

**SITE-SPECIFIC WORK PLAN ADDENDUM FOR THE
SUPPLEMENTAL REMEDIAL INVESTIGATION FOR THE
FENCED AREA AT RANGE J – PELHAM RANGE,
PARCEL 202(7)**

Attachment I

**Addendum for Supplemental Remedial Investigation
Site-Specific Unexploded Ordnance Safety Plan
Attachment
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

**Site-Specific Unexploded Ordnance Safety Plan Attachment
Addendum for Supplemental Remedial Investigation
Fenced Area at Range J - Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

Prepared for:

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

November 2000

Revision 0

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List of Acronyms

See Attachment 2, List of Abbreviations and Acronyms, of the Site-Specific Safety and Health Plan 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 supplemental remedial investigation activities at the Fenced Area at Range J, Parcel 202(7) located at Pelham Range, Fort McClellan (FTMC), Calhoun County, Alabama. IT will perform visual surveys and collect surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analysis at Fenced Area at Range J, Parcel 202(7). In performing these activities, IT will require unexploded ordnance (UXO) anomaly avoidance services to avoid any potential surface UXO or subsurface anomalies during sampling activities. Intrusive anomaly investigation is not authorized for this site investigation work.

Range J was a former chemical agent training and disposal area located in the north-central portion of Pelham Range. Range J was reportedly used for personnel training in various facets of chemical warfare exposure including agent use, detection, chemical waste disposal, and use of decontamination agents. Decontaminating agents were used on chemical warfare agents to reduce and eliminate their hazard after training exercises.

A chain link fence surrounds an area approximately 139 feet long (east to west) by approximately 50 feet wide (north to south) (0.16 acres) and was reportedly used until 1963 for training and chemical agent disposal (Science Application International Corporation [SAIC], 1993). The objective of this investigation is to determine whether or not the fenced area is the source of contamination in groundwater and better define the extent of groundwater contamination.

An entrance gate is located in the southeastern section of the chain link fence. A concrete monument is located inside the chain link fence near the entrance gate. Drums containing soil were disposed in a pit located inside the chain link fence. The pit is located in the northwest section of the site and is approximately 10 feet wide (north to south) by 40 feet long (east to west). The fenced area was reportedly used to dispose of drummed soil transported from a 110-gallon distilled mustard spill that occurred on the main post in 1955. The depth at which the drummed contaminated soil was buried is unknown. Surface topography at the site is generally flat over three-fourths of the site and slopes to the northwest in the western portion of the site near the pit. Generally, Range J is situated on a broad crest that slopes in all directions except to

the northeast. The topography northeast of the site is flat. Cane Creek is located approximately 2,200 feet south of the chain link fenced area.

Due to conflicting documentation reported in the environmental baseline survey (Environmental Science and Engineering, Inc., 1998) and in the Enhanced Preliminary Assessment Reports, the exact acreage (size) of Range J is not known. Range J is a small portion of a larger training area reportedly in use since 1954. This larger training area, approximately 60 acres, surrounds the chain link fence. The boundaries of this larger training area are not documented (SAIC, 1995). However, SAIC was not provided with the Environmental Photographic Interpretation Center aerial photographs. Review of aerial photographs prepared by the Environmental Photographic Interpretation Center for the U.S. Army Toxic and Hazardous Materials Agency indicates Range J was much larger than the reported 60 acres (U.S. Environmental Protection Agency, 1983). Based on review of aerial photographs taken in 1954, 1957, and 1961, Range J may have been approximately 170 acres.

Various types of chemical agents and decontaminants were reportedly used at Range J, some of which may have been used at different times throughout the history of the site. Below is a list of chemical agents and decontaminants, with descriptions of each, that were probably used at Range J:

- Decontamination agent (noncorrosive)
- Distilled mustard
- Supertropical bleach
- Decontamination Solution Number 2
- Chloroacetophenone in benzene and carbon tetrachloride
- Chloroacetophenone in chloropicrin and chloroform.

2.0 UXO Team Composition

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

- a) The UXO team will be composed of two UXO qualified personnel, depending on the tasks to be performed. One UXO team member will be a UXO Technician III and the other will be, as a minimum, a UXO Technician II. Qualifications of these personnel are published in Engineering Pamphlet 1110-1-18 and stated in Section 2.0 of the installation-wide OE management plan (IT, 2000).

- b) For the work to be performed in accordance with this safety plan, IT will use a Schonstedt GA-72 magnetometer to assist in surface and subsurface sweeps. The Schonstedt GA-230 magnetometer will be the instrument used for downhole anomaly avoidance.
 - (1) A geophysical 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 this safety plan.

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

4.0 Authority

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

5.0 Anomaly Avoidance Procedures for Sampling Activities

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

a) Access Surveys.

- (1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the investigation sites. If UXO is found during the access survey, the ordnance will be conspicuously marked and avoided. No personnel will be allowed outside of the surveyed areas.
- (2) The UXO team will locate an access route to and from the proposed investigation site that is free of surface and near-surface UXO using an appropriate geophysical detection instrument as required. The access route should be as wide as the minimum number of feet of the widest vehicle.
- (3) Geophysical instrumentation should be used to locate potential UXO just below the surface that may be encountered through erosion from rain, continual vehicular traffic, or subsurface sampling and drilling activities. If surface UXO or subsurface UXO-related anomalies are encountered, the access route must be diverted to avoid contact.
- (4) The boundary of each access route and investigation site should be marked using white survey flagging and pin flags. Non-UXO qualified personnel will not be allowed outside designated access areas without proper UXO escort. Near-surface anomaly locations will be prominently identified with yellow survey flagging or pin flags. Red flagging will be placed adjacent to any discovered UXO for subsequent visual reference.
- (5) At the actual investigation site, the UXO team must also complete an access survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations, as appropriate for site activities. As a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the largest vehicle or piece of equipment to be bought on site. Intrusive activities will not proceed if an anomaly is detected that cannot be positively identified as inert material.

In this event, the sampling personnel must select an alternate investigation area or configuration.

- b) **Surface/Near Surface-Sampling.** Surface soil samples are normally collected at depths of 0 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 feet. If the proposed site is still free of magnetic anomalies, the drilling equipment may be brought on site and utilized. Hand augering of a hole will not proceed if an anomaly is detected that cannot be positively identified as inert material. If OE is encountered or an anomaly cannot be positively identified as inert material, the sampling personnel must select a new drill hole location.
- (c) **Monitoring of Drilling by Others.** Once a drilling site has been surface cleared and a pilot hole installed as described above, the drilling contractor will be notified that the site is available for subsurface sampling or monitoring well installation. The drilling contractor's actual drill hole must be located within a 2-foot radius of the pilot hole installed by the UXO team. The UXO team will continue to complete a subsurface inspection for anomalies with a geophysical instrument configured for down hole utilization at 2-foot increments as the drilling is advanced from the clearance depth of the pilot hole until achievement of one of the following indicators: the drilling activity is completed; the drilling is extended to depths greater than 30 feet below ground surface; or a qualified geologist determines that virgin soil is found.
- (d) **Drilling equipment and/or metallic support materials (e.g., drill rig, augers, drill rods, casings, etc.)** may create an interference affecting the operation of the geophysical survey instrumentation during the incremental depth inspection process. In such event, the item(s) creating the interference must be relocated outside the interference range of the geophysical instrument during each incremental depth inspection of the drill hole for the presence of anomalies. Drilling of a hole will not proceed if OE is encountered or if an anomaly is detected that cannot be positively identified as inert material. In this event, the sampling personnel must select a new drill hole location.

6.0 UXO/OE Disposition

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

7.0 Safety

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

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

8.0 Quality

A UXO quality control specialist is not required for this work. However, quality control instructions and procedures listed in Section 9.0 of the installation-wide OE management plan (IT, 2000) will be followed as appropriate to this task.

9.0 References

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.

Science Application International Corporation (SAIC), 1993, **Site Investigation Report**, prepared for U.S. Army Environmental Center, Aberdeen Proving Grounds, Maryland, August.

Science Application International Corporation (SAIC), 1995, **Remedial Investigation Report**, prepared for U.S. Army Environmental Center, Aberdeen Proving Grounds, Maryland, August.

U.S. Environmental Protection Agency (EPA), 1983, **Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama**, (TS-PIC-83003), Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring System Laboratory.

Attachment II

**Addendum for Supplemental Remedial Investigation
Site-Specific Safety and Health Plan Attachment
for Fenced Area at Range J - Pelham Range, Parcel
202(7)
Fort McClellan, Calhoun County, Alabama**

Addendum for Supplemental Remedial Investigation
Site-Specific Safety and Health Plan Attachment
for Fenced Area at Range J - Pelham Range, Parcel 202(7)

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

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Prepared by:

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Delivery Order CK05
Contract No. DACA21-96-D-0018
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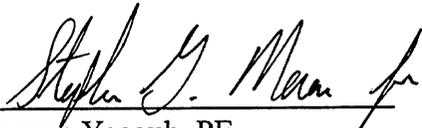
November 2000

Revision 0

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

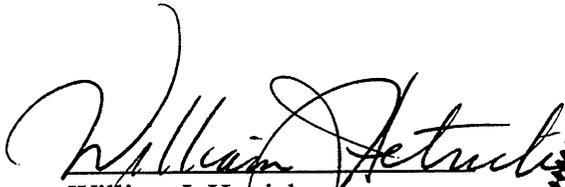
Site-Specific Safety and Health Plan Attachment Approval Fort McClellan, Calhoun County, Alabama

I have read and approve this site-specific safety and health plan attachment for Fenced Area at Range J – Pelham Range, Parcel 202(7), at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

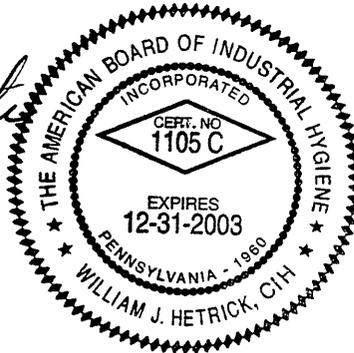


Jeanne Yacoub, PE
Project Manager

11/3/00
Date



William J. Hetrick
Health & Safety Manager



11/3/00
Date



Jeff Tarr
Site Coordinator

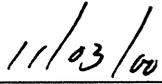
11/3/00
Date

Acknowledgements

The approved version of this site-specific safety and health plan (SSHP) attachment for Fenced Area at Range J – Pelham Range, Parcel 202(7), at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every 6 months until project completion.

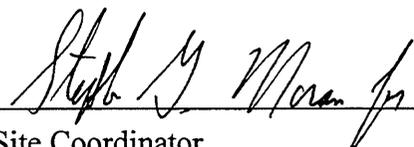


Project Manager

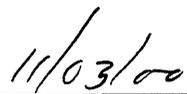


Date

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



Site Coordinator



Date

Fort McClellan Gate Hours

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

Pelham Range	IT personnel will contact the Range Control Office each day access is required to receive an access permit and available areas of entry. See Attachment 1 for Range Control contact for Pelham Range.
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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 Office.....	(256) 848-5433
Dr. Elaine Theriault, IT Occupational Physician.....	(800) 229-3674

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List of Acronyms

See Attachment 2, List of Abbreviations and Acronyms.

1.0 Site Work Plan Summary

Project Objective. The objective of this investigation at Fort McClellan (FTMC), Calhoun County, Alabama is to collect and analyze samples at Fenced Area at Range J – Pelham Range, Parcel 202(7).

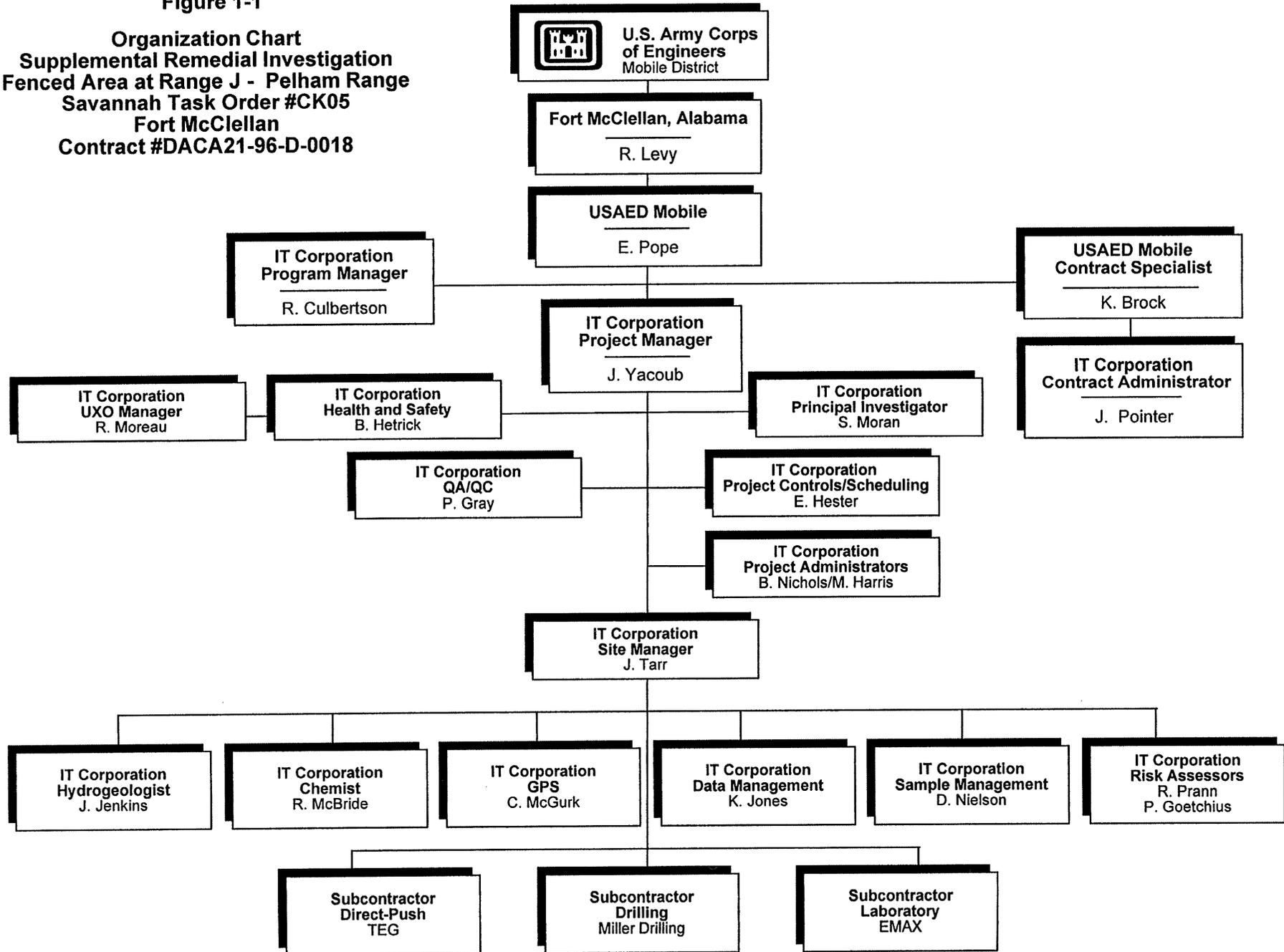
Project Tasks

- Install 20 groundwater monitoring wells.
- Collect 36 groundwater 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 (SSHP). This SSHP must be used in conjunction with the SHP, FTMC, Alabama.

Figure 1-1
Organization Chart
Supplemental Remedial Investigation
Fenced Area at Range J - Pelham Range
Savannah Task Order #CK05
Fort McClellan
Contract #DACA21-96-D-0018



2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE). Site control with the use of specific work zones (support zone, contamination reduction zone, and exclusion zone) is addressed in Chapter 7.0 of Appendix A of the IT Corporation (IT), March 2000, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*.

Fenced Area at Range J is located in the northcentral portion of Pelham Range. The site is approximately 60 feet wide (north to south) by 150 feet long (east to west) and is bounded on all sides by a chain link fence. Corroded drums containing soil were disposed in a surface pit located inside the chain link fence. The surface pit is located in the northwest section of the site and is approximately 10 feet wide (north to south) by 40 feet long (east to west). The study area is approximately 0.2 acres, but the fenced area is a small portion of a larger training area reportedly in use since 1954. This larger training area is approximately 60 acres and is located immediately around the chain link fence.

Table 2-1 contains the toxicological properties of chemicals anticipated or to be used at Fenced Area at Range J - Pelham Range.

The presence of unexploded ordnance (UXO) is suspected at Fenced Area at Range J - Pelham Range.

2.2 General Site Information

Location of Site. Fenced Area at Range J is located in the northcentral portion of Pelham Range.

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

Table 2-1

**Toxicological Properties of Chemicals
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 4)

Substance [CAS]	IP ^a (eV)	Odor Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Acetone [67-64-1]	9.7	13-100	Inh Ing Con	Irritated eyes, nose, and throat; headache, dizziness; dermatitis.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	750 ppm 750 ppm 250 ppm	1,000 ppm 1,000 ppm	PEL TLV REL	20,000 ppm
Carbon Tetrachloride [56-23-5]	11.47ev	NA	Inh Ing Con	Irritates eyes, skin; liver and kidney damage; nausea, vomiting, drowsiness, dizziness. Carcinogenic.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	10 ppm -- --	C 25 ppm 2 ppm --	PEL TLV REL	Ca 200 ppm
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho-pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	

Table 2-1

**Toxicological Properties of Chemicals
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 4)

Substance [CAS]	IP ^a (eV)	Odor Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm 500 ppm	PEL TLV REL	?
n-Hexane [110-54-3]	10.18	65-248	Inh Ing Con	Lightheadedness; nausea, headache; numbness of the extremities, muscular weakness; irritation of the eyes and nose; dermatitis; chemical pneumonia; giddiness.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	50 ppm 50 ppm 50 ppm		PEL TLV REL	5,000 ppm
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43-200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, headache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	500 ppm 500 ppm 500 ppm	PEL TLV REL	12,000 ppm
Motor Oil [NA]	?	?	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention			PEL TLV REL	
Nitric acid [7697-37-2]	11.95	0.3-1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	4 ppm 4 ppm 4 ppm	PEL TLV REL	100 ppm

Table 2-1

**Toxicological Properties of Chemicals
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 4)

Substance [CAS]	IP ^a (eV)	Odor Threshold (ppm)	Route ^b	Symptoms of Exposure	Treatment	TWA ^c	STEL ^d	Source ^e	IDLH (NIOSH) ^f
Portland cement			Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention		10 mg/m ³ 10 mg/m ³ / total dust 5 mg/m ³ respirable fraction	TLV REL	
Sodium hydroxide [1310-73-2]	NA	NA	Inh Ing Con	Irritated nose; pneumonitis; burns eyes, and skin; temporary loss of hair.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention		C 2 mg/m ³ C 2 mg/m ³ C 2 mg/m ³	REL TLV REL	250 mg/m ³
Sulfuric acid [7664-93-9]	?	0.15	Inh Ing Con	Irritated eyes, nose, and throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatitis; dental erosion; tracheobronchitis; skin and eye burns; dermatitis.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention	1 mg/m ³ 1 mg/m ³ 1 mg/m ³	3 mg/m ³	REL TLV REL	80 mg/m ³

^aIP = Ionization potential (electron volts).

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

^cTWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.

^dSTEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.

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

AEL = Airborne Exposure Limit.

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

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

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

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

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

Ca = Carcinogen.

NA = Not applicable.

? = Unknown.

Table 2-1

Toxicological Properties of Chemicals Fenced Area at Range J – Pelham Range, Parcel 202(7) Fort McClellan, Calhoun County, Alabama

(Page 4 of 4)

LEL = Lower explosive limits.

LC₅₀ = Lethal concentration for 50 percent of population tested.

LD₅₀ = Lethal dose for 50 percent of population tested.

NIC = Notice of intended change (ACGIH).

References:

- American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 1998, compiled by the American Conference of Governmental Industrial Hygienists.
- Amoore, J. E. Hautula, "Odor as an Aid to Chemical Safety," Journal of Applied Toxicology, 1983.
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- Fazzuluri, F. A., Compilation of Odor and Taste Threshold Values Data, American Society for Testing and Materials, 1978.
- Gemet, L. J. Van, Compilation of Odor Threshold Values in Air and Water, CIVO, Netherlands, 1977.
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- Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.
- National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1998, National Institute for Occupational Safety and Health.
- Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
- Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.
- Verschueren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.
- Warning Properties of Industrial Chemicals—Occupational Health Resource Center, Oregon Lung Association.
- Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

Site Topography and Size. The range occupies an area of approximately 60 acres, with ground sloping to the northwest.

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

3.0 Personal Protective Equipment

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

Task	Initial Level of PPE
Staging equipment	Level D
Collecting samples	Modified Level D*
Install monitoring wells	Modified Level D*

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

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

- Coveralls or work clothing
- Leather work gloves (when necessary)
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

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

- Permeable Tyvek, Kleenguard, or its equivalent (Saran-coated tyvek where chemical agents are anticipated)
- Latex boot covers
- Nitrile, heavy work, or latex gloves
- Steel-toed safety boots
- Safety glasses
- Hard hat

- Hearing protection (when working near/adjacent to operating equipment)
- Escape/egress air supply pack (where chemical agents are suspected).

Note: In addition to modifying Level D PPE, the operator of high-pressure water jetting equipment shall wear metatarsal guards for the legs and feet and 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/Mine Safety and Health Administration-approved full-face, air-purifying respirators equipped with organic vapor/acid gas cartridge in combination with high-efficiency particulate air filter
- Hooded, Saran-coated Tyvek, taped at gloves, boots, and respirator
- Nitrile gloves (outer)
- Latex or lightweight nitrile gloves (inner)
- Neoprene steel-toed boots or polyvinyl chloride overboots/steel-toed safety boots
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment)
- Escape/egress air supply pack (where chemical agents are suspected).

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

The environmental contaminants of concern resulting from Fenced Area at Range J – Pelham Range operations are diesel fuels, gasoline, and carbon tetrachloride. Table 4-1 contains action levels for site monitoring at Fenced Area at Range J – Pelham Range.

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

Unexploded Ordnance. UXO support for sampling activities are specified in the site-specific UXO safety plan developed for Fenced Area at Range J. The UXO specialists will perform UXO avoidance sweeps prior to moving the heavy equipment onto the site. During this operation, UXO on the surface will be detected and marked for avoidance during field operations. Additionally, downhole magnetometer surveys will be performed to detect metal objects in the path of the boring apparatus. The boring location will be moved to avoid subsurface metal objects.

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
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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When in Level C PPE

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

When in Level D Modified/D PPE

Analyte	Action Level	Required Action ^b
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.
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for VOCs.

Note: Quanterra Battelle Quicksilver will conduct environmental monitoring for chemical warfare agents (CWA). If CWAs are encountered or if "ring off" occurs, site personnel will don escape/egress air supply packs and evacuate the site immediately. Personnel will decontaminate using a bleach solution.

Table 4-1

**Action Levels
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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When in Support Zone

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

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

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

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

Table 4-2

**Air Monitoring Frequency and Location
Fenced Area at Range J – Pelham Range
Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

OV = Organic vapor.

LEL/O₂ = Lower explosive level/oxygen.

5.0 Activity Hazard Analysis

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

- Setup of equipment and general field activities
- Soil and groundwater sampling
- Installation of monitoring wells.

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
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Noise	<ul style="list-style-type: none"> • Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
	Cold stress	<ul style="list-style-type: none"> • Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (°F). • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
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Activity	Potential Hazards	Recommended Controls
Groundwater Sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with water. • Handle samples with care. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	<ul style="list-style-type: none"> • Use care when handling glassware. • Wear adequate hand protection.
	Hazard communication	<ul style="list-style-type: none"> • MSDSs shall be obtained for chemicals brought on site. • Label all containers as to contents.
	Strains/sprains	<ul style="list-style-type: none"> • Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Spills/residual materials	<ul style="list-style-type: none"> • Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
	Unattended worker	<ul style="list-style-type: none"> • Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

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

Table 5-1

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

Table 5-1

**Activity Hazard Analysis
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Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (continued)	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • If in a group, keep 6 feet of distance between people.
	UXO	<ul style="list-style-type: none"> • UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist.
	Accidental exposure to chemical agents	<ul style="list-style-type: none"> • Low-level real-time environmental monitoring will be performed by Quanterra Battelle Quicksilver Center. • Modified Level D personal protective equipment (PPE) will be required. During the first 15 feet depth of each monitoring well installation activity, downhole geophysics will be performed. • Engineering controls will be used as appropriate. • Personnel will be equipped with an emergency egress air supply pack.
Moving and Shipping Collected Samples	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cut hazards	<ul style="list-style-type: none"> • Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	<ul style="list-style-type: none"> • Label all containers as to contents and associated hazards.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.

Table 5-1

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

Table 5-1

**Activity Hazard Analysis
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Fenced Area at Range J – Pelham Range, Parcel 202(7)
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Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Fueling	<ul style="list-style-type: none"> • Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	<ul style="list-style-type: none"> • Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High-pressure water	<ul style="list-style-type: none"> • Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	<ul style="list-style-type: none"> • No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	<ul style="list-style-type: none"> • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended .
	Falling objects	<ul style="list-style-type: none"> • Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	<ul style="list-style-type: none"> • Impact-resistant safety glasses with side shields are required.

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 12 of 14)

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Contact with potentially contaminated materials	<ul style="list-style-type: none"> All site personnel will wear the appropriate PPE.
Drilling and Installation of Monitoring Wells	Overhead hazards	<ul style="list-style-type: none"> Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.
	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. Equipment will be inspected before being put to use and at the beginning of each shift. Faulty/unsafe equipment will be tagged and if possible locked out. Drill rigs shall be equipped with reverse signal alarm, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. All mobile equipment and areas in which they are operated shall be adequately illuminated. Aboveground and belowground utilities will be located prior to staging equipment. Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines will have the wheels chocked. Inspect brakes and tire pressure on drill rig before staging for work.
	Inexperienced operator	<ul style="list-style-type: none"> Machinery and mechanized equipment shall be operated only by designated personnel. Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgment.
	Jacks/outriggers	<ul style="list-style-type: none"> Ensure proper footing and cribbing.
	Falling objects	<ul style="list-style-type: none"> Remove unsecured tools and materials before raising or lowering the derrick. Stay alert and clear of materials suspended overhead.
	Pinch points	<ul style="list-style-type: none"> Keep feet and hands clear of moving/suspended materials and equipment. Stay alert at all times!

Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 13 of 14)

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	Fire	<ul style="list-style-type: none"> • Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available.
	Fall hazards	<ul style="list-style-type: none"> • Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Contact with rotating or reciprocating machine parts	<ul style="list-style-type: none"> • Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Practice good housekeeping, keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized. • Stop immediately at any sign of obstruction. • Do not breathe air surrounding boring unless necessary. • Upgrade to respirator if necessary. • Avoid skin contact with soil cuttings. Wear gloves. • Stay clear of moving parts of drill rig.
	Drum handling	<ul style="list-style-type: none"> • Be careful not to breathe air from around open drum any more than necessary. Monitor with photoionization detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary. • When filling a drum (with either soil or water), be careful not to make contact with the contained waste. Wear appropriate gloves. Make sure lid or bung of drum is secure. • If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boots. • When using a drum dolly, make sure straps and lid catch are securely attached. Leverage properly when tilting drum. Be sure toes stay away from drum.

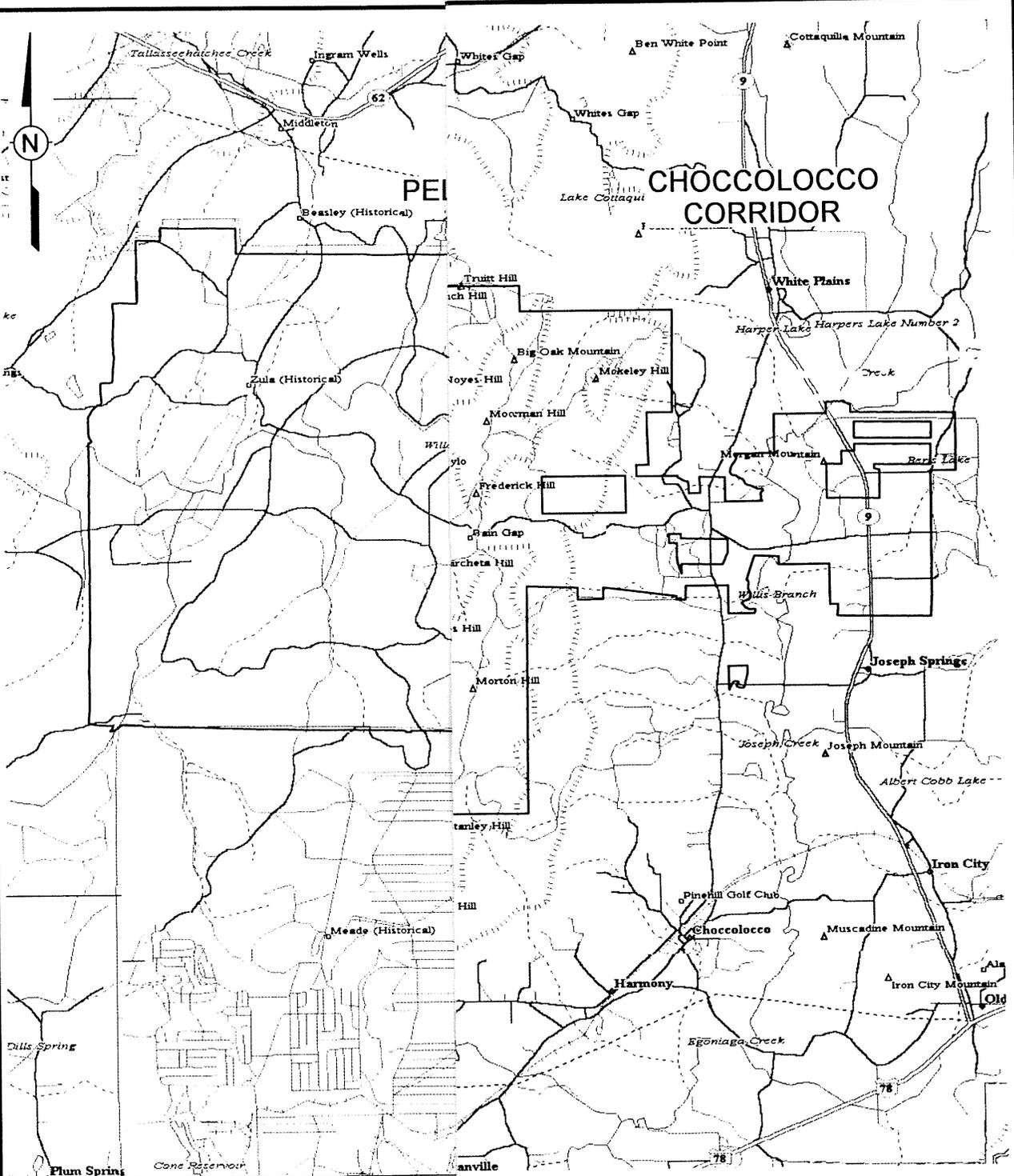
Table 5-1

**Activity Hazard Analysis
Supplemental Remedial Investigation
Fenced Area at Range J – Pelham Range, Parcel 202(7)
Fort McClellan, Calhoun County, Alabama**

(Page 14 of 14)

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	UXO	<ul style="list-style-type: none">• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities.• If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist immediately.
)	Accidental exposure to chemical agents	<ul style="list-style-type: none">• Low-level real-time environmental monitoring will be performed by Quanterra Battelle Quicksilver Center.• Modified Level D personal protective equipment (PPE) will be required. During the first 15 feet depth of each monitoring well installation activity, downhole geophysics will be performed.• Engineering controls will be used as appropriate.• Personnel will be equipped with an emergency egress air supply pack.

10/31/00	STARTING DATE: 10/31/00	DATE LAST REV.:	DRAFT. CHCK. BY:	INITIATOR: J. RAGSDALE	DWG. NO.: 774645es.647
11:02:53	DRAWN BY: D. BILLINGSLEY	DRAWN BY:	ENGR. CHCK. BY: J. RAGSDALE	PROJ. MGR.: J. YACOUB	PROJ. NO.: 774645



LEGEND:

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

**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



DBILLING
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ATTACHMENT 1

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

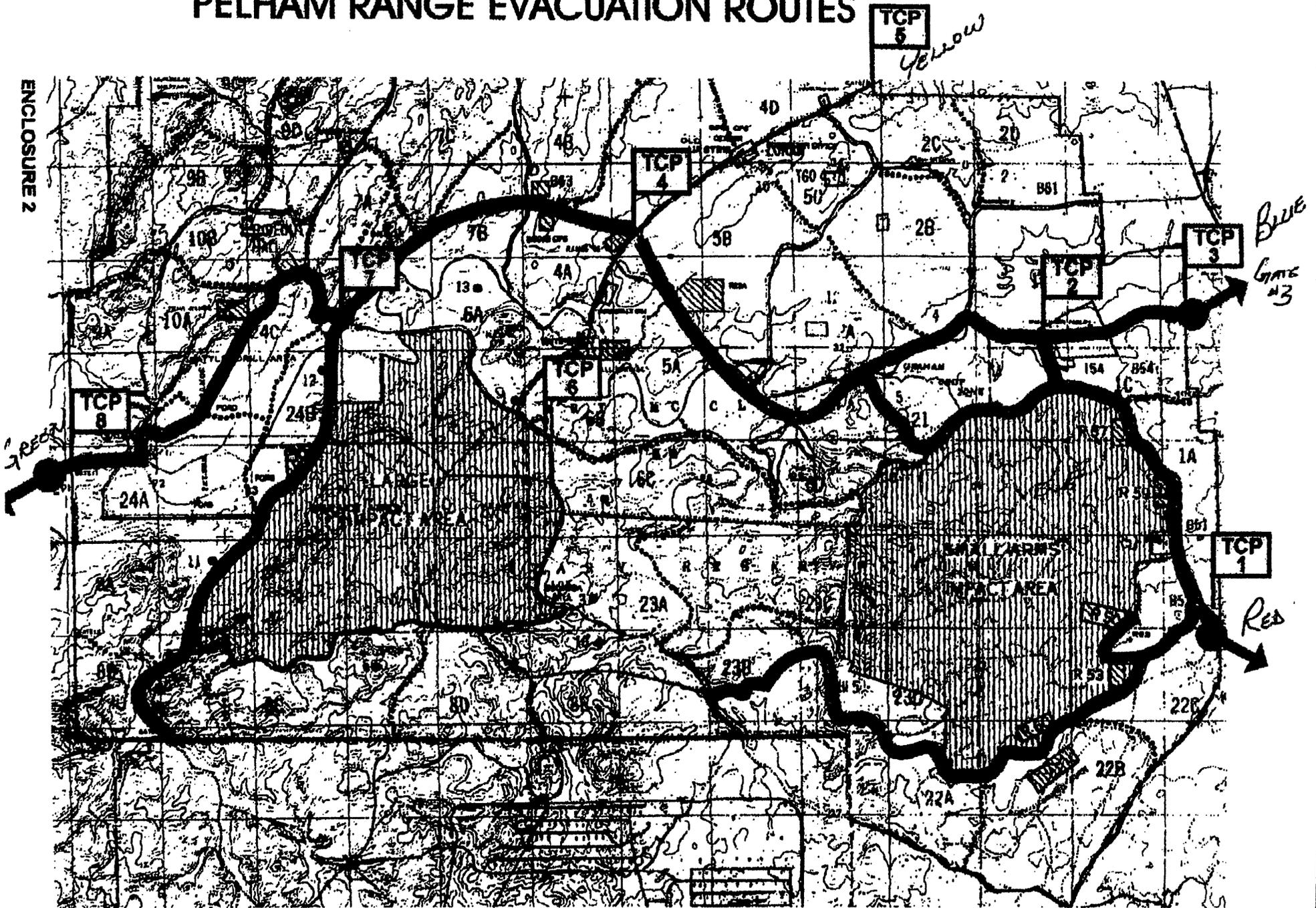
- Pelham Range Emergency Routes
- Depending on wind direction, the best egress route will be determined by Range Control.
 - Range Control will advise, over the radio, which route to take.
 - 4 routes are indicated on the enclosed map. Green, Yellow, Blue, & Red.

- Medical Emergency
- Exit Gate #3 at Pelham Range,
 - Turn right onto Route 431,
 - Turn right onto Hwy 21 (Quintard),
 - Turn left onto 10th St.,
 - Hospital is ahead @ 1/2 blocks.
Northeast Alabama Regional Medical Center
400 East 10th St.
Anniston, Al.

Range Control - Pelham Range
Bldg. 1120, Ft. Mc Clellan
Phone - 848-6772
Fax - 848-4412
All access permits are issued by Range Control, daily.

PELHAM RANGE EVACUATION ROUTES

ENCLOSURE 2



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.

Enclosure One

ATTACHMENT 2

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

3D	3D International Environmental Group	CNS	chloroacetophenone, chloropicrin, and chloroform	FedEx	Federal Express, Inc.
Abs	skin absorption	COC	chain of custody	FFE	field flame expedient
AC	hydrogen cyanide	COE	Corps of Engineers	Fil	filtered
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	Con	skin or eye contact	FIt	filtered
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	CRL	certified reporting limit	FMP 1300	Former Motor Pool 1300
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	CRZ	contamination reduction zone	Frtn	fraction
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	CS	ortho-chlorobenzylidene-malononitrile	FS	field split
ACGIH	American Conference of Governmental Industrial Hygienists	CSEM	conceptual site exposure model	ft	feet
ADEM	Alabama Department of Environmental Management	ctr.	container	ft/ft	feet per foot
AEL	airborne exposure limit	CWA	chemical warfare agent	FTA	Fire Training Area
AL	Alabama	CWM	chemical warfare material; clear, wide mouth	FTMC	Fort McClellan
amb.	amber	CX	dichloroformoxime	g	gram
ANAD	Anniston Army Depot	D	duplicate	G-856	Geometrics, Inc. G-856 magnetometer
APT	armor-piercing tracer	DANC	decontamination agent, non-corrosive	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
ASP	Ammunition Supply Point	°C	degrees Celsius	gal	gallon
ASR	Archives Search Report	°F	degrees Fahrenheit	gal/min	gallons per minute
AST	aboveground storage tank	DDT	dichlorodiphenyltrichloroethane	GB	sarin
ASTM	American Society for Testing and Materials	DEP	depositional soil	gc	clay gravels; gravel-sand-clay mixtures
B	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	DI	deionized	GC	gas chromatograph
BCT	BRAC Cleanup Team	DIMP	di-isopropylmethylphosphonate	GC/MS	gas chromatograph/mass spectrometer
BFB	bromofluorobenzene	DMMP	dimethylmethylphosphonate	GFAA	graphite furnace atomic absorption
bgs	below ground surface	DOD	U.S. Department of Defense	gm	silty gravels; gravel-sand-silt mixtures
bkg	background	DP	direct-push	gp	poorly graded gravels; gravel-sand mixtures
bls	below land surface	DPDO	Defense Property Disposal Office	gpm	gallons per minute
BOD	biological oxygen demand	DQO	data quality objective	GPR	ground-penetrating radar
BRAC	Base Realignment and Closure	DRMO	Defense Reutilization and Marketing Office	GPS	global positioning system
Braun	Braun Intertec Corporation	DRO	diesel range organics	GS	ground scar
BTEX	benzene, toluene, ethylbenzene, and xylenes	DS	deep (subsurface) soil	GSA	General Services Administration
BTOC	below top of casing	DS2	Decontamination Solution Number 2	GSBP	Ground Scar Boiler Plant
BZ	breathing zone; 3-quinuclidinyl benzilate	E&E	Ecology and Environment, Inc.	GSSI	Geophysical Survey Systems, Inc.
C	ceiling limit value	EBS	environmental baseline survey	GST	ground stain
Ca	carcinogen	Elev.	elevation	GW	groundwater
CCAL	continuing calibration	EM	electromagnetic	gw	well-graded gravels; gravel-sand mixtures
CCB	continuing calibration blank	EM31	Geonics Limited EM31 Terrain Conductivity Meter	HA	hand auger
CD	compact disc	EM61	Geonics Limited EM61 High-Resolution Metal Detector	HCl	hydrochloric acid
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	EOD	explosive and ordnance disposal	HD	distilled mustard
CERFA	Community Environmental Response Facilitation Act	EODT	explosive and ordnance disposal team	HDPE	high-density polyethylene
CESAS	Corps of Engineers South Atlantic Savannah	EPA	U.S. Environmental Protection Agency	Herb.	herbicides
CFC	chlorofluorocarbon	EPC	exposure point concentration	HNO ₃	nitric acid
CG	cyanogen chloride	EPIC	Environmental Photographic Interpretation Center	hr	hour
ch	inorganic clays of high plasticity	ER	equipment rinsate	H&S	health and safety
CK	carbonyl chloride	ESE	Environmental Science and Engineering, Inc.	HSA	hollow-stem auger
cl	inorganic clays of low to medium plasticity	ESV	ecological screening value	HTRW	hazardous, toxic, and radioactive waste
Cl.	chlorinated	Exp.	explosives	I	out of control, data rejected due to low recovery
CLP	Contract Laboratory Program	E-W	east to west	ICAL	initial calibration
CN	chloroacetophenone	EZ	exclusion zone	ICB	initial calibration blank
CNB	chloroacetophenone, benzene, and carbon tetrachloride	FB	field blank	ICP	inductively-coupled plasma
		FD	field duplicate	ICS	interference check sample

List of Abbreviations and Acronyms (Continued)

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

List of Abbreviations and Acronyms (Continued)

SSSL	site-specific screening level	WP	installation-wide work plan
STB	supertropical bleach	WS	watershed
STEL	short-term exposure limit	WSA	Watershed Screening Assessment
STOLS	Surface Towed Ordnance Locator System®	WWI	World War I
Std. units	standard units	WWII	World War II
SU	standard unit	XRF	x-ray fluorescence
SVOC	semivolatile organic compound	yd ³	cubic yards
SW	surface water		
SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>		
SZ	support zone		
TAL	target analyte list		
TAT	turn around time		
TB	trip blank		
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 compounds		
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		
UJ	not detected above reporting limit; result should be estimated		
USACE	U.S. Army Corps of Engineers		
USAEC	U.S. Army Environmental Center		
USAEHA	U.S. Army Environmental Hygiene Agency		
USAMCLS	U.S. Army Chemical 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.		