

**Final**

**Site-Specific Field Sampling Plan,  
Site-Specific Safety and Health Plan, and Site-Specific  
Unexploded Ordnance Safety Plan Attachments  
Former Rifle Grenade Range North of Washington  
Ranges, Parcel 221Q-X**

**Fort McClellan  
Calhoun County, Alabama**

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

**February 2001**

**Revision 1**

**Final  
Site-Specific Field Sampling Plan Attachment  
Site Investigation at Former Rifle Grenade Range North of  
Washington Ranges, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

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**February 2001**

**Revision 1**

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## ***List of Acronyms***

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See Attachment 1 – List of Abbreviations and Acronyms.

## ***Executive Summary***

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In accordance with Contract Number DACA21-96-D-0018, Delivery Order CK10, IT Corporation will conduct site investigation activities at the Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X, at Fort McClellan (FTMC), Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan is to provide technical guidance for sampling activities at the Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X.

Former Rifle Grenade Range, Parcel 221Q-X, is located east of Iron Mountain Road, directly northeast of Former Range 19, Qualification Pistol Range, Parcel 75Q, and south of Former Skeet Range, Parcel 69Q. The FTMC archive search report states that this rifle grenade range was used during World War II and was abandoned by 1958. It is also reported in the search report that World War II vintage rifle grenades were found northeast of Range 19 on the south side of the service road. The area is currently heavily wooded and no standing structures exist within the parcel boundaries.

Specifically, IT Corporation will collect three surface soil samples, three subsurface soil samples, two surface water samples, and two sediment samples at this site. Potential contaminant sources at Former Rifle Grenade Range, Parcel 221Q-X, are primarily unknown, but may include metals and nitroexplosives. Chemical analyses of the samples collected during the field program will include metals, perchlorate, and nitroexplosives. Results from these analyses will be compared with site-specific screening levels developed in the July 2000 *Human Health and Ecological Screening Values and PAH Background Summary Report*, and regulatory agency guidelines.

Former Rifle Grenade Range, Parcel 221Q-X, falls within the “Possible Explosive Ordnance Impact Areas in Central Main Post” shown on Plate 10 of the July 1999 FTMC archive search report maps; therefore, unexploded ordnance surface sweeps and downhole surveys of soil borings will be required to support field activities. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of unexploded ordnance (UXO) avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for Former Rifle Grenade Range, Parcel 221Q-X, will be used in conjunction with

the site-specific safety and health plan, 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, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan and the site-specific UXO safety plan.

## **1.0 Project Description**

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### **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. At the request of the U.S. Army, IT Corporation (IT) has been requested to conduct fast-track site investigation (SI) activities at Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X, at FTMC, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site for potential quick release of the property by the U.S. Army. The area of this parcel was specified by the FTMC transition force. IT will conduct SI activities in accordance with Contract Number DACA21-96-D-0018, Task Order CK10.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and site-specific unexploded ordnance (UXO) safety plan developed for Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X, and the installation-wide work plan (WP) (IT, 1998), and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP and site-specific UXO safety plan attachment.

Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X, will be referenced as Former Rifle Grenade Range, Parcel 221Q-X, throughout the text.

### **1.2 Site Description**

Former Rifle Grenade Range, Parcel 221Q-X is located in the southwest portion of the Main Post (Figure 1-1). Parcel 221Q-X, is a 5.23-acre area approximately 500 feet north of Former Range 19, Qualification Pistol Range, Parcel 75Q, and immediately south of the Former Skeet Range, Parcel 69Q (Figure 1-2). The parcel is bounded to the south, and divided by, a service road that connects to Iron Mountain Road. The area is heavily wooded and no standing structures currently exist at the site.

Former Rifle Grenade Range, Parcel 221Q-X, was used to train soldiers in the proper use of rifle grenades. The range was identified on the 1946 reservation map and Plate 10 of the July 1999 FTMC archive search report maps. The FTMC archive search report states that this rifle grenade range was used during World War II and was abandoned by 1958. The search report also states that World War II vintage rifle grenades were found northeast of Range 19 on the south side of the service road. Direction of fire is believed to have been toward the southeast from a firing line that would have been established at the northeast end of the parcel. This firing arrangement would allow the ridge to the southeast to serve as a backstop for rifle grenade fire.

The overall elevation of Former Rifle Grenade Range, Parcel 221Q-X, ranges from about 840 to 940 feet mean sea level. The highest elevation is at what is believed to be the target area for the range. Shallow groundwater flow probably follows site topography, with movement toward the northeast. A surface drainage feature passes through this parcel, beginning at the southeastern-most corner of the parcel boundary and exiting the site to Skeet Range, Parcel 69(Q) (Figure 1-2).

The soils at Former Rifle Grenade Range, Parcel 221Q-X, fall into Jefferson series, 0 to 10 percent slopes (U.S. Department of Agriculture, 1961).

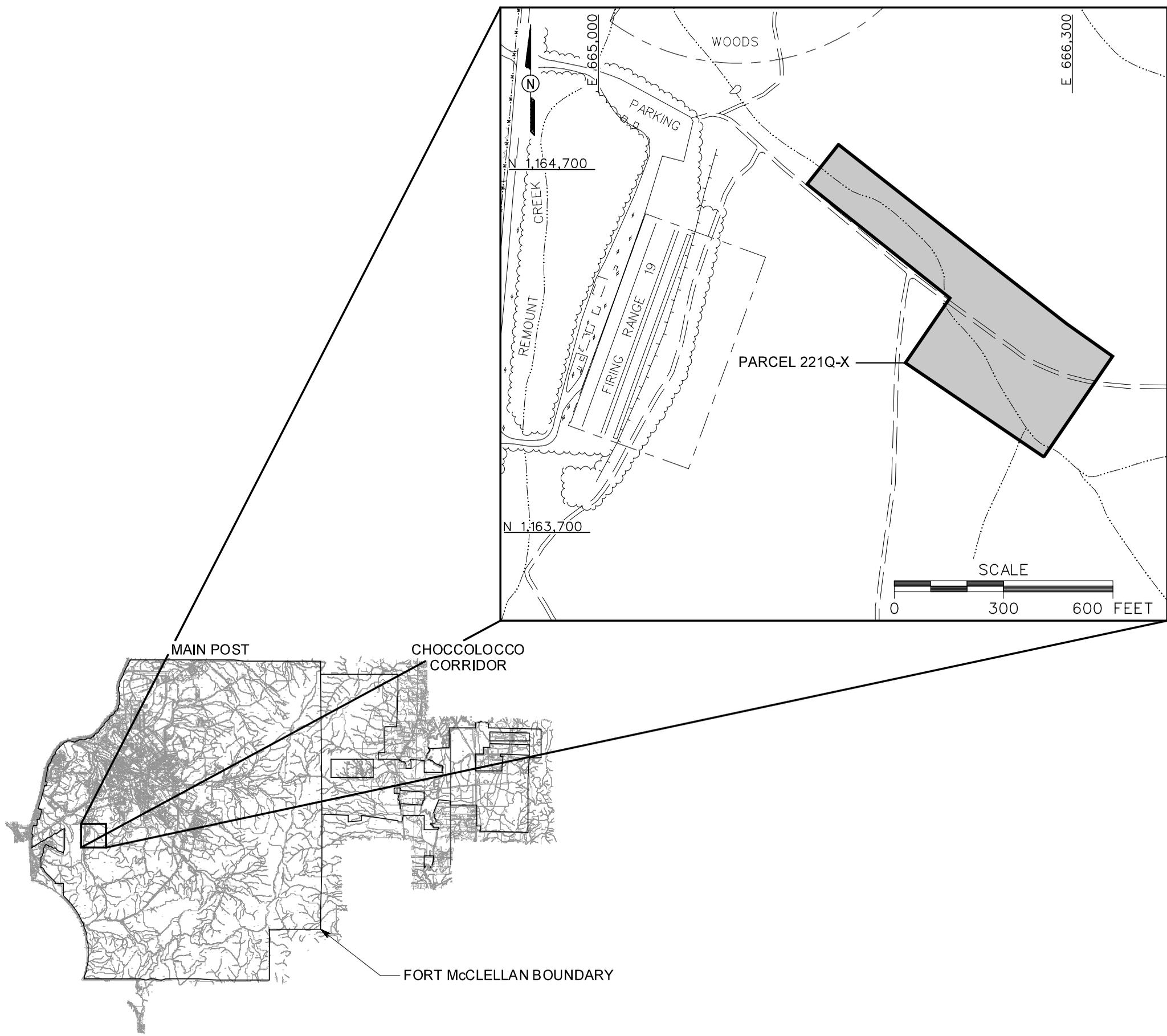
The Jefferson series consists of well-drained, strongly acidic soils that occur in small areas on fans and on foot slopes of Choccolocco, Colvin, and Coldwater Mountains. These soils have developed from old local alluvium that washed or sloughed from ridges of sandstone, shale, and Weisner quartzite. The surface soil is dark grayish-brown, fine, sandy loam, and the subsurface soil is yellowish-brown, light, fine, sandy clay. Fragments of sandstone and quartzite, as much as 8 inches in diameter, are on the surface throughout Jefferson soils. The depth to bedrock on these soils typically range from 2 feet to greater than 4 feet. The depth to the water table is likely greater than 20 feet. The typical soil description is 1.5 to 4 feet of well-drained, gravelly, fine, sandy clay developed from local alluvium that washed from soils underlain by sandstone and shale.

### **1.3 Scope of Work**

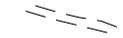
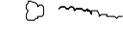
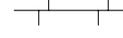
The scope of work for activities associated with the site investigation at Former Rifle Grenade Range, Parcel 221Q-X, as specified in the statement of work, includes the following tasks:

- Develop the SFSP attachment
- Develop the SSHP attachment

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 PROJ. MGR.: J. YACOUB  
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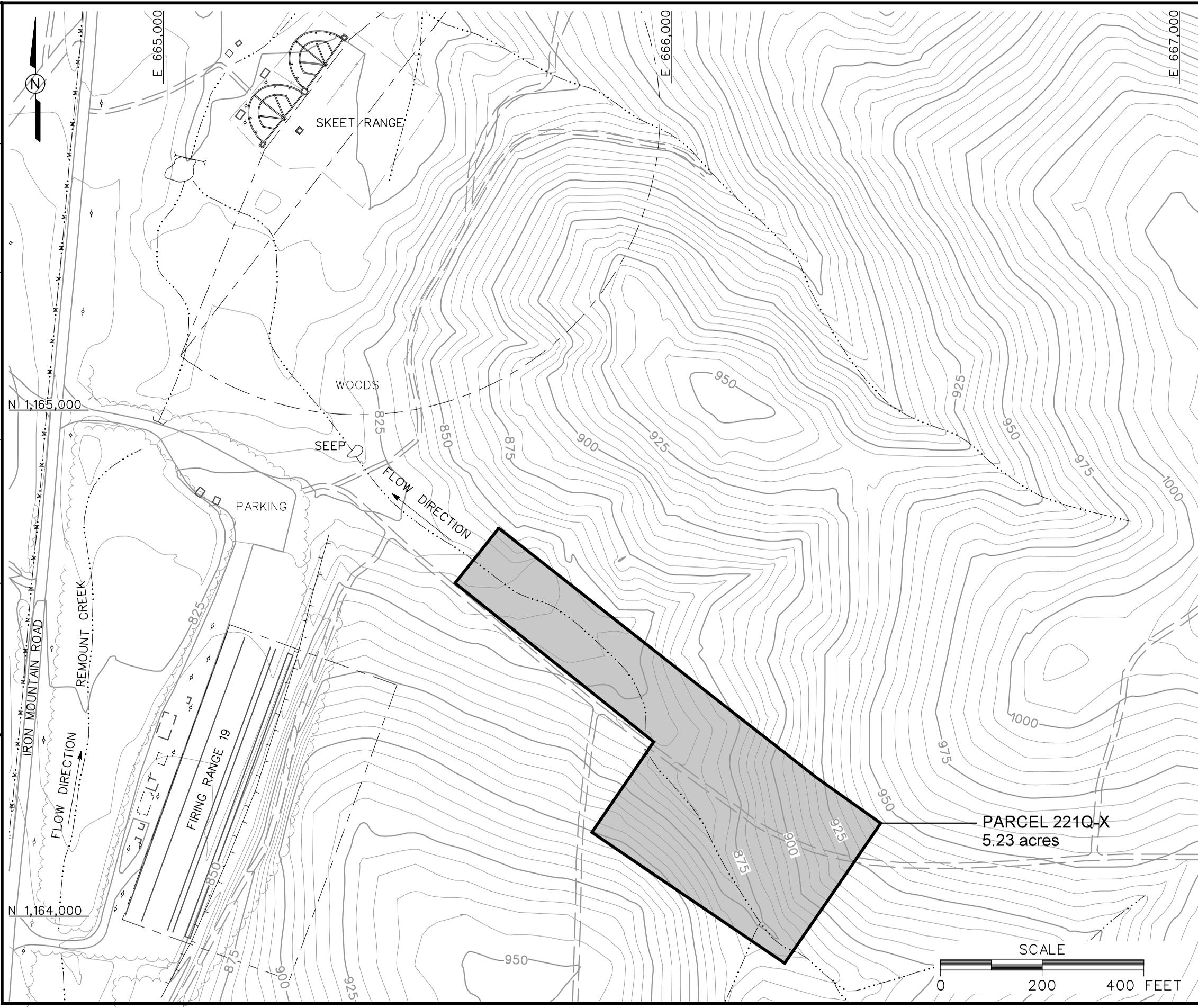
**LEGEND**

-  UNIMPROVED ROADS AND PARKING
-  PAVED ROADS AND PARKING
-  BUILDING LOCATION
-  FORMER BUILDING LOCATION
-  TREES / TREELINE
-  PARCEL BOUNDARY
-  SURFACE DRAINAGE / CREEK
-  UTILITY POLE
-  BERM

**FIGURE 1-1**  
**SITE LOCATION MAP**  
**FORMER RIFLE GRENADE RANGE**  
**NORTH OF WASHINGTON RANGES**  
**PARCEL 221Q-X**

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

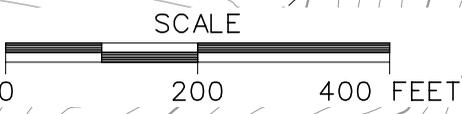
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 INITIATOR: J. BROWN  
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- LEGEND**
- UNIMPROVED ROADS AND PARKING
  - PAVED ROADS AND PARKING
  - BUILDING LOCATION
  - FORMER BUILDING LOCATION
  - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE / CREEK
  - FENCE
  - UTILITY POLE
  - BERM

**FIGURE 1-2**  
**SITE MAP**  
 FORMER RIFLE GRENADE RANGE  
 NORTH OF WASHINGTON RANGES  
 PARCEL 221Q-X

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



- Develop the site-specific UXO safety plan 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 three surface soil samples, three subsurface soil samples, two surface water samples, and two sediment samples to determine whether potential site-specific chemicals (PSSC) are present at Former Rifle Grenade Range, Parcel 221Q-X, and to provide data useful for supporting any future planned corrective measures and closure activities.

Former Rifle Grenade Range, Parcel 221Q-X, falls within the “Possible Explosive Ordnance Impact Areas” shown on Plate 10 of the July 1999 FTMC archive search report maps; 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 attachment addresses the manner in which the avoidance will be conducted.

Upon completion of the field activities and sample analyses (Section 4.5), draft and final 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 summary 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.

## **2.0 Summary of Existing Environmental Studies**

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An environmental baseline survey (EBS) was conducted by Environmental Science and Engineering, Inc. (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 seven criteria.

1. Areas where no storage, release, or disposal (including migration) has occurred.
2. Areas where only release or disposal of petroleum products has occurred.
3. Areas of contamination below action levels.
4. Areas where all necessary remedial actions have been taken.
5. Areas of known contamination with removal and/or remedial action underway.
6. Areas of known contamination where required response actions have not been taken.
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 (CERFA-Public Law 102-426) protocols 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 historic maps and aerial photographs were reviewed to document

historic land uses. In addition, visual site inspections were conducted to verify conditions of Former Rifle Grenade Range, Parcel 221Q-X.

Former Rifle Grenade Range, Parcel 221Q-X, was identified as a Category 1 CERFA site, qualified “X” for UXO. This CERFA site is a parcel where no known or recorded storage, release, or disposal (including migration) has occurred on site property, but is a qualified for potential UXO. Former Rifle Grenade Range, Parcel 221Q-X, also requires additional evaluation to determine its environmental condition.

## **3.0 Site-Specific Data Quality Objectives**

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### **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 Former Rifle Grenade Range, Parcel 221Q-X. 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 Former Rifle Grenade Range, Parcel 221Q-X, 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 along with electronic copies by the laboratory using Contract Laboratory Program-like forms. 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, presented in Table 3-1, related to the SI at Former Rifle Grenade Range, Parcel 221Q-X, 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 data users for 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.

### **3.3 Conceptual Site Model**

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks to human health in the risk assessment. The CSEM includes receptors and potential

Table 3-1

**Summary of Data Quality Objectives  
Site Investigation  
Former Rifle Grenade Range, Parcel 221Q-X,  
Fort McClellan, Calhoun County, Alabama**

Users	Data	Conceptual Site Model	Concern	Objectives	Data Types	Analytical Level	Data Quantity		
EPA, ADEM USACE, DOD FTMC, IT Corporation, other contractors, and possible future land users	None	<u>Contaminant Source</u> Former Rifle Grenade Range 221Q-X	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Perchlorate, and Nitroexplosives	Definitive data in CESAS Level B data packages	3 direct-push soil samples + QC		
		<u>Subsurface Soil</u>							
		<u>Migration Pathways</u> Infiltration to subsurface soil, dust emissions and volatilization to ambient air, runoff and erosion to surface water and sediment	<u>Surface Water</u>	Definitive quality data for future decision- making	<u>Subsurface Soil</u> TAL Metals, Perchlorate, and Nitroexplosives	Definitive data in CESAS Level B data packages	3 direct-push soil samples + QC		
		<u>Potential Receptors</u> Groundskeeper (future) Construction Worker (future) Resident (future) Recreational Site User (current and future)	<u>Sediment</u>		<u>Surface Water</u> TAL Metals, Perchlorate, and Nitroexplosives			Definitive data in CESAS Level B data packages	2 surface water samples + QC
		<u>PSSC</u> Metals, perchlorate, and explosives			<u>Sediment</u> TAL Metals, Perchlorate, Nitroexplosives, TOC, and grain size				

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.

PSSC - Potential site specific chemical.  
QC - Quality control.  
SI - Site inspection.  
TAL - Target analyte list.

TOC - Total organic carbon.  
USACE - U.S. Army Corps of Engineers.

exposure pathways appropriate to all plausible scenarios. The CSEM facilitates 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 direct receptor contact with a contaminated source medium.

Primary contaminant releases were probably limited to possible contaminants that entered surface soil. Potential contaminant transport pathways include infiltration and leaching to subsurface soil, dust emissions and volatilization to ambient air, surface water runoff, and erosion to surface water and sediment. Leaching to groundwater is not anticipated to be a potential contaminant transport pathway because the site history indicates that only rifle grenades were used at the site; it is not expected that explosive breakdown products would leach to groundwater (approximately 20 feet below ground surface [bgs]).

The site is not currently used and access is restricted. Most of the site is undeveloped. The site is not currently maintained in any fashion. Although it is unlikely, a trespasser could circumvent base security and wander into this area; therefore, the only receptor evaluated under the current land use conditions is the recreational site user. The surface water drainage feature does not support fish, and hunting on this site is not feasible because of the restricted nature of the base; therefore, fish and venison pathways are not evaluated for the recreational site user. Other potential receptors considered, but not included under current land-use scenarios, include the following:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.
- **Construction Worker.** The site is unused, and there is not any development or construction occurring.
- **Resident.** The site is not currently used for residential purposes.

Future land-use in this area will most likely be residential; the area is planned for a retirement development reserve. The site may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Receptors under the future land-use scenario are not evaluated for exposure to groundwater because it is not expected that any potential contamination from UXO associated with this site will leach to groundwater. The following receptor scenarios are evaluated for the future land-use scenario:

- **Resident.** This site is planned for a retirement community. The resident is evaluated for future use of the site.
- **Groundskeeper.** The site is likely to have areas that will need to be maintained, such as around parking lots and buildings.
- **Construction Worker.** The site is expected to be developed in the near future, thus this receptor is evaluated.
- **Recreational Site User.** The recreational site user is evaluated under the current and future land-use scenario to evaluate exposure to sediment and surface water. Fishing will not be included as a pathway because the on-site stream is too small to support fish. Ingestion of venison will not be included as a potential exposure pathway because the presence of a retirement community would preclude hunting.

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.

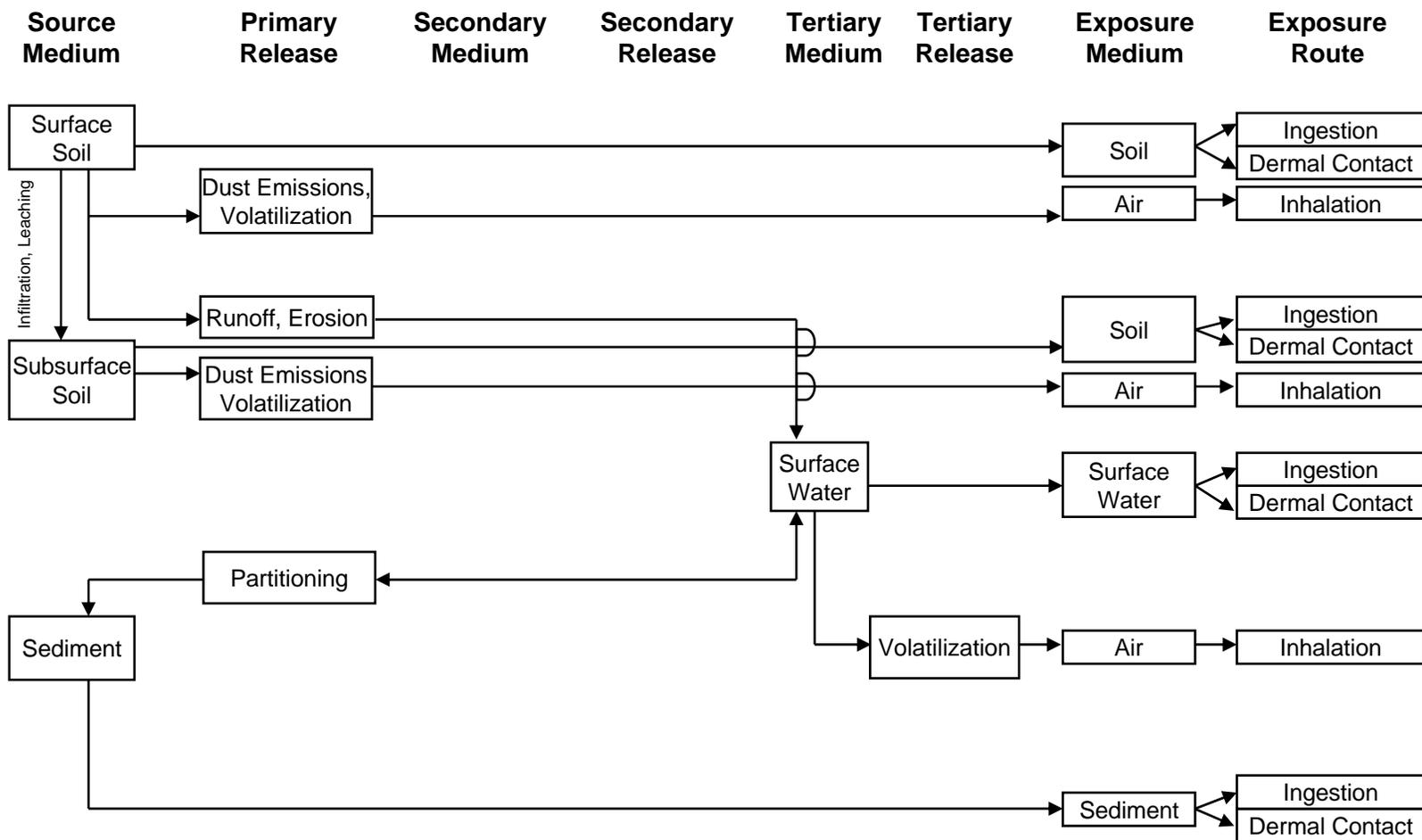
### **3.4 Decision-Making Process, Data Uses, and Needs**

The decision-making process consists of a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the site investigation at Former Rifle Grenade Range, Parcel 221Q-X. Data uses and needs are summarized in Table 3-1.

#### **3.4.1 Risk Evaluation**

Confirmation of contamination at Former Rifle Grenade Range, Parcel 221Q-X, will be based on using EPA definitive data with CESAS Level B data packages to determine whether or not PSSCs are detected in site media. Detected site chemical concentrations will be compared to site-specific screening levels developed in the *Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

**Figure 3-1**  
**Human Health Conceptual Site Exposure Model**  
**Former Rifle Grenade Range, Parcel 221Q-X**  
**Fort McClellan, Alabama**



Receptor Scenarios					
Groundskeeper - Future	Construction Worker - Future	Resident - Future	Recreational Site User - Current	Recreational Site User - Future	
*	*	*	*	*	
*	*	*	*	*	
*	*	2	2	2	
1	*	1	1	1	
1	*	1	1	1	
1	*	1	1	1	
1	1	*	*	*	
1	1	*	*	*	
2	2	2	2	2	
1	1	*	*	*	
1	1	*	*	*	

\* = 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.

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, surface water, and sediment samples will be sampled and analyzed to meet the objectives of the SI at Former Rifle Grenade Range, Parcel 221Q-X. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. The samples will be analyzed by EPA-approved SW-846 methods, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages along with electronic copies. 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**

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### **4.1 UXO Survey Requirements and Utility Clearances**

The Former Rifle Grenade Range, Parcel 221Q-X, falls within the “Possible Explosive Ordnance Impact Area” shown on Plate 10 of the FTMC archive search report maps (USACE, 1999). Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings.

#### **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 each avoidance. Subsurface metallic anomalies will not be disturbed, and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendix E of the approved SAP (IT, 2000). Additionally, the site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP as a necessary measure for UXO avoidance.

#### **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 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 FTMC installation 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 Former Rifle Grenade Range, Parcel 221Q-X, includes the collection of surface soil, subsurface soil, surface water, and sediment samples for chemical analyses. 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.

### **4.2.1 Surface Soil Sampling**

Three surface soil samples will be collected from three locations at Former Rifle Grenade Range, Parcel 221Q-X.

#### **4.2.1.1 Sample Locations and Rationale**

The surface soil sampling rationale is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring 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. 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 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.

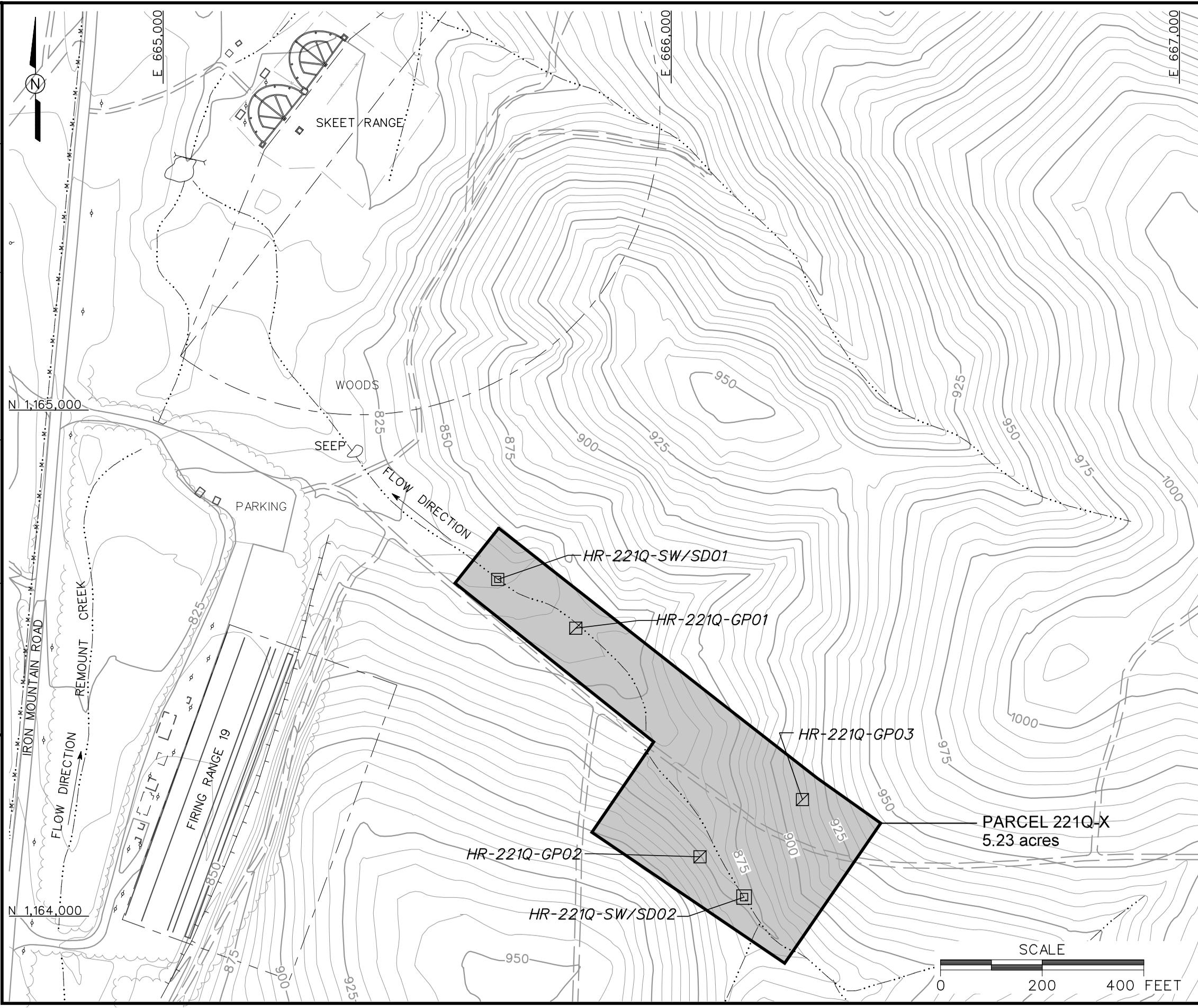
### **4.2.2 Subsurface Soil Sampling**

Three subsurface soil samples will be collected in conjunction with surface soil sample activities at Former Rifle Grenade Range, Parcel 221Q-X.

#### **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 is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

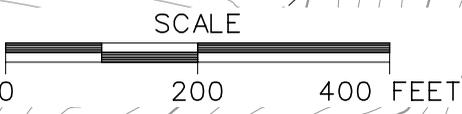
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 02/22/01 04:54:46 PM  
 STARTING DATE: 6/5/00  
 DRAWN BY: A.W. SMITH  
 DATE LAST REV.:  
 DRAWN BY:  
 DRAFT. CHCK. BY:  
 ENGR. CHCK. BY: S. MORAN  
 INITIATOR: J. BROWN  
 PROJ. MGR.: J. YACOUB  
 DWG. NO.: ...796887\es.097  
 PROJ. NO.: 796887



- LEGEND**
- UNIMPROVED ROADS AND PARKING
  - PAVED ROADS AND PARKING
  - BUILDING LOCATION
  - FORMER BUILDING LOCATION
  - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE / CREEK
  - FENCE
  - UTILITY POLE
  - BERM
  - PROPOSED SURFACE WATER/SEDIMENT SAMPLE LOCATION
  - PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

**FIGURE 4-1**  
**PROPOSED SAMPLE LOCATIONS**  
**FORMER RIFLE GRENADE RANGE**  
**NORTH OF WASHINGTON RANGES**  
**PARCEL 221Q-X**

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



**Table 4-1**

**Sampling Locations And Rationale  
Site Investigation  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sample Location Rationale
HR-221Q-GP01	Surface and subsurface soil	Soil boring for surface and subsurface soil samples placed at the northwest end of the parcel at the area believed to be the firing line. Sample data will indicate if contaminant releases into the environment have occurred and if contaminated media exists at this site. 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.
HR-221Q-GP02	Surface and subsurface soil	Soil boring for surface and subsurface soil samples placed downrange, at the southeast end of the parcel. Sample data will indicate if contaminant releases into the environment have occurred and if contaminated media exists at this site. 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.
HR-221Q-GP03	Surface and subsurface soil	Soil boring for surface and subsurface soil samples placed downrange, at the southeast end of the parcel. Sample data will indicate if contaminant releases into the environment have occurred and if contaminated media exists at this site. 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.
HR-221Q-SW/SD01	Surface water and sediment	Sample location at the northwest corner of the site as surface water drainage exits the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
HR-221Q-SW/SD02	Surface water and sediment	Sample location at the southeast corner of the site as surface water drainage enters the parcel. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities  
Site Investigation  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-221Q-GP01	HR-221Q-GP01-SS-NB0001-REG	0-1		HR-221Q-GP01-SS-NB0001-MS/MSD	TAL Metals, Perchlorate, and Nitroexplosives
	HR-221Q-GP01-DS-NB0002-REG	a			
HR-221Q-GP02	HR-221Q-GP02-SS-NB0003-REG	0-1	HR-221Q-GP02-SS-NB0004-FD		TAL Metals, Perchlorate, and Nitroexplosives
	HR-221Q-GP02-DS-NB0005-REG	a			
HR-221Q-GP03	HR-221Q-GP03-SS-NB0006-REG	0-1			TAL Metals, Perchlorate, and Nitroexplosives
	HR-221Q-GP03-DS-NB0007-REG	a			

<sup>a</sup> Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

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

#### **4.2.2.2 Sample Collection**

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs 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).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithologic log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analyses. 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 analyses. Subsurface soil samples may be selected for analyses 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 analyses. 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 chain of custody 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 Surface Water Sampling**

Two surface water samples will be collected from the drainage that flows through the site.

##### **4.2.3.1 Sample Locations and Rationale**

The surface water sampling rationale is listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. The surface water sample designations and required QA/QC sample requirements are listed in Table 4-3. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

##### **4.2.3.2 Sample Collection**

The surface water samples will be collected in accordance with the procedures specified in

Table 4-3

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-221Q-SW/SD01	HR-221Q-SW/SD01-SW-NB2001-REG	Surface Water	N/A				TAL Metals, Perchlorate, and Nitroexplosives (TOC, Grain Size for sediment only)
HR-221Q-SW/SD01	HR-221Q-SW/SD01-SD-NB1001-REG	Sediment	0-0.5				
HR-221Q-SW/SD02	HR-221Q-SW/SD02-SW-NB2002-REG	Surface Water	N/A				TAL Metals, Perchlorate, and Nitroexplosives (TOC, Grain Size for sediment only)
HR-221Q-SW/SD02	HR-221Q-SW/SD02-SD-NB1002-REG	Sediment	0-0.5				

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

Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and chain of custody 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.

#### **4.2.4 Sediment Sampling**

Two sediment samples will be collected from the streams at the site. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.3.

##### **4.2.4.1 Sample Locations and Rationale**

The proposed locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationale is presented in Table 4-1. The sediment sample designations and required QA/QC sample requirements are listed in Table 4-3. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

##### **4.2.4.2 Sample Collection**

The sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. The sediment 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 crosscontamination 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.

#### **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 National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. 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. UXO avoidance will be implemented during surveying activities.

#### **4.5 Analytical Program**

Samples collected at locations specified in this chapter of this SFSP will be analyzed for the specific suites 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 from Former Rifle Grenade Range, Parcel 221Q-X, consist of the following list of analytical suites:

- Target analyte list metals - Method 6010B/7000
- Nitroexplosives - Method 8330
- Perchlorate - Method 314.

In addition, the sediment samples will be analyzed for the following list of parameters:

- Total organic carbon – Method 9060
- Grain size – ASTM D-421/D-422.

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. The samples will be submitted to the laboratory for one week turnaround time. 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). Chemical data will be reported via hard copy data packages along with electronic copies by the laboratory using Contract Laboratory Program-like forms. 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/chain of custody records will be secured and included with each shipment of coolers to:

Attn: John Reynolds  
Severn Trent Laboratories, Inc.

**Table 4-4**

**Analytical Samples  
Site Investigation  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples <sup>a</sup>				EMAX
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis
<b>Former Rifle Grenade Range, Parcel 221Q-X: 2 water matrix samples (2 surface water samples); 8 soil matrix samples (3 surface soil samples, 3 subsurface soil samples, and 2 sediment samples)</b>											
Tot TAL Metals	6010B/7000	water	normal	2	1	2	1	1		1	6
Nitroexplosives	8330	water	normal	2	1	2	1	1		1	6
Perchlorate	314	water	normal	2	1	2	1	1		1	6
TAL Metals	6010B/7000	soil	normal	8	1	8	1	1		1	12
Nitroexplosives	8330	soil	normal	8	1	8	1	1		1	12
Perchlorate	314	soil	normal	8	1	8	1	1		1	12
TOC	9060	sediment	normal	2	1	2	0	0		0	2
Grain Size	ASTM D-421/D-420	sediment	normal	2	1	2	0	0		8	2
<b>Subtotal:</b>						34	6	6		14	58

<sup>a</sup>Field duplicate 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. Equipment blanks 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.  
630 Maple Avenue  
Torrance, California 90503  
Tel: 310-618-8889  
Fax: 310-618-0818

MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality Assurance/Quality Control.  
TAL - Target analyte list.  
TAT - Turn-around time.  
TOC - Total organic carbon.  
ASTM - American Society for Testing and Materials.

5815 Middlebrook Pike  
Knoxville, Tennessee 37921  
Telephone: (865) 588-6401.

#### ***4.7 Investigation-Derived Waste Management***

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at Former Rifle Grenade Range, Parcel 221Q-X, site is expected to include decontamination fluids, soil cuttings, 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 Former Rifle Grenade Range, Parcel 221Q-X. The SSHP attachment will be used in conjunction with the installation-wide SHP. Additionally, the site-specific UXO safety plan attachment has been prepared as a necessary measure for UXO avoidance.

## ***5.0 Project Organization and Schedule***

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The project schedule for the SI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team (BCT) and during either a BCT meeting or conference call.

## 6.0 References

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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*, March.

IT, Corporation (IT), 2000b, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

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

U.S. Army Corps of Engineers (USACE), 1999, *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.

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

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	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine	EOD	explosive and ordnance disposal
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	CK	cyanogen chloride	EODT	explosive and ordnance disposal team
2,4,5-TP	silvex	cl	inorganic clays of low to medium plasticity	EPA	U.S. Environmental Protection Agency
3D	3D International Environmental Group	Cl.	chlorinated	EPC	exposure point concentration
Abs	skin absorption	CLP	Contract Laboratory Program	EPIC	Environmental Photographic Interpretation Center
AC	hydrogen cyanide	CN	chloroacetophenone	ER	equipment rinsate
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	CNB	chloroacetophenone, benzene, and carbon tetrachloride	ESE	Environmental Science and Engineering, Inc.
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	CNS	chloroacetophenone, chloropicrin, and chloroform	ESV	ecological screening value
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	Co-60	cobalt-60	Exp.	explosives
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	COC	chain of custody	E-W	east to west
ACGIH	American Conference of Governmental Industrial Hygienists	COE	Corps of Engineers	EZ	exclusion zone
ADEM	Alabama Department of Environmental Management	Con	skin or eye contact	FB	field blank
AEL	airborne exposure limit	CRL	certified reporting limit	FD	field duplicate
AL	Alabama	CRZ	contamination reduction zone	FedEx	Federal Express, Inc.
amb.	amber	Cs-137	cesium-137	FFE	field flame expedient
ANAD	Anniston Army Depot	CS	ortho-chlorobenzylidene-malononitrile	Fil	filtered
APT	armor-piercing tracer	CSEM	conceptual site exposure model	Flt	filtered
ASR	Archives Search Report	ctr.	container	FMP 1300	Former Motor Pool 1300
AST	aboveground storage tank	CWA	chemical warfare agent	Foster Wheeler	Foster Wheeler Environmental Corporation
ASTM	American Society for Testing and Materials	CWM	chemical warfare material; clear, wide mouth	Frtn	fraction
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	CX	dichloroformoxime	FS	field split
BCT	BRAC Cleanup Team	D	duplicate; dilution	ft	feet
BEHP	bis(2-ethylhexyl)phthalate	DANC	decontamination agent, non-corrosive	ft/ft	feet per foot
BFB	bromofluorobenzene	°C	degrees Celsius	FTA	Fire Training Area
BG	Bacillus globigii	°F	degrees Fahrenheit	FTMC	Fort McClellan
bgs	below ground surface	DCE	dichloroethene	g	gram
BHC	betahexachlorocyclohexane	DDD	dichlorodiphenyldichloroethane	G-856	Geometrics, Inc. G-856 magnetometer
bkg	background	DDE	dichlorodiphenyldichloroethene	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
bls	below land surface	DDT	dichlorodiphenyltrichloroethane	gal	gallon
BOD	biological oxygen demand	DEH	Directorate of Engineering and Housing	gal/min	gallons per minute
BRAC	Base Realignment and Closure	DEP	depositional soil	GB	sarin
Braun	Braun Intertec Corporation	DI	deionized	gc	clay gravels; gravel-sand-clay mixtures
BTEX	benzene, toluene, ethyl benzene, and xylenes	DIMP	di-isopropylmethylphosphonate	GC	gas chromatograph
BTOC	below top of casing	DMMP	dimethylmethylphosphonate	GC/MS	gas chromatograph/mass spectrometer
BW	biological warfare	DOD	U.S. Department of Defense	GFAA	graphite furnace atomic absorption
BZ	breathing zone; 3-quinuclidinyl benzilate	DP	direct-push	gm	silty gravels; gravel-sand-silt mixtures
C	ceiling limit value	DPDO	Defense Property Disposal Office	gp	poorly graded gravels; gravel-sand mixtures
Ca	carcinogen	DQO	data quality objective	gpm	gallons per minute
CCAL	continuing calibration	DRMO	Defense Reutilization and Marketing Office	GPR	ground-penetrating radar
CCB	continuing calibration blank	DRO	diesel range organics	GPS	global positioning system
CD	compact disc	DS	deep (subsurface) soil	GS	ground scar
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	DS2	Decontamination Solution Number 2	GSA	General Services Administration
CERFA	Community Environmental Response Facilitation Act	E&E	Ecology and Environment, Inc.	GSBP	Ground Scar Boiler Plant
CESAS	Corps of Engineers South Atlantic Savannah	EBS	environmental baseline survey	GSSI	Geophysical Survey Systems, Inc.
CG	carbonyl chloride (phosgene)	Elev.	elevation	GST	ground stain
CFC	chlorofluorocarbon	EM	electromagnetic	GW	groundwater
ch	inorganic clays of high plasticity	EM31	Geonics Limited EM31 Terrain Conductivity Meter	gw	well-graded gravels; gravel-sand mixtures
		EM61	Geonics Limited EM61 High-Resolution Metal Detector	HA	hand auger

**List of Abbreviations and Acronyms (Continued)**

HCl	hydrochloric acid	µg/kg	micrograms per kilogram	Parsons	Parsons Engineering Science, Inc.
HD	distilled mustard	µg/L	micrograms per liter	Pb	lead
HDPE	high-density polyethylene	µmhos/cm	micromhos per centimeter	PCB	polychlorinated biphenyl
Herb.	herbicides	min	minimum	PCE	perchloroethene
HNO <sub>3</sub>	nitric acid	MINICAMS	miniature continuous air sampling system	PCP	pentachlorophenol
hr	hour	ml	inorganic silts and very fine sands	PDS	Personnel Decontamination Station
H&S	health and safety	mL	milliliter	PEL	permissible exposure limit
HSA	hollow-stem auger	mm	millimeter	Pest.	pesticide
HTRW	hazardous, toxic, and radioactive waste	MM	mounded material	PG	professional geologist
'I'	out of control, data rejected due to low recovery	MOGAS	motor vehicle gasoline	PID	photoionization detector
ICAL	initial calibration	MPA	methyl phosphonic acid	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
ICB	initial calibration blank	MR	molasses residue	POL	petroleum, oils, and lubricants
ICP	inductively-coupled plasma	MS	matrix spike	PP	peristaltic pump
ICS	interference check sample	mS/cm	millisiemens per centimeter	ppb	parts per billion
ID	inside diameter	MSD	matrix spike duplicate	PPE	personal protective equipment
IDL	instrument detection limit	msl	mean sea level	ppm	parts per million
IDLH	immediately dangerous to life or health	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes, severely eroded	PPMP	Print Plant Motor Pool
IDW	investigation-derived waste	mV	millivolts	ppt	parts per thousand
IMPA	isopropylmethyl phosphonic acid	MW	monitoring well	PSSC	potential site-specific chemical
in.	inch	N/A	not applicable; not available	pt	peat or other highly organic silts
Ing	ingestion	NAD	North American Datum	PVC	polyvinyl chloride
Inh	inhalation	NAD83	North American Datum of 1983	QA	quality assurance
IP	ionization potential	NAVD88	North American Vertical Datum of 1988	QA/QC	quality assurance/quality control
IPS	International Pipe Standard	ND	not detected	QAP	installation-wide quality assurance plan
IRDMIS	Installation Restoration Data Management Information System	NE	no evidence; northeast	QC	quality control
ISCP	Installation Spill Contingency Plan	NFA	No Further Action	QST	QST Environmental Inc.
IT	IT Corporation	ng/L	nanograms per liter	qty	quantity
ITEMS	IT Environmental Management System™	NGVD	National Geodetic Vertical Datum	Qual	qualifier
'J'	estimated concentration	NIC	notice of intended change	'R'	rejected; resample
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	NIOSH	National Institute for Occupational Safety and Health	RCRA	Resource Conservation and Recovery Act
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	No.	number	RDX	cyclonite
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	NOAA	National Oceanic and Atmospheric Administration	ReB3	Rarden silty clay loams
K	conductivity	NR	not requested	REG	field sample
L	lewisite; liter	ns	nanosecond	REL	recommended exposure limit
LC <sub>50</sub>	lethal concentration for 50 percent of population tested	N-S	north to south	RFA	request for analysis
LD <sub>50</sub>	lethal dose for 50 percent of population tested	nT	nanotesla	RI	remedial investigation
l	liter	NTU	nephelometric turbidity unit	RL	reporting limit
LCS	laboratory control sample	O&G	oil and grease	RPD	relative percent difference
LEL	lower explosive limit	OD	outside diameter	RRF	relative response factor
LT	less than the certified reporting limit	OE	ordnance and explosives	RSD	relative standard deviation
max	maximum	oh	organic clays of medium to high plasticity	RTK	real-time kinematic
MDL	method detection limit	ol	organic silts and organic silty clays of low plasticity	SAD	South Atlantic Division
mg/kg	milligrams per kilogram	OP	organophosphorus	SAE	Society of Automotive Engineers
mg/L	milligrams per liter	ORP	oxidation-reduction potential	SAIC	Science Applications International Corporation
mg/m <sup>3</sup>	milligrams per cubic meter	OSHA	Occupational Safety and Health Administration	SAP	installation-wide sampling and analysis plan
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	OWS	oil/water separator	sc	clayey sands; sand-clay mixtures
MHz	megahertz	oz	ounce	Sch.	schedule
µg/g	micrograms per gram	PAH	polynuclear aromatic hydrocarbon	SD	sediment

## List of Abbreviations and Acronyms (Continued)

SDG	sample delivery group	UCL	upper confidence limit	<u>SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation</u>	
SDZ	safe distance zone; surface danger zone	UCR	upper certified range		
SEMS	Southern Environmental Management & Specialties, Inc.	'U'	not detected above reporting limit		N/A – Not analyzed
SFSP	site-specific field sampling plan	USACE	U.S. Army Corps of Engineers		ND – Not detected
SGF	standard grade fuels	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine		Boolean Codes
SHP	installation-wide safety and health plan	USAEC	U.S. Army Environmental Center		LT – Less than the certified reporting limit
SI	site investigation	USAEHA	U.S. Army Environmental Hygiene Agency		Flagging Codes
SL	standing liquid	USACMLS	U.S. Army Chemical School		9 – Non-demonstrated/validated method performed for USAEC
sm	silty sands; sand-silt mixtures	USAMPS	U.S. Army Military Police School		B – Analyte found in the method blank or QC blank
SM	<i>Serratia marcescens</i>	USATEU	U.S. Army Technical Escort Unit		C – Analysis was confirmed
SOP	standard operating procedure	USATHAMA	U.S. Army Toxic and Hazardous Material Agency		D – Duplicate analysis
sp	poorly graded sands; gravelly sands	USCS	Unified Soil Classification System		I – Interfaces in sample make quantitation and/or identification to be suspicious
SP	sump pump	USDA	U.S. Department of Agriculture		J – Value is estimated
Sr-90	strontium-90	USEPA	U.S. Environmental Protection Agency		K – Reported results are affected by interfaces or high background
Ss	stony rough land, sandstone series	UST	underground storage tank		N – Tentatively identified compound (match greater than 70%)
SS	surface soil	UXO	unexploded ordnance		Q – Sample interference obscured peak of interest
SSC	site-specific chemical	VOA	volatile organic analyte		R – Non-target compound analyzed for but not detected (GC/MS methods)
SSHO	site safety and health officer	VOC	volatile organic compound		S – Non-target compound analyzed for and detected (GC/MS methods)
SSHP	site-specific safety and health plan	VOH	volatile organic hydrocarbon		T – Non-target compound analyzed for but not detected (non GC/MS methods)
SSSL	site-specific screening level	VQlfr	validation qualifier		U – Analysis in unconfirmed
STB	supertropical bleach	VQual	validation qualifier	Z – Non-target compound analyzed for and detected (non-GC/MS methods)	
STEL	short-term exposure limit	VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)	Qualifiers	
STOLS	Surface Towed Ordnance Locator System®	Weston	Roy F. Weston, Inc.	J – The low-spike recovery is low	
Std. units	standard units	WP	installation-wide work plan	N – The high-spike recovery is low	
SU	standard unit	WS	watershed	R – Data is rejected	
SVOC	semivolatile organic compound	WSA	Watershed Screening Assessment		
SW	surface water	WWI	World War I		
SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>	WWII	World War II		
SZ	support zone	XRF	x-ray fluorescence		
TAL	target analyte list	yd <sup>3</sup>	cubic yards		
TAT	turn around time				
TB	trip blank				
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				
TOC	top of casing; total organic carbon				
TPH	total petroleum hydrocarbons				
TRADOC	U.S. Army Training and Doctrine Command				
TRPH	total recoverable petroleum hydrocarbons				
TWA	time weighted average				

**Final**

**Site-Specific Safety and Health Plan Attachment  
Site investigation at the Former Rifle Grenade Range North of  
Washington Ranges, Parcel 221Q-X**

**Fort McClellan  
Calhoun County, Alabama  
EPA ID No. AL7 210 020 562**

**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**

**February 2001**

**Revision 1**

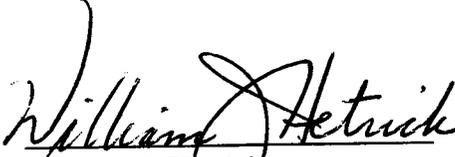
This Site-Specific Safety and Health Plan must be used in conjunction with the Installation-Wide Safety and Health Plan, Fort McClellan, Alabama.

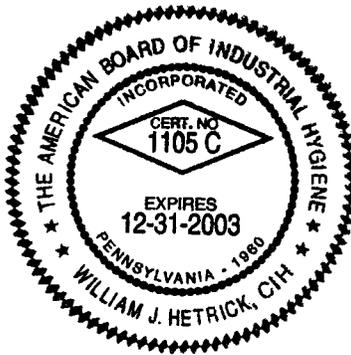
# Site-Specific Safety and Health Plan Attachment Approval Fort McClellan, Calhoun County, Alabama

I have read and approve this site-specific safety and health plan attachment for the site investigation at Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

  
Jeanne Yacoub, PE  
Project Manager

2/12/01  
Date

  
William J. Hetrick  
Health & Safety Manager



2/15/01  
Date

  
Jeff Tarr  
Site Coordinator

2/12/01  
Date

## Acknowledgements

The final approved version of this site-specific safety and health plan (SSHP) attachment for the site investigation at the Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every 6 months until project completion.

Stephen D. Moran for J. Yacoub  
Project Manager

02/12/01  
Date

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

Stephen D. Moran for J. Tan  
Site Coordinator

2/12/01  
Date



# Fort McClellan Gate Hours

Baltzell Gate	Baltzell Road. Open 24 hours daily, 7 days a week.
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# Fort McClellan Project Emergency Contacts

Fire Department (on post).....	911
Fire Department (off post) .....	(256) 237-3541
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) 820-7272
(Hank Hubbard, Huntsville COE UXO EODT) .....	cell phone (205) 994-2254 or 994-2269
UXO Emergencies .....	(256) 820-7272
(Hank Hubbard, Huntsville COE UXO EODT) .....	cell phone (205) 994-2254 or 994-2269
UXO Nonemergencies/Reporting Only (Ronald Levy) .....	(256) 848-3758
Baltzell Gate Guard Shack (Staffed 1600-0700 hours, Mon-Sun) .....	(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) 848-3758
Ellis Pope, U.S. Army Corps of Engineers.....	(334) 690-3077
Jeanne Yacoub, IT Project Manager.....	(770) 663-1429
William Hetrick, IT H&S Manager .....	(865) 690-3211
Mike Moore, Fort McClellan Safety Officer .....	(256) 848-5433
Dr. Jerry Berke, IT Occupational Physician.....	(800) 350-4511

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## ***List of Acronyms***

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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**

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**Project Objective.** The objective of this investigation at Fort McClellan (FTMC), Calhoun County, Alabama is to collect and analyze samples at the Former Rifle Grenade Range North of Washington Ranges, Parcel 221Q-X.

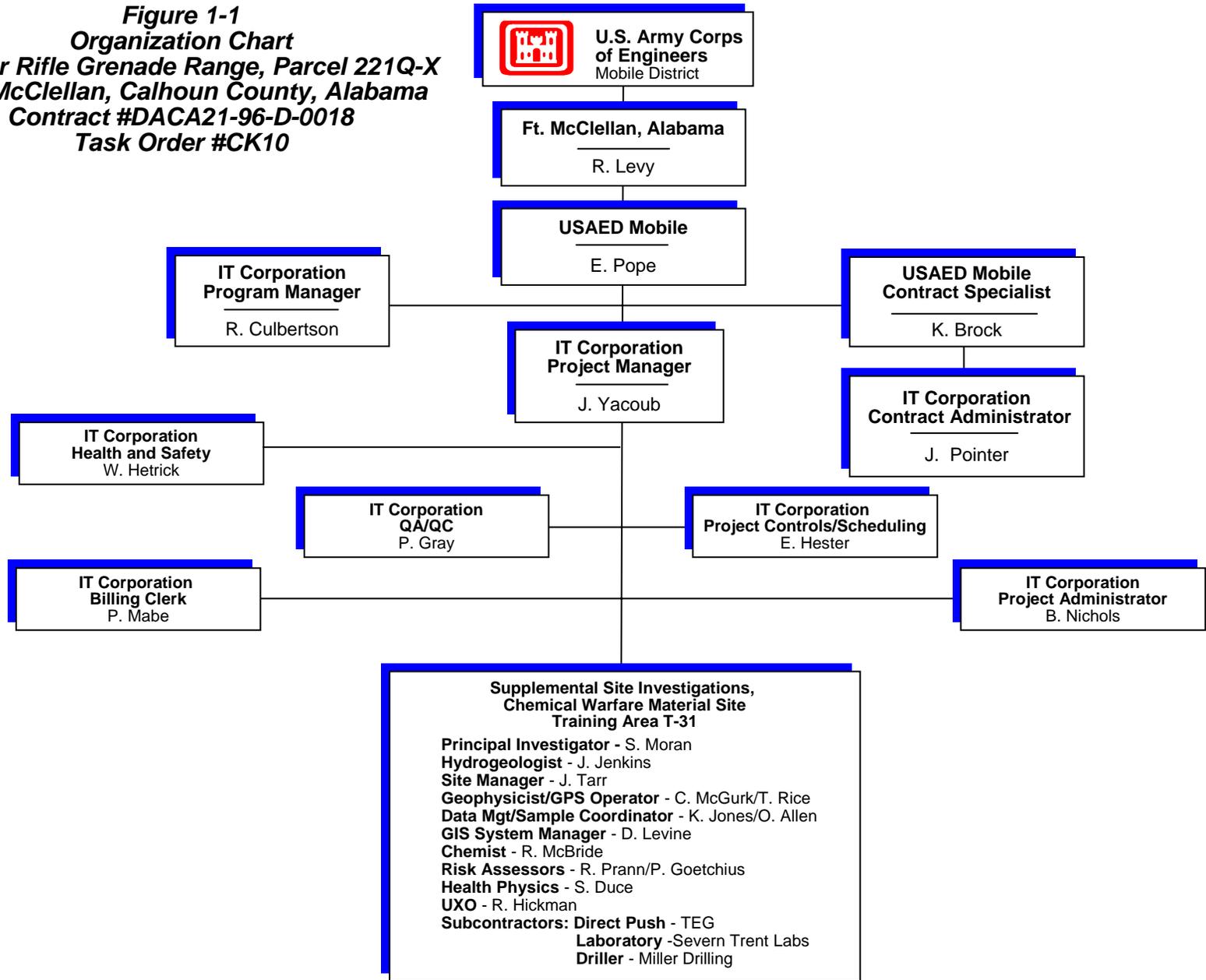
### **Project Tasks**

- Conduct a surface and near-surface unexploded ordnance (UXO) survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling activity to determine the presence of potential downhole hazards.
- Collect surface soil samples, subsurface soil samples, surface water samples, and sediment samples.

**Personnel Requirements.** Up to ten employees. See Figure 1-1 for an organization chart.

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 SHP (SSHP). This SSHP must be used in conjunction with the SHP, FTMC, Alabama.

**Figure 1-1  
 Organization Chart  
 Former Rifle Grenade Range, Parcel 221Q-X  
 Fort McClellan, Calhoun County, Alabama  
 Contract #DACA21-96-D-0018  
 Task Order #CK10**



## **2.0 Site Characterization and Analysis**

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### **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).

Former Rifle Grenade Range, Parcel 221Q-X, was used for the practice of rifle grenades. The range was identified by the 1946 Reservation Map and Plate 5 of the July 1999 FTMC archive search report maps. The FTMC archive search report states that this rifle grenade range was used during World War II and was abandoned by 1958. The search report also states that World War II vintage rifle grenades were found northeast of Range 19 on the south side of the service road. Direction of fire is believed to have been toward the southeast from a firing line that would have been established at the northeast end of the parcel. This firing arrangement would allow the ridge to the southeast to serve as a backstop for rifle grenade fire.

Table 2-1 contains the toxicological and physiological properties of chemicals anticipated or to be used at the Former Rifle Grenade Range, Parcel 221Q-X. Contaminants of concern at the area include lead and trinitrotoluene.

The possibility of UXO exists at the Former Rifle Grenade Range, Parcel 221Q-X; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Former Rifle Grenade Range. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

### **2.2 General Site Information**

**Site Location.** Former Rifle Grenade Range, Parcel 221Q-X, is a 5.23 acre area approximately 500 feet north of Former Range 19, Qualification Pistol Range, Parcel 75Q, and immediately south of the Former Skeet Range, Parcel 69Q, in the south-western portion of the Main Post. The parcel is bounded to the south, and divided by, a service road that connects to Iron Mountain Road. The area is heavily wooded and no standing structures currently exist at the site.

**Table 2-1**

**Toxicological and Physical Properties of Chemicals  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Type & Threshold (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
Lead inorganic dusts & fumes (as Pb) [7439-92-1]	NA	NA	Inh Ing Con	Weakness, lassitude, insomnia; facial pallor; eye pallor, low body weight, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremors; wrist and ankle paralysis; brain damage; kidney damage; irritated eyes; hypotension.	Eye: Irrigate immediately Skin: Soap flush promptly Breath: Respiratory support Swallow: Immediate medical attention	0.05 mg/m <sup>3</sup> 0.05 mg/m <sup>3</sup> (NIC)  (CA - See 29 CFR 1910.1025)	NA NA	PEL TLV	100 mg/m <sup>3</sup> (as Pb)
2,4,6-Trinitrotoluene (TNT) [118-96-7]	10.59	odorless	Inh Abs Ing Con	Liver damage, jaundice; cyanosis; sneezing coughing, sore throat; peripheral neuropathy, muscular pain; kidney damage; cataract; sensitive dermatitis; leukocytosis; anemia; cardiac irregularities.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	1.5 mg/m <sup>3</sup> (skin) 0.1 mg/m <sup>3</sup> (skin)	NA NA	PEL TLV	500 mg/m <sup>3</sup>

<sup>a</sup>IP = Ionization potential (electron volts).

<sup>b</sup>Route: Inh = Inhalation; Abs = Skin absorption; Ing = Ingestion; Con = Skin and/or eye contact.

<sup>c</sup>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.

<sup>d</sup>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.

<sup>e</sup>Source: PEL = Permissible Exposure Limit (OSHA - 29 CFR 1910.1000, Table Z); TLV = Threshold Limit Value (ACGIH); NIOSH = National Institute for Occupational Safety and Health; WEEL = Workplace Environmental Exposure Level (AIHA).

<sup>f</sup>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.

ppm = Parts per million.

mg/m<sup>3</sup> = Milligrams per cubic meter.

skin = Danger of cutaneous absorption.

ND = No evidence could be found for the existence of an IDLH (National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards, Pub. No. 94-116, June 1994).

C = Ceiling limit value which should not be exceeded at any time.

Ca = Carcinogen.

NA = Not applicable or not available.

LEL = Lower explosive limits.

LC<sub>50</sub> = Lethal concentration in air for 50 percent of population tested.

LD<sub>50</sub> = Lethal dose for 50 percent of population tested.

NIC = Notice of intended change (ACGIH).

**References:**

Guide to Occupational Exposure Values - 1997, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).

Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.

Micromedex Tomes Plus (R) System, 1995, Micromedex, Inc.

Pocket Guide to Chemical Hazards, Pub. No. 94-116, June 1994, National Institute for Occupational Safety and Health (NIOSH).

Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association (AIHA), 1989.

Workplace Environmental Exposure Levels, American Industrial Hygiene Association (AIHA), 1995.

**Duration of Planned Employee Activity.** Employee activity duration is 2 months.

**Pathways for Hazardous Substance Dispersion.** Possible pathways for hazardous substances in the area are groundwater, surface water, sediment, and soils.

**Site Topography.** The overall elevation of Former Rifle Grenade Range, Parcel 221Q-X, ranges from about 840 to 940 feet mean sea level. The highest elevation is at what is believed to be the target area for the range. Shallow groundwater flow probably follows site topography, with movement toward the northeast. A surface drainage feature passes through this parcel, beginning at the southeastern-most corner of the parcel boundary and exiting the site to Skeet Range, Parcel 69Q.

### 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
Staging equipment	Level D
Collecting samples	Modified Level D*

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

**Level D.** The minimal level of protection that will be required of IT Corporation 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
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

Note: UXO personnel should not wear hard hats and steel-toed shoes when engaged in ordnance operations unless a significant overhead hazard exists. Where overhead hazards exist, a chin strap will be worn with hard hats to prevent accidental failing of hard hat.

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

- Permeable Tyvek, Kleenguard, or its equivalent
- Latex boot covers
- Nitrile or latex gloves under work gloves
- Steel-toed safety boots
- Safety glasses
- Hard hat
- 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 shall wear metatarsal guards for the legs and feet.

Note: UXO personnel should not wear hard hats and steel-toed shoes when engaged in ordnance operations unless a significant overhead hazard exists. Where overhead hazards exist, a chin strap will be worn with hard hats to prevent accidental falling of hard hat.

**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:

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

Note: In addition to Level C PPE, the operator of high-pressure water jetting equipment shall wear metatarsal guards for the legs and feet.

## 4.0 Site Monitoring

---

The environmental contaminants of concern resulting from Former Rifle Grenade Range, Parcel 221Q-X operations are lead and trinitrotoluene. Table 4-1 contains action levels for site monitoring at the sites.

**Chemical.** Monitoring will be performed by the site safety and health officer during the performance of ground intrusive operations. A calibrated flame ionization detector (i.e., OVA 128 or equivalent) organic vapor analyzer will be utilized to monitor the sampling locations and breathing zones to determine if any organic material may be present that would necessitate upgrading of protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the work areas and breathing zones to determine if any combustible/flammable oxygen levels may be present that would necessitate evacuation of the work area. Table 4-2 contains the air monitoring frequency and location for site monitoring at the work sites.

**Unexploded Ordnance.** UXO safety will be achieved by employing UXO specialists to ensure that field personnel do not come into contact with UXO. In areas where UXO is suspected to exist, the UXO specialists will perform the following UXO avoidance operations.

- X **Area UXO Surveys Using Magnetometers.** During this operation UXO on the surface will be detected and marked for avoidance during field operations. Metal objects just below the surface (within 2 feet) will also be marked to indicate the potential hazard.
- X **Downhole UXO Surveys.** UXO specialists will perform downhole magnetometer surveys to detect metal objects in the path of the boring apparatus until undisturbed soils are reached. The boring location will be moved if subsurface metal objects are detected.

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

**Table 4-1**

**Action Levels  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

When in Level C PPE

Analyte	Action Level	Required Action <sup>a</sup>
VOCs	≥ 10 ppm above background in BZ	Stop work, evacuate work area, contact program CIH, upgrade to Level B PPE.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area, contact CIH. Continue operations, monitor for VOCs.

When in Level D Modified/D PPE

Analyte	Action Level	Required Action <sup>b</sup>
VOCs	≥ 5 ppm above background in BZ	Stop activities, suspend work activities for 15 to 30 minutes, if readings are sustained then contact program CIH, upgrade to Level C PPE.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area contact CIH.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area, contact CIH. Continue operations, monitor for VOCs.

**Table 4-1**

**Action Levels  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

When in Support Zone

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

- <sup>a</sup> 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.
- <sup>b</sup> Contact with the health and safety manager must be made prior to continuance of work. The health and safety 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 health and safety manager.**

PPE - Personal protective equipment.  
VOC - Volatile organic compound.  
ppm - Parts per million.  
BZ - Breathing zone.  
LEL - Lower explosive limit.

**Table 4-2**

**Air Monitoring Frequency and Location  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

Work Activity	Instrument	Frequency	Location
Staging equipment	NA	NA	NA
Land Survey	NA	NA	NA
Sampling (water, sediment, and soil)	OV Monitor LEL/O <sub>2</sub> Monitor	Continuously Continuously	Breathing zone of employees and/or work area

NA = Not applicable.

OV = Organic vapor.

LEL/O<sub>2</sub> = Lower explosive level/oxygen.

## ***5.0 Activity Hazard Analysis***

---

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

- X Setup of equipment and general field activities
- X Land survey
- X Soil, sediment, and water sampling.

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

If hospital care must be provided, the victim shall be treated at Northeast Regional Medical Center. Directions to the hospital are provided in Figure 5-1.

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 11)

Activity	Potential Hazards	Recommended Controls
Staging equipment	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Determine best access route before transporting equipment.</li> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> <li>• Look before you step; ensure safe and secure footing.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.</li> </ul>
	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> <li>• Wear safety glasses/goggles; ensure that eye wash is in proper working condition.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> </ul>
	Cuts/bruises	<ul style="list-style-type: none"> <li>• Use cotton or leather work gloves for material handling.</li> </ul>
	Bees, spiders, and snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet into concealed areas.</li> </ul>
	Ticks	<ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul>
	Fire	<ul style="list-style-type: none"> <li>• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 11)

Activity	Potential Hazards	Recommended Controls
Staging equipment (continued)	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> <li>• Work area will be barricaded/demarcated.</li> <li>• Equipment will be laid out in an area free of traffic flow.</li> </ul>
	Hazard communication	<ul style="list-style-type: none"> <li>• Label all containers as to contents and dispose of properly.</li> <li>• Ensure material safety data sheets are available for hazardous chemicals used on site.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Sound levels above 85 dBA mandate hearing protection.</li> </ul>
	Lighting	<ul style="list-style-type: none"> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>• Workers should wear insulated clothing when temperatures drop below 40°F.</li> <li>• Drink warm beverages on breaks. Refrain from drinking caffeinated beverages.</li> <li>• Remove wet clothing promptly.</li> <li>• Take breaks in warm areas.</li> <li>• Reduce work periods as necessary.</li> <li>• Layer work clothing.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	Heat rash	<ul style="list-style-type: none"> <li>• Keep the skin clean and dry.</li> <li>• Change perspiration-soaked clothing, as necessary.</li> <li>• Bathe at end of work shift or day.</li> <li>• Apply powder to affected area.</li> </ul>
	Heat cramps	<ul style="list-style-type: none"> <li>• Drink plenty of cool fluids even when not thirsty.</li> <li>• Provide cool fluid for work crews.</li> <li>• Move victim to shaded, cool area.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 11)

Activity	Potential Hazards	Recommended Controls
Staging equipment (continued)	Heat exhaustion	<ul style="list-style-type: none"> <li>• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature)</li> <li>• Set up work/rest periods.</li> <li>• Use the buddy system.</li> <li>• Allow workers time to acclimate.</li> <li>• Have ice packs available for use.</li> <li>• Take frequent breaks.</li> </ul>
	Heat stroke	<ul style="list-style-type: none"> <li>• Evaluate possibility of night work.</li> <li>• Perform physiological monitoring on workers during breaks.</li> <li>• Wear body cooling devices.</li> </ul>
	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> <li>• Work area will be barricaded/demarcated.</li> <li>• Equipment will be laid out in an area free of traffic flow.</li> <li>• Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic.</li> <li>• Barriers shall be used to protect workers from vehicular traffic.</li> <li>• Barriers shall be used to guard excavations adjacent to streets or roadways.</li> <li>• Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided.</li> <li>• Heavy equipment shall have backup alarms.</li> </ul>
	Forklift operations	<ul style="list-style-type: none"> <li>• Use qualified and trained forklift operators.</li> <li>• The operator shall not exceed the load capacity rating for the forklift.</li> <li>• The load capacity shall be clearly visible on the forklift.</li> <li>• Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.</li> </ul>
	Portable electric tools	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Portable electric tools and all cord and plug connected equipment shall be protected by a GFCI device.</li> <li>• Electrical tools shall be inspected daily prior to use.</li> </ul>
	Extension cords	<ul style="list-style-type: none"> <li>• Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service.</li> <li>• Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic.</li> <li>• Cords shall be suspended with a nonconductive support (rope, plastic ties, etc.).</li> <li>• Cords shall be designed for hard duty.</li> <li>• Cords shall be inspected daily.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 11)

Activity	Potential Hazards	Recommended Controls
Staging equipment (continued)	Lightning strikes	<ul style="list-style-type: none"> <li>• Whenever possible, halt activities and take cover.</li> <li>• If outdoors, stay low to the ground.</li> <li>• 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).</li> <li>• Seek shelter in a building if possible.</li> <li>• Stay away from windows.</li> <li>• If available, crouch under a group of trees instead of one single tree.</li> <li>• Keep all body parts in contact with the ground as close as possible.</li> <li>• Remain 6 feet away from tree trunk if seeking shelter beneath tree(s).</li> <li>• If in a group, keep 6 feet of distance between people.</li> </ul>
	Thunderstorms, tornadoes	<ul style="list-style-type: none"> <li>• Listen to radio or TV announcements for pending weather information.</li> <li>• Cease field activities during thunderstorm or tornado warnings.</li> <li>• Seek shelter. Do not try to outrun a tornado.</li> </ul>
Surveying	Slip, trip, fall	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide adequate lighting in all work areas.</li> <li>• Whenever possible, avoid routing cords and hoses across walking pathways.</li> <li>• Flag or cover inconspicuous holes to protect against falls.</li> <li>• Work areas will be kept clean and orderly.</li> <li>• Garbage and trash will be disposed of daily in approved refuse containers.</li> <li>• Tools and accessories will be properly maintained and stored.</li> <li>• Work areas and floors will be kept free of dirt, grease, and slippery materials.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will perform UXO surface clearance for UXO avoidance.</li> </ul>
	Traffic accidents	<ul style="list-style-type: none"> <li>• Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians.</li> <li>• If working adjacent to roadways, have workers wear fluorescent orange vests.</li> <li>• Use warning signs or lights to alert oncoming traffic.</li> <li>• Assign flag person(s) if necessary to direct local traffic.</li> <li>• Set up temporary parking locations outside the immediate work area.</li> <li>• Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits.</li> <li>• Pedestrians have the right-of-way.</li> <li>• Wear seat belts when vehicles are in motion.</li> </ul>
	Wildlife hazards	<ul style="list-style-type: none"> <li>• Workers should be cautious when driving through the site in order to avoid encounters with passing animals.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 5 of 11)

Activity	Potential Hazards	Recommended Controls
Surveying (continued)	Biological hazards	<ul style="list-style-type: none"> <li>• Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).</li> </ul>
	Ticks	<ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
Hydropunch sampling	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> <li>• All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition.</li> <li>• Equipment will be inspected before being put to use and at the beginning of each shift.</li> <li>• Faulty/unsafe equipment will be tagged and if possible locked out.</li> <li>• 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.</li> </ul>
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> <li>• 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.</li> <li>• All mobile equipment and areas in which they are operated shall be adequately illuminated.</li> <li>• Whenever the equipment is parked, the parking brake shall be set.</li> <li>• Equipment parked on inclines will have the wheels chocked.</li> <li>• Inspect brakes and tire pressure on drill rig before staging for work.</li> <li>• Obtain trenching/drilling permit prior to operation.</li> </ul>
	Inexperienced operator	<ul style="list-style-type: none"> <li>• Machinery and mechanized equipment shall be operated only by designated personnel.</li> <li>• Heavy equipment operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgement.</li> </ul>
	Jacks/outriggers	<ul style="list-style-type: none"> <li>• Ensure proper footing and cribbing.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 11)

Activity	Potential Hazards	Recommended Controls
Hydropunch sampling (continued)	Falling objects	<ul style="list-style-type: none"> <li>• Remove unsecured tools and materials before raising or lowering the derrick.</li> <li>• Stay alert and clear of materials suspended overhead.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep feet and hands clear of moving/suspended materials and equipment.</li> <li>• Stay alert at all times!</li> </ul>
	Fire	<ul style="list-style-type: none"> <li>• Mechanized equipment shall be shut down prior to and during fueling operations.</li> <li>• Have fire extinguishers inspected and readily available.</li> </ul>
	Fall hazards	<ul style="list-style-type: none"> <li>• Personnel are not allowed to work off of machinery or use them as ladders.</li> <li>• Use fall protection when working above 6 feet.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Hearing protection is mandatory above 85 dBA.</li> </ul>
	Contact with rotating or reciprocating machine part	<ul style="list-style-type: none"> <li>• Use machine guards; use long-handled shovels to remove auger cuttings.</li> <li>• Safe lockout procedures for maintenance work.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.</li> </ul>
Groundwater, sediment, and surface water sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with water.</li> <li>• Handle samples with care.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 7 of 11)

Activity	Potential Hazards	Recommended Controls
Groundwater, sediment and surface water sampling (continued)	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
	Hazard communication	<ul style="list-style-type: none"> <li>• MSDSs shall be obtained for chemicals brought on site.</li> <li>• Label all containers as to contents.</li> </ul>
	Strains/sprains	<ul style="list-style-type: none"> <li>• Use the proper tool for the job being performed.</li> <li>• Get assistance if needed.</li> <li>• Avoid twisting/turning while pulling on tools, moving equipment, etc.</li> </ul>
	Drowning	<ul style="list-style-type: none"> <li>• Personal flotation devices will be worn when sampling on or adjacent to the water.</li> </ul>
	Spills/residual materials	<ul style="list-style-type: none"> <li>• Absorbent material and containers will be kept available where leaks or spills may occur.</li> </ul>
	Lighting	<ul style="list-style-type: none"> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> </ul>
	Unattended worker	<ul style="list-style-type: none"> <li>• Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.</li> </ul>
Soil boring and surface/subsurface sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with paint.</li> <li>• Handle samples with care.</li> <li>• Only essential personnel will be in the work area.</li> <li>• All personnel will follow good hygiene practices..</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 8 of 11)

Activity	Potential Hazards	Recommended Controls
Soil boring and surface/subsurface sampling (continued)	Bees, spiders, and snakes	<ul style="list-style-type: none"> <li>• Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas.</li> <li>• Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>• Workers should wear insulated clothing when temperatures drop below 40 °F.</li> <li>• Drink warm beverages on breaks. Refrain from drinking caffeinated beverages.</li> <li>• Remove wet clothing promptly.</li> <li>• Take breaks in warm areas.</li> <li>• Reduce work periods as necessary.</li> <li>• Layer work clothing.</li> </ul>
	Access/egress hazards	<ul style="list-style-type: none"> <li>• Use qualified and trained bushhog operator.</li> <li>• Keep employees out of the bushhog work area.</li> <li>• Utilize good housekeeping practices.</li> <li>• Keep aisleways, pathways, and work areas free of obstruction.</li> <li>• Clean ice or snow off of walkways or work stations.</li> <li>• Use appropriate footwear for the task assigned.</li> </ul>
	Heat rash	<ul style="list-style-type: none"> <li>• Keep the skin clean and dry.</li> <li>• Change perspiration-soaked clothing, as necessary.</li> <li>• Bathe at end of work shift or day.</li> <li>• Apply powder to affected area.</li> </ul>
	Heat cramps	<ul style="list-style-type: none"> <li>• Drink plenty of cool fluids even when not thirsty.</li> <li>• Provide cool fluid for work crews.</li> <li>• Move victim to shaded, cool area.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 9 of 11)

Activity	Potential Hazards	Recommended Controls
Soil boring and surface/subsurface sampling (continued)	Heat exhaustion	<ul style="list-style-type: none"> <li>• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature)</li> <li>• Set up work/rest periods.</li> <li>• Use the buddy system.</li> <li>• Allow workers time to acclimate.</li> <li>• Have ice packs available for use.</li> <li>• Take frequent breaks.</li> </ul>
	Heat stroke	<ul style="list-style-type: none"> <li>• Evaluate possibility of night work.</li> <li>• Perform physiological monitoring on workers during breaks.</li> <li>• Wear body cooling devices.</li> </ul>
	Lightning strikes	<ul style="list-style-type: none"> <li>• Whenever possible, halt activities and take cover.</li> <li>• If outdoors, stay low to the ground.</li> <li>• 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).</li> <li>• Seek shelter in a building if possible.</li> <li>• Stay away from windows.</li> <li>• If available, crouch under a group of trees instead of one single tree.</li> <li>• Keep all body parts in contact with the ground as close as possible.</li> <li>• If in a group, keep 6 feet of distance between people.</li> </ul>
	Thunderstorms, tornadoes	<ul style="list-style-type: none"> <li>• Listen to radio or TV announcements for pending weather information.</li> <li>• Cease field activities during thunderstorms or tornado warnings.</li> <li>• Seek shelter. Do not try to outrun a tornado.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.</li> </ul>
Moving and shipping collected samples	Pinch points	<ul style="list-style-type: none"> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Wear adequate hand protection. Use care when handling glassware.</li> </ul>
	Hazard communication	<ul style="list-style-type: none"> <li>• Label all containers as to contents and associated</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

(Page 10 of 11)

Activity	Potential Hazards	Recommended Controls
Material storage	Flammable and combustible liquids	<ul style="list-style-type: none"> <li>• Store in NO SMOKING AREA.</li> <li>• Fire extinguisher readily available.</li> <li>• Transfer only when properly grounded and bonded.</li> </ul>
Disposal of IDW (Forklift Operation)	Personnel injury, property damage, and/or equipment damage	<ul style="list-style-type: none"> <li>• Use qualified and trained forklift operators.</li> <li>• The operator shall not exceed the load capacity rating for the forklift.</li> <li>• The load capacity shall be clearly visible on the forklift.</li> <li>• Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.</li> </ul>
	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Stop immediately at any sign of obstruction.</li> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
High-pressure water jetting operations	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques.</li> <li>• Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Good housekeeping shall be implemented.</li> <li>• The work area shall be kept clean as feasible.</li> <li>• Inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Fueling	<ul style="list-style-type: none"> <li>• Only approved safety cans shall be used to store fuel.</li> <li>• Do not refuel equipment while it is operating.</li> <li>• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Former Rifle Grenade Range, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

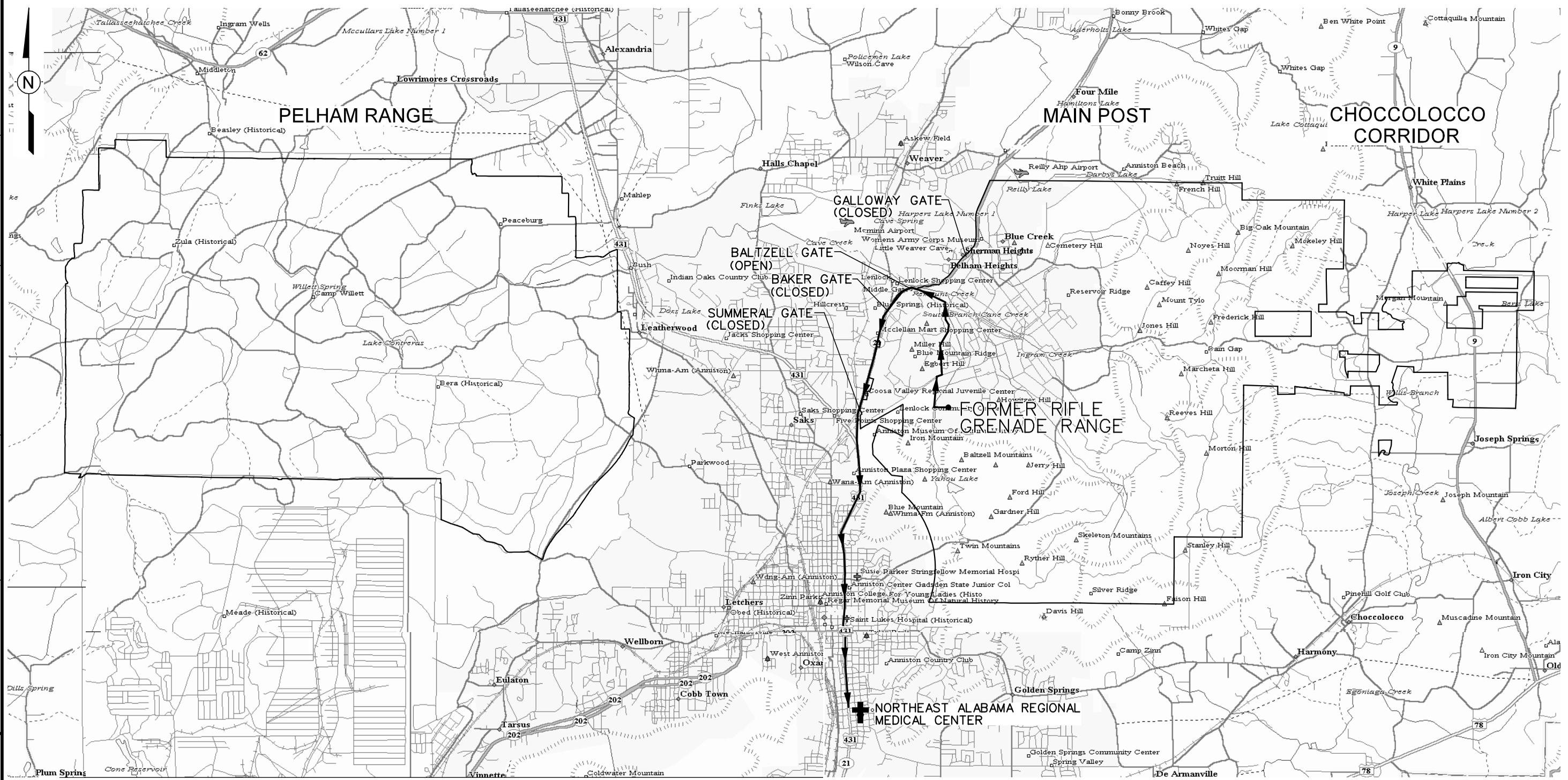
(Page 11 of 11)

Activity	Potential Hazards	Recommended Controls
High-pressure water jetting operations (continued)	Faulty or damaged equipment	<ul style="list-style-type: none"> <li>Equipment shall be inspected before being placed into service and at the beginning of each shift.</li> <li>Preventive maintenance procedures recommended by the manufacturer shall be followed.</li> <li>A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.</li> </ul>
	High-pressure water	<ul style="list-style-type: none"> <li>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).</li> <li>One standby person shall be available within the vicinity of the pump during jetting operation.</li> <li>The work area shall be isolated and adequate barriers will be used to warn other site personnel.</li> </ul>
	Unqualified operators	<ul style="list-style-type: none"> <li>Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.</li> </ul>
	Out of control equipment	<ul style="list-style-type: none"> <li>No machinery or equipment is permitted to run unattended.</li> <li>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.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>Sound levels above 85 dBA mandates hearing protection by nearby site personnel.</li> </ul>
	Activation during repairs	<ul style="list-style-type: none"> <li>All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>Keep feet and hands clear of moving/suspended materials and equipment.</li> <li>Stay alert and clear of materials suspended</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>Hard hats are required by site personnel.</li> <li>Stay alert and clear of material suspended overhead.</li> </ul>
	Flying debris	<ul style="list-style-type: none"> <li>Impact-resistant safety glasses with side shields are required.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>All site personnel will wear the appropriate PPE.</li> </ul>

UXO - Unexploded ordnance.  
 dbA - Decibels.  
 °F - Degrees Fahrenheit.  
 MSDS - Material safety data sheet.

GFCI - Ground-fault circuit interrupter.  
 TV - Television.  
 IDW - Investigation-derived waste.

DWG. NO.: ... \796887es.110  
 INITIATOR: J. BROWN  
 DRAFT. CHK. BY:  
 DATE LAST REV.:  
 STARTING DATE: 06/20/00  
 02/22/01  
 04:56:53 PM  
 PROJ. MGR.: J. YACOUB  
 ENGR. CHK. BY: J. JENKINS  
 DRAWN BY: D. BILLINGSLEY  
 DBILLING  
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**LEGEND:**

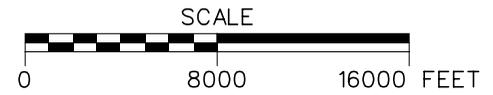
- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITAL
- INVESTIGATION SITES

**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

**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



**Final  
Site-Specific Unexploded Ordnance Safety Plan Attachment  
Site Investigation at Former Rifle Grenade Range North  
of Washington Ranges, Parcel 221Q-X  
Fort McClellan, Calhoun County, Alabama**

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## ***List of Acronyms***

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

## **1.0 Introduction**

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This document defines anomaly avoidance procedures for activities to be performed by IT Corporation (IT) in conjunction with the a fast-track site investigation activities at Former Rifle Grenade Range, Parcel 221Q-X, at Fort McClellan, Calhoun County, Alabama. IT will perform visual surveys and collect surface, subsurface, surface water, and sediment samples for chemical analysis at Parcel 221Q-X. In performing these activities, IT will require unexploded ordnance (UXO) anomaly avoidance services to avoid any potential surface UXO or subsurface anomalies during sampling activities. Intrusive anomaly investigation is not authorized for this site investigation work.

## **2.0 UXO Team Composition**

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A UXO team will be on-site during all sampling activities for anomaly avoidance on a site with known or suspected ordnance and explosives (OE).

- a) The UXO team will be composed of two UXO qualified personnel, depending on the tasks to be performed. One UXO team member will be a UXO Technician III and the other will be, as a minimum, a UXO Technician II. Qualifications of these personnel are published in Engineering Pamphlet 1110-1-18 and stated in Section 2.0 of the Installation-Wide OE Management Plan (IT, 2000).
- b) For the work to be performed in accordance with this work plan, IT will use a Schonstedt GA-72 magnetometer will be utilized to assist in surface and subsurface sweeps. The Schonstedt GA-230 is the selected instrument for down-hole anomaly avoidance.
  - (1) A geophysical prove-out test grid will be established and each geophysical instrument will be checked for operational reliability and calibration against this known response prior to field use each day. If calibration checks indicate that the instrument is not functioning within an acceptable range, and field adjustments do not resolve the performance discrepancy, the instrument will be tagged and removed from service.
  - (2) Preventive maintenance will be performed on a regularly scheduled basis. If an equipment problem is encountered, maintenance will be performed as soon as possible; records of the unscheduled maintenance and corrective action will be collected and retained for future reference.

### **3.0 Responsibilities**

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The UXO team member(s) will have the following responsibilities for anomaly avoidance procedures at the sites specified in this work plan.

- a) Provide the explosive ordnance recognition, location and safety functions for IT Corporation employees and any subcontractors during sampling activities. Sampling activities include surface and subsurface soil sampling, drilling and sampling of monitoring wells, survey of sample points, and safe access and egress to the site.
- b) Conduct UXO safety briefings for all site personnel and visitors.

### **4.0 Authority**

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For this investigation, the UXO team will not perform any disposal activities. If the team identifies an OE item, it will clearly mark the item, and direct operations to another location for safe execution of the investigation. The UXO team will not destroy the item. The UXO team will report the item to the IT Corporation site manager and the Base Transition Force at Fort McClellan for disposition of the item.

### **5.0 Anomaly Avoidance Procedures for Sampling Activities**

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When conducting sampling activities in the areas described in this work plan, consideration must be given for possible OE contamination. Since these areas may contain OE contamination, the UXO team must conduct a surface access survey and a subsurface survey of UXO before any type of activities commence, including foot and vehicular traffic.

- a) Access Surveys.
  - (1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the fill area work areas. If UXO is found during the access survey, the ordnance will be conspicuously marked and avoided. No personnel will be allowed outside of the surveyed areas.
  - (2) The UXO team will locate an access route to and from the proposed

investigation site that is free of surface and near-surface UXO using an appropriate geophysical detection instrument as required. The access route should be as wide as the minimum number of feet of the widest vehicle.

- (3) Geophysical instrumentation should be used to locate potential UXO just below the surface that may be encountered through erosion from rain, continual vehicular traffic, or subsurface sampling and drilling activities. If surface UXO or subsurface UXO-related anomalies are encountered, the access route must be diverted to avoid contact.
  - (4) The boundary of each access route and investigation site should be marked using white survey flagging and pin flags. Non-UXO qualified personnel will not be allowed outside designated access areas without proper UXO escort. Near-surface anomaly locations will be prominently identified with yellow survey flagging or pin flags. Red flagging will be placed adjacent to any discovered UXO for subsequent visual reference.
  - (5) At the actual investigation site, the UXO team must also complete an access survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations, as appropriate for site activities. As 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 bought on-site. Intrusive activities will not proceed if an anomaly is detected that cannot be positively identified as inert material. In this event, the sampling personnel must select an alternate investigation area or configuration.
- b) **Surface/Near Surface-Sampling.** Surface soil samples are normally collected at depths of zero to twelve inches below ground surface. The UXO team will visually survey the surface of the selected surface soil sampling sites for any indication of UXO or UXO-related contamination. In addition, the UXO team will utilize a magnetometer over the site before sampling begins. Any anomalies detected will be prominently marked with a yellow survey flag or pin flag for avoidance during sampling activities. If too many anomalies are found within an area of interest, the sampling personnel will select an alternate sampling location for collection of surface/near surface samples.
- c) **Subsurface Soil Sampling.** Subsurface soil sampling is considered to be the collection of samples below a nominal depth of approximately twelve inches from a split-spoon, Shelby tube, or bucket auger soil sampler using drilling techniques.
- (1) The UXO team must conduct an access survey to locate an access route to

the proposed sampling or drilling location as well as an access survey at the proposed drilling site that is large enough to support drill rig maneuverability, parking of support vehicles, and establishment of decontamination stations. As a minimum, the surveyed area should have a minimum dimension in all directions equal to twice the length of the largest vehicle or piece of equipment to be brought on-site. The UXO team will clearly mark the boundaries of the cleared soil sampling or well site. Personnel will not go outside the cleared area. If a pre-selected area indicates magnetic anomalies, a new sampling/drilling site will be chosen.

- (2) The UXO team must complete a subsurface geophysical survey of the proposed drill hole location(s). If the subsurface sampling depth is greater than the geophysical instrumentation detection capabilities below existing ground surface, then the UXO team must incrementally complete the geophysical survey as outlined below.
  - (a) **Underground Utilities.** Utility clearance and/or excavation permits are not required for the areas covered by this document. In the event subsurface utilities are suspected in an excavation area, the UXO team must attempt to verify their location using geophysical instrumentation. Note that only utilities with a ferrous content are detectable with a geophysical instrument. All located utilities should be marked with a series of pin flags to visually delineate their approximate subsurface routing.
  - (b) **Pilot Hole.** An incremental geophysical survey of the drill hole location(s) 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 its installation. The UXO team using a manual or mechanical portable auger will install the pilot hole. The augured hole will be inspected for anomalies with a geophysical instrument (configured for down hole utilization) at two-foot increments as the hole is advanced below ground surface. The pilot hole will also be inspected with the geophysical instrument upon reaching the final depth of the hand auger 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. Hand augering of a hole will not proceed if an anomaly is detected that cannot be positively identified as inert material. If OE is encountered or an anomaly cannot be positively identified as inert material, the sampling personnel must select a new drill hole location.
  - (c) **Monitoring of Drilling by Others.** Once a drilling site has been surface cleared and a pilot hole installed as described above, the drilling contractor will be notified that the site is available for subsurface sampling.

The drilling contractor's actual drill hole must be located within a two-foot radius of the pilot hole installed by the UXO team. The UXO team will continue to complete a subsurface inspection for anomalies with a geophysical instrument configured for down hole utilization at two-foot increments as the drilling is advanced from the clearance depth of the pilot until achievement of one of the following indicators: the drilling activity is completed; the drilling is extended to depths greater than 30 feet below ground surface; or a qualified geologist determines that virgin soil is found.

- (d) Drilling equipment and/or metallic support materials (e.g., drill rig, augers, drill rods, casings, etc.) may create an interference affecting the operation of the geophysical survey instrumentation during the incremental depth inspection process. In such event, the item(s) creating the interference must be relocated outside the interference range of the geophysical instrument during each incremental depth inspection of the drill hole for the presence of anomalies. Drilling of a hole will not proceed if OE is encountered or if an anomaly is detected that cannot be positively identified as inert material. In this event, the sampling personnel must select a new drill hole location.

## **6.0 UXO/OE Disposition**

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Since the purpose of UXO support during activities is anomaly avoidance, the UXO team is not tasked to perform UXO/OE disposal. The UXO team will notify the site manager and the Fort McClellan Base Transition Force if UXO is encountered that cannot be avoided or if the item presents an imminent hazard requiring immediate action based on the items fuzing or current condition,. The UXO/OE item will be marked and recorded and all project personnel will evacuate the area.

## **7.0 Safety**

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In addition to the requirements of the Site-Specific Safety and Health Plan prepared for this site, the UXO team 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 a head

threat is present.

## **8.0 Quality**

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A UXO Quality Control (QC) Specialist is not required for this work. However, QC instructions and procedures listed in Section 9.0 of the Installation-Wide OE Management Plan (IT, 2000) will be followed, as appropriate to this task.

## **9.0 Reference**

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