

**Final
Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan,
Site-Specific Unexploded Ordnance Safety Plan Attachments
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan
Calhoun County, Alabama**

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

August 2000

**Final
Site-Specific Field Sampling Plan Attachment
Site Investigation at the Hand Grenade Range,
Range 32, Parcel 90Q-X
Fort McClellan
Calhoun County, Alabama**

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August 2000

Revision 1

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List of Acronyms

See Attachment 1 for the List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation will conduct site investigation activities at the Hand Grenade Range, Range 32, Parcel 90Q-X, at Fort McClellan, 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 Hand Grenade Range, Range 32, Parcel 90Q-X.

The Hand Grenade Range, Range 32, Parcel 90Q-X, is located in the south central area of the Main Post. The Hand Grenade Range, Range 32, Parcel 90Q-X, comprises approximately 39 acres. The Hand Grenade Range contained four live-fire throwing bays, a practice throwing area, bleachers, mess area, testing site, male/female restrooms, observation tower, and several parking lots. The facility is located southeast of Rock Hollow Road on an unnamed paved road. Three unnamed intermittent tributaries of the South Branch of Cane Creek converge on the eastern portion of this site to form a single tributary exiting the site to the northeast, and eventually flowing northwest into the South Branch of Cane Creek. The Hand Grenade Range was active from 1987 to 1999. Ordnance used at this facility consisted of practice and live hand grenades. The practice grenades contain blasting cap-like devices.

Specifically, IT Corporation will collect five surface soil samples, five subsurface soil samples, five groundwater samples, four surface water samples, and four sediment samples at this site. Potential contaminant sources at the Hand Grenade Range, Range 32, Parcel 90Q-X, are primarily unknown, but may include lead and nitroexplosives. Chemical analyses of the samples collected during the field program will include nitroexplosives and metals. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared with site-specific screening levels developed in the July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, and regulatory agency guidelines.

The Hand Grenade Range, Range 32, Parcel 90Q-X, falls within the "Possible Explosive Ordnance Impact Areas" shown on Plate 10 of the Fort McClellan Archive Search Report Maps, July 1999; therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at the Hand Grenade Range, Range 32. The

surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for the Hand Grenade Range, Range 32, Parcel 90Q-X, will be used in conjunction with the site-specific safety and health plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, ordnance and explosives management 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

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Hand Grenade Range, Range 32, Parcel 90Q-X, under Task Order CK10, Contract Number DACA21-96-D-0018.

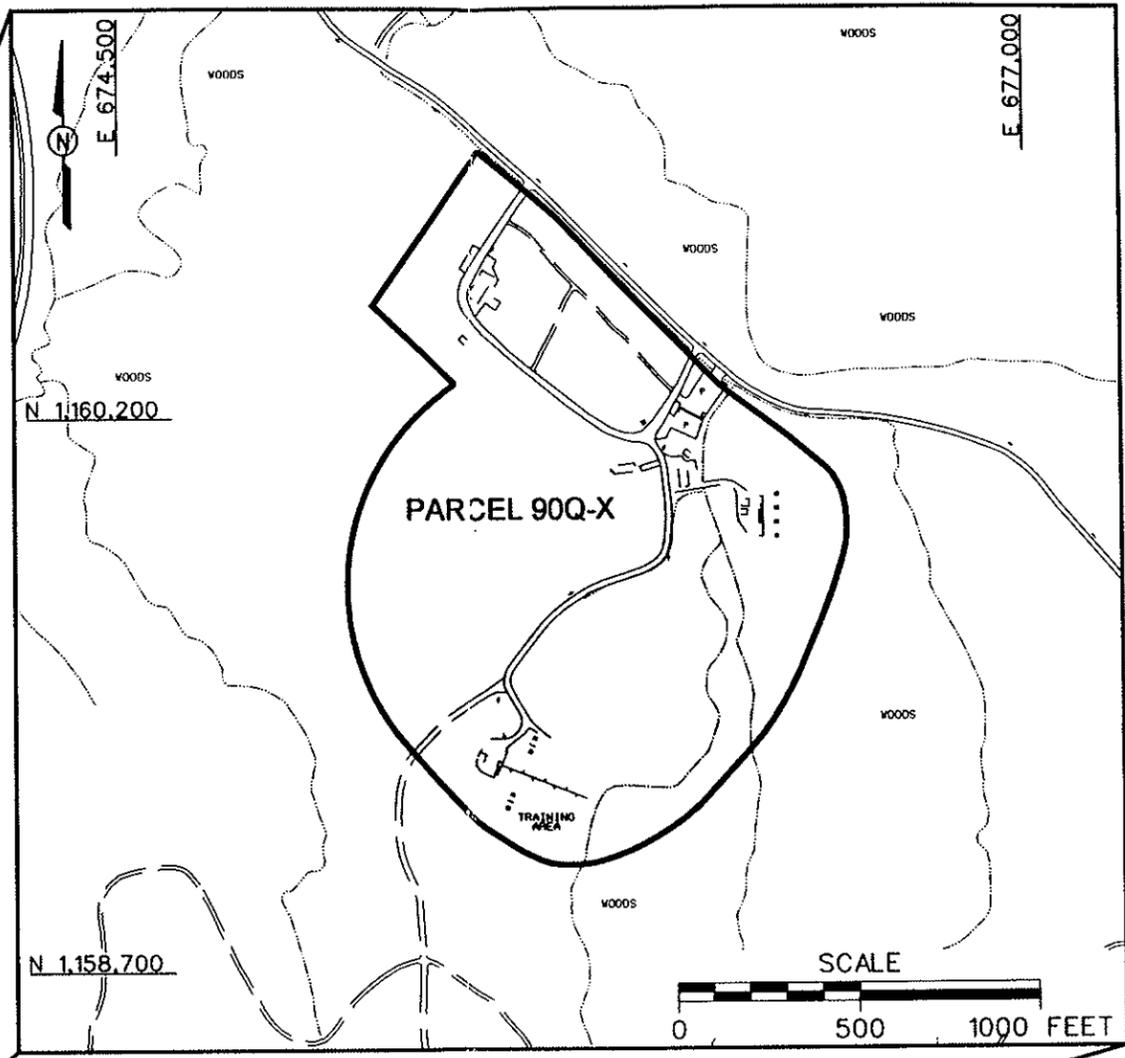
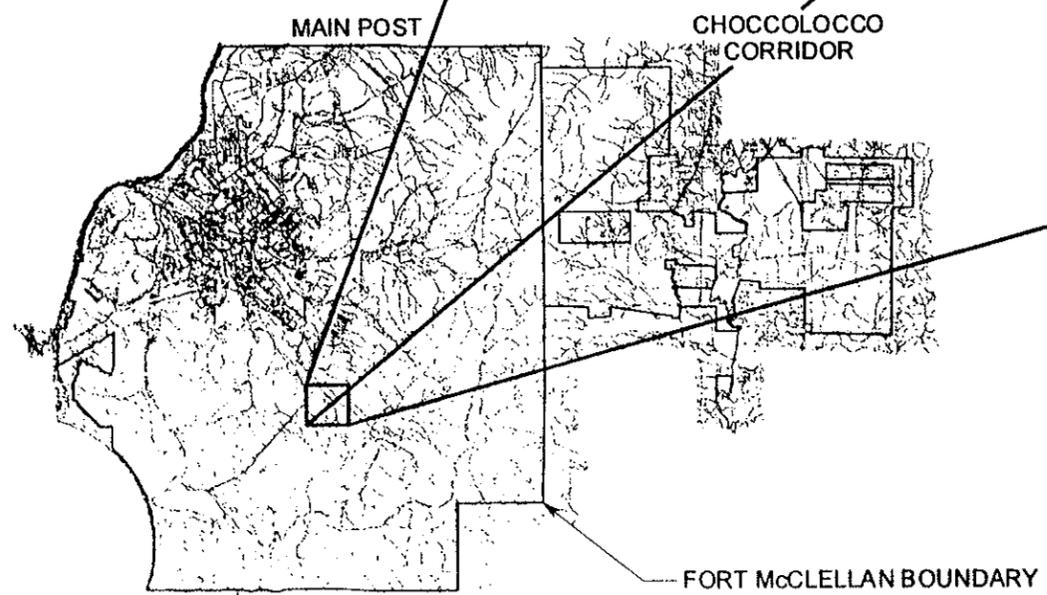
This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Hand Grenade Range. This SFSP will be used in conjunction with the site-specific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

1.2 Site Description

The Hand Grenade Range, Range 32, Parcel 90Q-X, is located in the south-central area of the Main Post (Figure 1-1). The Hand Grenade Range comprises an area of approximately 39 acres. The Hand Grenade Range is located southeast of Rock Hollow Road, on an unnamed paved road that parallels the South Branch of Cane Creek (Figure 1-2). The Hand Grenade Range contains four live-fire throwing bays, a practice throwing area, and several parking lots. Bleachers, a mess area, a testing site, male/female restrooms, and an observation tower have been removed from the site. The Hand Grenade Range was active from 1987 to 1999. Ordnance used at this facility consisted of practice and live hand grenades. The practice grenades contain blasting cap-like devices.

Three unnamed intermittent tributaries of the South Branch of Cane Creek converge on the eastern portion of this site to form a single tributary exiting the site to the northeast and eventually flowing northwest into the South Branch of Cane Creek. The majority of the area at this site appears to be undeveloped.

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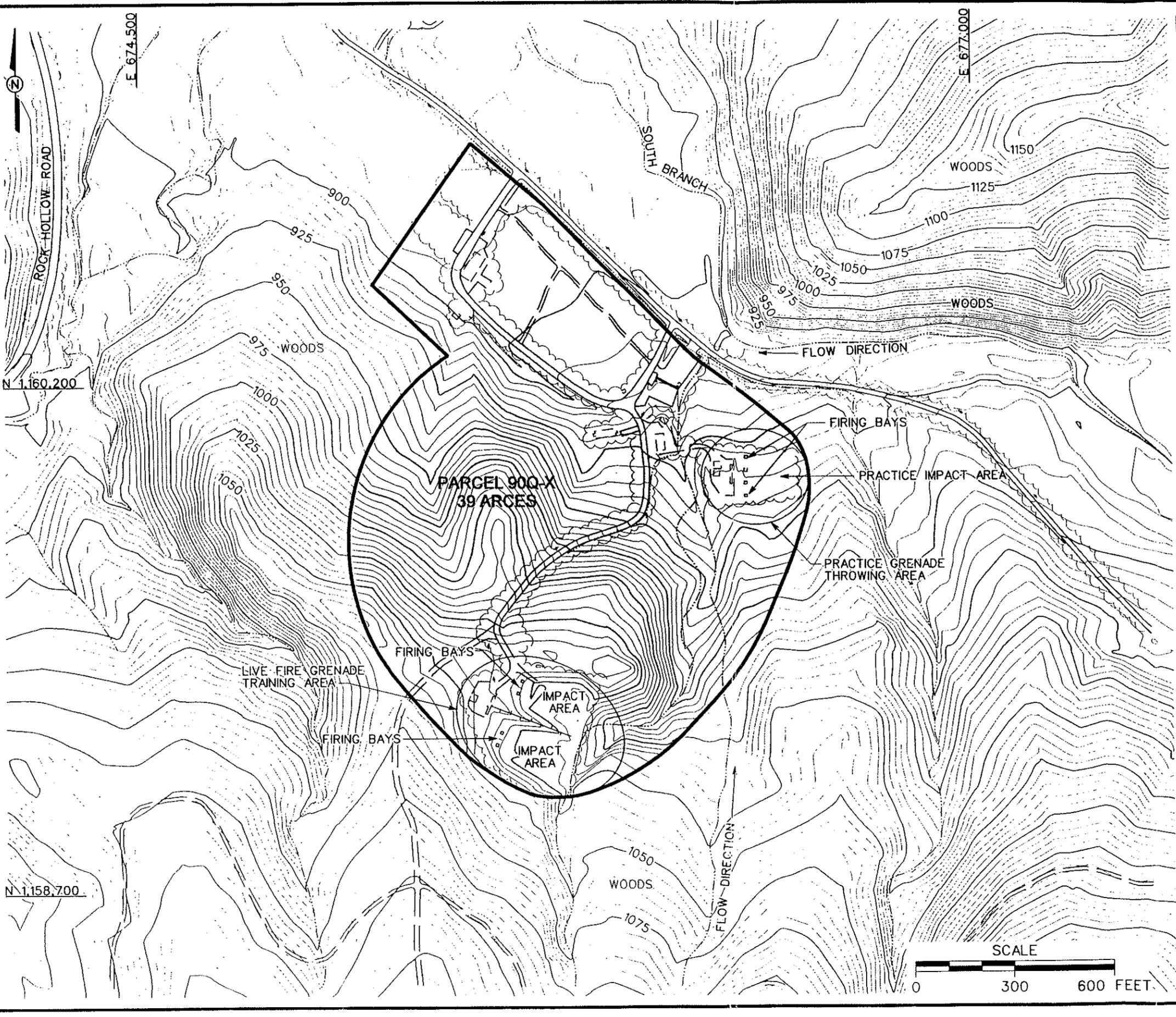
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	PARCEL BOUNDARY
	SURFACE DRAINAGE / CREEK
	UTILITY POLE

FIGURE 1-1
 SITE LOCATION MAP
 HAND GRENADE RANGE, RANGE 32
 PARCEL 90Q-X

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



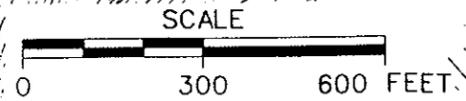
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- LEGEND**
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 - PAVED ROADS AND PARKING
 - REMOVED BUILDINGS
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK
 - UTILITY POLE
 - BERM

FIGURE 1-2
SITE MAP
HAND GRENADE RANGE, RANGE 32
PARCEL 90Q-X

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



The elevation of the site ranges from about 885 and 1,050 feet (National Geodetic Vertical Datum of 1929). Surface water appears to drain to the northeast. Local shallow groundwater direction at the site is probably controlled by topography; therefore, groundwater direction in the residuum is likely to the northeast, toward the South Branch of Cane Creek.

Soils at the Hand Grenade Range consist of the Anniston and Allen Series. The Anniston and Allen Series of soils consist of strongly acidic, deep, well-drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. Sandstone and quartzite gravel and cobbles, as much as 8 inches in diameter, are on the surface and throughout the soil.

Soils at this site fall into the Anniston and Allen stony loams, 10 to 25 percent slopes, (AdE) (U.S. Department of Agriculture, 1961). Strong slopes, reduced erosion, and numerous stones, 3 to 8 inches in diameter, distinguish the series from the Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded. The surface soil of this series is very dark brown to very dark grayish-brown stony loam, typically 4 to 8 inches thick. At a depth of about 10 inches, this material grades into a dark-red or dark reddish-brown, stony fine sandy loam. Stones and strong slopes make this soil type poorly suited for cultivation, therefore, most of the acreage of this soil type is wooded.

The depth to bedrock ranges from 2 feet to greater than 10 feet (U.S. Department of Agriculture, 1961). The typical soil description is 2 to 10 feet of well-drained stony loam to clay loam over stratified local alluvium, limestone, or shale bedrock. The depth to the water table is likely greater than 20 feet.

This mapping unit consists of friable soils that have developed in old alluvium on foot slopes and along the base of mountains. The color of the surface soil ranges from very dark brown and dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low.

1.3 Scope of Work

The scope of work for activities associated with the SI at the Hand Grenade Range, Range 32, Parcel 90Q-X, as specified by the statement of work (USACE, 1999a), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Develop the site-specific UXO safety plan.
- 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 five surface soil samples, five subsurface soil samples, five groundwater samples, four surface water samples, and four sediment samples to determine whether potential site-specific chemicals (PSSC) are present at the Hand Grenade Range, Range 32, Parcel 90Q-X site and to provide data useful for supporting any future planned corrective measures and closure activities.
- Samples will be analyzed for the parameters listed in Section 4.5.

The Hand Grenade Range, Range 32, Parcel 90Q-X, falls within the “Possible Artillery Impact Areas” shown on Plate 10 of the FTMC Archive Search Report Maps (USACE, 1999b); therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan will be used to support hazardous, toxic, and radioactive waste investigation and construction activities at the Hand Grenade Range, Range 32, Parcel 90Q-X should incidental ordnance, explosives, and UXO be encountered and require avoidance.

At completion of the field activities and sample analyses, draft and final SI summary 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. The SI summary report 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

An environmental baseline survey (EBS) was conducted by Environmental Sciences 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 (DOD) guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal (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 = Unexploded ordnance
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and DOD 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. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Hand Grenade Range, Range 32, Parcel 90Q-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 qualified for potential UXO. The Hand Grenade Range, Range 32 also requires additional evaluation to determine the environmental condition of the parcel.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Hand Grenade Range, Range 32, Parcel 90Q-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 the Hand Grenade Range, Range 32, Parcel 90Q-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 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-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 the Hand Grenade Range, Range 32 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.

Table 3-1

**Summary of Data Quality Objectives
Site Investigation
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	None	<u>Contaminant Source</u> Hand Grenade Range, Range 32, Parcel 90Q <u>Migration Pathways</u> Infiltration to subsurface soil, infiltration and leaching to groundwater, dust emissions and volatilization to ambient air, and runoff and erosion to surface water and sediment <u>Potential Recaptors</u> Recreational site users (current and future), construction workers (future), and residents (future) <u>PSSC</u> Metals and explosives	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	5 direct-push soil samples + QC
			<u>Subsurface Soil</u>				
			<u>Groundwater</u>	Definitive quality data for future decision-making	<u>Subsurface Soil</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	5 direct-push soil samples + QC
			<u>Surface Water</u>				
			<u>Sediment</u>		<u>Groundwater</u> TAL Metals and Nitroexplosives		
	<u>Surface Water</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	4 surface water samples + QC				
	<u>Sediment</u> TAL Metals, Nitroexplosives, TOC and Grain Size			Definitive data in CESAS Level B data packages	4 sediment samples + QC		

ADEM - Alabama Department of Environmental Management.
 CESAS - Corps of Engineers South Atlantic Savannah.
 DOD - U.S. Department of Defense.
 EPA - U.S. Environmental Protection Agency.
 FTMC - Fort McClellan.
 PSSC - Potential site-specific chemical.
 QC - Quality control.
 SI - Site investigation.
 TAL - Target analyte list.
 TOC - Total organic carbon.
 USACE - U.S. Army Corps of Engineers.

3.3 Conceptual Site Exposure Model

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

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

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

Primary contaminant releases were probably limited to releases through detonation activity that entered surface soil. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, dust emissions and volatilization to ambient air, surface water runoff, and erosion to surface water and sediment.

Currently, the site is not used as a grenade range but it contains parking lots. Other areas/buildings associated with the prior use as a grenade range have been removed. The site is not currently maintained in any fashion. Therefore, the only plausible receptor with the current land-use scenario is a recreational site user who may hunt. The streams on site are too small to support fish, which would be caught by the recreational site user. Other potential receptors considered, but not included under current land-use scenarios, are:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.
- **Construction Worker.** The site is unused, and no development or construction is occurring or scheduled.
- **Resident.** The site is not currently used for residential purposes.

Future land use in this area is shown as remediation reserve (FTMC, 1997) and will likely be used for passive recreation and open space. The site may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997).

Plausible future land-use receptor scenarios addressed in the CSEM include:

- **Resident.** Although the site is expected to be used as open space and undeveloped, the residential scenario is considered in order to provide information for the project manager and regulators.
- **Groundskeeper.** The site is not likely to have areas that will need to be maintained because the area is abandoned; however, the groundskeeper scenario has been included for the purposes of this site investigation.
- **Construction Worker.** Although the site is not expected to be developed in the near future, construction/demolition or maintenance of buried utilities may occur at some point in the future, thus this receptor is evaluated.
- **Recreational Site User.** The site is planned for use as open space. Hunting is a potential exposure pathway for the recreational site user, however fishing is not considered plausible due to the size of the small streams associated with the site.

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.

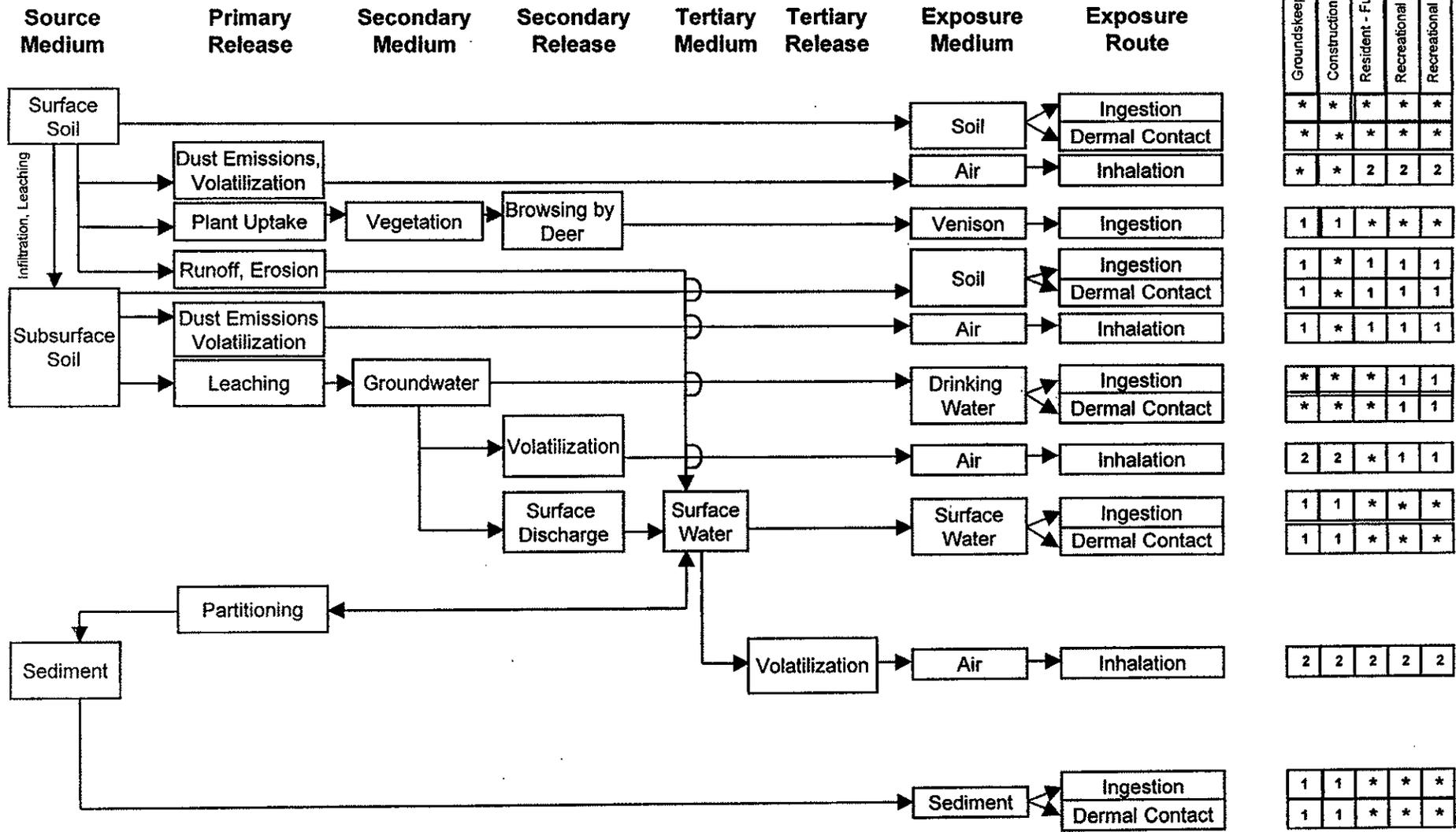
3.4 Decision-Making Process, Data Uses, and Needs

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 SI at the Hand Grenade Range, Range 32, Parcel 90Q-X. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at the Hand Grenade Range, Range 32, Parcel 90Q-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 July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report*. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Human Health Conceptual Site Exposure Model Hand Grenade Range, Range 32, Parcel 90Q-X Fort McClellan, Calhoun County, Alabama



	Groundskeeper - Future	Construction Worker - Future	Resident - Future	Recreational Site User - Current	Recreational Site User - Future
Soil - Ingestion	*	*	*	*	*
Soil - Dermal Contact	*	*	*	*	*
Air - Inhalation	*	*	2	2	2
Venison - Ingestion	1	1	*	*	*
Soil - Ingestion	1	*	1	1	1
Soil - Dermal Contact	1	*	1	1	1
Air - Inhalation	1	*	1	1	1
Drinking Water - Ingestion	*	*	*	1	1
Drinking Water - Dermal Contact	*	*	*	1	1
Air - Inhalation	2	2	*	1	1
Surface Water - Ingestion	1	1	*	*	*
Surface Water - Dermal Contact	1	1	*	*	*
Air - Inhalation	2	2	2	2	2
Sediment - Ingestion	1	1	*	*	*
Sediment - Dermal Contact	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, groundwater, surface water, and sediment samples will be sampled and analyzed to meet the objectives of the SI at the Hand Grenade Range, Range 32, Parcel 90Q-X. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods, Update III, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

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

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

The Hand Grenade Range, Range 32, Parcel 90Q-X, site falls within the “Possible Artillery Impact Area” shown on Plate 10 of the FTMC archive search report maps (USACE, 1999b). 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 easy 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 Appendices D and E of the approved SAP (IT, 2000).

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, 2000), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet below ground surface, 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, 2000). The site manager will mark the proposed locations with stakes, coordinate with the appropriate local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at the Hand Grenade Range, Range 32, Parcel 90Q-X includes the collection of surface soil, subsurface soil, groundwater, 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. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from five soil locations at the Hand Grenade Range, Range 32.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale are listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and 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.

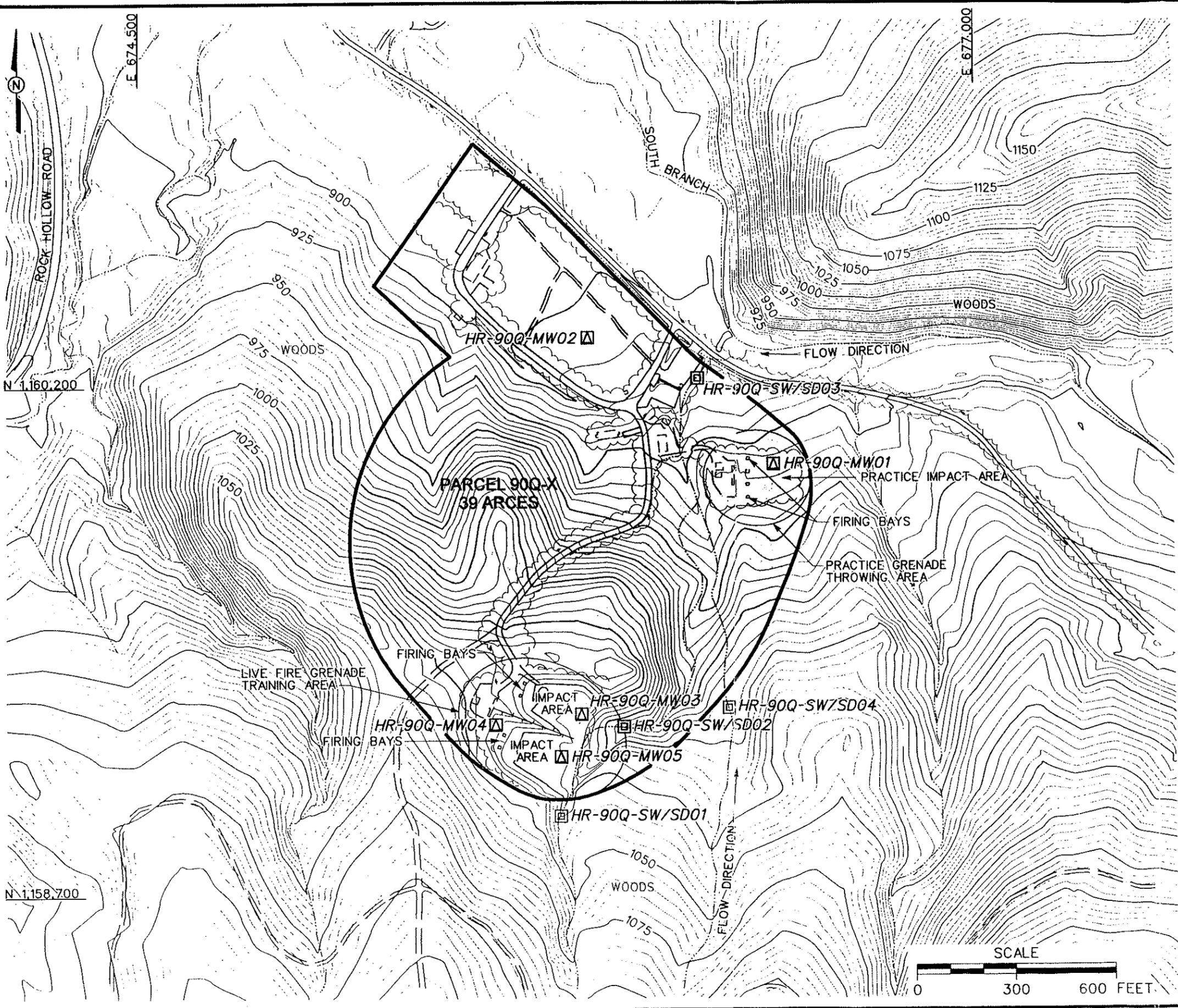
4.2.1.2 Sample Collection

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

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from the five soil borings installed at the Hand Grenade Range, Range 32, Parcel 90Q-X.

DWG. NO.: ... 796887es.046
 PROJ. NO.: 796887
 INITIATOR: D. HILL
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY: J. RAGSDALE
 ENGR. CHK. BY: J. RAGSDALE
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 01/24/00
 DRAWN BY: D. BILLINGSEY
 08/08/00
 10:08:39
 BILLING
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- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - REMOVED BUILDINGS
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK
 - UTILITY POLE
 - BERM
 - PROPOSED SURFACE WATER/SEDIMENT SAMPLE LOCATION
 - PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

FIGURE 4-1
PROPOSED SAMPLE LOCATIONS
HAND GRENADE RANGE, RANGE 32
PARCEL 90Q-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
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sample Location Rationale
HR-90Q-MW01	Surface soil, groundwater, and subsurface soil	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed near the center of the grenade practice throwing area of Parcel 90Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil 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. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-90Q-MW02	Surface soil, groundwater, and subsurface soil	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed on the north-central portion of Parcel 90Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil 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. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-90Q-MW03	Surface soil, groundwater, and subsurface soil	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed on the southern side of Parcel 90Q-X, north of the live grenade firing line. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil 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. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-90Q-MW04	Surface soil, groundwater, and subsurface soil	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed on the southern portion of Parcel 90Q-X, near the western end of the live grenade firing line. 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. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-90Q-MW05	Surface soil, groundwater, and subsurface soil	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed on the southern side of Parcel 90Q-X, south and upgradient of the live grenade firing line. Sample data will indicate if contaminant releases into the environment have occurred upgradient of this area and if contaminated soil exists upgradient of 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. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-90Q-SW/SD01	Surface water, and Sediment	Sample location on the southern side (upgradient) of Parcel 90Q-X and of the live grenade firing line. Sample data will indicate if contaminant releases have occurred from runoff upgradient of the Parcel 90Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-90Q-SW/SD02	Surface water, and Sediment	Sample location on the southeastern side of Parcel 90Q-X, downgradient of the live grenade firing line. Sample data will indicate if contaminant releases have occurred from runoff in the live fire firing line area of Parcel 90Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-90Q-SW/SD03	Surface water, and Sediment	Sample location at northeastern boundary of Parcel 90Q-X, south of unnamed paved road, before the tributary discharges into South Branch of Cane Creek. Sample data will indicate if contaminant releases have occurred from runoff in the area of Parcel 90Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-90Q-SW/SD04	Surface water, and Sediment	Sample location outside the southeastern boundary of Parcel 90Q-X on an intermittent stream that flow north in the eastern section of the parcel. Sample data will indicate if contaminant releases have occurred from runoff upstream of Parcel 90Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-90Q-MW01	HR-90Q-MW01-SS-YN0001-REG	0-1			HR-90Q-MW01-SS-YN0001-MS/MD	TAL Metals and Nitroexplosives
	HR-90Q-MW01-DS-YN0002-REG	a				
HR-90Q-MW02	HR-90Q-MW02-SS-YN0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-90Q-MW02-DS-YN0004-REG	a				
HR-90Q-MW03	HR-90Q-MW03-SS-YN0005-REG	0-1				TAL Metals and Nitroexplosives
	HR-90Q-MW03-DS-YN0006-REG	a				
HR-90Q-MW04	HR-90Q-MW04-SS-YN0007-REG	0-1	HR-90Q-MW04-SS-YN0008-FD	HR-90Q-MW04-SS-YN0009-FS		TAL Metals and Nitroexplosives
	HR-90Q-MW04-DS-YN0010-REG	a				
HR-90Q-MW05	HR-90Q-MW05-SS-YN0011-REG	0-1				TAL Metals and Nitroexplosives
	HR-90Q-MW05-DS-YN0012-REG	a				

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

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

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.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithological 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 will 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 Permanent Residuum Monitoring Wells

Five permanent residuum monitoring wells will be installed at the Hand Grenade Range, Range 32. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for the monitoring well locations are presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new, threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The well will be installed so the well screen straddles the water table.

Soil samples for lithology will be collected every 5 feet to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter, split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials (ASTM) Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the five monitoring wells completed at the Hand Grenade Range, Range 32 as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

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

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the five monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Hand Grenade Range, Range 32,
Parcel 90Q-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-90Q-MW01	HR-90Q-MW01-GW-YN3001-REG	Groundwater	a			HR-90Q-MW01-GW-YR3001-MS/MD	TAL Metals and Nitroexplosives
HR-90Q-MW02	HR-90Q-MW02-GW-YN3002-REG	Groundwater	a				TAL Metals and Nitroexplosives
HR-90Q-MW03	HR-90Q-MW03-GW-YN3003-REG	Groundwater	a				TAL Metals and Nitroexplosives
HR-90Q-MW04	HR-90Q-MW04-GW-YN3004-REG	Groundwater	a				TAL Metals and Nitroexplosives
HR-90Q-MW05	HR-90Q-MW05-GW-YN3005-REG	Groundwater	a	HR-90Q-MW05-GW-YN3006-FD	HR-90Q-MW-GW-YN3007-FS		TAL Metals and Nitroexplosives

*Sample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

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 (IT, 2000). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Four surface water samples will be collected from the drainage ditches/streams that flow through the Hand Grenade Range, Range 32, Parcel 90Q-X on the eastern side of the site.

4.2.5.1 Sample Locations and Rationale

The surface water sampling rationale are 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 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000). 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.

4.2.6 Sediment Sampling

Four sediment samples will be collected from the Hand Grenade Range, Range 32, Parcel 90Q-X. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 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 designation and required QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the

Table 4-4

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Hand Grenade Range, Range 32, Parcel 90Q-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-90Q-SW/SD01	HR-90-SW/SD01-SW-YN2001-REG	Surface Water	N/A				TAL Metals and Nitroexplosives
HR-90Q-SW/SD01	HR-90-SW/SD01-SD-YN1001-REG	Sediment	0-0.5				(TOC, Grain Size for sediment only)
HR-90Q-SW/SD02	HR-90-SW/SD02-SW-YN2002-REG	Surface Water	N/A				TAL Metals and Nitroexplosives
HR-90Q-SW/SD02	HR-90-SW/SD02-SD-YN1002-REG	Sediment	0-0.5				(TOC, Grain Size for sediment only)
HR-90Q-SW/SD03	HR-90-SW/SD03-SW-YN2003-REG	Surface Water	N/A				TAL Metals and Nitroexplosives
HR-90Q-SW/SD03	HR-90-SW/SD03-SD-YN1003-REG	Sediment	0-0.5				(TOC, Grain Size for sediment only)
HR-90Q-SW/SD04	HR-90-SW/SD04-SW-YN2004-REG	Surface Water	N/A				TAL Metals and Nitroexplosives
HR-90Q-SW/SD04	HR-90-SW/SD04-SD-YN1004-REG	Sediment	0-0.5				(TOC, Grain Size for sediment only)

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.

discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 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 cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000). 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. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required.

Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP. All areas at this site must be cleared for UXO avoidance before any surveying activities will commence.

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 the Hand Grenade Range, Range 32, Parcel 90Q-X, consist of the following list of analytical suites:

- Target Analyte List Metals - Method 6010B/7000
- Nitroexplosives – Method 8330.

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 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP).

Chemical data will be reported via hard copy data packages by the laboratory using CLP-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, 2000). Completed analysis request/chain of custody records will be secured and included with each shipment of coolers to:

Attn: John Reynolds
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Telephone: (865) 588-6401.

QA split samples collected for the USACE laboratory will be shipped to the following address:

Table 4-3

**Analytical Samples
Site Investigation
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a					Quanterra	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (5%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X: 9 water matrix samples (5 groundwater samples and 4 surface water samples); 14 soil matrix samples (5 surface soil samples, 5 subsurface soil samples, and 4 sediment samples)													
Tot TAL Metals	6010B/7000	water	normal	9	1	9	1	1	1		1	13	1
Nitroexplosives	8330	water	normal	9	1	9	1	1	1		1	12	1
TAL Metals	6010B/7000	soil	normal	14	1	14	1	1	1		1	18	1
Nitroexplosives	8330	soil	normal	14	1	14	1	1	1		1	17	1
TOC	9060	sediment	normal	4	1	4						4	0
Grain Size	ASTM D-421/D-422	sediment	normal	4	1	4						4	0
Hand Grenade Range, Range 32, Parcel 90Q-X Subtotal:				54	4	4	4	4	0	4	68	4	

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

Shp samples to: Severn Trent Laboratories, Inc.
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Attn: John Reynolds
Tel: 865-588-6401
Fax: 865-584-4315

USACE Laboratory split samples are shipped to: U.S. Army Engineer District, Savannah
Environmental & Materials District
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Tel: 678-354-0310

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.

TOC - Total organic carbon.
ASTM- American Society for Testing and Materials

U.S. Army Engineer District, Savannah
Environmental & Materials Unit
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Telephone: (678) 354-0310.

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, 2000). The IDW generated at the Hand Grenade Range, Range 32, Parcel 90Q-X site is expected to include decontamination fluids, drill 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 the Hand Grenade Range, Range 32, Parcel 90Q-X. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

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

6.0 References

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

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

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

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

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

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

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

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

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

ATTACHMENT 1
LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms (continued)

ml	inorganic silts and very fine sands	ppb	parts per billion	STEL	short-term exposure limit
mL	milliliter	PPE	personal protective equipment	Std. units	standard units
mm	millimeter	ppm	parts per million	SU	standard unit
MOGAS	motor vehicle gasoline	PPMP	Print Plant Motor Pool	SVOC	semivolatile organic compound
MPA	methyl phosphonic acid	ppt	parts per thousand	SW	surface water
MR	molasses residue	PSSC	potential site-specific chemical	SW-846	U.S. EPA Test Methods for Evaluating Solid Waste: Physical/Chemical Methods
MS	matrix spike	pt	peat or other highly organic silts	SZ	support zone
mS/cm	milliSiemens per centimeter	PVC	polyvinyl chloride	TAL	target analyte list
MSD	matrix spike duplicate	QA	quality assurance	TAT	turn around time
msl	mean sea level	QA/QC	quality assurance/quality control	TB	trip blank
MtD3	Montevillo shaly, silty clay loam, 10 to 40 percent slopes, severely eroded	QAP	installation-wide quality assurance plan	TCL	target compound list
mV	millivolts	QC	quality control	TCLP	toxicity characteristic leaching procedure
MW	monitoring well	QST	QST Environmental Inc.	TDGCL	thiodiglycol
N/A	not applicable; not available	qty	quantity	TDGCLA	thiodiglycol chloroacetic acid
NAD	North American Datum	Qual	qualifier	TERC	Total Environmental Restoration Contract
NAD83	North American Datum of 1983	R	rejected	TIC	tentatively identified compounds
NAVD88	North American Vertical Datum of 1988	RCRA	Resource Conservation and Recovery Act	TN	Tennessee
ND	not detected	REG	field sample	TOC	top of casing
NFA	No Further Action	RFA	request for analysis	TPH	total petroleum hydrocarbons
NGVD	National Geodetic Vertical Datum	RI	remedial investigation	TRPH	total recoverable petroleum hydrocarbons
NIOSH	National Institute for Occupational Safety and Health	RL	reporting limit	TWA	time weighted average
No.	number	RPD	relative percent difference	UCL	upper confidence limit
NOAA	National Oceanic and Atmospheric Administration	RRF	relative response factor	UCR	upper certified range
NR	not requested	RSD	relative standard deviation	UJ	not detected above reporting limit; result should be estimated
ns	nanosecond	RTK	real-time kinematic	USACE	U.S. Army Corps of Engineers
N-S	north to south	SAD	South Atlantic Division	USAEC	U.S. Army Environmental Center
nT	nanotesla	SAIC	Science Applications International Corporation	USAEHA	U.S. Army Environmental Hygiene Agency
NTU	nephelometric turbidity unit	SAP	installation-wide sampling and analysis plan	USAMCLS	U.S. Army Chemical School
O&G	oil and grease	sc	clayey sands; sand-clay mixtures	USATEU	U.S. Army Technical Escort Unit
°C	degrees Celsius	Sch.	schedule	USATHAMA	U.S. Army Toxic and Hazardous Material Agency
OD	outside diameter	SD	sediment	USCS	Unified Soil Classification System
°F	degrees Fahrenheit	SDG	sample delivery group	USDA	U.S. Department of Agriculture
OE	Ordnance and explosives	SDZ	safe distance zone	USEPA	U.S. Environmental Protection Agency
oh	organic clays of medium to high plasticity	SEMS	Southern Environmental Management & Specialties	UST	underground storage tank
ol	organic silts and organic silty clays of low plasticity	SFSP	site-specific field sampling plan	UXO	unexploded ordnance
OP	organophosphorus pesticide	SHP	installation-wide safety and health plan	VOA	volatile organic analyte
OWS	oil/water separator	SI	site investigation	VOC	volatile organic compound
oz	ounce	sm	silty sands; sand-silt mixtures	VOH	volatile organic hydrocarbon
PAH	polynuclear aromatic hydrocarbon	SOP	standard operating procedure	VQual	validated qualifier
Pb	lead	sp	poorly graded sands; gravelly sands	VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)
PCB	polychlorinated biphenyl	SP	sump pump	Weston	Roy F. Weston, Inc.
PCE	perchloroethene	Ss	stony rough land, sandstone	WP	installation-wide work plan
PG	professional geologist	SS	surface soil	WS	watershed
PID	photoionization detector	SSC	site-specific chemical	WSA	Watershed Screening Assessment
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	SSHO	site safety and health officer	WWI	World War I
POL	petroleum, oils, and lubricants	SSHP	site-specific safety and health plan	WWII	World War II
PP	peristaltic pump	SSSL	site-specific screening level	XRF	x-ray fluorescence
		STB	supertropical bleach	yd ³	cubic yards

List of Abbreviations and Acronyms

AC	hydrogen cyanide	DANC	decontamination agent, non-corrosive	GC/MS	gas chromatograph/mass spectrometer
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	DDT	dichlorodiphenyltrichloroethane	GFAA	graphite furnace atomic absorption
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	DEP	depositional	gm	silty gravels; gravel-sand-silt mixtures
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	DI	deionized	gp	poorly graded gravels; gravel-sand mixtures
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	DIMP	di-isopropylmethylphosphonate	gpm	gallons per minute
ADEM	Alabama Department of Environmental Management	DMMP	dimethylmethylphosphonate	GPR	ground-penetrating radar
AL	Alabama	DOD	U.S. Department of Defense	GPS	global positioning system
amb.	amber	DP	direct-push	GSSI	Geophysical Survey Systems, Inc.
APT	armor piercing tracer	DPDO	Defense Property Disposal Office	GW	groundwater
ASP	Ammunition Supply Point	DQO	data quality objective	gw	well-graded gravels; gravel-sand mixtures
ASR	Archives Search Report, July 1999	DRMO	Defense Reutilization and Marketing Office	HA	hand auger
AST	aboveground storage tank	DS2	Decontamination Solution Number 2	HCl	hydrochloric acid
ASTM	American Society for Testing and Materials	E&E	Ecology and Environment, Inc.	HD	distilled mustard
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	EBS	environmental baseline survey	HDPE	high-density polyethylene
BCT	BRAC Cleanup Team	Elev.	elevation	HNO ₃	nitric acid
BFB	bromofluorobenzene	EM	electromagnetic	hr	hour
bgs	below ground surface	EM31	Geonics Limited EM31 Terrain Conductivity Meter	HTRW	hazardous, toxic, and radioactive waste
bkg	background	EM61	Geonics Limited EM61 High-Resolution Metal Detector	ICAL	initial calibration
bis	below land surface	EOD	explosive and ordnance disposal	ICB	initial calibration blank
BRAC	Base Realignment and Closure	EPA	U.S. Environmental Protection Agency	ICP	inductively-coupled plasma
Braun	Braun Intertec Corporation	EPC	exposure point concentration	ICS	interference check sample
BTEX	benzene, toluene, ethylbenzene, and xylenes	EPIC	Environmental Photographic Interpretation Center	ID	inside diameter
BTOC	below top of casing	ER	equipment rinsate	IDL	instrument detection limit
BZ	breathing zone	ESE	Environmental Science and Engineering, Inc.	IDW	investigation-derived waste
CCAL	continuing calibration	ESV	ecological screening value	IMPA	isopropylmethyl phosphonic acid
CCB	continuing calibration blank	E-W	east to west	in.	inch
CD	compact disc	EZ	exclusion zone	IRDMIS	Installation Restoration Data Management Information System
CDZ	contamination reduction zone	FB	field blank	IT	IT Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	FD	field duplicate	ITEMS	IT Environmental Management System™
CERFA	Community Environmental Response Facilitation Act	FedEx	Federal Express, Inc.	J	estimated concentration
CESAS	Corps of Engineers South Atlantic Savannah	FFE	field flame expedient	JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
CFC	Chlorofluorocarbon	Flt	filtered	K	conductivity
CG	cyanogen chloride	Flt	filtered	L	lewisite; liter
ch	inorganic clays of high plasticity	FMP 1300	Former Motor Pool 1300 Site	l	liter
CK	carbonyl chloride	Frtn	fraction	LCS	laboratory control sample
cl	inorganic clays of low to medium plasticity	FS	field split	LEL	lower explosive limit
Cl.	chlorinated	ft	feet	LT	less than the certified reporting limit
CLP	Contract Laboratory Program	ft/ft	feet per foot	max	maximum
CN	chloroacetophenone	FTA	fire training area	MDL	method detection limit
COC	chain of custody	FTMC	Fort McClellan	mg/kg	milligrams per kilogram
CRL	certified reporting limit	g	gram	mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
CS	ortho-chlorobenzylidene-malononitrile	G-856	Geometrics, Inc. G-856 magnetometer	MHz	megahertz
CSEM	conceptual site exposure model	G-858G	Geometrics, Inc. G-858G magnetic gradiometer	µg/g	micrograms per gram
ctr.	container	gal	gallon	µg/kg	micrograms per kilogram
CWA	chemical warfare agent	gal/min	gallons per minute	µg/L	micrograms per liter
CWM	chemical warfare material; clear wide mouth	GB	sarin	µmhos/cm	micromhos per centimeter
CX	dichloroformoxime	gc	clay gravels; gravel-sand-clay mixtures	min	minimum
D	duplicate	GC	gas chromatograph	MINICAMS	miniature continuous air sampling system

**Final
Site-Specific Safety and Health Plan Attachment
Hand Grenade Range, Range 32, Parcel 90Q-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**

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

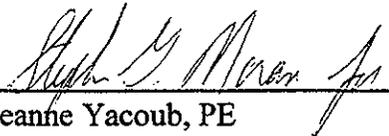
August 2000

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.

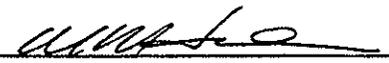
**Site-Specific Safety and Health Plan Attachment Approval
Fort McClellan, Calhoun County, Alabama**

I have read and approve this site-specific safety and health plan attachment for the Hand Grenade Range, Range 32, Parcel 90Q-X at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.



Jeanne Yacoub, PE
Project Manager

8/10/00
Date



Michael Henderson, CIH
Health & Safety Manager

8/8/00
Date

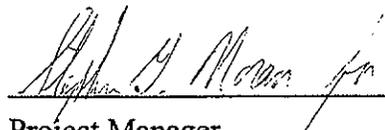


Jeff Tarr
Site Coordinator

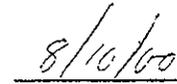
8/10/00
Date

Acknowledgements

The final approved version of this site-specific safety and health plan (SSHP) attachment for the Hand Grenade Range, Range 32, Parcel 90Q-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.



Project Manager

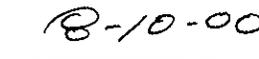


Date

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



Site Coordinator



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
Michael Henderson, IT H&S Manager	(865) 690-3211
Mike Moore, Fort McClellan Safety Officer	(256) 848-5433
Dr. Elaine Theriault, IT Occupational Physician.....	(800) 229-3674

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List of Acronyms

See Attachment I (List of Abbreviations and Acronyms) of the site-specific field sampling plan contained in this binder.

1.0 Site Work Plan Summary

Project Objective. The objective of this investigation at Fort McClellan (FTMC), Calhoun County, Alabama is to collect and analyze samples at the Hand Grenade Range, Range 32, Parcel 90Q-X.

Project Tasks

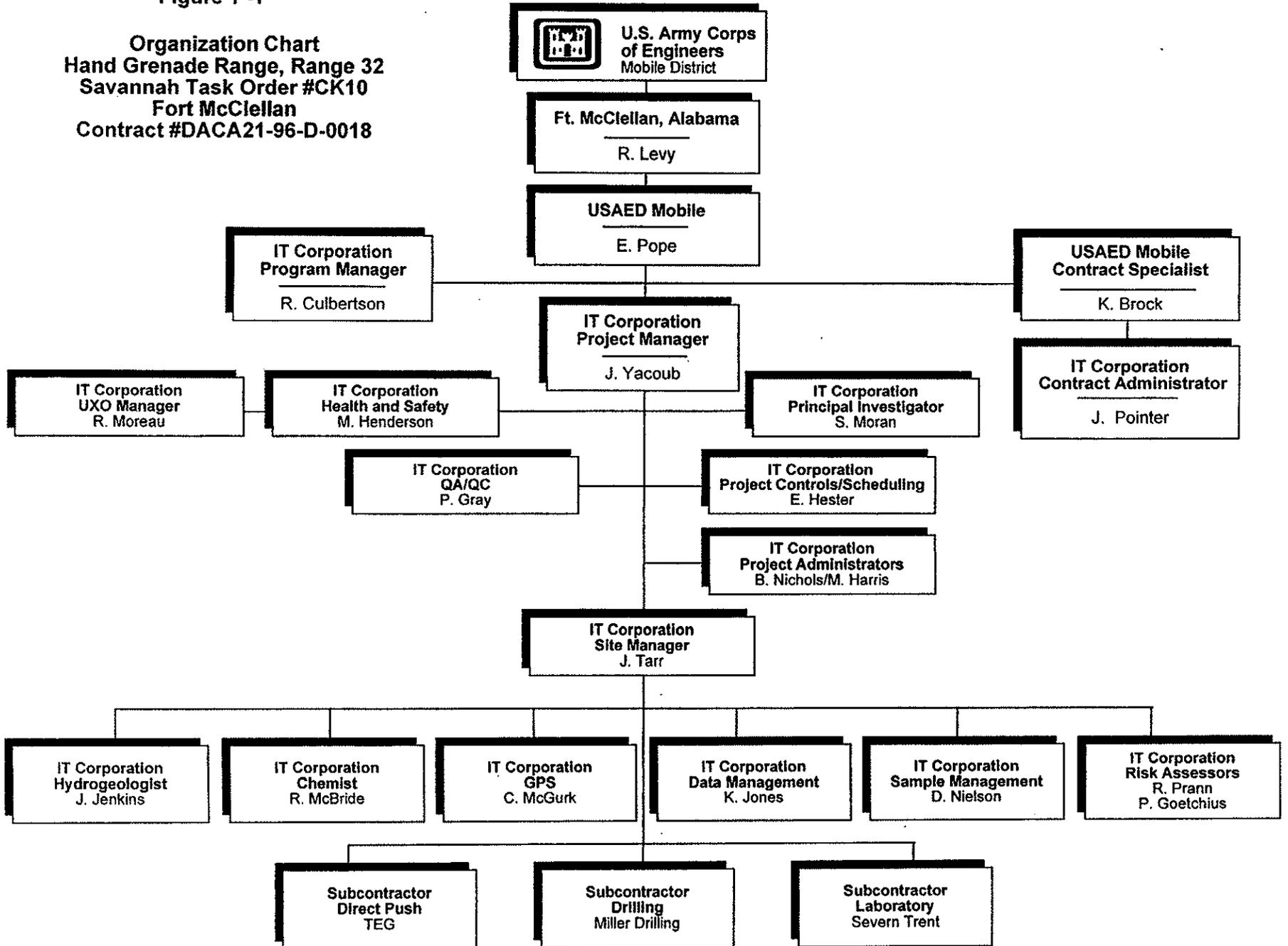
- Provide unexploded ordnance (UXO) surface avoidance and downhole survey support during field work at all locations.
- Collect 4 sediment samples.
- Collect 4 surface water samples.
- Collect 5 surface soil samples.
- Collect 5 subsurface soil samples.
- Collect 5 groundwater samples.
- Install 5 groundwater monitoring wells.

Personnel Requirements. Up to 15 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
Hand Grenade Range, Range 32
Savannah Task Order #CK10
Fort McClellan
Contract #DACA21-96-D-0018**



2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE). Site control with the use of separate work zones (support zone, contamination reduction zone, and the exclusion zone) is discussed in Chapter 7.0 of the IT installation-wide work plan, August 1998.

The Hand Grenade Range, Range 32, Parcel 90Q-X, is located in the south central area of the Main Post. The Hand Grenade Range, Range 32, Parcel 90Q-X, comprises approximately 39 acres. The Hand Grenade Range contains four live-fire throwing bays, a practice throwing area, bleachers, mess area, testing site, male/female restrooms, observation tower, and several parking lots. The site is not gated or fenced. The facility is located southeast of Rock Hollow Road on an unnamed paved road. Three unnamed intermittent tributaries of the South Branch of Cane Creek converge on the eastern portion of this site to form a single tributary exiting the site to the northeast, and eventually flowing northwest into the South Branch of Cane Creek. The Hand Grenade Range has been active since 1987, but is now inactive. Ordnance used at this facility consisted of practice and live hand grenades. The practice grenades contain blasting cap-like devices.

Table 2-1 contains the toxicological and physiological properties of chemicals anticipated or to be used at the Hand Grenade Range, Range 32, Parcel 90Q-X. The anticipated contaminant of concern is nitroexplosives.

The presence of UXO is suspected at this area.

2.2 General Site Information

Duration of Planned Employee Activity. Employee activity duration is 1 month.

Table 2-1

**Toxicological and Physical Properties of Chemicals
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Substance [CAS]	IP ^a (eV)	Odor Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Acetone [67-64-1]	9.7	13-100	Inh Ing Con	Irritated eyes, nose, and throat; headache, dizziness; dermatitis.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	750 ppm 750 ppm 250 ppm	1,000 ppm 1,000 ppm	PEL TLV REL	20,000 ppm
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho- pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm 500 ppm	PEL TLV REL	?
n-Hexane [110-54-3]	10.18	65-248	Inh Ing Con	Lightheadedness; nausea, headache; numbness of the extremities, muscular weakness; irritation of the eyes and nose; dermatitis; chemical pneumonia; giddiness.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	50 ppm 50 ppm 50 ppm		PEL TLV REL	5,000 ppm
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43-200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, head- ache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	500 ppm 500 ppm 500 ppm	PEL TLV REL	12,000 ppm

Table 2-1

**Toxicological and Physical Properties of Chemicals
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Substance [CAS]	IP ^a (eV)	Odor Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Methyl ethyl ketone [78-93-9]	9.54	2-85	Inh Ing Con	Irritated eyes and nose; headache, dizziness; vomiting.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Fresh air Swallow: Immediate medical attention	200 ppm 200 ppm 200 ppm	300 ppm 300 ppm	PEL TLV REL	3,000 ppm
Motor Oil [NA]	?	?	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention		500 ppm 500 ppm 500 ppm	PEL TLV REL	
Nitric acid [7697-37-2]	11.95	0.3-1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	4 ppm 4 ppm 4 ppm	PEL TLV REL	100 ppm
Portland cement			Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention		10 mg/m ³ 10 mg/m ³ / total dust 5 mg/m ³ respirable fraction	TLV PEL/REL	
Sodium hydroxide [1310-73-2]	NA	NA	Inh Ing Con	Irritated nose; pneumonitis; burns eyes, and skin; temporary loss of hair.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention		C2 mg/m ³ C2 mg/m ³ C2 mg/m ³	PEL TLV REL	250 mg/m ³
Sulfuric acid [7664-93-9]	?	0.15	Inh Ing Con	Irritated eyes, nose, and throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatitis; dental erosion; tracheobronchitis; skin and eye burns; dermatitis.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention	1 mg/m ³ 1 mg/m ³ 1 mg/m ³	3 mg/m ³	PEL TLV REL	80 mg/m ³
2,4,6-Trinitrotoluene (TNT) [118-96-7]	10.59	?	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	0.5 mg/m ³ (skin) 0.5 mg/m ³ (skin) 0.5 mg/m ³ (skin)		PEL TLV REL	NE

Table 2-1

Toxicological and Physical Properties of Chemicals Hand Grenade Range, Range 32, Parcel 90Q-X Fort McClellan, Calhoun County, Alabama

(Page 3 of 3)

^aIP = Ionization potential (electron volts).

^bRoute = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.

^cTWA = 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.

^dSTEL = 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.

^ePEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).

AEL = Airborne Exposure Limit.

TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value—TWA.

REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.

^fIDLH (NIOSH)—Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.

NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. 1998).

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

Ca = Carcinogen.

NA = Not applicable.

? = Unknown.

LEL = Lower explosive limits.

LC₅₀ = Lethal concentration for 50 percent of population tested.

LD₅₀ = Lethal dose for 50 percent of population tested.

NIC = Notice of intended change (ACGIH).

References:

American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 1998, compiled by the American Conference of Governmental Industrial Hygienists.

Amoore, J. E. Hautala, "Odor as an Aid to Chemical Safety," Journal of Applied Toxicology, 1983.

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National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1998, National Institute for Occupational Safety and Health.

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

Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.

Verschueren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.

Warning Properties of Industrial Chemicals—Occupational Health Resource Center, Oregon Lung Association.

Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

Pathways for Hazardous Substance Dispersion. Possible pathways for hazardous substances in the area are water and soils.

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*
Install monitoring wells	Modified Level D*

*Initial level will be raised to Level C or higher if air monitoring results for volatile organic hydrocarbons 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 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: Unexploded ordnance (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.

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

- Permeable Tyvek, Kleenguard, or its equivalent (Saran-coated tyvek where chemical agents are anticipated)
- Latex boot covers
- Nitrile, heavy work, or latex gloves

- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

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

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:

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

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

4.0 Site Monitoring

The environmental contaminants of concern resulting from the Hand Grenade Range, Range 32, Parcel 90Q-X are nitroexplosives. Table 4-1 contains action levels for site monitoring at the sites.

Chemical. Monitoring will be performed by the site safety and health officer (SSHO) during the performance of ground intrusive operations. A calibrated photoionization detector will be utilized to monitor the sampling locations and BZs to determine if any organic material may be present that would necessitate upgrading of protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the work areas and BZs 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.

- **Area UXO Surveys Using Magnetometers.** During this operation UXO on the surface will be detected and marked for avoidance during field operations. Metal objects just below the surface (within 2 feet) will also be marked to indicate the potential hazard.
- **Downhole 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
Relative Risk Screening for the Hand Grenade Range, Range 32,
Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

When in Level C PPE

Analyte	Action Level	Required Action ^a
Volatile Organic Hydrocarbons (VOH)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, upgrade to Level B.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for VOCs.

When in Level D Modified/D PPE

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

When in Support Zone

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

Table 4-1

Action Levels Relative Risk Screening for the Hand Grenade Range, Range 32, Parcel 90Q-X Fort McClellan, Calhoun County, Alabama

(Page 2 of 2)

- ^a Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.
- ^b Contact with the H&S manager must be made prior to continuance of work. The H&S manager may then initiate perimeter/integrated air sampling along with additional engineering controls.

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

Table 4-2

**Air Monitoring Frequency and Location
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Work Activity	Instrument	Frequency	Location
Staging equipment	OV Monitor	Initially for area	Breathing zone (BZ) of employees
Land Survey	OV Monitor	Initially for area	BZ of employees
Sampling (water and soil)	OV Monitor LEL/O ₂ Monitor	Continuously Continuously	BZ of employees and/or work area
Installing monitoring wells	OV Monitor LEL/O ₂ Monitor	Continuously Continuously	BZ of employees and/or work area

OV = Organic vapor.

LEL/O₂ = Lower explosive level/oxygen.

5.0 Activity Hazard Analysis

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

- Setup of equipment and general field activities
- Land survey
- Soil and water sampling
- Installation of monitoring wells.

All injuries and illnesses must be immediately reported to the site manager or the SSHO, 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
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 14)

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

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 14)

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

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 14)

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

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 14)

Activity	Potential Hazards	Recommended Controls
Staging equipment (continued)	Extension cords	<ul style="list-style-type: none"> • Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic. • Cords shall be suspended with a nonconductive support (rope, plastic ties, etc.). • Cords shall be designed for hard duty. • Cords shall be inspected daily.
	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • Remain 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornados	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
Surveying	Slip, trip, fall	<ul style="list-style-type: none"> • Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe boots when working in the field. • Provide adequate lighting in all work areas. • Whenever possible, avoid routing cords and hoses across walking pathways. • Flag or cover inconspicuous holes to protect against falls. • Work areas will be kept clean and orderly. • Garbage and trash will be disposed of daily in approved refuse containers. • Tools and accessories will be properly maintained and stored. • Work areas and floors will be kept free of dirt, grease, and slippery materials.
	UXO	<ul style="list-style-type: none"> • UXO specialists will perform UXO surface clearance for UXO avoidance.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 5 of 14)

Activity	Potential Hazards	Recommended Controls
Surveying (continued)	Traffic accidents	<ul style="list-style-type: none"> • Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. • If working adjacent to roadways, have workers wear fluorescent orange vests. • Use warning signs or lights to alert oncoming traffic. • Assign flag person(s) if necessary to direct local traffic. • Set up temporary parking locations outside the immediate work area. • Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits. • Pedestrians have the right-of-way. • Wear seat belts when vehicles are in motion.
	Wildlife hazards	<ul style="list-style-type: none"> • Workers should be cautious when driving through the site in order to avoid encounters with passing animals.
	Biological hazards	<ul style="list-style-type: none"> • Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).
	Ticks	<ul style="list-style-type: none"> • Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellent. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
Hydropunch sampling	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> • All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out. • Drill rigs shall be equipped with reverse signal alarm, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 14)

Activity	Potential Hazards	Recommended Controls
Hydropunch sampling (continued)	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> • Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work. • Obtain trenching/drilling permit prior to operation.
	Inexperienced operator	<ul style="list-style-type: none"> • Machinery and mechanized equipment shall be operated only by designated personnel. • Heavy equipment operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgement.
	Jacks/outriggers	<ul style="list-style-type: none"> • Ensure proper footing and cribbing.
	UXO	<ul style="list-style-type: none"> • UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance. See SSHPs to determine if required.
	Falling objects	<ul style="list-style-type: none"> • Remove unsecured tools and materials before raising or lowering the derrick. • Stay alert and clear of materials suspended overhead.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert at all times!
	Fire	<ul style="list-style-type: none"> • Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available.
	Fall hazards	<ul style="list-style-type: none"> • Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Noise	<ul style="list-style-type: none"> • Hearing protection is mandatory above 85 dBA.
	Contact with rotating or reciprocating machine part	<ul style="list-style-type: none"> • Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 7 of 14)

Activity	Potential Hazards	Recommended Controls
Hydropunch sampling (continued)	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.
Groundwater sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with water. • Handle samples with care. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	UXO	<ul style="list-style-type: none"> • UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance. See SSHPs to determine if required.
	Cut hazards	<ul style="list-style-type: none"> • Use care when handling glassware. • Wear adequate hand protection.
	Hazard communication	<ul style="list-style-type: none"> • MSDSs shall be obtained for chemicals brought on site. • Label all containers as to contents.
	Strains/sprains	<ul style="list-style-type: none"> • Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 8 of 14)

Activity	Potential Hazards	Recommended Controls
Groundwater sampling (continued)	Spills/residual materials	<ul style="list-style-type: none"> Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	<ul style="list-style-type: none"> Adequate lighting will be provided to ensure a safe working environment.
	Unattended worker	<ul style="list-style-type: none"> Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.
Soil boring and surface/subsurface sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> Stop immediately at any sign of obstruction. Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. Only essential personnel will be in the work area. Real-time air monitoring will take place before and during sampling activities. All personnel will follow good hygiene practices. Proper decontamination procedures will be followed. All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	<ul style="list-style-type: none"> Use care when handling glassware. Wear adequate hand protection.
	Slip, trip, fall	<ul style="list-style-type: none"> Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe/shank boots when working in the field. Whenever possible, avoid routing cords and hoses across walking pathways. Flag or cover inconspicuous holes to protect against falls.
	UXO	<ul style="list-style-type: none"> UXO specialists will perform UXO surface clearance and/or UXO downhole clearance for UXO avoidance. See SSHPs to determine if required.
	Bees, spiders, and snakes	<ul style="list-style-type: none"> Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas. Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 9 of 14)

Activity	Potential Hazards	Recommended Controls
Soil boring and surface/subsurface sampling (continued)	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Cold stress	<ul style="list-style-type: none"> • Workers should wear insulated clothing when temperatures drop below 40°F. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Access/egress hazards	<ul style="list-style-type: none"> • Use qualified and trained bushhog operator. • Keep employees out of the bushhog work area. • Utilize good housekeeping practices. • Keep aisleways, pathways, and work areas free of obstruction. • Clean ice or snow off of walkways or work stations. • Use appropriate footwear for the task assigned.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 10 of 14)

Activity	Potential Hazards	Recommended Controls
Soil boring and surface/subsurface sampling (continued)	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornados	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorms or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
Installation of Monitoring Wells	Overhead hazards	<ul style="list-style-type: none"> • Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.
	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> • All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out. • Drill rigs and geoprobes 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.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Comply with IT Procedure HS 400 (May 13, 1999). • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Comply with IT Procedure HS 400 (May 13, 1999). • Move victim to shaded, cool area.

Table 5-1

Activity Hazard Analysis
 Hand Grenade Range, Range 32, Parcel 90Q-X
 Fort McClellan, Calhoun County, Alabama

(Page 11 of 14)

Activity	Potential Hazards	Recommended Controls
Installation of Monitoring Wells (continued)	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Comply with IT Procedure HS 400 (May 13, 1999). • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices. • Comply with IT Procedure HS 400 (May 13, 1999).
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> • Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Aboveground and belowground utilities will be located prior to staging equipment. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work.
	Inexperienced operator	<ul style="list-style-type: none"> • Machinery and mechanized equipment shall be operated only by designated personnel. • Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgment.
	Jacks/outriggers	<ul style="list-style-type: none"> • Ensure proper footing and cribbing.
	Falling objects	<ul style="list-style-type: none"> • Remove unsecured tools and materials before raising or lowering the derrick. • Stay alert and clear of materials suspended overhead.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert at all times!
	Fire	<ul style="list-style-type: none"> • Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available. • Obtain a Hot Work Permit, per IT Procedure HS 314 (May 19, 1999) for any operation which could act as an ignition source.
	Fall hazards	<ul style="list-style-type: none"> • Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Noise	<ul style="list-style-type: none"> • Hearing protection is mandatory above 85 dBA.
	Contact with rotating or reciprocating machine parts	<ul style="list-style-type: none"> • Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Practice good housekeeping, keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 12 of 14)

Activity	Potential Hazards	Recommended Controls
Installation of Monitoring Wells (continued)	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real time air monitoring will take place. Proper personal protective clothing and equipment will be utilized. • Stop immediately at any sign of obstruction. • Do not breathe air surrounding boring any more than necessary. • Upgrade to respirator if necessary. • Avoid skin contact with soil cuttings. Wear gloves. • Stay clear of moving parts of drill rig and geoprobe.
	Drum handling	<ul style="list-style-type: none"> • Be careful not to breathe air from around open drum any more than necessary. Monitor with photoionization detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary. • When filling a drum (with either soil or water), be careful not to make contact with the contained waste. Wear appropriate gloves. Make sure lid or bung of drum is secure. • If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boots. • When using a drum dolly, make sure straps and lid catch are securely attached. Leverage properly when tilting drum. Be sure toes stay away from drum.
Moving and shipping collected samples	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cut hazards	<ul style="list-style-type: none"> • Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	<ul style="list-style-type: none"> • Label all containers as to contents and associated hazards.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
Material storage	Flammable and combustible liquids	<ul style="list-style-type: none"> • Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.

Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 13 of 14)

Activity	Potential Hazards	Recommended Controls
Disposal of investigation-derived waste (IDW) (Forklift Operation) (continued)	Personnel injury, property damage, and/or equipment damage	<ul style="list-style-type: none"> • Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> • Stop immediately at any sign of obstruction. • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	<ul style="list-style-type: none"> • Use care when handling glassware. • Wear adequate hand protection.
High-pressure water jetting operations	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
	Fueling	<ul style="list-style-type: none"> • Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

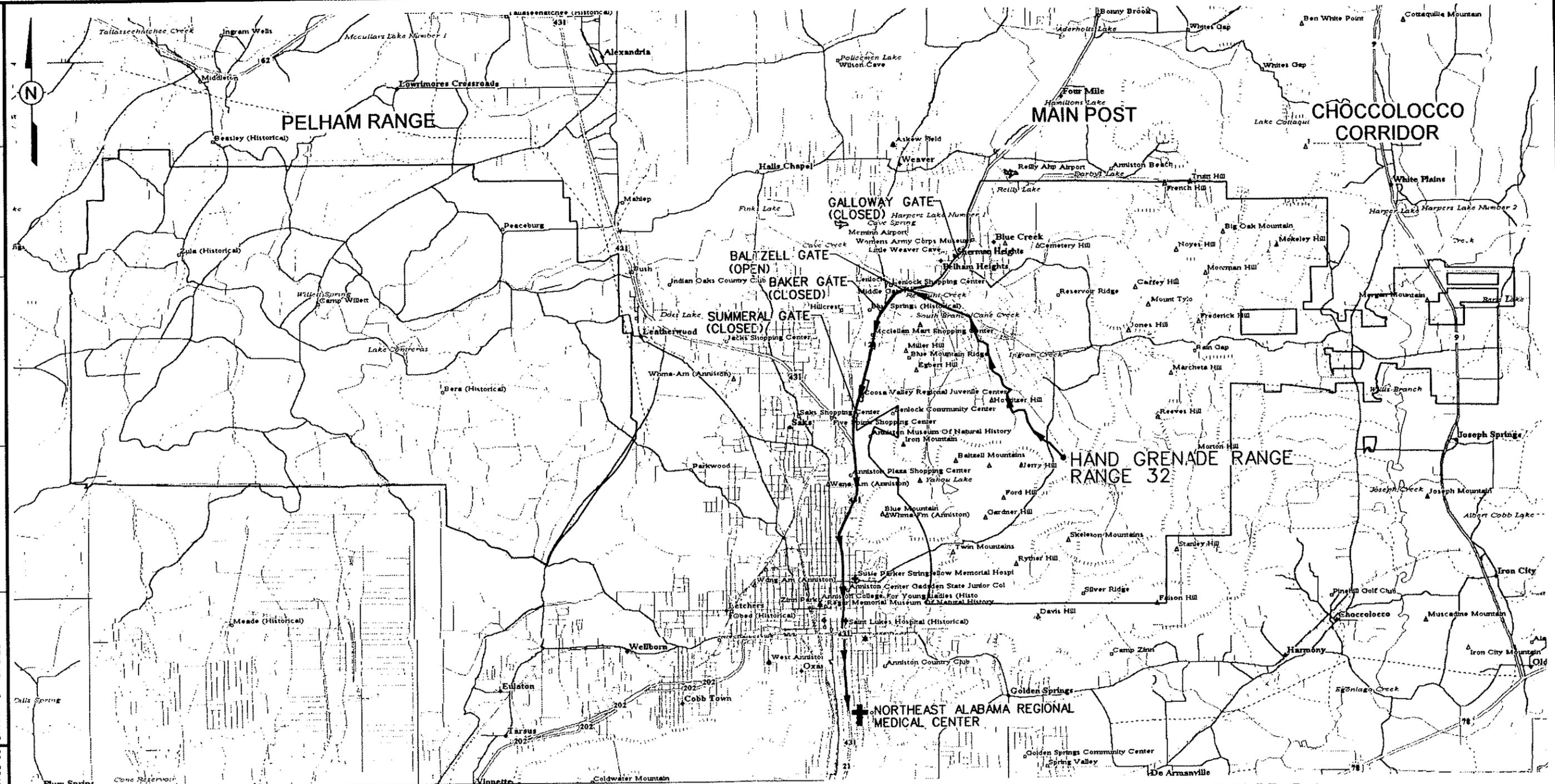
Table 5-1

**Activity Hazard Analysis
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 14 of 14)

Activity	Potential Hazards	Recommended Controls
High-pressure water jetting operations (continued)	Faulty or damaged equipment	<ul style="list-style-type: none"> • Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High-pressure water	<ul style="list-style-type: none"> • Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	<ul style="list-style-type: none"> • No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	<ul style="list-style-type: none"> • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended
	Falling objects	<ul style="list-style-type: none"> • Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	<ul style="list-style-type: none"> • Impact-resistant safety glasses with side shields are required.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • All site personnel will wear the appropriate PPE.

08/09/00 STARTING DATE: 08/08/00 DATE LAST REV: 11:05:09
 DRAWN BY: D. BILLINGSLEY DRAWN BY: ENGR. CHECK BY: J. YACOUB
 DRAFT. CHECK BY: INITIATOR: J. RAGSDALE DWG. NO.: 796887es.121
 PROJ. MGR.: J. YACOUB PROJ. NO.: 796887



LEGEND:

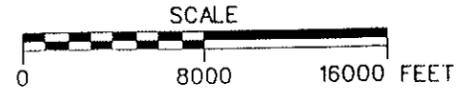
- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITAL
- INVESTIGATION SITES

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
Hand Grenade Range, Range 32, Parcel 90Q-X
Fort McClellan, Calhoun County, Alabama**

Prepared for:

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

August 2000

Revision 0

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List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms, of the site-specific field sampling plan attachment contained in this binder.

1.0 Introduction

This document defines anomaly avoidance procedures for activities to be performed by IT Corporation (IT) in conjunction with the site investigation activities at Hand Grenade Range, Range 32, Parcel 90Q-X, at Fort McClellan (FTMC), Calhoun County, Alabama. IT will perform visual surveys and collect surface, subsurface, surface water, and sediment samples for chemical analysis at Hand Grenade Range, Range 32, Parcel 90Q-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.

The Hand Grenade Range, Range 32, Parcel 90Q-X, is located in the south central area of the Main Post. The Hand Grenade Range comprises an area of approximately 39 acres. The Hand Grenade Range is located southeast of Rock Hollow Road, on an unnamed, paved road that parallels the South Branch of Cane Creek. The Hand Grenade Range contains four live-fire throwing bays, a practice throwing area and several parking lots. Also, bleachers, a mess area, a testing site, male/female restrooms, and an observation tower have been removed at the site. The Hand Grenade Range was active from 1987 to 1999. Ordnance used at this facility consisted of practice and live hand grenades. The practice grenades contain blasting cap-like devices.

Three unnamed intermittent tributaries of the South Branch of Cane Creek converge on the eastern portion of this site to form a single tributary exiting the site to the northeast and eventually flowing northwest into the South Branch of Cane Creek. The majority of the area at this site appears to be undeveloped. The elevation of the site ranges from about 885 to 1050 feet (National Geodetic Vertical Datum of 1929).

2.0 UXO Team Composition

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 to assist in surface and subsurface sweeps. The Schonstedt GA-230 magnetometer will be the instrument used for downhole 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

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 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

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 site manager and the FTMC transition force at FTMC for disposition of the item.

5.0 Anomaly Avoidance Procedures for Sampling Activities_____

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 investigation sites. 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 brought 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 and Monitoring Well Installations.** Subsurface soil sampling is considered to be the collection of samples below a nominal depth of approximately 12 inches from a split-spoon, Shelby tube, or bucket auger soil sampler using drilling techniques. Drilling techniques are also used to install groundwater-monitoring wells for investigative sampling.
 - (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 2-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 2 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 or monitoring well installation. The drilling contractor's actual drill hole must be located within a 2-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 2-foot increments as the drilling is advanced from the clearance depth of the pilot hole 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

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 FTMC 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

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

A UXO quality control specialist is not required for this work. However, quality control 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

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