concern are present in certain environmental media, and provides site-specific data to support recommendations in the EE/CA. The EE/CA summarizes site characterization information and provides human health and ecological risk assessment in accordance with criteria of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). At landfills where CERCLA risks are identified, the EE/CA also identifies remedial action objectives, describes potential remedial action alternatives, contains analysis of these alternatives, and recommends a remedial action alternative.

Landfill No. 1, Parcel 78(6). This parcel was the subject of a remedial investigation (RI) by Science Applications International Corporation (SAIC). Fill area definition activities consisted of geophysical surveys, trenching, and installation of borings in fill material. Based on the results of the investigation, the fill material covers approximately 6.3 acres; the average depth of fill is estimated to extend to 11.5 feet below ground surface (bgs) (IT, 2002c). Based on data presented in the EE/CA and human health and ecological risk assessment results, Landfill No. 1 presents no unacceptable human health or ecological risk under CERCLA (IT, 2002d).

Landfill No. 2, Parcel 79(6). This parcel was included in the SAIC RI. In addition, surface soil sampling was performed at the site by Shaw. Fill area definition activities consisted of geophysical surveys, trenching, and installation of borings in fill material. Based on the results of the investigations, the fill material covers approximately 5.6 acres; the average depth of fill is estimated to extend to 8 feet bgs (IT, 2002c). Lead, polynuclear aromatic hydrocarbons, and arsenic in surface soils would pose an unacceptable risk for a potential resident. However, proposed reuse for Landfill No. 2 is passive recreation; therefore, the parcel does not present an unacceptable human health risks for the recreational site user. Surface water and sediments present no unacceptable risks for ecological receptors; metals and other compounds in surface soils pose potential risks for ecological receptors. However, the screening-level ecological risk assessment (SLERA) presents several uncertainty factors that may mitigate these risks (IT, 2002d).

Landfill No. 3, Parcel 80(6). This parcel was included in the SAIC RI, and a supplemental RI is currently being performed by Shaw to define the extent of groundwater contamination. Fill area definition activities consisted of trenching and installation of borings in fill material. Based on the results of the investigations, the fill material covers approximately 22.8 acres; the average depth of fill is estimated to extend to 17 feet bgs (IT, 2002c). Exposures to thallium in surface soil and trichloroethene and 1,1,2-2 tetrachloroethane in groundwater present unacceptable risks to a resident. Proposed reuse for Landfill No. 3 is passive recreation; the parcel presents no unacceptable human health risks for the recreational site-user. Landfill No. 3 does not present any unacceptable risk to the ecological receptor. However, elevated levels of VOCs associated with landfilling activities have been detected in groundwater at the site (IT, 2002d).

Fill Area East of Reilly Airfield, Parcel 227(7), and the Former Post Garbage Dump, Parcel 126(7). These parcels were the subject of SIs by Shaw. Fill area definition activities consisted of geophysical surveys, trenching, and installation of borings in fill material. Based on the results of the investigations, the total fill material at both parcels covers approximately 6.5 acres. The average depth of fill at Parcel 227(7) is estimated to extend to 8 feet bgs; the average depth of fill at Parcel 126(7) is estimated to extend to 3 feet bgs (IT, 2002c). The Fill Area East of Reilly Airfield and the Former Post Garbage Dump do not pose any unacceptable risks to human health under CERCLA. Metals and pesticides in soils, and metals and semivolatile organic compounds in surface water pose potential risks to ecological receptors. However, the SLERA presents several uncertainty factors that could mitigate these risks (IT, 2002d).

Fill Area Northwest of Reilly Airfield, Parcel 229(7). This parcel was the subject of an SI by Shaw. Fill area definition activities consisted of geophysical surveys, trenching, and installation of borings in fill material. Based on the results of the investigation, the fill material covers approximately 5.9 acres; the average depth of fill is estimated to extend to 8 feet bgs (IT, 2002c). The Fill Area Northwest of Reilly Airfield does not present any unacceptable human health risks under CERCLA. Mercury in surface water presents a potential risk to ecological receptors. However, the SLERA presents several uncertainty factors that could mitigate these risks (IT, 2002d).

Stump Dump, Parcel 82(7). This parcel was the subject of an SI by Shaw. Fill area definition activities consisted of installation of borings in fill material. The fill material covers approximately 10 acres; the average depth of fill is estimated to extend to 8 feet bgs (IT, 2002c). The Stump Dump presents no unacceptable human health or ecological risks under CERCLA (IT, 2002d).

3.0 Field Activities

This investigation will consist of a three-phase approach to assess landfill gas at the landfills and fill areas. The investigation phases are as follows:

- Perform surface emissions screening
- Collect subsurface soil gas screening data
- Quantify VOCs in subsurface gas.

The assessment of landfill gas will be initiated by performing a surface soil gas emission screening, which will consist of screening the landfill perimeter with a flame ionization detector (FID) and installing transverses at specified intervals in a grid pattern over the landfill or fill area while monitoring for landfill gas. Significant surface release points of landfill gas will be marked and recorded for additional investigation during the subsurface soil gas screening.

The subsurface soil gas screening will consist of a bar-hole screening program. Bar-holes will be installed along the perimeter and within each of the landfills or fill areas. The bar-holes will be installed at soil gas emission screening locations that show significant screening results. Additional subsurface screening points will be assigned using a grid methodology to provide a representative distribution. The bar-holes will be monitored for methane/total hydrocarbon and other major landfill gas components.

The subsurface gas sample will be collected from the one subsurface soil gas screening location measured to have the highest concentrations of methane/total hydrocarbons in each of the landfill and fill areas.

The following sections describe the field activities required to conduct the landfill gas investigation at the landfills and fill areas.

3.1 UXO Survey Requirements and Utility Clearance

One fill area (Stump Dump, Parcel 82[7]) falls within the "Possible Artillery Impact Area" shown on Plate 10 of the September 2001 *Archives Search Report* (USACE, 2001). Therefore UXO surface sweeps and downhole surveys of bar-holes and/or auger borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. Shaw will conduct UXO avoidance activities as outlined in Appendix E of the SAP (IT, 2002a) and the attached site-specific UXO safety plan.

3.1.1 Surface UXO Survey

At the Stump Dump, a UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed but will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendix E of the SAP (IT, 2002a).

3.1.2 Downhole UXO Survey

At the Stump Dump, downhole UXO surveys will be performed during the bar-hole and auger hole installation to determine if buried metallic objects are present. UXO monitoring as described in Appendix E of the SAP (IT, 2002a) will continue to the completed depth of the auger or bar-hole (approximately 4 feet bgs).

3.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where bar-holes or auger borings are to be installed, using the procedure outlined in Section 4.2 of the SAP (IT, 2002a).

3.2 Soil Gas Emissions Screening

The following sections outline the instrumentation, calibration, and procedures to be undertaken for the soil gas emissions screening.

3.2.1 Required Weather Conditions

Prior to field activities, the weather conditions will be monitored to ensure screening is undertaken during typical site weather conditions, as required by 40 Code of Federal Regulations (CFR) 60.55 (c) and (d) and 40 CFR 60. The following data will be recorded to document the meteorological conditions:

- General weather conditions (e.g., sunny, overcast)
- Temperature
- Approximate wind direction and speed
- Barometric pressure.

3.2.2 Instrumentation

The instrumentation to be implemented for the soil gas emission screening is a Micro Flame Ionization Detector® (Micro FID) equipped with a wand. The Micro FID conforms to the requirements of 40 CFR 60, Appendix A, Method 21. The Micro FID has good sensitivity for a wide range of compounds, including methane, hydrocarbons, and VOCs. It also has a wide detection range from 0.2 to 1,000 parts per million (ppm).

3.2.3 Instrument Calibration

The Micro FID will be calibrated according to the manufacturer's recommendations prior to commencement of site screening. EPA Method 21 specifies a standard protocol for instrument calibration and documentation. Equipment maintenance requirements, monitoring procedures, and calibration information for the instruments used to monitor methane concentrations will be recorded in the field logbook and on the appropriate calibration forms included in Appendix A of this work plan.

3.2.4 Screening Locations

Three inactive landfills and four fill areas will be investigated for landfill gas. Transects for the soil gas emissions screening at each landfill or fill area will be determined in the field by the senior technician. Figures 3-1 through 3-6 are maps that provide useful site-specific information to aid in landfill or fill area perimeter definition and determination of transect locations.

3.2.5 Screening Procedures

Prior to screening, the FID will be calibrated in accordance with the manufacturer's specifications. Once at the site, background concentrations of methane will be determined by screening upwind and downwind 100 feet from the perimeter of the landfill or fill area. Soil gas emissions screening will begin by walking the landfill or fill area perimeter, screening with the tip of the Micro FID wand positioned 2 to 4 inches above the ground surface. Next, screening will continue over the surface of the landfill or fill area by walking traverses in a grid-like pattern. The spacing for each transverse across the landfill or fill area will be approximately 50 feet. Any screened location exceeding 300 ppm will be clearly marked with a unique identifier for additional investigation.

3.3 Subsurface Soil Gas Screening

The following sections outline the instrumentation, calibration, and procedures to be undertaken for the subsurface soil gas screening.

3.3.1 Instrumentation

The GEM 500 will be used to screen the subsurface soil gas for methane, oxygen, carbon dioxide, and nitrogen.

3.3.2 Calibration

The GEM 500 calibration will be verified each working day by sampling a known methane standard (15 to 50 percent methane by volume) following the manufacturer's recommendations and specifications. Equipment maintenance requirements and calibration information for the GEM 500 will be recorded in the field logbook and on the appropriate forms found in Appendix A.

3.3.3 Screening Procedures

After the completion of the soil gas emission screening, the subsurface soil gas screening will be performed. Table 3-1 specifies the required spacing and estimated number of bar-holes to be installed along the perimeter and within the interior of the landfills and fill areas. Bar-hole probing will be conducted by driving a metal probe approximately 1/2-inch in diameter into the ground to a depth of 1 to 3 feet bgs for bar-hole locations on the perimeter and approximately 4 feet bgs for locations in the interior (within the fill). If the bar-hole cannot be advanced to its target depth or if UXO clearance prohibits the use of a bar-hole punch, a hand auger will be used. Once the bar-hole or auger boring is complete, a steel pipe with a Teflon® sampling tube will be inserted into the hole/boring to seal the hole for approximately 0.5 to 1 hour to allow any potential gas to accumulate. The GEM 500 will directly contact the sample tube, to measure for methane/total hydrocarbons, oxygen, carbon dioxide, and nitrogen. The soil gas concentration will be recorded for each borehole, for the time and location of the highest detected concentration of methane. The location of the bar-hole and measured concentrations of methane/total hydrocarbon, oxygen, carbon dioxide, and nitrogen will be recorded in the field logbook and on the appropriate form found in Appendix A. Each bar-hole and auger boring location will be staked and labeled with a unique identifier so that the point may be surveyed.

3.4 Subsurface Soil Gas Sample Collection

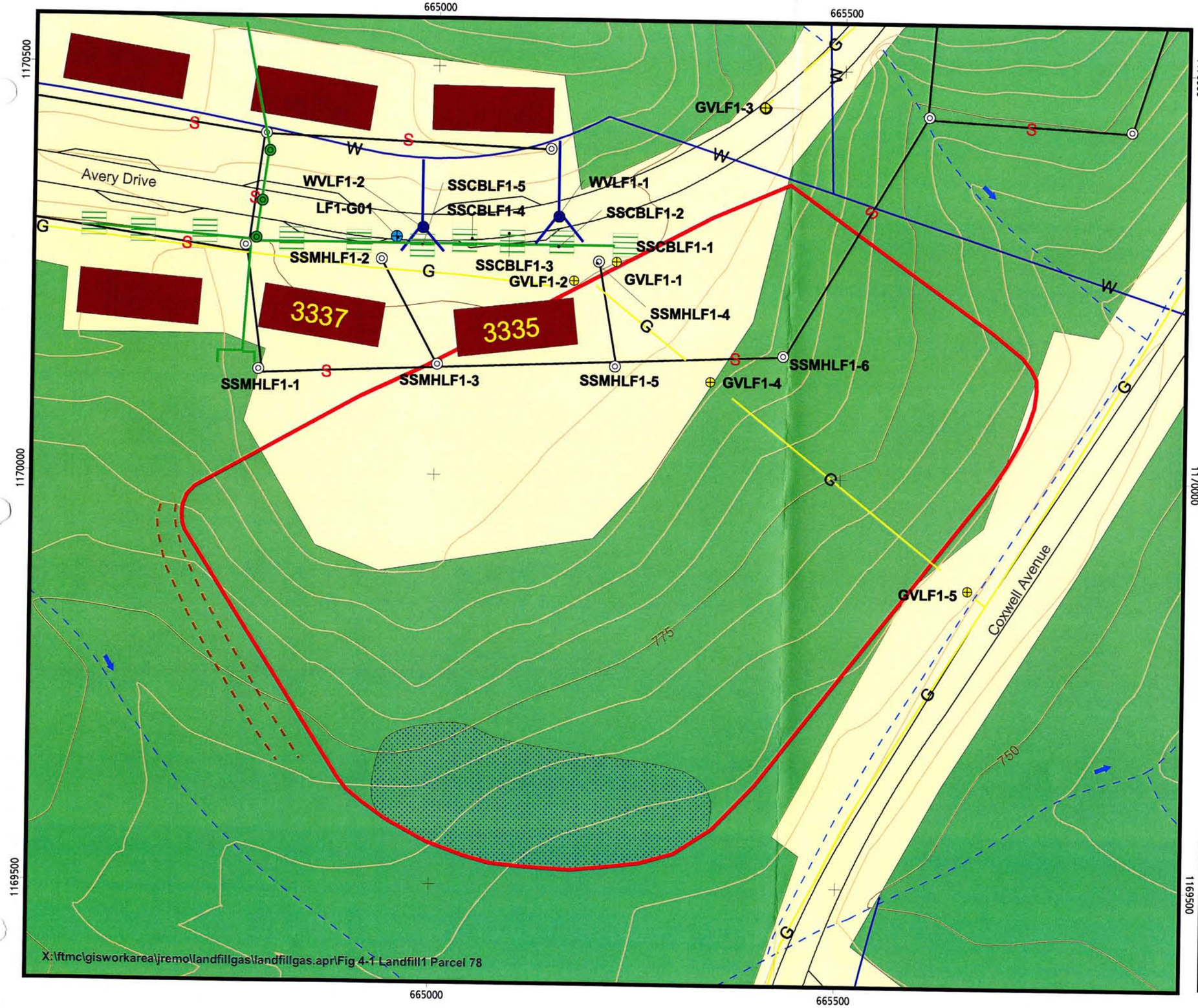
One subsurface gas sample will be collected at the each of the landfills and fill areas using a 6-liter Summa® canister per EPA Method TO-15 for VOCs. The sample will be collected from the subsurface gas screening location with the highest measured concentrations of methane/total hydrocarbons. If no methane or total hydrocarbon concentrations are detected during screening, the gas sample will be collected from the screening location with the lowest concentration of soil oxygen. The soil will be sealed around the bar-hole cap to reduce the potential for atmospheric

Figure 3-1

Structure and Monitoring Well Screening Location Map

Landfill No. 1, Parcel 78(6)

Fort McClellan, Alabama



Legend

- Improved Roads
- Access Road
- 5' Topographic Contours
- Surface Drainage Feature (dashed where intermittent)
- Gas Utility
- Gas Utility Valve Vault/Meter
- Water Utility
- Water Utility Valve Vault
- Sanitary Sewer
- Sanitary Sewer Manhole
- Storm Sewer
- Storm Sewer Catch Basin
- Storm Sewer Manhole
- Landfill Boundary Inferred by Surface Geophysics and Trenches
- Buildings
- Mound Area
- Wooded
- 3337 — Buildings to be Screened for Landfill Gas
- Monitoring Wells to be Screened for Landfill Gas

120 0 120 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

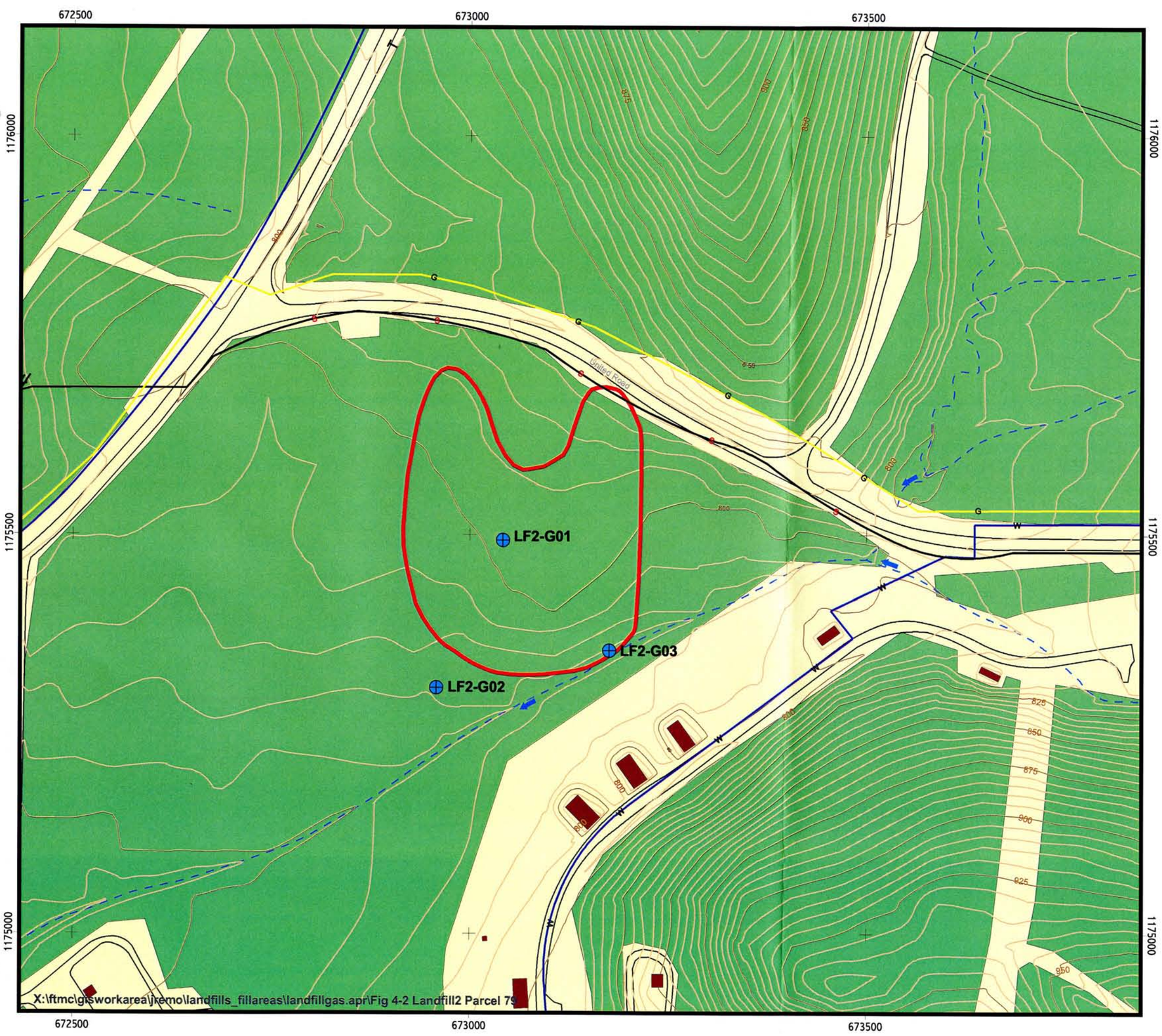


Figure 3-2
Structure and Monitoring Well Screening Location Map

Landfill No. 2, Parcel 79(6)

Fort McClellan, Alabama

Legend

- Improved Roads
- 5' Topographic Contours
- Surface Drainage Feature (dashed where intermittent)
- Gas Utility
- Water Utility
- Sewer Utility
- Landfill Boundary Inferred by Surface Geophysics and Trenches
- Buildings
- Wooded
- Monitoring Wells to be Screened for Landfill Gas

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

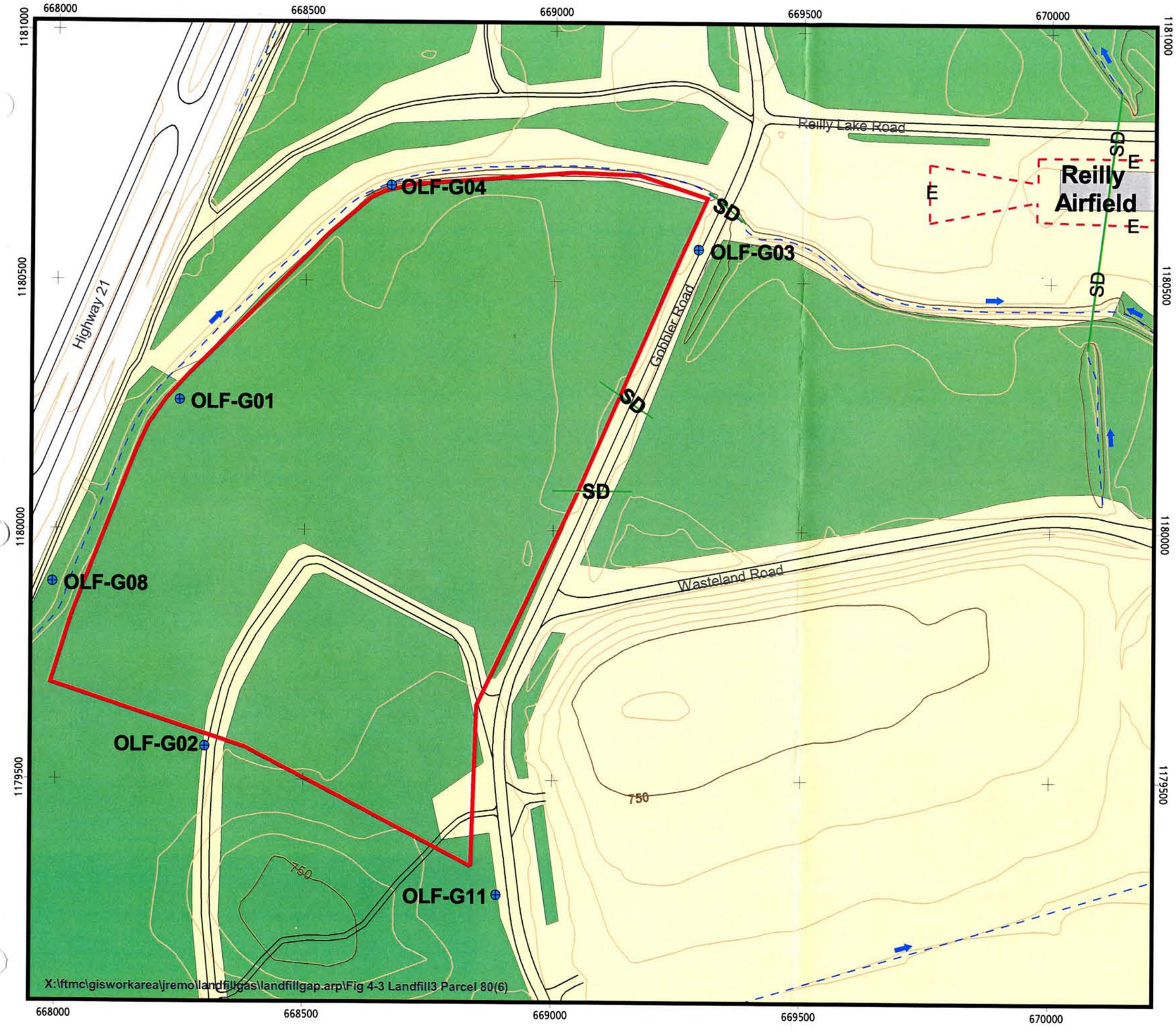


Figure 3-3
Structure and Monitoring Well Screening Location Map
Landfill No. 3 Parcel 80(6)
Fort McClellan, Alabama

Legend

- Improved Roads
- 5' Topographic Contours
- SD — Storm Drain
- Surface Drainage Feature (dashed where intermittent)
- E — Underground Electric Utility
- Landfill Boundary Inferred by Surface Geophysics and Trenches
- Wooded
- Former Runway
- Monitoring Wells to be Screened for Landfill Gas

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

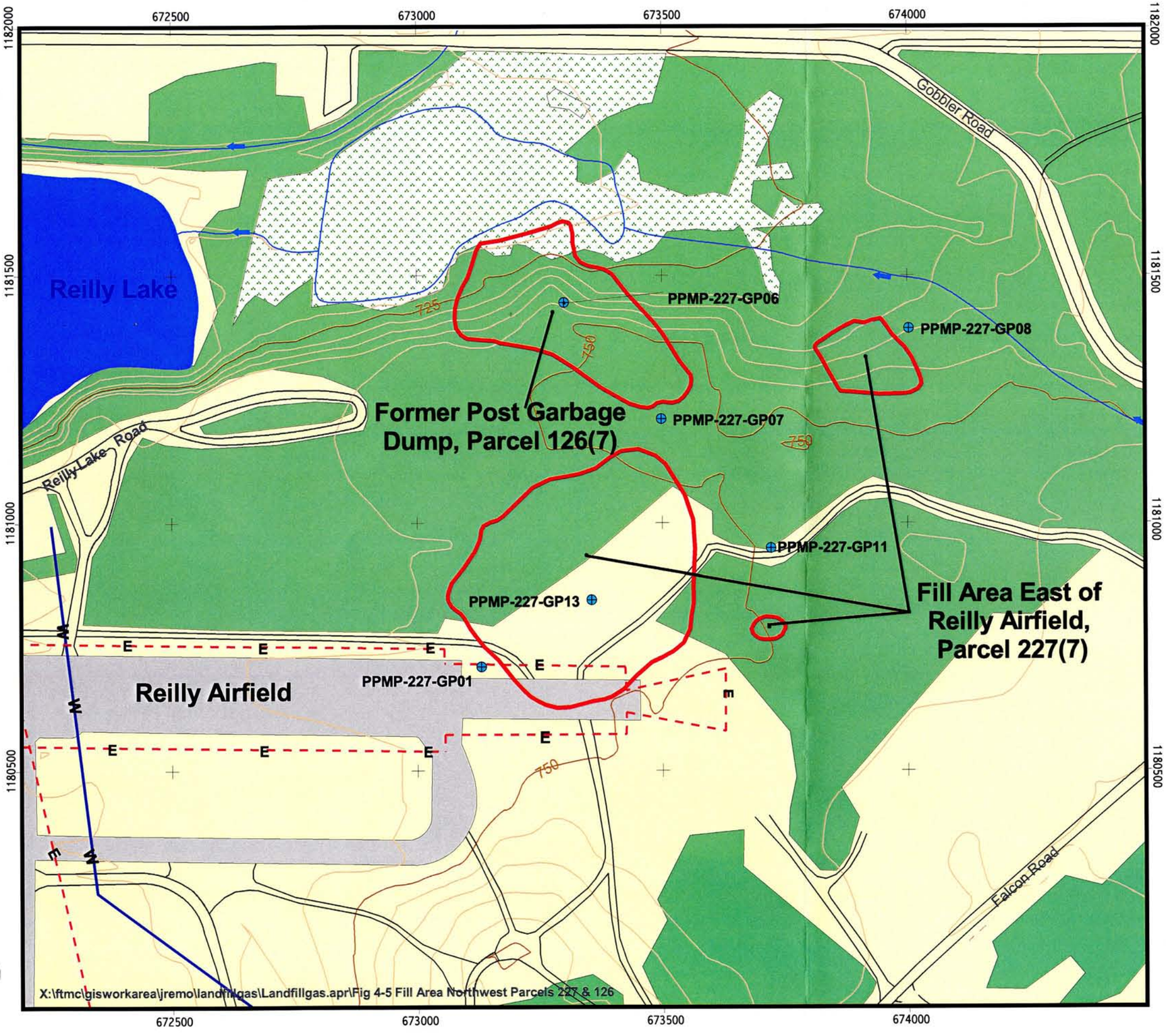


Figure 3-4

Structure and Monitoring Well Screening Location Map

Fill Area East of Reilly Airfield & Former Post Garbage Dump, Parcels 227(7) and 126(7)

Fort McClellan, Alabama

Legend

- Improved Roads
- 5' Topographic Contours
- Surface Drainage Feature (dashed where intermittent)
- Underground Electric Utility
- Water Utility
- Landfill Boundary Inferred by Surface Geophysics and Trenches
- Wetlands
- Wooded
- Former Runway
- Monitoring Wells to be Screened for Landfill Gas

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

669500
670000
670500
1181500
1181000
1180500
PPMP-229-GP01
PPMP-229-GP05
PPMP-229-GP02
PPMP-229-GP04
PPMP-229-GP03
Reilly Lake Road
Reilly Airfield
Gobbler Road
700
725
SD
E
X:\ftmc\gisworkarea\jremo\landfillgas\Landfillgas.apr\Fig 4-6 Parcel 229

Figure 3-5

Structure and Monitoring Well Screening Location Map

Fill Area Northwest of Reilly Airfield, Parcel 229(7)

Fort McClellan, Alabama

Legend

- Improved Roads
- 5' Topographic Contours
- Surface Drainage Feature (dashed where intermittent)
- Underground Electric Utility
- Storm Drain
- Landfill Boundary Inferred by Surface Geophysics and Trenches
- Wooded
- Former Runway
- Monitoring Wells to be Screened for Landfill Gas

150 0 150 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

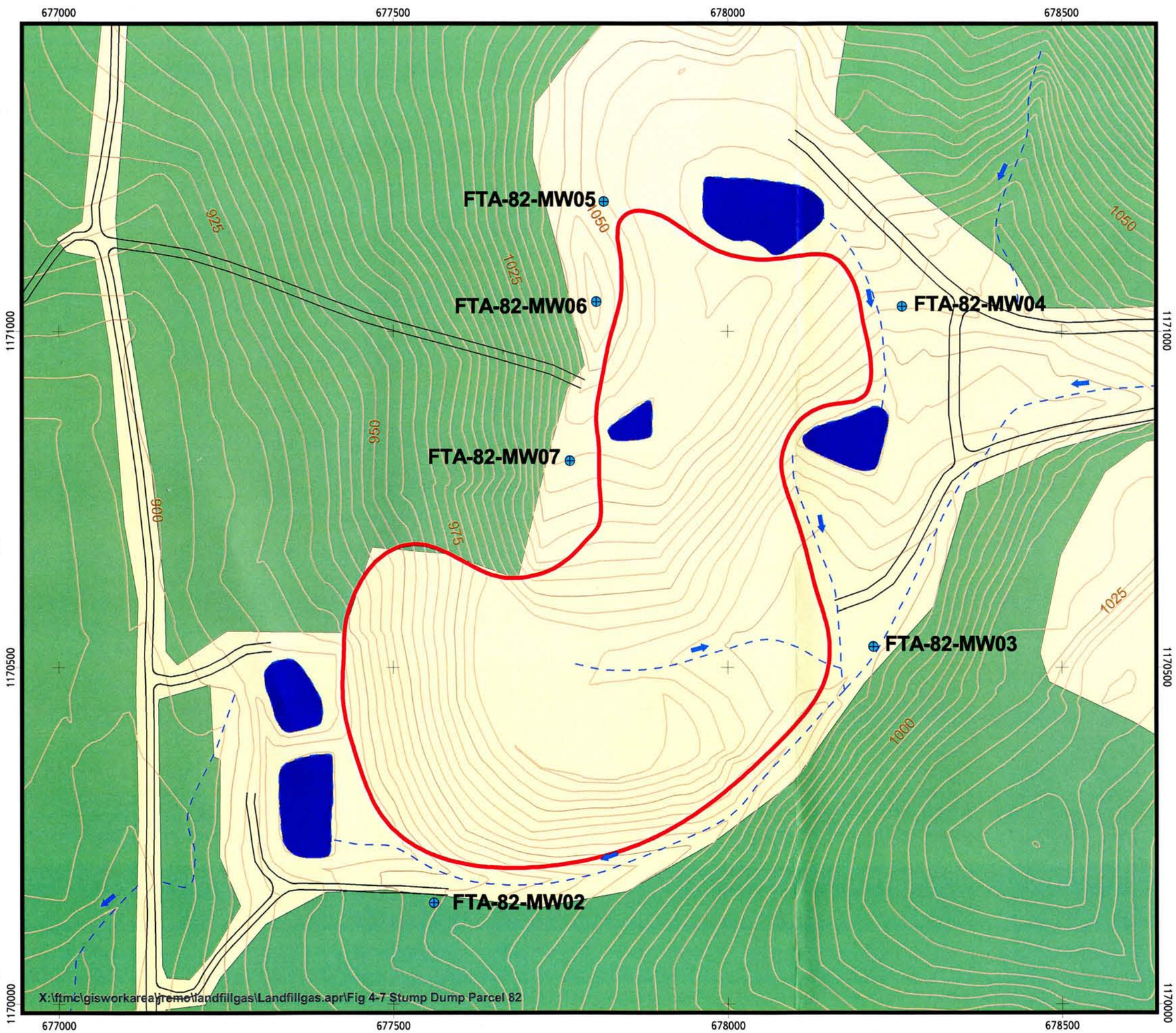


Figure 3-6

Monitoring Well Screening Location Map

Stump Dump, Parcel 82(7)

Fort McClellan, Alabama

Legend

- Improved Roads
- 5' Topographic Contours
- Surface Drainage Feature (dashed where intermittent)
- Fill Boundary and CERFA Parcel
- Surface Water Feature (may be ephemeral)
- Wooded
- Monitoring Wells to be Screened for Landfill Gas

150 0 150 Feet

NAD83 State Plane Coordinates

N

Shaw Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

Table 3-1

Summary of Landfill Gas Field Investigations
Landfills and Fill Areas
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Alabama

Parcel Name	Area (sq. ft.)	Estimated Fill Volume (cu. yds.)	UXO	Estimated Amount of Decomposable Waste	Interior Bar-Hole Spacing (ft.)	Estimated No. of Interior Bar-Holes	Perimeter Bar-Hole Spacing (ft.)	Estimated No. of Perimeter Bar-Holes	Perimeter Structure Survey Radius (ft.)
Landfill No. 1	274,428	81,800	no	residual-to-none	200	8	400	5	100
Landfill No. 2	243,936	54,200	no	residual-to-none	200	7	400	5	100
Landfill No. 3	993,168	375,200	no	residual-to-substantial*	1 per fill trench	49	250	16	200
Fill Area East of Reilly Airfield	196,020	29,000	no	residual-to-none*	200	6	250	7	200
Former Post Garbage Dump	87,120	9,700	no	residual*	200	4	250	5	200
Fill Area Northwest of Reilly Airfield	255,697	53,000	no	residual*	1 per fill trench	7	250	8	200
Stump Dump	435,600	116,200	yes	residual-to-substantial*	200	13	250	11	200
Totals	**2,485,969**	**719,100**				**94**		**57**	

* Interior bar-holes to be field located within known waste accumulation areas.

intrusion and dilution. A new Teflon sampling tube will be used to connect the canister to the bar-hole cap at each sampling location. The subsurface gas sample will be slowly bled into the canister over a minimum 2-minute sample period, to minimize dilution from in-rushing air. The canister will be sealed with residual vacuum remaining, to allow detection of any potential leakage in transit. Subsurface soil gas sample designations are summarized in Table 3-2.

3.5 Structure and Monitoring Well Screening

Surface and subsurface structures located within the landfill or fill area perimeter specified on Table 3-1 will be screened for landfill gas and explosive gas accumulations above the regulatory limit (25 percent of the lower explosive limit = 1.25 percent by volume). Table 3-3 lists the structures within the specified distance for each landfill or fill area. Figures 3-1 through 3-6 show the locations of surface and subsurface structures and other features in the vicinity of the landfills and fill areas.

Prior to entering each building, an outside ambient air reading will be taken to verify correct instrument calibration for oxygen concentrations. If the building has not been opened or occupied within the previous 5 days, the interior air of the building shall be monitored for sufficient oxygen, through a partially open door or window, before any entry is permitted. Oxygen concentrations in all areas shall be a minimum of 20 percent by volume, to permit entry without personnel protective equipment and confined space training. Once the building is cleared for safe entry, a minimum of five screening locations inside each building will be monitored. Crawl spaces, basements, and cellars will also be monitored for sufficient oxygen, through doorways or other accessible openings, before entry. Other screening locations will be based on the determination of the field technician as to areas susceptible to landfill gas accumulation. Usually small-enclosed spaces or building corners at ground level are locations subjected to limited airflow and landfill gas accumulation.

Landfill No. 1 will be screened for landfill and explosive gas accumulations at two water valve vaults, five gas valve/meter vaults, five storm sewer catch basins, and six sanitary sewer manholes. This screening will be accomplished by inserting the wand of the FID and GEM 500 through an opening in manhole or utility vault cover. No personnel shall enter the manhole or utility vault. The manholes and utility vaults to be investigated at Landfill No. 1 are presented in Table 3-2 and the location of these subsurface structures can be found on Figure 3-1.

Underground utilities have also been identified at Landfill No. 2, Fill Area East of Reilly Airfield and the Former Post Garbage Dump, and Fill Area Northwest of Reilly Airfield. However, Shaw

Table 3-2

Subsurface Soil Gas Sample Designations
Landfill and Fill Areas
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Alabama

Sample Location	Sample Designation	Analytical Method
LF1-78-GAS01	LF1-78-GAS01-GS-SH5001-REG	TO-15
LF2-79-GAS01	LF2-79-GAS01-GS-SH5002-REG	TO-15
OLF-80-GAS01	OLF-80-GAS01-GS-SH5003-REG	TO-15
PPMP-227-GAS01	PPMP-227-GAS01-GS-SH5005-REG	TO-15
FTA-126-GAS01	FTA-126-GAS01-GS-SH5006-REG	TO-15
PPMP-229-GAS01	PPMP-229-GAS01-GS-SH5007-REG	TO-15
FTA-82-GAS01	FTA-82-GAS01-GS-SH5008-REG	TO-15

TO-15 - Toxic Organic Air Pollutants EPA Method Number 15.
REG - Field sample.

Table 3-3

Summary of Perimeter Structure\Monitoring Well Screening
Landfills and Fill Areas
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Alabama

Parcel Name	Parcel Number	Perimeter of Structure Survey Radius (ft.)	Structure Name	Description
Landfill No. 1	78(6)	100	Building No. 3337	1 Single Floor Dwelling (former military housing)
			Building No. 3338	1 Single Floor Dwelling (former military housing)
			WVLF1-1	Water Valve Vault
			WVLF1-2	Water Valve Vault
			GVLF1-1	Gas Valve/Meter Vault
			GVLF1-2	Gas Valve/Meter Vault
			GVLF1-3	Gas Valve/Meter Vault
			GVLF1-4	Gas Valve/Meter Vault
			GVLF1-5	Gas Valve/Meter Vault
			SSCBLF1-1	Storm Sewer Catch Basin
			SSCBLF1-2	Storm Sewer Catch Basin
			SSCBLF1-3	Storm Sewer Catch Basin
			SSCBLF1-4	Storm Sewer Catch Basin
			SSCBLF1-5	Storm Sewer Catch Basin
			SSMHLF1-1	Sanitary Sewer Manhole
			SSMHLF1-2	Sanitary Sewer Manhole
			SSMHLF1-3	Sanitary Sewer Manhole
			SSMHLF1-4	Sanitary Sewer Manhole
			SSMHLF1-5	Sanitary Sewer Manhole
			SSMHLF1-6	Sanitary Sewer Manhole
			LF-G01	Monitoring Well
Landfill No. 2	79(6)	100	LF2-01	Monitoring Well
			LF2-02	Monitoring Well
			LF2-03	Monitoring Well
Landfill No.3	80(6)	200	Storm Drain 1	Storm Drain
			Storm Drain 2	Storm Drain
			Storm Drain 3	Storm Drain
			OLF-G01	Monitoring Well
			OLF-G02	Monitoring Well
			OLF-G03	Monitoring Well
			OLF-G04	Monitoring Well
			OLF-G08	Monitoring Well
			OLF-G11	Monitoring Well

Table 3-3

Summary of Perimeter Structure\Monitoring Well Screening
Landfills and Fill Areas
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Alabama

Parcel Name	Parcel Number	Perimeter of Structure Survey Radius (ft.)	Structure Name	Description
Fill Area East of Reilly Airfield & Former Poat Garbage Dump	227(7) 126(7)	200	PPMP-227-GP01	Monitoring Well
			PPMP-227-GP06	Monitoring Well
			PPMP-227-GP07	Monitoring Well
			PPMP-227-GP08	Monitoring Well
			PPMP-227-GP11	Monitoring Well
			PPMP-227-GP13	Monitoring Well
Fill Area Northwest of Reilly Airfield	229(7)	200	Storm Drain	Storm Drain
			PPMP-229-GP01	Monitoring Well
			PPMP-229-GP02	Monitoring Well
			PPMP-229-GP03	Monitoring Well
			PPMP-229-GP04	Monitoring Well
			PPMP-229-GP05	Monitoring Well
Stump Dump	82(7)	200	FTA-82-MW02	Monitoring Well
			FTA-82-MW03	Monitoring Well
			FTA-82-MW04	Monitoring Well
			FTA-82-MW05	Monitoring Well
			FTA-82-MW06	Monitoring Well
			FTA-82-MW07	Monitoring Well

has not found records of manholes or vaults associated with these utilities. A site inspection for manholes and/or utility vaults will be performed by the field technicians to ensure there are no additional subsurface structures within the perimeter structure survey radius for each landfill and fill area (Table 3-1).

Four storm drains fall within the structure survey radius (Table 3-3). Three storm drains are located along the eastern boundary of Landfill No. 3 and the fourth storm drain is located approximately 150 feet southeast of the Fill Area Northwest of Reilly Airfield (Figures 3-3 and 3-5, respectively). The inlet and the outfall of these storm drains will be monitored for landfill gas using the GEM 500. In addition, a surface screening for landfill gas will be performed across the length of the storm drain as outlined in Section 3.2.5.

In addition to surface structures, residuum and shallow bedrock monitoring wells within the survey radius will be screened for landfill gas. Each monitoring well will be screened twice, once before and once after purging of any accumulated gas in the well casing. Each monitoring well will be unlocked, the well cap removed, and the casing interior will be immediately screened using a GEM 500. Subsequently, the casing interior will be purged of approximately one casing volume of gas (estimated based on the most recent water level data) and a second reading will be recorded. Frequently, the pre-purge reading will provide a peak reading, and the post-purge reading will provide a steadier, equilibrium reading. Typically the post-purge reading is more representative of the actual soil pore gas concentration in the area. Table 3-3 provides a list of monitoring wells to be screened within each survey radius. Figures 3-1 through 3-6 show the locations of the monitoring wells to be screened.

3.6 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in section 6.5.1.1 of the SAP (IT, 2002a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.2 of the SAP.

3.7 Surveying of Screening and Sample Locations

Subsurface screening locations will be given a unique identifier, will be marked with a stake, and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum 1983. Elevations will be referenced to the North American Datum of 1988.

3.8 Analytical Program

The sampling program for the landfill gas investigation at Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7) includes the collection of seven subsurface gas samples for chemical analysis (Table 3-2). The soil gas samples will be collected and analyzed to determine the presence of VOCs. The subsurface gas collected during this investigation will be analyzed using EPA toxic organic air pollutants method number 15 (Method TO-15). Method TO-15 documents the sampling and analytical procedures for the determination of VOCs in air collected in a specially prepared canister and is analyzed using gas chromatography/mass spectrometry. The data will be reported in accordance with definitive data requirements of Chapter 2.0 of the USACE Engineer Manual 200-1-6, *Chemical Quality Assurance for Hazardous, Toxic, and Radioactive Waste Projects* (USACE, 1997) and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the quality assurance plan [IT, 2002a]). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms, along with electronic copies.

3.9 Sample Preservation, Packing and Shipping

The Summa canisters will remain sealed until a sample is collected. After sampling, the canisters will be resealed until analysis. The samples collected will be shipped and analyzed on an expedited 72 hour turnaround time. Complete analysis request/chain of custody records will be secured and included with each shipment to:

Attention: Sample Receiving/Elizabeth McIntyre
EMAX Laboratories Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889

3.10 Investigation-Derived Waste Management

Management and disposal of IDW will follow procedures and requirements described in Appendix D of the SAP (IT, 2002a). IDW generated at the landfills and fill areas is expected to include Tygon tubing, decontamination fluids, disposable personal protective equipment, and possibly small amounts of soil IDW. The IDW will be characterized and staged at a secure location designated by the site manager while awaiting finial disposal. Sampling of IDW to obtain analytical results to characterize the waste for disposal will follow procedures specified in Section 6.1.8 of the SAP (IT, 2002a).

3.11 Site-Specific Safety and Health

Safety and health requirements for the landfill gas investigation are provided in the SSHP attachment for the LGFSP. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan, Appendix A of the SAP (IT, 2002a) and the site-specific UXO safety plan.

4.0 Project Schedule

The project schedule for the landfill gas investigation activities will be provided by the Shaw project manager to the Base Realignment and Closure Cleanup Team.

5.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2002a, ***Draft Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, Revision 3, February.

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IT Corporation (IT), 2002c, ***Draft Final, Site Investigation and Fill Area Definition Report, Landfills and Fill Areas, Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 126(7), 229(7), 231(7), 233(7), and 82(7), Fort McClellan, Calhoun County, Alabama***, March.

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U.S. Army Corps of Engineers (USACE), 2001, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, Revision 1, September.

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U.S. Environmental Protection Agency (EPA), 1990, ***Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama*** *(TS-PIC-89334),* Environmental Photographic Interpretation Center Report (EPIC), Environmental Monitoring Systems Laboratory.

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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
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	ä-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
CAMU	corrective action management unit
CBR	chemical, biological, and radiological
CCAL	continuing calibration
CCB	continuing calibration blank
CCV	continuing calibration verification
CD	compact disc
CDTF	Chemical Defense Training Facility
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CF	conversion factor
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
CFR	Code of Federal Regulations
CG	carbonyl chloride (phosgene)
CGI	combustible gas indicator
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl	chlorinated
CLP	Contract Laboratory Program
cm	centimeter
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
CO	carbon monoxide
CO_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 air monitoring system
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DCA	dichloroethane
DCE	dichloroethene

List of Abbreviations and Acronyms (Continued)

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 Command
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDA	U.S. Food and Drug Administration
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
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
HCl	hydrochloric acid
HD	distilled mustard
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
IATA	International Air Transport Authority
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection

List of Abbreviations and Acronyms (Continued)

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	lewisite; liter
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-advserse-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
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
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
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
RRF	relative response factor
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
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

APPENDIX A

FIELD FORMS

Shaw™ Shaw Environmental, Inc.

CALIBRATION PRECISION TEST RECORD FORM

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME(S): _____ PARCEL NUMBER(S): _____

DATE: _____

TIME: _____

INSTRUMENT MAKE: _____ MODEL: _____ S/N: _____

CALIBRATION GAS TYPE: _____

CALIBRATION GAS MANUFACTURE NAME: _____

CALIBRATION GAS LOT NUMBER: _____

CALIBRATION GAS EXPIRATION DATE: _____

MEASUREMENT #1:

Meter Reading for Zero Air: _____ ppm (1)

Meter Reading for Calibration Gas: _____ ppm (2)

MEASUREMENT #2:

Meter Reading for Zero Air: _____ ppm (3)

Meter Reading for Calibration Gas: _____ ppm (4)

MEASUREMENT #3:

Meter Reading for Zero Air: _____ ppm (5)

Meter Reading for Calibration Gas: _____ ppm (6)

CALCULATE PRECISION:

$$\frac{[500 - (2)] + [500 - (4)] + [500 - (6)]}{3} \times \frac{1}{500} \times \frac{100}{1}$$

= _____ % (must be less than 10%)

CALIBRATION PERFORMED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

RESPONSE TIME TEST RECORD FORM

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME(S): _____ PARCEL NUMBER(S): _____

DATE: _____

TIME: _____

INSTRUMENT MAKE: _____ MODEL: _____ S/N: _____

CALIBRATION GAS TYPE: _____

CALIBRATION GAS MANUFACTURE NAME: _____

CALIBRATION GAS LOT NUMBER: _____

CALIBRATION GAS EXPIRATION DATE: _____

MEASUREMENT #1:

Stabilized Reading Using Calibration Gas: _____ ppm

90% of the Stabilized Reading: = _____ ppm

Time to Reach 90% of Stabilized reading
After switching from Zero Air to
Calibration Gas _____ seconds (Time 1)

MEASUREMENT #2:

Stabilized Reading Using Calibration Gas: _____ ppm

90% of the Stabilized Reading: = _____ ppm

Time Reach 90% of Stabilized Reading
After switching from Zero Air to
Calibration Gas _____ seconds (Time 2)

MEASUREMENT #3:

Stabilized Reading Using Calibration Gas: _____ ppm

90% of the Stabilized Reading: = _____ ppm

Time to Reach 90% of Stabilized Reading
After switching from Zero Air to
Calibration Gas _____ seconds (Time 3)

CALCULATE RESPONSE TIME:

$$\frac{(\text{Time 1}) + (\text{Time 2}) + (\text{Time 3})}{3}$$

= _____ SECONDS (MUST BE LESS THAN 30 SECONDS)

CALIBRATION PERFORMED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

CALIBRATION PROCEDURE AND BACKGROUND DETERMINATION REPORT FORM

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER:_____

PARCEL NAME(S): _____PARCEL NUMBER(S): _____

DATE: _____

TIME: _____

INSTRUMENT MAKE: _____ MODEL: _____ S/N: _____

CALIBRATION GAS TYPE: _____

CALIBRATION GAS MANUFACTURE NAME: _____

CALIBRATION GAS LOT NUMBER: _____

CALIBRATION GAS EXPIRATION DATE: _____

CALIBRATION PROCEDURE

1. Allow instrument to internally zero itself while introducing zero air.

2. Introduce the calibration gas into the probe.
   Stable reading = _____ ppm

3. Adjust meter to read 300 ppm.

BACKGROUND DETERMINATION PROCEDURE

1. Upwind Reading (highest in 30 seconds): _____ ppm (Upwind)

2. Downwind Reading (highest in 30 seconds): _____ ppm (Upwind)

   Calculate Background Value:

$$\frac{\text{(Upwind)} + \text{(Downwind)}}{2} = \text{Background ppm}$$

   Background = _____ ppm

CALIBRATION PERFORMED BY: _____ DATE:_____

Shaw™ Shaw Environmental, Inc.

GEM 500 CALIBRATION VERIFICATION FORM

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

DATE: _____

TIME: _____

PARCEL NAME(S): _____ PARCEL NUMBER(S): _____

INSTRUMENT MAKE: GEM 500 . MODEL: _____ S/N: _____

CALIBRATION GAS TYPE: _____

CALIBRATION GAS MANUFACTURE NAME: _____

CALIBRATION GAS LOT NUMBER: _____

CALIBRATION GAS EXPIRATION DATE: _____

CALIBRATION GAS CONCENTRATION: _____

INSTURMENT READING: _____

CALIBRATION VERIFICATION PERFORMED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

LANDFILL GAS EMMISION LOG

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME: _____ PARCEL NUMBER: _____

DATE: _____

TIME: _____

MONITORING TEAM: _____

INSTRUMENT TYPE: _____

INSTRUMENT MAKE: _____ MODEL: _____ S/N: _____

Location ID	Time	Reading (ppm)

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

LANDFILL GAS EMMISION LOG

(Supplement Page)

Location ID	Time	Reading (ppm)

FORM COMPLETED BY: ______________________________ DATE: ______________

Shaw™ Shaw Environmental, Inc.

SUBSURFACE SOILS GAS SCREENING LOG

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME: _____ PARCEL NUMBER: _____

MONITORING TEAM: _____

DATE: _____

MONITORING EQUIPEMENT: LANDTEC GEM 500 S/N: _____

DATE OF CALIBRATION: _____

SUBSURFACE SOILGAS SCREENING LOCATIONS:

Location ID:	Time	Methane/ Total Hydrocarbons %	Oxygen %	Carbon Dioxide %	Nitrogen %

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

SUBSURFACE SOILS GAS SCREENING LOG
(Supplemental Page)

SUBSURFACE SOILGAS SCREENING LOCATIONS:

Location ID:	Time	Methane/ Total Hydrocarbons %	Oxygen %	Carbon Dioxide %	Nitrogen %

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

STRUCTURE SURVEY FORM

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME: _____ PARCEL NUMBER: _____

MONITORING TEAM: _____ DATE: _____

MONITORING EQUIPEMENT: LANDTEC GEM 500 S/N: _____

DATE OF CALIBRATION: _____ STRUCTURE NAME / NUMBER: _____

Ambient Air Readings	Inside Structure	
LEL 25% _____	Location # 1	Location #2
Oxygen % _____	LEL 25% _____	LEL 25 % _____
	Oxygen % _____	Oxygen % _____
	Alarm Level Condition: _____	Alarm Level Condition: _____

Inside Structure (continued)

Location # 3	Location # 4	Location # 5
LEL 25% _____	LEL 25% _____	LEL 25% _____
Oxygen % _____	Oxygen % _____	Oxygen % _____
Alarm Level Condition _____	Alarm Level Condition: _____	Alarm Level Condition: _____

LEL - Lower explosive limit (LEL) means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmosphere pressure. The LEL is 5% concentration by volume of methane. The UEL (upper explosive limit) is 15% concentration by volume of methane. Explosive range (5% - 15%, LEL - UEL).

% Oxygen - (19.5% to 25%): established range required by select monitoring instruments for proper functioning.

Conditions	Structures
Safe	0%
Caution	0 - 1.0%
Peril	1.25 - 5% and > 15%
Explosive	5 - 15%

Safe: No concentrations of methane were detected that would cause harm or danger to personnel or structures.

Caution: Conditions where concentration levels of methane are elevated or approaching levels that may cause harm or danger to personnel or structures.

Peril: 25% concentration of LEL is detected in facility structures or the UEL is exceeded at the property boundary. UEL may rapidly return to the explosive range due to changing site conditions.

Explosive: Methane concentration levels are detected within the LEL - UEL range of 5 to 15 percent.

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

METEOROGICAL DATA LOG

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME: _____ PARCEL NUMBER: _____

MONITORING TEAM: _____

DATE: _____ TIME: _____

Climatic/Physical Conditions at Site:

a. Soil Conditions: _____

b. Weather Conditions: _____

c. Wind Direction and Speed: _____

d. Temperature (°C / °F): _____

d. Barometric Conditions (millibars / inches of mercury): _____

e. Relative Humidity within range of 10 to 90 per cent. Yes ( ) No ( ) Range 0-0%

f. Water Table Conditions:

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

MONITORING WELL SCREENING LOG

PROJECT NAME: FORT McCLELLAN PROJECT NUMBER: _____

PARCEL NAME: _____ PARCEL NUMBER: _____

MONITORING TEAM: _____

DATE: _____

MONITORING EQUIPEMENT: LANDTEC GEM 500 S/N: _____

DATE OF CALIBRATION: _____

Monitoring Well ID:	Pre purge Screening Time Post purge Screening Time	Methane/ Total Hydrocarbons %	Oxygen %	Carbon Dioxide %	Nitrogen %

FORM COMPLETED BY: _____ DATE: _____

Shaw™ Shaw Environmental, Inc.

MONITORING WELLSCREENING LOG
(Supplemental Page)

Monitoring Well ID:	Pre purge Screening Time Post purge Screening Time	Methane/ Total Hydrocarbons %	Oxygen %	Carbon Dioxide %	Nitrogen %

FORM COMPLETED BY: _____ DATE: _____

Landfill Gas Investigation
Site-Specific Safety and Health Plan Attachment
Landfill and Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(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 CK09
Contract No. DACA21-96-D-0018
Shaw Project No. 786886

May 2003

Revision 0

The following Site-Specific Safety and Health Plan (SSHP) has been designed for the methods presently contemplated by the company for execution of the proposed work. Therefore, the SSHP may not be appropriate if the work is not performed by or using the methods presently contemplated by the company. In addition, as the work is performed, conditions different from those anticipated may be encountered and the SSHP may have to be modified. Therefore, the company only makes representations or warranties as to the adequacy of this SSHP for currently anticipated activities and conditions.

The SSHP must be used in conjunction with the installation-wide safety and health plan and the installation-wide ordnance and explosive management plan, Fort McClellan, Alabama.

Site-Specific Safety and Health Plan Attachment Approval
Fort McClellan, Calhoun County, Alabama

I have read and approve this site-specific safety and health plan attachment for Landfill and Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7) at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and Shaw Environmental, Inc. procedures.

Jeanne Yacoub, PE
Project Manager

5/9/03
Date

William J. Hetrick, CIH
Health & Safety Manager

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE INCORPORATED
CERT. NO 1105 C
EXPIRES 12-31-2003
PENNSYLVANIA - 1960
WILLIAM J. HETRICK, CIH

5/8/03
Date

Jeff Tarr
Site Coordinator

5/9/03
Date

Acknowledgments

The final approved version of this site-specific safety and health plan (SSHP) attachment for the landfill and fill area investigations at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every 6 months until project completion.

Joanne Jacoub — 5/9/03

Project Manager — Date

I acknowledge receipt of this SSHP attachment from the project manager, and that it is my responsibility to explain its contents to all site personnel and cause these requirements to be fully implemented. Any change in conditions, scope of work, or other change that might affect worker safety requires me to notify the project manager and/or the health and safety manager.

Joanne Jacoub for — 5/9/03

Site Coordinator — Date

Site-Specific Safety and Health Plan
Acknowledgment Form

I have been informed of, and will abide by the procedures set forth in this site-specific safety and health plan attachment for the activities at the landfill and fill areas at Fort McClellan, Calhoun County, Alabama.

Printed Name	***Signature***	***Representing***	***Date***

Fort McClellan Gate Hours

Baltzell Gate	Baltzell Road Open 24 hours daily, 7 days a week
Galloway Gate	Galloway Road Open 6:00 am to 6:00 pm Monday through Friday

Fort McClellan Project Emergency Contacts

Range Control Office (Main Post)	(256) 848-6772
Fire Department (off post)	911
Ambulance (off post)	911
Regional Medical Center	(256) 235-5121
DOD Guard Force (Mr. Bolton)	(256) 848-5680, 848-4732
Anniston Police Department	(256) 238-1800
Chemical Agent Emergencies	(256) 895-1598
(Mike Smith, CEHNC)	cell phone (256) 759-3931
UXO Emergencies	(256) 895-1598
(Mike Smith, CEHNC)	cell phone (256) 759-3931
UXO Nonemergencies/Reporting Only (Ronald Levy)	(256) 848-6853
National Response Center & Terrorist Hotline	(800) 424-8802
Poison Control Center	(800) 222-1222
U.S. Environmental Protection Agency (EPA) Region IV	(404) 562-8725
Ronald Levy, BRAC Environmental Coordinator, FTMC Transition Force	(256) 848-6853
Lisa Holstein, FTMC Transition Force	(256) 848-7455
Lee Coker, U.S. Army Corps of Engineers, Mobile District	(251) 690-3099
Philip Stroud, Alabama Department of Environmental Management	(334) 270-5646
Doyle Brittain, EPA Region IV	(404) 562-8259
Ross McCollum, U.S. Army Corps of Engineers, Mobile District	(251) 690-3113
Mike Moore, Fort McClellan Safety Officer	(256) 848-5433
Darryl Stabile, U.S. Army Corps of Engineers	(251) 690-2784
Jeanne Yacoub, Shaw Project Manager	(770) 663-1429
Jeff Tarr, Shaw Site Manager	(256) 848-3482, 3499
Bill Hetrick, Shaw Health and Safety Manager	(865) 692-3571
Dr. Jerry H. Berke, Health Resources Occupational Physician	(800) 350-4511

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List of Acronyms

See Attachment 1 of the Site-Specific Field Sampling Plan for the list of Abbreviations and Acronyms.

1.0 Site Work Plan Summary

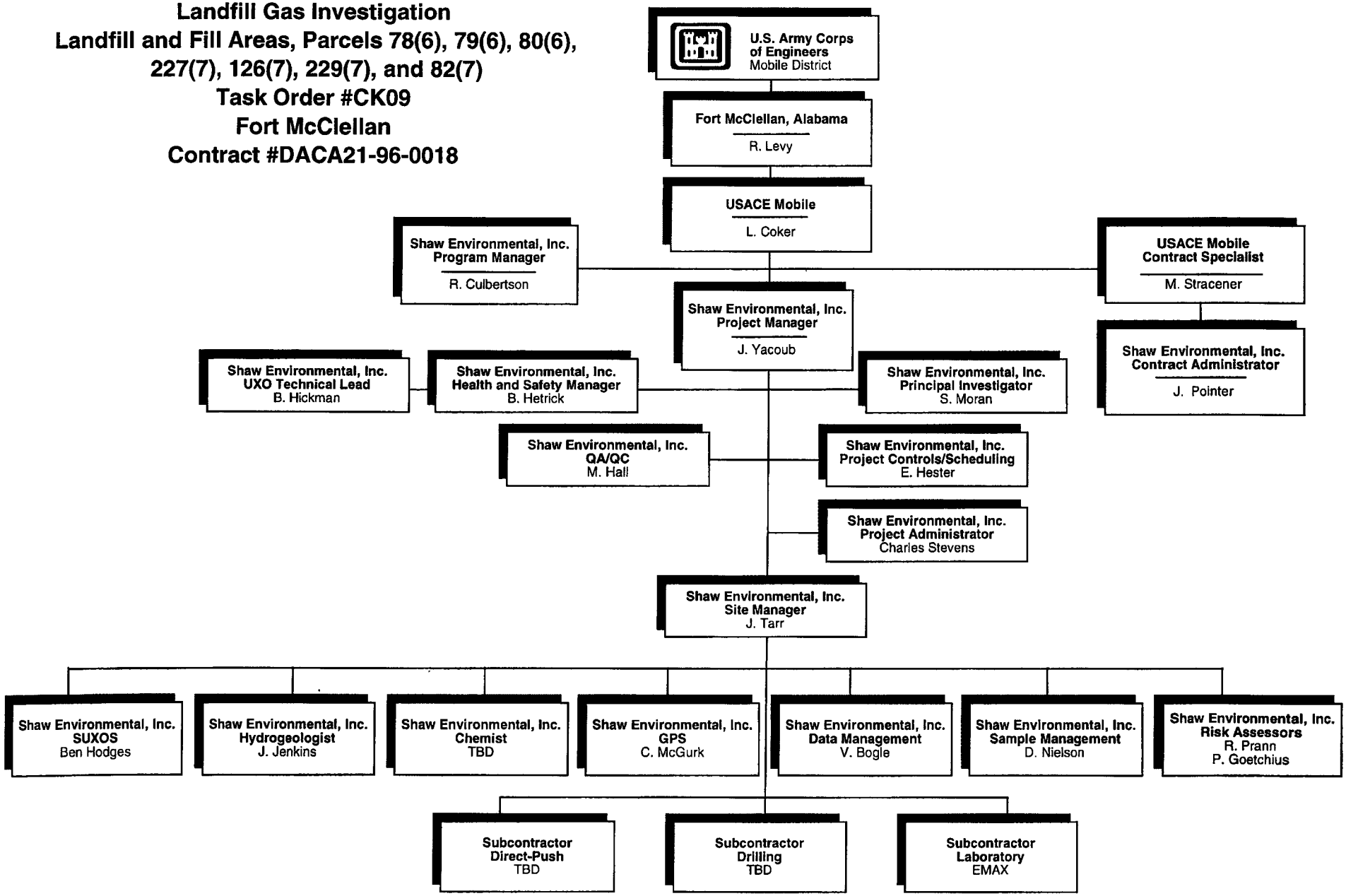
Project Objective. The objective of this investigation at Fort McClellan (FTMC), in Calhoun County, Alabama, is to conduct landfill gas investigations at seven of the landfills and fill areas. The landfill and fill areas to be investigated are: Landfill No. 1, Parcels 78(6); Landfill No. 2, Parcel 79(6); Landfill No. 3, Parcel 80(6); Fill Area East of Reilly Airfield and Former Post Garbage Dump, Parcels 82(7) and 126(7); Fill Area Northwest of Reilly Airfield, Parcel 229(7) and Stump Dump, Parcel 82(7) (hereinafter referred to as landfills and fill areas), Calhoun County, under the management of the U.S. Army Corps of Engineers (USACE), Mobile District.

Project Tasks. The project tasks addressed by this site-specific safety and health plan (SSHP) for the landfill gas investigation at the landfills and fill areas include the following:

- At parcels that require unexploded ordnance (UXO) support, conduct a surface and near-surface UXO survey over the area of investigation
- At parcels that require UXO support, provide downhole UXO support for all intrusive bar-hole and hand auger borings
- Conduct a three-phase investigation approach, including
    1. A surface emissions screening at three inactive landfills and four fill areas
    2. Collect subsurface soil gas screening data at 151 locations over these landfills and fill areas
    3. Collect seven subsurface gas samples and analyze subsurface gas samples for volatile organic compounds (VOC) from locations at each landfill/fill area exhibiting the highest VOC/methane concentrations.

Note: All personnel on this site shall have received training, informational programs, and medical surveillance as outlined in the installation-wide safety and health plan for site investigations at FTMC and shall be familiar with the requirements of this SSHP and UXO safety plan attachment. This SSHP must be used in conjunction with the installation-wide safety and health plan and the installation-wide ordnance and explosives (OE) management plan for FTMC. The organizational chart for this SSHP is shown in Figure 1-1 and identifies the key personnel associated with this field activity.

Figure 1-1
Organization Chart
Landfill Gas Investigation
Landfill and Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Task Order #CK09
Fort McClellan
Contract #DACA21-96-0018



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2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE).

Potential contaminant sources at the site may include methane gas, VOCs, asbestos, diesel oil, diazinon, benzene, toluene, ethyl benzene, xylenes, lead, and gasoline. One fill area, the Stump Dump, Parcel 82(7), lies within former "Possible Explosive Ordnance Impact Areas."

Shaw Environmental, Inc. (Shaw) will conduct UXO surface sweeps and downhole surveys of auger borings and/or bar-holes to identify anomalies for the purpose of UXO avoidance.

Table 2-1 contains the toxicological and physiological properties of chemicals anticipated to be present during site activities.

UXO. At the Stump Dump, Parcel 82(7), UXO safety will be achieved by employing UXO specialists to ensure that field personnel do not come into contact with UXO. In areas where UXO is suspected to exist, the UXO specialists will perform the following field UXO avoidance operations.

- ***Area UXO Surveys Using Magnetometers.*** During this operation UXO on the surface will be detected and marked for avoidance during field operations. Metal objects just below the surface (within 2 feet) will also be marked to indicate the potential hazard.

- ***Downhole Boring and Bar-Hole UXO Surveys.*** UXO specialists will perform downhole magnetometer surveys to detect metal objects in the path of the boring (auger) apparatus until undisturbed soils are reached. The boring location will be moved if subsurface metal objects are detected. Bar-holes will not be installed if surface screening identifies metal objects. If surface screening does not indicate metal objects, bar-hole depth will be limited to one foot. Any intent to install bar-holes at a depth of 2 feet or greater will require downhole magnetometer surveys to be conducted and hand auger use for boring.

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Asbestos [1332-21-4]	NA	?	Inh Ing Con	Asbestos; dyspnea; interstitial fibrosis; restricted pulmonary function; irritated eyes.	Eye: Irrigate immediately Breath: Fresh air	0.1 f/cc 0.1 f/cc 0.1 f/cc	1 f/cc	PEL TLV REL	Ca (ND)
Acetone [67-64-1]	9.7	13–100	Inh Ing Con	Irritated eyes, nose, and throat; headache, dizziness; dermatitis.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	750 ppm 750 ppm 250 ppm	1,000 ppm 1,000 ppm	PEL TLV REL	20,000 ppm
Benzene [71-43-2]	9.24	34–119	Inh Abs Ing Con	Irritates eyes, nose, respiratory system; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone-marrow depression. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	1 ppm (10 ppm) NIC–0.1 skin 0.1 ppm	5 ppm C1 ppm (Ca)	PEL TLV REL	Ca [1,000 ppm]* *OSHA
Diazinon [333-41-5]	?	?	Inh Abs Con Ing	Irritated eyes; miosis; blurred vision; dizziness; confusion; weakness, convulsions, dyspnea; nausea; vomiting.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	 0.1 mg/m^3 0.1 mg/m^3 skin	-- -- --	PEL TLV REL	ND
Ethyl benzene [100-41-4]	8.76	0.09–0.6	Inh Ing Con	Irritates eyes, mucous membranes; headache; dermatitis; narcosis, coma.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	125 ppm 125 ppm 125 ppm	PEL TLV REL	2,000 ppm

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, sub-sternal stress, pulmonary edema; bronchopneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	
Fuel Oil No. 1, see kerosene. [NA]								PEL TLV REL	
Fuel Oil No. 2, see fuel oil. [NA]								PEL TLV REL	

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Fuel Oils No. 4, 5, and 6 [NA]	?	?	Abs Con	Low toxicity; prolonged contact may produce systemic effects.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention			PEL TLV REL	
Kerosene	?	?	Inh Ing Con	Irritation to eyes, skin, nose, throat; burning sensation in chest; nausea; weakess; headache; confusion; drowsiness; vomiting; dermatitis; chemical pneumonia.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	100 mg/m^3		PEL TLV REL	
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm 500 ppm	PEL TLV REL	?

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
n-Hexane [110-54-3]	10.18	65-248	Inh Ing Con	Lightheadedness; nausea, headache; numbness of the extremities, muscular weakness; irritation of the eyes and nose; dermatitis; chemical pneumonia; giddiness.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	50 ppm 50 ppm 50 ppm		PEL TLV REL	5,000 ppm
Hydrogen chloride (hydrochloric acid) [74-90-8]	12.74	0.255-10.6	Inh Ing Con	Inflamed nose, throat, larynx; cough, burns throat, choking; burns eyes, skin; dermatitis; in animals; laryngeal spasm; pulmonary edema.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention		C5 ppm C5 ppm C5 ppm	PEL TLV REL	100 ppm
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43-200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, headache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	500 ppm 500 ppm 500 ppm	PEL TLV REL	12,000 ppm
Lead [7439-92-1]	NA	NA	Inh Ing Con	Weak, insomnia, facial pallor, constipated, abdominal pain, colic, anemia, irritated eyes, paralysis of wrists and ankles, encephalopathy.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	0.05 mg/m 0.05 mg/m 0.1 mg/m		PEL TLV REL	100 mg/m
Methane	NA	None	Inh	Simple asphyxiant dizziness, nausea, unconsciousness	Maintain normal atmospheric 0_2 levels	None	None	None	LEL - 5% UEL - 15% Simple Asphyxiant

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Methanol	10.85	4.2-5960	Inh Abs Ing Con	Irritated eyes, headache, drowsiness, lightheadedness, nausea, vomiting, disturbance in vision, blindness.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Fresh air Swallow: Immediate medical attention		200 ppm (skin) 200 ppm (skin) 200 ppm	PEL TLV REL	25,000 ppm
Motor oil [NA]	?	?	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention			PEL TLV REL	
Naphtha, see petroleum distillate									
Nitric acid [7697-37-2]	11.95	0.3-1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	4 ppm 4 ppm 4 ppm	PEL TLV REL	100 ppm
Petroleum distillate (Naphtha) [8002-05-9]	?	?	Con Ing	Coughing, dyspnea, nausea, or vomiting.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	400 ppm		PEL TLV REL	
Petroleum hydrocarbons, see Stoddard solvent									

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Portland cement			Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention		10 mg/m^3 10 mg/m^3/ total dust 5 mg/m^3 respirable fraction	TLV PEL/REL	
Sodium hydroxide [1310-73-2]	NA	NA	Inh Ing Con	Irritated nose; pneumonitis; burns eyes, and skin; temporary loss of hair.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical Attention		C2 mg/m^3 C2 mg/m^3 C2 mg/m^3	PEL TLV REL	250 mg/m^3
Stoddard Solvent	?	?	Inh Ing Con	Irritated eyes, nose, and throat; dizziness; dermatitis; chemical pneumonia.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	500 ppm 350 mg/m^3		PEL TLV REL	20,000 mg/m^3
Toluene [108-88-3]	8.82	0.16-37	Inh Abs Ing Con	Fatigue, weakness; confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscular fatigue, insomnia; paralysis; dermatitis.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 50 ppm (skin) 100 ppm	150 ppm 150 ppm	PEL TLV REL	2,000 ppm
Xylene (o-, m-, and p-isomers) [1330-20-7;95-47-6; 108-38-3;106-42-3]	8.56/ 8.56/ 8.44	1.1-20	Inh Abs Ing Con	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritated eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	150 ppm 150 ppm 150 ppm	PEL TLV REL	1,000 ppm

[a]IP = Ionization potential (electron volts).
[b]Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.
[c]TWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day

Table 2-1

Toxicological and Physical Properties of Chemicals
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

without adverse effect.
[d]STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.
[e]PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).
AEL = Airborne Exposure Limit.
TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value--TWA.
REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.
[f]IDLH (NIOSH)--Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub1998).
C = Ceiling limit value which should not be exceeded at any time.
Ca = Carcinogen.
NA = Not applicable.
? = Unknown.
LEL = Lower explosive limits.
LC_{50} = Lethal concentration for 50 percent of population tested.
LD_{50} = Lethal dose for 50 percent of population tested.
NIC = Notice of intended change (ACGIH).

References:

American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 2001, compiled by the American Conference of Governmental Industrial Hygienists.
Clayton, George D., Clayton, F. E., Patty's Industrial Hygiene and Toxicology, 3rd ed., John Wiley & Sons, New York.
Documentation of TLVs and BEIs, American Conference of Governmental Industrial Hygienists, 6th ed., 1998.
Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.
National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub., 1998, National Institute for Occupational Safety and Health.
Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

Attachment 1, *Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities*, includes an assessment for each of the landfill and fill area sites covered by this plan and included in the field sampling plan. All sites indicate that the potential for exposure to chemical warfare material (CWM) is low. While UXO support will be required on the one parcel previously identified, there are no anticipated precautions deemed necessary for CWM. Similarly, there are no known or suspected radiation hazards associated with work on any of the 9 parcels covered by this plan.

2.2 General Site Information

The assessments for landfill gas will be initiated by performing a soil gas emission screening for landfill gas. A subsurface soil gas screening will be performed along the perimeter and within each of the landfill and fill areas; approximately 150 locations have been identified for landfill gas screening within these fill areas. Subsurface soil gas will be screened for methane/total hydrocarbons and other major landfill gas components. In addition, surface and subsurface structures within a specified distance from the waste limit of each fill area will be screened for landfill gas and explosive gas accumulations above the regulatory limit (25 percent of the lower explosive limit). A quantification of VOCs presence will be performed by collecting and analyzing one subsurface gas sample in each landfill and fill area. The analytical sample for VOC analysis will be collected from the subsurface screening location with the highest methane/total hydrocarbon screening result. The analytical data collected will be used to determine if additional site-specific investigation efforts will be required to evaluate the distribution, extent and magnitude of landfill gas as well as the availability and production rates of landfill gas.

The field sampling plan (FSP) includes a list of figures for the landfills and fill areas covered by this SSHP. Chapter 1.0 of the FSP contains a brief summary of specific parcel information and the type of waste disposed in each parcel. Figure 1-1 of the FSP shows the locations of the landfills and fill areas covered by this plan.

2.3 Pathways for Hazardous Substance Dispersion

Possible pathways for hazardous substances in the area are groundwater and soils. The primary exposure routes include inhalation, absorption, and ingestion. The possible presence of methane and/or VOCs warrants caution due to fire or explosion potential.

3.0 Personal Protective Equipment

The work activities will begin in the following levels of protection. Also, a complete description of Level D, Modified Level D, and Level C PPE is provided.

Task	Initial Level of PPE*
Staging equipment and UXO avoidance on surface and shallow subsurface sweeps	Level D
Surveying Utility clearance	Level D
Surface soil gas and subsurface soil gas collection	Level D **
Equipment decontamination	Modified Level D

* Initial level will be raised to Level C or higher if air monitoring results for VOCs in the worker's breathing zone (BZ) are greater than action levels.

** Latex or Nitrile gloves required for field sampling and sample container handling. Work gloves may be necessary during auger bar-hole installation.

Level D. The minimal level of protection that will be required of personnel at the site will be Level D. The following equipment will be used for Level D protection:

- Coveralls or work clothing
- Leather work gloves (when necessary)
- Latex or Nitrile gloves for field sampling and sample container handling
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

Modified Level D. The following equipment will be used for Level D-Modified protection:

- Permeable Tyvek, Kleenguard, or its equivalent (polycoated Tyvek for pressure washing)
- Latex boot covers
- Nitrile, heavy work, or latex gloves
- Steel-toed safety boots
- Safety glasses

- Hard hat
- Hearing protection (when working near/adjacent to operating equipment)
- Supplied air emergency escape/egress pack (required for bar-hole and auger borings).

Note: In addition to modified Level D PPE, the operator of high-pressure water jetting equipment shall wear metatarsal guards for the feet, leg guards, and a face shield.

Level C. Level C protection will not be used unless air-monitoring data indicate the need for upgrade; however, the equipment shall be readily available on site. The following equipment will be used for Level C protection:

- National Institute of Occupational Safety and Health-approved full-face, air-purifying respirator equipped with organic vapor/acid gas/P100 cartridge
- Hooded, Saran-coated Tyvek, taped at gloves, boots, and respirator
- Nitrile gloves (outer)
- Latex or lightweight nitrile gloves (inner)
- Neoprene steel-toed boots or polyvinyl chloride overbooties/steel-toed safety boots
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).
- Supplied air emergency escape/egress pack (required for bar-hole and auger borings).

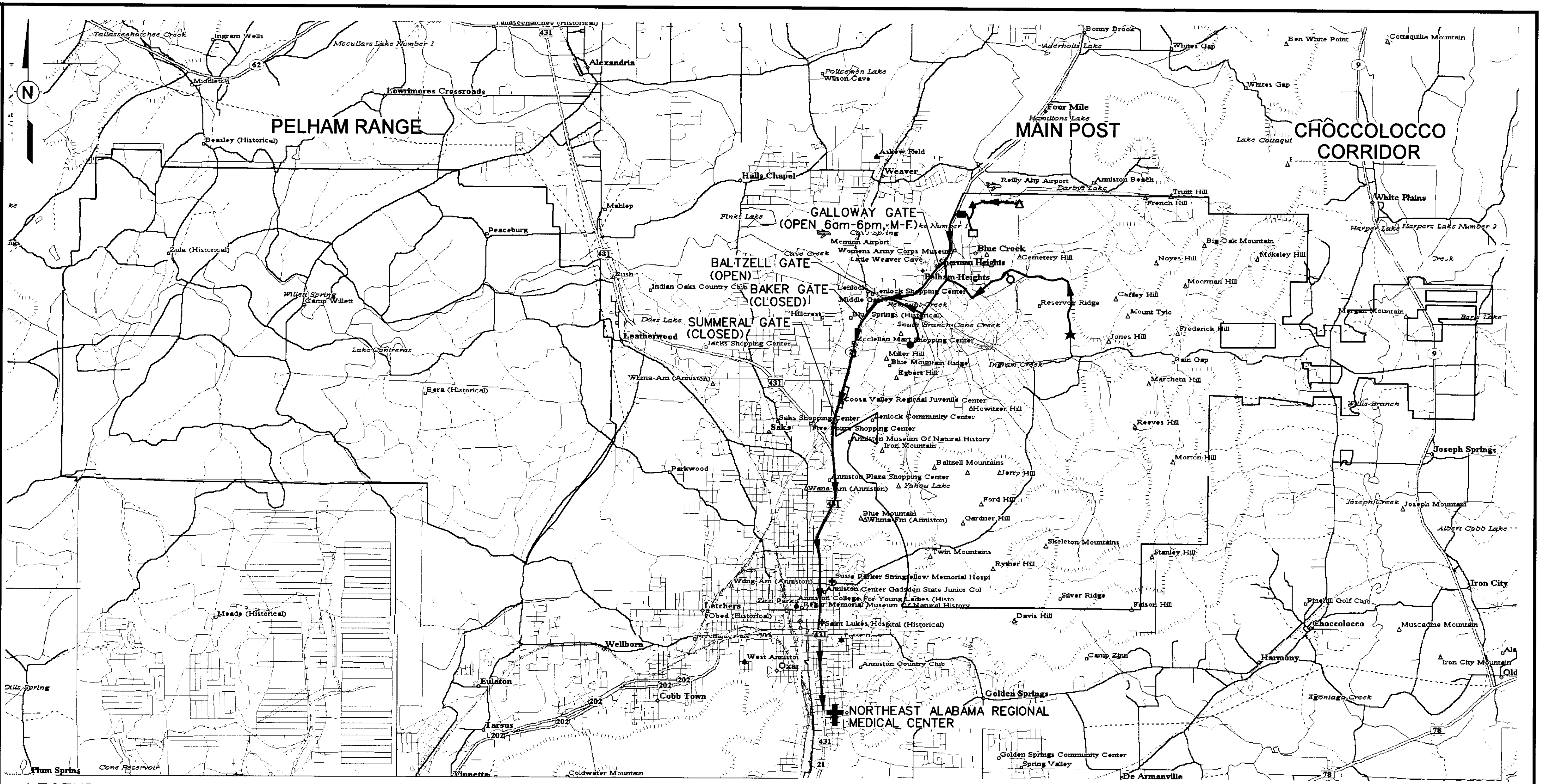
Note: In addition to Level C PPE, the operator of high-pressure water jetting equipment shall wear metatarsal guards for the feet and leg guards, and a face shield can be worn to minimize water spray to the respirator cartridge and polycarbonate lens.

4.0 Site Monitoring

The potential environmental contaminants of concern resulting from the landfill and fill area investigation activities are methane, asbestos, diesel, diazinon, benzene, toluene, ethyl benzene, xylenes, lead, and gasoline. Table 4-1 contains action levels for site monitoring during the soil gas sampling activities at the landfill and fill area sites described in this plan.

Monitoring separate and distinct from the soil gas sampling activities will be performed by the site safety and health officer during the performance of ground-intrusive (soil gas sampling) operations. A calibrated photoionization detector organic vapor analyzer will be utilized to monitor the sampling locations and BZs to determine if any organic material may be present that would necessitate upgrading of protection level. A calibrated combustible gas/oxygen monitor (calibrated using methane in the cal-gas) will be utilized to monitor the sampling locations and BZs to determine if any combustible/flammable gases (methane) or low oxygen levels may be present that would necessitate evacuating the site. Benzene detector tubes will be utilized to monitor the sampling locations and BZs for benzene when real-time air monitoring action levels are met or exceeded. Table 4-2 contains the air monitoring frequency and location for site monitoring during the landfill and fill area sampling activities.

If site conditions become dusty from vehicle operations, a MINIRAM aerosol monitor will be utilized to measure respirable dust concentrations. If use of particulate monitoring equipment is deemed necessary, the health and safety manager will be contacted to determine action levels pertinent to the task at hand.



LEGEND:

- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITALS
- ● LANDFILL No.1, PARCEL 78(6)
- ○ LANDFILL No.2, PARCEL 79(6)
- ■ LANDFILL No.3, PARCEL 80(6)
- □ LANDFILL No.4 AND INDUSTRIAL LANDFILL, PARCELS 81(5) &175(5)
- ▲ FILL AREA NORTHWEST OF REILLY AIRFIELD, PARCEL 229(7)
- △ FILL AREA EAST OF REILLY AIRFIELD AND FORMER POST GARBAGE DUMP, PARCELS 227(7) & 126(7)
- ★ STUMP DUMP, PARCEL 82(7)

DRIVING DIRECTIONS FROM BALTZELL GATE ROAD TO THE NORTHEAST ALABAMA MEDICAL CENTER

- LEAVING FORT MCCLELLAN ON BALTZELL GATE ROAD, TURN LEFT (SOUTH) ONTO AL HWY 21
- GO ~ 2.5 MILES WHERE AL HWY 21 MERGES WITH U.S. HWY 431 AND CONTINUE SOUTH
- CONTINUE SOUTH ON AL21/US431 FOR ~ 2.7 MILES
- TURN LEFT ONTO EAST 10th STREET
- GO ~ 0.2 MILE TO MEDICAL CENTER ON RIGHT
- NORTHEAST ALABAMA REGIONAL MEDICAL CENTER, 400 EAST 10th STREET
- PHONE NUMBER : (256) 235-5121

SCALE
0 8000 16000 FEET

FIGURE 5-1
HOSPITAL EMERGENCY ROUTE

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

Shaw Environmental, Inc.

Table 4-1

Action Levels
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

When in Level C Personal Protective Equipment (PPE)

Analyte	Action Level	Required Action[a]
Volatile organic compounds (VOC)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, upgrade to Level B.
Benzene	≥ 5 ppm in BZ	Stop work, evacuate work area, upgrade to Level B.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% lower explosive limit (LEL) (methane LEL is 5%) < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for volatile organic compounds (VOC) and methane.

When in Level D Modified/D PPE

Analyte	Action Level	Required Action[b]
VOCs	≥ 5 ppm above background in BZ	Stop activities, suspend work activities for 15 to 30 minutes, if readings are sustained then upgrade to Level C PPE.
Benzene	1 ppm in BZ	Upgrade to Level C PPE.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL (methane LEL is 5%) < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for VOCs and methane.

Table 4-1

Action Levels
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

When in Support Zone

Analyte	Action Level	Required Action
VOCs	≥ 1 ppm above background in BZ	Evacuate support zone and re-establish perimeter of exclusion zone.

[a] Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

[b] Contact with the H&S manager must be made prior to continuance of work. The H&S manager may then initiate perimeter/integrated air sampling along with additional engineering controls.

ppm – Parts per million.
BZ – Breathing zone.
VOC – Volatile organic compound.
PPE – Personal protective equipment.

No one is permitted to downgrade levels of PPE without authorization from the H&S manager.

Table 4-2

Air Monitoring Frequency and Location
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Work Activity	Instrument	Frequency	Location
Staging equipment	OV Monitor	Initially for area	Breathing zone (BZ) of employees
Surface soil and subsurface soil gas sampling	OV Monitor LEL/O_2 Monitor BDT	Continuously Continuously As Needed	BZ of employees

OV = Organic vapor.
LEL/O_2 = Lower explosive level/oxygen.
BDT = Benzene detector tube.

5.0 Activity Hazard Analysis

The attached activity hazard analysis (Table 5-1) is provided for the following activities:

- Initial UXO avoidance sweep and equipment staging
- Land survey and utility clearance
- Surface soil gas and subsurface soil gas collection
- Moving and shipping collected samples
- High-pressure water jetting.

All injuries and illnesses must be immediately reported to the site manager or the site safety and health officer, who will then notify off-site personnel and organizations as necessary.

If hospital care must be provided, the victim shall be treated at Northeast Regional Medical Center, 400 East 10th Street, Anniston, Alabama. The telephone number is (256) 235- 5121. Directions to the hospital are provided in Figure 5-1.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging	UXO	• UXO support for surface and subsurface sample site installation is required for Parcel 87(7), Stump Dump.
	Slip, trip, and fall hazards	• Determine best access route before transporting equipment. • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards. • Look before you step; ensure safe and secure footing.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.
	Falling objects	• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.
	Flying debris, dirt, dust, etc.	• Wear safety glasses/goggles; ensure that eye wash is in proper working condition.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cuts/bruises	• Use cotton or leather work gloves for material handling.
	Bees, spiders, and snakes	• Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Ticks	• Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellant. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Fire	• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Hazard communication	• Label all containers as to contents and dispose of properly. • Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Noise	• Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	• Adequate lighting will be provided to ensure a safe working environment.
	Cold stress	• Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (°F). • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Contact with moving equipment/vehicles	• Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic. • Barriers shall be used to protect workers from vehicular traffic. • Barriers shall be used to guard excavations adjacent to streets or roadways. • Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided. • Heavy equipment shall have backup alarms.
	Forklift operations	• Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Portable electric tools	• Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (do not use) and removed from service. • Portable electric tools and all cord and plug connected equipment shall be protected by a ground-fault circuit interrupter (GFCI) device. • Electrical tools shall be inspected daily prior to use.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Extension cords	• Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic. • Cords shall be suspended with a nonconductive support (rope, plastic ties, etc,). • Cords shall be designed for hard duty. • Cords shall be inspected daily.
	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one. • Keep all body parts in contact with the ground as close as possible. • Remain 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornados	• Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
Land Survey and Utility and Clearance	Slip, trip, and fall hazards	• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe boots when working in the field. • Provide adequate lighting in all work areas. • Whenever possible, avoid routing cords and hoses across walking pathways. • Flag or cover inconspicuous holes to protect against falls. • Work areas will be kept clean and orderly. • Garbage and trash will be disposed of daily in approved refuse containers. • Tools and accessories will be properly maintained and stored. • Work areas and floors will be kept free of dirt, grease, and slippery materials.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Land Survey and Utility Clearance (continued)	Traffic accidents	• Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. • If working adjacent to roadways, have workers wear fluorescent orange vests. • Use warning signs or lights to alert oncoming traffic. • Assign flag person(s) if necessary to direct local traffic. • Set up temporary parking locations outside the immediate work area. • Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits. • Pedestrians have the right-of-way. • Wear seat belts when vehicles are in motion.
	Wildlife hazards	• Workers should be cautious when driving through the site in order to avoid encounters with passing animals.
	Biological hazards	• Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).
	Ticks	• Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellant. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning any survey or utility clearance activities. • If UXO is encountered, cease all activities, mark the location, and notify the site manager.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Surface Soil Gas and Subsurface Soil Gas Collection	Auger and bar-hole installation	• At the Stump Dump, Parcel 82(5), bar-hole installation will not proceed beyond one foot in depth unless UXO support is present. • At the Stump Dump, Parcel 82(5), stop immediately at any sign of obstruction; UXO will require downhole checks at 2-foot intervals with hand auger if sample depth is more than 1 foot. • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities (OV and methane). • All personnel will follow good hygiene practices. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
	Slip, trip, and fall hazards	• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe/shank boots when working in the field. • Whenever possible, avoid routing cords and hoses around walking pathways. • Flag or cover inconspicuous holes to protect against falls.
	Bees, spiders, and snakes	• Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas. • Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Cold stress	• Workers should wear insulated clothing when temperatures drop below 40°F. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Surface Soil Gas and Subsurface Sol Gas Collection (continued)	Access/egress hazards	• Use qualified and trained bushhog operator. • Keep employees out of the bushhog work area. • Utilize good housekeeping practices. • Keep aisleways, pathways, and work areas free of obstruction. • Clean ice or snow off of walkways or work stations. • Use appropriate footwear for the task assigned.
	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Surface Soil Gas and Subsurface Soil :Gas Collection (continued)	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • If in a group, keep 6 feet of distance between people.
	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • UXO support is necessary on Parcel 87(7), Stump Dump. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist.
Moving and Shipping Collected Samples (Summa Canisters)	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cut hazards	• Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	• Label all containers as to contents and associated hazards.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60pounds require assistance or mechanical equipment; size up the lift.
Material Storage	Flammable and combustible liquids	• Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.
High-Pressure Water Jetting Operations	Heavy lifting	• Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Slip, trip, and fall hazards	• Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
	Fueling	• Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	• Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High-pressure water	• Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	• Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	• No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	• Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
High-Pressure Water Jetting Operations (continued)	Activation during repairs	• All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended .
	Falling objects	• Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.

Table 5-1

Activity Hazard Analysis
Fill Areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Flying debris	• Impact-resistant safety glasses with side shields are required.
	Contact with potentially contaminated materials	• All site personnel will wear the appropriate PPE.

ATTACHMENT 1

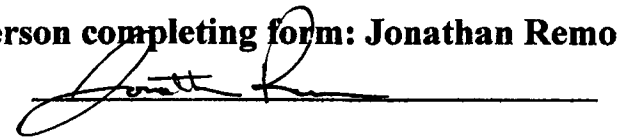
EVALUATING OE/UXO/CWM HAZARDS IN SUPPORT OF HTRW ACTIVITIES

Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities

Site Name: Stump Dump, Parcel 82(7)

Job Number: 796886 **Date: 17-Mar-03**

Name of person completing form: Jonathan Remo **Title: Geologist**

Signature: 

	Yes	No
1a. Have the historical records available for this HTRW site been reviewed?	☒	☐

If the answer to **1a.** is yes, proceed to **1b.**
If the answer to **1a.** is no, review site information prior to completing this form.

	Yes	No
1b. Is there recent information (site walk, worker interviews, etc.) that indicates a potential OE/CWM hazard at this site?	☐	☒

Proceed to **2.**

2. According to the records review, is this site known or suspected to have been used for:

	Yes	No
2a. Manufacturing, production, or shipping of conventional or chemical warfare materiel (CWM) OE:	☐	☒
Live fire testing of any ordnance:	☒	☐
Conventional or CWM OE training:	☒	☐
Storage of conventional or CWM OE:	☐	☒
Disposal or demilitarization of conventional or CWM OE:	☐	☒
Other (specify):		

	Yes	No
2b. Manufacturing, production, or shipping of chemical agent:	☐	☒
Research or testing of chemical agent:	☐	☒
Chemical agent related training:	☐	☒
Storage of chemical agent:	☐	☒
Disposal or demilitarization of chemical agent:	☐	☒
Other (specify):		

Any **2a** question answered "YES" indicates UXO support is required for all site activities. If all **2a** questions are answered "NO", UXO support may not be required. Refer to Installation-Wide Safety and Health Plan (SHP) for additional information concerning UXO support. Proceed to question **2b.**

Any **2b** question answered "YES" requires the remainder of this form to be completed. If all **2b** questions are answered "NO", real-time monitoring for chemical agent will not be required and completing the remainder of this form is not required. Refer to SHP for additional information concerning agent monitoring.

Additional space for notes and explanations on page 4.
Continue to page 2 of 4 –

3. For sites where the manufacturing, testing, storage, or disposal of CWM is suspected:	**Yes**	**No**
Is there evidence that the CWM is/was containerized in potentially unexploded ordnance:	☐	☐
Is there evidence that the CWM is/was containerized in nonexplosive containers:	☐	☐
Is there evidence that the CWM is open to the environment (i.e., in an open container or free liquid/solid in the soil/water):	☐	☐
Is there evidence that the CWM hazard has been removed from the site or that the site has been decontaminated:	☐	☐
Has the site been previously monitored or sampled for chemical agent or agent breakdown products:	☐	☐
For any "YES" above, was the agent or breakdown product identified?	☐	☐

For any "Yes", list types of agent (mustard, lewisite, etc.) and the form (in ordnance, in drum, etc.) the CWM is expected to be found (or state "unknown"):

List agent breakdown products identified:

4. Defining the Potential for the Presence of CWM:	**Agent Monitoring Requirements for Site Activities:**
4a. High Presence Potential – Definition: CWM is known or highly suspected to be present at the site in a condition (within ordnance and/or nonexplosive container, or in an uncontainerized form in sufficient volume that weathering of the product has not rendered it harmless) that will cause potential harm to personnel if it is encountered.	Mandatory personal and perimeter air monitoring using the DAAMS, MINICAMS, and RTAP collection/analysis methods with off-site surety laboratory confirmation of all environmental samples. Specific monitoring criteria (equipment types and sampling station placement, percentage of personnel monitored, etc.) to be established in the Site Specific Safety and Health Plan (SSHP).
4b. Moderate Presence Potential - Definition: CWM is suspected to have been present at the site, but has been previously removed and/or decontaminated, or has been open to the environment such that it is expected to have degraded and been rendered harmless.	The need for personal and perimeter air monitoring using the DAAMS, MINICAMS, and RTAP collection/analysis methods with off-site surety laboratory confirmation of all environmental samples will be reviewed on a site-by-site basis. Specific monitoring criteria (equipment types and sampling station placement, percentage of personnel monitored, etc.) to be established in the Site Specific Safety and Health Plan (SSHP).
4c. Low Presence Potential – Definition: No indications that CWM will be present in quantity or reactivity (in munitions, projectiles, drums, etc.).	No specific personal or area monitoring for chemical agents required beyond what is specified in the SHP.

Continue to page 3 of 4 -

Site Name: Stump Dump, Parcel 82(7)

Job Number: 796886 **Date: 17-Mar-03**

Based on the information available for this site, including information gathered during completion of this form, the potential for CWM to be present at this site, as defined above, is expected to be: ***LOW***

Exceptions/Explanations: (additional space for notes and explanations on page 4)

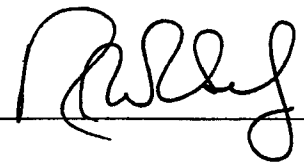
5. Based on the information provided in questions 1 through 5, above, the following guidelines will be used for establishing PPE requirements for activities to be performed at this site; Specific details are provided in the SSHP:

5a. High Exposure Potential - High exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the IT CIH, PPE for all personnel in the exclusion zone at a site identified as having a "High Exposure Potential" will be Level B (supplied air) or Level C (full-face respirator with HEPA/Acid Gas/OV cartridges w/ emergency egress hood) and chemically resistant coveralls. Specific PPE requirements are in the SSHP for this site.
5b. Moderate Exposure Potential - Moderate exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the IT CIH, PPE for all personnel in the exclusion zone at a site identified as having a "Moderate Exposure Potential" will be Modified Level D (disposable coveralls and emergency egress hood) carried by all personnel. Specific PPE requirements are in the SSHP for this site.
5c. Low Exposure Potential - Low exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the IT CIH, no additional PPE requirements above those stated in the SSHP are needed for sites identified as having "Low Exposure Potential." Specific PPE requirements are in the SSHP for this site.

Based on all available information, the exposure potential at this site is considered to be: ***LOW***

Exceptions/Explanations:

Review Signatures:

IT UXO Technical Manager  Date: 20 Mar 03 IT H&S Specialist  Date: 4/10/03

Site Name: Stump Dump, Parcel 82(7)

Job Number: 796886 **Date: 17-Mar-03**

Additional Notes and Explanations:

The Stump Dump, Parcel 82(7), falls within "Possible Explosive Ordinance Impact Area" shown on Plate 10 of the FTMC *Archive Search Report, Maps* (USACE, 2001). The Stump Dump, Parcel 82(7), was used as a disposal site from sometime before 1985 until approximately 1988. The site originally was intended for the disposal of storm debris (anything that might wash up in a storm flow, i.e., vegetation, tree limbs, stumps, etc.). Uncontrolled and unauthorized dumping of items including construction debris (sheet rock and concrete), batteries, tires, paint cans, refrigerators, landscaping trash, and other materials also occurred at the site (ESE, 1998).

Site-Specific Unexploded Ordnance Safety Plan Attachment
Landfill Gas Investigation, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(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 CK09
Contract No. DACA21-96-D-0018
Shaw Project No. 796886

May 2003

Site-Specific Unexploded Ordnance Safety Plan Attachment
Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7)

I have read and approve this site-specific unexploded ordnance (UXO) safety plan attachment for the landfill gas investigation, involving Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7) at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and Shaw Environmental UXO procedures.

Robert W. Hickman, Jr.
UXO Technical Manager

7 Apr 03
Date

William J. Hetrick, CIH
Health & Safety Manager

5/8/03
Date

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE
INCORPORATED
CERT. NO. 1105 C
EXPIRES 12-31-2003
PENNSYLVANIA - 1960
WILLIAM J. HETRICK, CIH

Table of Contents

List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms, of the Site-Specific Field Sampling Plan Attachment contained in this binder.

1.0 Introduction

This document defines anomaly avoidance procedures for activities to be performed by Shaw Environmental, Inc. (Shaw) (formerly the IT Corporation [IT]) unexploded ordnance (UXO) personnel in conjunction with the landfill gas investigation at Fort McClellan, Alabama. The landfill and fill areas to be investigated are:

- Landfill No. 1, Parcel 78(6)
- Landfill No. 2, Parcel 79(6)
- Landfill No. 3, Parcel 80(6)
- Fill Area East of Reilly Airfield and Former Post Garbage Dump Parcels 227(7) and 126(7)
- Fill Area Northwest of Reilly Airfield, Parcel 229(7) and Stump Dump, Parcel 82(7).

This document is not a stand-alone document; it must be used in conjunction with the *Fort McClellan Unexploded Ordnance Supplementary Procedures* (Shaw, 2002), attached as Attachment 1.

Shaw UXO personnel will perform visual surveys, assisted by hand-held magnetometers and metal detectors, to support a landfill gas investigation at Parcel 82(7). The purpose of the UXO surveys is to avoid any ordnance and explosives (OE) during hazardous, toxic, and radioactive waste (HTRW) sampling activities. Intrusive anomaly investigation is not authorized for this site work.

The assessment of landfill gas will be initiated by performing a soil gas emission screening for landfill gas. A subsurface soil gas screening will be performed along the perimeter and within each of the landfills and fill areas; approximately 150 locations have been identified for landfill gas screening. Subsurface soil gas will be screened for methane/total hydrocarbons and other major landfill gas components. In addition, surface and subsurface structures within a specified distance from the waste limit of each fill area will be screened for landfill gas and explosive gas accumulations above the regulatory limit (25 percent of the lower explosive limit). A quantification of VOC presence will be performed by collecting and analyzing one subsurface gas sample in each landfill and fill area. The analytical sample for VOC analysis will be

collected from the subsurface screening location with the highest methane/total hydrocarbon screening result. The analytical data collected will be used to determine if additional site-specific investigation efforts will be evaluate the distribution, extent, and magnitude of landfill gas as well as the availability and production rates of landfill gas.

One fill area, the Stump Dump, Parcel 82(7), falls within the "Possible Artillery Impact Area" shown on Plate 10 of the *September 2001 Archives Search Report (U.S. Army Corps of Engineers [USACE], 2001)*. Therefore, UXO surface sweeps and downhole surveys of auger borings and/or bar-holes will be required to support field activities at these sites. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

The landfills and fill areas, Parcels 78(6), 79(6), 80(6), 227(7), 126(7), 229(7), and 82(7), are located on the Main Post of FTMC (Figure 1-1). The following sections briefly outline the site description and history of each landfill and fill area.

Landfill No. 1, Parcel 78(6), is located in the western part of the Main Post of FTMC. The landfill was the FTMC sanitary landfill from 1945 to 1947. Aerial photographs taken in 1944 document the clearing for the landfill. The Landfill No. 1 parcel boundary covers approximately 6 wooded acres. Currently, the landfill is partially wooded and contains a playground and two residential structures.

Landfill No. 2, Parcel 79(6), is located in the central part of the Main Post of FTMC as shown in Figure 1-1. The 5.6-acre landfill was used as a sanitary landfill after the closure of Landfill No. 1 and was active from 1947 to an unknown date. However, landfilling activities were believed to have occurred at Landfill No. 2 as early as 1927 (ESE, 1998).

Landfill No. 3, Parcel 80(6), is located in the northwest corner of the Main Post of FTMC (Figure 1-1). This site was the Main Post sanitary landfill from 1946 to 1967 (Environmental Science and Engineering, Inc. [ESE], 1998). The approximately 23-acre landfill was constructed using trenches that extend east-west across the site. The waste was placed in the trenches and subsequently covered with topsoil. A complete manifest of all wastes deposited at the landfill is not available; however, it has been reported that empty pesticide container, and burned ammunition pallets or crates were disposed in this landfill (ESE, 1998). The pesticide containers were reported to have been triple-rinsed prior to disposal. Additionally, there is the potential for

disposal of paint containers, fluorescent bulbs and ballasts, waste oil, and construction debris at this site (ESE, 1998). The landfill was not capped when it was closed in 1967, and settling is occurring.

The Fill Area East of Reilly Airfield, Parcel 227(7), is located near the northern boundary of the Main Post adjacent to the Former Post Garbage Dump, Parcel 126(7) near Reilly Airfield (Figure 1-1). The site contains several potential disposal areas identified in the Environmental Photographic Interpretation Center (EPIC) report (EPA, 1990). The EPIC aerial photo composite dated 1949 annotates two ground scars with the label "Fill Area." The aerial photo composite dated 1961 annotates one site as "Pit" and another as "TR" (trench). This parcel encompasses the four sites identified by EPIC. The parcel also includes an adjacent area of disturbed ground that was not identified in the EPIC report but which appeared to possibly contain mounded material (ESE, 1998). Information is not available regarding operations at this parcel. Combined, the area totals approximately 4.5acres.

The Former Post Garbage Dump, Parcel 126(7), is located along the northern boundary of the Fill Area East of Reilly Airfield (Figure 1-1). The parcel covers approximately 2 acres. The site consists of a steep north-facing slope that borders a wetland. There were no records of disposal activities at this parcel.

The Fill Area Northwest of Reilly Airfield, Parcel 229(7), contains a potential disposal area identified in the Environmental Photographic Interpretation Center (EPIC) report from the aerial photo composite dated 1954 (EPA, 1990). Linear mounds are visible in aerial photos at the northern margin of a cleared area (ground scar); however, IT personnel did not observe these mounds during site visits on June 23 and July 21, 1998. Several oil filters were noted lying on the west bank of the stream. It is unclear precisely which feature or features were interpreted by EPIC as being "Fill"; therefore, this original CERFA parcel encompasses the entire cleared area, including the area of the linear mounds. The fill area is approximately 5.9 acres in size. Additional information is not available regarding operations at this parcel.

The Stump Dump, Parcel 82(7), is located in the central portion of the Main Post (Figure 1-1). The dump is an open area with a soil cover. It has engineered features such as terraced decks and slopes. Surface runoff is controlled by engineered drainage structures that divert surface water from the covered surface of the fill area. Several detention ponds or stilling basins were

constructed around the covered fill area to control the velocity and turbidity of water leaving the site. The Stump Dump is approximately 10 acres in size.

The Stump Dump is now inactive but was used as a disposal site between 1985 and 1988. The Stump Dump was originally intended to receive storm debris (trees, branches, and flood soil). Uncontrolled and unauthorized dumping of items such as construction debris (sheet rock and concrete), batteries, tires, paint cans, refrigerators, landscaping trash, and other materials also occurred at this location. The Stump Dump was covered with soil and vegetation and the detention ponds were installed.

2.0 UXO Team Composition

UXO team and personnel requirements will be in accordance with EP 75-1-2 (USACE, 2000) and the installation-wide sampling and analysis plan (IT, 2000) for FTMC. A UXO team will be on site during all sampling and intrusive activities where OE is suspected.

3.0 Responsibilities

The UXO team leader is responsible for ensuring that personnel performing UXO tasks at FTMC have the required qualifications. The UXO team leader supervises and coordinates UXO work activities.

The UXO team member(s) will provide UXO avoidance, OE recognition, location, and safety functions for Shaw employees and any subcontractors during sampling activities. Additionally, the UXO team will survey sample points and safe access and egress to and from the site in support of HTRW operations.

4.0 Authority

UXO personnel are authorized to perform UXO avoidance activities only. UXO personnel are not permitted to initiate OE investigative or disposal activities.

5.0 UXO Avoidance Procedures to Support HTRW Sampling Activities at FTMC

One fill area, the Stump Dump, Parcel 82(7), falls within the "Possible Artillery Impact Area" shown on Plate 10 of the September 2001 Archives Search Report, Maps (U.S. Army Corps of Engineers [USACE], 2001). The scope of work for site investigation activities at Parcel 82(7) includes the following tasks:

- Provide UXO avoidance support during surface emissions screening
- Provide UXO support for all intrusive bar-hole/hand auger boring installations to determine buried downhole hazards during the collection of subsurface soil gas screening data at approximately 150 locations over three inactive landfills and four fill areas
- Provide surveys for all intrusive field activities (e.g., digging, fence-post driving, grading, or excavation).

Since these areas may contain OE contamination, the UXO team must conduct a surface access survey for UXO before any other activities commence. This includes foot and vehicular traffic. UXO avoidance activities at Parcel 82(7), will include:

a) Access Corridors and Sampling Sites

(1) An access survey is defined as a UXO sweep performed to allow entry to and exit from a sampling sites. In cases where hand auger sampling is required, the UXO team may consist of a UXO technician and sampling personnel. The UXO technician will sweep ahead of the non-UXO technician team member and mark a clear route. An access survey will begin in a known clear area and proceed by the most direct route to the sampling site. The boundaries of the access route, whether for vehicle or personnel traffic, and the area of the sampling site, will be marked with white tape or white pin flags.

(2) If an OE item is found during the survey, the location will be conspicuously marked with a red pin flag and avoided by altering the route. Subsurface anomalies will be marked with a yellow flag and avoided by altering the route. Additionally, UXO personnel will complete the Shaw FTMC "Unexploded Ordnance Report Form."

(3) The boundaries of the access route and sampling site will be recorded by the UXO technician in the Shaw FTMC "UXO Sketch Log." Additionally, anomaly locations will be recorded on this form.

(4) Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or the Whites Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or MG-230 will be set up for downhole monitoring. All equipment will be operated as specified in the appropriate operator's manual. All equipment will be function tested prior to use following the procedure in paragraph 3.2, *FTMC UXO Supplementary Procedures* (Shaw, 2002) and the operator's instructions. The Whites Metal Detector will be used in conjunction with hand-held magnetometers in areas of high concentrations of rocks with a magnetic signature to assist in eliminating anomalies created by "hot rocks."

(5) The access route will be twice as wide as the widest vehicle that will use the route. Footpath lanes will be a minimum of three feet wide.

(6) If surface OE or subsurface anomalies are encountered that cannot be avoided, the access route must be diverted to avoid contact. No personnel will be allowed outside the surveyed areas without a UXO escort. No unescorted access is permitted inside the corridor area until a survey has been completed and boundaries established.

(7) At the actual investigation site, the UXO team must also complete a survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations. At a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the largest vehicle or piece of equipment to be brought on site. White pin flags or tape will be used to mark the boundaries of the surveyed site.

(8) Surface soil samples are normally collected at depths of 0 to 12 inches below ground surface. The UXO team will survey the area of the soil sampling site for any indication of OE. Sampling is not permitted at any location where an anomaly has been detected.

(9) Tracked or other vehicles whose movement would disturb the soil are authorized for use only in areas that have been surveyed and in which no anomalies have been detected.

(10) If grading or soil movement is required to support access corridor development or a sampling location, UXO personnel will perform a survey. After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per cut. If

additional grading is required, another survey will be performed after each one foot of soil has been removed.

(11) Erosion and weathering will typically cause some OE items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional surveys may be required. The decision regarding the performance of follow-on surveys will be made by the site superintendent with input provided by the FTMC UXO safety officer and FTMC UXO team leader. The decision will be based on such factors as: the amount of time since the last survey was performed, the weather during this period, the terrain in the area of concern, the former use of the area, and the type and quantity of OE found during initial surveys.

(12) Incremental geophysical surveys at drill hole locations will be initially accomplished using a hand auger to install a pilot hole. An access survey of the immediate vicinity of the pilot hole location will precede the installation of the pilot hole. The UXO team will use a manual or mechanical portable auger to install the pilot hole. The augered hole will be inspected for anomalies with a geophysical instrument (configured for downhole utilization) in two-foot increments as the hole is advanced below ground surface. Hand augering of a hole will not proceed if an anomaly is detected that cannot be positively identified as inert material. If a suspect OE item is encountered, the sampling personnel must select a new auger hole location. The pilot hole will also be inspected with the geophysical instrument upon reaching the final depth of the hand augered hole, providing a total clearance depth equal to pilot hole depth plus two feet. The UXO team will continue to inspect the auger hole for anomalies at two-foot increments until total depth of auger hole (4 ft) is reached.

b) Vegetation Removal

In cases where removal of large trees or other vegetation removal to support access or sampling operations, the procedures in paragraph 4.2, *FTMC UXO Supplementary Procedures* (Shaw, 2002) will be followed.

c) Magnetometer/Metal Detector Checkout and Field Procedures

The procedures in paragraph 3.0, *FTMC UXO Supplementary Procedures* (Shaw, 2002) will be followed. Since the uses of these areas are uncertain, the function test will utilize the function test ordnance that most closely approximates the 40mm projectile and 37mm projectile. The UXO Team Leader may designate another function test item if other types of ordnance are discovered.

d) UXO Logbooks and Documentation

All UXO personnel identified in paragraph 5.0, *FTMC UXO Supplementary Procedures* (Shaw, 2002) will maintain a logbook in accordance with that procedure.

6.0 Safety

In addition to the requirements of the site-specific safety and health plan prepared for this site, the UXO personnel will ensure the following:

a) During the access and subsurface surveys conducted with a geophysical instrument, the UXO team members will not wear safety shoes or other footwear that would cause the instrument to present a false response.

b) The UXO team will not be required to wear protective helmets unless an overhead hazard is present.

c) The FTMC UXO Safety Officer will monitor UXO activities to ensure compliance with applicable safety requirements.

d) The FTMC UXO Safety Officer will certify that all FTMC UXO workers are capable of performing UXO activities at FTMC based on observation of work performance.

e) The FTMC UXO Safety Officer is responsible for all site-specific UXO training.

f) The UXO technician on site will advise project personnel regarding all evacuation and/or exclusion zones as appropriate. The UXO technician will monitor all sampling site activities to ensure that only the minimum number of personnel are present on site.

7.0 Quality

The Shaw FTMC UXO Quality Control Officer will follow quality control instructions and procedures listed in Section 9.0 of the installation-wide OE management plan contained in Volume IV of the installation-wide sampling and analysis plan (IT, 2000) appropriate to this task and the FTMC UXO Supplementary Procedures. The Shaw FTMC UXO Quality Control

Officer will also utilize the "UXO Avoidance Quality Control Report" to document his activities. Copies of this form will be provided to the Shaw quality assurance representative upon request.

8.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2000, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

Shaw Corporation (Shaw), 2002, ***Fort McClellan Unexploded Ordnance Supplementary Procedures***, October.

U. S. Army Corps of Engineers (USACE), 2000, ***Engineering Publication, EP 75-1-2, Unexploded Ordnance (UXO) Support During Hazardous, Toxic, and Radiological (HTRW) and Construction Activities,*** 20 November.

U.S. Army Corps of Engineers (USACE), 2001, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama,*** July.

U.S. Environmental Protection Agency (1990), ***Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama*** *(TS-PIC-89334),* Environmental Photographic Interpretation Center Report (EPIC), Environmental Monitoring Systems Laboratory.

ATTACHMENT 1

FORT MCCLELLAN UNEXPLODED ORDNANCE SUPPLEMENTARY PROCEDURES

FTMC UXO SUPPLEMENTARY PROCEDURES

Subject: Ordnance and Explosives

1.0 INTRODUCTION

Shaw Environmental (Shaw) (formally IT Corporation) has been retained by the U.S. Army Corps of Engineers-Mobile District, under Contract Number DACA21-96-D-0018, to provide environmental services related to Base realignment and closure (BRAC) of Fort McClellan, Alabama. The Installation-Wide Ordnance and Explosives (OE) Management Plan for Fort McClellan (FTMC) was prepared by Shaw Corporation and submitted as a final document in March 2000. The Installation-Wide OE Management Plan was prepared to provide general guidance for conducting unexploded ordnance (UXO) work associated with hazardous, toxic, and radiological waste (HTRW) investigations and remedial activities currently in progress at FTMC. Shaw Corporation prepares site-specific field sampling, health and safety, and UXO safety plans for sites where fieldwork will occur that may potentially contain OE. A UXO Safety Plan is not prepared for sites that are not reported to be in areas containing OE.

1.1 Purpose

This document is intended to provide procedures to the field staff that outline UXO operations and clarify activities currently permitted under "anomaly avoidance." The document is not intended to replace any of the project documents currently approved; rather, it is intended to complement those documents with additional information that allows successful completion of the job.

2.0 FTMC EMPLOYEE ORIENTATION/TRAINING AND CERTIFICATION

The Shaw FTMC orientation program is designed to:

- Indoctrinate new employees to FTMC-unique procedures
- Verify compliance with regulatory certification requirements
- Provide continuing instruction and updating in UXO fundamentals to sustain readiness to safely perform UXO tasks

2.1 Responsibilities

The Shaw OE Service Center Operations Manager will oversee the training programs and maintain a master record of UXO employee training and certification status.

The UXO person designated as the senior Shaw UXO individual at FTMC will schedule the orientation listed below.

The FTMC UXO Safety Officer will:

- Conduct all UXO-specific orientation and training at FTMC
- Certify that each new UXO employee is capable of performing UXO work activities at FTMC
- Maintain FTMC training files and records on each UXO technician on site reflecting his or her current training status.

2.2 UXO Employee Orientation

Every UXO employee assigned to FTMC will receive a site-specific UXO orientation in addition to training required by the Occupational Health and Safety Administration (OSHA). This orientation will include, as a minimum, the following topics:

- Local emergency response drills and procedures
- Personal protective equipment (PPE) and personnel decontamination procedures
- Ordnance recognition/UXO expected to be encountered at FTMC
- Equipment safety
- FTMC site orientation
- Chemical warfare material (CWM) awareness and procedures
- Communications procedures
- FTMC Logbook/data recording procedures
- Shaw administrative policies and procedures
- Magnetometer checkout procedures.

Upon completion of the UXO employee orientation, the FTMC UXO Safety Officer will monitor the performance of the new hire for at least three workdays while conducting typical UXO activities. The FTMC UXO Safety Officer will then certify that the individual is capable of performing UXO activities at FTMC based upon satisfactory performance of the three-day period. A copy of this certification will be maintained in the individual's site FTMC training file (see example at Attachment 1).

2.3 UXO Sustainment Training

All UXO technicians have had the OSHA 40-hour hazardous waste operations and emergency response (HAZWOPER) course in order to be initially certified at FTMC. They are also required to maintain the certification with an 8-hour OSHA refresher course on an annual basis. Additionally, all Shaw FTMC UXO personnel will have 8 hours of site-specific annual UXO sustainment training. This training can be performed incrementally (2 hours every quarter) at the discretion of the site superintendent in coordination with the FTMC Shaw UXO Safety Officer. Topics will include, but are not limited to, the following subjects:

- Site-specific environmental hazards
- Site-specific UXO hazards, ordnance fuzing, functioning and precautions
- Topics which the Shaw UXO Team Leader or Shaw Safety UXO Officer determines necessary to support FTMC UXO activities

Sustainment training will be conducted for a period of no less than 8 hours. Daily safety briefings, tailgate safety meetings, and other required site-specific training are not a substitute for this training. The purpose of this training is to provide each UXO employee with site-specific UXO training over and above OSHA requirements. The site-specific UXO training will be recorded in the project file and the UXO employee's personnel file.

3.0 FTMC MAGNETOMETER/METAL DETECTOR FUNCTION TEST AND FIELD PROCEDURES

This section provides FTMC magnetometer/metal detector function tests and operating procedures to be employed at all work sites that have been identified as requiring avoidance support.

3.1 Geophysical Test Plot

The purpose of a test plot is to provide a consistent environment where the equipment can be evaluated. The location of the geophysical test plot will be inside the Shaw compound. It will be established as follows

- The test plot will consist of an area approximately 20 x 20 feet and clear of vegetation and magnetic anomalies, located in the Shaw compound next to the southeast end of the office trailers.

- Five metal test objects will be buried at depths varying from 6 inches to 24 inches. The objects will approximate the weight, diameter, and length of an MK 2 grenade, a 60mm mortar, a 2.36-inch rocket warhead, a 75mm projectile, and a 37mm projectile. Additionally, three non-ferrous test objects will be buried at a depth of 2 inches to 8 inches. A 6-inch length of 1/2-inch reinforcing rod will be placed on the surface for use as a surface check source. Items with greater mass will be buried at greater depths. Each burial location will be marked with a wooden stake located about 6 inches to the north of the object. Each stake will be assigned a reference number and will be tagged or marked to denote the depth, type of item and orientation of the item. The site will utilize native soils; no fill material will be brought in from another area. Sand will be used to cover the area to mitigate the effects of wet weather.

- For downhole magnetometer testing, a length of 2-inch PVC pipe will be buried to a depth of 36 inches. The pipe should be of sufficient length to allow at least another 24 inches to extend above the surface of the ground. A metal object will be buried at a depth of 24 inches and 24 inches from the side of the pipe. The location of the item, similar in size and mass to a 75mm projectile, will be marked with a wooden stake tagged to denote the depth, type of item, orientation, and reference number assigned.

3.2 Magnetometer/Metal Detector Check-Out Procedures

- Prior to field use, all magnetometers and metal detectors will be set up following the guidelines in the manufacturer's operating manual for the specific instrument used. Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or White's Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or

MG-230 will be set up for downhole monitoring. All equipment will be operated in a manner consistent with instructions contained in the appropriate operator's manual. All equipment will be function-tested prior to use. The White's Metal Detector will be used in conjunction with hand-held magnetometers in areas of high concentrations of rocks with a magnetic signature, to assist in eliminating anomalies created by "hot rocks." The operating manual for each of the instruments used at FTMC will be available for use with the equipment.

- Once the instrument has been determined to be working according to the manufacturer's operating manual, the operator will perform a function test on the FTMC geophysical test plot using the detection methods described in the manual. A function test will consist of using the instrument over a minimum of three test sources. The same sources will be used during each function test to ensure consistency. The instrument detection indicator, as described in the operator's manual, will be noted in the instrument logbook. For site checks, a 6-inch length of 1/2-inch steel reinforcing rod will be available to each operator at the work site.

- Instruments that fail to reproduce a detection indication consistent with previous tests will be checked to ensure that the power supply or batteries are sufficient. If the power supply is determined to be sufficient and the operator cannot find a fault in accordance with the operator's manual, the instrument will be tagged and removed from service.

- Function tests will be performed each morning before the equipment is put into service.

- If an instrument is determined to be working improperly, the FTMC UXO Team Leader and the site superintendent will be immediately notified. Any activities performed using that instrument since its last positive test procedure will be considered invalid and will require reevaluation.

- Upon completion of the function test, the "Magnetometer/Metal Detector Functions Test Data Sheet" (Attachment 2) and the equipment logbook will be filled out.

- After an instrument has been function-tested at the beginning of each day, the instrument will be checked at least once during every hour of use or each time the instrument is turned on after having been turned off. This check will consist of dropping the 6-inch length of 1/2-inch reinforcing rod in a clear area and passing the detector over the rod in a manner consistent with the operator's instructions. The instrument indication will be compared to the indication produced during the morning function test. Instruments that fail to produce a consistent indication will be checked and removed from service as required.

3.3 Equipment Documentation

Each piece of equipment will be assigned a logbook noting the make, model, manufacturer, and serial number of the equipment. The logbook and manufacturer's operating manual will be present when the equipment is tested. The following information will be recorded:

- Date and time
- The test plot object used (assigned stake number)
- The reading or indication at each test site
- Whether or not the reading or indication was satisfactory
- The name of the individual performing the test.

The Shaw FTMC Quality Control (QC) Officer will observe the daily testing of all equipment and will record the results of each test in his field logbook.

3.4 Magnetometer/Metal Detector Field Procedures

All intrusive field actives in potential OE areas (e.g., digging, fence post driving, grading, well installation or excavation) will be preceded by a UXO sweep. Each hole made in areas where OE may potentially be found will have a check immediately over the spot of the intrusion. Magnetometer operations at FTMC will assume a detection depth of one foot when surveying an area for excavation.

All magnetometers and metal detectors will be operated in accordance with the manufacturers specifications and procedures.

When surveying a potential area for a sampling well, an area of sufficient size will be surveyed to allow for installation of required pads and bollards. After the well

is installed, the location of bollards will be adjusted as required if an anomaly is detected during the bollard installation process.

The White's Metal Detector will be used to augment the magnetometers on sites where "hot rocks" are suspected. The purpose of using the metal detector in addition to the magnetometers is to eliminate the probability of "hot rocks."

4.0 FTMC ACCESS CLEARANCES, VEGETATION REMOVAL, AND ROAD MAINTENANCE

This section is designed to provide specific procedures regarding activities associated with the building of access corridors, vegetation removal, and road maintenance in support of FTMC operations.

4.1 Access Corridors

The purpose of access corridors is to enable Shaw personnel access to well and/or other types of sampling sites within FTMC. Access corridors will be created by marking the route, both length and width, in which a UXO survey has been performed. The marking method will be defined in each site-specific UXO safety plan. No unescorted access is permitted until a corridor has been established. If an anomaly is detected during the survey or during a subsequent excavation, it must be avoided, since investigation is not authorized. The route will be altered to avoid the anomaly for FTMC activities. A magnetometer is considered to reliably detect anomalies to a depth of one foot.

The size of each area to be surveyed is dependent on the type and quantity of equipment expected to be used on that site. The UXO survey crew will follow the procedures outlined in the site-specific UXO safety plan to determine the dimensions of the area to be surveyed. Normally, the width of the access route will be at least twice as wide as the widest vehicle that will use the route; footpaths will be a minimum of 3 feet wide.

Tracked or other vehicles, that disturb the soil are authorized for use only in areas that have been surveyed and no anomalies have been detected.

Erosion and weathering will typically cause some UXO items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional UXO surveys may be required. The decision regarding the performance of additional

surveys will be made by the FTMC UXO team leader and the Shaw FTMC UXO Safety Officer. The site superintendent will be notified of this decision. This decision will be based on, but not limited to, such factors as: the amount of time since the last survey was performed; the weather during this period; the terrain in the area of concern; and the type and quantity of UXO found during initial surveys.

4.2 Vegetation Removal

In cases where removal of large trees or other types of vegetation is required, the following procedures will be followed:

- The UXO technician will survey around the base of the tree or vegetation, and, if no anomaly is detected, direct the bulldozer or other equipment to proceed. If an anomaly is detected, the location will be recorded and marked and another route will be selected. The size of the area to be surveyed will depend on the size of the suspected root system of the tree to be removed.

- Once the tree has been pushed over, the UXO technician will survey around the root ball and the area in and around the hole. If an anomaly is detected, the anomaly will be recorded and marked and an alternate route will be selected. If no anomaly is detected, the UXO technician will direct the equipment operator to proceed with the excavation.

4.3 Road Maintenance

Remote range roads and trails frequently require a certain amount of repair to remain passable. This section describes authorized actions regarding the maintenance of dirt or gravel range roads by Shaw UXO personnel.

- Bulldozers or grader-type equipment is authorized to repair roads and trails as long as a UXO survey has been performed and no anomalies have been detected.

- The UXO technician will observe the blade of the equipment as the earth is moved. If a potential UXO is uncovered, the UXO technician will signal the equipment operator to immediately stop the equipment. The UXO technician will then attempt to visually identify the object. If the object cannot be positively identified as a non-hazardous item, the

equipment will be moved, the location of the object marked and recorded on the Shaw FTMC Unexploded Ordnance Report Form (Attachment 3), and the route changed to avoid the object. If no suspicious objects are detected, the equipment will continue to move earth at a rate of no more than one foot of depth at a time. If, more grading is required after the first past is complete the UXO technician will perform another survey. If no anomalies are detected, the equipment can repeat the grading process. If an anomaly is detected, the operation will be halted and the route changed.

- After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per lift. If additional grading is required, a survey will be performed after each one-foot increment the soil has been removed.

- Earth may not, at any time, be moved at a rate of more than one foot in each lift.

5.0 FTMC UXO LOG BOOKS

All UXO team leaders or UXO technicians supporting HTRW operations will maintain a logbook. The purpose of the logbook is to record UXO actions and activities taken at each work site.

5.1 Responsibilities

UXO personnel will maintain an individual daily logbook of work activities.

The logbooks will be routinely inspected weekly by the UXO QC Officer and will be made available to the FTMC site superintendent upon request. Copies will be made daily and filed in the Shaw Field Project office.

Logbooks will contain bound and numbered pages. Entries will be on successive pages as work is performed. The individual using the logbook will sign the page after the last entry for that page has been made. Logbooks are part of the project legal file and will be filed with the project files upon completion of each investigation.

5.2 Data Requirements

As a minimum, individual logbooks will contain the following information:

- Date, time and location of UXO activities
- Personnel involved in the activities
- UXO activities performed, including UXO/anomalies found
- A description of areas swept
- A record of the magnetometer or other equipment used, including instrument serial number
- Weather conditions.

The Shaw FTMC QC Officer will utilize the Shaw FTMC "UXO Avoidance Quality Control Report" (Attachment 4) to document checks of field activities.

Additionally, UXO personnel will complete Shaw FTMC Form "UXO Sketch Log" (Attachment 5) and Shaw FTMC Unexploded Ordnance Report Form. The "UXO Sketch Log" will contain a description of activities, including the dimensions of the area surveyed. A description of the length and width will be recorded, as well as the manner in which the survey was performed. These forms will be completed as required and presented to the site superintendent.

ATTACHMENT 1

FTMC Employee Certification
(Example)

I certify that (name of individual) has fulfilled all UXO orientation requirements and has been observed by me for a period of 3 work days and is therefore eligible to perform UXO activities at FTMC.

_____

Ben Hodges
FTMC UXO Safety Officer

ATTACHMENT 2

Magnetometer/Metal Detector Functions Test Data Sheet

Each magnetometer and/or metal detector will receive a function test at the beginning of each workday and after changing batteries. The function test will include operating the magnetometer/metal detector over a test area developed specifically for ensuring that detection instruments are operating properly. Instruments that do not pass the function test will be tagged out until repairs are made or a replacement instrument is available.

Project Number: _____

Instrument Model: _____

Instrument Serial Number: _____

Date	Person Performing Test	Function Test Results	Remarks

ATTACHMENT 3

Unexploded Ordnance Report Form

Report Tracking Number:

Discovery and Reporting Time

Time of Discovery	
Date	Time

Time Reported to Base Transition Force	
Date	Time

Employee Name:_____

Reported to FTMC Transitional Force Personnel

Name:_____

Location of Ordnance

Location, Description, and Parcel Number:

Coordinates of Ordnance:	State Plane Coordinates	
	Northing	Easting

Picture Taken of Ordnance			
Yes	No	Date	Time

Written Description and/or Sketch of Ordnance:

Corrective Action Taken by Fort McClellan Transition Force

Date	

ATTACHMENT 4

UXO Quality Control Report

Project Location: _____ **Date:** _____

Work Site Location: _____ **Day:** _____

1. **Personnel Involved:**

2. **Description of Work Being Performed:**

3. **Equipment Utilized:**

4. **Comments:**

_____ _____
Completed By **Printed Name & Title**

_____ _____
Signature **Date**

ATTACHMENT 5

UXO Sketch Location Log

District:_____ **Hole Number:**_____ **Date:**_____

Company Name: Shaw Corporation **Subcontractor:**_____

Parcel Location:_____ Well Location:_____ Date Started:_____ Date Completed:_____

Type of UXO Work Being Performed:

Most Probable Munition:	
Down-Hole Depth Achieved for UXO Avoidance:	
Total Number of Surface UXO Marked:	
Total Number of Anomalies Marked:	

Location Sketch/Comments:	**Not to Scale**
Signature of UXO Technician:	Date: