Final
Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments Small Arms Impact Area, South of the Former Prisoner of War Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q

Fort McClellan
Calhoun County, Alabama

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

January 2002

Revision 0

SFSP

Final
Site-Specific Field Sampling Plan Attachment
Site Investigation Small Arms Impact Area, South of the Former Prisoner of War Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q

Fort McClellan
Calhoun County, Alabama

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

December 2001

Revision 0

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List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at the Small Arms Impact Area, South of the Former Prisoner of War (POW) Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, (hereafter referred to as the Small Arms Impact Area, South of the Former POW Training Facility) at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals (PSSC) at this site. The purpose of this site-specific field sampling plan is to provide technical guidance for sampling activities at the Small Arms Impact Area, South of the Former POW Training Facility.

The Small Arms Impact Area, South of the Former POW Training Facility is located in the north-central area of the Main Post of Fort McClellan, south of the intersection of Falcon and Gobbler Roads. This area of investigation was identified during a site walk by IT personnel and encompasses a possible target berm and an area containing a significant quantity of expended small arms munitions (bullets and bullet fragments). The area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility is located within the range fans for Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, identified in the environmental baseline survey (EBS).

Review of the available aerial photographs suggests that range activity at the Former Rifle/Machine Gun Range, Parcel 100Q, between 1964 and 1973 is the likely cause of the features found at the Small Arms Impact Area, South of the Former POW Training Facility.

Based on the orientation of the range fans and firing lines presented in the EBS, the direction of fire for Parcels 100Q and 101Q, was to the southeast in the direction of the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility. The impact areas for Parcels 100Q and 101Q were not identified in the EBS. The orientation and position of the firing lines and range fans for Parcels 100Q and 101Q in relation to the features found within the area of investigation for this site investigation (SI) suggest range activities at those parcels may be related to the features found at the present investigation site. This site investigation will address only the features found within the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility. Other areas for Parcels 100Q and 101Q will be addressed in additional SIs.

IT will collect 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples at this site. Potential contaminant sources at the Small Arms Impact Area, South of the Former Training Facility are primarily unknown but may include lead and ordnance. Chemical analyses of all the samples collected during the field program will include explosives and metals. Ten percent of the samples collected will also be analyzed for target compound list volatile organic compounds and semivolatile organic compounds, chlorinated pesticides, chlorinated herbicides, and organophosphate pesticides. Results from these analyses will be compared with site-specific screening levels at the site concentrations, ecological screening values (ESV), and background values to determine if PSSCs are present but pose an unacceptable risk to human health or the environment.

The Small Arms Impact Area, South of the Former POW Training Facility falls within the "Possible Ordnance Impact Areas" shown on Plate 10 of the *U.S. Army Corps of Engineers Archives Search Report, Maps, Fort McClellan, Anniston, Alabama*. Therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at the Small Arms Impact Area, South of the Former POW Training Facility. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for the Small Arms Impact Area, South of the Former POW Training Facility 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 plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

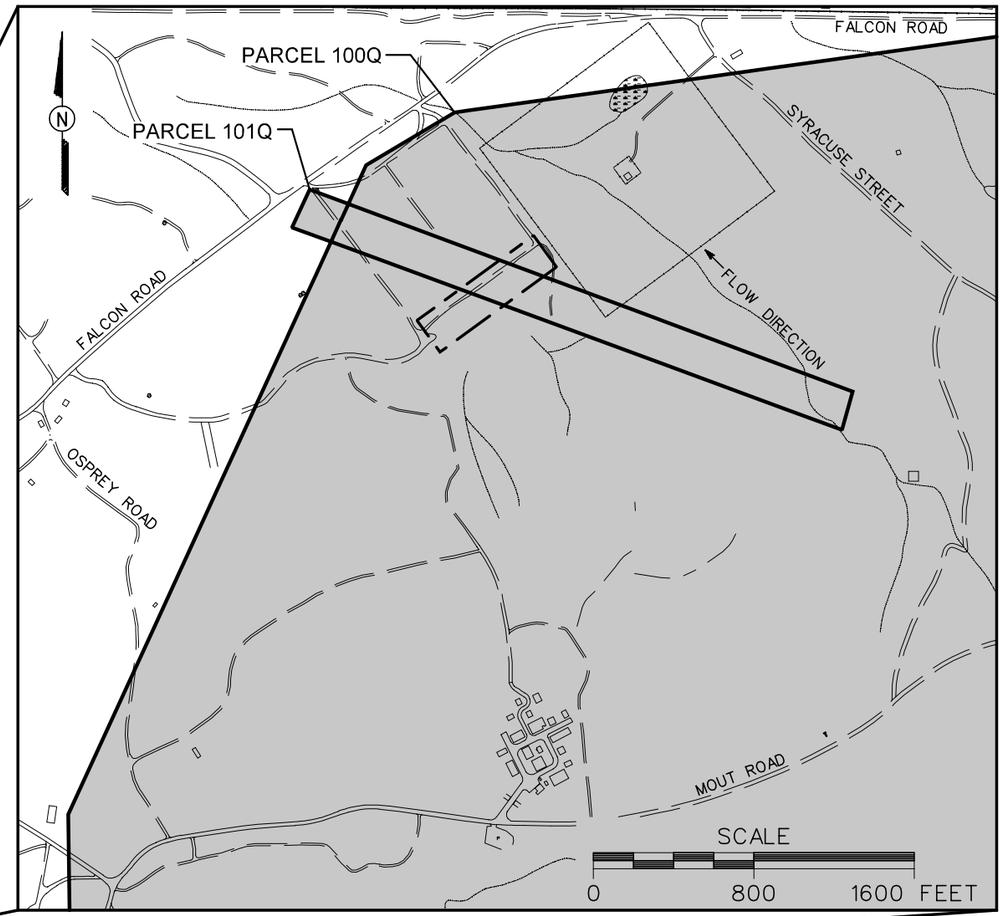
1.1 Introduction

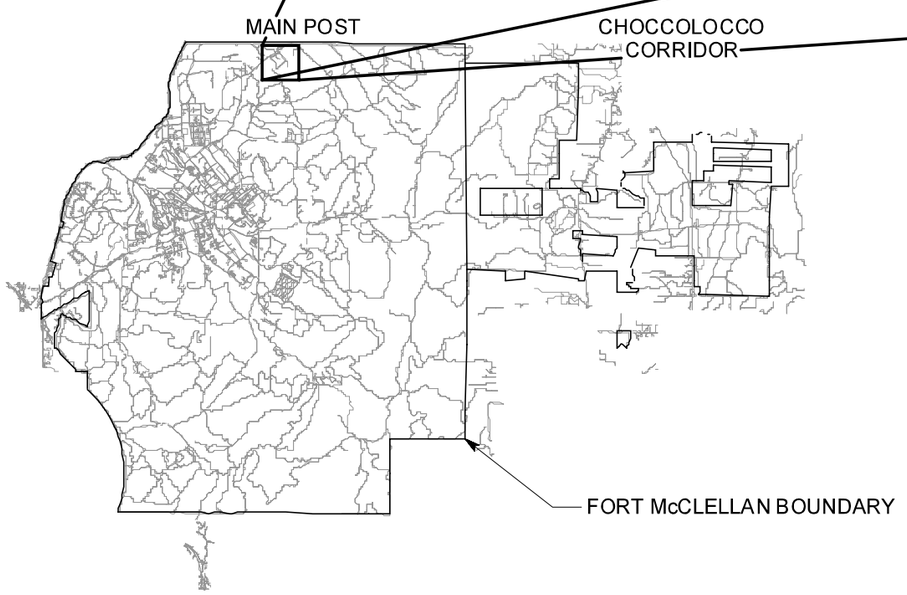
The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Small Arms Impact Area, South of the Former Prisoner of War (POW) Training Facility, Former Rifle /Machine Gun Ranges, Parcels 100Q and 102Q, (hereinafter referred to as Small Arms Impact Area, South of the Former POW Training Facility), under Task Order CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) for FTMC (IT, 2000a) has been prepared to provide technical guidance for sample collection and analysis at the Small Arms Impact Area, South of the Former POW Training Facility. This area of investigation encompasses a possible target berm and an area containing a significant quantity of expended small arms munitions within the range fans of the Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for the Small Arms Impact Area, South of the Former POW Training Facility and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

1.2 Site Description

The Small Arms Impact Area, South of the Former POW Training Facility is located in the north-central portion of the Main Post of FTMC, south of the intersection of Falcon and Gobbler Roads (Figure 1-1). This small arms impact area was identified during a site walk conducted by IT personnel in October 2001. The area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility, approximately 3 acres, consists of a possible target berm and area containing a significant quantity of expended small arms rounds (bullets and bullet fragments). Historical aerial photographs indicate several disturbed areas. The area is generally covered with trees and brush. However, grass vegetation is found along the northern portion of





LEGEND

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

FIGURE 1-1
SITE LOCATION MAP
SMALL ARMS IMPACT AREA,
SOUTH OF FORMER POW TRAINING
FACILITY, FORMER RIFLE /
MACHINE GUN RANGES,
PARCELS 100Q AND 101Q

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the site. The topography in the area of investigation gently slopes to the northeast. The elevation is generally flat, ranging between 770 to 780 feet above mean sea level (Figure 1-2).

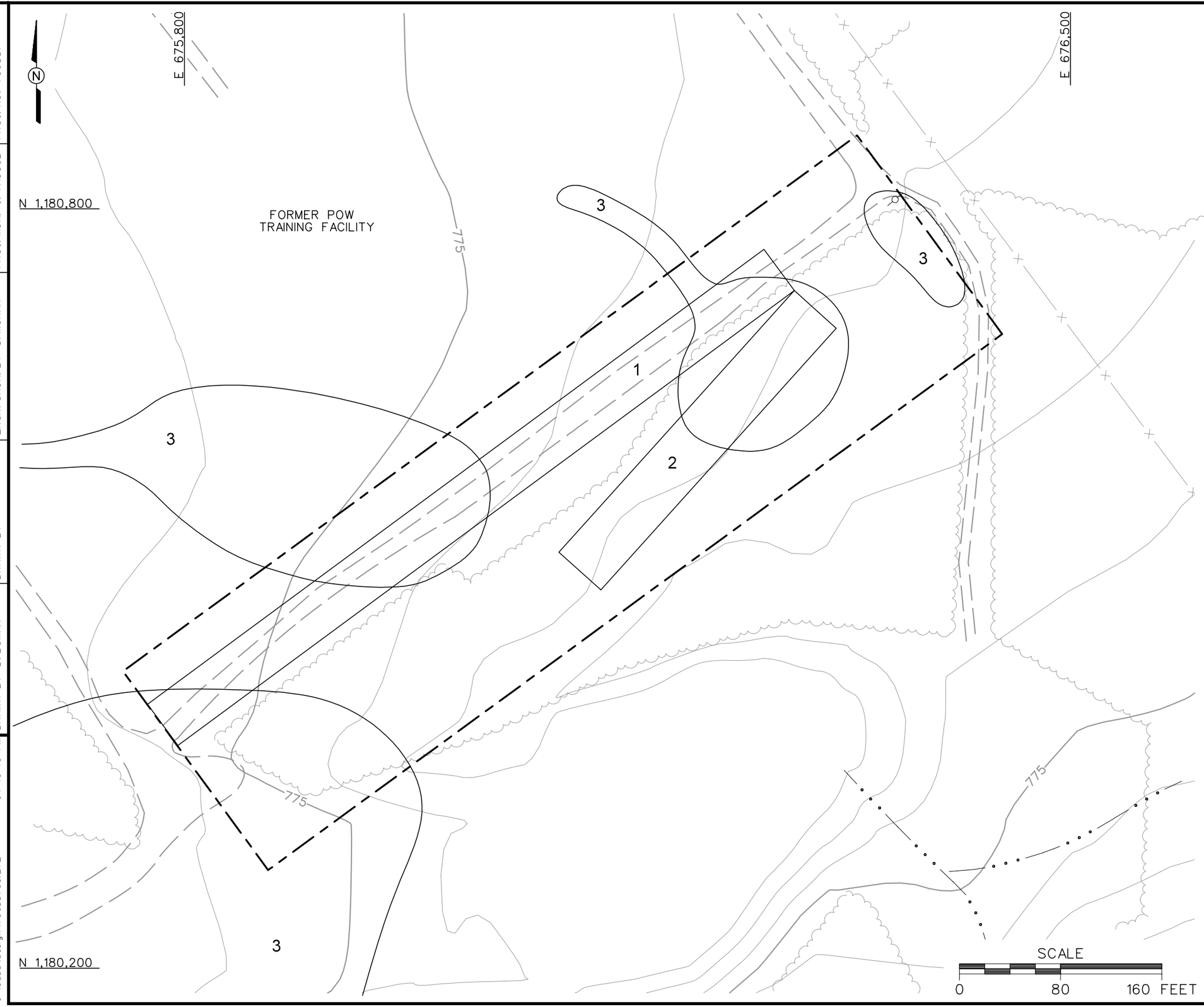
The Small Arms Impact Area, South of the Former POW Training Facility is located within the range fans for Former Rifle/Machine Gun Ranges, EBS Parcels 100Q and 101Q. According to the EBS, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q are two of seven former rifle/machine gun ranges that were identified on the northern Main Post. The dates of operation and types of specific ordnance fired at these ranges are unknown. However, based on the name, it is assumed that small arms were used here, and because .30-caliber, 5.56-millimeter (mm), and 7.62-mm bullets were observed during the October 2001 site walk.

Based on the orientation of the range fans and firing lines presented in the EBS, the direction of fire for the Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, was to the southeast in the direction of the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility. Impact areas for Parcels 100Q and 101Q were not identified in the EBS. However, the orientation and position of the firing lines and range fans for Parcels 100Q and 101Q in relation to the features found within the area of investigation for this SI suggest that range activities at those parcels may be related to the features found at the Small Arms Impact Area, South of the Former POW Training Facility. This SI will only address the area of investigation identified for the Small Arms Impact Area, South of the Former POW Training Facility. Other areas within the range fans for Parcels 100Q and 101Q will be addressed in additional SIs.

Aerial Photographs. Available aerial photographs were reviewed to reveal any land use activity in the area of investigation. The following paragraphs are a summary of the review of aerial photographs for this area of investigation.

1937. This aerial photograph shows the area of investigation to be densely wooded without any apparent range activities at Parcel 100Q or 101Q.

1940. The 1940 aerial photograph shows a significant amount of change within and around the area of investigation (Figure 1-3). Most of the trees within the area of investigation have been removed, and a significant portion of the area was disturbed and bare. There were not any berms or impact areas apparent within the area of investigation. However, berms were noted south and west of the area of investigation. The clearing of vegetation, the presence of berms, and the observation of disturbed and bare areas suggest significant range activity at Parcels 100Q and



LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- AREA OF INVESTIGATION
- SURFACE DRAINAGE / CREEK
- FENCE
- UTILITY POLE

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

1. .30 CALIBER, 7.62mm AND 5.56mm EXPENDED ROUNDS (BULLETS AND BULLET FRAGMENTS)
2. POSSIBLE TARGET BERM
3. FORMER DISTURBED AREA IDENTIFIED FROM AERIAL PHOTOGRAPHS

FIGURE 1-2
SITE MAP
SMALL ARMS IMPACT AREA, SOUTH OF FORMER POW TRAINING FACILITY, FORMER RIFLE / MACHINE GUN RANGES, PARCELS 100Q AND 101Q

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

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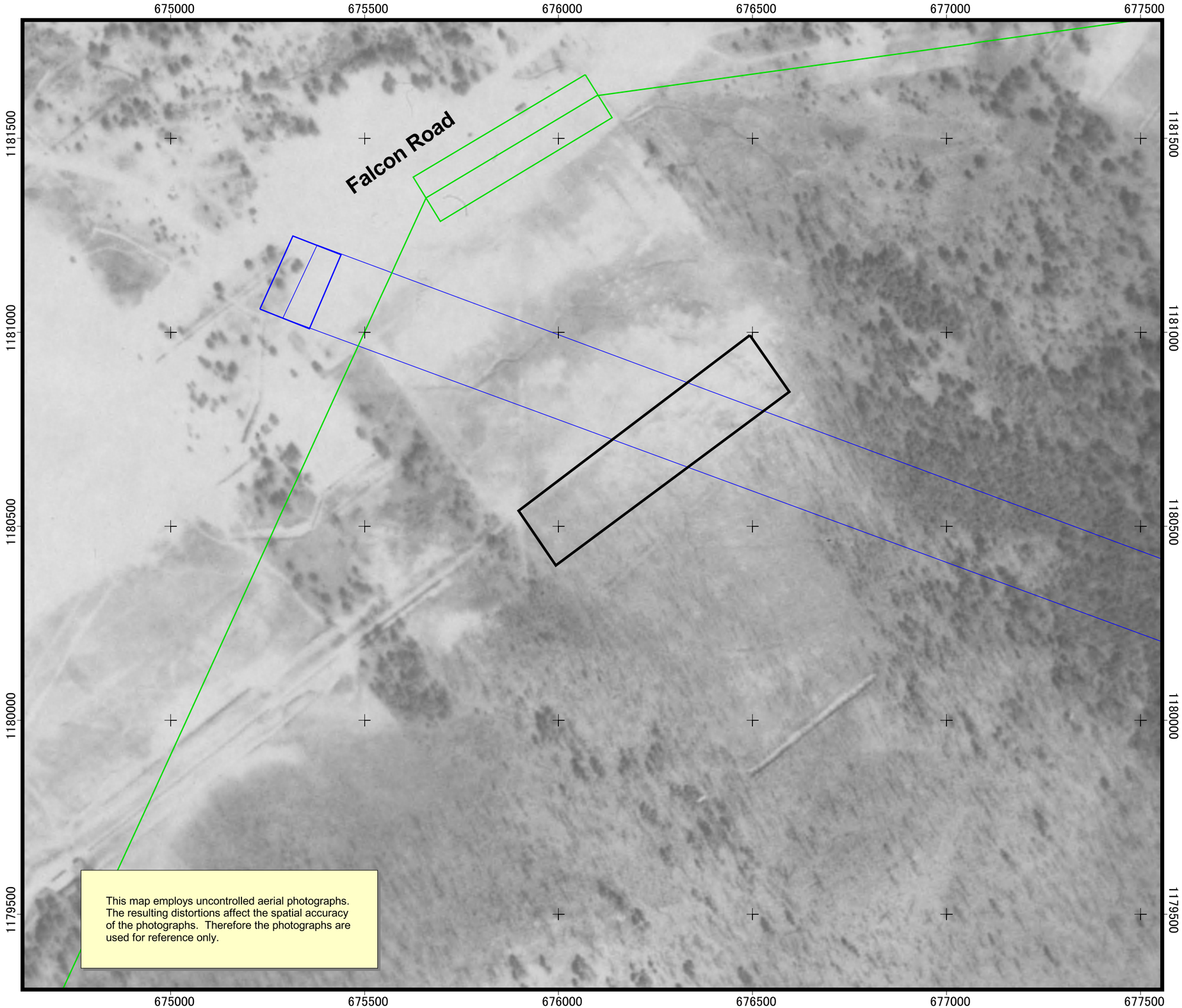

Figure 1-3

1940 Aerial Photograph - Inter War Range Use
Small Arms Impact Area South of the Former POW Training Facility
Former Rifle/Machine Gun Ranges
Parcels 100Q and 101Q

Legend

- Area of Investigation
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 100Q
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 101Q

200 0 200 Feet

State Plane feet, NAD83

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101Q during this time. However, the aerial photograph did not reveal any range activities related to the Small Arms Impact Area, South of the Former POW Training Facility.

1944. Activity shown in this aerial photograph is very similar to the 1940 photograph. This aerial photograph shows disturbed areas and bare spots within and around the area of investigation. From this aerial photograph it appears both EBS ranges (Parcels 100Q, and 101Q) were probably still active at this time. However, this aerial photograph did not reveal any range activities related to the Small Arms Impact Area, South of the Former POW Training Facility.

1954 and 1961. Throughout this period, an increase in vegetation was noted within the area of investigation, suggesting decreased activity. However, significant activity was noted outside the area of investigation within Parcels 100Q and 101Q. Three berms were identified on the 1954 aerial photograph, and a new road was identified running from Falcon Road past the west boundary of the area of investigation on the 1961 aerial photograph. The berms and new road suggest continued range activity in Parcels 100Q and 101Q. However, none of the range activities observed on these aerial photographs appeared to be related to the Small Arms Impact Area, South of the Former POW Facility.

1964. The 1964 aerial photograph shows an increase in vegetation near the firing line for Parcel 101Q, suggesting discontinued use. However, a decrease in vegetation was noted in the central portion of Parcel 100Q and most of the area of investigation. A new loop road was observed overlapping a section of the area of investigation. A cleared/disturbed area, possibly representing a target area, was also noted in the central portion of the area of investigation (Figure 1-4). The decrease in vegetation, the new loop road, and the cleared/disturbed area suggests ongoing range activity at Parcel 100Q, possibly associated with the Small Arms Impact Area, South of the Former POW Facility.

1969. The 1969 aerial photograph showed a continued increase in range activity within the area of investigation and at Parcel 100Q. Six berms beginning near and perpendicular to the firing line for Parcel 100Q were noted on the aerial photograph. Disturbed and cleared areas related to range activities at Parcels 100Q were noted within the area of investigation (Figure 1-5).

1973. This aerial photograph showed a circular disturbed area, possibly a target area, within the eastern portion and a disturbed area along the western boundary of the area of investigation

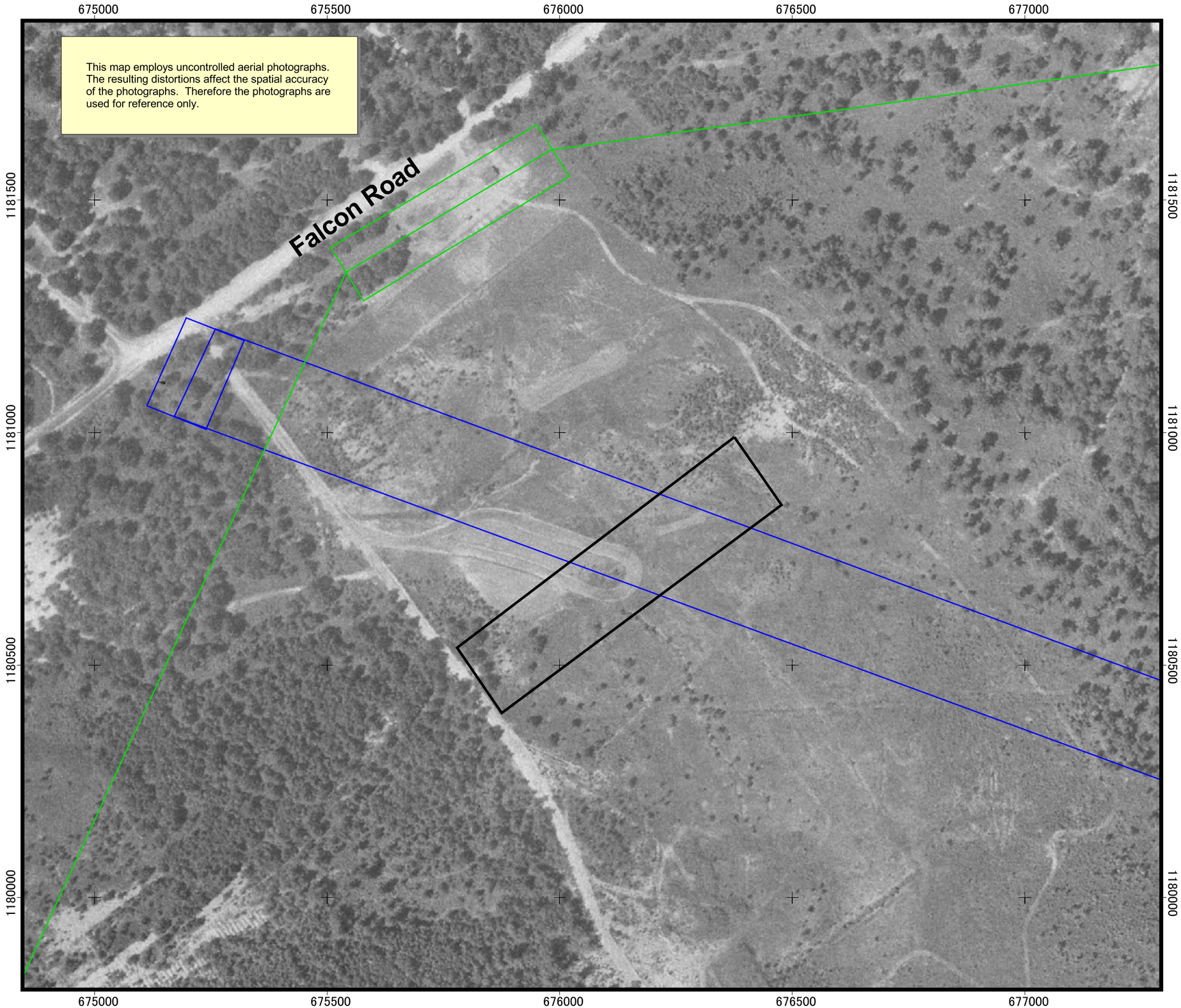

Figure 1-4

1964 Aerial Photograph - 1950 to 1973 Range Use Small Arms Impact Area, South of the Former POW Training Facility Former Rifle/ Machine Gun Ranges Parcels 100Q, and 101Q

Legend

- Area of Investigation
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 100Q
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 101Q

200 0 200 Feet

State Plane feet, NAD83

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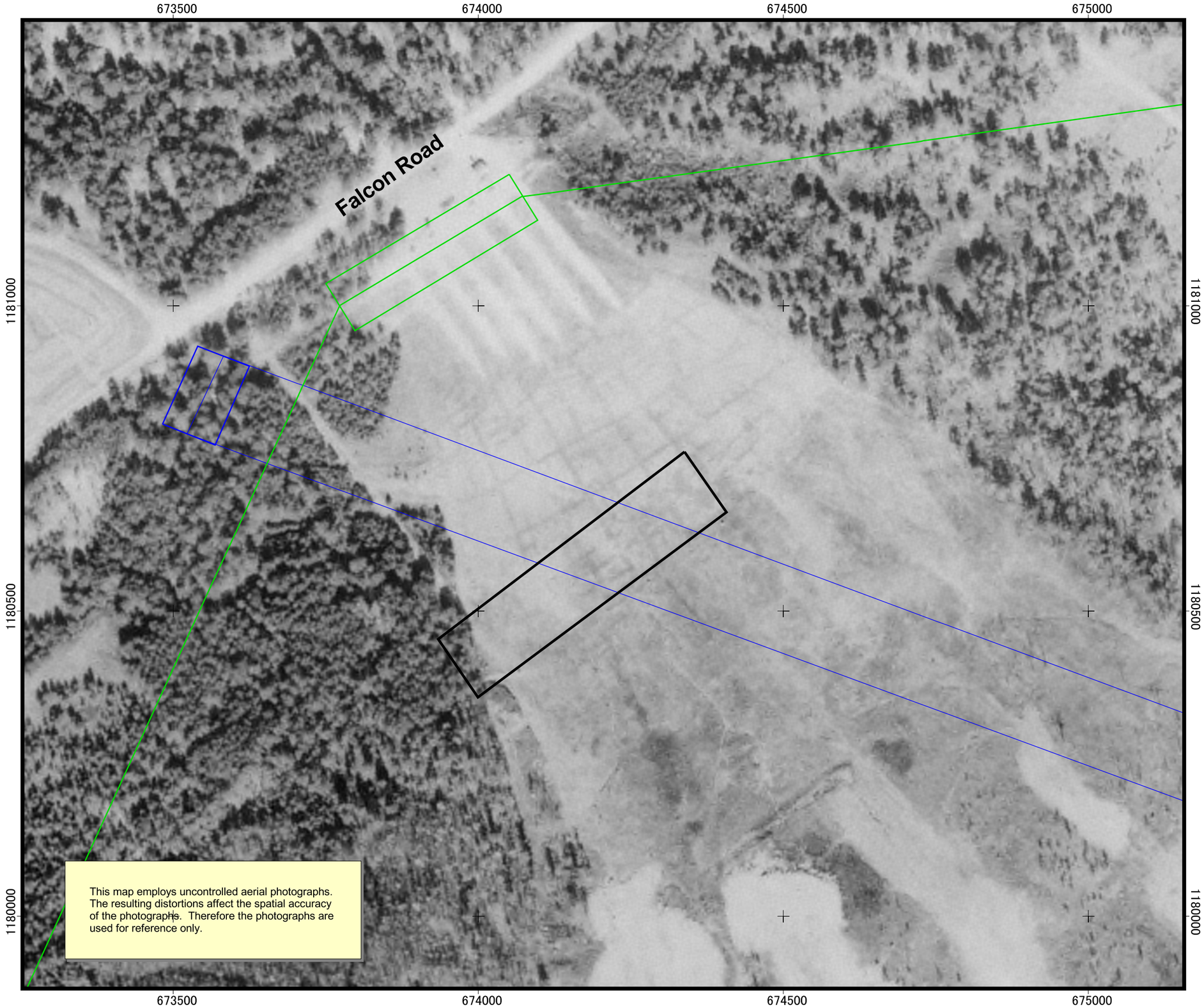

Figure 1-5

1969 Aerial Photograph - 1950 to 1973 Range Use Small Arms Impact Area, South of the Former POW Training Facility Former Rifle/Machine Gun Ranges Parcels 100Q and 101Q

Legend

- Area of Investigation
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 100Q
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 101Q

200 0 200 Feet

State Plane feet, NAD83

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(Figure 1-6). This aerial photograph shows continued range activity at Parcel 100Q, which appears to have affected the area of investigation.

1976. The 1976 aerial photograph shows the two disturbed areas identified in the 1973 aerial photograph. However, an increase in brush-like vegetation was present across the area of investigation and Parcel 100Q, suggesting discontinued use of the range.

1982, 1994, and 1998. Review of the aerial photographs indicated that between 1976 and 1982 a prisoner-of-war training facility was built. This facility was observed on the 1982, 1994, and 1998 aerial photographs. The prisoner-of-war training facility was located along the northern boundary of the site and overlapped the range fans for Parcels 100Q and 101Q. Therefore, the ranges were abandoned by this time period (Figure 1-7). The prisoner-of-war training facility was removed in 1999.

Review of the available aerial photographs suggests that range activity at the Former Rifle/Machine Gun Range, Parcel 100Q, between 1964 and 1973 is the likely cause of the features found at the Small Arms Impact Area, South of the Former POW Training Facility.

Soil Types. Soils mapped within the area of investigation consist of three soil types: the Cumberland gravelly loam, the Anniston and Allen gravelly loam, and the Anniston gravelly clay loam (U.S. Department of Agriculture [USDA], 1961). The Cumberland gravelly loam has generally developed in old alluvium that washed from soils derived mainly from limestone, cherty limestone, shale, and sandstone. The surface soil of the Cumberland gravelly loam ranges from very dark brown to reddish brown. The subsoil ranges from dark red to red in color and from silt clay loam to clay in texture. The thickness of the alluvium ranges from 2 to greater than 15 feet. Some areas included in this soil mapping unit have a silt loam to gravelly fine sandy loam surface soil which is generally underlain in places by beds of gravel or sand. Rounded chert, sandstone, and quartz gravel, as much as three inches in diameter, can be found throughout this soil. Infiltration of this soil type is medium, permeability moderate, and the capacity for available moisture is high (USDA, 1961).

The Anniston and Allen gravelly loam consists of friable soils that have developed in old alluvium on foot slopes and fans along the base of larger hills in the region. The color of the surface soils ranges from very dark grayish brown to dark reddish brown. The subsoil ranges from dark red to yellowish red. The texture of the subsoil ranges from light clay loam to clay or

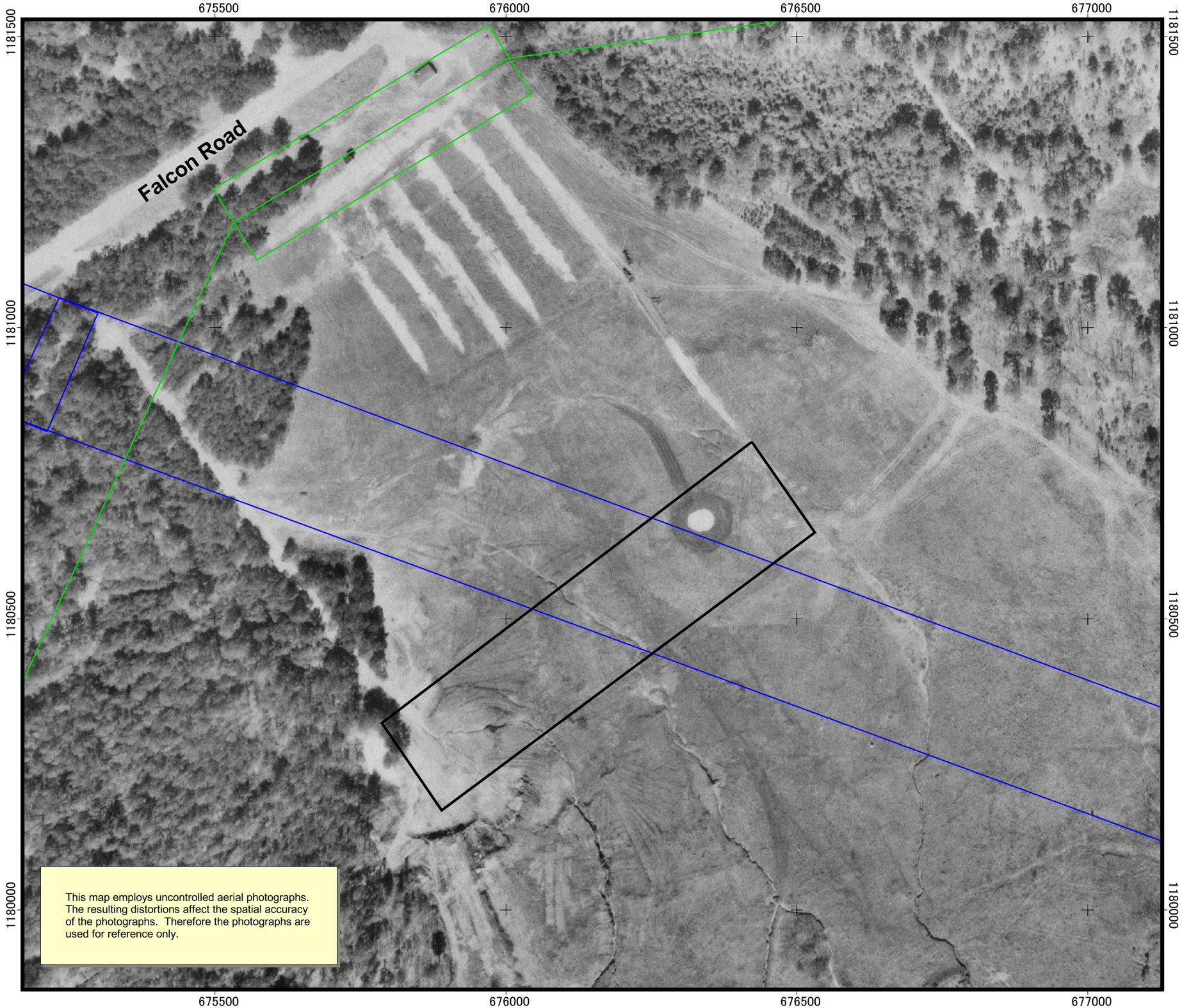

Figure 1-6

1973 Aerial Photograph - 1950 to 1973 Range Use Small Arms Impact Area South of the Former POW Training Facility Former Rifle/Machine Gun Ranges Parcels 100Q, and 101Q

Legend

- Area of Investigation
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 100Q
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 101Q

200 0 200 Feet

State Plane feet, NAD83

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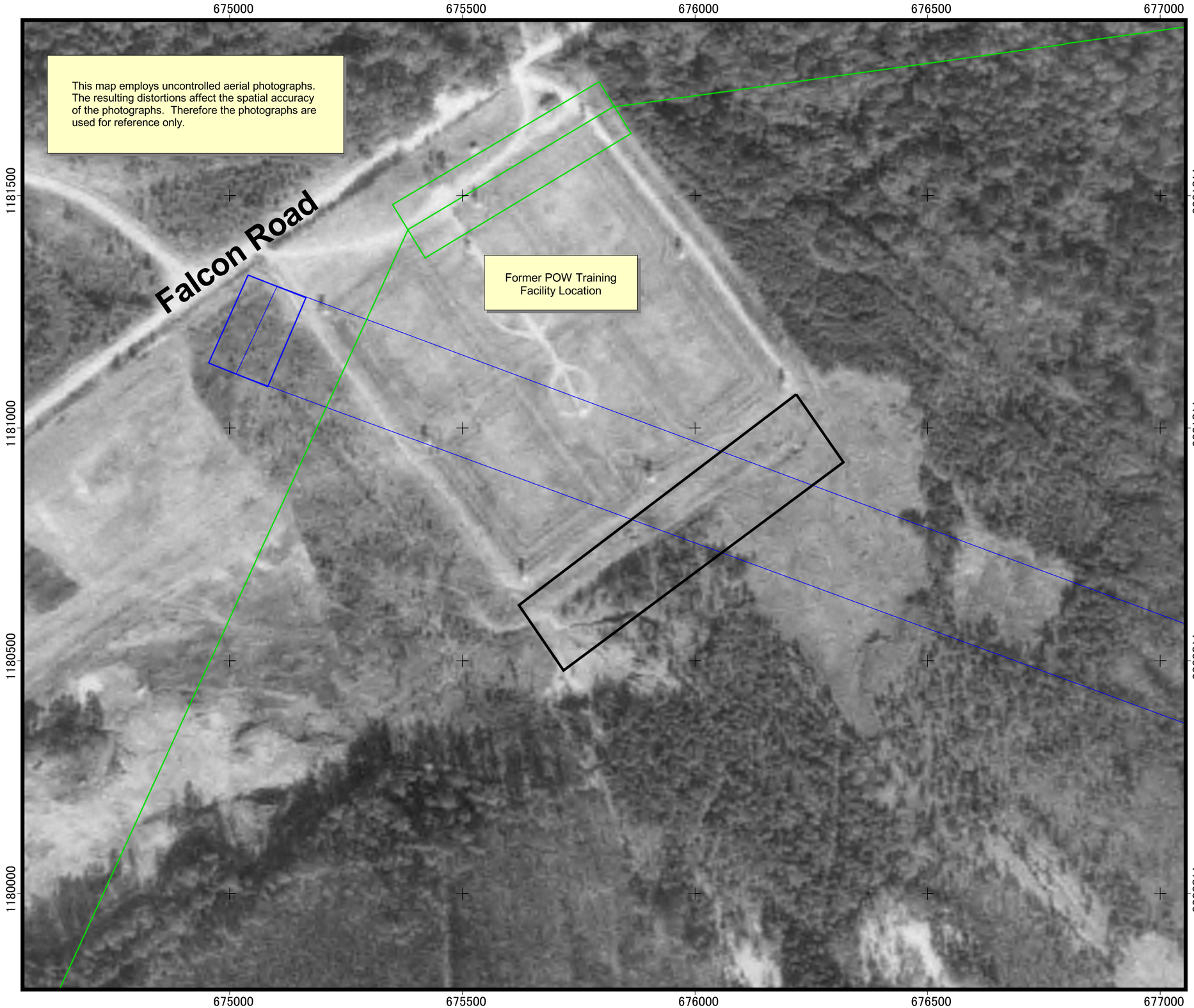

Figure 1-7

1983 Aerial Photograph - 1973 to Present Range Use Small Arms Impact Area, South of the Former POW Training Facility Former Rifle/Machine Gun Ranges Parcels 100Q and 101Q

Legend

- Area of Investigation
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 100Q
- EBS Range Fan and Firing Line, Former Rifle/ Machine Gun Range, Parcel 101Q

200 0 200 Feet

State Plane feet, NAD83

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silty clay loam. The amount of gravel ranges from a few pieces to a significant quantity. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high (USDA, 1961).

The Anniston gravelly clay loam consists of friable, medium to strongly acidic, deep, well-drained soils that have developed in old local alluvium on the foot slopes and along the base of larger hills in the region. The parent material for the Anniston gravelly clay loam is washed from the adjacent, higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. Sandstone and quartzite gravel, cobbles, and fragments as much as 8 inches in diameter are on the surface and throughout the soil. The color of the Anniston gravelly clay loam surface soil ranges from dark brown and very dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low (USDA, 1961).

1.3 Scope of Work

The scope of work for activities associated with the SI at the Small Arms Impact Area, South of the Former POW Training Facility, as specified by the statement of work (USACE, 1999a), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the supplemental sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples to determine whether potential site-specific chemicals (PSSC) are present within the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility and to provide data useful for supporting any future planned corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

The Small Arms Impact Area, South of the Former POW Training Facility falls within the "Possible Ordnance Impact Areas" shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999b). Therefore, UXO surface sweeps and downhole surveys of soil 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. The site-specific UXO safety plan will be used to support sample collection activities at the Small Arms Impact Area, South of the Former POW Training Facility.

At completion of the field activities and sample analyses, draft and final SI reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site, and to recommend further actions, if appropriate. SI reports will be prepared in accordance with current guidelines of the U.S. Environmental Protection Agency (EPA), Region IV, and the Alabama Department of Environmental Management (ADEM).

2.0 Summary of Existing Environmental Studies

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

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

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

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

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

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

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

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

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

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls

- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Small Arms Impact Area, South of the Former POW Training Facility was identified as a Category 1 CERFA sites, a parcel where no known or recorded storage, release, or disposal (including migration) has occurred on site property, but is qualified because the site was part of an active range. The Small Arms Impact Area, South of the Former POW Training Facility also requires additional evaluation to determine the environmental condition of the parcel.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Small Arms Impact Area, South of the Former POW Training Facility. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071, *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Small Arms Impact Area, South of the Former POW Training Facility is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 of this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data related to the SI at the Small Arms Impact Area, South of the Former Training Facility, presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The users of the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

Summary of Data Quality Objectives
Small Arms Impact Area, South of Former POW Training Facility,
Former Rifle/ Machine Gun Ranges, Parcels 100Q and 101Q
Site Investigation
Fort McClellan, Calhoun County, Alabama

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	None	Contaminant Source Small Arms Impact Area South of the Former P.O.W. Training Facility, Fomer Rifle/Machine Gun Ranges, Parcels 100Q and 101Q (explosives and metals) Migration Pathways Infiltration to subsurface soil, infiltration and leaching to groundwater, biotransfer to venison, dust emissions and volatilization to ambient air, and rain runoff erosion to surface water sediment. Potential Receptors Residents (future), Recreational site user (current) Groundskeeper (future) Construction Worker (future) PSSC metals, nitroexplosives	Surface soil Subsurface Soil Groundwater Surface Water Sediment	SI to confirm the presence or absence of contamination in the site media Definitive quality data for future decision-making	Surface soil All Samples TAL Metals and Nitroexplosives 10% VOCs, SVOCs, Chlorinated Pesticides, Chlorinated herbicides, Organophosphate Pesticides Subsurface Soil All Samples TAL Metals and Nitroexplosives 10% VOCs, SVOCs, Chlorinated Pesticides, Chlorinated herbicides, Organophosphate Pesticides Groundwater All Samples TAL Metals and Nitroexplosives 10% VOCs, SVOCs, Chlorinated Pesticides, Chlorinated herbicides, Organophosphate Pesticides	Definitive data in data packages (as defined in USACE EM200-1-6)	11 surface soil samples + QC
						Definitive data in data packages (as defined in USACE EM200-1-6)	8 subsurface soil samples + QC
						Definitive data in data packages (as defined in USACE EM200-1-6)	2 groundwater samples + QC

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile Organic Compound.
SVOC - Semivolatile Organic Compound.
SI - Site investigation.
QC - Quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
PSSC - Potential site-specific chemical.
EM200-1-6-USACE Engineering Manual, Chemical Quality Assurance for HTRW Projects, October 10, 1997.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for scenarios involving direct receptor contact with a contaminated source medium.

Primary contaminant releases were probably limited to training activities; more precisely, pieces of ammunition deposited on or within surface and subsurface soil and their subsequent breakdown. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, bio-transfer to deer through browsing, dust emissions and volatilization to ambient air, rain runoff, and erosion to surface water and sediment.

Currently, the Small Arms Impact Area is not utilized and is not maintained. Trees and grass vegetate most of the study area. The area is not fenced; therefore, people may trespass at the site for hunting. The only plausible receptor under the current land-use scenario is a recreational site user who may hunt. Other potential receptors considered, but not included under the current land-use scenario, are the:

- ***Groundskeeper.*** The area is not currently maintained and will not be maintained in the future.

- ***Construction Worker.*** The site is unused, and no development or construction is occurring or scheduled.

- ***Resident.*** The site is not currently used for residential purposes.

Future land use in this area is shown as industrial (FTMC, 1997). The site may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- ***Resident.*** Although the site is not planned for residential use, the residential scenario is considered in order to provide information for the project manager and regulators.
- ***Construction Worker.*** The site may be developed for industrial purposes in the future.
- ***Groundskeeper.*** The portions of the area developed for industrial use will require maintenance; also, this receptor scenario represents the most highly exposed site worker for an industrial scenario.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process is a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at the Small Arms Impact Area, South of the Former POW Training Facility. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

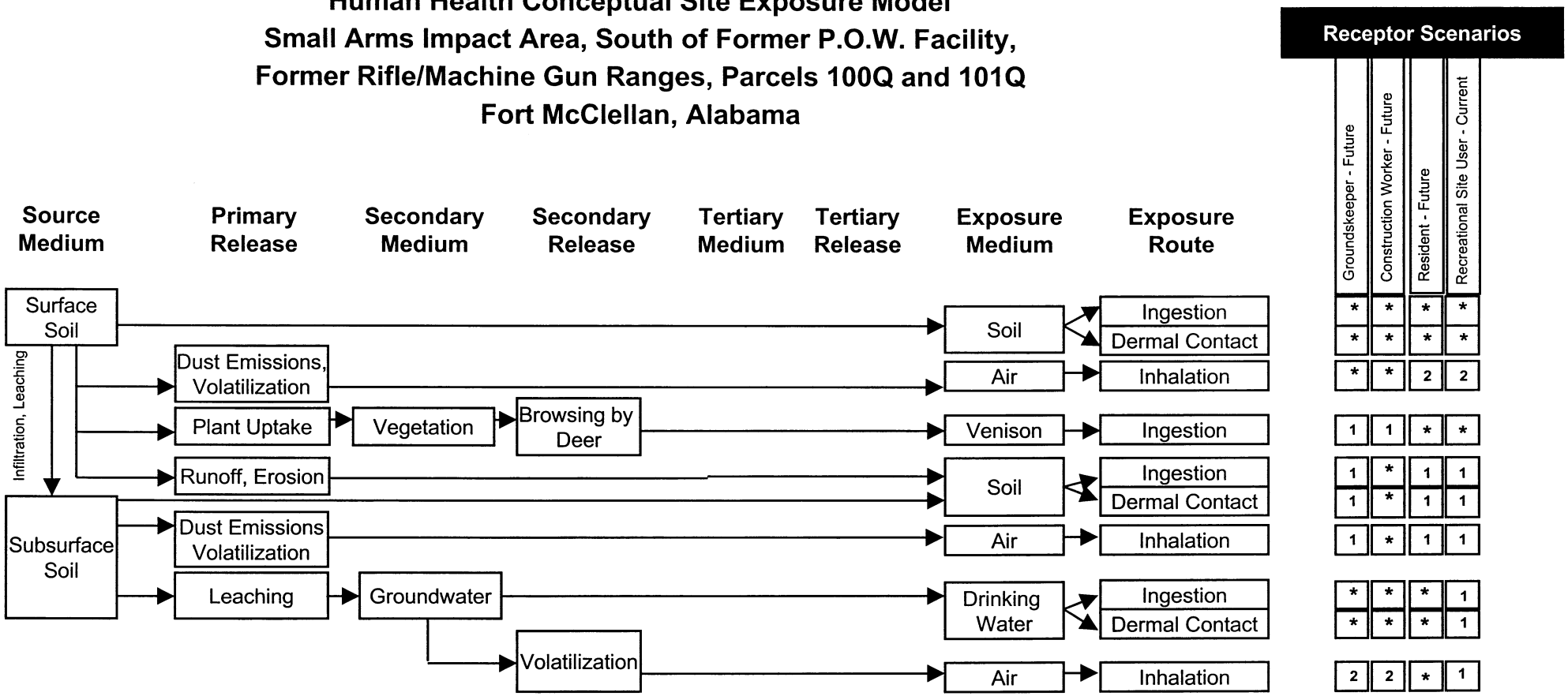
Detected site chemical concentrations will be compared to site-specific screening levels, ecological screening values, and background values to determine if PSSCs are present at site concentrations that pose an unacceptable risk to human health or the environment. EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in the WP.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, and groundwater will be sampled and analyzed to meet the objectives of the SI at the Small Arms Impact Area, South of the Former POW Training Facility.

Figure 3-1
Human Health Conceptual Site Exposure Model
Small Arms Impact Area, South of Former P.O.W. Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
1 = Incomplete exposure pathway.
2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

The Small Arms Impact Area, South of the Former POW Training Facility falls within the "Possible Ordnance Impact Area" shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999b). Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety work plan provides technical guidance for ordnance and explosives avoidance activities for sample collection activities at the Small Arms Impact Area, South of the Former POW Training Facility. The site-specific UXO safety work plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a).

4.1.1 Surface UXO Survey

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 Appendices D and E of the approved SAP (IT, 2000a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet below ground surface (bgs), whichever is reached first.

4.1.3 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 soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the

locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at the Small Arms Impact Area, South of the Former POW Training Facility includes the collection of surface soil, subsurface soil, and groundwater samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from eleven locations in the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale are listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and QA/QC sample requirements are summarized in Table 4-2. The final soil sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from eight borings installed in the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility.

Table 4-1

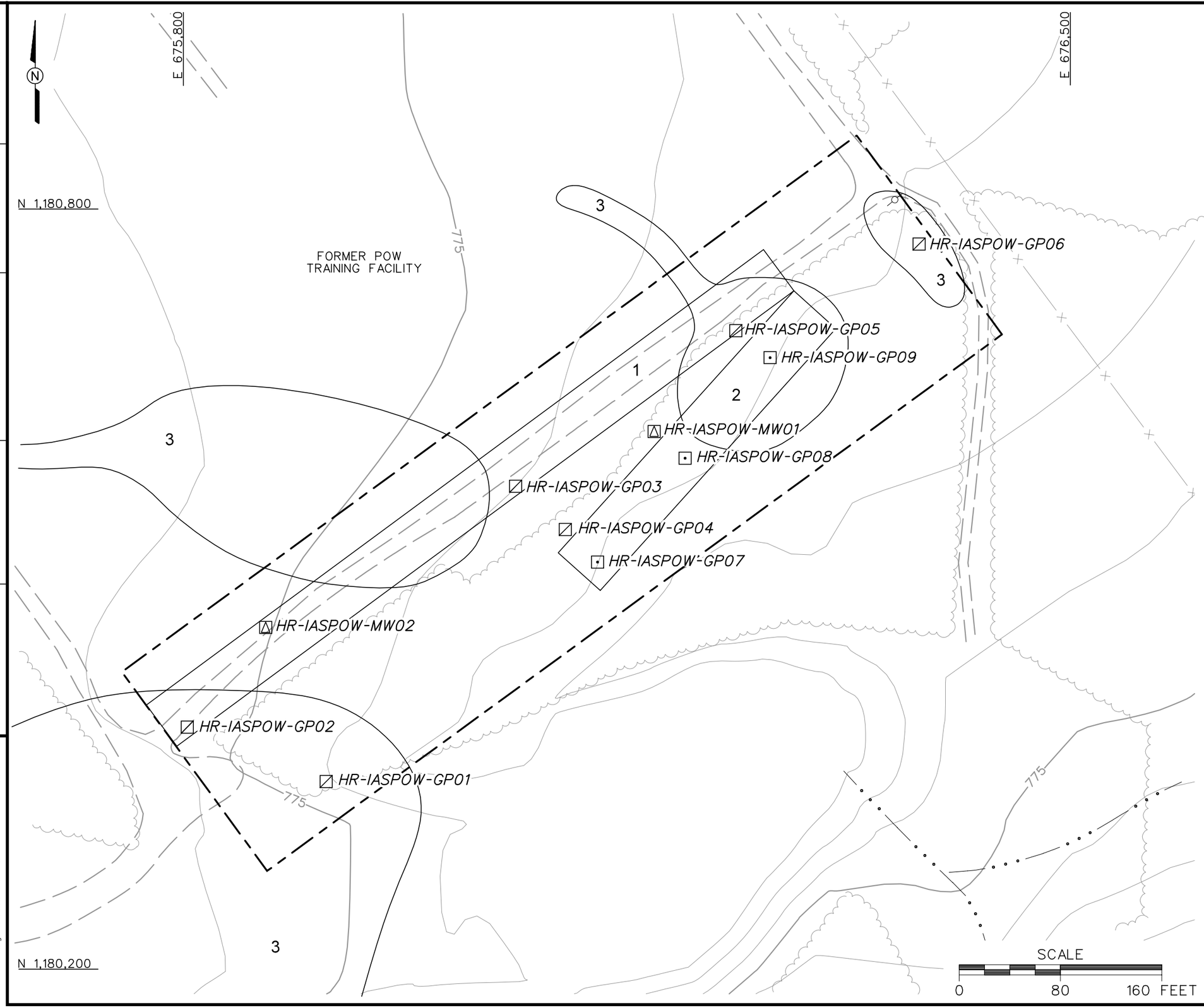
Sampling Locations and Rationale
Small Arms Impact Area, South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101A
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
IMP-IASPOW-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be collected from the central portion of the area of investigation. This sample location was selected because it is located immediately down gradient of the center portion of a possible target berm discovered during a site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
IMP-IASPOW-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be collected from the southwestern portion of the area of investigation. This sample location was selected because it is within an area were a significant number of expended rounds were noted during a site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
IMP-IASPOW-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be collected in the southwestern portion of the area of investigation. This sample location was selected because review of aerial photographs showed a significant amount of ground surface disturbance. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be collected in the southwestern portion of the area of investigation. This sample location was selected because it is within an area were a significant number of expended rounds were noted during a site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be collected in the central portion of the area of investigation. This sample location was selected because it is within an area were a significant number of expended rounds were noted during a site walk by IT personnel and because review of aerial photographs showed a significant amount of disturbance. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.

Table 4-1

Sampling Locations and Rationale
Small Arms Impact Area, South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101A
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
IMP-IASPOW-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be collected in the central portion of the area of investigation. This sample location was selected because it is located immediately down gradient of the western end of a possible target berm discovered during a site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be collected along the northeastern boundary of the area of investigation. This sample location was selected because review of aerial photographs showed a significant amount of historical ground surface disturbance. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP07	Surface soil	Surface soil sample to be collected in the central portion of the area of investigation. The sample to be collected from the southwestern end of a possible target berm identified during the site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP08	Surface soil	Surface soil sample to be collected in the central portion of the area of investigation. The sample to be collected from the center portion of a possible target berm identified during the site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
IMP-IASPOW-GP09	Surface soil	Surface soil sample to be collected in the eastern portion of the area of investigation. The sample to be collected from the northeastern portion of a possible target berm identified during the site walk by IT personnel. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.



LEGEND

- UNIMPROVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- AREA OF INVESTIGATION
- SURFACE DRAINAGE / CREEK
- FENCE
- UTILITY POLE
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED GROUNDWATER, SURFACE, AND SUBSURFACE SOIL SAMPLE LOCATION

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

1. .30 CALIBER, 7.62mm AND 5.56mm EXPENDED ROUNDS (BULLETS AND BULLET FRAGMENTS)
2. POSSIBLE TARGET BERM
3. FORMER DISTURBED AREA IDENTIFIED FROM AERIAL PHOTOGRAPHS

FIGURE 4-1
PROPOSED SAMPLE LOCATION MAP
SMALL ARMS IMPACT AREA,
SOUTH OF FORMER POW TRAINING
FACILITY, FORMER RIFLE /
MACHINE GUN RANGES,
PARCELS 100Q AND 101Q

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

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\796887es.273 | PROJ. NO.: 796887
INITIATOR: J. REMO | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 12/18/01 | DRAWN BY: D. BOMAR
12/21/01 04:39:32 PM
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Table 4-2

Surface Soil and Subsurface Soil Sample Designatins and QA/QC Sample Quantities
Small Arms Impact Area, South of Former POW Training Facility,
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-IASPOW-GP01	HR-IASPOW-GP01-SS-QG0001-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-GP01-DS-QG0002-REG	2-4[a]				
HR-IASPOW-GP02	HR-IASPOW-GP02-SS-QG0003-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-GP02-DS-QG0004-REG	2-4[a]				
HR-IASPOW-GP03	HR-IASPOW-GP03-SS-QG0005-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-GP03-DS-QG0006-REG	2-4[a]				
HR-IASPOW-GP04	HR-IASPOW-GP04-SS-QG0007-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-IASPOW-GP04-DS-QG0008-REG	2-4[a]	HR-IASPOW-GP04-DS-QG0009-FD			
HR-IASPOW-GP05	HR-IASPOW-GP05-SS-QG0010-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-GP05-DS-QG0011-REG	2-4[a]				
HR-IASPOW-GP06	HR-IASPOW-GP06-SS-QG0012-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-GP06-DS-QG0013-REG	2-4[a]				
HR-IASPOW-GP07	HR-IASPOW-GP07-SS-QG0014-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-IASPOW-GP08	HR-IASPOW-GP08-SS-QG0015-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-IASPOW-GP09	HR-IASPOW-GP09-SS-QG0016-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-IASPOW-MW01	HR-IASPOW-MW01-SS-QG0017-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-IASPOW-MW01-DS-QG0018-REG	2-4[a]				
HR-IASPOW-MW02	HR-IASPOW-MW02-SS-QG0019-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-IASPOW-MW02-DS-QG0020-REG	2-4[a]	HR-IASPOW-MW02-DS-QG0021-FD		HR-IASPOW-MW02-DS-QG0020-MS/MSD	

[a] Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
CL - Chlorinated.
OP - Organophosphate.

4.2.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The subsurface soil sampling rationale are listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring locations will be determined in the field by the on-site geologist, based on actual field observations and UXO and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a hand auger.

Soil samples will be collected continuously for the first four feet. A detailed lithogical log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples may be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. The depth of the boring may extended beyond four feet below ground surface, and more than one subsurface soil sample will be collected, if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Two permanent residuum monitoring wells will be installed in the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility. The monitoring well locations are shown on Figure 4-1. The rationale for the monitoring well locations are presented in Table 4-1. Monitoring wells will be installed using a hollow-stem auger drill rig mounted on a truck or all-terrain vehicle. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10 to 20 foot screen.

The monitoring well casing will consist of new 2-inch inside diameter (ID), Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The well will be installed so the well screen intersects the water table. At the discretion of the IT site manager, a sump (composed of new, 2-inch ID, Schedule 40, threaded, flush-joint PVC) may be attached to the bottom of the well screen. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. In wells installed to a depth of 20 feet or less, the filter pack material will be gravity-filled. In monitoring wells installed to depths of more than 20 feet, the filter pack will be tremied into place. The filter pack will be installed from the bottom of the well to approximately five feet above the top of the well screen. The filter pack will consist of 20/40 silica sand. A fine sand (30/70 silica sand) approximately five feet thick may be placed above the filter pack. A bentonite seal, approximately five feet thick, will be placed above the filter pack (or fine sand, if used). The remaining annular space will be grouted with a bentonite-cement mixture, using approximately 7 to 8 gallons of water and approximately 5 pounds of bentonite per 94-pound bag of Type I or Type II Portland cement. The grout will be tremied into place from the top of the bentonite seal to ground surface.

Soil samples for lithology will be collected starting at five feet bgs, and at five-foot intervals thereafter, to the total depth of the borehole. The samples will be collected for lithology using a 24-inch long, 2-inch or larger diameter, split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions. Monitoring wells will be

allowed to equilibrate for 14 days after well development prior to collection of groundwater samples.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the two monitoring wells completed in the area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale are listed in Table 4-1. The groundwater sample designations, depths, and QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP. Low-flow groundwater sampling methodology outlined in the August 2000 letter report to USACE (IT, 2000b) may be used as deemed necessary by the IT site manager.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 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 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Small Arms Impact Area, South of Former POW Training Facility,
Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Alabama

Sample Location	Sample Designation	Sample Matrix [a]	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-IASPOW-MW01	HR-IASPOW-MW01-GW-QG3001-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-IASPOW-MW02	HR-IASPOW-MW02-GW-QG3002-REG	Groundwater	HR-IASPOW-MW02-GW-QG3003-FD		HR-IASPOW-MW02-GW-QG3002-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides

[a] Groundwater samples will be collected from the approximate midpoint of the saturated screened interval of the monitoring well.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
CL - Chlorinated.
OP - Organophosphate.

4.4 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging 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 Vertical Datum of 1988.

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for a specific suite of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected at the Small Arms Impact Area, South of the Former POW Training Facility consist of the following list of analytical suites:

- Target Analyte List Metals - Method 6010B/7000
- Nitroaromatic and Nitramine Explosives - Method 8330.

In addition, ten percent of the samples will be analyzed for the following list of analytical suites:

- Target Compound List Volatile Organic Compounds - Method 5035/8260B
- Target Compound List Semivolatile Organic Compounds - Method 8270C
- Chlorinated pesticides - Method 8081A
- Chlorinated herbicides - Method 8151A
- Organophosphate pesticides - Method 8141A.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP).

Table 4-4

Analytical Samples
Site Investigation
Small Arms Impact Area, South of Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX Total No. Analysis	QA Lab Total No. Analysis
Impact Area for Parcels 100Q and 101Q: 2 water matrix samples (2 groundwater samples); **19 soil matrix samples** (11 surface soil samples and 8 subsurface soil samples)													
All samples will be analyzed for the following parameters:													
TAL Metals	6010B/7000	water	normal	2	1	2	1		1		1	6	0
Nitroaromatic/Nitramine Explosives	8330	water	normal	2	1	2	1		1		1	6	0
TAL Metals	6010B/7000	soil	normal	19	1	19	2		1		2	25	0
Nitroaromatic/Nitramine Explosives	8330	soil	normal	19	1	19	2		1		2	25	0
Approximately 10 % of the samples will be analyzed for the following parameters:													
TCL VOCs	5035/8260B	Water	normal	1	1	1	1		1	1	1	6	0
TCL SVOCs	8270C	Water	normal	1	1	1	1		1		1	5	0
CL Pesticides	8081A	Water	normal	1	1	1	1		1		1	5	0
OP Pesticides	8141A	Water	normal	1	1	1	1		1		1	5	0
Cl Herbicides	8151A	Water	normal	1	1	1	1		1		1	5	0
TCL VOCs	5035/8260B	soil	normal	2	1	1	1		1		2	6	0
TCL SVOCs	8270C	soil	normal	2	1	1	1		1		2	6	0
CL Pesticides	8081A	soil	normal	2	1	1	1		1		2	6	0
OP Pesticides	8141A	soil	normal	2	1	1	1		1		2	6	0
Cl Herbicides	8151A	soil	normal	2	1	1	1		1		2	6	0
			Impact Area for Parcels 100Q and 101Q:			52	16	0	14	1	21	118	0

[a]Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 424-618-8889
Fax: 424-618-0818

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
TCL - Target compound list

VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
CL - Chlorinated.
OP - Organophosphate.

Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms and electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (424) 618-8889.

4.7 Investigation-Derived Waste Management

Management and disposal of investigation-derived waste (IDW) will follow procedures and requirements described in Appendix D of the SAP (IT, 2000a). The IDW generated at the Small Arms Impact Area, South of the Former POW Training Facility is expected to include: soil from hollow-stem auger samples and drill cuttings, purge water from monitoring well development and sampling activities, decontamination fluids, and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Small Arms Impact Area, South of the Former POW Training Facility. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT Project Manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

6.0 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.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

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

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

Osborne, W.E., M. W. Szabo, C. W. Copeland, Jr., and T. L. Nethery, 1989, ***Geologic Map of Alabama***, Geological Survey of Alabama Special Map 221, scale 1:500,000, 1 Sheet.

U.S. Army Corps of Engineers (USACE), 1999a, ***Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama***, June.

U.S. Army Corps of Engineers (USACE), 1999b, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, July.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September 1961.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
Abs	skin absorption
Amsl	above mean sea level
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AEC	U.S. Army Environmental Center
AEL	airborne exposure limit
AET	adverse effect threshold
AHA	ammunition holding area
AL	Alabama
ALAD	ä-aminolevulinic acid dehydratase
amb.	Amber
amsl	above mean sea level
ANAD	Anniston Army Depot
AOC	area of concern
APT	armor-piercing tracer
ARAR	applicable or relevant and appropriate requirement
AREE	area requiring environmental evaluation
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AWARE	Associated Water and Air Resources Engineers, Inc.
AWWSB	Anniston Water Works and Sewer Board
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCF	blank correction factor
BCT	BRAC Cleanup Team
BERA	baseline ecological risk assessment
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BFE	base flood elevation
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
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
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CAB	chemical warfare agent breakdown products
CAMU	corrective action management unit
CCAL	continuing calibration
CCB	continuing calibration blank
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
CG	carbonyl chloride (phosgene)
CFC	chlorofluorocarbon
CFDP	Center for Domestic Preparedness
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
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
Co-60	cobalt-60
CoA	Code of Alabama
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	contaminant of potential concern
COPEC	contaminant of potential environmental concern
CQCSM	Contract Quality Control System Manager
CRL	certified reporting limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
'D'	duplicate; dilution
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
EC_{50}	effects concentration for 50 percent of a population
ECBC	Edgewood Chemical/Biological Command
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
ER	equipment rinsate

ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FDA	U.S. Food and Drug Administration
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
FMP 1300	Former Motor Pool 1300
FOMRA	Former Ordnance Motor Repair Area
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m^3	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
HEAST	Health Effects Assessment Summary Tables
Herb.	herbicides
HHRA	human health risk assessment
HI	hazard index
HNO_3	nitric acid
HQ	hazard quotient
HQ_{screen}	screening-level hazard quotient
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICRP	International Commission on Radiological Protection
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
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
IRDMIS	Installation Restoration Data Management Information System
IRIS	Integrated Risk Information Service
IRP	Installation Restoration Program
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
JPA	Joint Powers Authority
K	conductivity
K_{ow}	octonal-water partition coefficient
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LBP	lead-based paint
LCS	laboratory control sample
LC_{50}	lethal concentration for 50 percent population tested
LD_{50}	lethal dose for 50 percent population tested
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LT	less than the certified reporting limit
LUC	land-use control
LUCAP	land-use control assurance plan
LUCIP	land-use control implementation plan
max	maximum
MCL	maximum contaminant level
MCPA	4-chloro-2-methylphenoxyacetic acid
MDC	maximum detected concentration
MDCC	maximum detected constituent concentration
MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/kg/day	milligram per kilogram per day
mg/kgbw/day	milligrams per kilogram of body weight per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air monitoring system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MMBtu/hr	million Btu per hour
MOGAS	motor vehicle gasoline

MPA	methyl phosphonic acid
MPM	most probable munition
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
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
Na	sodium
NA	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NCP	National Contingency Plan
ND	not detected
NE	no evidence; northeast
ne	not evaluated
NEW	net explosive weight
NFA	No Further Action
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
NLM	National Library of Medicine
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
ns	nanosecond
N-S	north to south
NS	not surveyed
nT	nanotesla
NTU	nephelometric turbidity unit
nv	not validated
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OWS	oil/water separator
oz	ounce
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
PES	potential explosive site
Pest.	pesticides
PETN	pentarey thritol tetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
POW	prisoner of war
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRG	preliminary remediation goal
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
‘R’	rejected data; resample
R&A	relevant and appropriate
RAO	removal action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDX	cyclonite
RfD	reference dose
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	Schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
SLERA	screening-level ecological risk assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	submersible pump
SQRT	screening quick reference tables
Sr-90	strontium-90
SRA	streamlined human health risk assessment
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
STEL	short-term exposure limit
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*
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
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TNT	trinitrotoluene
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
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
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
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

<u>SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation</u>

N/A – Not analyzed

ND – Not detected

Boolean Codes

- LT – Less than the certified reporting limit

Flagging Codes

- 9 – Non-demonstrated/validated method performed for USAEC
- B – Analyte found in the method blank or QC blank
- C – Analysis was confirmed
- D – Duplicate analysis
- I – Interfaces in sample make quantitation and/or identification to be suspicious
- J – Value is estimated
- K – Reported results are affected by interfaces or high background
- N – Tentatively identified compound (match greater than 70%)
- Q – Sample interference obscured peak of interest
- R – Non-target compound analyzed for but not detected (GC/MS methods)
- S – Non-target compound analyzed for and detected (GC/MS methods)
- T – Non-target compound analyzed for but not detected (non GC/MS methods)
- U – Analysis in unconfirmed
- Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

- J – The low-spike recovery is low
- N – The high-spike recovery is low
- R – Data is rejected

SSHP

Final
Site-Specific Safety and Health Plan
Small Arms Impact Area,
South of the Former Prisoner of War Training Facility,
Former Rifle/Machine Gun Ranges
Parcels 100Q and 101Q
Fort McClellan
Calhoun County, Alabama

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

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

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

January 2002

The following Site-Specific Safety and Health Plan (SSHP) has been designed for the methods presently contemplated by IT Corporation (IT) 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 IT. In addition, as the work is performed, conditions different from those anticipated may be encountered and the SSHP may have to be modified. Therefore, IT only makes representations or warranties as to the adequacy of the SSHP for currently anticipated activities and conditions.

This Site-Specific Safety and Health Plan must be used in conjunction with the Installation-Wide Safety and Health Plan and Installation-Wide Ordnance and Explosives 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 the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle and Machine Gun Ranges, Parcels 100Q and 101Q. Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

Stephen G. Moran for
Jeanne Yacoub, PE
Project Manager

1/4/02
Date

William J. Hetrick
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

1/4/02
Date

Jeffrey J. Tarr
Jeff Tarr
Site Coordinator

1/4/02
Date

Acknowledgements

The approved version of this site-specific safety and health plan (SSHP) attachment for the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q. Fort McClellan, Calhoun County, 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.

Project Manager

01/04/02
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 the health and safety manager.

Site Coordinator

01/04/2002
Date

Site-Specific Safety and Health Plan Acknowledgement Form

I have been informed of, and will abide by the procedures set forth in this site-specific safety and health plan attachment for work activities on the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q. Fort McClellan, Calhoun County, Alabama.

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

Fort McClellan Gate Hours

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

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
Military Police (SSG Busch) ..... (256) 848-5680, 848-4824
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 Non emergencies/Reporting Only (Ronald Levy) ..... (256) 848-6853
Baltzell Gate Guard Shack ..... (256) 848-5693, 848-3821
National Response Center & Terrorist Hotline ..... (800) 424-8802
Poison Control Center ..... (800) 462-0800
EPA Region IV ..... (404) 562-8725
Ronald Levy, Chief, FTMC Environmental Management ..... (256) 848-6853
Ellis Pope, U.S. Army Corps of Engineers ..... (251) 690-3077
Jeanne Yacoub, IT Project Manager ..... (770) 663-1429
Bill Hetrick, IT H&S Manager ..... (865) 690-3211, ext. 2571; pager (888) 655-9529
Jeff Tarr, IT Site Manager ..... (256) 848-3482, 3499
Mike Moore, Fort McClellan Safety Office ..... (256) 848-5433
Dr. Jerry H. Berke, Health Resources Occupational Physician ..... (800) 350-4511

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Attachment 1 – Evaluating OE/UXO/CWM in Support of HTRW Activities

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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 Site Work Plan Summary

Project Objective. The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to conduct site investigation activities at the Small Arms Impact Area, South of the Former Prisoner of War (POW) Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q.

The scope of work includes collection of the following:

- Surface soil samples
- Subsurface soil samples
- Groundwater samples (Installation of two permanent residuum monitoring wells).

Attachment 1, Evaluating ordnance explosive (OE)/unexploded ordnance (UXO)/chemical warfare material (CWM) Hazards in Support of hazardous, toxic, and radioactive waste (HTRW) Activities, confirm that the historical records available for the Parcels have been reviewed and that UXO support is required for all site activities. Figures 1-1 and 1-2 in the Site-Specific Field Sampling Plan (SFSP) show the site map and the location of parcels 100Q and 101Q for the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges. Table 1-1 in the SFSP provides references to each parcel and historical information on description and use. Additionally, based on all available information, it is anticipated that the potential for chemical warfare agents is low; also, no real time air monitoring for chemical warfare materials will be required.

UXO surface sweeps and downhole surveys of soil 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 purpose of UXO avoidance. The site-specific UXO safety plan will be used to support sample collection activities for this investigation and will provide specific instructions if incidental ordnance, explosives, and UXO are encountered and require avoidance.

At completion of the field activities and sample analysis, draft and final reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of potential site-

specific chemicals (PSSC) at this site, and to recommend further actions, if appropriate. Range sampling reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA) Region IV, and the Alabama Department of Environmental Management (ADEM) guidelines.

Personnel Requirements. Up to 15 employees are anticipated for this scope of work.

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 (SHP) for site investigations at FTMC, and be familiar with the requirements of this site-specific safety and health plan (SSHP). This SSHP must be used in conjunction with the Installation Wide SHP, FTMC, Alabama and the Site Specific UXO Safety Work Plan which provides technical guidance for Ordnance and Explosives avoidance.

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). Site control with the use of specific work zones (support zone, contamination reduction zone, and exclusion zone) is addressed in Chapter 7.0 of Appendix A of the IT, August 2000a, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama.*

Detailed descriptions of each of the ranges to be investigated can be found in Section 1.0 (Project Description) the site specific field sampling plan (SFSP) and should be reviewed to supplement this SSHP. Potential contaminant sources at the Small Arms Impact Area, Former Rifle/Machine Gun Ranges are primarily unknown, but may include nitroexplosives (nitroaromatic and nitroamine) and metals. Lead in soil will be the most likely metal encountered since live fire was conducted at the ranges. Additional metals associated with the live fire of ammunition include: arsenic, antimony, and barium. Ten percent of the samples will be collected and analyzed for selected volatile organic compounds (VOC) , semivolatile organic compounds (SVOC), chlorinated pesticides, herbicides, and organophosphate pesticides. Sediment samples will be analyzed for total organic carbon. Engineering controls (dust suppression) will be required where site activities generate visible dust emissions from vehicle and equipment operations performed off established roadways and within the surface danger zone or range fan firing direction and impact areas. The site and proposed sample location maps in the SFSP illustrate impact and range fan areas where the highest potential for lead contamination is anticipated.

Procedures contained in the Site Specific UXO Safety Plan shall be followed for all site activities associated with this investigation.

Table 2-1 contains the toxicological properties of chemicals anticipated or to be used at the Small Arms Impact Area, Former Rifle/Machine Gun Ranges, Parcels 100Q, and 101Q.

Table 2-1

Toxicological Properties of Chemicals
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
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]
Arsenic [7440-38-2]	NONE	NONE	Inh Ing Con	Cough, diarrhea, shortness of breath, vomiting, grey skin. Redness	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	0.01 mg/m^3 0.01 mg/m^3	.002 mg/m3 (Ca)	PEL TLV REL	5 mg/m^3
Antimony [7440-36-0]	NONE	NONE	Inh Ing Con	Coughing, abdominal pain, burning sensation, vomiting, diarrhea,	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow : Immediate medical attention	0.5 mg/m^3 0.5 mg/m^3 0.5 mg/m^3		PEL TLV REL	50 mg/m^3
Barium [7440-39-3]	NONE	NONE	Inh Ing Con	Cough, sore throat Redness	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	0.5 mg/m^3 0.5 mg/m^3 0.5 mg/m^3		PEL TLV REL	NA
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, substernal 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	NONE		PEL TLV REL	

Table 2-1

Toxicological Properties of Chemicals
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
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]
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 Ca, lowest feasible conc. (LOQ 15 ppm)	- 500 ppm	PEL TLV REL	1400 ppm (10% LEL)
Lead {7439-92-1}	N/A	N/A	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	0.05 mg/m^3 0.05 mg/m^3 0.1mg/m^3		PEL TLV REL	100 mg/m^3
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	2,000 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	NONE		PEL TLV REL	
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	PEL TLV REL	25ppm

Table 2-1

Toxicological Properties of Chemicals
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
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]
Nitroglycerin [55-63-0]	NA	NA	Inh Ing Con	Abdominal ramps, blue lips and fingernails, dizziness, headache, labored breathing	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	- 0.46 mg/m^3 skin -	.2 mg/m3 skin - 0.1 mg/m^3 skin	PEL TLV REL	75 mg/m^3
Portland cement [65997-15-1]	NA	NA	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	5 mg/m^3 respirable dust 15 mg/m^3 total dust 10 mg/m3 10 mg^3/ total dust 5 mg/m3 respirable dust	- - -	PEL TLV REL	5000 mg/m^3
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	2 mg/m^3 - -	- C 2 mg/m^3 C 2 mg/m^3	PEL TLV REL	10 mg/m^3

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 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.

Table 2-1

Toxicological Properties of Chemicals
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

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, Pub. 1998).
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, 1998, 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.
Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.
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.
Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.
Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

2.2 General Site Information

Location of Site. FTMC is located in the foothills of the Appalachian Mountains of northeastern Alabama near the cities of Anniston and Weaver in Calhoun County. FTMC is approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn and 95 miles west of Atlanta, Georgia. FTMC consists of three main areas of government-owned and leased properties: Main Post, Pelham Range and Choccolocco Corridor (lease terminated in May 1998).

Parcels 100Q and 101Q are two of seven former rifle/machine gun ranges that were identified on the Northern Main post. The range fans for parcels 100Q and 101Q cover an area of approximately 3790 and 14 acres respectively. The area of investigation, however, will be limited to approximately 3 acres which consists of a possible target berm, an area containing a significant number of expended small arm rounds and historically disturbed areas. The ranges are not fenced and it is possible that hunters may trespass at the sites. The study area includes the range firing line(s), target line(s) and impact zone(s). Study areas are defined in this work plan and are based on the historical range use and topography. The safety fan is defined as the down range area where personnel were not allowed when training was in progress. Safety fans limits were originally defined by the Army and are based on the ballistics of the ordnance used at the range and the range orientation.

Duration of Planned Employee Activity. Employee activity duration is anticipated to be less than one month.

Site Description

The Small Arms Impact Area South of the Former POW Training Facility is located in the north-central area of the Main Post of Fort McClellan, south of the intersection of Falcon and Gobbler Roads. This area of investigation was identified during a site walk by IT personnel and encompasses a possible target berm and an area containing a significant quantity of expended small arms munitions (bullets and bullet fragments). The area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility is located within the range fans for Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, identified in the environmental baseline survey (EBS).

Review of the available aerial photographs suggests that range activity at the Former Rifle/Machine Gun Range, Parcel 100Q, between 1964 and 1973 is the likely cause of the features found at the Small Arms Impact Area, South of the Former POW Training Facility.

Pathways for Hazardous Substance Dispersion. Possible pathways for hazardous substances in the area are soils, sediments, surfacewater and groundwater.

3.0 Personal Protective Equipment

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

Task	Initial Level of PPE
Initial UXO avoidance sweep and equipment staging	Level D
Utility clearance	Level D
Surface water, sediment and surface soil sampling (Including x-ray fluorescence [XRF])	Level D
Subsurface soil and groundwater sampling	Modified Level D*
Monitoring well installation and downhole UXO avoidance	Modified Level D*
Surveying	Level D

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

Level D. The minimal level of protection that will be required of IT 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)
- Steel-toed safety boots
- Safety glasses
- Hardhat
- Wear 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
- Latex boot covers
- Nitrile, heavy work, or latex gloves
- Steel-toed safety boots
- Safety glasses
- Hardhat

- Hearing protection (when working near/adjacent to operating equipment).

Note: In addition to Modified Level D PPE, the operator of high-pressure water jetting equipment (pressure washers), shall wear metatarsal guards for protection of the legs and feet and a face shield for protection from splashes (refer to IT H&S Procedure HS 303).

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/Mine Safety and Health Administration-approved full-face, air-purifying respirators equipped with organic vapor/acid gas cartridge in combination with high-efficiency particulate air filter
- 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
- Hardhat
- Hearing protection (when working near/adjacent to operating equipment).

Note: In addition to Level C PPE, the operator of high-pressure water jetting equipment (pressure washers), shall wear metatarsal guards for protection of the legs and feet and a face shield for protection from splashes (refer to IT H&S Procedure HS 303).

4.0 Site Monitoring

The environmental contaminants of concern resulting from former activities on the Small Arms Impact Area, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q are primarily unknown but based on land use history probably include nitro explosives, white phosphorous and lead.

Table 4-1 contains action levels for site monitoring on the Small Arms Impact Area, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q.

Chemical. The site safety and health officer or task geologist shall perform air monitoring during the performance of site activities and ground intrusive operations. A calibrated photo ionization detector (i.e., Hnu DL-101 or equivalent) 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 the protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the borehole, work areas and BZs to determine if any combustible/flammable gases may be present that would necessitate evacuation of the work area. A Miniram PDM-3 or equivalent aerosol monitor shall be used to monitor airborne dust since lead is a potential concern. Table 4-2 contains the required air monitoring frequency and location for site monitoring at the three parcels under investigation.

Radiological. Radiation hazards are not anticipated from previous site activities. However, the field screening for lead contamination within range fans using the NITON XRF instrument requires general radiation awareness training. The XRF contains cadmium$_{109}$, americium $_{241}$, and iron $_{55}$ sealed radioactive sources. Operators of the XRF shall be trained in the safe use of the instrument and follow all required manufacturers instructions. Leak detection testing within the last six months shall be performed on the XRF and certificates of analysis included in the shipping container. Required licensing documentation and storage requirements shall be enforced. Exposure to radiation is related to three factors: time, distance and shielding. Human exposure to radiation is typically measured in rems, or in one-thousandths of a rem, called millirems (mR). The allowable limit in the US for occupational exposure is 5,000 mR/year for a whole-body and 50,000 mR for shallow penetration of extremities. Exposure from a properly-used NITON will be less than 50 mR per year, even if the instrument is used 2,000 hours per year.

Table 4-1

Action Levels
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

When in Level C PPE

Analyte	Action Level[a]	Required Action[b]
VOCs (volatile organic compound)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, upgrade to Level B; Notify CIH
Dust	> 5.0 mg/m^3 above background in BZ	Stop operations, Notify CIH.
LEL (lower explosive limit)	≤ 10 % LEL ≥ 10 % LEL	Normal operations Stop work, identify source

When in Level D Modified/D PPE

Analyte	Action Level[a]	Required Action[b]
VOCs	≥ 1 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; Notify CIH
Dust	≥ 0.5 mg/m^3 above background in BZ	Stop work, Initiate dust control, upgrade to Level C PPE if dust control is not effective; Notify CIH
LEL (lower explosive limit)	≤ 10 % LEL ≥ 10 % LEL	Normal operations Stop work, identify source. Monitor for VOC's

Table 4-1

Action Levels
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

When in Support Zone

Analyte	Action Level[a]	Required Action[b]
VOCs	$\geq$ 1 ppm above background in BZ	Evacuate support zone and re-establish perimeter of exclusion zone.
Dust	> 0.5 mg/m^3 above background in BZ	Stop work, Initiate dust control

[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.

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

Table 4-2

Air Monitoring Frequency and Location
Small Arms Impact Area, South of the Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Work Activity	Instrument	Frequency	Location
Staging equipment and UXO avoidance sweeps	OV Monitor Miniram	Initially for area Periodically	(BZ) of employees
Sampling (surface water, surface soil, sediment, and XRF analysis)	OV Monitor Miniram	Periodically Periodically	BZ of employees BZ of employees
Monitoring well installation and subsurface soil sampling	OV Monitor Miniram LEL/ O_2	Periodically Periodically Periodically	BZ of employees BZ of employees Bore hole
XRF Sampling	Miniram	Periodically	BZ of employees

OV = Organic vapor as determined by a PID or FID.
Miniram = Aerosol (dust) monitor (direct reading instrument).
LEL/O_2 = Lower Explosive Limit/Oxygen as determined by a Combustible Gas Meter.
BZ = Breathing Zone of employee(s).

Unexploded Ordnance. UXO support for sampling activities are specified in the site-specific UXO safety plan developed for the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q. The UXO specialists will perform UXO avoidance sweeps prior to moving the heavy equipment onto the site. During this operation, UXO on the surface will be detected and marked for avoidance during field operations. Additionally, downhole magnetometer surveys will be performed to detect metal objects in the path of sampling equipment or boring apparatus. The sampling/boring location will be moved to avoid subsurface metal objects. It will be standard practice to conduct UXO avoidance for all intrusive activities.

If UXO is encountered, personnel will contact the site manager and UXO specialist immediately. Personnel will evacuate the immediate area and secure it.

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.
- Installation of monitoring wells.
- Subsurface soil, groundwater, surface water and sediment sampling.
- Surveying.
- Moving and shipping collected samples.
- Disposal of investigative derived waste (forklift operations).
- High-pressure water jetting operations.

All injuries and illnesses must be immediately reported to the site manager and 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. Directions to the hospital from the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q are provided in Figure 5-1.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging	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.
	Noise	• Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	• Adequate lighting will be provided to ensure a safe working environment.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	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
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
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
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
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. • 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.
Surveying	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
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Surveying (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 activities. • If UXO is encountered, cease all activities, mark the location, and notify the site manager.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Groundwater Sampling	Cross-contamination and contact with potentially contaminated materials	• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with water. • Handle samples with care. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • 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.
	Hazard communication	• MSDSs shall be obtained for chemicals brought on site. • Label all containers as to contents.
	Strains/sprains	• Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Spills/residual materials	• Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	• Adequate lighting will be provided to ensure a safe working environment.
	Unattended worker	• Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (XRF)	Cross-contamination and contact with potentially contaminated materials	• Stop immediately at any sign of obstruction. • 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. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • 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 across 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
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (XRF) (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
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (XRF) (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. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist.
	Accidental exposure to chemical agents	• Low-level real-time environmental monitoring will be performed by Quanterra Battelle Quicksilver Center. • Modified Level D personal protective equipment (PPE) will be required. During the first 15 feet depth of each monitoring well installation activity, downhole geophysics will be performed. • Engineering controls will be used as appropriate. • Personnel will be equipped with an emergency egress air supply pack.
Moving and Shipping Collected Samples	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 60 pounds require assistance or mechanical equipment; size up the lift.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Material Storage	Flammable and combustible liquids	• Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.
Disposal of Investigation-Derived Waste (IDW) (Forklift Operation)	Personnel injury, property damage, and/or equipment damage	• 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.
	Cross-contamination and contact with potentially contaminated materials	• Stop immediately at any sign of obstruction. • 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. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • 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.
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.
	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.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	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.
	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.
	Flying debris	• Impact-resistant safety glasses with side shields are required.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Contact with potentially contaminated materials	• All site personnel will wear the appropriate PPE.
Drilling and Installation of Monitoring Wells	Overhead hazards	• Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.
	Faulty or damaged equipment being utilized to perform work	• All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out. • Drill rigs shall be equipped with reverse signal alarm, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	• Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Aboveground and belowground utilities will be located prior to staging equipment. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work.
	Inexperienced operator	• Machinery and mechanized equipment shall be operated only be designated personnel. • Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgment.
	Jacks/outriggers	• Ensure proper footing and cribbing.
	Falling objects	• Remove unsecured tools and materials before raising or lowering the derrick. • Stay alert and clear of materials suspended overhead.
	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert at all times!

Table 5-1

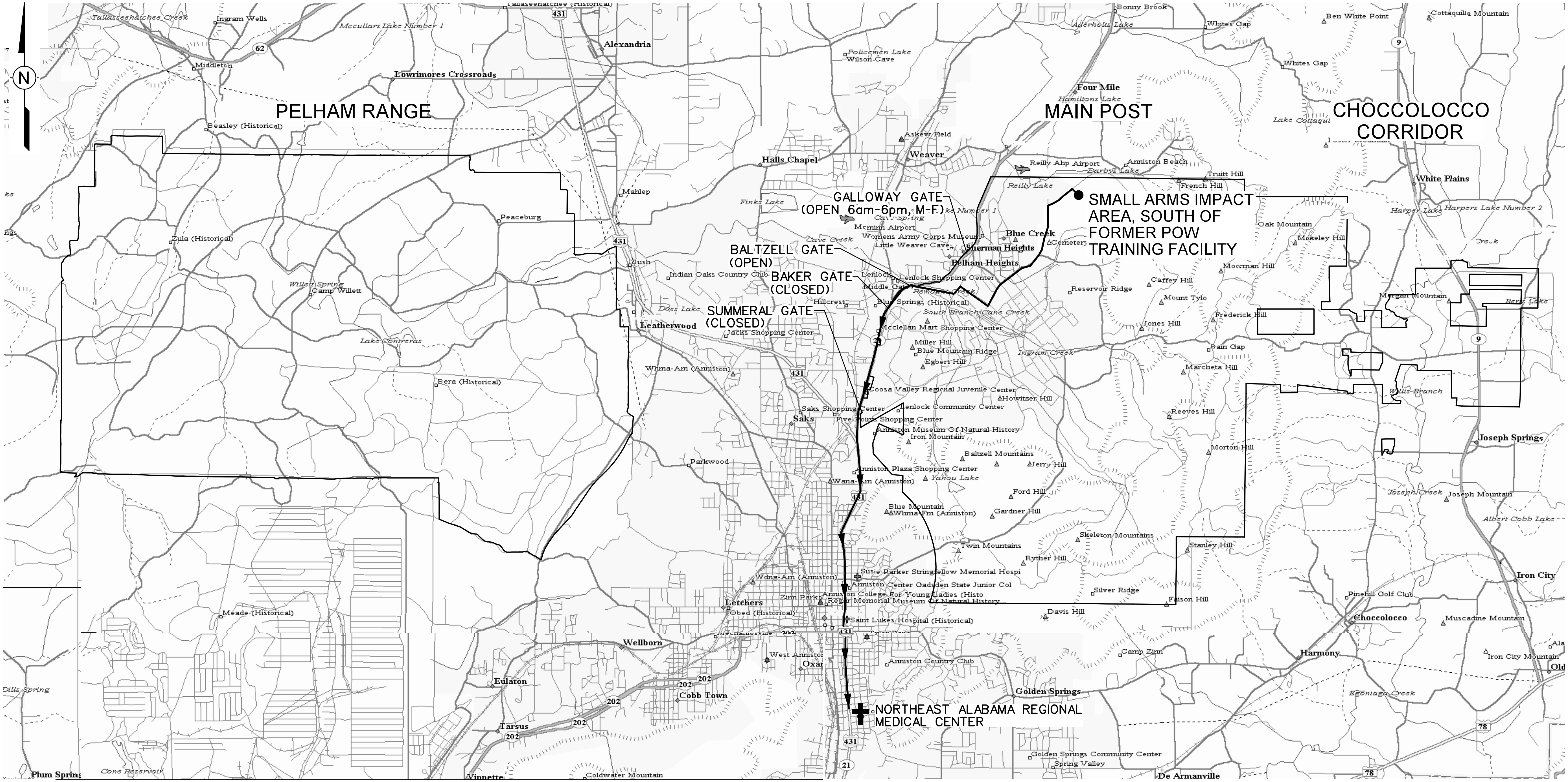
Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	Fire	• Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available.
	Fall hazards	• Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Contact with rotating or reciprocating machine parts	• Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	• Practice good housekeeping, keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Contact with potentially contaminated materials	• Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized. • Stop immediately at any sign of obstruction. • Do not breathe air surrounding the boring unless necessary. • Upgrade to respirator if necessary. • Avoid skin contact with soil cuttings. Wear gloves. • Stay clear of moving parts of drill rig.

Table 5-1

Activity Hazard Analysis
Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	Drum handling	• Be careful not to breathe air from around open drum any more than necessary. Monitor with photoionizaton detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary. • When filling a drum (with either soil or water), be careful not to make contact with the contained waste. Wear appropriate gloves. Make sure lid or bung of drum is secure. • If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boots. • When using a drum dolly, make sure straps and lid catch are securely attached. Leverage properly when tilting drum. Be sure toes stay away from drum.
	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • UXO avoidance monitoring shall apply to all intrusive activities associated with well construction completion. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist immediately.



LEGEND:

- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- 431 U.S. HIGHWAY
- HOSPITALS
- INVESTIGATION SITE

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

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\796887es.279
PROJ. NO.: 796887
INITIATOR: J. REMO
PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 12/20/01
DRAWN BY: D. BOMAR
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ATTACHMENT 1

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

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

Site Name: Small Arms Impact Area, South of the Former P.O.W. Training Facility

Job Number: 796887 **Date: 13-Dec-01**

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 –

Site Name: Small Arms Impact Area, South of the Former P.O.W. Training Facil

Job Number: 796887 **Date: 13-Dec-01**

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: Small Arms Impact Area, South of the Former P.O.W. Training Facil

Job Number: 796887

Date: 13-Dec-01

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: 21DEC01 IT H&S Specialist _____ Date: 1/4/02

Site Name: Small Arms Impact Area, South of the Former P.O.W. Training Facil

Job Number: 796887

Date: 13-Dec-01

Additional Notes and Explanations:

Site-Specific UXO Safety Plan

Final
Site-Specific Unexploded Ordnance Safety Plan Attachment Site Investigation at the Small Arms Impact Area, South of the Former Prisoner of War Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, Fort McClellan, Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
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Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887

January 2002

Revision 0

Final
Site-Specific Unexploded Ordnance Safety Plan Attachment Site Investigation at the Small Arms Impact Area, South of the Former P.O.W. Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q

I have read and approve this site-specific unexploded ordnance (UXO) safety plan attachment for the Small Arms Impact Area, South of the Former P.O.W. Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation UXO procedures.

Robert W. Hickman, Jr.
UXO Technical Manager

21 DEC 01
Date

William J. Hetrick, CIH
Health & Safety Manager

1/4/02
Date

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE
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WILLIAM J. HETRICK, CIH

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Attachment 1 - Fort McClellan Unexploded Ordnance Supplementary Procedures

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 IT Corporation (IT) unexploded ordnance (UXO) personnel in conjunction with the site investigation (SI) at the Small Arms Impact Area, South of the Former Prisoner of War (POW) Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, at Fort McClellan (FTMC), Calhoun County, Alabama. This document is not a stand-alone document; it must be used in conjunction with the *Fort McClellan Unexploded Ordnance Supplementary Procedures* (IT, 2001), attached as Attachment 1.

IT UXO personnel will perform visual surveys, assisted by hand-held magnetometers and metal detectors, to support the collection of surface soil, subsurface soil, and groundwater samples for chemical analysis at the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q. The purpose is to avoid ordnance and explosives (OE) during hazardous, toxic and radioactive waste (HTRW) sampling activities. Intrusive anomaly investigation is not authorized for this site work.

The Small Arms Impact Area, South of the Former POW Training Facility is located in the north-central portion of the Main Post of FTMC, south of the intersection of Falcon and Gobbler Roads. This small arms impact area was identified during a site walk conducted by IT personnel in October 2001. The area of investigation is approximately three acres and consists of a possible target berm, an area containing a significant quantity of expended small arms rounds (bullets and bullet fragments), and historically disturbed areas. The area is generally covered with trees and brush, except for some grass-like vegetation found along the northern portion of the area of investigation.

The area of investigation for the Small Arms Impact Area, South of the Former POW Training Facility is located within the range fans for Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc., 1998). According to the EBS, Former Rifle/Machine Gun Ranges, Parcels100Q and 101Q, are two of seven former rifle/machine gun ranges that were identified in the northern part of the Main Post. The dates of operation and types of ordnance fired at these ranges are unknown. According to historical maps, four ranges were in use in 1917. However, it is unclear which four of the seven were active at that time. The remaining three ranges appear on later historical maps (1959 and 1966).

Based on the orientation of the range fans and firing lines presented in the EBS, the direction of fire for the Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, was to the southeast, in the direction of the Small Arms Impact Area, South of the Former POW Training Facility. Impact areas for Parcels 100Q and 101Q were not identified in the EBS.

The Small Arms Impact Area, South of the Former POW Training Facility falls within the "Possible Ordnance Impact Areas" shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (U.S. Army Corps of Engineers [USACE], 1999). Therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site.

Review of the available aerial photographs suggests that range activity between 1964 and 1973 at the Former Rifle/Machine Gun Range, Parcel 100Q, is the likely cause of the features found at the Small Arms Impact Area, South of the Former POW Training Facility. No other information is available regarding the types or quantities of ordnance used at these sites.

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 for FTMC (IT, 2000). A UXO team will be on site during all sampling or 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 and explosive ordnance recognition, location, and safety functions for IT employees and any subcontractors during sampling activities. Sampling activities at this site include surface and subsurface soil sampling, drilling and installing monitoring wells, sampling of monitoring wells, survey of sample points, and safe access and egress to and from the site in support of HTRW sampling 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

The scope of work for SI activities at the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, includes the following UXO tasks:

- Provide UXO avoidance support during the collection 11 surface soil samples, 8 subsurface soil samples, and 2 groundwater samples. Sample locations are defined in Section 4.0 of the site-specific field sampling plan contained in this binder.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- 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 the commencement of any type of activities. This includes foot and vehicular traffic. UXO avoidance activities at the Small Arms Impact Area, South of the Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, will include:

a) Access Corridors and Sampling Sites

(1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the investigation sites. Access surveys will begin in a known clear area and proceed by the most direct route to the sampling site. The boundaries of the access route and 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 IT FTMC "Unexploded Ordnance Report Form."

(3) The boundaries of the access routes and sampling sites will be recorded in the IT FTMC "UXO Sketch Log" by the UXO technician. 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* (IT, 2001) 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 of 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 drill 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. If the proposed site is still free of magnetic anomalies, the drilling equipment may be brought on site and utilized. The UXO team will continue to inspect the drill hole for anomalies at two-foot increments as the drilling is advanced from the clearance depth of the pilot hole until a depth of 12 feet is reached.

b) Vegetation Removal

In cases where removal of large trees or other vegetation is required to support access or sampling operations, the procedures in paragraph 4.2, *FTMC UXO Supplementary Procedures* (IT, 2001) will be followed.

c) Magnetometer/Metal Detector Checkout and Field Procedures

The procedures in paragraph 3.0, *FTMC UXO Supplementary Procedures* (IT, 2001) will be followed. The Small Arms Impact Area, South of the Former POW Training Facility, is located in an area of FTMC that potentially includes portions of an

artillery range impact area. Therefore, the function test will utilize the function test ordnance that most closely approximates the 2.36-inch projectile and 75mm projectile.

d) UXO Logbooks and Documentation

All UXO personnel identified in paragraph 5.0, *FTMC UXO Supplementary Procedures* (IT, 2001) 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 IT 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 IT 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 IT quality assurance representative upon request.

8.0 References

IT Corporation (IT), 2001, ***Fort McClellan Unexploded Ordnance Supplementary Procedures***, June.

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

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), 1999, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama,*** July.

ATTACHMENT 1

FORT MCCLELLAN UNEXPLODED ORDNANCE SUPPLEMENTARY PROCEDURES

FTMC UXO SUPPLEMENTARY PROCEDURES

Subject: Ordnance and Explosives

1.0 INTRODUCTION

IT Corporation (IT) 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 IT 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. IT 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 IT 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 IT 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 IT 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
- IT 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 IT 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 IT 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 IT UXO Team Leader or IT 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 IT 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 IT 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 IT 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 IT 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 IT 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 IT 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 IT 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 IT 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 IT FTMC QC Officer will utilize the IT FTMC "UXO Avoidance Quality Control Report" (Attachment 4) to document checks of field activities.

Additionally, UXO personnel will complete IT FTMC Form "UXO Sketch Log" (Attachment 5) and IT 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.

_____

Jim Kerr
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: IT 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: