

**Final**

**Site-Specific Safety and Health Plan Attachment  
Training Area T-38, Former Technical  
Escort Reaction Area, Parcel 186(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 CK10  
Contract No. DACA21-96-D-0018  
IT Project No. 796887**

**August 2000**

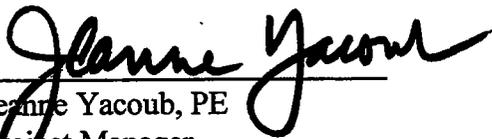
**Revision 1**

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.

**Final**  
**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 Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

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

8/17/00  
Date

  
\_\_\_\_\_  
Michael Henderson, CIH  
Health & Safety Manager

8/18/00  
Date

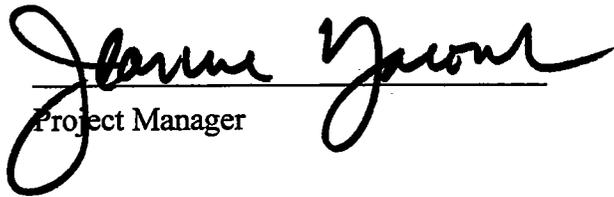
  
\_\_\_\_\_  
Jeff Tarr  
Site Coordinator

8-18-00  
Date

## **Acknowledgements**

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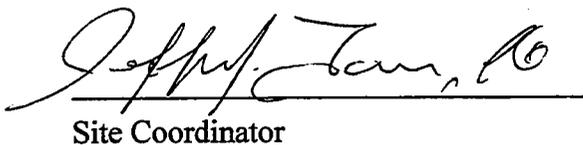
The final approved version of this site-specific safety and health plan (SSHP) attachment for the Training Area T-38 investigations at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and 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

8/17/00

Date

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

  
Site Coordinator

8-18-00

Date



## Fort McClellan Gate Hours

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

Fire Department (on post).....	911
Fire Department (off post) .....	(256) 257-3541
Ambulance (off post) .....	911
Regional Medical Center .....	(256) 235-5121
Military Police (SSG Busch) .....	(256) 848-5680, 848-4824
DOD Guard Force (Mr. Bolton) .....	(256) 848-5680, 848-4732
Anniston Police Department .....	(256) 238-1800
Chemical Agent Emergencies.....	(256) 820-7272
(Hank Hubbard, Huntsville COE UXO EODT) .....	cell phone (205) 994-2254 or 994-2269
UXO Emergencies .....	(256) 820-7272
(Hank Hubbard, Huntsville COE UXO EODT) .....	cell phone (205) 994-2254 or 994-2269
UXO Nonemergencies/Reporting Only (Ronald Levy) .....	(256) 848-3758
Baltzell Gate Guard Shack (Staffed 1600-0700 hours, Mon-Sun) .....	(256) 848-5693, 848-3821
National Response Center & Terrorist Hotline.....	(800) 424-8802
Poison Control Center.....	(800) 462-0800
EPA Region IV .....	(404) 562-8725
Ronald Levy, Chief, FTMC Environmental Management .....	(256) 848-3758
Ellis Pope, U.S. Army Corps of Engineers.....	(334) 690-3077
Jeanne Yacoub, IT Project Manager .....	(770) 663-1429
Michael Henderson, IT H&S Manager .....	(865) 690-3211
Mike Moore, Fort McClellan Safety Office.....	(256) 848-5433
Dr. Elaine Theriault, IT Occupational Physician.....	(800) 229-3674

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## **List of Acronyms**

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

## ***1.0 Site Work Plan Summary***

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***Project Objective.*** In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct a supplemental remedial investigation of Training Area T-38, the Former Technical Escort Reaction Area, Parcel 186(6), at Fort McClellan (FTMC), Calhoun County, Alabama to determine the nature and extent of potential site-specific chemicals at the site resulting from U.S. Army chemical waste disposal and training activities.

### ***Project Tasks***

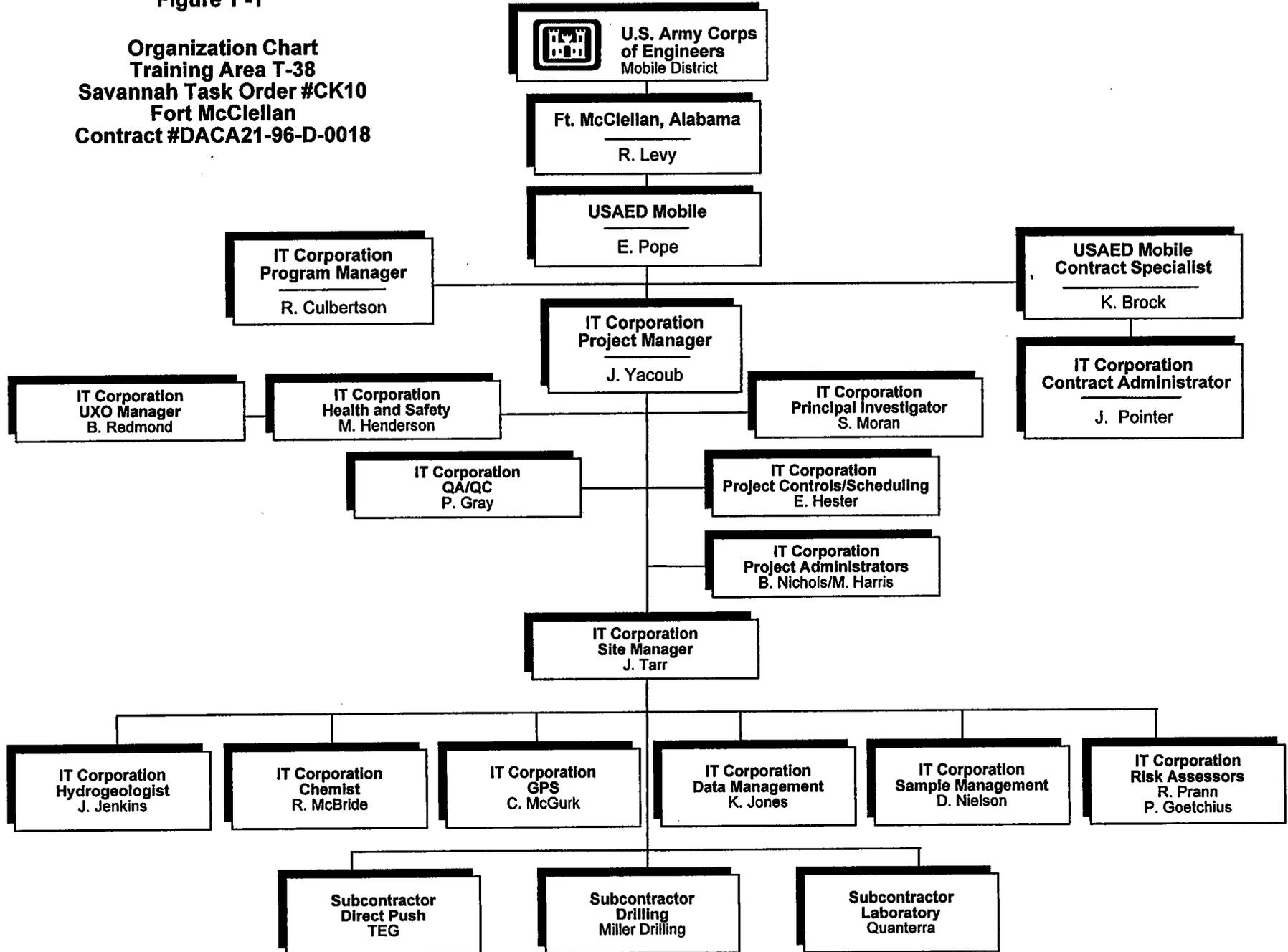
- Provide unexploded ordnance (UXO) surface avoidance and downhole survey support during field work.
- Install 17 temporary rotosonic borings; collect approximately 115 discreet groundwater samples.
- Collect 13 surface and 1 depositional soil samples.
- Collect 13 subsurface soil samples.
- Collect 32 groundwater samples.
- Collect four seep water samples.
- Collect six surface water samples.
- Collect six sediment samples.
- Install 27 monitoring wells.

***Personnel Requirements.*** Up to ten field employees. An organization chart is included as Figure 1-1.

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 SHP must be used in conjunction with the SHP for FTMC.

Figure 1 -1

**Organization Chart**  
**Training Area T-38**  
**Savannah Task Order #CK10**  
**Fort McClellan**  
**Contract #DACA21-96-D-0018**



## **2.0 Site Characterization and Analysis**

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### **2.1 Anticipated Hazards**

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE).

Potential contaminant sources at the site may include distilled mustard, decontamination solutions supertropical bleach, contamination solution number 2, chloroaceto-phenone in benzene and carbon tetrachloride (CNB), and chloroacetophenone in chloropicrin and chloroform, decontamination agent, sulfur trioxide-chlorosulfonic solution (FS), phosgene, Sarin, and nerve agent.

Table 2-1 contains the toxicological and physiological properties of chemicals anticipated or to be used at the Training Area T-38 assessments.

**UXO.** UXO safety will be achieved by employing UXO specialists to ensure that field personnel do not come into contact with UXO. In areas where UXO is suspected to exist, the UXO specialists will perform the following field 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 Boring and Trench 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. UXO specialists will perform magnetometer surveys to detect metal objects in the path of trenching equipment until undisturbed soils are reached.

**Table 2-1**

**Toxicological and Physical Properties of Chemicals  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 5)

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Threshold (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
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
CNB/CNS [506-77-4]	?	?	Inh Con Abs	Irritated eyes, nose, and throat; headache, dizziness, dermatitis, cough, delayed pulmonary edema; weakness, vomiting.	Eye: Irrigate immediately Skin: Water wash immediately Breath: Respiratory support Swallow: Immediate medical attention			PEL TLV REL	ND
Decontamination Bleach, Super Tropical Bleach	?	?	Inh Ing Con Abs	Irritated eyes, mucous membranes, upper respiratory; mouth; eye, skin burns.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention	0.5 ppm 0.5 ppm		PEL TLV REL	ND
DS2	?	?	Inh Ing Con	Direct contact will corrode skin, cause corneal opacification, severe burns, and esophageal stricture; inhalation may cause CNS depression, liver damage, nausea, vomiting, and respiratory irritation.  Repeated skin and respiratory exposure can cause skin sensitization and asthma.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention. Give milk/water if conscious.	1 ppm 1 ppm 5.2 mg/m <sup>3</sup>	-- --	PEL TLV REL	

Table 2-1

**Toxicological and Physical Properties of Chemicals  
Chemical Warfare Material Sites  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 5)

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Threshold (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho-pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm 500 ppm	PEL TLV REL	?
n-Hexane [110-54-3]	10.18	65-248	Inh Ing Con	Lightheadedness; nausea, headache; numbness of the extremities, muscular weakness; irritation of the eyes and nose; dermatitis; chemical pneumonia; giddiness.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	50 ppm 50 ppm 50 ppm		PEL TLV REL	5,000 ppm
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43-200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, 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
Lead [7439-92-1]	NA	NA	Inh Ing Con	Weak, insomnia, facial pallor, constipated, abdominal pain, colic, anemia, irritated eyes, paralysis of wrists and ankles, encephalopathy.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	0.05 mg/m 0.05 mg/m 0.1 mg/m		PEL TLV REL	100 mg/m

Table 2-1

**Toxicological and Physical Properties of Chemicals  
Chemical Warfare Material Sites  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 5)

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Threshold (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
Methyl ethyl ketone [78-93-9]	9.54	2-85	Inh Ing Con	Irritated eyes and nose; headache, dizziness; vomiting.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Fresh air Swallow: Immediate medical attention	200 ppm 200 ppm 200 ppm	300 ppm 300 ppm	PEL TLV REL	3,000 ppm
Motor Oil [NA]	?	?	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention		500 ppm 500 ppm 500 ppm	PEL TLV REL	
Mustard gas, HD	?	0.0006 mg/m <sup>3</sup>	Abs Inh	Garlic-like odor. Eye and respiratory tract irritation; redness of skin and blisters develop 4 to 24 hours after the exposure; hoarseness, sore throat, coughing, pulmonary edema.	Treat like a thermal burn. Do not break blisters.  Eye: Irrigate immediately. Transfer to medical facility. Skin: Remove victim from area immediately. Flush skin and clothes with bleach within 1 minute. Cut and remove contaminated clothing, then wash skin again with bleach and then with soap and water. Transfer to medical facility. Breath: Remove from area immediately. Transfer to medical facility.		C0.003 mg/m <sup>3</sup>	AEL	0.5 mg/m <sup>3</sup>
Nitric acid [7697-37-2]	11.95	0.3-1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	4 ppm 4 ppm 4 ppm	PEL TLV REL	100 ppm
Portland cement			Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention		10 mg/m <sup>3</sup> 10 mg/m <sup>3</sup> / total dust 5 mg/m <sup>3</sup> respirable fraction	TLV PEL/REL	

Table 2-1

**Toxicological and Physical Properties of Chemicals  
Chemical Warfare Material Sites  
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 5)

Substance [CAS]	IP <sup>a</sup> (eV)	Odor Threshold (ppm)	Route <sup>b</sup>	Symptoms of Exposure	Treatment	TWA <sup>c</sup>	STEL <sup>d</sup>	Source <sup>e</sup>	IDLH (NIOSH) <sup>f</sup>
Sodium hydroxide [1310-73-2]	NA	NA	Inh Ing Con	Irritated nose; pneumonitis; burns eyes, and skin; temporary loss of hair.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention		C2 mg/m <sup>3</sup> C2 mg/m <sup>3</sup> C2 mg/m <sup>3</sup>	PEL TLV REL	250 mg/m <sup>3</sup>
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 <sup>3</sup> 1 mg/m <sup>3</sup> 1 mg/m <sup>3</sup>	3 mg/m <sup>3</sup>	PEL TLV REL	80 mg/m <sup>3</sup>

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

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

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

<sup>d</sup>STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.

<sup>e</sup>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. 1998).

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).

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.

Clayton, George D., Clayton, F. E., Patty's Industrial Hygiene and Toxicology, 3rd ed., John Wiley & Sons, New York.

Documentation of TLVs and BEIs, American Conference of Governmental Industrial Hygienists, 6th ed., 1998.

## Table 2-1

### Toxicological and Physical Properties of Chemicals Chemical Warfare Material Sites Fort McClellan, Calhoun County, Alabama

(Page 5 of 5)

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.  
Gemet, L. J. Van, Compilation of Odor Threshold Values in Air and Water, Supplement IV, CIVO, Netherlands, 1977.  
Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.  
Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.  
National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1998, National Institute for Occupational Safety and Health.  
Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.  
Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.  
Verschuseren, 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.

## **2.2 General Site Information**

**Location of Site.** Section 1.3 of the site-specific sampling and analysis plan gives site descriptions and locations of the Training Area T-38 sites.

**Duration of Planned Employee Activity.** Employee activity duration is 3 months.

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

### 3.0 Personal Protective Equipment

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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*
Conducting UXO surface surveys	Level D**
Conducting UXO downhole and trenching surveys	Modified Level D*
Installing monitoring wells	Modified Level D

\*The PPE level may be upgraded to Level C if air monitoring results in the worker's breathing zone (BZ) are greater than action levels or if contaminants are observed in the samples and the potential for personnel exposure is possible.

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

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

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

**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 (when 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.

**Level C.** Level C protection will not be used for activities other than those listed in the table on Page 4 unless air-monitoring data indicate the need for upgrade; however, the equipment shall be readily available on site. The following equipment will be used for Level C protection:

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

## 4.0 Site Monitoring

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The potential environmental contaminants of concern resulting from the Training Area T-38 investigation activities are distilled mustard, decontamination solutions supertropical bleach, decontamination agent, contamination solution number 2, carbon tetrachloride, sulfur trioxide-chlorosulfonic solution, phosgene, Sarin, and nerve agent. Table 4-1 contains action levels for site monitoring at the Training Area T-38 assessments.

Monitoring will be performed by the site safety and health officer during the performance of ground-intrusive operations. A calibrated photoionization detector 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 monitor will be utilized to monitor the sampling locations and BZs to determine if any combustible/flammable gases or oxygen levels may be present that would necessitate evacuating the site. Table 4-2 contains the air monitoring frequency and location for site monitoring during the Training Area T-38 area investigations.

**Unexploded Ordnance.** 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 excavate the immediate area and secure it.

**Table 4-1**

**Action Levels  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(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 hydrocarbons (VOH)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, upgrade to Level B.
Benzene	≥ 5 ppm in 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% lower explosive limit (LEL) < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for volatile organic compounds (VOC).

When in Level D Modified/D PPE

Analyte	Action Level	Required Action <sup>b</sup>
VOHs	≥ 5 ppm above background in BZ	Stop activities, suspend work activities for 15 to 30 minutes, if readings are sustained then upgrade to Level C PPE.
Benzene	1 ppm in BZ	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:** 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  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

When in Support Zone

Analyte	Action Level	Required Action
VOHs	$\geq 1$ 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 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  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
Fort McClellan, Calhoun County, Alabama**

Work Activity	Instrument	Frequency	Location
Staging equipment	OV Monitor	Initially for area	Breathing zone (BZ) of employees
Collecting samples	OV Monitor LEL/O <sub>2</sub> Monitor	Continuously Continuously As Needed	BZ of employees work area
Installing monitoring wells	OV Monitor LEL/O <sub>2</sub> Monitor BDT	Continuously Continuously As needed	BZ of employees work areas

OV = Organic vapor.

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

BDT = Benzene detector tube.

## **5.0 Activity Hazard Analysis**

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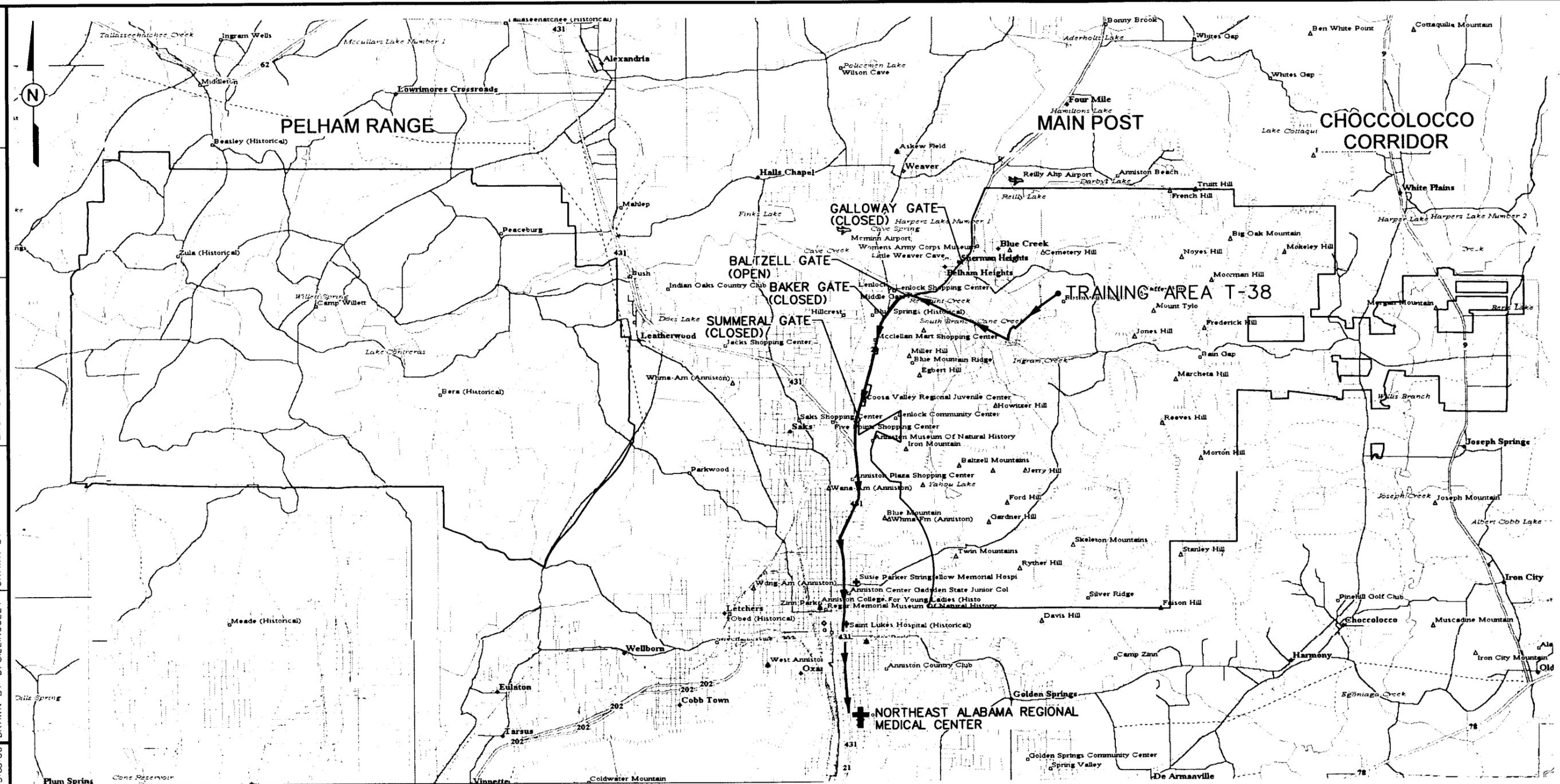
The attached activity hazard analysis (Table 5-1) is provided for the following activities:

- Setup of equipment and general field activities
- Soil and water sampling
- Install 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 1-2.

DWG. NO.: Y796887es.123  
 PROJ. NO.: 796887  
 INITIATOR: J. JENKINS  
 DRAFT. CHK. BY:  
 ENGR. CHK. BY: J. JENKINS  
 STARTING DATE: 08/16/00 DATE LAST REV.:  
 DRAWN BY: D. BILLINGSLEY DRAWN BY:  
 08/16/00 03:00:00  
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**LEGEND:**

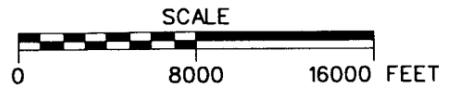
-  ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
-  U.S. HIGHWAY
-  HOSPITAL
-  INVESTIGATION SITES

**DRIVING DIRECTIONS FROM BALTZELL GATE ROAD TO THE NORTHEAST ALABAMA MEDICAL CENTER**

- LEAVING FORT MCCLELLAN ON BALTZELL GATE ROAD, TURN LEFT (SOUTH) ONTO AL HWY 21
- GO ~ 2.5 MILES WHERE AL HWY 21 MERGES WITH U.S. HWY 431 AND CONTINUE SOUTH
- CONTINUE SOUTH ON AL21/US431 FOR ~ 2.7 MILES
- TURN LEFT ONTO EAST 10th STREET
- GO ~ 0.2 MILE TO MEDICAL CENTER ON RIGHT
- PHONE NUMBER: (256)235-5121

**FIGURE 1-2  
HOSPITAL EMERGENCY ROUTE**

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



**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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"> <li>• Determine best access route before transporting equipment.</li> <li>• Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>• Continually inspect the work area for slip, trip, and fall hazards.</li> <li>• Look before you step; ensure safe and secure footing.</li> </ul>
	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.</li> </ul>
	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> <li>• Wear safety glasses/goggles; ensure that eye wash is in proper working condition.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> </ul>
	Cuts/bruises	<ul style="list-style-type: none"> <li>• Use cotton or leather work gloves for material handling.</li> </ul>
	Fire	<ul style="list-style-type: none"> <li>• Obtain hot work permit (per IT Procedure HS314[May 13, 1999]), for any operation that could act as an ignition source.</li> <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>
	Bees, spiders, snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet in concealed areas.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
Fort McClellan, Calhoun County, Alabama**

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Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Noise	<ul style="list-style-type: none"> <li>• Sound levels above 85 decibels (dBA) mandates hearing protection.</li> </ul>
	Lighting	<ul style="list-style-type: none"> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> </ul>
	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 liquids even when not thirsty.</li> <li>• Provide cool liquids 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, 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  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> <li>• Work area will be barricaded/demarcated.</li> <li>• Equipment will be laid out in an area free of traffic flow.</li> <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>
	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 device.</li> <li>• Electrical tools shall be inspected daily prior to use.</li> </ul>
	Extension cords	<ul style="list-style-type: none"> <li>• Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service.</li> <li>• Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic.</li> <li>• Cords shall be suspended with a nonconductive support (rope, plastic ties, etc.).</li> <li>• Cords shall be designed for hard duty.</li> <li>• Cords shall be inspected daily.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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Activity	Potential Hazards	Recommended Controls
Staging Equipment (continued)	Lightning strikes	<ul style="list-style-type: none"> <li>• Whenever possible, halt activities and take cover.</li> <li>• If outdoors, stay low to the ground.</li> <li>• Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground).</li> <li>• Seek shelter in a building if possible.</li> <li>• Stay away from windows.</li> <li>• If available, crouch under a group of trees instead of one.</li> <li>• Keep all body parts in contact with the ground as close as possible.</li> <li>• Remain 6 feet away from tree trunk if seeking shelter beneath tree(s).</li> <li>• If in a group, keep 6 feet of distance between people.</li> </ul>
	Thunderstorms, tornadoes	<ul style="list-style-type: none"> <li>• Listen to radio or TV announcements for pending weather information.</li> <li>• Cease field activities during thunderstorm or tornado warnings.</li> <li>• Seek shelter. Do not try to outrun a tornado.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• A UXO specialist will conduct a UXO surface survey prior to staging equipment.</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>
	Bees, spiders, snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet in concealed areas.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
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Activity	Potential Hazards	Recommended Controls
Surveying (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>
	UXO	<ul style="list-style-type: none"> <li>• A UXO specialist will conduct a UXO surface survey prior to staging equipment.</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>
Soil Boring and Surface/ Subsurface Sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Stop immediately at any sign of obstruction.</li> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
	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>

**Table 5-1**

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Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/ Subsurface Sampling (continued)	Contact with utilities	<ul style="list-style-type: none"> <li>• Obtain trenching/drilling permit (per IT Procedure HS316[May 10, 1995]) prior to conducting activities.</li> </ul>
	Bees, spiders, snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet in concealed areas.</li> </ul>
	Access/egress hazards	<ul style="list-style-type: none"> <li>• Use qualified and trained bushhog operator.</li> <li>• Keep employees out of the bushhog work area.</li> <li>• Utilize good housekeeping practices.</li> <li>• Keep 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 liquids even when not thirsty.</li> <li>• Provide cool liquids 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, 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  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/ Subsurface 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 laying on the ground).</li> <li>• Seek shelter in a building if possible.</li> <li>• Stay away from windows.</li> <li>• If available, crouch under a group of trees instead of one single tree.</li> <li>• Keep all body parts in contact with the ground as close as possible.</li> <li>• If in a group, keep 6 feet of distance between people.</li> </ul>
	UXO Accidental exposure to chemical agents	<ul style="list-style-type: none"> <li>• A UXO specialist will conduct a UXO surface survey prior to staging equipment.</li> <li>• Low-level minicam or Real-Time Analytical Platform (RTAP) monitoring will be performed by Quicksilver.</li> <li>• Modified Level D personal protective equipment (PPE) will be required.</li> <li>• During the first 15-foot depth of each monitoring well installation activity, downhole geophysics (inside of probed boring) will be performed.</li> <li>• Engineering controls will be used as appropriate.</li> <li>• Personnel will review site-specific evacuation procedures.</li> <li>• Personnel will be equipped with an emergency egress air supply pack.</li> </ul>
Groundwater Sampling and Measuring Water Levels	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with water.</li> <li>• Handle samples with care.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Use care when handling glassware.</li> <li>• Wear adequate hand protection.</li> </ul>
	Hazard communication	<ul style="list-style-type: none"> <li>• MSDSs shall be obtained for hazardous chemicals brought on site.</li> <li>• Label all containers as to contents and appropriate hazard warning.</li> </ul>

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**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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Activity	Potential Hazards	Recommended Controls
Groundwater Sampling and Measuring Water Levels (continued)	Strains/sprains	<ul style="list-style-type: none"> <li>• Use the proper tool for the job being performed.</li> <li>• Get assistance if needed.</li> <li>• Avoid twisting/turning while pulling on tools, moving equipment, etc.</li> </ul>
	Spills/residual materials	<ul style="list-style-type: none"> <li>• Absorbent material and containers will be kept available where leaks or spills may occur.</li> </ul>
	Lighting	<ul style="list-style-type: none"> <li>• Adequate lighting will be provided to ensure a safe working environment.</li> </ul>
	Unattended worker	<ul style="list-style-type: none"> <li>• "Buddy system" - visual contact will be maintained with the sampling technician during sampling activities.</li> </ul>
Surface Water/Sediment Sampling	Drowning	<ul style="list-style-type: none"> <li>• Personal flotation devices (PFD) will be provided and worn by workers over or near water where the danger of drowning exists.</li> <li>• PFDs shall be inspected prior to and after each use.</li> <li>• Detective PFDs will be tagged and removed from service.</li> <li>• Ring buoys with at least 90 feet of line shall be provided and readily available at locations where employees are working over or adjacent to water.</li> <li>• Use the "buddy system."</li> <li>• Personnel trained in launching and operating the skiff shall be readily available during work hours.</li> </ul>
	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination.</li> <li>• Avoid skin contact with water.</li> <li>• Handle samples with care.</li> <li>• Only essential personnel will be in the work area.</li> <li>• Real-time air monitoring will take place before and during sampling activities.</li> <li>• All personnel will follow good hygiene practices.</li> <li>• Proper decontamination procedures will be followed.</li> <li>• All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.</li> </ul>
Moving and Shipping Collected Samples	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>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep hands, fingers, and feet clear of moving/suspended materials and equipment.</li> <li>• Beware of contact points.</li> <li>• Stay alert at all times!</li> </ul>
	Cut hazards	<ul style="list-style-type: none"> <li>• Wear adequate hand protection. Use care when handling glassware.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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Activity	Potential Hazards	Recommended Controls
Moving and Shipping Collected Samples (continued)	Hazard communication	<ul style="list-style-type: none"> <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> <li>• Obtain hot work permit (per IT Procedure HS314 (May 13, 1999) for any operation that could act as an ignition source.</li> </ul>
High-Pressure Water Jetting Operations	Heavy lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques.</li> <li>• Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>• Good housekeeping shall be implemented.</li> <li>• The work area shall be kept clean as feasible.</li> <li>• Inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Fueling	<ul style="list-style-type: none"> <li>• Only approved safety cans shall be used to store fuel.</li> <li>• Do not refuel equipment while it is operating.</li> <li>• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.</li> </ul>
	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>

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**Activity Hazard Analysis  
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Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Out of control equipment	<ul style="list-style-type: none"> <li>• No machinery or equipment is permitted to run unattended.</li> <li>• Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Sound levels above 85 dBA mandates hearing protection by nearby site personnel.</li> </ul>
	Activation during repairs	<ul style="list-style-type: none"> <li>• All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• Keep feet and hands clear of moving/suspended materials and equipment.</li> <li>• Stay alert and clear of materials suspended .</li> </ul>
	Falling objects	<ul style="list-style-type: none"> <li>• Hard hats are required by site personnel.</li> <li>• Stay alert and clear of material suspended overhead.</li> </ul>
	Flying debris	<ul style="list-style-type: none"> <li>• Impact-resistant safety glasses with side shields are required.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>• All site personnel will wear the appropriate PPE.</li> </ul>
	Heat Stress	<ul style="list-style-type: none"> <li>• Comply with IT Procedure HS 400 (May 13, 1999)</li> <li>• Be aware of signs and symptoms. Observe work parties during likely heat/cold stress ambient conditions.</li> </ul>
Direct-Push Sampling/Monitoring Well Installation	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> <li>• All machinery or mechanized equipment will be inspected by a competent mechanic and certified to be 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> </ul>

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Activity	Potential Hazards	Recommended Controls
Direct-Push Sampling/Monitoring Well Installation (continued)	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	<ul style="list-style-type: none"> <li>• Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.</li> <li>• All mobile equipment and areas in which they are operated shall be adequately illuminated.</li> <li>• Whenever the equipment is parked, the parking brake shall be set.</li> <li>• Equipment parked on inclines will have the wheels chocked.</li> <li>• Inspect brakes and tire pressure on drill rig before staging for work.</li> <li>• Obtain trenching/drilling permit (per IT Procedure HS316 [May 10, 1995]), prior to operation.</li> </ul>
	Inexperienced operator	<ul style="list-style-type: none"> <li>• Machinery and mechanized equipment shall be operated only by designated personnel.</li> <li>• Heavy equipment operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgement.</li> </ul>
	Jacks/outriggers	<ul style="list-style-type: none"> <li>• Ensure proper footing and cribbing.</li> </ul>
	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>• Obtain a hot work permit (per IT Procedure HS314 [May 13, 1999]), for operations that could act as ignition sources.</li> <li>• Mechanized equipment shall be shut down prior to and during fueling operations.</li> <li>• Have fire extinguishers inspected and readily available.</li> </ul>
	Fall hazards	<ul style="list-style-type: none"> <li>• Personnel are not allowed to work off of machinery or use them as ladders.</li> <li>• Use fall protection when working above 6 feet.</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>• Hearing protection is mandatory above 85 dBA.</li> </ul>
	Contact with rotating or reciprocating machine part	<ul style="list-style-type: none"> <li>• Use machine guards; use long-handled shovels to remove auger cuttings.</li> <li>• Use safe lockout procedures for maintenance work.</li> </ul>
	Bees, spiders, snakes	<ul style="list-style-type: none"> <li>• Inspect work area carefully and avoid placing hands and feet in concealed areas.</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
Fort McClellan, Calhoun County, Alabama**

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Activity	Potential Hazards	Recommended Controls
Direct-Push Sampling/Monitoring Well Installation (continued)	Heavy lifting	<ul style="list-style-type: none"> <li>Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.</li> </ul>
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>Practice good housekeeping; keep work area picked up and clean as feasible.</li> <li>Continually inspect the work area for slip, trip, and fall hazards.</li> </ul>
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> <li>Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized.</li> </ul>
	Heat stress	<ul style="list-style-type: none"> <li>Be aware of signs and symptoms. Observe work parties during likely heat/cold stress ambient conditions.</li> <li>Comply with IT Procedure HS 400 (May 13, 1999).</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>A UXO specialist will conduct a UXO surface survey prior to staging equipment.</li> </ul>
	Accidental exposure to chemical agents	<ul style="list-style-type: none"> <li>Modified Level D personal protective equipment (PPE) will be required.</li> <li>During the first 15-foot depth of each monitoring well installation activity, downhole geophysics (inside of probed boring) will be performed.</li> <li>Engineering controls will be used as appropriate.</li> <li>Personnel will review site-specific evacuation procedures.</li> <li>Personnel will be equipped with an emergency egress air supply pack.</li> </ul>
Surveying for UXO	Slip, trip, and fall hazards	<ul style="list-style-type: none"> <li>Site workers will be required to wear safety glasses with side shields, and work boots when working in the field.</li> <li>Provide adequate lighting in all work areas.</li> <li>Flag or cover inconspicuous holes to protect against falls.</li> <li>Work areas will be kept clean and orderly.</li> <li>Tools and accessories will be properly maintained and stored.</li> </ul>
	Traffic accidents	<ul style="list-style-type: none"> <li>Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians.</li> <li>If working adjacent to roadways, have workers wear fluorescent orange vests.</li> <li>Use warning signs or lights to alert oncoming traffic.</li> <li>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 walking through the site in order to avoid encounters with animals.</li> </ul>
	Biological hazards	<ul style="list-style-type: none"> <li>When walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).</li> </ul>

**Table 5-1**

**Activity Hazard Analysis  
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)  
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(Page 13 of 13)

Activity	Potential Hazards	Recommended Controls
Surveying for UXO (continued)	Ticks	<ul style="list-style-type: none"> <li>• Wear light colored clothing (can see ticks better).</li> <li>• Mow vegetated and small brush areas.</li> <li>• Wear insect repellent.</li> <li>• Wear long sleeves and long pants.</li> <li>• Visually check oneself promptly and frequently after exiting the work area.</li> </ul>
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> <li>• Avoid plant areas if possible.</li> <li>• Wear long sleeves and long pants.</li> <li>• Promptly wash clothing that has contacted poisonous plants.</li> <li>• Wash affected areas immediately with soap and water.</li> </ul>
	UXO	<ul style="list-style-type: none"> <li>• UXO specialists will conduct UXO avoidance operations.</li> </ul>
	Confined space	<ul style="list-style-type: none"> <li>• Personnel shall not enter an excavation that may contain hazardous atmosphere; have the potential for engulfing an entrant; have internal configurations that could trap or asphyxiate an entrant; or contain any other recognized serious safety or health hazard without the completion of a confined space permit.</li> <li>• All entries into excavations which meet the definition of a confined space shall be done in accordance with IT Procedure HS300.</li> </ul>
	Oil spillage	<ul style="list-style-type: none"> <li>• Oil will be drained from the piping and placed in a recovery drain.</li> <li>• Oil absorbent pads will be placed under oil transfer points.</li> <li>• All spilled oil will be cleaned up immediately.</li> </ul>
	Ropes, slings, chains, and hooks	<ul style="list-style-type: none"> <li>• The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer.</li> <li>• Rigging equipment shall not be loaded in excess of its recommended safe working load.</li> <li>• The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling.</li> <li>• Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.</li> <li>• Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to insure that it is safe. Defective rigging equipment shall be removed from service.</li> <li>• Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored so as not to present a hazard.</li> <li>• Taglines shall be used to control the loads being handled by hoisting equipment.</li> </ul>