

**Final  
Site-Specific Field Sampling Plan,  
Site-Specific Safety and Health Plan, and Site-Specific  
Unexploded Ordnance Safety Plan Attachments,  
Range 4A Fog Oil Storage Area – Pelham Range,  
Parcel 123(6)**

**Fort McClellan  
Calhoun County, Alabama**

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

**March 2001**

**Final  
Site-Specific Field Sampling Plan Attachment  
Range 4A Fog Oil Storage Area – Pelham Range,  
Parcel 123(6)**

**Fort McClellan  
Calhoun County, Alabama**

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

**March 2001**

**Revision 1**

# Table of Contents

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	<b>Page</b>
List of Tables .....	iii
List of Figures .....	iii
List of Acronyms .....	iv
Executive Summary .....	ES-1
1.0 Project Description.....	1-1
1.1 Introduction .....	1-1
1.2 Site Description .....	1-1
1.3 Scope of Work .....	1-3
2.0 Summary of Existing Environmental Studies .....	2-1
3.0 Site-Specific Data Quality Objectives .....	3-1
3.1 Overview .....	3-1
3.2 Data Users and Available Data.....	3-1
3.3 Conceptual Site Exposure Model .....	3-2
4.0 Field Activities.....	4-1
4.1 UXO Survey Requirements and Utility Clearances .....	4-1
4.1.1 Surface UXO Survey .....	4-1
4.1.2 Downhole UXO Survey .....	4-1
4.1.3 Utility Clearances .....	4-1
4.2 Environmental Sampling .....	4-2
4.2.1 Surface Soil Sampling.....	4-2
4.2.1.1 Sample Locations and Rationale .....	4-2
4.2.1.2 Sample Collection .....	4-2
4.2.2 Subsurface Soil Sampling .....	4-3
4.2.2.1 Sample Locations and Rationale .....	4-3
4.2.2.2 Sample Collection .....	4-3
4.2.3 Permanent Residuum Monitoring Wells.....	4-4
4.2.4 Groundwater Sampling .....	4-4
4.2.4.1 Sample Locations and Rationale .....	4-4
4.2.4.2 Sample Collection .....	4-4
4.2.5 Depositional Sampling.....	4-5
4.2.5.1 Sample Locations and Rationale .....	4-5
4.2.5.2 Sample Collection .....	4-5

**Table of Contents** *(Continued)*

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	<b>Page</b>
4.3 Decontamination Requirements .....	4-5
4.4 Surveying of Sample Locations.....	4-5
4.5 Analytical Program.....	4-6
4.6 Sample Preservation, Packaging, and Shipping .....	4-6
4.7 Investigation-Derived Waste Management .....	4-7
4.8 Site-Specific Safety and Health.....	4-7
5.0 Project Schedule.....	5-1
6.0 References .....	6-1

Attachment 1 – List of Abbreviations and Acronyms

## **List of Tables**

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<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
3-1	Summary of Data Quality Objectives	3-1
4-1	Sampling Locations and Rationale	4-2
4-2	Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities	4-2
4-3	Groundwater Sample Designations and QA/QC Sample Quantities	4-4
4-4	Analytical Samples	4-6

## **List of Figures**

---

<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
1-1	Site Location Map, Range 4A Fog Oil Storage Area	1-1
1-2	Site Map, Range 4A Fog Oil Storage Area	1-2
3-1	Human Health Conceptual Site Exposure Model	3-3
4-1	Proposed Sample Locations, Range 4A Fog Oil Storage Area	4-2

## ***List of Acronyms***

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See Attachment 1, List of Abbreviations and Acronyms

## ***Executive Summary***

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In accordance with Contract Number DACA21-96-D-0018, Delivery Order CK05, IT Corporation (IT) will conduct site investigation activities at Range 4A Fog Oil Storage Area – Pelham Range, Parcel 123(6), 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 Range 4A Fog Oil Storage Area, Parcel 123(6).

Range 4A Fog Oil Storage Area, Parcel 123(6), is located in north central Pelham Range and is due west of Range 56 in Training Area 4A of Pelham Range. The area had been designed for storage of fog oil used to generate smoke for training exercises at Fort McClellan and Pelham Range and is believed to have been in use since at least 1964. The storage capacity at Range 4A Fog Oil Storage Area is 75,000 gallons. The Fog Oil Storage Area is constructed with two concrete structures: a 15 foot by 15 foot drum handling area, and a 60 foot by 60 foot loading and storage area. Each concrete structure is equipped with drains connected to an oil/water separator and an underground storage tank. The drains are designed to collect spilled oil and precipitation. The facility covers an area of less than 1 acre.

The soils underlying each of the concrete structures may have been affected with fog oil. Fog oil may have reached the soil through seams in the concrete structures. Also, fog oil may have been able to reach the soils prior to the installation of the concrete, when the storage and handling areas were simply constructed of earthen berms.

Specifically, IT will collect five surface soil samples, five subsurface soil samples, five groundwater samples, and three depositional soil samples at Range 4A Fog Oil Storage Area to meet the objectives of the site investigation. Potential contaminant sources at Range 4A Fog Oil Storage Area include fog oil and other petroleum products (gasoline, diesel, oils, and lubricants). Chemical analyses of the samples collected during the field program will include volatile organic compounds, semivolatile organic compounds, and metals. Results from these analyses will be compared with site-specific screening levels developed in the IT 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, and regulatory agency guidelines.

This site-specific field sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for Range 4A Fog Oil Storage Area will be used in conjunction with the site-specific

safety and health plan, site-specific unexploded ordnance safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan and site-specific unexploded ordnance safety plan.

## **1.0 Project Description**

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### **1.1 Introduction**

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of Range 4A Fog Oil Storage Area, Parcel 123(6), under Delivery Order CK05, Contract Number DACA21-96-D-0018.

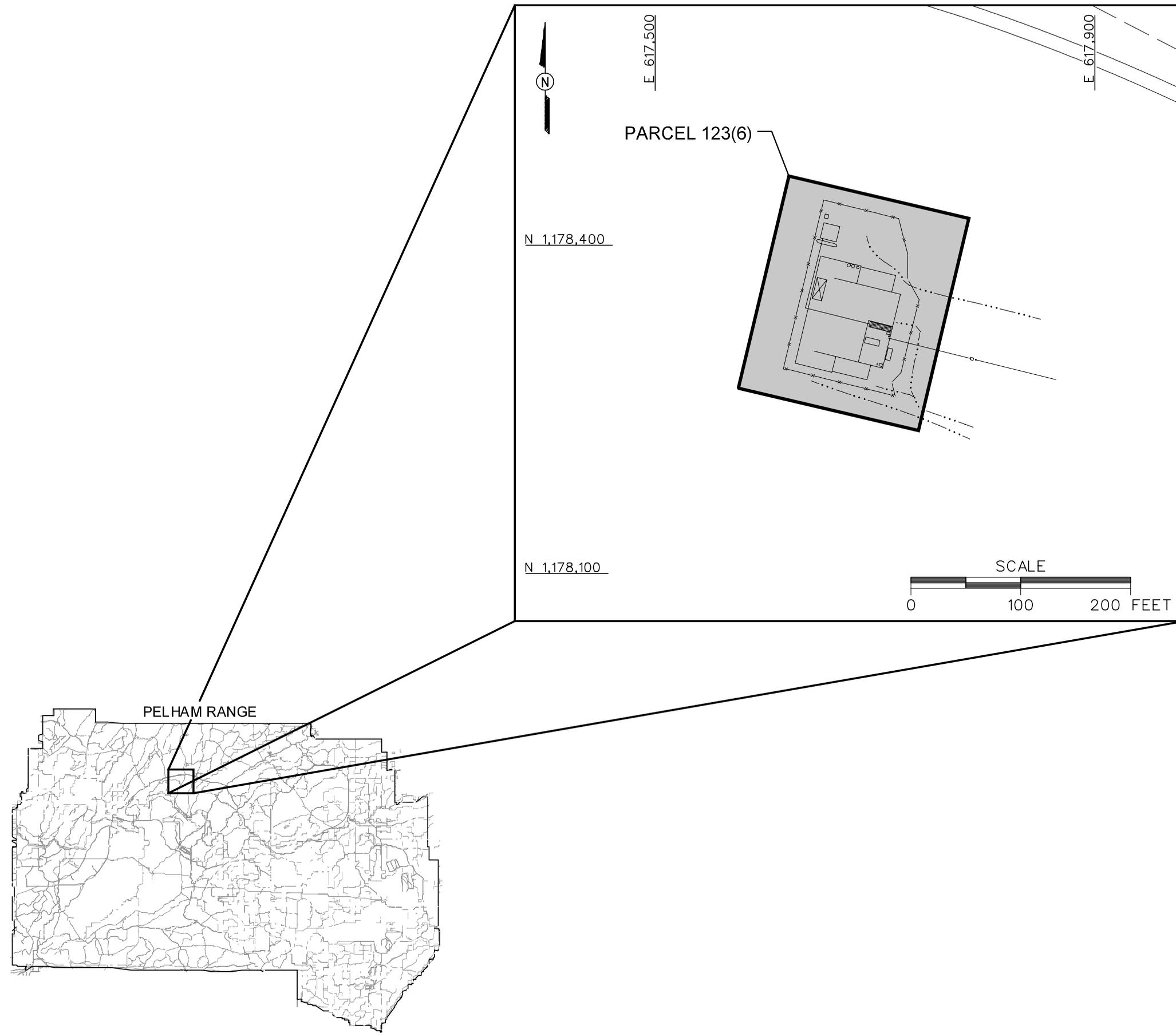
This site-specific field sampling plan (SFSP) is an attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000) for FTMC and has been prepared to provide technical guidance for sample collection and analysis at Range 4A Fog Oil Storage Area, Parcel 123(6). This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and site-specific unexploded ordnance (UXO) safety plan developed for Range 4A Fog Oil Storage Area, Parcel 123(6), and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP and site-specific UXO safety plan.

### **1.2 Site Description**

Range 4A Fog Oil Storage Area, Parcel 123(6), is located in north central Pelham Range and is due west of Range 56 in Training Area 4A of Pelham Range (Figure 1-1). The area has been designed for storage of fog oil used to generate smoke for training exercises at FTMC and Pelham Range, and is believed to have been in use since at least 1964. The storage capacity at Range 4A Fog Oil Storage Area, Parcel 123(6), is 75,000 gallons. The Fog Oil Storage Area is constructed with two concrete structures: a 15 foot by 15 foot drum handling area, and a 60 foot by 60 foot loading and storage area. Both the drum handling area and loading and storage area are located inside a fenced-in area. Each concrete structure is equipped with drains connected to an oil/water separator (OWS) and an underground storage tank. The drains are designed to collect spilled oil and precipitation (U.S. Army Center for Health Promotion and Preventive Medicine [CHPPM], 1999). The facility covers an area of less than 1 acre.

The 60 foot by 60 foot loading and storage area at Range 4A Fog Oil Storage Area is sloped and designed to divert spilled oil and precipitation to a floor drain, which is connected to the OWS. Seams once present in the concrete pad have been sealed. The seams were once reported leaking

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 PROJ. MGR.: J. YACOUB  
 DRAFT. CHCK. BY:  
 ENGR. CHCK. BY: S. MORAN  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 12/28/00  
 DRAWN BY: D. BILLINGSLEY  
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**LEGEND**

- UNIMPROVED ROADS
- == PAVED ROADS
- BUILDING
- ▭ PARCEL BOUNDARY
- . . - SURFACE DRAINAGE
- / — FENCE

**FIGURE 1-1**  
**SITE LOCATION MAP**  
**RANGE 4A FOG OIL STORAGE AREA**  
**PELHAM RANGE - PARCEL 123(6)**

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



and eventually may have led to seepage of fog oil onto the ground beneath the pad (Environmental Science and Engineering, Inc. [ESE], 1998).

The original configuration of the loading and storage area at Range 4A Fog Oil Storage Area was an earthen bermed area with drums of fog oil stored on bare soil within the berms prior to the renovation and the current use of concrete. The surface soil is reported as stained with oil from the storage and handling activities. The loading and storage area is designed to store approximately 75,000 gallons of fog oil. However, in 1986, quantities larger than 75,000 gallons were observed. The once earthen-bottomed loading and storage area has been modified to the current 60-foot by 60-foot concrete pad, and elevated containment areas (Figure 1-2) (CHPPM, 1999).

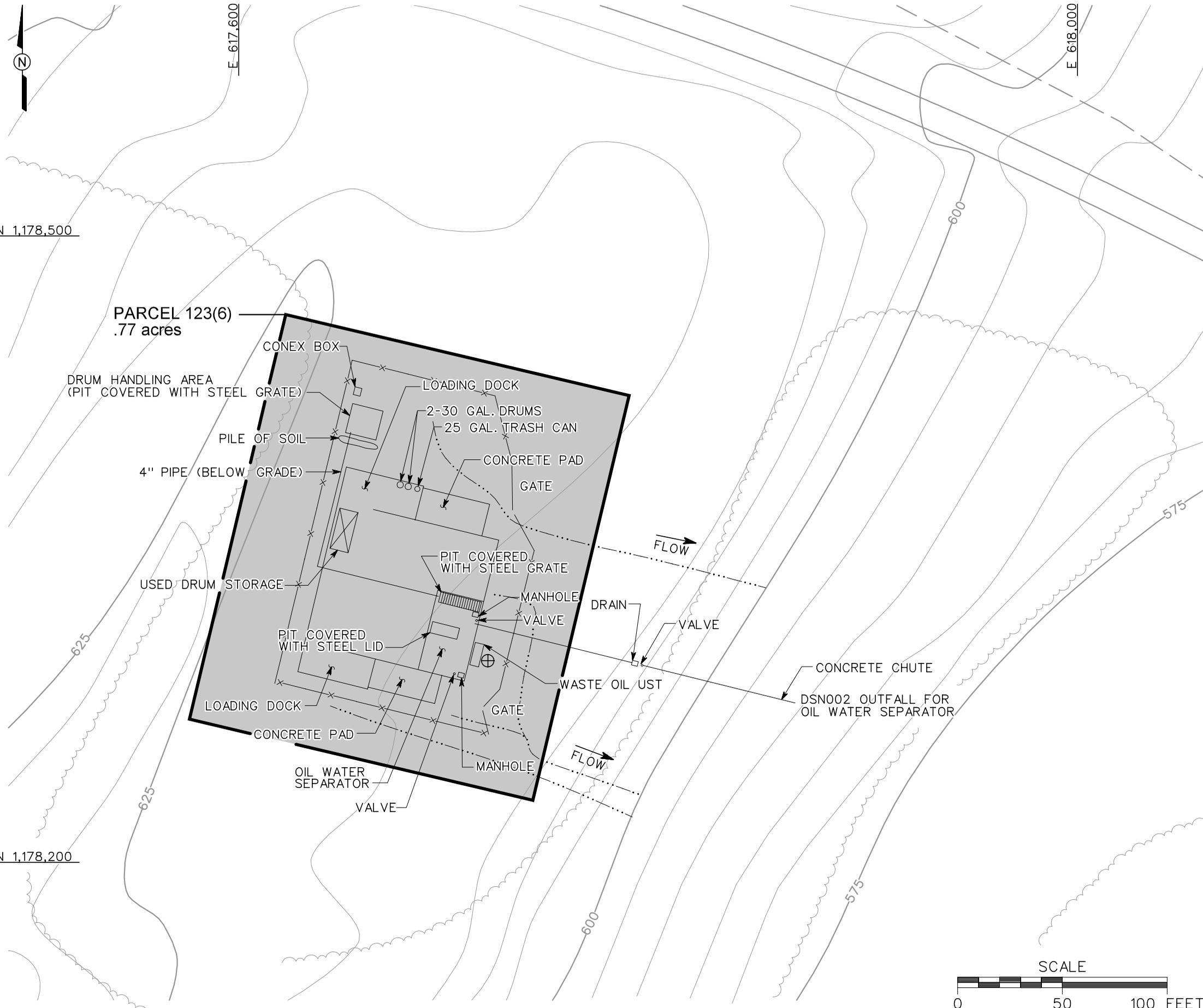
The drum handling area, located north of the loading and storage area, within the fenced area, is a 15 foot by 15 foot, 2 foot deep pit covered with a metal grate, and is plumbed into the OWS via underground piping. Design drawings required for the renovation of Range 4A Fog Oil Storage Area indicate that the drum handling area was originally a sand pit prior to the renovation and current use of concrete (CHPPM, 1999). Oil spills were observed at the staging area that includes the soils outside of the drum staging area. The soils outside of the original drum staging area were noticeably stained (Roy F. Weston, Inc., 1990).

Drums, historically, were stored horizontally in the elevated containment areas. Approximately 150 30-gallon drums were stored at the facility in June 1999, but were to be removed from the facility by October 1, 1999 due to the closure of FTMC (CHPPM, 1999). Three 30-gallon drums were found half-full during a site inspection conducted by IT on November 6, 2000. In addition to fog oil, clean rags, used rags, dry sweep, and minor amounts of fuel were stored at Range 4A Fog Oil Storage Area (CHPPM, 1999).

The length of use as a fog oil loading and storage area is not well recorded. Environmental Photographic Information Center aerial photos taken in 1964 clearly confirm nearly the same appearance as in a 1996 aerial photograph of the area. The area is believed to have been in use since at least 1964 based on the interpretation of the aerial photos.

FTMC has received noncompliance notifications for the OWS due to the lead and total organic carbon exceedances of the discharge limits at Outfall DSN002 at the facility. The discharge limits were raised after an evaluation by regulators in December 1994. Since December 1994,

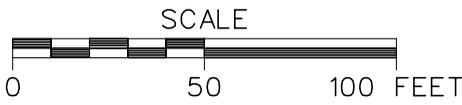
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 PROJ. MGR.: J. YACOUB  
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 ENGR. CHECK. BY: J. JENKINS  
 DATE LAST REV.:  
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- LEGEND**
- UNIMPROVED ROADS
  - PAVED ROADS
  - BUILDING
  - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - PARCEL BOUNDARY
  - SURFACE DRAINAGE
  - FENCE
  - EXISTING UST OBSERVATION WELL LOCATION

**FIGURE 1-2**  
**SITE MAP**  
 RANGE 4A FOG OIL STORAGE AREA  
 PELHAM RANGE  
 PARCEL 123(6)

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



the permitted levels for lead and total organic carbon have not been exceeded. The quarterly effluent sampling was conducted by the FTMC Directorate of Environment (ESE, 1998).

In 1986, the OWS was found functioning improperly by U.S. Army Environmental Hygiene Agency. The OWS was replaced in 1994 and now features coalescing plates, and is designed to continuously discharge water. The current OWS contains two sumps located at the downgradient end of the 60-foot by 60-foot loading and storage area. Waste oil from the OWS is discharged to the UST. The OWS is recorded as being cleaned out periodically with wastes disposed of through a Defense Reutilization Marketing Office contract (CHPPM, 1999). One groundwater observation well is located directly adjacent to the UST on the east side. Depth of this well is 8.9 feet from the top of well casing.

Range 4A Fog Oil Storage Area, Parcel 123(6), is approximately 200 feet long (north to south) by 170 feet wide (east to west) and covers approximately 0.77 acre. The elevation of Range 4A Fog Oil Storage Area varies from 600 feet to 635 feet (National Geodetic Vertical Datum of 1929). Surface water at the site appears to drain to the southeast. Local shallow groundwater direction at the site is probably controlled by topography; therefore, groundwater direction in the residuum is likely to the southeast.

Soils at Range 4A Fog Oil Storage Area consist of the Clarksville series of soils. The Clarksville series of soils consists of strongly acidic, well-drained soils that have developed in the residuum cherty limestone. Clarksville soils are associated with the Fullerton, Dewey, and Decatur soils.

Soils at Range 4A Fog Oil Storage Area fall into the Clarksville-Fullerton stony loams, 15 to 40 percent slopes (U.S. Department of Agriculture, 1961). The soils in this mapping unit have poor tilth. Their capacity for available moisture is low, and is not suitable for cultivation. About 99 percent of the acreage is in forest. The typical soil description is 1 to 3 feet of well-drained cherty silt loam to cherty silty clay loam; developed from deeply weathered cherty dolomitic limestone. The depth to bedrock is typically greater than 20 feet with depth to water greater than 20 feet.

### **1.3 Scope of Work**

The scope of work for activities associated with the SI at the Range 4A Fog Oil Storage Area, as specified by the statement of work (USACE, 2000), includes the following tasks:

- Develop the SFSP attachment.

- Develop the SSHP attachment.
- Develop the site specific UXO safety plan attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the 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, and three depositional soil samples to determine whether potential site-specific chemicals (PSSC) are present at the Range 4A Fog Oil Storage Area, and to provide data useful for supporting any future planned corrective measures and closure activities.

Pelham Range is an active range maintained by the Alabama National Guard. Range 4A Fog Oil Storage Area is about 1 mile northeast of the Large Impact area at Pelham Range, and the history prior to 1964 is unclear. Therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan attachment addresses the manner which the avoidance will be conducted.

At completion of the field activities and sample analyses (as listed in Section 4.5), draft and final SI summary reports will be prepared 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 Alabama Department of Environmental Management (ADEM) guidelines.

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

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

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are under way, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. 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.

During a site inspection conducted by IT on November 6, 2000, a UST monitoring well was observed east and adjacent to the location of the UST at Range 4A Fog Oil Storage Area. The total depth of the well was measured as 8.9 feet deep from the top of the well casing and the depth to water was measured as 2.5 feet deep from the top of the well casing. There is not any historical data available for this well. It is believed that this well is simply an observation well used in conjunction with the OWS. The well appears to be installed in the same backfill as the UST and was likely installed in conjunction with the renovation of the OWS in 1994. There are not any construction details for this well.

Range 4A Fog Oil Storage Area was identified as a CERFA Category 6 site. This CERFA category identifies the recorded release of fog oil onto the ground at the drum handling area and the loading and storage area at Range 4A Fog Oil Storage Area. Range 4A Fog Oil Storage Area requires additional evaluation to determine the environmental condition of the parcel.

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

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### **3.1 Overview**

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Range 4A Fog Oil Storage Area, Parcel 123(6). 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 Range 4A Fog Oil Storage Area is described in more detail in Section 4.3 of this SFSP. 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-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

### **3.2 Data Users and Available Data**

The available data, presented in Table 3-1, related to the SI at Range 4A Fog Oil Storage Area, 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 other 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  
Range 4A Fog Oil Storage Area - Pelham Range  
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> Range 4A Fog Oil Storage Area  <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 soil.  <u>Potential Receptors</u> Groundskeeper (future), construction worker (future), recreational site user (future), on-site resident (future).  <u>PSSC</u> Fog oil and other petroleum products (gasoline, diesel, oils, lubricants).	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TCL VOCs, TCL SVOCs, and TAL Metals	Definitive data in CESAS Level B data packages	5 direct-push soil samples + QC		
			<u>Subsurface Soil</u>		Definitive quality data for future decision- making			<u>Subsurface Soil</u> TCL VOCs, TCL SVOCs, and TAL Metals	Definitive data in CESAS Level B data packages
			<u>Groundwater</u>	<u>Groundwater</u> TCL VOCs, TCL SVOCs, and TAL Metals		Definitive data in CESAS Level B data packages	5 groundwater samples + QC		
			<u>Depositional Soil</u>	<u>Depositional Soil</u> TCL VOCs, TCL SVOCs, and TAL Metals				Definitive data in CESAS Level B data packages	

ADEM - Alabama Department of Environmental Management.  
 CESAS - Corps of Engineers South Atlantic Savannah.  
 DOD - U.S. Department of Defense.  
 EPA - U.S. Environmental Protection Agency.  
 FTMC - Fort McClellan.  
 PSSC - Potential site-specific chemical.

QC - Quality control.  
 SI - Site inspection.  
 TAL - Target analyte list.  
 TOC - Total organic carbon.  
 USACE - U.S. Army Corps of Engineers.

### **3.3 Conceptual Site Exposure Model**

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating the 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 human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

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

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

Primary contaminant releases were probably limited to leaks and spills that entered subsurface soil. Spills or leaks could also have impacted surface soil through cracks in the concrete pad of the loading and storage area and in the vicinity of the drum handling area. Also, prior to the renovation and the current concrete construction, the loading and storage area and the drum handling area were earthen structures. Spills and leaks in this case would impact the soils directly. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, dust emissions and volatilization to ambient air, and erosion runoff to depositional soil. Neither sediment nor surface water is located at the site. Potential receptors considered, but not included under current land-use scenarios, are the:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.
- **Construction worker.** The site is unused, and no development or construction is occurring.
- **Resident.** The site is not currently used for residential purposes.
- **Recreational Site User.** The site is fenced and covered with concrete. No surface water or sediment are located at the site.

Currently, access to the site is limited by fencing. The site is currently not in use. None of the receptor scenarios developed for FTMC are relevant for this site. The Alabama National

Guardsmen are not directly exposed to the potentially contaminated soil due to the concrete floorings, nor are they exposed to groundwater. In addition, because the soldiers are on site for such short periods of time, any contaminants in the air would most likely be insignificant. A groundskeeper scenario could be applied for the current land use, however it would present the uppermost conservative bounds for soil exposure, which is currently not occurring. Therefore, there are no plausible receptors with the current land use. Future receptor scenarios will be evaluated in place of current receptor scenarios.

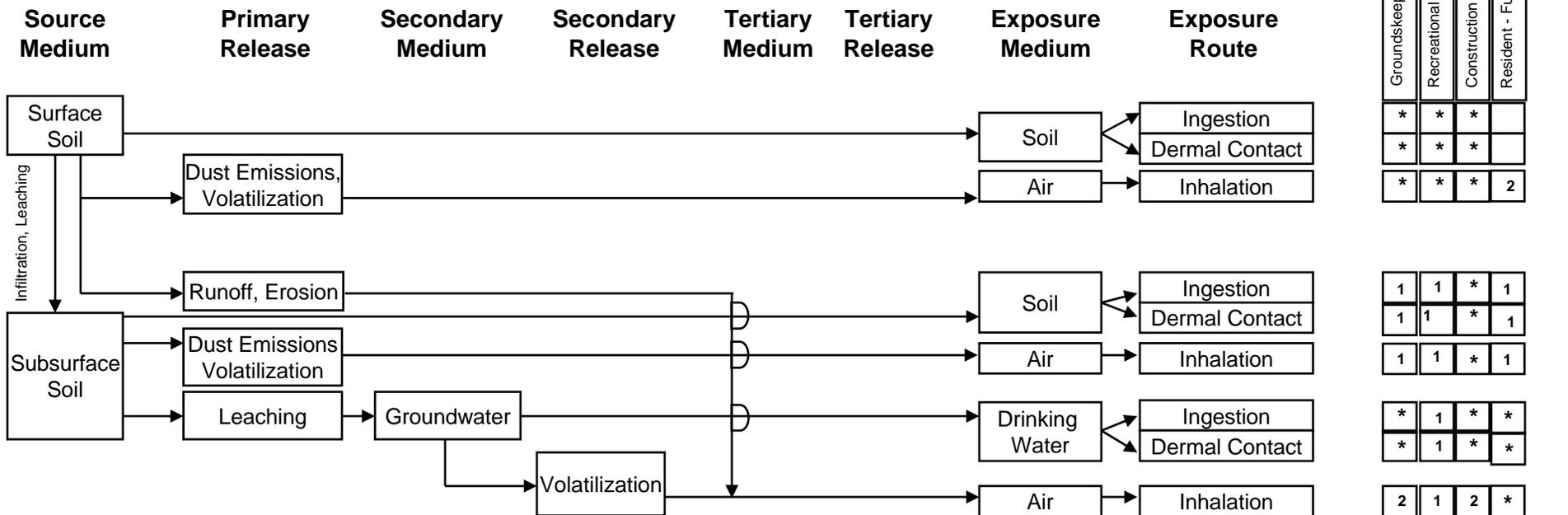
Future land use at this site will most likely remain the same, while land use in the surrounding area will be military training. Since the future site use has not specifically been designated, any future land-use receptor scenarios are plausible. Thus the following future land-use receptor scenarios are included in the CSEM:

- **Resident.** Although the site is not expected to be utilized for residential purposes, the resident is considered in order to provide information for the project manager and regulators.
- **Groundskeeper.** The site is likely to have areas that will need to be maintained.
- **Construction Worker.** The site may be developed in the future, thus this receptor is evaluated.
- **Recreational Site User.** Although the site will most likely remain the same, it is surrounded with many acres of forests, providing a good area for recreational purposes.

Hunting will be not be evaluated since the site is small and access has been limited, thus reducing the likelihood for uptake through browsing by deer.

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.

**Figure 3-1**  
**Human Health Conceptual Site Exposure Model**  
**Range 4A Fog Oil Storage Area**  
**Fort McClellan, Alabama**



**Receptor Scenarios**

	Groundskeeper - Future	Recreational Site User - Future	Construction Worker - Future	Resident - Future
Soil (Ingestion/Dermal Contact)	*	*	*	
Air (Inhalation)	*	*	*	2
Soil (Ingestion/Dermal Contact)	1	1	*	1
Air (Inhalation)	1	1	*	1
Drinking Water (Ingestion/Dermal Contact)	*	1	*	*
Air (Inhalation)	*	1	*	*
Groundwater (Inhalation)	2	1	2	*

\* = 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.

## **4.0 Field Activities**

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

Pelham Range is an active range currently used by the Alabama National Guard and the Anniston Army Depot for military training activities. Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance activities for sample collection activities at the Range 4A Fog Oil Storage Area – Pelham Range. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000).

#### **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. Hand-held, low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for each avoidance. Subsurface metallic anomalies will not be disturbed, and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendix E of the approved SAP (IT, 2000). Additionally, the site-specific UXO safety plan attachment has been written in conjunction with Appendix E, Installation-Wide Ordnance and Explosives Management Plan for Support of Hazardous, Toxic, Radiological Waste Activities and Construction Activities (IT, 2000), as a necessary measure for UXO avoidance. The site-specific UXO safety plan attachment is necessary due to the possible UXO hazards at Range 4A Fog Oil Storage Area.

#### **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 necessary 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 proposed location stakes will be labeled as cleared.

## **4.2 Environmental Sampling**

The environmental sampling program at Range 4A Fog Oil Storage Area includes the collection of surface soil, subsurface soil, groundwater, and depositional soil 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 Range 4A Fog Oil Storage Area.

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

The surface soil sampling rationale is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required quality assurance/quality control (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-custodies 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**

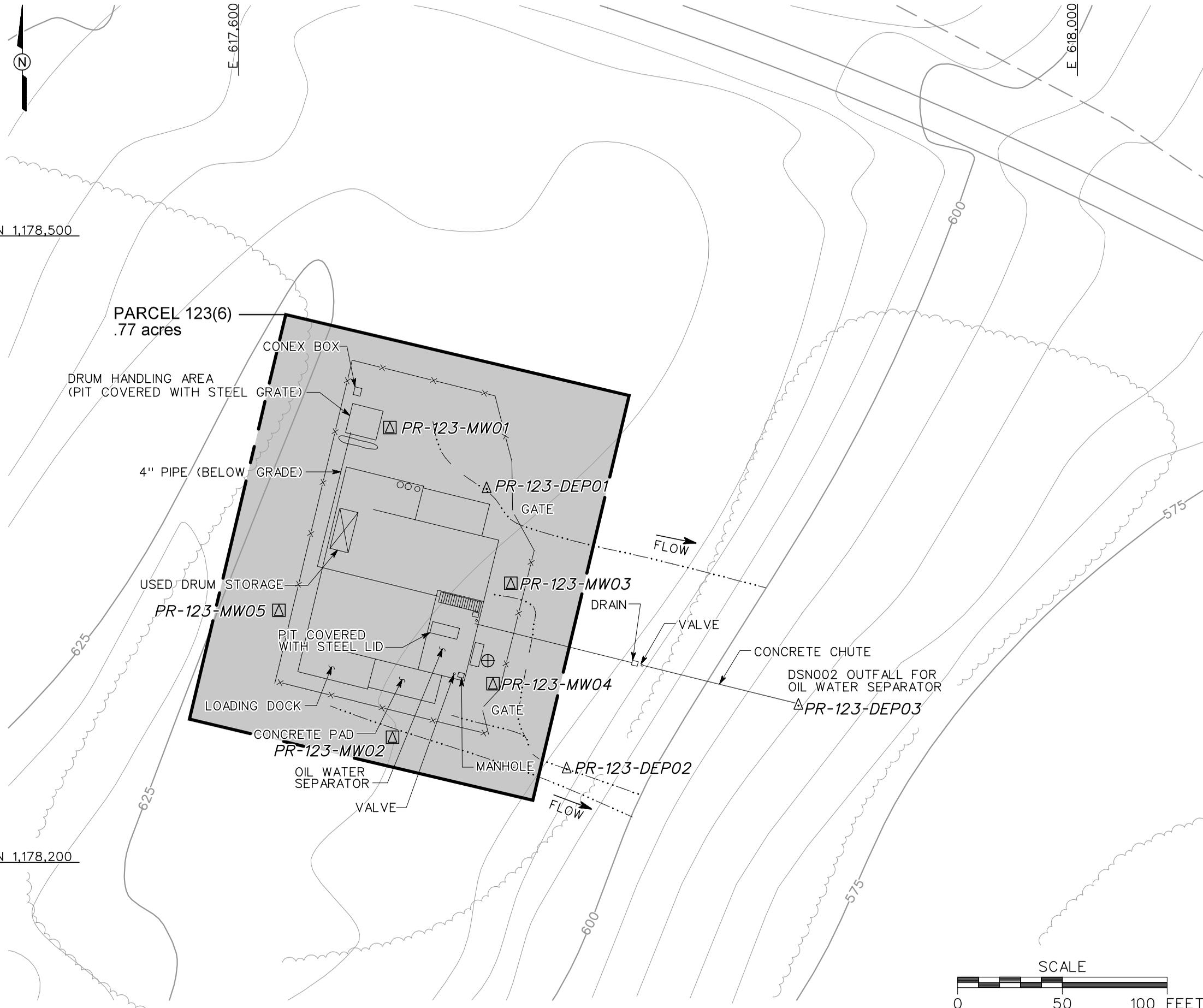
Subsurface soil samples will be collected from the five soil borings installed at Range 4A Fog Oil Storage Area.

Table 4-1

**Sampling Locations and Rationale  
Site Investigation  
Range 4A Fog Oil Storage Area - Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sample Location Rationale
PR-123-MW01	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed on northern end of the fenced area, immediately east of the drum handling area. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media 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. 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.
PR-123-MW02	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed in the south central portion of the parcel, approximately 20 feet south of the fenced area. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media 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. 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.
PR-123-MW03	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be adjacent to the east side of the concrete pad north of the oil water separator. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media 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. 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.
PR-123-MW04	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed in southeast, downslope corner of the parcel. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media 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. 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.
PR-123-MW05	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed potentially upgradient on the west side of the concrete pad. Sample data will indicate if contaminant releases into the environment have occurred from previous use of this area and if contaminated media 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. 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.
PR-123-DEP01	Depositional soil	Sample placed at the east side of the parcel at the north end. This is at a surface water drainage feature that ultimately leaves the site and proceeds down the embankment on the east. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exists at this site. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
PR-123-DEP02	Depositional soil	Sample placed at the east side of the parcel at the south end. This is at a surface water drainage feature that ultimately leaves the site and proceeds down the embankment on the east. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exists at this site. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
PR-123-DEP03	Depositional soil	Sample placed at the east side of the parcel at the outfall for the oil water separator. This is at the east end of a concrete chute that directs outfall from the oil water separator down an embankment to the east of the parcel. This is at a surface water drainage feature that ultimately leaves the site and proceeds down the embankment on the east. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exists at this site. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.

DWG. NO.: ... \774645es.694  
 PROJ. NO.: 774645  
 INITIATOR: J. BROWN  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHK. BY:  
 ENGR. CHK. BY: J. JENKINS  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 12/15/00  
 DRAWN BY: D. BILLINGSLEY  
 03/05/01  
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- LEGEND**
- UNIMPROVED ROADS
  - == PAVED ROADS
  - BUILDING
  - 625 TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
  - TREES / TREELINE
  - ▭ PARCEL BOUNDARY
  - SURFACE DRAINAGE
  - ✕ FENCE
  - ⊕ EXISTING UST OBSERVATION WELL LOCATION
  - △ PROPOSED DEPOSITIONAL SOIL SAMPLE LOCATION
  - ▭ PROPOSED GROUNDWATER, SURFACE, AND SUBSURFACE SOIL SAMPLE LOCATION

**FIGURE 4-1**  
**PROPOSED SAMPLE LOCATIONS**  
**SITE INVESTIGATION AT**  
**RANGE 4A FOG OIL STORAGE AREA**  
**PELHAM RANGE - PARCEL 123(6)**

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

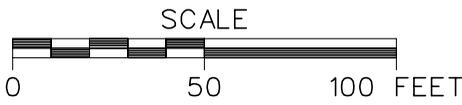


Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities  
Site Investigation  
Range 4A Fog Oil Storage Area - Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PR-123-MW01	PR-123-MW01-SS-HH0001-REG	0-1			PR-123-MW01-SS-HH0001-MS/MSD	TCL VOCs, TCL SVOCs, and TAL Metals
	PR-123-MW01-DS-HH0002-REG	a				
PR-123-MW02	PR-123-MW02-SS-HH0003-REG	0-1	PR-123-MW02-SS-HH0004-FD			TCL VOCs, TCL SVOCs, and TAL Metals
	PR-123-MW02-DS-HH0005-REG	a				
PR-123-MW03	PR-123-MW03-SS-HH0006-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals
	PR-123-MW03-DS-HH0007-REG	a				
PR-123-MW04	PR-123-MW04-SS-HH0008-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals
	PR-123-MW04-DS-HH0009-REG	a				
PR-123-MW05	PR-123-MW05-SS-HH0010-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals
	PR-123-MW05-DS-HH0011-REG	a				
PR-123-DEP01	PR-123-DEP01-SS-HH0012-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-DEP02	PR-123-DEP02-SS-HH0013-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-DEP03	PR-123-DEP03-SS-HH0014-REG	0-1				TCL VOCs, TCL SVOCs, and TAL Metals

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

FS - Field split.  
MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality assurance/quality control.  
REG - Field sample.

TAL - Target analyte list.  
TCL - Target compound list.  
VOC - Volatile organic compound.  
SVOC - Semivolatile organic compounds.

#### **4.2.2.1 Sample Locations and Rationale**

Subsurface soil samples will be collected from the five 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-custodies 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 Range 4A Fog Oil Storage Area. 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 or until adequate groundwater is encountered to install a well with a 10 to 20 foot screen. Monitoring wells will be installed 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 pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap polyvinyl chloride well screen, approximately 10 to 20 feet long. The well will be installed so the well screen intersects the water table.

Soil samples for lithology will be collected continuously 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 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 Range 4A Fog Oil Storage Area, and the one existing monitoring well as described 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  
Range 4A Fog Oil Storage Area - Pelham Range, Parcel 123(6)  
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	
PR-123-MW01	PR-123-MW01-GW-HH3001-REG	Groundwater	a			PR-123-MW01-GW-HH3001-MS/MSD	TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-MW02	PR-123-MW02-GW-HH3002-REG	Groundwater	a				TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-MW03	PR-123-MW03-GW-HH3003-REG	Groundwater	a	PR-123-MW03-GW-HH3004-FD			TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-MW04	PR-123-MW04-GW-HH3005-REG	Groundwater	a				TCL VOCs, TCL SVOCs, and TAL Metals
PR-123-MW05	PR-123-MW05-GW-HH3006-REG	Groundwater	a				TCL VOCs, TCL SVOCs, and TAL Metals

<sup>a</sup>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.

TCL - Target compound list.

VOC - Volatile organic compound.

Sample documentation and chain-of-custodies 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 Depositional Sampling**

Three depositional samples will be collected from Fog Oil Storage Area, Parcel 123(6).

##### **4.2.5.1 Sample Locations and Rationale**

The proposed locations for the depositional samples are shown in Figure 4-1. Depositional sampling rationale is presented in Table 4-1. The depositional sample designation and required QA/QC sample requirements are listed in Table 4-2. The actual depositional sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

##### **4.2.5.2 Sample Collection**

The depositional samples will be collected in accordance with the procedures for sediment sampling as 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 depositional 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 Range 4A Fog Oil Storage Area, Parcel 123(6), consist of the following list of analytical suites:

- Target compound list volatile organic compounds - Method 5035/8260B
- Target compound list semivolatile organic compounds - Method 8270C
- Target analyte list metals - Method 6010B/7000.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

#### **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: Elizabeth McIntyre  
EMAX Laboratories, Inc.  
630 Maple Avenue  
Torrance, California 90503  
Telephone: (310) 618-8889.

**Table 4-4**

**Analytical Samples  
Site Investigation  
Range 4A Fog Oil Storage Area - Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples <sup>a</sup>				EMAX Total No. Analysis
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	
<b>Range 4A Fog Oil Storage Area: 8 water matrix samples</b> (5 groundwater samples, 3 surface water); <b>13 soil matrix samples</b> (5 surface soil samples, 5 subsurface soil samples, and 3 sediment samples)											
TCL VOCs	8260B	water	normal	8	1	8	2	2	2	1	17
TCL SVOCs	8270C	water	normal	8	1	8	2	2		1	15
Tot TAL Metals	6010B/7000	water	normal	8	1	8	2	2		1	15
TCL VOCs	8260B	soil	normal	13	1	13	2	2	0	1	20
TCL SVOCs	8270C	soil	normal	13	1	13	2	2		1	20
TAL Metals	6010B/7000	soil	normal	13	1	13	2	2		1	20
TOC	9060	soil	normal	3	1	3					3
Grain Size	ASTM D-421/D-422	soil	normal	3	1	3					3
<b>Subtotal:</b>				69			12	12	2	6	113

<sup>a</sup>Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment rinsates will be collected once per event whenever sampling equipment is field decontaminated and re-used. Equipment rinsates 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 rinsates.

Ship samples to: EMAX Laboratories, Inc.  
630 Maple Avenue  
Torrance, California 90503  
Attn: Elizabeth McIntyre  
Tel: 310-618-8889  
Fax: 310-618-0818.

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

TAT - Turn-around time.  
TCL - Target compound list.  
TOC - Total organic carbon.  
VOC - Volatile organic compound.

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

Management and disposal of the investigation-derived wastes will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000). The investigation-derived wastes expected to be generated at Range 4A Fog Oil Storage Area, Parcel 123(6), will include decontamination fluids, drill cuttings, and disposable personal protective equipment.

#### ***4.8 Site-Specific Safety and Health***

Health and safety requirements for this SI are provided in the SSHP attachment for Range 4A Fog Oil Storage Area. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan. Additionally, the site-specific UXO safety plan attachment has been prepared as a necessary measure for UXO avoidance.

## **5.0 Project Schedule**

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

## 6.0 References

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

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

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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.

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

Roy F. Weston, Inc., 1990, *Enhanced Preliminary Assessment Fort McClellan, Alabama Vols I, II (Appendices)*, Report No. CETHA-BC-CR-90181.

**ATTACHMENT 1**

**LIST OF ABBREVIATIONS AND ACRONYMS**

## List of Abbreviations and Acronyms

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

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

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

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

sc clayey sands; sand-clay mixtures  
 Sch. schedule  
 SD sediment  
 SDG sample delivery group  
 SDZ safe distance zone; surface danger zone  
 SEMS Southern Environmental Management & Specialties, Inc.  
 SFSP site-specific field sampling plan  
 SGF standard grade fuels  
 SHP installation-wide safety and health plan  
 SI site investigation  
 SL standing liquid  
 sm silty sands; sand-silt mixtures  
 SM *Serratia marcescens*  
 SOP standard operating procedure  
 sp poorly graded sands; gravelly sands  
 SP sump pump  
 Sr-90 strontium-90  
 Ss stony rough land, sandstone series  
 SS surface soil  
 SSC site-specific chemical  
 SSHO site safety and health officer  
 SSHP site-specific safety and health plan  
 SSSL site-specific screening level  
 STB supertropical bleach  
 STEL short-term exposure limit  
 STOLS Surface Towed Ordnance Locator System®  
 Std. units standard units  
 SU standard unit  
 SVOC semivolatile organic compound  
 SW surface water  
 SW-846 U.S. EPA Test Methods for Evaluating Solid Waste: Physical/Chemical Methods  
 SZ support zone  
 TAL target analyte list  
 TAT turn around time  
 TB trip blank  
 TCA trichloroethane  
 TCDD 2,3,7,8-tetrachlorodibenzo-p-dioxin  
 TCDF tetrachlorodibenzofurans  
 TCE trichloroethene  
 TCL target compound list  
 TCLP toxicity characteristic leaching procedure  
 TDGCL thiodiglycol  
 TDGCLA thiodiglycol chloroacetic acid  
 TERC Total Environmental Restoration Contract  
 TIC tentatively identified compound  
 TLV threshold limit value  
 TN Tennessee  
 TOC top of casing; total organic carbon

TPH total petroleum hydrocarbons  
 TRADOC U.S. Army Training and Doctrine Command  
 TRPH total recoverable petroleum hydrocarbons  
 TWA time weighted average  
 UCL upper confidence limit  
 UCR upper certified range  
 'U' not detected above reporting limit  
 USACE U.S. Army Corps of Engineers  
 USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine  
 USAEC U.S. Army Environmental Center  
 USAEHA U.S. Army Environmental Hygiene Agency  
 USACMLS U.S. Army Chemical School  
 USAMPS U.S. Army Military Police School  
 USATEU U.S. Army Technical Escort Unit  
 USATHAMA U.S. Army Toxic and Hazardous Material Agency  
 USCS Unified Soil Classification System  
 USDA U.S. Department of Agriculture  
 USEPA U.S. Environmental Protection Agency  
 UST underground storage tank  
 UXO unexploded ordnance  
 VOA volatile organic analyte  
 VOC volatile organic compound  
 VOH volatile organic hydrocarbon  
 VQlfr validation qualifier  
 VQual validation qualifier  
 VX nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)  
 Weston Roy F. Weston, Inc.  
 WP installation-wide work plan  
 WS watershed  
 WSA Watershed Screening Assessment  
 WWI World War I  
 WWII World War II  
 XRF x-ray fluorescence  
 yd<sup>3</sup> cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected

**Final  
Site-Specific Safety and Health Plan Attachment  
For Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
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 CK05  
Contract No. DACA21-96-D-0018  
IT Project No. 774645**

**March 2001**

**Revision 1**

The following Safety and Health Plan (SHP) has been designed for the methods presently contemplated by IT Corporation (IT) for execution of the proposed work. Therefore, the SHP may not be appropriate if the work is not performed by or using the methods presently contemplated by IT.

In addition, as the work is performed, conditions different from those anticipated may be encountered and the SHP may have to be modified. Therefore, IT only makes representations or warranties as to the adequacy of the SHP for currently anticipated activities and conditions.

## Acknowledgements

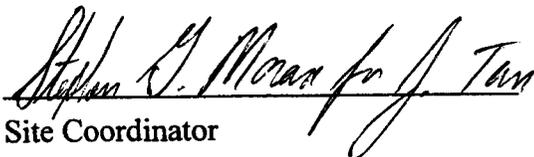
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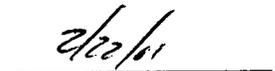
The final approved version of this site-specific safety and health plan (SSHP) attachment for the Range 4A Fog Oil Storage Area, Pelham Range, Parcel 123(6), has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified 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 the health and safety manager.

  
Site Coordinator

  
Date

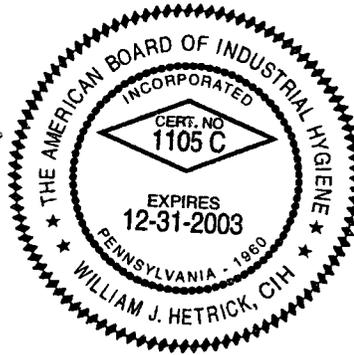
**Site-Specific Safety and Health Plan Attachment Approval  
Fort McClellan, Calhoun County, Alabama**

I have read and approve this site-specific safety and health plan attachment for the Range 4A Fog Oil Storage Area, Pelham Range, Parcel 123(6), at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

  
\_\_\_\_\_  
Jeanne Yacoub, PE  
Project Manager

2/22/01  
Date

  
\_\_\_\_\_  
William J. Hetrick, CIH  
Health & Safety Manager



2/22/01  
Date

  
\_\_\_\_\_  
Jeff Tarr  
Site Coordinator

2/22/01  
Date



## Fort McClellan Gate Hours

Baltzell Gate	Baltzell Road. Open 24 hours daily, 7 days a week.
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## Pelham Range Access Requirements

Pelham Range	IT personnel will contact the Range Control Office <b>each day</b> access is required to receive an access permit and available areas of entry. <b>See Attachment 1 for Range Control contact for Pelham Range.</b>
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## Fort McClellan Project Emergency Contacts

Range Control Office (Main Post).....	(256) 848-6772
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) 895-1598
(Ken Barnett, CEHNC).....	cell phone (256) 310-0604
UXO Emergencies .....	(256) 895-1598
(Ken Barnett, CEHNC).....	cell phone (256) 310-0604
UXO Nonemergencies/Reporting Only (Ronald Levy) .....	(256) 848-3758
Baltzell Gate Guard Shack.....	(256) 848-5693, 848-3821
National Response Center & Terrorist Hotline.....	(800) 424-8802
Poison Control Center.....	(800) 462-0800
EPA Region IV .....	(404) 562-8725
Ronald Levy, Chief, FTMC Environmental Management .....	(256) 848-3758
Ellis Pope, U.S. Army Corps of Engineers.....	(334) 690-3077
Jeanne Yacoub, IT Project Manager.....	(770) 663-1429
Bill Hetrick, IT H&S Manager .....	(865) 690-3211, pager (888) 655-9529
Mike Moore, Fort McClellan Safety Officer .....	(256) 848-5433
Dr. Jerry Berke, IT Occupational Physician.....	(800) 350-4511

# **Table of Contents**

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	<b>Page</b>
List of Tables .....	ii
List of Figures .....	ii
List of Acronyms .....	iii
1.0 Site Work Plan Summary.....	1
2.0 Site Characterization and Analysis.....	2
2.1 Anticipated Hazards .....	2
2.2 Site Description.....	2
3.0 Personal Protective Equipment.....	5
4.0 Site Monitoring .....	7
5.0 Activity Hazard Analysis.....	8
Attachment 1 – Pelham Range Emergency Route and Range Control Contact	

## **List of Tables**

---

<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
2-1	Toxicological Properties of Chemicals	2
4-1	Action Levels	7
4-2	Air Monitoring Frequency and Location	7
5-1	Activity Hazard Analysis	8

## **List of Figures**

---

<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
1-1	Organization Chart	1
5-1	Hospital Emergency Route	8

## ***List of Acronyms***

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See Attachment 1, List of Abbreviations and Acronyms, of the Field Sampling Plan Attachment 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 soil and water at the Range 4 Fog Oil Storage Area, Pelham Range, Parcel 123(6).

### **Project Tasks**

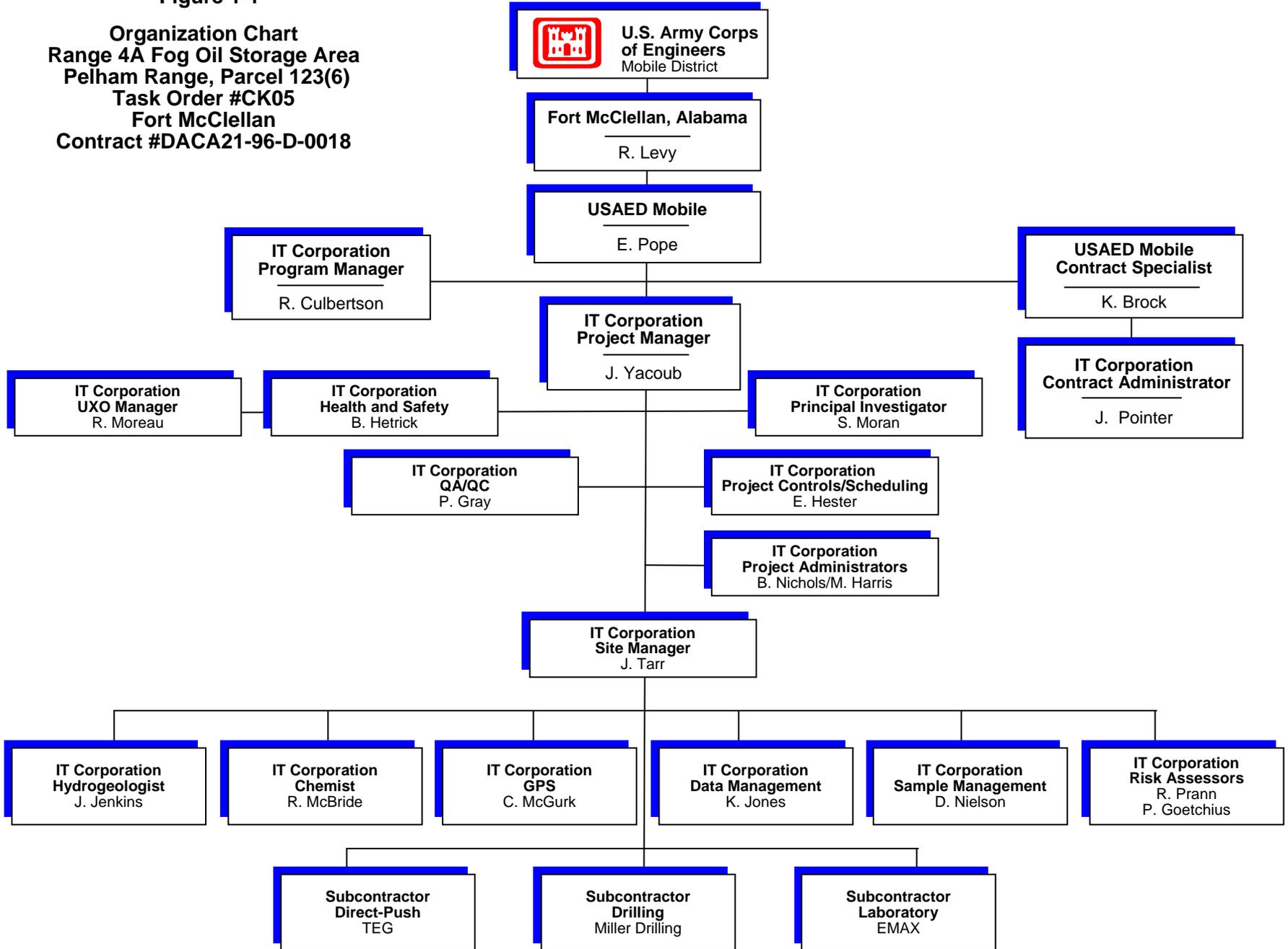
- Conduct a surface and near surface unexploded ordnance (UXO) survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling activity to determine the presence of potential downhole hazards.
- Conduct utility clearances after the UXO surface survey prior to any intrusive sampling.
- Install groundwater monitoring wells.
- Collect surface soil samples, subsurface soil samples, groundwater samples, and depositional soil samples.

**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. This site-specific safety and health plan must be used in conjunction with the SHP, FTMC, Alabama.

Figure 1-1

Organization Chart  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Task Order #CK05  
Fort McClellan  
Contract #DACA21-96-D-0018



## **2.0 Site Characterization and Analysis**

---

### **2.1 Anticipated Hazards**

The tasks which will be conducted in which an activity hazard analysis has been completed are:

- Equipment setup and field mobilization
- Land survey including UXO surface/near surface survey
- Surface soil, subsurface soil, and depositional soil sampling
- Installation of monitoring wells including downhole UXO support.

Historical data indicate that the fog oil, prior to 1986, was greater than 50 percent polyaromatic hydrocarbons. In the absence of a specific material safety data sheet, the potential chemicals of concern listed in Table 2-1 are benzene, toluene, ethylbenzene, and xylene compounds and diesel oil. There are no known or suspected particulate contaminants.

The possibility of UXO exists at Range 4A; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities. 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, including new and existing well locations, the UXO specialists will observe UXO avoidance operations.

### **2.2 Site Description**

Range 4A Fog Oil Storage Area, Parcel 123(6), is located in north central Pelham Range and is due west of Range 56 in Training Area 4A of Pelham Range. The area has been designed for storage of fog oil used to generate smoke for training exercises at FTMC and Pelham Range, and is believed to have been in use since at least 1964. The storage capacity at Range 4A Fog Oil Storage Area, Parcel 123(6), is 75,000 gallons. The Fog Oil Storage Area is constructed with two concrete structures: a 15 foot by 15 foot drum handling area, and a 60 foot by 60 foot loading and storage area. Both the drum handling area and loading and storage area are located inside a fenced-in area. Each concrete structure is equipped with drains connected to an oil/water separator (OWS) and an underground storage tank. The drains are designed to collect spilled oil and precipitation. The facility covers an area of less than 1 acre.

The 60 foot by 60 foot loading and storage area at Range 4A Fog Oil Storage Area is sloped and designed to divert spilled oil and precipitation to a floor drain, which is connected to the OWS. Seams once present in the concrete pad have been sealed. The seams were once reported leaking

Table 2-1

**Toxicological Properties of Chemicals  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Thresho Id (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
Benzene [71-43-2]	9.24	34-119	Inh Abs Ing Con	Irritates eyes, nose, respiratory system; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone-marrow depression. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	1 ppm (.5 ppm) Skin 0.1 ppm	5 ppm (2.5 ppm)  (Ca)1 ppm (Ca)	PEL TLV  REL	Ca [500 ppm]
Ethyl benzene	8.76	0.09-0.6	Inh Ing Con	Irritates eyes, mucous membranes; headache; dermatitis; narcosis, coma.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	125 ppm 125 ppm	PEL TLV REL	800 ppm (10% of LEL)
Fuel oil (diesel)			Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; bronchopneumonia; excited, then depressed central nervous system.	Eye: Irrigate immediately Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	
Toluene [108-88-3]	8.82	0.16-37	Inh Abs Ing Con	Fatigue, weakness; confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscular fatigue, insomnia; paralysis; dermatitis.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	200 ppm 50 ppm (skin) 100 ppm	C300 ppm 150 ppm	PEL TLV REL	500 ppm
Xylene (o-, m-, and p-isomers) [1330-20-7;95-47-6;108-38-3;106-42-3]	8.56 8.56 8.44	1.1-20	Inh Abs Ing Con	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritated eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	150 ppm 150 ppm	PEL TLV REL	900 ppm

Table 2-1

**Toxicological Properties of Chemicals  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

<sup>a</sup>IP = Ionization potential (electron volts).  
<sup>b</sup>Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.  
<sup>c</sup>TWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.  
<sup>d</sup>STEL – Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.  
<sup>e</sup>PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).  
AEL = Airborne Exposure Limit.  
TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value – TWA.  
REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.  
<sup>f</sup>IDLH (NIOSH) = Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.  
NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. No. 97-140, 1997).  
C = Ceiling limit value which should not be exceeded at any time.  
Ca = Carcinogen.  
NA = Not applicable.  
? = Unknown.  
LEL = Lower explosive limits.  
LC<sub>50</sub> = Lethal concentration for 50 percent of population tested.  
LD<sub>50</sub> = Lethal dose for 50 percent of population tested.  
NIC = Notice of intended change (ACGIH).

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Seams once present in the concrete pad have been sealed. The seams were once reported leaking and eventually led to seepage of fog oil onto the ground beneath the pad.

The original configuration of the loading and storage area at Range 4A Fog Oil Storage Area was an earthen bermed area with drums of fog oil stored on bare soil within the berms prior to the renovation and the current use of concrete. The surface soil is reported as stained with oil from the storage and handling activities. The loading and storage area is designed to store approximately 75,000 gallons of fog oil. However, in 1986, quantities larger than 75,000 gallons were observed. The once earthen-bottomed loading and storage area has been modified to the current 60-foot by 60-foot concrete pad, and elevated containment areas.

The drum handling area, located north of the loading and storage area and within the fenced area, is a 15 foot by 15 foot, 2 foot deep pit covered with a metal grate, and is plumbed into the OWS via underground piping. Design drawings required for the renovation of Range 4A Fog Oil Storage Area indicate that the drum handling area was originally a sand pit prior to the renovation and current use of concrete. Oil spills were observed at the staging area that includes the soils outside of the drum staging area. The soils outside of the original drum staging area were noticeably stained.

Drums, historically, were stored horizontally in the elevated containment areas. Approximately 150 30-gallon drums were stored at the facility in June 1999, but were to be removed from the facility by October 1, 1999 due to the closure of FTMC (CHPPM, 1999). Three 30-gallon drums were found half-full during a site inspection conducted by IT on November 6, 2000. In addition to fog oil, clean rags, used rags, dry sweep, and minor amounts of fuel were stored at Range 4A Fog Oil Storage Area.

Physical features of Range 4A Fog Oil Storage Area includes an unnamed tributary to Cane Creek approximately 1,000 feet to the east of the site. The stream originates north of the site, and flows from north to south. Range 4A is positioned in a low-lying area of approximately 600 feet in elevation.

Range 4A Fog Oil Storage Area, Parcel 123(6), is comprised of a concrete pad approximately 360 square feet in size (60 feet by 60 feet), and a drum handling area approximately 15 feet by 15 feet, an oil/water separator, and waste oil UST. The entire area used for the handling and storage of fog oil drums is fenced.

The original configuration of the storage area was a bermed area with drums of fog oil stored on bare soil within the berm. The surface soil was stained with oil from the storage and handling activities. The earthen-bottomed storage area has been modified and is currently a 60 feet by 60 feet concrete pad surrounded by a 5-foot high concrete berm, and elevated containment areas. A locked chainlink fence surrounds the Fog Oil Storage Area.

### 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 personal protective equipment (PPE) is provided.

Task	Initial Level of PPE
Staging equipment	Level D
Conducting UXO surface surveys	Level D**
Drilling and groundwater well installation	Modified Level D*
Soil boring sampling	Modified Level D*
Collecting surface water samples	Modified Level D*
Equipment Decontamination	Modified Level D*

\* Initial level will be raised to level C or higher if air monitoring results in the worker's breathing zone are greater than action levels.

\*\* Personnel conducting UXO surveys must wear nonconductive work boots. Where overhead hazards exist, a chin strap will be worn with hard hats to prevent accidental falling of the hard hat.

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

- Coveralls or work clothing
- Leather work gloves (when necessary)
- Steel-toed safety boots
- Safety glasses
- Full face shield when there is a potential for flying projectile or splash hazards
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

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

- Tyvek coveralls when handling dry contaminants (i.e. collecting soil borings)
- Poly-coated Tyvek when handling liquid contaminants (i.e., water samples, decontamination)
- Latex boot covers
- Nitrile, or latex inner gloves; leather work gloves (outer) when necessary
- Steel-toed safety boots

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

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

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

- National Institute of Occupational Safety and Health-approved full-face, air-purifying respirators equipped with organic vapor/acid gas/P100 cartridge
- Hooded, Saran-coated Tyvek, taped at gloves, boots, and respirator
- Nitrile gloves (outer); wear leather work gloves (outer) when necessary
- Latex or lightweight nitrile gloves (inner)
- Neoprene steel-toed boots or steel-toed safety boots with polyvinyl chloride over booties
- 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 a face shield.

## 4.0 Site Monitoring

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Potential environmental contaminants of concern resulting from Range 4A operations are benzene, toluene, ethylbenzene, and xylene compounds and residual fuel oil. Table 4-1 contains action levels for site monitoring at the sites.

**Chemical.** Monitoring will be performed by the site safety and health officer during the performance of ground intrusive operations. A calibrated photoionization or flame ionization detector will be utilized to monitor the sampling locations and breathing zones for volatile organic compounds that may be present that would necessitate upgrading of protection level. Benzene detector tubes will be used to monitor for benzene if volatile organic compounds are present on a continuous basis at 1 parts per million or greater. Table 4-2 contains the air monitoring frequency and location for site monitoring at the work sites.

**Unexploded Ordnance.** 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  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

**When in Level C Personal Protective Equipment (PPE)**

Analyte	Action Level	Required Action <sup>a</sup>
Volatile Organic Compounds (VOC)	≥ 10 parts per million (ppm) above background in breathing zone (BZ)	Stop work, evacuate work area, notify CIH.
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area/notify CIH.
Flammable vapors	≥ 10% lower explosive limit (LEL)  < 10% LEL	Stop work, evacuate work area, notify CIH. Continue operations, monitor for VOC's
Benzene	≥ 5 ppm in BZ	Notify CIH, stop work, evacuate work area.

**When in Level D Modified/D PPE**

Analyte	Action Level	Required Action <sup>b</sup>
VOCs	≥ 5 ppm above background in BZ	Stop activities, suspend work activities for 15 to 30 minutes, if readings are sustained then upgrade to Level C PPE/notify CIH. Check benzene using detector tube, if > 1.0 ppm, notify CIH.
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area/notify CIH.
Flammable vapors	≥ 10% LEL  < 10% LEL	Stop work, evacuate work area/notify CIH. Continue operations, monitor for VOCs.
Benzene	≥ 1 ppm in BZ	Notify CIH; upgrade to Level C PPE.

Table 4-1

**Action Levels**  
**Range 4A Fog Oil Storage Area**  
**Pelham Range, Parcel 123(6)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

When in Support Zone

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

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

<sup>b</sup> Contact with the H&S manager must be made prior to continuance of work. The H&S manager may then initiate 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  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

Work Activity	Instrument	Frequency	Location
Staging equipment	FID or PID	Initially for area	Breathing zone (BZ) of employees
	LEL/O <sub>2</sub>	Periodically	BZ of Employees
	Benzene detector tube	If VOCs ≥ 1 ppm	BZ of Employees
Installing Groundwater Monitoring Wells	FID or PID	Periodically	BZ of Employees
	LEL/O <sub>2</sub>	Periodically	BZ of Employees and near well opening
	Benzene detector tube	If VOCs ≥ 1 ppm	BZ of Employees
Sampling (Groundwater, Soil, and Sediment)	FID or PID	Periodically	BZ of Employees
	LEL/O <sub>2</sub>	Periodically	BZ of Employees and near well opening
	Benzene detector tube	If VOCs ≥ 1 ppm	BZ of Employees

BZ – Breathing zone.  
 FID – Flame ionization detector.  
 LEL/O<sub>2</sub> – Lower explosive limit/oxygen.  
 PID – Photoionization detector.  
 VOC – Volatile organic compound.

## **5.0 Activity Hazard Analysis**

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

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

The activity hazard analyses will be checked by the site manager and any changes that are necessary will be communicated to the work crew. All injuries and illnesses must be immediately reported to the site manager or the site safety and health officer, who will then notify off-site personnel and organizations as necessary.

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

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 15)

Activity	Potential Hazards	Recommended Controls
Staging Equipment	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Determine best access route before transporting equipment.</li> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> <li>• Look before you step; ensure safe and secure footing.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques.</li> <li>• Lifts greater than 60 pounds require assistance or mechanical equipment.</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.</li> </ul>
	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> <li>• Wear safety glasses/goggles; ensure that eyewash is in proper working condition.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> </ul>
	Cuts/bruises	<ul style="list-style-type: none"> <li>• Use cotton or leather work gloves for material handling.</li> </ul>
	Bees, spiders, and snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet into concealed areas.</li> </ul>
	Ticks	<ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul>
	Fire	<ul style="list-style-type: none"> <li>• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.</li> </ul>
	Hazard communication	<ul style="list-style-type: none"> <li>• Label all containers as to contents and dispose of properly.</li> <li>• Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Sound levels above 85 decibels (dBA) mandates hearing protection.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 15)

Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Lighting	<ul style="list-style-type: none"> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>• Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (°F).</li> <li>• Drink warm beverages on breaks. Refrain from drinking caffeinated beverages.</li> <li>• Remove wet clothing promptly.</li> <li>• Take breaks in warm areas.</li> <li>• Reduce work periods as necessary.</li> <li>• Layer work clothing.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	Heat rash	<ul style="list-style-type: none"> <li>• Keep the skin clean and dry.</li> <li>• Change perspiration-soaked clothing, as necessary.</li> <li>• Bathe at end of work shift or day.</li> <li>• Apply powder to affected area.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Heat cramps	<ul style="list-style-type: none"> <li>• Drink plenty of cool fluids even when not thirsty.</li> <li>• Provide cool fluid for work crews.</li> <li>• Move victim to shaded, cool area.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Heat exhaustion	<ul style="list-style-type: none"> <li>• Conduct physiological worker monitoring as needed (i.e., heart rate, and oral temperature).</li> <li>• Set up work/rest periods.</li> <li>• Use the "buddy system."</li> <li>• Allow workers time to acclimate.</li> <li>• Have ice packs available for use.</li> <li>• Take frequent breaks.</li> <li>• Comply with IT Procedure HS 400 (May 13, 1999).</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 15)

Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Heat stroke	<ul style="list-style-type: none"> <li>• Evaluate possibility of night work.</li> <li>• Perform physiological monitoring on workers during breaks.</li> <li>• Wear body cooling devices.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> <li>• Work area will be barricaded/demarcated.</li> <li>• Equipment will be laid out in an area free of traffic flow.</li> <li>• Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic.</li> <li>• Barriers shall be used to protect workers from vehicular traffic.</li> <li>• Barriers shall be used to guard excavations adjacent to streets or roadways.</li> <li>• Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided.</li> <li>• Heavy equipment shall have backup alarms.</li> </ul>
	Forklift operations	<ul style="list-style-type: none"> <li>• Use qualified and trained forklift operators.</li> <li>• The operator shall not exceed the load capacity rating for the forklift.</li> <li>• The load capacity shall be clearly visible on the forklift.</li> <li>• Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.</li> </ul>
	Portable electric tools	<ul style="list-style-type: none"> <li>• Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (do not use) and removed from service.</li> <li>• Portable electric tools and all cord and plug connected equipment shall be protected by a ground-fault circuit interrupter (GFCI) device.</li> <li>• Electrical tools shall be inspected daily prior to use.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 15)

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

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 5 of 15)

Activity	Potential Hazards	Recommended Controls
Surveying (continued)	<p>Traffic accidents</p> <p>Wildlife hazards</p> <p>Biological hazards</p> <p>Ticks</p> <p>Poison ivy/oak/sumac</p>	<ul style="list-style-type: none"> <li>• Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians.</li> <li>• If working adjacent to roadways, have workers wear fluorescent orange vests.</li> <li>• Use warning signs or lights to alert oncoming traffic.</li> <li>• Assign flag person(s) if necessary to direct local traffic.</li> <li>• Set up temporary parking locations outside the immediate work area.</li> <li>• Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits.</li> <li>• Pedestrians have the right-of-way.</li> <li>• Wear seat belts when vehicles are in motion.</li> </ul> <ul style="list-style-type: none"> <li>• Workers should be cautious when driving through the site in order to avoid encounters with passing animals.</li> </ul> <ul style="list-style-type: none"> <li>• Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, and copperheads).</li> </ul> <ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul> <ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
LXO Surface and Downhole Surveys	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe boots when working in the field.</li> <li>• Provide adequate lighting in all work areas.</li> <li>• Whenever possible, avoid routing cords and hoses across walking pathways.</li> <li>• Flag or cover inconspicuous holes to protect against falls.</li> <li>• Work areas will be kept clean and orderly.</li> <li>• Garbage and trash will be disposed of daily in approved refuse containers.</li> <li>• Tools and accessories will be properly maintained and stored.</li> <li>• Work areas and floors will be kept free of dirt, grease, and slippery materials.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 15)

Activity	Potential Hazards	Recommended Controls
UXO Surface and Downhole Surveys (continued)	Traffic accidents	<ul style="list-style-type: none"> <li>• Place physical barrier (I.E., barricades, fencing) around work areas regularly occupied by pedestrians.</li> <li>• If working adjacent to roadways, have workers wear fluorescent orange vests.</li> <li>• Use warning signs or lights to alert oncoming traffic.</li> <li>• Assign flag person(s) if necessary to direct local traffic.</li> <li>• Set up temporary parking locations outside the immediate work area.</li> <li>• Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits.</li> <li>• Pedestrians have the right-of-way.</li> <li>• Wear seat belts when vehicles are in motion.</li> </ul>
	Wildlife hazards	<ul style="list-style-type: none"> <li>• Workers should be cautious when driving through the site in order to avoid encounters with passing animals.</li> </ul>
	Biological hazards	<ul style="list-style-type: none"> <li>• Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).</li> </ul>
	Ticks	<ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Tape pants or Tyvek to work boots.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Apply protective cream/lotion to exposed skin to prevent poison ivy/oak or similar reactions.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• Only UXO specialist may perform the UXO surveys. Downhole UXO surveys will be conducted prior to soil borings and subsurface sampling.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 7 of 15)

Activity	Potential Hazards	Recommended Controls
Soil Boring, Surface/Sub-surface, and Depositional Soil Sampling	<p>Cross-contamination and contact with potentially contaminated materials</p>	<ul style="list-style-type: none"> <li>• Stop immediately at any sign of obstruction.</li> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe/shank boots when working in the field.</li> <li>• Whenever possible, avoid routing cords and hoses across walking pathways.</li> <li>• Flag or cover inconspicuous holes to protect against falls.</li> </ul>
	Bees, spiders, and snakes	<ul style="list-style-type: none"> <li>• Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas.</li> <li>• Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>• Workers should wear insulated clothing when temperatures drop below 40°F.</li> <li>• Drink warm beverages on breaks. Refrain from drinking caffeinated beverages.</li> <li>• Remove wet clothing promptly.</li> <li>• Take breaks in warm areas.</li> <li>• Reduce work periods as necessary.</li> <li>• Layer work clothing.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 8 of 15)

Activity	Potential Hazards	Recommended Controls
Soil Boring, Surface/Sub-surface, and Depositional Soil Sampling (continued)	Access/egress hazards	<ul style="list-style-type: none"> <li>• Use qualified and trained bushhog operator.</li> <li>• Keep employees out of the bushhog work area.</li> <li>• Utilize good housekeeping practices.</li> <li>• Keep aiseways, pathways, and work areas free of obstruction.</li> <li>• Clean ice or snow off of walkways or work stations.</li> <li>• Use appropriate footwear for the task assigned.</li> </ul>
	Heat rash	<ul style="list-style-type: none"> <li>• Keep the skin clean and dry.</li> <li>• Change perspiration-soaked clothing, as necessary.</li> <li>• Bathe at end of work shift or day.</li> <li>• Apply powder to affected area.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Heat cramps	<ul style="list-style-type: none"> <li>• Drink plenty of cool fluids even when not thirsty.</li> <li>• Provide cool fluid for work crews.</li> <li>• Move victim to shaded, cool area.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Heat exhaustion	<ul style="list-style-type: none"> <li>• Conduct physiological worker monitoring as needed (i.e., heart rate, and oral temperature).</li> <li>• Set up work/rest periods.</li> <li>• Use the buddy system.</li> <li>• Allow workers time to acclimate.</li> <li>• Have ice packs available for use.</li> <li>• Take frequent breaks.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>
	Heat stroke	<ul style="list-style-type: none"> <li>• Evaluate possibility of night work.</li> <li>• Perform physiological monitoring on workers during breaks.</li> <li>• Wear body cooling devices.</li> <li>• Comply with IT Procedure HS400 (May 13, 1999).</li> </ul>

Table 5-1

**Activity Hazard Analysis**  
**Range 4A Fog Oil Storage Area**  
**Pelham Range, Parcel 123(6)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 9 of 15)

Activity	Potential Hazards	Recommended Controls
Soil Boring, Surface/Sub-surface, and Depositional Soil Sampling (continued)	Lightning strikes	<ul style="list-style-type: none"> <li>• Whenever possible, halt activities and take cover.</li> <li>• If outdoors, stay low to the ground.</li> <li>• Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than lying on the ground).</li> <li>• Seek shelter in a building if possible.</li> <li>• Stay away from windows.</li> <li>• If available, crouch under a group of trees instead of one single tree.</li> <li>• Keep all body parts in contact with the ground as close as possible.</li> <li>• If in a group, keep 6 feet of distance between people.</li> <li>• Remain 6 feet away from tree trunk if seeking shelter beneath tree(s).</li> </ul>
Drilling and Installation of Monitoring Well	<p>Overhead Hazards</p> <p>Faulty or damaged equipment being utilized to perform work</p> <p>Uneven terrain, poor ground support, inadequate clearances, contact with utilities</p> <p>Inexperienced operator</p>	<ul style="list-style-type: none"> <li>• Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.</li> <li>• All machinery or mechanized equipment will be inspected by a competent mechanic to determine if it is in safe operating condition.</li> <li>• Equipment will be inspected before use and at the beginning of each shift.</li> <li>• Faulty/unsafe equipment will be tagged and if possible locked out.</li> <li>• Drill rigs shall be equipped with reverse signal alarm, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.</li> <li>• Inspections or determinations of rod conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.</li> <li>• All mobile equipment and areas in which they are operated shall be adequately illuminated.</li> <li>• Aboveground and below ground utilities will be located prior to staging equipment.</li> <li>• Whenever the equipment is parked, the parking brake shall be set.</li> <li>• Equipment parked on inclines will have the wheels chocked.</li> <li>• Inspect brakes and tire pressure on drill rig before staging for work.</li> <li>• Machinery and mechanized equipment shall be operated only by designated personnel.</li> <li>• Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgement.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 10 of 15)

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Well (continued)	Jacks/outriggers	<ul style="list-style-type: none"> <li>• Ensure proper footing and cribbing.</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>• Remove unsecured tools and materials before raising or lowering the derrick.</li> <li>• Stay alert and clear of materials suspended overhead.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep feet and hands clear of moving/suspended materials and equipment.</li> <li>• Stay alert at all times.</li> </ul>
	Fire	<ul style="list-style-type: none"> <li>• Mechanized equipment shall be shut down prior to and during fueling operations.</li> <li>• Have fire extinguishers inspected and readily available.</li> </ul>
	Fall hazards	<ul style="list-style-type: none"> <li>• Personnel are not allowed to work off of machinery or use them as ladders.</li> <li>• Use fall protection when working above 6 feet.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Hearing protection is mandatory above 85 dBA.</li> </ul>
	Contact with rotating or reciprocating machine parts	<ul style="list-style-type: none"> <li>• Use machine guards; use long-handled shovels to remove auger cuttings.</li> <li>• Use safe lockout procedures for maintenance work.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Real time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.</li> <li>• Stop immediately at any sign of obstruction.</li> <li>• Do not breathe air surrounding boring unless necessary.</li> <li>• Upgrade to respirator if necessary.</li> <li>• Avoid skin contact with soil cuttings. Wear gloves.</li> <li>• Stay clear of moving parts of drill rig.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 11 of 15)

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Well (continued)	Drum handling	<ul style="list-style-type: none"> <li>• Be careful not to breathe air from around open drum any more that necessary. Monitor with photoionization detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary.</li> <li>• When filling a drum (with either soil or water), be careful not to make contact with the contained waste.</li> <li>• Wear appropriate gloves. Make sure lid or bung of drum is secure.</li> <li>• If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boot.</li> <li>• 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.</li> <li>• A UXO specialist will conduct downhole UXO surveys prior to soil boring and subsurface sampling.</li> </ul>
Soil Sampling	UXO  Cross-contamination and contact with potentially contaminated materials  Cut hazards  Strains/sprains  Spills/residual materials  Lighting  Unattended worker	<ul style="list-style-type: none"> <li>• Wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with water.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• Only essential personnel will be in the work area.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> <li>• Wear adequate hand protection.</li> <li>• Use the proper tool for the job being performed.</li> <li>• Get assistance in needed.</li> <li>• Avoid twisting/turning while pulling on tools, moving equipment, etc.</li> <li>• Absorbent material and containers will be kept available where leaks or spills may occur.</li> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> <li>• Use "buddy system" – visual contact will be maintained with the sampling technician during sampling activities.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 12 of 15)

Activity	Potential Hazards	Recommended Controls
Groundwater Sampling	<p>Cross-contamination and contact with potentially contaminated materials</p> <p>Cut hazards</p> <p>Hazard communication</p> <p>Strains/sprains</p> <p>Spill/residual materials</p> <p>Lighting</p> <p>Unattended worker</p>	<ul style="list-style-type: none"> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with water.</li> <li>• Handle samples with care.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with Federal, state, and local regulations.</li> </ul> <ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul> <ul style="list-style-type: none"> <li>• MSDSs shall be obtained for hazardous chemicals brought on site.</li> <li>• Label all containers as to contents and appropriate hazard warning.</li> </ul> <ul style="list-style-type: none"> <li>• Use the proper tool for the job being performed.</li> <li>• Get assistance in needed.</li> <li>• Avoid twisting/turning while pulling on tools, moving equipment, etc.</li> </ul> <ul style="list-style-type: none"> <li>• Absorbent material and containers will be kept available where leaks or spills may occur.</li> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> <li>• Use "buddy system" – visual contact will be maintained with the sampling technician during sampling activities.</li> </ul>
		<ul style="list-style-type: none"> <li>•</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 13 of 15)

Activity	Potential Hazards	Recommended Controls
Moving and Shipping Collected Samples	<p>Heavy lifting</p> <p>Pinch points</p> <p>Cut hazards</p> <p>Hazard communication</p>	<ul style="list-style-type: none"> <li>• Use proper lifting techniques.</li> <li>• Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.</li> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> <li>• Wear adequate hand protection. Use care when handling glassware.</li> <li>• Label all containers as to contents and associated hazards.</li> </ul>
Material Storage	Flammable and combustible liquids	<ul style="list-style-type: none"> <li>• Store in NO SMOKING AREA.</li> <li>• Fire extinguisher readily available.</li> <li>• Transfer only when properly grounded and bonded.</li> </ul>
Disposal of Investigation-Derived Waste (IDW) (Forklift Operation)	<p>Personnel injury, property damage, and/or equipment damage</p> <p>Cross-contamination and contact with potentially contaminated materials</p>	<ul style="list-style-type: none"> <li>• Use qualified and trained forklift operators.</li> <li>• The operator shall not exceed the load capacity rating for the forklift.</li> <li>• The load capacity shall be clearly visible on the forklift.</li> <li>• Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.</li> <li>• Stop immediately at any sign of obstruction.</li> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>

Table 5-1

**Activity Hazard Analysis  
Range 4A Fog Oil Storage Area  
Pelham Range, Parcel 123(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 14 of 15)

Activity	Potential Hazards	Recommended Controls
Disposal of Investigation-Derived Waste (IDW) (Forklift Operation) (continued)	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
High-Pressure Water Jetting Operations (if applicable)	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques.</li> <li>• Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Good housekeeping shall be implemented.</li> <li>• The work area shall be kept clean as feasible.</li> <li>• Inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Fueling	<ul style="list-style-type: none"> <li>• Only approved safety cans shall be used to store fuel.</li> <li>• Do not refuel equipment while it is operating.</li> <li>• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.</li> </ul>
	Faulty or damaged equipment	<ul style="list-style-type: none"> <li>• Equipment shall be inspected before being placed into service and at the beginning of each shift.</li> <li>• Preventive maintenance procedures recommended by the manufacturer shall be followed.</li> <li>• A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.</li> </ul>
	High-pressure water	<ul style="list-style-type: none"> <li>• Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate).</li> <li>• One standby person shall be available within the vicinity of the pump during jetting operation.</li> <li>• The work area shall be isolated and adequate barriers will be used to warn other site personnel.</li> </ul>
	Unqualified operators	<ul style="list-style-type: none"> <li>• Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.</li> </ul>
	Out of control equipment	<ul style="list-style-type: none"> <li>• No machinery or equipment is permitted to run unattended.</li> <li>• Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Sound levels above 85 dBA mandates hearing protection by nearby site personnel.</li> </ul>

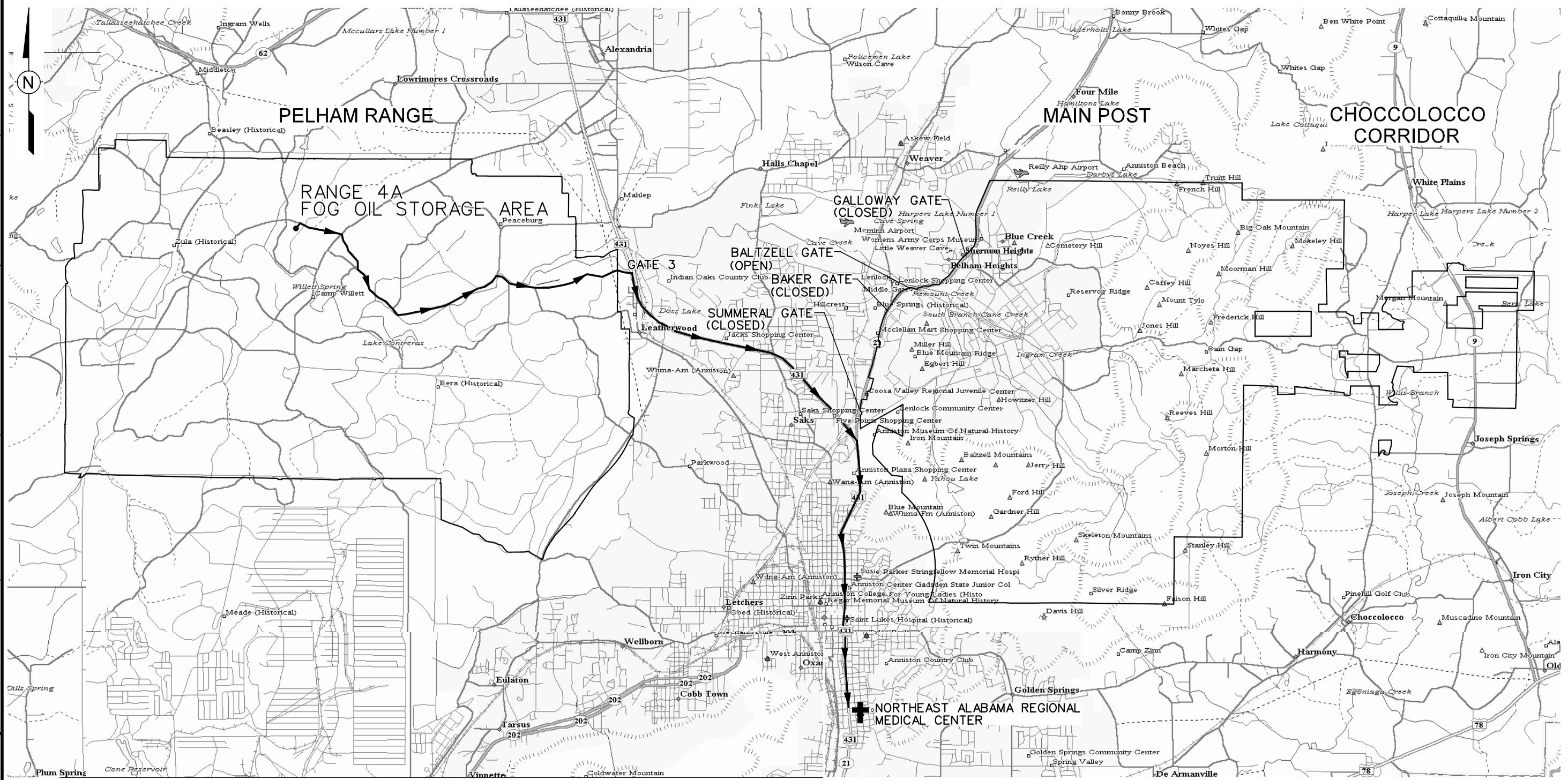
**Table 5-1**

**Activity Hazard Analysis  
 Range 4A Fog Oil Storage Area  
 Pelham Range, Parcel 123(6)  
 Fort McClellan, Calhoun County, Alabama**

(Page 15 of 15)

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (if applicable) (continued)	Activation during repairs	<ul style="list-style-type: none"> <li>All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>Keep feet and hands clear of moving/suspended materials and equipment. Stay alert and clear of materials suspended.</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>Hard hats are required by site personnel.</li> <li>Stay alert and clear of material suspended overhead.</li> </ul>
	Flying debris	<ul style="list-style-type: none"> <li>Impact-resistant safety glasses with side shields are required.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>All site personnel will wear the appropriate PPE.</li> </ul>

DWG. NO.: 774645es.667  
 PROJ. NO.: 774645  
 INITIATOR: J. BROWN  
 PROJ. MGR.: J. YACOB  
 DRAFT. CHK. BY:  
 ENGR. CHK. BY: J. JENKINS  
 DATE LAST REV.:  
 DRAWN BY: D. BILLINGSLEY  
 11/08/00  
 10:14:39  
 12/18/00  
 10:14:39  
 DBILLING  
 c:\cadd\design\774645es.667



**LEGEND:**

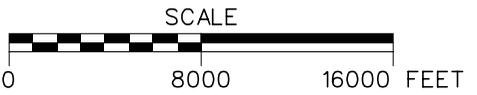
- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITAL
- INVESTIGATION SITES

**DRIVING DIRECTIONS FROM PELHAM RANGE GATE 3 TO THE NORTHEAST ALABAMA MEDICAL CENTER**

- EXIT PELHAM RANGE AT GATE NO. 3 AND TURN RIGHT ON U.S. HWY 431
- CONTINUE TO WHERE AL HWY 21 MERGES WITH U.S. HWY 431 AND CONTINUE SOUTH
- CONTINUE SOUTH ON AL21/US431 FOR ~ 2.7 MILES
- TURN LEFT ONTO EAST 10th STREET
- GO ~ 0.2 MILE TO MEDICAL CENTER ON RIGHT
- NORTHEAST ALABAMA REGIONAL MEDICAL CENTER, 400 EAST 10 TH STREET
- PHONE NUMBER : (256) 235-5121

**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



**ATTACHMENT 1**

**PELHAM RANGE EMERGENCY ROUTE AND  
RANGE CONTROL CONTACT**

## FORT MCCLELLAN ALERT AND NOTIFICATION SYSTEM

An outdoor electronic alert and notification system is operational on Fort McClellan and Pelham Range. The purpose of this system is to provide warning(s) of an emergency situation that poses a threat to the safety and health of personnel on Fort McClellan and Pelham Range. The system has the capability of providing digital voice, electronic tone alerts and live voice loudspeaker warnings of emergency situations. The following is a list of the digital voice and associate tone alerts for the various hazards that could threaten personnel on both portions of the installation:

1. **THIS IS A TEST!** This is a test of the Fort McClellan emergency warning system. **THIS IS A TEST AND ONLY A TEST!** **WAIL TONE**

This message is used for the monthly test on the first Tuesday at 1600 hrs.

2. **WARNING! TORNADO WARNING!** A tornado warning has been issued for this area. Seek shelter immediately. Tune to a local radio station. Seek shelter immediately. **TORNADO WARNING!** **SOLID TONE**

3. **WARNING! SEVERE WEATHER WARNING!** A severe weather warning has been issued for this area. Standby for further instructions. Tune to a local radio station. **SEVERE WEATHER WARNING!** **SOLID TONE**

4. **WARNING! THUNDERSTORM WARNING!** A thunderstorm warning has been issued for this area. Standby for further instructions. Tune to a local radio station. **THUNDERSTORM WARNING!** **SOLID TONE**

5. **WARNING! HAZARDOUS MATERIALS ACCIDENT!** There has been a hazardous materials accident. Standby for further instructions. Tune to a local radio station. **HAZARDOUS MATERIALS ACCIDENT!** **HI-LO TONE**

6. **WARNING! Anniston Army Depot has announced a chemical agent release. Standby for further instructions. Tune to FM 100 radio station. CHEMICAL AGENT RELEASE!** **WHOO TONE**

7. **ALL CLEAR!** The emergency situation is over. **ALL CLEAR!** The emergency situation is over. **ALL CLEAR!** **NO TONE**

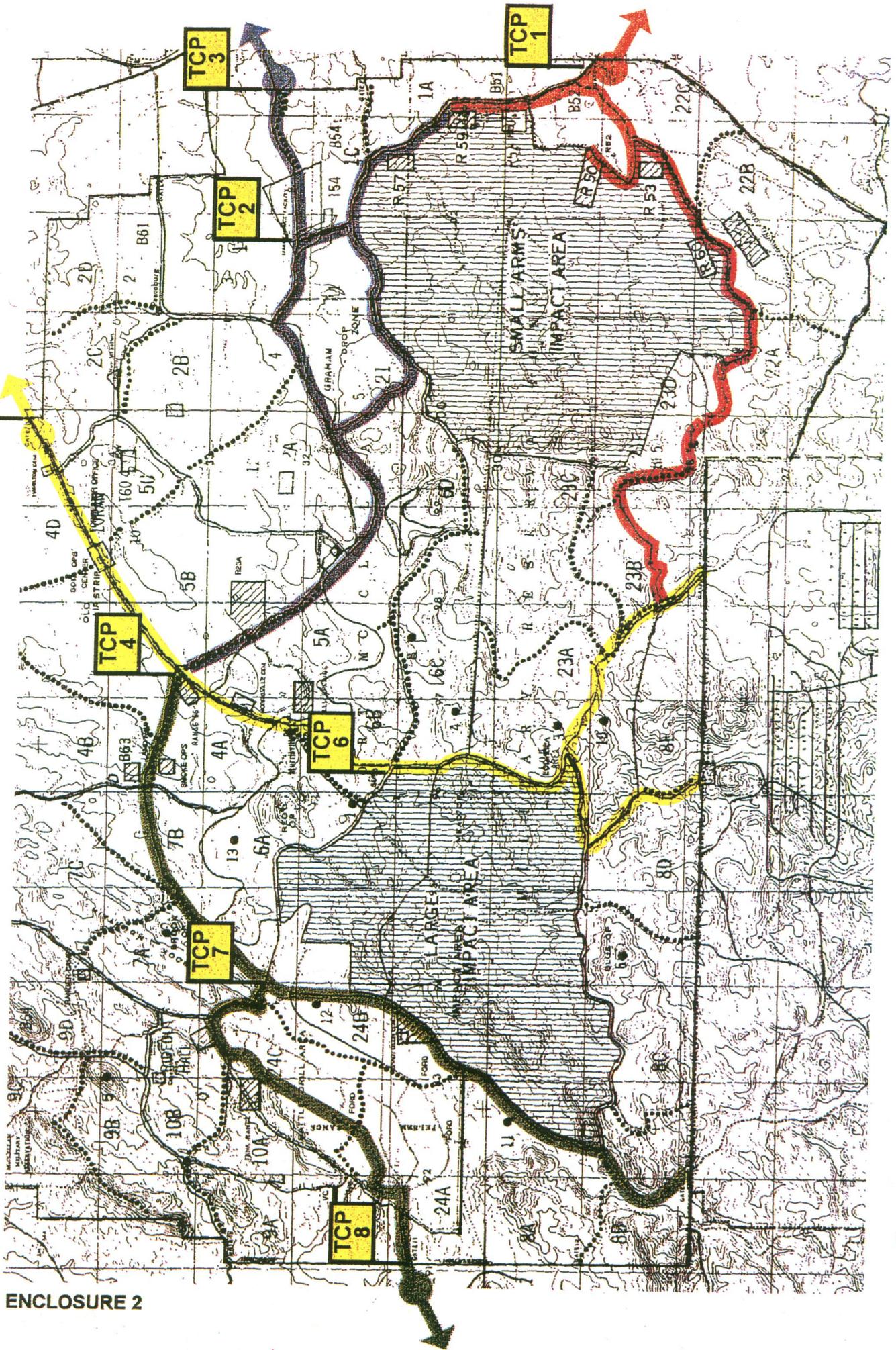
8. **CHEMICAL ALERT!** Initiate evacuation procedures immediately. A chemical agent release has occurred at Anniston Army Depot. **EVACUATE IMMEDIATELY! CHEMICAL ALERT!** **WHOO TONE**

This voice message was specifically designed for Pelham Range.

Sequence of initial alert and notification is:

**VOICE MESSAGE--TONE--VOICE MESSAGE--TONE**  
repeated twice, again as the situation warrants.

# PELHAM RANGE EVACUATION ROUTES



## Pelham Range Emergency Routes

- Range Control will determine depending on the wind direction the best egress route.
- Range Control will advise over the radio which route to take.
- 4 routes have been indicated on the enclosed map.

## Medical Emergency

- Exit gate Number 3 at Pelham Range,
- Turn right onto Route 431,
- Turn right onto Highway 21 (Quintard),
- Turn left onto 10<sup>th</sup> Street,
- Hospital is 1-1/2 blocks ahead,
  - Northeast Alabama Regional Medical Center
  - 400 East 10<sup>th</sup> Street
  - Anniston, Alabama

## Range Control- Pelham Range

- Building 1120, Ft McClellan  
Phone No. 848-6772  
Fax No. 848-4412

**All access permits are issued by range control, daily.**

**Final  
Site-Specific Unexploded Ordnance Safety Plan  
Attachment  
Range 4A Fog Oil Drum Storage Area –  
Pelham Range, Parcel 123(6)**

**Fort McClellan  
Calhoun County, Alabama**

**Prepared for:**

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

**Prepared by:**

**IT Corporation  
312 Directors Drive  
Knoxville, Tennessee 37923**

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

**March 2001**

**Revision 1**

**Table of Contents**

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	<b>Page</b>
List of Acronyms .....	ii
1.0 Introduction .....	1
2.0 UXO Team Composition .....	1
3.0 Responsibilities .....	2
4.0 Authority .....	2
5.0 Anomaly Avoidance Procedures for Sampling Activities .....	3
6.0 UXO/OE Disposition .....	6
7.0 Safety .....	6
8.0 Quality.....	6
9.0 Reference .....	6

## ***List of Acronyms***

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See Attachment 1, List of Abbreviations and Acronyms, contained in 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 fast-track site investigation, at Range 4A Fog Oil Storage Area, Parcel 123(6), at Fort McClellan (FTMC), Calhoun County, Alabama. IT will perform visual surveys and collect surface, subsurface, and depositional soil samples for chemical analysis. 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.

Range 4A Fog Oil Storage Area, Parcel 123(6), is located in north central Pelham Range and is due west of Range 56 in Training Area 4A of Pelham Range. The area had been designed for storage of fog oil used to generate smoke for training exercises at FTMC and Pelham Range and is believed to have been in use since at least 1964. The storage capacity at Range 4A Fog Oil Storage Area is 75,000 gallons. The Fog Oil Storage Area is constructed with two concrete structures: a 15 foot by 15 foot drum handling area, and a 60 foot by 60 foot loading and storage area. Each concrete structure is equipped with drains connected to an oil/water separator and an underground storage tank. The drains are designed to collect spilled oil and precipitation. Fog oil has now been moved to the Directorate of Logistics facility where smoke generators are now fueled (U.S. Army Center for Health Promotion and Preventive Medicine, 1999). The facility covers an area of less than 1 acre.

The soils underlying each of the concrete structures may have been affected with fog oil. Fog oil may have reached the soil through seams in the concrete structures (Environmental Science and Engineering, Inc., 1998). Also, fog oil may have been able to reach the soils prior to the installation of the concrete structures, when the loading and storage area and drum handling area were simply constructed of earthen berms (U.S. Army Center for Health Promotion and Preventive Medicine, 1999).

## **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 the site-specific field sampling plan, IT will use a Schonstedt GA-72. The Schonstedt GA-230 is the selected instrument for downhole anomaly avoidance.
  - (1) A geophysical proveout 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 the SFSP.

- 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 project, 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 project. The UXO team will not destroy the item. The UXO team will report the item to the site manager and the Base 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 the site-specific field sampling plan, consideration must be given for possible OE contamination. Since these areas may contain OE contamination, the UXO team must conduct a surface access survey and a subsurface survey of UXO before any type of activities commence, including foot and vehicular traffic.

- a) Access Surveys.
  - (1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the fill area work areas. If UXO is found during the access survey, the ordnance will be conspicuously marked and avoided. No personnel will be allowed outside of the surveyed areas.
  - (2) The UXO team will locate an access route to and from the proposed investigation site that is free of surface and near-surface UXO using an appropriate geophysical detection instrument as required. The access route should be as wide as the minimum number of feet of the widest vehicle.
  - (3) Geophysical instrumentation should be used to locate potential UXO just below the surface that may be encountered through erosion from rain, continual vehicular traffic, or subsurface sampling and drilling activities. If surface UXO or subsurface UXO-related anomalies are encountered, the access route must be diverted to avoid contact.
  - (4) The boundary of each access route and investigation site should be marked using white survey flagging and pin flags. Non-UXO qualified personnel will not be allowed outside designated access areas without proper UXO escort. Near-surface anomaly locations will be prominently identified with yellow survey flagging or pin flags. Red flagging will be placed adjacent to any discovered UXO for subsequent visual reference.
  - (5) At the actual investigation site, the UXO team must also complete an access survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations, as appropriate for site activities. As a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the largest vehicle or piece of equipment to be 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 12 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 preselected 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. If the proposed site is still free of magnetic anomalies, the drilling equipment may be brought onsite 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 downhole utilization at 2-foot increments as the drilling is advanced from the clearance depth of the pilot until achievement of one of the following indicators: the drilling activity is completed; the drilling is extended to depths greater than 30 feet below ground surface; or a qualified geologist determines that virgin soil is found.
  
- (d) **Drilling equipment and/or metallic support materials (e.g., drill rig, augers, drill rods, casings, etc.)** may create an interference affecting the operation of the geophysical survey instrumentation during the incremental depth inspection process. In such event, the item(s) creating the interference must be relocated outside the interference range of the geophysical instrument during each incremental depth inspection of the drill hole for the presence of anomalies. Drilling of a hole will not proceed if OE is encountered or if an anomaly is detected that cannot be positively identified as inert material. In this event, the sampling personnel must select a new drill hole location.

## **6.0 UXO/OE Disposition**

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

## **7.0 Safety**

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In addition to the requirements of the site-specific safety and health plan, the UXO team will ensure the following:

- a) During the access and subsurface surveys conducted with a geophysical instrument, the UXO team members will not wear safety shoes or other footwear that would cause the instrument to present a false response.
- b) The UXO team will not be required to wear protective helmets unless a head threat is present.

## **8.0 Quality**

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A UXO Quality Control 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 References**

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

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

U.S. Army Center for Health Promotion and Preventative Medicine, 1999, *Draft Preliminary Assessment No. 38-EH-1775-99, Fort McClellan Army National Guard Training Center, Fort McClellan, Alabama*, June.