



**U.S. Army
Environmental
Center**

RI/FS HEALTH AND SAFETY PLAN

**FORT McCLELLAN, ALABAMA
TASK ORDER 005
Contract Number DAAA15-91-D-0017**

FINAL

Prepared for:

**U.S. Army Environmental Center
Installation Restoration Division
Aberdeen Proving Ground, Maryland 21010-5401**

April 6, 1994

SAIC
Science Applications International Corporation

**HEALTH AND SAFETY PLAN
FOR
FORT McCLELLAN RI/FS
ANNISTON, ALABAMA**

FINAL

Submitted to:

**U.S. Army Environmental Center
Installation Restoration Division
SFIM-AEC-IRB
Aberdeen Proving Ground, Maryland 21010-5401**

Submitted by:

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**USATHAMA Contract DAAA15-91-D-0017
Task Order 5**

SAIC Project No. 01-0827-03-6520-005

April 6, 1994

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EMERGENCY RESPONSE SUMMARY

It is the objective of this health and safety plan (HASP) to minimize chemical and physical hazards and operational incidents. The following information is provided to ensure that personnel respond to emergency situations in a calm, reasonable manner. The types of emergencies that could occur include the following:

- Heat stress illnesses
- Slips, trips, and falls
- Motor vehicle-related accidents/injuries
- Drill rig related injuries
- Snake, spider, scorpion or other contact
- Chemical contact and splashes
- Explosions.

Should an accident occur, the Site Health and Safety Officer (SHSO) will immediately notify the Fort McClellan Fire Department (Post extension 17 or 1-205-820-1117), investigate the cause, and complete an accident report. Accidents must be reported by telephone to USAEC Health and Safety Officer at (410) 671-4811, as soon as possible, but not later than two hours after occurrence and reported in writing within five days of occurrence. All other incidents must be reported by telephone to the USAEC at (410) 671-4811, within eight hours of occurrence, or sooner if conditions permit. SAIC is currently coordinating medic and medical evacuation (Med-evac) support with Post personnel for Range L (Lima Pond), Range J, and the Old Water Hole, because of the remote locations and disposal histories of these sites.

Table A and Figure 1 provide emergency information for personnel working at Fort McClellan. The quickest route from Fort McClellan to the Anniston Regional Medical Center is as follows:

Summerall Gate Road to Summerall Gate. After leaving the post turn left on McClellan Boulevard (State Highway 21 South) and follow it until it turns into Quintard Boulevard and intersects with 10th Street. Turn left (eastbound) on 10th Street, drive one block, and the hospital is on the right at the intersection of 10th Street and Leighton Ave.

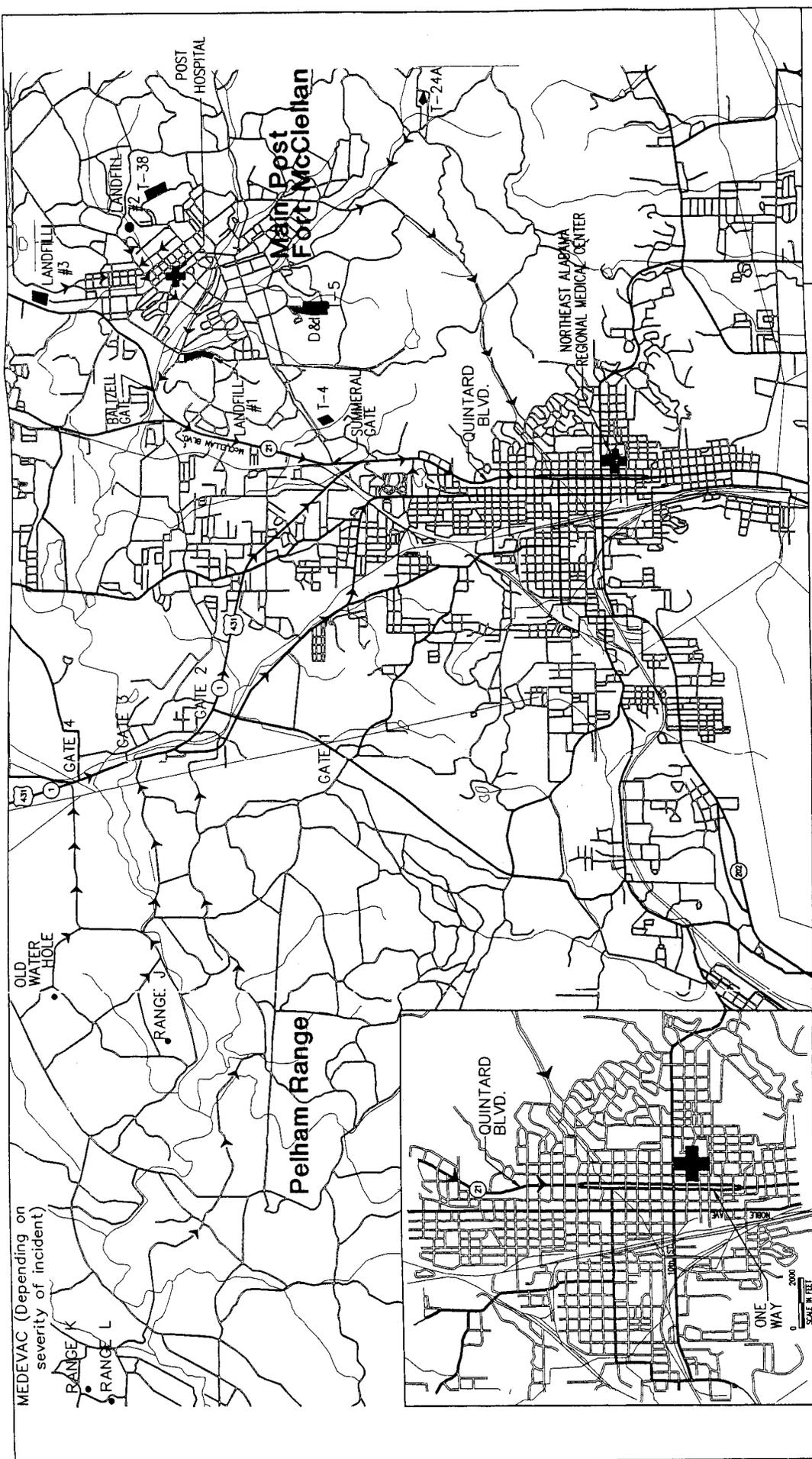
The quickest route from Pelham Range to the Regional Medical Center is shown on Figure 1 and is described as follows:

Use Gate 3 Road and proceed to Gate 3. After leaving the post, stay on Gate 3 Road to the intersection of Gate 3 Road and U.S. Highway 431/State Highway 1. Turn right (southbound) on U.S. Highway 431/State Highway 1 and follow it approximately 2 miles to the intersection of U.S. Highway 431/State Highway 1 and McClellan Boulevard (State Highway 21). Turn right (southbound) on McClellan Boulevard and follow it until it turns into Quintard Boulevard (approximately 2 miles). At the intersection of Quintard Boulevard and Tenth Street, turn left (eastbound) on Tenth Street, drive one block, and the hospital is on the right at the intersection of Tenth Street and Leighton Avenue.

Table A. Emergency Information

EMERGENCY RESOURCES:		
<i>Resource*</i>	<i>Post Telephone</i>	<i>Civilian Telephone</i>
Fort McClellan Military Police	ext. 5-3821	1-205-848-555
Fort McClellan Fire Department	ext. 17	1-205-820-1117
Fort McClellan Ambulance	ext. 12	1-205-848-2315
Post POC - Bill Garland	ext. 5-3728	1-205-848-3758
USAEC Safety and Environmental Services Branch - William P. Houser		1-301-671-4811 (Civ. Telephone)
PROJECT CONTACTS:		
<i>Contact</i>	<i>Office Telephone</i>	
Alfred Wickline - Program Manager	1-703-734-5514	
Robert Reisdorf - Corporate Safety	1-703-821-4634	
Christopher Manikas - Project Manager	1-703-827-4832	
MEDICAL SUPPORT:		
Any situations requiring medical attention will be handled at the Regional Medical Center.		
Telephone: 1-205-235-5121 Address: 400 East 10th Street, Anniston, Alabama		

* Emergency Resources will be notified in advance of planned SAIC field activities at Fort McClellan.

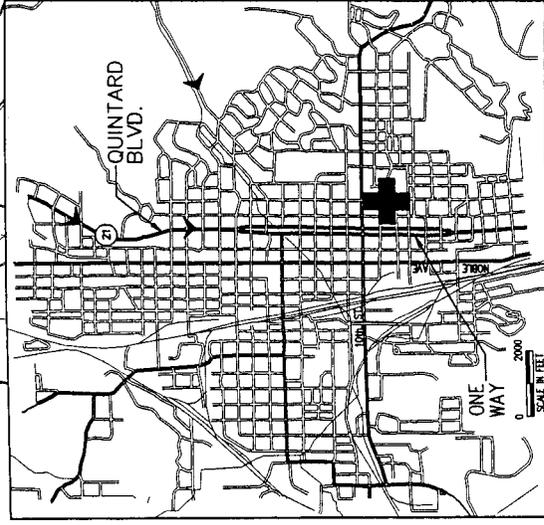


MEDEVAC (Depending on severity of incident)

RANGE K
RANGE L

OLD WATER HOLE

Pelham Range



U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

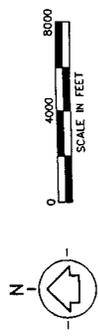
HOSPITAL EMERGENCY ROUTES

Fort McClellan RI/FS, Anniston, Alabama

Figure: 01 Project: 01-0827-03-6520-005

- LEGEND**
- U.S. HIGHWAYS
 - STATE HIGHWAYS
 - HOSPITALS
 - RI/FS Sites

FIRE DEPT. PHONE NUMBER:
(205) 848-5936



X

1. INTRODUCTION

This health and safety plan (HASP) for the planned remedial investigation (RI) at Fort McClellan, Alabama, documents the protocols to be implemented during field activities at the Post. A copy of the final HASP will be given to the U.S. Army Environmental Center (USAEC) Safety and Environmental Services Branch for final approval. Field work will not commence until all comments have been incorporated into the document or addressed in writing. This document is intended to complement a companion plan developed by the U.S. Army Technical Escort Unit (USATEU) for investigations at former chemical warfare agent (CWA) training areas and munitions disposal sites.

Due to the possibility of encountering chemical surety material (CSM) during the performance of this contract/task, Science Applications International Corporation (SAIC), the USAEC project office, and the USAEC Safety and Environmental Services Branch will coordinate CSM sampling support with the USATEU and the installation safety and surety offices. This contract is not a CSM contract, nor is SAIC certified to handle CSM; therefore, every effort will be made to preclude SAIC personnel from encountering CSM. In addition, every reasonable effort will be taken to minimize the risk of contact and exposure of site personnel to CSM. SAIC will not perform intrusive work within areas known or suspected to be contaminated by CSM.

1.1 SCOPE AND APPLICABILITY

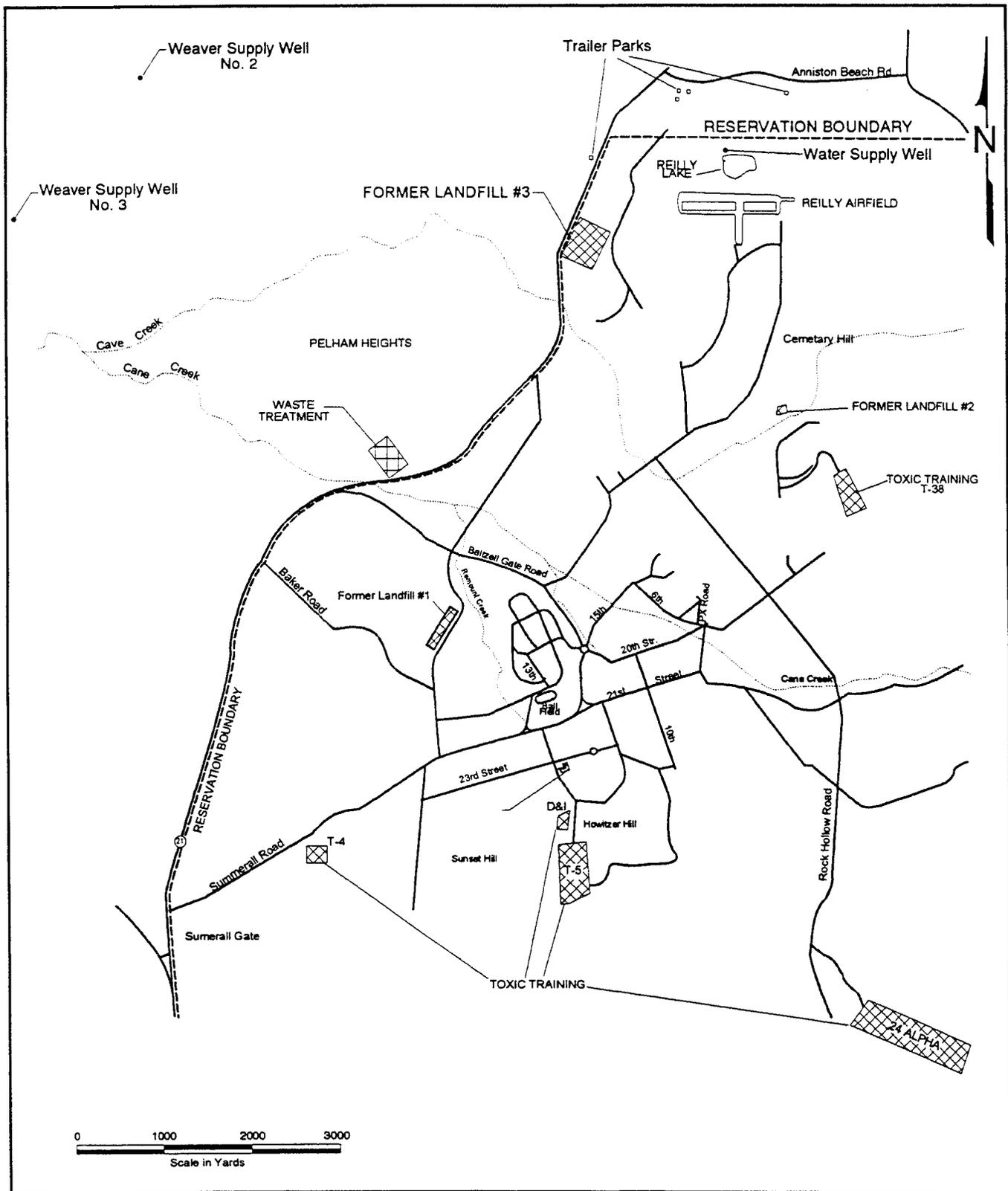
SAIC is conducting a remedial investigation/feasibility study (RI/FS) at 12 sites located on Fort McClellan, Alabama. The purpose of the investigation is to determine the nature, extent, and potential ecological and human health impacts of environmental contamination resulting from controlled U.S. Army chemical warfare agent training activities and uncontrolled munitions and municipal waste disposal historically conducted at the sites. Assessment of the sources of potential contamination, delineation of the areal extent of detected contamination, detailed geologic/hydrogeologic characterization of several of the sites, and site remediation are additional objectives of the RI/FS. The sites to be investigated are summarized in Table 1-1 and include seven former training areas (T-4, T-5, T-24A, T-38, Range J,

**Table 1-1. Sites to be Investigated Under RI/FS Program,
Fort McClellan, Alabama**

Site	Location
Detection and Identification Area (USATEU)	Main Post
Area T-4 Biological Simulant Test Area (USATEU)	Main Post
Area T-5 Toxic Hazards Detection and Decontamination Training Area (USATEU)	Main Post
Area T-24A Chemical Munitions Disposal Training Area (USATEU)	Main Post
Area T-38 Technical Escort Reaction Area (USATEU and SAIC)	Main Post
Range J Agent Training Area (USATEU)	Pelham Range
Range K Agent Training Area (USATEU)	Pelham Range
Range L (Lima Pond) Chemical Munitions Disposal Area (USATEU and SAIC)	Pelham Range
Old Water Hole (USATEU and SAIC)	Pelham Range
Former Landfill #1 (SAIC)	Main Post
Former Landfill #2 (SAIC)	Main Post
Former Landfill #3 (SAIC)	Main Post

Range K, and Detection and Identification [D&I] Area), two former munitions disposal sites (Old Water Hole and Range L [Lima Pond]), and three former municipal or demolition debris landfills (Former Landfills #1, #2, and #3). These areas are shown on Figures 1-1 and 1-2. The work to be conducted at Fort McClellan will be completed at the request of USAEC pursuant to Contract DAAA15-91-D-0017, Task Order 5. Field work for the project will be conducted jointly by SAIC and USATEU.

RI/FS activities will follow site-specific health and safety requirements that were developed for Fort McClellan. This plan is complemented by safety and emergency contingency plans prepared by the U.S. Army at Fort McClellan and by health and safety plans prepared by the USATEU for sampling to be conducted at suspected chemical surety and munitions sites. The SAIC Health and Safety Plan is prepared in accordance with the requirements of 29 CFR 1910.120, the SAIC Health and Safety Program for Hazardous Waste Projects, and the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01

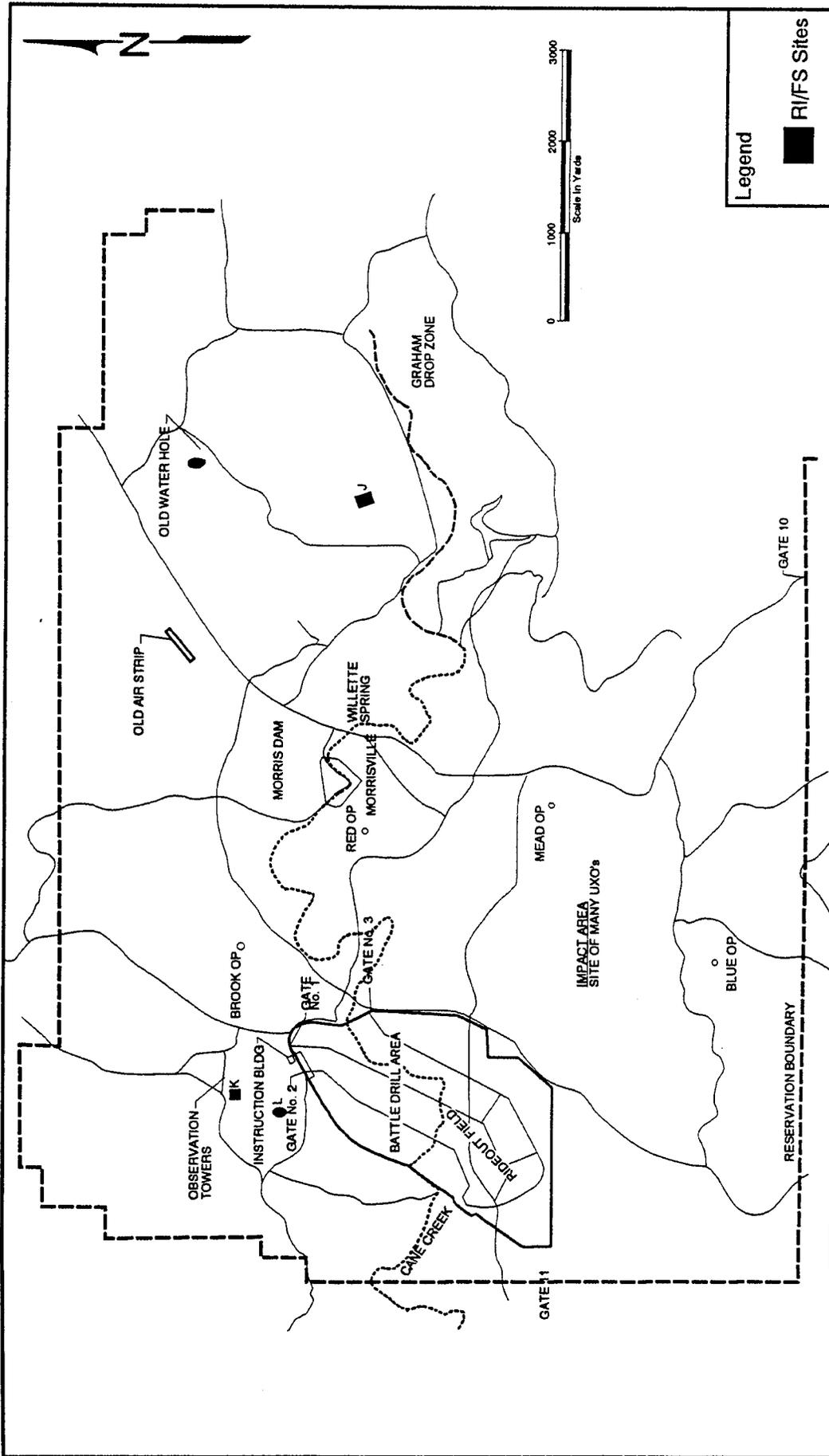


**SITE LOCATION : MAIN POST
FORT McCLELLAN, ALABAMA**

**Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland**



Figure 1-1



**SITE LOCATION MAP - PELHAM RANGE
FORT MCCLELLAN RI/FS**

Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland



Figure 1-2

All SAIC, U.S. Army, and subcontractor personnel performing field activities will be provided a copy of this Plan and will be required to follow its protocols. SAIC claims no responsibility for use by others. The Plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if conditions change.

1.2 PROJECT WORK SCOPE OVERVIEW

The principal field investigation tasks for the RI at Fort McClellan include planning, field sampling, hydrogeologic characterization, geophysical surveying, MINICAMS screening, and land surveying. The techniques and procedures to be used during this effort are outlined below and will utilize guidance provided in the *Geotechnical Requirements for Drilling, Monitor Wells, Data Acquisition, and Reports* (USATHAMA 1987), the *Compendium of Superfund Field Operations Methods* (USEPA 1987), and the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA 1988). Detailed operating procedures, sample and survey locations, and quantitative data management information is provided in the project Sampling and Analysis Plan.

Upon acceptance and approval of project plans by USAEC and the Alabama Department of Environmental Management (ADEM), USATEU and SAIC will commence field activities at Fort McClellan. Investigation activities will include aerial photography and field reconnaissance, screening level surveys, field sampling, and monitoring well installation and sampling. Table 1-2 summarizes the RI tasks to be conducted at each site.

Chemical agents and decontaminants formerly used at the sites included mustard (HD), the nerve agents O-ethyl-S(diisopropylaminoethyl)-methylphosphonothiolate (VX) and Sarin (GB), and the biological simulants *Bacillus globigii* (BG), *Serratia mercesans* (SM), DS-2 (70 percent diethylenetriamine, 2 percent sodium hydroxide, and 28 percent ethylene glycol monomethyl ether), and supertropical bleach (STB). Material safety data sheets for these agents are provided in Appendix A.

**Table 1-2. Summary of Remedial Investigation Tasks
Fort McClellan, Alabama**

Site No.	Site Name	SI Field and Laboratory Results	RI/FS Activities
1	Area T-4	<ul style="list-style-type: none"> Unable to locate site 	<p>Research site location using historical coordinates and aerial photography. Conduct additional field reconnaissance of site. Collect soil samples for analysis for MINICAMS analysis for CWA and laboratory analysis for CWA breakdown products.</p>
2	Area T-5	<ul style="list-style-type: none"> HD, GB, VX chemical agent, agent breakdown products not detected at 5 locations 	<p>Surface soil MINICAMS screening for CWA. Laboratory analysis for CWA breakdown products.</p>
3	Area T-24A	<ul style="list-style-type: none"> HD, GB chemical agent, agent breakdown products not detected at 3 locations 	<p>Delineate pit boundaries and possible ordnance geophysically; Surface soil MINICAMS screening; possible excavation in pit area; laboratory analysis of soil for CWA breakdown products.</p>
4	Area T-38	<ul style="list-style-type: none"> HD, GB VX chemical agent, agent breakdown products not detected at 4 locations 	<p>Locate disposal sump possible buried drums; Surface soil MINICAMS screening for CWA; drill soil boring in pit area; install 4 groundwater monitoring wells.</p>
5	Range K	<ul style="list-style-type: none"> HD, GB, VX chemical agent, agent breakdown products not detected at 1 location 	<p>Additional site reconnaissance for CWA ordnance; Surface soil MINICAMS screening for CWA; Laboratory analysis for CWA breakdown products.</p>
6	Range J	<ul style="list-style-type: none"> HD chemical agent, agent breakdown products not detected at 4 locations 	<p>Assess site geophysically for additional burials; MINICAMS screening for CWA; additional laboratory analysis for CWA breakdown products; test pit excavations.</p>
7	Range L	<ul style="list-style-type: none"> Samples not collected; metal detection indicates possible munitions burials at site 	<p>Install 7 monitoring wells; investigate pond area geophysically; Surface soil and groundwater MINICAMS screening for CWA; Laboratory analysis for CWA breakdown products; topographic surveying.</p>
8	Detection and Identification Area	<ul style="list-style-type: none"> HD, GB chemical agent, agent breakdown products not detected at 2 locations 	<p>Surface soil MINICAMS screening; Laboratory analysis for CWA breakdown products; possible excavation at site.</p>
9	Former Landfill 1	<ul style="list-style-type: none"> Magnetometer survey indicates potential ground disturbance 	<p>Additional geophysical surveying in southern portion of site; possible monitoring well installation (4), sampling, and analysis.</p>

**Table 1-2. Summary of Remedial Investigation Tasks
Fort McClellan, Alabama (continued)**

Site No.	Site Name	SI Field and Laboratory Results	RI/FS Activities
10	Former Landfill 2	<ul style="list-style-type: none"> Organics, inorganics, agent breakdown products not detected in groundwater 	Groundwater and surface water/sediment sampling and analysis.
11	Former Landfill 3 (OLF)	<ul style="list-style-type: none"> Organic and inorganic contamination detected in groundwater at site; explosive compounds detected in groundwater 	<p>Install 9 additional wells; Delineate extent of groundwater contamination; hydrogeology; groundwater and surface water/sediment sampling; laboratory subsurface soil analysis for contaminants of concern.</p>
12	Old Water Hole	<ul style="list-style-type: none"> Magnetometer survey indicates substantial quantities of buried material 	<p>Investigate site using quantitative geophysics; install five perimeter groundwater monitoring wells; assess CWA surface soil contamination using MINICAMS screening and laboratory analyses; topographic mapping.</p>

1.3 SITE DESCRIPTIONS

Fort McClellan is located in northeastern Alabama near the cities of Anniston and Weaver in Calhoun County, as shown in Figure 1-3. The Post is approximately 60 miles northeast of Birmingham and approximately 75 miles northwest of Auburn, Alabama, approximately 95 miles from Atlanta, Georgia. Fort McClellan consists of three main bodies of government-owned and leased land situated in the foothills of the Appalachian Mountains of northwest Alabama. The Main Post is bounded on the east by the Choccolocco Corridor, which connects the Post with Talladega National Forest. The Choccolocco Corridor is leased from the State of Alabama and designated for bivouac maneuvers by foot troops, wheeled vehicles, and tracked vehicles. The Morrisville Maneuver Area (Pelham Range) is located approximately 5 miles due west of the main installation, and adjoins the Anniston Army Depot on the southwest. Pelham Range is bordered on the east by U.S. Highway 431. A property summary is provided in Table 1-3.

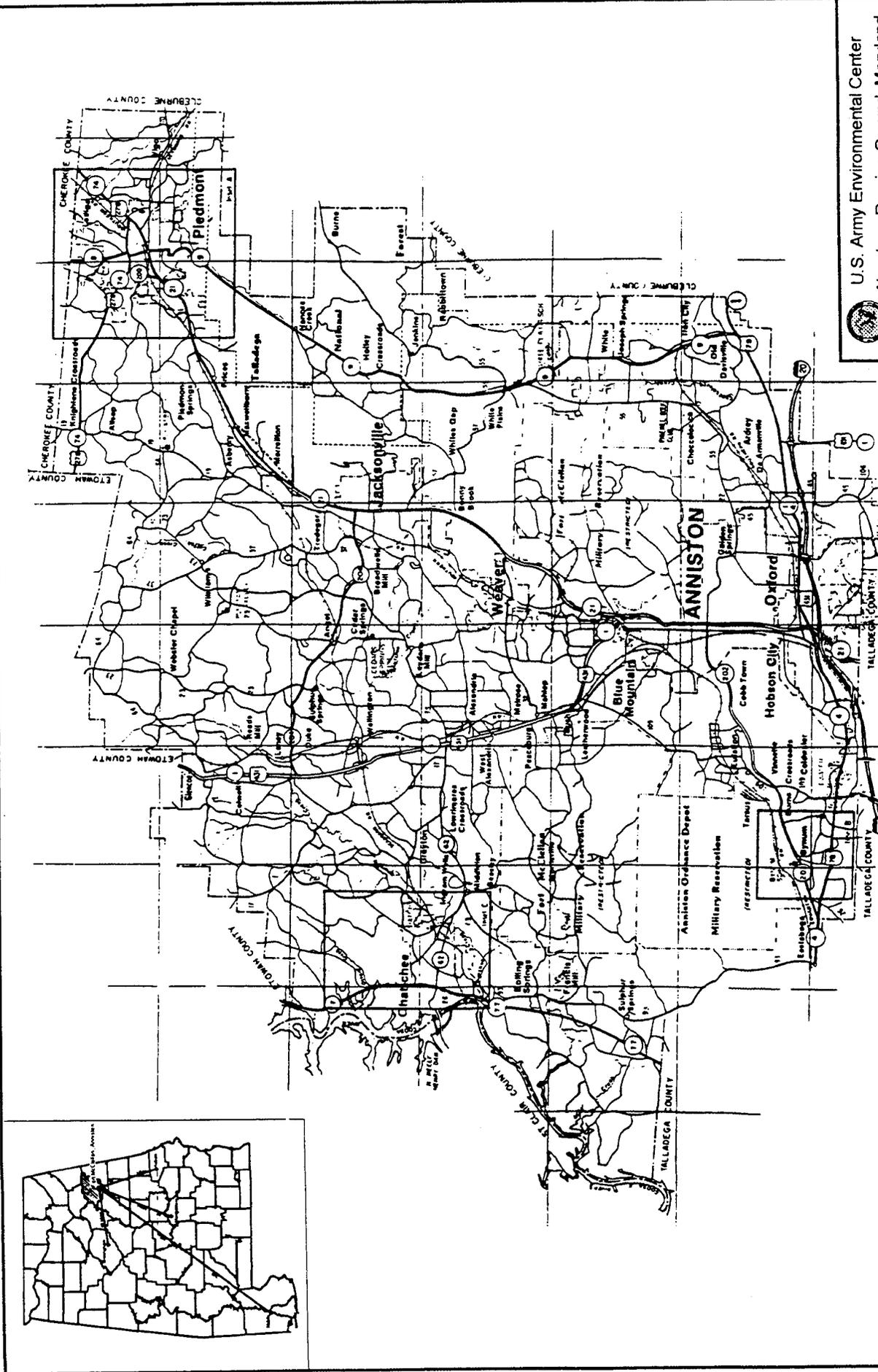
Fort McClellan is under the jurisdiction of the U.S. Army Training and Doctrine Command (TRADOC). The installation houses three major organizations, including the U.S. Army Military Police School, the U.S. Army Chemical School, and the Training Center (under the direction of the Training Brigade), in addition to other major support units and tenants.

1.3.1 Site 1 - Area T-4

Site 1 - Area T-4 was reportedly a Biological Simulant Test Area located on the Main Post. Records indicate that a 0.25-acre site was used between 1965 and 1971 for biological simulant (BG and SM) training. Decontamination of the simulants on the surface soils was performed by adding STB and DS-2.

1.3.2 Site 2 - Area T-5

Site 2 - Area T-5 is the Toxic Hazards Detection and Decontamination Training Area and is located between Sunset Hill and Howitzer Hill. The 11.4-acre wooded site was used between 1961 and 1973 to train students in the methods of detecting and decontaminating toxic agents, including HD, GB, and VX. The quantities of agent used for training purposes ranged from 20




U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

Site Location Map

Fort McClellan RI/FS, Anniston, Alabama

Figure 1-3 Project: 01-0827-03-6520-004



Table 1-3. Property Information Summary

Name:	Fort McClellan and Pelham Range
FFID:	AL-2137-20562
Property Number:	1102
Command:	U.S. Army Training and Document Command
County:	Calhoun, Alabama
Property Description:	Fort McClellan consists of three components: the Main Post, Choccolocco Corridor, and Pelham Range. The Main Post adjoins the city of Anniston on the south and west. It is bounded on the east by the Choccolocco Corridor, which connects the post with Talladega National Forest. Pelham Range is located approximately 5 miles due west of the Main Post.
Post Coordinates:	33° 42'N; 85° 47'W
Size:	45,679 acres total (18,946 acres Main Post, 4,488 acres Choccolocco Corridor, and 22,245 acres Pelham Range)
Mission:	Fort McClellan's primary mission is to provide command and support for the U.S. Army Military Police and Chemical Schools/Training Centers, the Training Brigade, and other units, as specified by higher headquarters.
Operations:	Activities at Fort McClellan can be divided into three categories: support activities, academic training, and practical training. Support activities include housing, feeding, and moving individuals during training. Academic training includes classroom, laboratory, and field instruction. Practical training encompasses weapons, artillery and explosives, vehicle operation and maintenance, and physical and tactical training activities.

to 40 milliliters per exercise. The training sites were decontaminated and checked at the end of each exercise. Decontamination of the agents on residual soils was performed by adding STB and/or DS-2. In addition to HD, GB, and VX used during training, Site 2 may have been the location of a 110-gallon HD spill. Available evidence indicates that the contaminated soil was chemically decontaminated, removed, and ultimately disposed of at Range J (Pelham Range).

1.3.3 Site 3 - Area T-24A

Site 3 - Area T-24A was a Chemical Munitions Disposal Training Area located on the Main Post south of Holloway Hill. The 1.5-acre site was used until 1973 for chemical munitions disposal training with CG, BZ, GB, and HD. During each training exercise, approximately 4.46 kilograms of HD reportedly were used; however, first hand observers reported that as much as 2 gallons of HD was poured on six howitzers and later on armored personnel carriers during training exercises. In addition, 40 milliliters of CG, one M-6 canister of BZ, and 740 grams of GB were used per exercise. Two square burning pits, each 16 feet on a side, were used for training exercises and were enclosed by a fenced area measuring 40 by 80 meters. The depths of the pits are unknown; however, standard operating procedures (SOPs) recommended a depth of 6 feet. At closure, the pits reportedly were filled with soil, although some depressions were observed in 1988. Decontamination of agents on residual soils was performed with STB and DS-2. A large HD spill may have occurred at this site, but this has not been confirmed. The agents HD, CG, BZ, and GB were not detected in the surface samples collected by the U.S. Army in April and July 1973 in the proximity of the pits.

1.3.4 Site 4 - Area T-38

Site 4 - Area T-38 (Technical Escort Reaction Area, formerly Old Toxic Agent Yard) is located on the Main Post west of Reservoir Hill. The 6-acre site was used between 1961 and 1972 for training escort personnel in techniques of eliminating toxic hazards caused by mishaps to chemical munitions during transport. The area also was used to store, demonstrate, and dispose of toxic agents and munitions, including GB, VX, and HD. In addition, unspecified decontaminants (likely STB, DS-2, and DANC) were stored on at least two sites and were used for demonstration purposes and were disposed of onsite. Extensive decontamination was conducted at this site for reported spills and contaminated training aids. Liquid materials,

including tetrachloroethane, were poured into an unlined pit (sump). The former disposal sump area was approximately 10 by 20 by 10 feet and reportedly was used to dispose of decontaminants and other hazardous wastes at the site. The sump was approximately located in the field during the April 1992 site visit (G. Harvey, oral communication). In addition, there is an unconfirmed report of the burial of a drum of chemical agent (mustard) in the southern portion of the site; however, efforts to determine the precise location of the drum were unsuccessful.

1.3.5 Site 5 - Range K

Site 5 - Range K was a 2-acre Agent Training Area located on Pelham Range. Limited information on the site is available, including time of operation and agents used. A reported shell tapping area where rounds were opened and decontaminated was operated in Range K prior to 1961 through the summer of 1963. During training exercises, breaking open one 55-mm round of HD, one 105-mm round of GB, and one 4.2-mortar round of CG was standard practice (G. Harvey, written communication). The identified site has been physically rearranged (bulldozed) and records indicate that the area was cleared for surface usage in 1967. Spent 105-mm GB and 155-mm HD rounds and DS-2 cans were observed by USAEC beyond the tree line in November 1992 (T. Perry, written communication).

1.3.6 Site 6 - Range J

Site 6 - Range J was an Agent Training Area located on Pelham Range. The 50 by 139 meter fenced area was used until 1963 for training and agent disposal. The agents used at the site are unknown, but are believed to be HD. The site also was reportedly used for disposal of a 110-gallon HD spill that occurred on the Main Post in 1955. Evidence of drummed soil disposed of in a surface pit at the site was observed during the October 1991, April 1992, and September 1993 site walkovers.

1.3.7 Site 7 - Detection and Identification Area

Site 7 - Detection and Identification (D&I) Area is located on the Main Post. The 1.1-acre site was used from the 1950's to 1972 for GB training. The Navy may have used HD at

the site in the late 1950's for training purposes. Training routinely consisted of application of test kits to detect and identify agents contained in 40-milliliter vials. Agents often were mixed as a 10 percent solution with water. The agent simulants CK, GC, CX, and AC also were reportedly used in the training area. All training aids from this site and a building from Area T-4 were burned twice in a dug pit and buried. The remains are reportedly still located in the pit. The pit containing the burned materials is identified by stake F, which was located during the October 1991 walkover.

1.3.8 Site 8 - Range L (Lima Pond)

Site 8 - Range L was a Chemical Munitions Disposal Area located on Pelham Range. The 0.5-acre site reportedly was used to dispose of captured World War II munitions, including chemical munitions. According to Post personnel, a shallow man-made pond (Lima Pond) was used as a dump site for the munitions. The pond is within a bermed area that is approximately 15 feet higher topographically than the surrounding wooded terrain. The pond is estimated to be approximately 30 feet deep from the top of the berm, although the actual depth of potential burials below the pit bed is unknown.

1.3.9 Site 9 - Former Landfill #1

Site 9 - Former Landfill #1 reportedly operated as the Post sanitary landfill between 1945 and 1947. The assumed site covers approximately 2 densely wooded acres and is located between 16th Avenue and Avery Drive adjacent to the floodplain of an unnamed intermittent stream draining into Remount Creek. The site slopes to the southeast toward 16th Avenue. No information exists concerning the operation or content of the landfill. Known or suspected releases have not been documented and evidence of releases (leachate seeps) was not observed during the site preliminary assessment (PA) (USATHAMA 1990) or the October 1991 site visit. Aerial photographs of the site dated 1944 suggest that portions of the area may have been cleared, although the purpose for the clearing is unknown. A site walkover in October 1991 showed no evidence of previous landfilling at this location.

1.3.10 Site 10 - Former Landfill #2

Site 10 - Former Landfill #2 reportedly was used as the Post sanitary landfill after the closure of Former Landfill #1 and was active from 1947 to an unknown date. The landfill covers approximately 4 acres and is located west of the southern tip of Cemetery Hill, between 2nd Avenue and 10th Street. This site is heavily wooded and is located in the floodplain of Cave Creek, which is an intermittent stream flowing south-southeast of the landfill. Shallow weathered bedrock was observed in the creek bed. The landfill reportedly was used to dispose of waste during deactivation of the installation. Rusted drums, metal, small containers (5-gallon cans and bottles), assorted building materials, and machinery parts were observed at the site in October 1991. Known or suspected releases have not been documented and evidence of releases (leachate seeps) was not observed during SAIC's October 1991 site visit. Demolition debris (i.e., asphalt, concrete, glass) was exposed at the landfill by road-building operations during the 1992 site investigation (SI).

1.3.11 Site 11 - Former Landfill #3

Site 11 - Former Landfill #3 was the Post sanitary landfill in operation between 1946 and 1967. The landfill was operated using the trench and fill method, with trenches trending northwest to southeast. Traces of the trenches due to settling over the old landfill cells have been noted in the past and were observed during the SI field work. These trenches also have been observed on high altitude aerial photographs. The linear depressions probably result in the ponding of water and accelerate leachate generation. The landfill covers approximately 22 wooded acres and is located east of State Route 21 and north of Cane Creek. This location is northwest of and adjacent to active Sanitary Landfill #4. Access to the landfill area is obtained along unpaved perimeter roads.

1.3.12 Site 12 - Old Water Hole

Site 12 - Old Water Hole is a site located between New Mt. Sellers Cemetery and the prisoner of war (POW) camp on Pelham Range that possibly was used for the disposal of a variety of munitions, including chemical agents. The site is possibly a sinkhole, which would not have any release controls. A rectangular, shallow, topographic depression approximately

35 by 85 feet was located by Fort McClellan Department of Environmental Management personnel in the approximate area between the cemetery and the POW camp. An additional circular depression was located near the main depression in this area. Fort McClellan personnel indicate that the depression periodically fills with water, although it was dry during SAIC's October 1991 site visit. The depression was under water during SAIC's April 1992 site visit. Several small-caliber bullet shells were found at the site.

1.4 SITE HISTORY

Historical information regarding the activities conducted at the sites to be investigated under the RI/FS program has been obtained from USATHAMA (1990) and Environmental Science and Engineering (1984). This information is summarized in Table 1-4.

The chemical and biological agent training sites under investigation during the SI were used for the controlled training of personnel in various facets of chemical and biological warfare decontamination, detection, and munitions/agent disposal. Training at these sites occurred at various times between the early 1950's and 1973, with operations involving various agents, some of which may have been used on the individual sites. Limited, controlled usage of fixed quantities of chemical warfare agent was typical during the training exercises. Usage included establishing of identification stations where agent samples were set up for field identification, in addition to contaminating field equipment with limited quantities of agent for identification and decontamination training. SAIC did not identify evidence of widespread dispersal or usage of training materials at the sites of concern based on review of records at the U.S. Army Chemical Museum at Fort McClellan and discussions with site personnel who were present during the training exercises. The chemical agents included mustard (HD), the nerve agents O-ethyl-S(diisopropylaminoethyl)-methylphosphonothiolate (VX) and Sarin (GB), and the biological simulants *Bacillus globigii* (BG) and *Serratia mercesans* (SM). HD is the predominant agent thought to have been used at Fort McClellan. HD readily undergoes hydrolysis to form thiodiglycol, a relatively nontoxic compound. The HD also may polymerize on its surface in aqueous situations to form a protective insoluble coat, thus inhibiting further hydrolysis.

**Table 1-4. Summary of Previous Remedial/Removal Actions
RI/FS Sites, Fort McClellan, Alabama**

Range	Site Size	Probable Date Opened	Last Used	Agents Used	Process and Waste Disposal History
T-4	0.3 acres	1965	1971	BG, SM, HD**, VX**	Decontamination of agents and surface soils using STB and DS-2. Surface soil sampling and analysis.
T-5	11.4 acres	1961	1973	HD, GB, VX, BG, SM	Training sites decontaminated and tested at end of each exercise, using STB and/or DS-2. Contaminated soil possibly removed and disposed of at Range J. Surface and subsurface soil sampling and analysis for CWA and CWA breakdown products.
T-24 Alpha	1.5 acres	Unknown	1973	HD, GB*	Pits filled with soil. Decontamination of agents on soils using STB and DS-2. Surface and subsurface soil sampling and analysis for CWA and CWA breakdown products.
T-38	6.0 acres	1961	1972	HD, GB, VX	Extensive decontamination for reported spills and contaminated training aids. Surface and subsurface soil sampling and analysis for CWA and CWA breakdown products. Electromagnetics surveys.
Pelham Range K	2.0 acres	Unknown	Unknown	HD**	Site was physically rearranged (bulldozed). Surface monitoring conducted. HD, GB rounds, DS-2 cans observed on site.
Pelham Range J	0.1 acres	Unknown	1963	HD**	Surface and subsurface soil sampling and analysis for CWA and CWA breakdown products.
Detection and Identification	1.1 acres	Early 1950s	1973	HD, GB*	Decontaminants STB and DS-2 used on surface soils. Training aids burned in open, onsite pit and subsequently buried. Surface and subsurface soil samples analyzed for CWA and CWA breakdown products.
Pelham Range L	0.5 acres	Unknown	Unknown	HD**	Sampled and analyzed surface water and soil samples for CWA.
Former Landfill 1	2 acres	1945	1947	None	Magnetometer survey over site area. Visual inspection.
Former Landfill 2	4 acres	1947	Unknown	None	Groundwater sampling and analysis for VOC's, SVOC's, pesticides/PCB's, metals; 3 wells installed around site perimeter.
Former Landfill 3	22 acres	1946	1967	None	Groundwater sampling and analysis for VOC's, SVOC's, pesticides/PCB's, metals; 10 wells installed around site perimeter.
Old Water Hole	2,975 sq ft	Unknown	Unknown	Unknown	USATEU metal detection survey.

* Other simulants also used

** Assumed HD or VX used

BG Bacillus Gobi

CWA Chemical Warfare Agent

SM Serratia Marcescens

STB Supertropical Bleach

Reference: Solid Waste Study No. 99-056-73/76, Fort McClellan, AL, Jul 73-Aug 75

The potential persistence of subsurface contamination in soils and groundwater for these agents, agent degradation byproducts, decontaminant DS-2 (70 percent diethylenetriamine, 2 percent sodium hydroxide, and 28 percent ethylene glycol monomethyl ether) and supertropical bleach (STB) constituents, and byproducts from the reactions of agent with decontaminants has been evaluated (Small 1983). Based on the solubility, volatility, toxicity, and formation potential of the compounds evaluated, it was concluded that the only toxic compounds likely to persist in the subsurface soils at Fort McClellan are HD and bis(2-diisopropylaminoethyl) disulfide (DES)₂. The latter compound is the principal byproduct formed from the decontamination of VX with DS-2. The limited quantities of VX used on these sites essentially eliminates the potential for sufficiently large quantities of DES₂ to be of significance as environmental contaminants.

Based on similar considerations, it was concluded that the only toxic compounds associated with chemical warfare agents and their decontaminants with potential to persist in groundwater are divinyl sulfide (DVS), mustard sulfoxide (HO), DES₂, and S-(diisopropylaminoethyl) methylphosphonothioate (DESMP). Divinyl sulfide is formed from the alkaline hydrolysis of HD with DS-2, and HO is formed from the oxidation of HD with STB. The DESMP is formed from the hydrolysis of VX. Although the potential exists for these compounds to be present in groundwater, it is unlikely that they will be detected due to the limited quantities of agents used and decontaminated during training exercises. Several chemical agents/decontaminants were used in great quantities in the 1950's and 1960's, principally at Area T-38 (G. Harvey, written communication). The decontaminant DANC (6.25 percent solution of RH 195 in acetylene tetrachloride, RH 195-1,3-dichloro-5,5-dimethylhydantoin) was used extensively for mustard agents prior to the usage of DS-2. The chemicals FS (sulphur trioxide-chlorosulfonic acid) and CNB (chloroacetophenone solution [chloroacetophene in benzene and carbon tetrachloride]) also were widely used at the time.

Disposal inventories for the munitions burial sites and the former municipal/demolition debris landfills are not available. The buried munitions may include the remains of captured World War II chemical or conventional armaments. Chemicals of concern for these sites include explosives, chemical warfare agent and its breakdown products, decontaminant compounds, heavy metals, and degreasing compounds. Similarly, disposal inventories are not available for

buried municipal wastes; therefore, precise accountings of the contents of the former landfills is not possible.

1.4.1 Environmental Contamination

Previous studies have been conducted at the RI/FS sites with minimal detection of chemical contamination. MINICAMS field screening for chemical warfare agents (i.e., GB, HD, and VX) in soil, sediment, and water samples collected from high probability locations within the former chemical training areas did not detect agent in concentrations exceeding established time-weighted average (TWA) values or site background for these compounds (SAIC 1992). Laboratory analysis of the screened samples for agent breakdown products yielded nondetect results. However, organic compounds and metals were detected in groundwater samples collected at Former Landfill #3. In addition, geophysical surveys indicated the presence of near surface metallic debris or shallow soil disturbance at Former Landfill #1, Range L, Old Water Hole, Area T-24A, and Area T-38. Metallic surface debris was visually observed at Former Landfill #2. Qualitative geophysical (metal detection) surveys by USATEU indicate the presence of substantial metallic objects buried at Range L and the Old Water Hole. Quantitative EM surveys at Area T-38 suggest the presence of subsurface disturbance at the approximate location of a former disposal sump.

SAIC (1993) investigated three former municipal landfill sites using surface geophysics and environmental sampling of groundwater, surface water, and sediment at the sites. Chemical analyses for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides/PCBs, explosives, and chemical agent breakdown products were completed for groundwater, surface water, and sediment samples collected at Former Landfills #2 and #3.

Quantitative magnetometer surveys at Former Landfill #1 detected the presence of scattered near-surface metallic debris. Broad anomalous areas were delineated in the southwestern portion of the site that warrant additional, multiple-technique geophysical surveying and potentially monitoring well installation.

Environmental analyses at Former Landfill #2 do not indicate the presence of groundwater contamination at the site. Groundwater contamination by organic compounds and metals was detected at Former Landfill #3. Concentrations of organics (i.e., trichloroethylene, 1,1-dichloroethene, benzene, methyl isobutyl ketone, and 1,1,2,2-trichloroethane) were generally detected below or slightly exceeding regulatory maximum contaminant levels (MCLs). Metals concentrations, including chromium, nickel, lead, and beryllium, exceeded MCLs at wells OLF-2 and OLF-3. Explosive-related compounds 1,3,5-trinitrobenzene and 2,4-dinitrotoluene were detected in well OLF-10. The Former Landfill #3 groundwater and surface water pathways produced a Hazard Ranking System (HRS) score of 16.08. Tables 1-5 through 1-7 provide information on chemical agents, chemicals, and biological agents present at Fort McClellan.

Table 1-5. Physical and Chemical Properties for Chemical Warfare Agents at Fort McClellan, Alabama

Chemical Warfare Agents	Name	CAS No.	Formula	Physical State	Odor	Relative Density		Boiling Point (°C)	Vapor Pressure (mm Hg) @ 20-25°C	Volatility (mg/m³) @ 20-25°C	Henry's Law Constant (atm-m³/mol)	Flash Point (°C)	Decomposition Temp (°C)	Latent Heat of Vaporization² (cal/g)	Solubility in Water (mg/L)	log Kow	log Koc	Hydrolysis Products
						(Air=1) @ 20-25°C	(Air=1) @ 20-25°C											
	Cyanogen chloride (CX)	506-77-4	61.48	Gas	Bitter almonds	2.1	1.18	12.8	1000	6132000		None	>100	103	Soluble	0.46 ⁴		HCl, CHOH
	Hydrogen cyanide (AC)	74-90-8	27.02	liquid	Bitter almonds	1.007	0.67	25.7	742	1075000		0	66	210	Soluble	0.00 ⁴		NH ₃ , NCOOH
	Mustard (HD)	505-60-2	159.08	liquid	Garlic	5.5	1.27	217	0.72-1.11	610-920	1.96E-5 ¹	105	177	94	810 (@PPC) ¹	1.37-2.03 ¹	2.01-2.08 ¹	HCL, thiophosphoch
	Hemimustard (CH)	693-30-1		liquid					4.6E-3						8100	3	1.54	
	-thioethyl (TDG)	111-48-8	122.18	liquid				118-172	164-283	137 ⁴		160-230			721000 ⁴	-31	-52	
	-dimethyl sulfide (DVS)	627-51-0		liquid					60						2500	85	1.84	
	-methyl sulfide (MS)	98-57-7	190.66	Solid					81						93000	-85	91	
	-p-chlorophenylmethyl sulfide	934-73-6	174.65	Solid											11700 ⁴	1.69 ⁴	1.48 ⁴	
	-p-chlorophenylmethyl sulfide	471-03-4		Solid														
	-mustard sulfone (HS)	505-29-3	120.24	Solid					1.6						11000	-51	1.1	
	-1,4 dithiane	107-06-2	98.96	liquid	sweet	3.42	1.25	176-200	8-1.71 ¹		3.53E-5 ¹	13-21			5400	1.25 ⁴	1.04 ⁴	
	-1,2 dithioethane	15980-15-1	104.17	liquid					64		9.1E-4-2.25	42			7986-8800	1.45-1.48	1.15-2.18	
	-1,4 oxathiane	75-44-5	98.92	Gas	Mown grass, hay	3.4	1.373	7.6	1173	6370000		None	800	60	Low	1.05 ⁴		HCl, CO ₂
	Phosgene (CO)	107-44-8	140.10	liquid	None	4.86	1.0887	158	2.9	16800		NF	150	85	v. soluble	.72	1.77	HF, isopropyl alcohol
	Sarin (GB)	1832-54-8		liquid	Chy	1.1	1.072	102	0.034						48000	-54	1.08	
	-isopropyl methylphosphonic acid (IMPA)	993-13-5	96.02	liquid											1,160,000 ⁴	-0.68 ⁴	-89 ⁴	
	-Methylphosphonic acid	756-79-6	124.08	liquid														
	-Dimethyl methylphosphonate (DMMP)	1445-75-6	180.17	liquid					<1			68						
	-Diisopropylmethylphosphonate (DIMP)	50782-69-9	267.38	liquid	None	9.2	1.0083	298	.0007	~10.5		159	295		30000 (@25°C)	1.992 ¹	1.18 ¹	See 3 below
	VX	108-18-9	101.19	liquid	ammonia	3.49	1.72	84	60-70		2.3E-2	-6.7			400	1.72	2.31	
	-diethyl methylphosphonic acid (EMPA)	1832-53-7	124.08	liquid								>109			1100	-1.15	.75	
	-ethyl methylphosphonic acid (EMPA)	65332-44-7		liquid					1.5E-8						9.5	3.48	3.28	
	-bis-(2-diisopropylaminoethyl) sulfide (DBS) ¹			liquid					6.67E-07	Negligible					1.2	4.47	3.81	
	-bis-(2-diisopropylaminoethyl) sulfide (DBS) ¹			liquid														3-Quinacridin, benzilic
	CB (Chloroacetophenene in benzene and carbon tetrachloride)	1619-34-7	337.41	Solid	None	11.6	0.51	370	Negligible			246	200	62.9	2815 ⁴	2.08 ⁴	1.87 ⁴	
	FS	532-27-4	154.59	liquid	garlic	-4	1.14	75-247	1		7.23E-5 ¹	<4.44	>207	NA				
	-sulfur trioxide	7449-11-9		solid														
	-chlorosulfonic acid	7790-94-5		liquid	pungent													
	Decomposition																	
	STB (Super Trojical Bites)			Liquid	Chlorine	1.085		100										
	-calcium hypochlorite chloride	7778-54-3		Solid	Chlorine	2.35			NA	NA		NA						
	DS-2			liquid														
	-Sodium hydroxide (2%)	40.01		liquid														
	-Diethylacetamide (70%)	111-40-0	103.17	liquid	Ammonia			207	.37			102				-1.67	.46	
	-2-methoxy ethanol (28%)	109-86-4	76.09	liquid		2.63	97	125	6-10			46				-77	.96	
	DANC	79-34-5	167.85	liquid	sweet	5.8	1.59	146.2	5-8		3.8-4.5E-4	NF			2900-3230	2.39-2.56	1.66-2.07	
	6.25% RH 195 in acetylene tetrachloride			solid														
	1,3-dichloro-5,5-dimethylamino (DDH)	118-32-5	197.02	solid	chlorine	1.5					2.67E-4 ¹	174.4				NA	NA	hypochlorous acid
	Sodium Carbonate	497-19-8		solid	carbonates	2.509		Decomp	eff=0			NC						
	CLOROX bleach (1.32% sodium hypochlorite)	7681-52-9		liquid	Chlorine	1.085		100										
	Chemicals																	
	benzene	71-43-2	78.11	liquid	gasoline	2.7	0.87	80.1	76-95.2		5.48E-3	-11			870-1800	1.56-2.15	1.69-2.0	
	carbon tetrachloride	56-23-5	153.82	liquid	sweet	5.31	1.59	76.5	90-113		2.4E-2	NC			757-800	2.73-2.83	2.35-2.64	chloroform, CO ₂ , HCl
	1,1,1-Trichloroethane	71-55-6	133.4	liquid	sweet	4.6	1.32	74.1	96-174		1.5E-2	<25			300-4400	2.17-2.49	2.02-2.18	acetic acid, 1,1 DCE
	1,1,2,2-tetrachloroethane (acetylene tetrachloride)	79-34-5	167.85	liquid	sweet	5.8	1.59	146.2	5-8		3.8-4.5E-4	NF			2900-3230	2.39-2.56	1.66-2.07	
	S-(diisopropylaminoethyl)methylphosphonothioate (DSSMP)			liquid														
	U.S. Army Chemical Research, Development, and Engineering Center, Material Safety Data Sheets, 3 December 1990.																	
	U.S. Army Technical Escort Unit, Standard Operating Procedures for Chemical Toxicity Activities, Fort McClellan Site Investigation, March, 1993.																	
	Small, M.J., Soil Detection Limits for Potential Chemical Warfare-Related Contaminants at Fort McClellan, Alabama, May 1983.																	
	Montgomery and Welton, "Groundwater Chemicals Desk Reference, Vol 1, II, 1991.																	
	1'Sage and Howard, "Environmental Fate Assessments of Chemical Agents HD and VX," CRDEC-CR-034, 1989.																	
	2'Wilbur Chemistry and Chemical Agents, U.S. Army technical manual TM 8-9, 1963.																	
	3'VX hydrolysis products include: diethyl methylphosphonate, 2-diisopropylaminoethyl mercaptan, ethyl hydrogen methylphosphonate, bis (ethylmethylphosphonate) anhydride, bis (2-diisopropylaminoethyl)methylphosphonothioate.																	
	Toxic hydrolysis products form at pH 7-10.																	
	RISKPRO, General Science Corporation, 1990.																	
	* - Solid below 39°C, liquid above 39°C																	
	NA= Not applicable																	
	NC= Non combustible																	
	ND= Data n/a																	
	NF= Non-																	

Table 1-6. Chemical Properties for Chemicals of Concern at Fort McClellan, Alabama
(non - Chemical Warfare Agents)

Chemical Name	MCL (mg/L)	Ionization Potential (eV)	Formula Weight	Relative Vapor Density (Air =1)	Relative Liquid Density (Water=1)	Boiling Point (°C)	Vapor Pressure (mm Hg @ 20°C)	Flash Point (°C)	Water Solubility (mg/L @ 20°C)	Lower Explosive Limit (%)	Upper Explosive Limit (%)	IDLH (ppm)
Volatile Organics												
1,1-Dichloroethane	L	ND	98.96	3.42	1.176	57	182.1	-6	5500	5.6	16	4000
1,1-Dichloroethene	.007	9.81±.35	96.94	3.32	1.21	37	495	-15	400	6.5	15.5	ND
Benzene	.005	9.25-9.56	78.11	2.7	.87	80.1	76	-11	1780	1.3	7.1	2000 ^c
bis(2-Ethylhexyl)phthalate	NL	ND	390.57	13.48	.986	385	2 x 10 ⁻⁷	207	.041	.3	ND	C
Methyl isobutyl ketone	NL	9.3	100.16	3.46	.8	117	6-16	22.8	17000	1.4	7.5	3000
Methylene Chloride	.005	11.35	84.93	2.93	1.32	40.2	348.9	>30	20000	12	19	5000 ^c
1,1,2,2-Tetrachloroethane	L	11.1	167.85	5.79	1.6	146.2	5-8	NF	2900	NF	NF	C
trans 1,2-Dichloroethene	0.1	9.64	96.94	3.35	1.26	47.5	26.5	2	600	9.7	12.8	4000
Tetrachloroethene	.005	9.32-9.71	165.83	5.72	1.62	121.2	14	NF	150	NF	NF	500 ^f
1,1,2-Trichloroethane	.005	ND	133.4	4.6	1.44	111-114	19	ND	4500	6	15.5	C
Trichloroethene	.005	9.47-9.94	131.39	4.54	1.46	87	57.8	32.2	1100	8	10.5	1000 ^c
Pesticides												
alpha-BHC	NL	ND	290.83	ND	~1.87	288	2.5 x 10 ⁻⁵	ND	2	ND	ND	ND
Explosives												
1,3,5-Trinitrobenzene	NL	ND	ND	ND	1.688	ND	ND	ND	~35	ND	ND	Explosive
2,4-Dinitrotoluene	L	ND	182.14	ND	1.379	250	1	206.7	~270	ND	ND	200 ^f
Metals												
Arsenic	.05	NA	74.92	NA	NA	NA	NA	NA	Insoluble*	NA	NA	NA
Beryllium	.004	NA	9.01	NA	NA	NA	NA	NA	ND*	NA	NA	NA
Lead	.015	NA	106.42	NA	NA	NA	NA	NA	Insoluble*	NA	NA	NA
Mercury	.002	NA	200.59	NA	NA	NA	NA	NA	Insoluble*	NA	NA	NA
Nickel	.1	NA	58.69	NA	NA	NA	NA	NA	Insoluble*	NA	NA	NA
Thallium	.002	NA	204.38	NA	NA	NA	NA	NA	ND*	NA	NA	NA

Data sources:
Montgomery, J.H., Groundwater Chemicals Desk Reference Vols I,II, Lewis Publishers, 1991.
CRC Press, Inc., CRC Handbook of Chemistry and Physics, CRC Press, Inc., 1985

U.S. Environmental Protection Agency, Drinking Water Regulations and Health Advisories, Office of Water, May, 1993.

* Pure metals are relatively insoluble. Oxides and other compounds formed with the metals may be substantially more soluble.
C or ^c = carcinogen
L = Listed
NA = Not applicable
ND = No data available.
NF = Not flammable.
NI = Not listed

**Table 1-7. Information on Properties of Biological Agents Used
at Fort McClellan, Alabama**

BG (BACILLUS GLOBIGII)

Bacillus globigii is a variation of *Bacillus subtilis* utilized as a simulant for biological warfare agents. As with most *Bacillus* types, the cells are rod-shaped, gram positive bacteria. These are aerobic or facultatively anaerobic spore-formers and flagellated.

Species are pervasive in the environment based on the distribution and persistence of spores. *B. globigii*'s primary habitat is soil and plant litter where it plays a role in carbon and nitrogen cycling. The *Bacillus* genus has been isolated in almost all natural habitats, including fresh and sea waters, food, and pharmaceuticals. A site of isolation cannot be considered natural habitat for this species due to the ease of transference of the bacteria and tenacity of the spores.

It is felt *B. Globigii*, as with many of the *Bacillus* species, can be opportunistic pathogens when presented with a host predisposed to establishment of infection. Hosts previously compromised are most frequently involved. *B. subtilis* has been implicated in food poisoning, cellulitis, septicemia, respiratory illness, and endocarditis; however, the association cannot be regarded as unequivocal. *B. globigii* has not been implemented in infections; however, its close relationship with *B. subtilis* and general acceptance of pathogenic potential of *Bacillus* species indicate the possibility of pathogenicity.

SM (SERRATIA MARCESANS)

Serratia marcesans are straight rods generally conforming to the family Enterobacteriaceae. They are facultatively anaerobic, motile, and pigmented. *S. marcesans* can be white or pink; however, strains used as biological simulants were selected for red pigmentation.

These organisms occur in the natural environment, and have been isolated in soil, water, and on plant surfaces. Bacteriophages active on *serratis* are found in river water and sewage.

S. Marcesans is an opportunistic human pathogen prominent in hospitalized patients. Infection occurs most frequently as the result of accidental infection of contaminated perfusions or irrigation fluids. *Serratis* species also have been clinically isolated without significance.

2. PROJECT ORGANIZATION AND RESPONSIBILITIES

The remedial investigation (RI) at Fort McClellan, Alabama, will be conducted by the U.S. Army Environmental Center (USAEC) subcontractor, Science Applications International Corporation (SAIC). The organizational relationships within the project are shown in Figure 2-1. A contact list for key project personnel is provided in Table 2-1.

2.1 ORGANIZATION

SAIC is the subcontractor retained by USAEC to perform the remedial investigation/feasibility study (RI/FS) activities for the 12 sites at Fort McClellan. The organization and responsibilities within SAIC are described below.

The Project Manager is directly responsible for technical direction of subcontractor activities. All coordination requiring USAEC, Fort McClellan personnel, or regulatory input or concurrence will be through the USAEC Project Manager. Daily coordination of field activities will occur between the SAIC Project Manager or Site Field Manager, Fort McClellan, U.S. Army Technical Escort Unit (USATEC), and subcontractor personnel. USAEC personnel will be kept informed of these communications.

The SAIC Field Manager will coordinate field activities on a daily basis and will maintain daily communications with the USAEC and Fort McClellan points-of-contact on activities such as planning and scheduling, onsite equipment, materials, storage and office facilities, permitting for drilling, personnel and subcontractor access to the Post and secure areas, emergency procedures, and unanticipated administrative problems. All inquiries from nonproject parties will be referred to the USAEC and Fort McClellan points-of-contact.

2.2 RESPONSIBILITIES

The responsibilities for key project personnel (Table 2-2) are described below. SAIC will maintain oversight responsibilities for all field and laboratory activities to be conducted for the RI/FS.

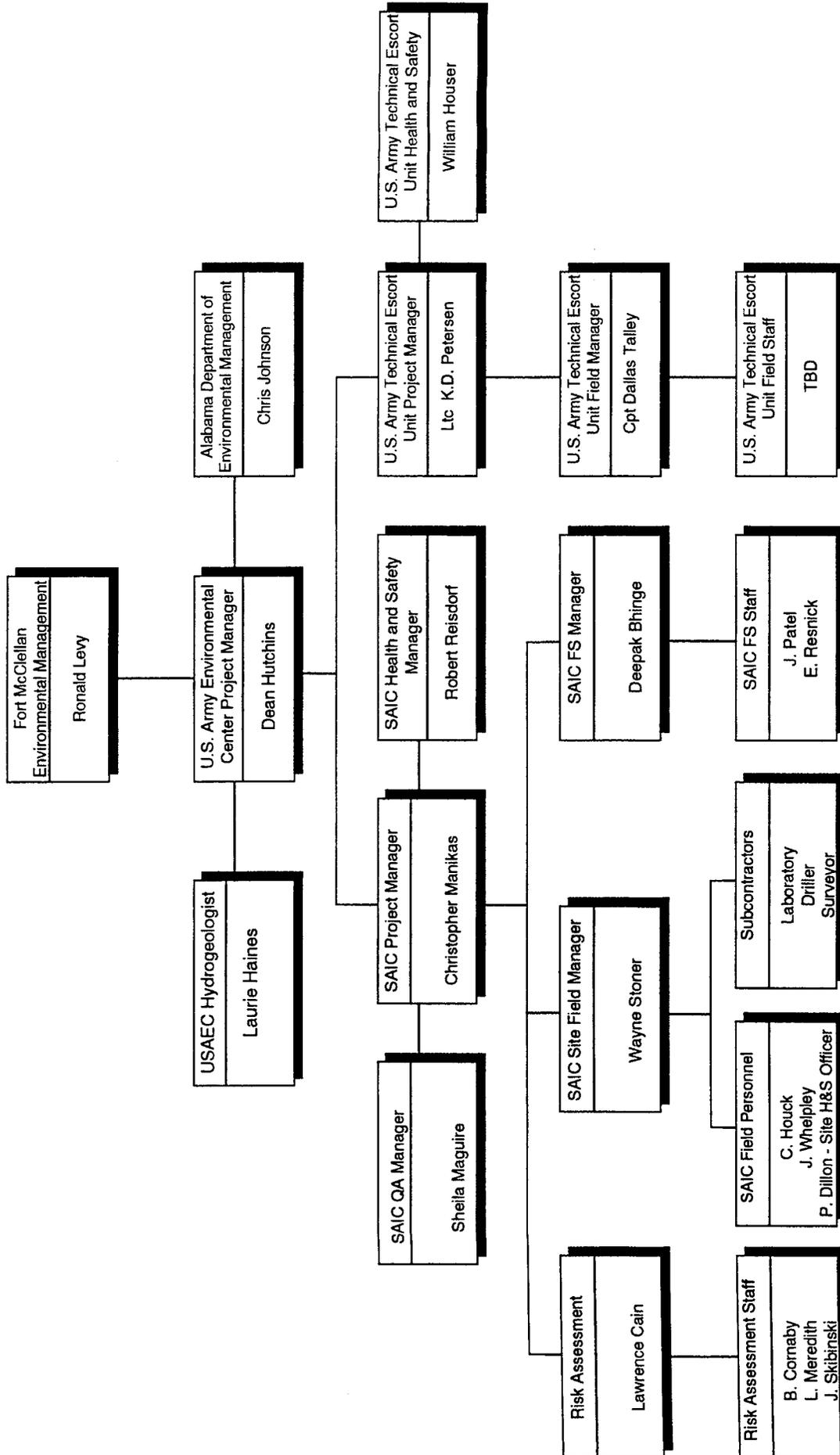


Figure 2-1. Project Organization for Remedial Investigation/Feasibility Study at Fort McClellan, Alabama

Table 2-1. Contact List for Fort McClellan RI/FS

<u>Fort McClellan Environmental Management</u>		
Ronald Levy, Chief		205-848-3758
Lisa Kingsbury		205-848-3539
William Garland		205-848-5517 (fax)
<u>Alabama Department of Environmental Management</u>		
Chris Johnson		205-260-2777
		205-260-2795 (fax)
<u>U.S. Army Environmental Center</u>		
Dean Hutchins (Project Manager)		410-671-1530
Laurie Haines (Project Geologist)		410-671-1548 (fax)
William Houser (Health and Safety)		410-671-4811
<u>U.S. Army Technical Escort Unit</u>		
Cpt Dallas Talley		410-671-4381
		410-671-4259
<u>Science Applications International Corporation (SAIC)</u>		
Alfred Wickline (Program Mngr)		703-734-5514
Christopher Manikas (Project Mngr)		703-827-4832
Wayne Stoner (Site Field Mngr)		703-734-5996
Sheila Maguire (QA/QC Mngr)		703-827-4856
Lawrence Cain (Risk Assessment Mngr)		703-734-5991
Deepak Bhinge (FS Mngr)		703-734-5931
Robert Reisdorf (Health & Safety)		703-821-4634
Joseph Skibinski (Data Mngr)		703-734-5952
Chris Fontana (Sample Mngr)		703-827-4918
Lisa Jones-Bateman (Contracts)		703-734-5503
fax		703-506-9689
Natural Resources Bldg (Fort McClellan)		205-848-3758
<u>Analytical Laboratory</u>		
Richard Goebel (DATACHEM)		801-266-7700
Joseph Vondrick (ES&E)		904-332-3318 (x1463)
<u>Drilling Subcontractor</u>		
Environmental Exploration, Inc.		404-389-0475
<u>Surveying Subcontractor</u>		
Frank Hollis and Assoc, Inc.		205-625-4433
<u>MINICAMS Support</u>		
CMS Research Corporation		205-733-6911
		205-733-6919 (fax)

Table 2-2. SAIC Personnel and Responsibilities

Name	Title	Responsibility
Alfred Wickline	Program Manager	Coordinates all programmatic aspects of the USAEC program to ensure a safe and successful conclusion to each assignment.
Robert Reisdorf, CIH	Project Safety Manager	Reviews field operational requirements and site hazards for regulatory safety compliance and approval of site-specific safety plans.
Sheila Maguire	Program QA Manager	Reviews all field and laboratory investigation activities to ensure proper execution and technique.
Christopher Manikas, CPG	Project Manager	Coordinates all aspects of the environmental investigation for a safe and successful conclusion.
Wayne Stoner	Site Field Manager	Coordinates all aspects of field investigation activities while onsite to ensure a safe and successful conclusion.
Wayne Stoner Paige Dillon	Site Safety Officers	Enforce and carry out the provisions of this site safety plan while onsite.

2.2.1 Program Manager

The Program Manager will ensure that SAIC's full resources are accessible to the Project Manager and that all staffing and administrative support needs of this project are met in a timely manner. He also will play an active role in client interaction and review all deliverables. The SAIC Program Manager is Mr. Alfred Wickline.

2.2.2 Project Manager

The Project Manager will provide overall management of this project. He will be the technical lead and the principal point of contact for the project. He will develop, monitor, and fill project staffing needs and coordinate with administrative staff to maintain smooth flow of all project activities. The Project Manager will lead the deliverable preparation and production activities. He is directly responsible for meeting schedules and budget requirements of this project. Mr. Christopher Manikas, C.P.G., will be the SAIC Project Manager for the Fort McClellan RI/FS. USAEC's counterpart Project Manager is Mr. Dean Hutchins.

2.2.3 Site Field Manager

The Site Field Manager will be located at Fort McClellan to supervise day-to-day activities of the entire RI/FS field data collection effort. He will participate extensively in data interpretation, report writing, and preparation of deliverables. The Site Field Manager's main responsibility is to ensure that work is being conducted as specified in the Work Plan, Field Sampling and Analysis Plan, and Quality Assurance Project Plan (QAPjP). The Fort McClellan Site Field Manager will be Mr. Wayne Stoner.

2.2.4 Quality Assurance Manager

The Quality Assurance (QA) Manager is the primary point-of-contact for the RI/FS on matters concerning field and laboratory QA procedures. She will be responsible for ensuring that QA procedures are implemented and that appropriate controls are used to ensure a high level of quality. The QA Manager also will be responsible for preparing the RI/FS QAPjP and statements of work (SOWs) for all subcontractors providing analytical services. The QA Manager will be responsible for the review, evaluation, and validation of all analytical data for

the RI/FS, and will participate extensively in interpretation and presentation of analytical data in the final report. Ms. Sheila Maguire will be the QA Manager for the Fort McClellan RI/FS.

2.2.5 Health and Safety Manager

The Health and Safety Manager will ensure that the physical and chemical hazards are appropriately mitigated through effective execution of the Health and Safety Plan (H&SP), audit project performance according to the plan, and provide technical support as needed in executing the plan. Mr. Robert Reisdorf, C.I.H., will be the project Health and Safety Manager. Onsite health and safety will be the responsibility of the Field Manager, working in coordination with the Project Manager and the project Health and Safety Manager. Mr. William Houser (USAEC) will be responsible for overall health and safety for the USATEU and USAEC personnel and will coordinate with SAIC's Health and Safety Officer.

2.2.6 U.S. Army Technical Escort Unit (USATEU)

The USATEU will be conducting investigative activities at Fort McClellan concurrent with activities to be completed by SAIC. The USATEU Field Manager will interact with SAIC personnel to coordinate sample collection, field MINICAMS analyses, sample handling, and shipping protocols to ensure satisfactory completion of these activities.

2.2.7 Subcontractors

Services for laboratory chemical analyses, drilling, and land surveying will be subcontracted by SAIC. The following paragraphs describe the subcontractor support positions to be interfaced with SAIC during the completion of the Fort McClellan RI/FS.

Laboratory Manager—The Laboratory Manager is responsible for the technical quality of the laboratory, laboratory personnel management, cost control, and strict adherence to project schedules. His overall QA management responsibilities in the RI/FS are the satisfactory analysis of all samples with complete data documentation and the quality control of data uploaded to the USAEC Installation Restoration Management Information System (IRDMIS) data management system. SAIC will use a subcontracted laboratories Data Chem Laboratories, Inc. of Salt Lake

City, Utah, and Environmental Science and Engineering of Gainesville, Florida to provide these services. Laboratory activities will be monitored by the SAIC QA Manager, Ms. Sheila Maguire.

Drilling Manager—The Drilling Manager will be responsible for ensuring that capable drilling crews are onsite and equipped to complete the required work. A drilling foreman will be in day-to-day contact onsite with the SAIC Field Manager throughout the work assignment.

Survey Foreman—The Survey Foreman will be responsible for ensuring that all land surveying is completed on time and in accordance with State of Alabama and USAEC requirements.



3. TASK DESCRIPTION

This section outlines the remedial investigation/feasibility study (RI/FS) field tasks and procedures that will be followed at Fort McClellan, Alabama. Detailed field protocols and procedures are described in the project Sampling and Analysis Plan.

3.1 AERIAL PHOTOGRAPHY AND FIELD RECONNAISSANCE

Prior to the onset of field work at Fort McClellan, Science Applications International Corporation (SAIC) will evaluate low altitude aerial photographs to be provided by the U.S. Army Environmental Center (USAEC) for each of the RI/FS sites. The photographs will be used to document historical site usage and as a basis for confirming field reconnaissance. U.S. Environmental Protection Agency (1982, 1983) portfolios for Area T-24A, Area T-38, Range J, and the northeastern corner of Pelham Range are currently available for the project. The aerial photography will be used to identify structures and areas for investigation in the field and to guide the placement of sampling points and monitoring wells dependent on the available coverage.

3.2 SCREENING SURVEYS

Screening-level surveys, including MINICAMS analyses and geophysical surveys, will be conducted at the RI/FS sites to provide broader-based areal coverage of the site areas and nonintrusive investigation methods for areas containing uncontrolled munitions or chemical agents. MINICAMS surveys will be conducted to provide broader spatial analysis of the distribution of detected chemical agent in the surficial and shallow subsurface site soils. MINICAMS analyses will be used at all of the former Army training areas and also will be used to screen laboratory soil, surface water, and groundwater samples for chemicals of concern at the municipal landfill sites. MINICAMS sampling distribution will be determined using a systematic (triangular grid) sampling scheme combined with biased sampling of known training localities. USEPA (1989) guidance (*Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solid Media*) will be used to select sampling locations. Geophysical surveys, including magnetometry, electromagnetic conductivity, and ground penetrating radar, will provide nonintrusive data regarding the distribution of subsurface

anomalies, particularly at Range L, Old Water Hole, Area T-38, and Former Landfill #2. Geophysical data will be collected along transects and grids.

3.3 FIELD SAMPLING

In addition to the survey-level sampling and analysis to be conducted for the RI/FS, environmental samples will be collected and analyzed in the laboratory to quantitatively assess contamination at the sites. Subsurface soil, surface water, sediment, and groundwater samples will be collected and analyzed from the sites. Groundwater samples will be collected from monitoring wells, on-Post potable water sources, and from the Town of Weaver water supply wells. Two rounds of groundwater sampling will be conducted for existing wells and for the additional wells to be installed during the RI. Field sampling activities to be conducted by the U.S. Army Technical Escort Unit (USATEU) will be under the oversight of SAIC personnel.

3.4 INTRUSIVE SAMPLING AND MONITORING WELLS

The purpose of the soil drilling program is to obtain subsurface soil samples for lithologic and chemical analysis, obtain stratigraphic information, and install groundwater monitoring wells. Subsurface soil samples will be field-described to determine the sample lithology. Soil samples will be collected at 5-foot intervals and at distinct changes in lithology. These samples will be screened in the field using a photoionization detector (PID) to provide qualitative field information on potential contaminant distributions. The location of the soil borings will be based on the history of the site and the locations of existing monitoring points. Soil sample locations are provided in the Sampling and Analysis Plan (SAP). USATEU will conduct chemical warfare agent (CWA) screening at sites suspected of former agent usage.

The soil borings will be completed as monitoring wells after the soil samples have been collected and the total borehole depth is reached to provide additional information concerning the hydrogeology and hydrochemistry of the sites under investigation. The monitoring wells will provide necessary site-specific information on the groundwater quality and elevation. Subsequent to the completion and development, groundwater samples will be collected from the monitoring wells.

A minimum of 32, schedule 40 polyvinyl chloride (PVC) monitoring wells will be installed during the RI/FS. The wells are planned to provide groundwater sample locations for chemical analysis to determine the groundwater quality near the sites under investigation. Monitoring wells also will be used to obtain water level data for determining site-specific groundwater flow direction at the landfill and munitions burial sites. Monitoring well installations at Former Landfill #3 will include approximately four off-Post well placements west of the facility boundary.

Background samples will be obtained from three locations on the Main Post and from one location on Pelham Range. Background groundwater samples will be obtained from the existing well at Reilly Lake, from a proposed well east of operating Landfill #4 (to be installed under separate contract), and from a proposed well southeast of Range T-24A. A potable well at Rideout Hall on Pelham Range also will be sampled. Upgradient wells at individual sites also may be regarded as representative of background conditions if the well is determined to be consistently upgradient. Background soil samples will be collected at these locations. Surface water and sediment samples collected upgradient of Site T-5, Site T-24A, Former Landfill #2, and Former Landfill #3 will be treated as background for the Main Post and Pelham Range.

3.5 SURVEYING

Accurate location of sampling points and monitoring wells is necessary for correctly interpreting analytical results and physical measurements, data management, and for concise mapping of site features. Detailed topographic maps are not available specifically for the RI/FS sites. SAIC will develop topographic maps for many of the sites from available topographic sheets of the Main Post and Pelham Range. Topographic surveying will be conducted at Range L and the Old Water Hole because detailed (2- foot contour interval) mappings of these sites will be necessary for engineering purposes. Soil boring, monitoring well, and geophysical grid/transect locations at all sites will be surveyed by a registered surveyor.

4. HAZARD ANALYSIS AND TASK-SPECIFIC HAZARD CONTROLS

This section presents Science Applications International Corporation's (SAIC's) assessment of the potential hazards associated with investigating the remedial investigation/feasibility study (RI/FS) sites at Fort McClellan, Alabama. The assessment includes a historical perspective of previous actions at the sites and an evaluation of SI data collected at the sites.

4.1 T-4 BIOLOGICAL SIMULANT TEST AREA

Area T-4 was reportedly a biological simulant test area located on the Main Post. Records indicate that a 0.25-acre site was used between 1965 and 1971 for biological simulant (BG and SM) training. Decontamination of the simulants on the surface soils was performed by adding STB and DS-2. A U.S. Army Technical Escort Unit (USATEU) team will conduct MINICAMS screening for chemical warfare agent (CWA) and collect laboratory samples for CWA breakdown products in soil. SAIC field personnel will not conduct any investigatory activities and will function as observers remaining outside and upwind of the exclusion zone established by the USATEU team.

Environmental Contaminants—Biological simulant compounds are impersistent in the environment. Potential for encountering CWA is low based on site history.

Hazard Analysis—Significant health and safety hazards are unlikely under existing conditions.

SAIC Task	PPE Level
QA/QC	D Basic work clothes, safety shoes/boots

Required Monitoring—MINICAMS screening will be conducted by USATEU.

4.2 T-5 TOXIC HAZARDS DETECTION AND DECONTAMINATION TRAINING AREA

Area T-5 is the Toxic Hazards Detection and Decontamination Training Area located between Sunset Hill and Howitzer Hill. The 11.4-acre wooded site was used between 1961 and 1973 to train students in the methods of detecting and decontaminating toxic agents, including HD, GB, and VX. The quantities of agent used for training purposes ranged from 20 to 40 milliliters per exercise. The training sites were decontaminated and checked at the end of each exercise using STB and/or DS-2. In addition to HD, GB, and VX used during training, Site 2 may have been the location of a 110-gallon HD spill.

Task Description—A USATEU team will conduct MINICAMS screening for CWA in soil and will collect soil samples for laboratory analysis of CWA breakdown products. SAIC field personnel will not conduct any investigatory activities and will function as observers remaining outside and upwind of the exclusion zone established by the USATEU team.

Environmental Contaminants—Previous sampling at high-probability locations in Area T-5 did not detect CWA.

Hazard Analysis—Significant health and safety hazards are unlikely under existing conditions. Ordnance previously observed at the site was determined to be a practice dummy and has been removed.

SAIC Task	PPE Level
QA/QC	D Basic work clothes, safety shoes/boots

4.3 T-24A CHEMICAL MUNITION DISPOSAL TRAINING AREA

Area T-24A was a 1.5-acre Chemical Munitions Disposal Training Area located on the Main Post south of Holloway Hill until 1973. Chemical munitions disposal training with CG, BZ, GB, and HD was conducted at the site. During each training exercise, approximately 4.46 kilograms of HD were reportedly used; however, first hand observers reported that as much as 2 gallons of HD were poured on six howitzers and later on armored personnel carriers

during training exercises. In addition, 40 milliliters of CG, one M-6 canister of BZ, and 740 grams of GB were used per exercise. Two square burning pits, each 16 feet on a side, were used for training exercises and were enclosed by a fenced area measuring 40 by 80 meters. The depths of the pits are unknown; however, standard operating procedures (SOPs) recommended a depth of 6 feet. At closure, the pits reportedly were filled with soil, although some depressions were observed in 1988. Decontamination of agents on residual soils was performed with STB and DS-2. A large HD spill may have occurred at this site, but this has not been confirmed. The agents HD, CG, BZ, and GB were not detected in the surface samples collected by the U.S. Army in April and July 1973 in the proximity of the pits. Sample depths ranged from 3 to 10 centimeters, and may not represent the depths at which agents were used in the training pits. Two 81-mm mortar shells also were discovered at the site in October 1991. Portions of Area T-24A are located within the target area (fan) of two currently operating firing ranges.

Task Description—USATEU will conduct MINICAMS screening for CWA in soils within the fenced area and will collect additional soil samples for laboratory analysis of CWA breakdown products. USATEU may partially or fully excavate former training pits pending U.S. Army approval. USATEU will perform initial metal detection sweeps through the site area and will clear extensive brush from within the site area using earth moving equipment. Prior to intrusive USATEU sampling or excavation activities within the fenced area, SAIC will conduct magnetometer and EM surveys within the fenced area. SAIC will collect surface water and sediment samples outside of and topographically downgradient from Area T-24A. SAIC will work in close association with USATEU in this area.

Environmental Contaminants—Previous MINICAMS screening for CWA in soil and laboratory analysis for CWA breakdown products in soil from the suspected pit locations did not detect CWA within the fenced area (SAIC 1993). The area is not suspected of being contaminated with hazardous chemicals; however, potential hazards with regard to ordnance or undetected CWA may exist.

Hazard Analysis—Potential hazards include encountering ordnance and exposure (including skin contact) to degradation products of chemical agents. Chemical resistant gloves must be used when collecting surface water or sediment samples. Geophysical surveys for metals will be conducted before all intrusive activity.

SAIC Task	PPE Level
QA/QC; surface water/sediment sampling	D Basic work clothes, safety shoes/boots

Required Monitoring—USATEU will conduct MINICAMS screening for CWA in soil. USATEU will determine that the area is clear of agents prior to SAIC conducting any activity.

4.4 T-38 TECHNICAL ESCORT REACTION AREA

Area T-38 (Technical Escort Reaction Area) is located on the Main Post west of Reservoir Hill. The 6-acre site was used between 1961 and 1972 for training escort personnel in techniques to eliminate toxic hazards caused by mishaps to chemical munitions during transport. The area also was used to store toxic agents and munitions, including GB, VX, and HD. In addition, unspecified decontaminants (likely STB and DS-2) were stored on at least two sites and were used for demonstration purposes. Extensive decontamination was conducted on this site for reported spills and contaminated training aids. Residual surface contamination with HD was reported in January 1973. Subsequent sampling in March 1973 indicated that the surface soil at Area T-38 was uncontaminated. In addition, there is an unconfirmed report of the burial of a drum of chemical agent (mustard) in the southern portion of the site; however, efforts to determine the precise location of the drum were unsuccessful. A former disposal pit (sump) area approximately 10 by 20 by 10 feet was reportedly used to dispose of decontaminants and other hazardous wastes at the site and was approximately located in the field during the April 1992 site visit (G. Harvey, written communication).

Task Description—USATEU will conduct surface soil screening for CWA within the fenced area and may potentially drill a deep soil boring through the suspected sump location (pending U.S. Army approval). SAIC field personnel will oversee the installation of four monitoring wells in Area T-38 and will collect groundwater samples from these wells.

USATEU personnel will handle and MINICAMS screen all soil samples and groundwater (during drilling) from well borehole drilling because of the potential for encountering CWA in the subsurface. A drilling subcontractor will conduct all drilling, decontamination, split spoon sampling, and groundwater well development. SAIC will work in close association with USATEU in this area. USATEU will conduct surface monitoring for the presence of chemical agents using a MINICAMS detector.

Environmental Contaminants — Previous soil screening by USATEU for CWA (SAIC 1993) did not detect agent in any of the samples. The surface of this area is not suspected of being contaminated with hazardous chemicals, however, decontamination solutions containing mixtures of organic solvents were disposed of in an unlined sump onsite. Potential exposure hazards may exist, particularly during drilling.

Hazard Analysis - Drilling Operations — Potential hazards include exposure to chemical agents and breakdown products of chemical agents, heat stress, and noise. Hazards associated with heavy machinery also will be present. The sites will be monitored for chemical agent and gases as described in the monitoring section to minimize exposure.

Hazard Analysis - Groundwater Sampling — Potential hazards include exposure (including skin contact) to degradation products of chemical agents. Chemical resistant gloves must be used when collecting surface water or sediment samples.

SAIC Work Activity	PPE Level
Drilling operations	C,D
Collecting groundwater samples	D

PPE: Disposable coveralls over routine work clothes, hardhat, safety goggles, N-butyl rubber gloves under leather workgloves, butyl rubber boots with safety toe, hearing protection, M9 or M17 equivalent protective mask (slung, not worn).

Required Monitoring — USATEU will conduct MINICAMS monitoring for chemical agent during surface and subsurface sampling. USATEU will determine that the area is clear of agent prior to SAIC conducting any activity. In addition, continuous monitoring for

at the borehole will be performed using a Combustible Gas Indicator (CGI). Operations should cease and workers should egress site whenever the following condition is encountered: 10 percent LEL (for combustible gas).

For chemical agent, USATEU standard operating procedures will be followed:

Instrument	Action Levels	Action
CAM/M18	0.5 ppm for mustard gas 0.2 ppm for GB (nerve gas) 0.1 ppm for VX (nerve agent)	Egress site
ACAMS	0.003 ppm for mustard gas 0.0001 ppm for nerve agent	Upgrade to Level C

4.5 RANGE J - AGENT TRAINING AREA

Range J was an Agent Training Area located on Pelham Range. The 50 by 139 meter fenced area was used until 1963 for training and agent disposal. The agents used at the site are unknown, but are believed to be HD. The site also was reportedly used for disposal of a 110-gallon HD spill that occurred on the Main Post in 1955. Evidence of drummed soil disposed of in a surface pit at the site was observed during the October 1991 and April 1992 site walkovers. The depth at which this material was buried is unknown.

Task Description—A USATEU team will conduct MINICAMS surface screening for CWA. USATEU also will clear extensive brush overgrowth onsite using earth moving equipment prior to collecting samples for laboratory analysis. SAIC field personnel will conduct magnetometer and electromagnetic surveys within the fenced area after USATEU clearance. SAIC personnel will provide quality assurance/quality control (QA/QC) for USATEU sampling and will remain outside and upwind of the exclusion zone established by the USATEU team. USATEU may excavate buried drums from site pending U.S. Army approval. SAIC personnel will not be present during excavation activities.

Environmental Contaminants—Possible degraded CWA in soil.

Hazard Analysis—Significant health and safety hazards are unlikely under existing conditions. Previous sampling by USATEU in exposed drums did not detect CWA or CWA breakdown products.

SAIC Work Activity	PPE Level
QA/QC	D; Basic work clothes, safety shoes.

Required Monitoring—USATEU will conduct MINICAMS monitoring during sampling and possible excavation activities.

4.6 RANGE K - AGENT TRAINING AREA

Range K was a 2-acre Agent Training Area located on Pelham Range. Limited information on the site is available, including time of operation and agents used. A reported shell tapping area where rounds were opened and decontaminated was operated in Range K prior to 1961 through the summer of 1963. During training exercises, breaking open one 55-mm round of HD, one 105-mm round of GB, and one 4.2-mortar round of CG was standard practice (G. Harvey, written communication, October 7, 1992). The identified site has been physically rearranged (bulldozed) and records indicate that the area was cleared for surface usage in 1967. The U.S. Army conducted surface monitoring in 1980, and no surface contamination was detected. Evidence of a former training area at this site was not observed during SAIC's October 1991 site visit. Spent GB and HD rounds and decontaminant canisters were observed by USAEC on the site in September 1992.

Task Description—A USATEU team will conduct surface soil MINICAMS screening at Range K and will remove all observed spent CWA ordnance canisters. SAIC field personnel will not conduct any investigatory activities and will perform QA/QC functions while remaining outside and upwind of the exclusion zone established by the USATEU team.

Environmental Contaminants—Possible degraded CWA at ground surface.

Hazard Analysis—Significant health and safety hazards are unlikely under existing conditions.

SAIC Work Activity	PPE Level
QA/QC	D

PPE: Basic work clothes, safety shoes/boots.

Required Monitoring—USATEU will conduct MINICAMS screening for HD, GB, and CG.

4.7 RANGE L - CHEMICAL MUNITIONS DISPOSAL AREA (LIMA POND)

Range L was a Chemical Munitions Disposal Area located on Pelham Range. The 0.5-acre site reportedly was used to dispose of captured World War II munitions, including chemical munitions. According to Post personnel, a shallow man-made pond (Lima Pond) was used as a dump site for the munitions. The pond is within a bermed area that is approximately 15 feet higher topographically than the surrounding wooded terrain. The pond is estimated to be approximately 30 feet deep, although the actual depth of potential burials below the pit bed is unknown. USATEU collected three water samples from Lima Pond in 1982 and analyzed the samples for HD, GB, and VX. The depth of water in the pond was low (<2 feet) during the October 1991 site visit. Although empty ammunition crates were observed along the pond walls, no quantitative determination has been made on the presence or nature of buried munitions at this site. USATEU metal detection sweeps at the site detected significant positive anomalies within the bermed area.

Task Description—SAIC field personnel will oversee the installation of seven monitoring wells around the perimeter of Range L and will collect subsurface soil and groundwater samples from these wells. Depending on accessibility, SAIC personnel may perform remote surface geophysical surveys within the bermed area, including magnetometry, electromagnetics, and ground penetrating radar. SAIC personnel will not access the pond floor. USATEU will conduct surface monitoring for the presence of chemical agents using a MINICAMS detector.

Environmental Contaminants — Previous soil and water sampling for chemical agents was performed by USATEU (SAIC 1993). Chemical agents were not detected in any of the samples. The surface of this area is not suspected of being contaminated with hazardous chemicals; however, potential hazards associated with migrating wastes may exist, particularly during drilling.

Hazard Analysis - Drilling Operations — Potential hazards include exposure to chemical agents and breakdown products of chemical agents, heat stress, and noise. Hazards associated with heavy machinery also will be present. The drilling sites will be monitored for chemical agents and gases to minimize exposure.

Hazard Analysis - Groundwater Sampling — Potential hazards include exposure (including skin contact) to degradation products of chemical agents. Chemical resistant gloves must be used when collecting surface water or sediment samples.

SAIC Work Activity	PPE Level
Drilling operations	C,D
Collecting groundwater samples	D

PPE: Disposable coveralls over routine work clothes, hardhat, safety goggles, N-butyl rubber gloves under leather workgloves, butyl rubber boots with safety toe, hearing protection, M9 or M17 equivalent protective mask (slung, not worn).

Required Monitoring — USATEU will perform soil and groundwater monitoring for chemical agent during drilling. USATEU will determine that the area is clear of agent prior to SAIC conducting any activity. In addition, continuous monitoring for combustible gas at the borehole will be performed using a CGI. Drilling locations will be cleared geophysically prior to drilling. Operations should cease and workers should egress site whenever the 10 percent LEL (for combustible gas) is encountered.

For chemical agent, the USATEU standard operating procedures will be followed:

Instrument	Action Levels	Action
CAM/M18	0.5 ppm for mustard gas 0.2 ppm for GB (nerve gas) 0.1 ppm for VX (nerve agent)	Egress site
ACAMS	0.003 ppm for mustard gas 0.0001 ppm for nerve agent	Upgrade to Level C

4.8 DETECTION AND IDENTIFICATION AREA

The Detection and Identification (D&I) Area is located on the Main Post. The 1.1-acre site was used from the 1950's to 1972 for GB training. The Navy may have used HD at the site in the late 1950's for training purposes. Training routinely consisted of application of test kits to detect and identify agents contained in 40-milliliter vials. Agents often were mixed as a 10 percent solution with water. The agent simulants CK, GC, CX, and AC also were reportedly used in the training area. All training aids from this site and a building from Area T-4 were burned twice in a dug pit and buried. The remains are reportedly still located in the pit. The pit containing the burned materials is identified by stake F, which was located during an October 1991 site visit. The decontaminants STB and DS-2 were used on surface soils and the area was cleared for surface use. The D&I Area is heavily wooded.

Task Description—A USATEU team will conduct MINICAMS screening for CWA in soil at the D&I Area. USATEU also may complete excavation and removal of the former training pit pending U.S. Army approval. SAIC field personnel will not conduct any investigatory activities and will provide a QA/QC for soil sampling. SAIC personnel will remain outside and upwind of the exclusion zone established by the USATEU team.

Environmental Contaminants—Possible degraded CWA.

Hazard Analyses—Significant health and safety hazards are unlikely under existing conditions. Hazards associated with exposure to burned remains of training aids are not anticipated to be significant.

SAIC Work Activity	PPE Level
Drilling operations	D

PPE: Basic work clothes, safety shoes/boots.

Monitoring—USATEU will conduct MINICAMS screening for GB, HD.

4.9 OLD WATER HOLE

The Old Water Hole is a site located between New Mt. Sellers Cemetery and the prisoner of war (POW) camp on Pelham Range that reportedly was used for the disposal of a variety of munitions, including chemical agents. The site is possibly a sinkhole, which would not have any release controls. A rectangular, shallow, topographic depression approximately 35 by 85 feet was located by Fort McClellan Department of Environmental Health personnel in the approximate area between the cemetery and the POW camp. An additional circular depression was located near the main depression in this area. Fort McClellan personnel indicate that the depression periodically fills with water, although it was dry during SAIC's October 1991 site visit. The depression was under water during SAIC's April 1992 site visit. Several small-caliber bullet shells were found at the site in 1992.

Task Description—SAIC field personnel will oversee the installation of five groundwater monitoring wells around the perimeter of the site boundaries. Further, USATEU will collect surface soil samples from within the site boundaries for CWA screening using MINICAMS. USATEU will also screen subsurface soil and groundwater samples from monitoring well drilling for the presence of CWA. SAIC personnel will conduct quantitative geophysical surveys in the site area prior to initiating field sampling. SAIC will work in close association with USATEU in this area.

Environmental Contaminants—Previous USATEU metal detection sweeps in the area detected significant positive anomalies. Chemical sampling has not been conducted at the site.

Hazard Analysis - Drilling Operations—Potential hazards include exposure to chemical agents and breakdown products of chemical agents, heat stress, and noise. Hazards associated

with heavy machinery also will be present. The sites will be monitored for chemical agent and gases as described in the Monitoring section to minimize exposure.

Hazard Analysis - Groundwater Sampling — Potential hazards include exposure (including skin contact) to degradation products of chemical agents. Chemical resistant gloves must be used when collecting surface water or sediment samples.

Work Activity	PPE Level
Drilling operations	C,D
Collecting groundwater samples	D

PPE: Disposable coveralls over routine work clothes, hardhat, safety goggles, N-butyl rubber gloves under leather workgloves, butyl rubber boots with safety toe, hearing protection, M9 or M17 equivalent protective mask (slung, not worn).

Required Monitoring — USATEU will perform monitoring for chemical agent. USATEU will determine that the area is clear of agent prior to SAIC conducting any intrusive activity. In addition, continuous monitoring for combustible gas at the borehole will be performed using a CGI. The CGI will be set at 10 percent LEL. Operations should cease and workers should egress site whenever the following 10 percent LEL (for combustible gas) is attained or exceeded.

For chemical agent, the USATEU standard operating procedures will be followed.

Instrument	Action Levels	Action
CAM/M18	0.5 ppm for mustard gas 0.2 ppm for G (nerve gas) 0.1 ppm for VX (nerve agent)	Egress site
ACAMS	0.003 ppm for mustard gas 0.0001 ppm for nerve agent	Upgrade to Level C

4.10 FORMER LANDFILL #1

Former Landfill #1 reportedly operated as the Post sanitary landfill between 1945 and 1947. The assumed site covers approximately two densely wooded acres and is located between

16th Avenue and Avery Drive adjacent to the floodplain of an unnamed intermittent stream draining into Remount Creek. The site slopes to the southeast toward 16th Avenue. No information exists concerning the operation or content of the landfill and the site is presently unconfirmed. Known or suspected releases have not been documented and evidence of releases (leachate seeps) was not observed during the site PA (USATHAMA 1990) or the October 1991 site visit. Aerial photographs of the site dated 1944 suggest that portions of the area may have been cleared, although the purpose for the clearing is unknown. A site walkover in October 1991 showed no evidence of previous landfilling at this location. SAIC magnetometer surveys in this area detected scattered surficial debris indicative of random, small-scale dumping.

Task Description—SAIC field personnel will conduct additional geophysical surveys at the site and may oversee the installation of four groundwater monitoring wells pending the results of the geophysical surveys. If the wells are installed, SAIC will collect soil and groundwater samples from these wells.

Environmental Contaminants—Previous air, soil, and water sampling has not been conducted at the site. The surface of this area is not suspected of being contaminated with hazardous chemicals; however, potential hazards may exist, particularly during drilling.

Hazard Analysis - Drilling Operations—Potential hazards include exposure to chemical agents and breakdown products of chemical agents, heat stress, and noise. Hazards associated with heavy machinery also will be present.

Hazard Analysis - Groundwater Sampling—Potential hazards include exposure (including skin contact) to degradation products of chemical agents. Chemical resistant gloves must be used when collecting surface water or sediment samples.

Work Activity	PPE Level
Drilling operations	D
Collecting groundwater samples	D

PPE: Disposable coveralls over routine work clothes, hardhat, safety goggles, N-butyl rubber gloves under leather workgloves, butyl rubber boots with safety toe, hearing protection, protective mask (slung, not worn).

Required Monitoring—Continuous monitoring for combustible gas at the borehole will be performed using a CGI. The CGI will be set at 10 percent LEL. Operations should cease and workers should egress site whenever the 10 percent LEL (for combustible gas) is encountered.

4.11 FORMER LANDFILL #2

Former Landfill #2 reportedly was used as the Post sanitary landfill after the closure of Former Landfill #1 and was active from 1947 to an unknown date. The landfill covers approximately 4 acres and is located west of the southern tip of Cemetery Hill, between 2nd Avenue and 10th Street. This site is heavily wooded and is located in the floodplain of Cave Creek, which is an intermittent stream flowing south-southeast of the landfill. The landfill reportedly was used to dispose of waste during deactivation of the installation. Rusted drums, metal, small containers (5-gallon cans and bottles), assorted building materials, and machinery parts were observed at the site in October 1991. Known or suspected releases have not been documented and evidence of releases (leachate seeps) were not observed during SAIC's October 1991 site visit and contaminants were not detected in three wells installed and sampled by SAIC in 1992.

Task Description—SAIC will collect groundwater samples from existing groundwater monitoring wells and will collect surface water and sediment samples upgradient and downgradient from the site. Other investigatory activities will not be performed.

Environmental Contaminants—Low levels of environmental contaminants were detected in previous groundwater sampling surveys. A list of environmental contaminants of concern is presented below. Also included are workplace exposure limits and other relevant data.

Contaminant	PEL (mg/m ³)	TLV (mg/m ³)	Skin Notation (Yes/No)	Vapor Pressure @ 23°C and 760 mm Hg	IDLH (mg/m ³)	Flash Point (F°)
Acetone	750		No	180	20,000	0
Lead	0.05	0.15	No	0	700	N.A.
Barium		0.5	No			
Lindane		0.5	Yes			

Hazard Analysis—Potential hazards include exposure to metals, solvents, and pesticides (Lindane), which can be absorbed through the skin.

Work Activity	PPE Level
Collecting groundwater samples from well	D

PPE: includes Tyvek suit, boots, safety glasses and latex gloves.

Monitoring—Monitoring will not be performed.

4.12 FORMER LANDFILL #3

Former Landfill #3 was the Post sanitary landfill in operation between 1946 and 1967. The landfill was operated using the trench and fill method, with trenches trending northwest to southeast. Traces of the trenches due to settling over the old landfill cells has been noted in the past, and were observed during the SI field work. The linear depressions probably result in the ponding of water and accelerate leachate generation. The landfill covers approximately 22 wooded acres and is located east of State Route 21 and north of Cane Creek. Access to the landfill area is obtained along unpaved perimeter roads.

USAEHA (1986) installed five monitoring wells (OLF-1 through OLF-5) within or adjacent to Former Landfill #3 in 1986. Water levels measured at that time indicate northwestwardly groundwater flow exiting Fort McClellan toward State Route 21. Groundwater sampling of these wells was initiated in 1986 by USAEHA. Groundwater samples were collected and analyzed for pesticides and polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), metals, and standard inorganic and

water quality parameters (chloride, sulfate, nitrate/nitrite, total dissolved solids [TDS], specific conductivity [umhos/cm], chemical oxygen demand [COD], phenols, and pH). The initial (1986) groundwater sampling results indicated limited groundwater contamination. These results show that iron, manganese, and low pH were in excess of National Secondary Drinking Water Regulation criteria. In addition, the following six organic compounds were detected: tetrachloroethene (12 to 110 $\mu\text{g/L}$), methylene chloride (9 $\mu\text{g/L}$), 1,1-dichloroethane (18 $\mu\text{g/L}$), trans-1,2-dichloroethene (24 $\mu\text{g/L}$), benzene (4 $\mu\text{g/L}$), and bis(2-ethylhexyl)-phthalate (10 to 40 $\mu\text{g/L}$) (USATHAMA 1990).

SAIC (1993) analyzed groundwater samples for VOCs, SVOCs, pesticides/PCBs, metals, explosives, and chemical agent (HD, GB, VX) breakdown products. Organic compounds detected in the wells included trichloroethylene, 1,1-dichloroethene, 1,1,2,2-trichloroethane, benzene, methyl isobutyl ketone, bis-2-ethylhexyl phthalate, tetrachloroethene, and a variety of pesticides. Organic compounds exceeding established U.S. Environmental Protection Agency (USEPA) maximum contaminant levels (MCLs) include 1,1-dichloroethane (OLF-G04) and TCE (OLF-G07). Detected pesticides include α -BHC, δ -BHC, isodrin, lindane, DDD, DDE, DDT, α -Endosulfan, β -Endosulfan, aldrin, dieldrin, endrin, heptachlor, and heptachlor epoxide. The detected concentrations were below the MCLs for those compounds with regulatory limits. The explosives-related compounds 1,3,5-trinitrobenzene (1.7 $\mu\text{g/L}$) and 2,4-dinitrotoluene (.773 $\mu\text{g/L}$) were detected in well OLF-10 at Former Landfill #3. Chemical agent breakdown products were not detected in the groundwater samples collected at Former Landfill #3.

Metals concentrations in excess of MCLs were detected at wells OLF-2 (total chromium, nickel, lead, beryllium, and thallium) and OLF-G03 (beryllium). Mercury concentrations were detected at wells OLF-1, OLF-2, OLF-3, OLF-4, and OLF-8; however, the levels are below the 2 $\mu\text{g/L}$ MCL for mercury. In addition, the method detection limits for beryllium, cadmium, lead, and thallium all exceed the MCLs or action levels for these compounds in drinking water. Aluminum concentrations range from 318 to 240,000 $\mu\text{g/L}$, with the highest values occurring at wells OLF-2 (240,000), OLF-3 (18,300 $\mu\text{g/L}$), and OLF-10 (23,600 $\mu\text{g/L}$). MCLs are not available for naturally occurring metals, such as calcium, sodium, potassium, manganese,

magnesium, and iron. Groundwater pH values ranged between 5.88 and 6.65 units and specific conductivity ranged between 398 and 1,940 μ S.

Task Description—SAIC field personnel will oversee the installation of 11 groundwater monitoring wells and will collect soil and groundwater samples from these wells. SAIC also will collect groundwater samples from groundwater monitoring wells that already exist at Former Landfill #3.

Environmental Contaminants—Low levels of contaminants were detected in previous groundwater sampling surveys, including VOCs and metals. A list of environmental contaminants of concern is presented below. Also included are workplace exposure limits and other relevant information.

Contaminant	PEL (mg/m ³)	TLV (mg/m ³)	Skin Notation (Yes/No)	Vapor Pressure @ 23°C and 760 mm Hg	IDLH (mg/m ³)	Flash Point (F°)
Tetrachlorethane ^c	7	6.9	Yes	9	150	N.A.
Dichloroethane ^c	1750	175 ^c	No	476	5000 ppm	-2
Benzene ^c	3.0	32 ^c	No	75	3000 ppm	12°

^c = carcinogen.

Hazard Analysis - Drilling Operations—Potential hazards include exposure to chemical agents and breakdown products of chemical agents, heat stress, and noise. Hazards associated with heavy machinery also will be present.

Hazard Analysis - Groundwater Sampling—Potential hazards include exposure (including skin contact) to contaminants. Chemical resistant gloves must be used when collecting groundwater samples.

SAIC Work Activity	PPE Level
Drilling Operations	D
Collecting Groundwater Samples	D

PPE: includes Tyvek suit, hardhats, safety goggles, safety shoes/boots, hearing protection.

Required Monitoring—Continuous monitoring for combustible gas at the borehole will be conducted using a CGI set at 10 percent LEL. Operations will cease whenever the 10 percent LEL is encountered.

5. HAZARD MONITORING AND CONTROL

This section describes the protocols that will apply to all site activities. Additional site-specific requirements are described in Section 3. This section also defines the minimum requirements for participation in field activities.

5.1 TRAINING

All Science Applications International Corporation (SAIC) employees, managers, supervisors, consultants, and subcontractors who perform field activities at the Fort McClellan sites must have completed the initial 40-hour Hazardous Waste Operations training course (OSHA 29 CFR 1910.120), and annual 8-hour refresher training completed within the last 12 months. Managers and supervisors directly responsible for site activities must complete an 8-hour Supervisor Training course in addition to the 40-hour and 8-hour refresher course. Training certificates (Appendix B) for all personnel (including subcontractors) performing site activities will be maintained in the project file (see recordkeeping requirements).

In addition, a safety meeting "tailgate briefing" conducted by the site safety officer shall be held onsite prior to each day's activities to reiterate the health and safety requirements or to inform site personnel of upcoming operations and safety requirements. At least one member of the SAIC team is required to have first aid and cardiopulmonary resuscitation (CPR) certification. A first-aid and CPR certified person should be onsite with the SAIC team at all times. Excerpts from SAIC's corporate health and safety plan (HASP) as it pertains to hazardous waste operations are provided in Appendix C.

5.2 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

Personal protection requirements for SAIC personnel conducting investigations around Former Landfills #1 through #3 will be established at modified Level D with provision for upgrade to Level C as necessary. These areas are not associated with chemical surety materials or munitions. Personal protection requirements for U.S. Army Technical Escort Unit (USATEU) sampling at suspected chemical surety or munitions sites will be established by the USATEU Health and Safety Plan. During all onsite investigative activities, the ambient air in

the breathing zone will be continuously monitored for total organic vapors using an HNu photoionization detector (PID) or an organic vapor analyzer (OVA).

5.2.1 Modified Level D Personal Protective Equipment

Onsite activities that require soil gas surveys, soil borings, well installations, collection of environmental media, or handling of potentially contaminated equipment/debris will be performed in modified Level D personal protective equipment (PPE), as follows:

- Hard hat and safety goggles
- Disposable Tyvek® coveralls over routine work clothes
- Nitrile latex gloves over disposable vinyl gloves
- Neoprene steel toe/steel shank safety boots
- Hearing protection worn during operation of heavy equipment.

5.2.2 Level C Personal Protective Equipment

During any onsite operation, if any organic vapors are detected at greater than or equal to 5 parts per million (ppm) above background conditions in the breathing zone, field personnel will upgrade to Level C PPE as follows:

- Hard hat
- Disposable Tyvek® coveralls over routine work clothes
- Nitrile latex gloves over disposable vinyl gloves
- Neoprene steel toe/steel shank safety boots
- Full-face air purifying respirator equipped with organic vapor/HEPA filter cartridges
- Hearing protection.

If organic vapors exceed 25 ppm in the breathing zone, all personnel shall leave the site and contact the SAIC Program Safety Officer for direction. At that time, the SAIC Project Manager and Program Safety Officer will evaluate the situation. If the project is continued in Level B PPE, additional personnel and equipment will be required at the site and the HASP will be re-evaluated. Air monitoring will be performed continuously.

5.3 MEDICAL SURVEILLANCE

SAIC employees who perform field activities at Fort McClellan must participate in SAIC's medical surveillance program. Personnel performing site work must have received a medical baseline or followup examination within the past 12 months. A physician's statement declaring that each SAIC field team member is medically qualified to perform hazardous waste related activities must be kept on file (see recordkeeping requirements).

Subcontractor employees, including the drilling subcontractor, must participate in their employer's medical monitoring program. The Site Safety Officer must ensure that all subcontractors participate in a medical monitoring program and that subcontractors provide appropriate documentation. Documentation should include a physician's statement declaring that each subcontractor employee is medically qualified to perform hazardous waste site work.

5.4 MONITORING AND SAMPLING PLAN

During all onsite activities, the site safety officer shall monitor the ambient breathing zone air continuously for total organic vapors and combustible gas. The combustible gas indicator will be set to alarm at 10 percent of the lower explosive limit (LEL), and will be positioned as close as possible to the boreholes. In addition, readings shall be taken directly at the borehole every 15 minutes. Ambient air monitoring may be performed with the following equipment:

- FID - Foxboro, OVA. This instrument shall be maintained and calibrated every day according to the OVA Operations Manual.
- PID - HNu system portable PID equipped with a 10.2 electron-volt UV lamp. This instrument shall be maintained and calibrated every day according to the HNu operations manual.
- CGI - ISD, Inc. MX241 combustible gas indicator (CGI).

Daily air monitoring logs will be maintained in the field log books of the site safety officer. These logs will contain the names of all personnel performing work at each site, a description of the work being performed at each site, and any new procedures established for performing work. In addition, these logs will list the types of air monitoring equipment being

used; how and when this equipment was calibrated; air monitoring results; the level of personal protective equipment being used; and complete descriptions of all injuries, accidents, physical complaints, and unusual occurrences.

5.4.1 Air Monitoring Action Levels

Table 5-1 lists the site actions that are required for detected concentrations for each detection instrument. The validity of these concentration-related actions is demonstrated in Table 5-2. As shown in this table, the threshold limit values (TLVs) for all chemicals, except benzene, suspected to be detected onsite are well above the concentration-related action levels established in Table 5-1. In the case of benzene, the detected concentration was so low that it should not pose any problems in the well-ventilated outdoor conditions present at this work site.

5.5 SITE CONTROL MEASURES

Site-specific work zones at each location to be investigated shall be established prior to initiating field operations. These site-specific zones shall consist of an exclusion zone "hot zone," a contamination reduction zone "decon zone," and a support zone "clean zone." The "hot zone" will be the area where contamination is suspected and where investigation activities will be performed. The "decon zone" will be where personnel and equipment decontamination activities are performed, and the "clean zone" will be the area to stage clean equipment, take work breaks, and provide administrative support activities. Daily worker sign-in/out sheets will be maintained at several locations on site and will be collated daily by the field manager.

During boring and well installation activities, a temporary hot zone will be established by barrier tape. The barrier tape will be placed around a 25-foot radius of the drilling equipment. "CAUTION: DO NOT ENTER" signs shall be placed equidistantly along the barrier tape. This will act as a visual barrier to prevent access of non-project related observers. If the barrier tape is crossed by observers, drilling/boring activities shall cease until the observers depart. If observers become a hazard to themselves as well as to planned field operations, all field work shall stop and the Fort McClellan Safety Officer shall be contacted. Site surveys, geophysical surveys, and collection of environmental samples in the hot zones will

Table 5-1. Air Monitoring Action Levels

Monitoring Instrument	Detected Concentration	Site Action
PID/FID	≥ 10 ppm for 1 minute	Upgrade PPE to Level C
PID/FID	≥ 25 ppm for 1 minute	Egress site and contact SAIC Program Safety Officer
CGI	10 percent LEL	Egress site and contact Fire Department and SAIC Program Safety Officer

Table 5-2. Contaminants Identified in Groundwater, Fort McClellan, Alabama

	Number of Wells in which Chemical was Detected*	Detected Concentrations $\mu\text{g/L}^*$	Threshold Limit Value (TLV)** (ppm)
Tetrachloroethene	3	50 12 110	50
Methylene Chloride	1	9	50
1,1-Dichloroethane	1	18	200
trans-1,2-Dichloroethene	1	24	200
Benzene	1	4	1

* Information on number of wells in which chemical was detected and maximum detected concentrations obtained from 1990 Enhanced Preliminary Assessment report prepared by Roy F. Weston, Inc.

** Threshold Limit Value information obtained from ACGIH 1991-1992 Threshold Limit Values and Biological Exposure Indices Manual.

not require the use of barrier tape. A decon zone and a clean zone shall be established by the site safety officer in a location that facilitates field operations at each location to be investigated. Detailed site maps will be available on site during all field activities. SAIC team members will not work alone during the performance of any sampling or decontamination activities.

Other site control measures include:

- The initial indoctrination of site personnel and site-specific safety training will be accomplished during the training session conducted by the Site Health and Safety Officer

(SHSO). In addition, the site personnel will receive a site orientation and review the Health and Safety Plan.

- The SHSO will be responsible for ensuring that job site hazards are properly controlled to provide safe ingress and egress from the sites. Cones and high visibility surveyor tape (when deemed necessary by the SHSO), will be utilized for controlling traffic and limiting access to hazardous and restricted areas.
- Emergency telephone numbers will be posted for the fire department, ambulance service, and the nearest emergency medical clinic/hospital.
- A tailgate safety meeting will be conducted to discuss pertinent site safety topics at the beginning of each shift, whenever new personnel arrive at the job site, as site conditions change, and whenever otherwise deemed necessary. These meetings will be conducted by the SHSO and as a result of each meeting, a completed tailgate safety meeting form must be posted at the job site.
- To prevent the hazard of drilling into underground power cables or other utilities, maps showing proposed drilling locations will be submitted to Fort McClellan Facilities Engineering for approval. Standard drilling procedures forbid drilling within 5 feet of marked underground facilities or within 20 feet of overhead electrical hazards.
- Entrance into confined spaces is not anticipated to be necessary during site activities. This plan does not allow SAIC (or its subcontractors) to enter a confined space.
- In addition to avoiding the potential physical and chemical hazards presented by the survey and sampling activities, it is essential that personnel heed all Fort McClellan safety precautions and rules. To ensure safety work practices and conditions, the SHSO will document incidents of noncompliance with the Fort McClellan Safety Program or this Health and Safety Plan (H&SP), follow up on "near miss" incidents, and rectify any noted safety problems.
- All site sampling locations will be outlined using surveyor tape; the site exit/entry point will be established upwind of site operations. Atmospheric monitoring for organic vapors will be continuous while personnel conduct sampling operations. All atmospheric monitoring will follow the procedures established in the air monitoring section. Soil brought to the surface will be monitored for the presence of organic vapors.
- SAIC and its subcontractors will emphasize compliance with state, local, and Post motor vehicle laws and regulations as part of each daily safety briefing. Special considerations such as current or anticipated hazardous road conditions will be addressed at the daily safety briefings.
- If work is to be conducted during weekends or installation nonduty hours, special arrangements must be made with the appropriate medical and emergency service organizations.

5.6 DECONTAMINATION PLAN

Decontamination procedures are necessary to protect field personnel and control the spread of contamination by either personnel or equipment. Personnel participating in the Fort McClellan RI field activities may potentially become contaminated in a number of ways, including:

- Contacting vapors, gases, mists, or particulates in the air
- Being splashed by materials while sampling
- Walking on contaminated soil.

5.6.1 *Modified Level D Decontamination*

Site investigation tasks will be conducted in modified Level D protection, unless criteria for upgrading to Level C protection are exceeded. Personnel and equipment may not need to be decontaminated upon leaving the exclusion zone unless the SHSO identifies a need for decontamination based upon vapors being generated at a particular borehole, or notes gross visual contamination of protective clothing. When decontamination is necessary, it will consist of the following:

- A decontamination station will be located at the "hotline" where personnel routinely enter or exit the exclusion zone. When exiting the exclusion zone, personnel will take off overboots, chemical resistant boots, coveralls, and outer gloves only at the specified decontamination station.
- All PPE removed will remain at the decontamination station pending personnel redonning the clothing. At the conclusion of work in a site exclusion zone, all protective equipment will be placed in plastic bags prior to disposal or transfer offsite.
- Personnel will not be permitted to exit the regulated work area until contaminated clothing and equipment are removed and they have washed their hands and face with soap and water.

5.6.2 Level C Decontamination

Level C decontamination will include:

- A decontamination station in the contamination reduction zone (CRZ) will be located where personnel routinely enter or exit the exclusion zone. When exiting the exclusion zone, personnel will take off overboots (if used), chemical resistant boots, coveralls, and outer gloves only at the specified decontamination station. Air purifying respirators will be removed last.
- Personnel will be instructed in proper decontamination techniques. This will entail removal of protective clothing in an "inside out" manner. Removal of contaminants from clothing or equipment by blowing, shaking, or any other means that may disperse material into the air will be prohibited.
- All personal protective clothing removed will remain at the decontamination station pending personnel redonning the clothing. At the conclusion of work in a site exclusion zone, all protective equipment will be placed in plastic bags prior to disposal or transfer off site.
- Personnel will not be permitted to exit the regulated work area until contaminated clothing and equipment have been removed and they have washed their hands with soap and water.

5.6.3 Other Decontamination/Disposal Procedures

Disposable PPE—Disposable PPE and other noncontaminated investigation - derived wastes will be placed in a plastic bag and disposed of in an industrial dumpster.

Decontamination Solution—Steam, generated from a portable steam cleaning machine, will be the primary decontamination solution. Water for steam will be obtained from a potable water source on Post. Decontamination solutions will be containerized.

It is not expected that personnel or equipment performing investigative activities on this site will become contaminated to concentrations considered hazardous. However, to ensure that potential contaminants are not carried offsite, the following decontamination procedures shall be implemented.

5.6.4 Personnel Decontamination

The following decontamination procedure shall be followed when exiting the exclusion zone:

1: Segregated Equipment Drop	1. Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
2: Boot Cover and Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.
3: Boot Cover and Glove Rinse	3. Rinse off decon solution from station 2 using copious amounts of water.
4: Tape Removal	4. Remove tape around boots and gloves and deposit in plastic liner.
5: Boot Cover Removal	5. Remove boot covers and deposit in plastic liner.
6: Outer Glove Removal	6. Remove outer gloves and deposit in plastic liner.
7: Tyvek® Suit Removal	7. Remove Tyvek® suit and deposit in plastic liner.
8: Face Piece Removal	8. If respirators are used, wipe down the respirator exterior with a wet paper towel, remove and deposit in container with plastic liner. Avoid touching face with fingers. Respirators shall be washed in an MSA sanitizing solution (or equivalent), rinsed with potable water, and allowed to dry.
9: Inner Glove Removal	9. Remove inner glove and deposit in lined container. 10. Wash hands, face, and any other potentially contaminated areas with a potable water/mild soap solution followed by a potable water rinse. 11. Shower and launder personal clothing as soon as possible upon completing daily activities.

The personnel decontamination station will consist of the following components, at a minimum:

- Long handle, stiff bristle scrub brush 2 each
- 20-gallon plastic boot wash basin 2 each
- Plastic sheeting (6-foot by 30-foot roll) 1 each
- Portable field table 1 each

• Mild soap (16 oz.)	1	each
• Industrial soap powder (1 pound)	1	each
• Trash barrel (60 quart)	2	each
• Plastic trash bags (60 quart)	30	each
• Paper towels (100/roll)	10	each
• Water supply	1	each
• First-aid kit	1	each
• Portable eye wash	1	each
• Class A, B, C, fire extinguisher (5 pound)	1	each
• Portable air horn	1	each

5.6.5 Equipment Decontamination

All equipment that comes into direct contact with potentially contaminated soil, surface water, or groundwater shall be decontaminated between each sampling location and before being taken offsite. Decontamination activities will be conducted in modified Level D. Equipment decontamination procedures will consist of the following:

- Physically remove packed dirt, grit, mud, and debris with a wire or stiff bristle, long handle brush
- Steam clean all potentially contaminated surface areas
- Scrub all potentially contaminated surface areas with water and a brush
- Rinse scrub solution off with steam
- Allow to drip and air dry onsite
- Scan equipment with PID to ensure absence of volatile vapors.

The equipment decontamination station will consist of the following components, at a minimum:

• Portable steam cleaning machine	1	each
• Long handle, wire or stiff bristle brush	2	each
• 5-gallon plastic basin	2	each

- Industrial soap powder (1 pound) 1 each
- Potable water supply (fixed or portable) 1 each
- Fixed or portable electrical supply 1 each
- Class A, B, C fire extinguisher (5 pound) 1 each

5.7 CONFINED SPACE ENTRY PLAN

Confined space entries will not be made during any part of this sampling program.

5.8 HAZARDOUS WASTE MANAGEMENT

Hazardous wastes potentially encountered at Fort McClellan may include soil or groundwater laden with chemical warfare agents (CWA), CWA decontaminants, organic solvents, heavy metals, or explosives. Explosive hazards are minimal outside of direct burial locations. Liquid and solid waste materials generated by sampling activities at the RI sites will be containerized pending disposition based on laboratory testing and MINICAMS screening.

5.9 OTHER HAZARD CONTROL MEASURES

Additional hazard control and safety measures applicable to the Fort McClellan RI/FS are discussed below. These measures include general safety protocols, drill rig safety, physical hazards, and biological hazards.

5.9.1 *General Safety Protocols*

All persons involved in this project, including subcontractors, shall read and sign this safety plan prior to performing field investigation activities at Fort McClellan. Through their signature, personnel indicate that they understand and will adhere at all times to the SAIC, U.S. Army, and Occupational Safety and Health Administration (OSHA) requirements presented or referenced in this plan. The master copy (with signature sheet) of this safety plan will be held by the designated onsite safety officer and a copy will be available at each designated work site. In addition, all personnel will sign an individual signature sheet (Figure 5-1) upon arriving on site acknowledging that each individual has read, understands, and will comply with the requirements of the Health & Safety Plan.

PERSONAL ACKNOWLEDGEMENT

As a component of the Health and Safety Plan (HASP), designed to provide safety for remedial investigation activities to be conducted at Fort McClellan sites, you are required to read, understand, and agree to abide by any provisions in the HASP.

By my signature, I certify that I have read, understand, and will abide by the Fort McClellan Health and Safety Plan.

_____ Signature	_____ Date
_____ Onsite Health and Safety Officer	_____ Date

Figure 5-1. Personal Acknowledgement Signature Sheet

Project personnel will not be allowed to enter designated hazardous waste sites without the prior knowledge and consent of the designated site safety officer and project manager. No activities will be conducted at designated hazardous waste sites without sufficient backup personnel. At a minimum, two persons must be present during onsite investigation activities. Visual, voice, or radio communication will be maintained at all times. There will be no eating, drinking, application of cosmetics, or smoking in designated hazardous waste sites. Project personnel shall bring to the attention of the designated site safety officer any unsafe condition or practice associated with onsite project-related activities.

All boring and well installations, heavy equipment operation, and general construction activities shall be performed in compliance with 29 CFR 1926. The noise generated by heavy equipment will be monitored and evaluated using a noise level indicator. If the noise levels are greater than 85 dBA, hearing protection will be required. Efforts will be made to keep dust levels to a minimum during the operations. If dust levels appear to be problematic because of RI operations, access roads will be sprayed down with water using the post fire department. Because there will be very little movement of heavy equipment around the site during the RI, dust control is not anticipated to be particularly acute on the Post.

At each daily safety briefing, the site safety officer will emphasize that all persons involved with this project, including subcontractors, shall comply with all state, local, and Post motor vehicle laws and regulations. This briefing will include all special considerations pertaining to motor vehicle safety, including current or possible hazardous road conditions.

All project personnel who are likely to wear air purifying or air supplied respirators must first meet the training and medical requirements of 29 CFR 1910.120 and 29 CFR 1910.134. In addition, the SHSO will maintain onsite documentation at all times verifying completion of all training, respirator fit testing, and medical surveillance required by 29 CFR 1910.123 and 29 CFR 1910.134. Contact lenses may not be worn at hazardous waste sites.

5.9.2 Drill Rig Operations

Above- and below-ground utility lines may pose a safety hazard to workers during excavation or drilling. The driller must maintain a safe clearance distance (minimum of 20 feet) between overhead utility lines and the drill rig mast at all times. The location of underground utilities must be determined prior to excavation or drilling. No drilling will take place without the identification of underground utility lines by a representative of the utility company or by the appropriate installation personnel. All permits, licenses, and/or rights-of-entry required by state, local, and/or installation authorities shall be the responsibility of the contractor. These requirements will be identified during the project planning phase.

Drilling activities for the purpose of soil and water sampling involve several safety hazards (i.e., flying debris, hydraulic failures, unguarded machinery, equipment rollover, fire). Accordingly, the following minimum safety precautions will be implemented for contractors conducting drilling or coring operations on behalf of the U.S. Army Environmental Center (USAEC):

- The drilling contractor shall have documented safety and emergency action procedures for the equipment to be operated. The drilling contractor's employees will acknowledge, in writing, that they have read and understand these procedures.
- The drilling contractor shall ensure that the equipment is well maintained, meets safety requirements, is inspected daily during use, and has all required safety equipment (i.e., 20-pound A:B:C fire extinguisher, emergency stops). Boring tools shall be in good condition and adequate for the work to be performed.
- All personnel working on and around the rig will know where the kill switch is located in case of an emergency. Kill switches will be tested daily by the drill rig operator, verified by the Rig Geologists, and documented in the log book.
- The drill rig shall be operated by a qualified operator who can identify pending failures and supervise the driller's helper. Transportation of the drill rig to the work site shall be performed by a person with the proper commercial license.
- To the extent possible, the terrain should be level (a minimum of 10 feet on each side of the drill rig) and the condition of the ground such that unexpected movement of the drill rig is unlikely. If the slope of the terrain is determined to be potentially hazardous, alternate drilling location will be located in the field.

Drilling in known or suspected unexploded ordnance (UXO) areas will be avoided during the RI. In the event that drilling is necessary in a known or suspected UXO area, downhole magnetometer measurements will be obtained at 4 foot intervals using an MK-26 or equivalent ferrous ordnance locator. Relocation of the drilling rig on UXO sites will be minimized. Surface geophysical surveys will be conducted at sites where ordnance is suspected prior to the initiation of drilling activities. Additionally, the soil boring and monitoring well location at these sites also will be surveyed using a magnetometer to screen for subsurface metallic objects. Data collected from the overall site geophysical surveys and the magnetometer data collected at each boring and well will be used to evaluate the site. The following procedures will be used:

- If the formation collapses when the augers or casing are retracted, PVC casing will be placed into the borehole prior to the withdraw of any augers or casing.
- The augers or casing will be retracted approximately 20 feet.
- Place the magnetometer inside the PVC casing, lower it to the bottom of the borehole, and collect the reading.
- Remove the magnetometer from the PVC casing after the reading has been collected. Remove the PVC casing, drill the next 4 feet, and repeat the procedure.

5.9.3 Physical Hazards

Heat stress conditions are unlikely but could occur especially during the later part of the project or if higher levels of personal protection (i.e. Level C or B) are required. The SHSO should monitor daily weather conditions and prescribe the appropriate clothing and work-rest schedules to minimize heat stress.

The use of heavy equipment increases the risk for accidents that involve the crushing, fracturing, dislocation, or amputation type injuries. Great care will be exercised while working in the vicinity of the drill rig or backhoe. Other physical hazards include potential obstacles and wet conditions, which could present slip, tug, and fall hazards.

Safety glasses or goggles will be worn at all times in the "hot" and "warm zones". Additionally, safety glasses will be worn while using acids to preserve samples, mixing or tremieing grout, decontaminating equipment and tools, and any time there is a potential for

chemicals or flying objects to cause eye injuries. An eye wash bottle will be on site for first aid in the event an eye injury occurs.

Elevated noise levels are problematic in areas where heavy equipment (i.e. drill rig or backhoe) is being used. These levels will be monitored and evaluated in the initial stages of the field effort to determine if hearing protection will be required. If noise levels are greater than 85 dBA, the use of hearing protection will be maintained while in the presence of heavy equipment operation for the remainder of the field effort.

Chemical exposure to known chemicals (i.e. decontamination solvents) and possibly unknown chemicals released during drilling or excavating activities is of great concern. Sampling equipment will be decontaminated in an area that is not enclosed and thoroughly ventilated. The borehole, test pits, and associated breathing zones will be monitored very frequently to ensure that personnel are working in a safe environment.

The chemical warfare agents (CWA) H, HD, and HT are persistent blistering agents. The agents GB and VX are rapidly acting nerve agents. These materials are classified as Class A poisons by the department of Transportation (DOT) and as Chemical Group A agents by the U.S. Army Materiel Command (USAMC). The Material Safety Data Sheets (MSDSs) for the CWAs listed above are provided in Appendix A.

Hazards from exposure to mustard agents occur through vapor contact with the eyes or respiratory tract and liquid contact with the skin. Undecontaminated mustard agents may persist on surfaces as liquid contamination for extended time periods because of their low volatilities. Undecontaminated agent on surfaces can be transferred to personnel by contact. The agent GB is hazardous through vapor inhalation in the respiratory tract or absorption through the eyes or skin. The agent is highly toxic and quick acting. The hazards associated with VX exposure occur through liquid absorption by the skin, absorption as a vapor or aerosol through the respiratory tract and eyes, or ingestion through the gastrointestinal tract. Undecontaminated VX is slow to evaporate and may persist as a liquid for several days.

A solution of H, HD, or HT is considered dilute if its concentration is not greater than 10,000 mg/L (neat agent/solvent) and it contains no more than 100 mg of neat agent. A maximum GB concentration of 2,000 mg/L of agent in a solution containing a maximum quantity of 20 mg of neat GB is considered to be dilute. A dilute solution of VX agent has a maximum concentration of 1,000 mg/L and contains a maximum of 10 mg of VX agent. Operations involving chemical warfare agents diluted to or below the drinking water standards in U.S. Army manual TB MED 577 (i.e., 0.02 mg/L for nerve agents and 0.2 mg/L for mustard) are not subject to U.S. Army safety regulation #385-131 (USAMC 1987). Areas which have been monitored to verify concentrations of HD (0.003 mg/m³), GB (0.0001 mg/m³) and VX (.00001 mg/m³;) are regarded as clean (USAMC 1987).

Standard decontamination agents (USAMC 1987) used for decontaminating equipment or spills include:

- Super Tropical Bleach (STB) used as a slurry. STB in a dry state reacts violently with liquid mustard to produce toxic vapors and possibly sufficient heat to cause flame. The minimum acceptable chlorine content for STB is 10 percent.
- High Test Hypochlorite (HTH) used as a solution. HTH in a dry state reacts violently with liquid mustard to produce toxic vapors and possibly sufficient heat to cause flame. The minimum chlorine content for HTH is 30 percent.
- Commercial liquid bleach consisting of a nominal 5% solution of sodium hypochlorite. The minimum chlorine content for sodium hypochlorite is 3 percent.
- Ten percent sodium hydroxide or sodium carbonate for GB decontamination. Sodium hydroxide is not used as a decontaminant on agent-filled, aluminum cased munitions or containers because of a reaction with aluminum that generates heat, hydrogen gas, and aluminum deterioration.

In the event of an actual agent release that threatens unprotected personnel, every effort must be made, in coordination with civil authorities, to evacuate or offer protective advice to populations within the anticipated no significant effects (2 mg-min/m³ for mustard, 0.33 mg-min/m³ for GB, 0.25 mg-min/m³ for VX vapor, and 0.11 mg for inhalation deposition of liquid VX) arc downwind from the agent releases, based on hazard prediction calculations.

5.9.4 *Biological Hazards*

Poisonous snakes, spiders, and scorpions are indigenous to Fort McClellan. RI field Team members could encounter rattlesnakes at the Post. The SHSO will inform team members at the safety briefings to be on the lookout for rattlesnakes. Emergency procedures for snakebites are immobilization of the bite area and transport to a medical facility.

Personnel with any known allergies will be required to notify the SHSO and Site Field Manager prior to conducting any type of work related activities at the site. This includes allergies from insect bites (i.e. wasps, hornets, bees, etc), plants (i.e. poison ivy) or medication.

5.10 ENFORCEMENT OF THE HEALTH AND SAFETY PLAN

Adherence to the protocols and procedures established in this health and safety will be enforced by the SAIC and USAEC site health and safety officers, who will have decisionmaking authority to redirect work assignments and personnel in the interest of maintaining a safe work environment. The SAIC site health and safety officer will be supported by a minimum of two field health and safety audits by the project health and safety officer and by site visits by the SAIC project manager. Personnel who do not comply with the project protocols will be subject to dismissal from the site.

6. EMERGENCY RESPONSE PLAN

It is the objective of this Health and Safety Plan (H&SP) to minimize chemical and physical hazards and operational incidents. The following information is provided to ensure that personnel respond to emergency situations in a calm, reasonable manner. The types of emergencies that could occur include:

- Heat stress illnesses
- Slips, trips, and falls
- Motor vehicle-related accidents/injuries
- Drill rig related injuries
- Snake, spider, scorpion, or other contact
- Chemical contact and splashes
- Explosions.

Prior to commencement of field operations, an emergency medical assistance network will be established. Telephone numbers for the fire department, ambulance, and a hospital with an emergency room are identified in Table 6-1. A vehicle will be available onsite during all activities to transport injured personnel to the identified emergency medical facilities. Additional safety provisions will be made as follows:

- The SAIC team will be equipped with a cellular phone to assist in summoning assistance.
- Telephone numbers of the emergency room facilities and their locations will be posted at the site (including the fastest routes to the emergency facilities).
- The Site Health and Safety Officer (SHSO) will be the lead in all emergency situations.
- At least one SAIC field person at each site will be trained to render first aid and cardiopulmonary resuscitation (CPR) prior to initiating field activities. A first-aid kit will be available at the site. An adequate supply of fresh water and portable emergency eye wash will be available at each work site.
- Site personnel will be trained in emergency procedures during the personnel training session described in Section 5.

Table 6-1. Emergency Information

EMERGENCY RESOURCES:		
<i>Resource*</i>	<i>Post Telephone</i>	<i>Civilian Telephone</i>
Fort McClellan Military Police	ext. 5-3821	1-205-848-555
Fort McClellan Fire Department	ext. 17	1-205-820-1117
Fort McClellan Ambulance	ext. 12	1-205-848-2315
Post POC - Bill Garland	ext. 5-3728	1-205-848-3758
USAEC Safety and Environmental Services Branch - William P. Houser		1-301-671-4811 (Civ. Telephone)
PROJECT CONTACTS:		
<i>Contact</i>	<i>Office Telephone</i>	
Alfred Wickline - Program Manager	1-703-734-5514	
Robert Reisdorf - Project Health and Safety	1-703-821-4634	
Christopher Manikas - Project Manager	1-703-827-4832	
MEDICAL SUPPORT:		
Any situations requiring medical attention will be handled at the Regional Medical Center.		
Telephone: 1-205-235-5121 Address: 400 East 10th Street, Anniston, Alabama		

* Emergency resources have been notified in advance of planned SAIC field activities at Fort McClellan.

- Evacuation routes from each specific sampling area will be established by the SHSO, and communicated to all personnel during the tailgate safety meeting conducted before each work shift.
- A means to determine wind direction (wind sock or surveyor ribbon) will be set up in the vicinity of the work area.
- Either the SHSO or the supervisor in the exclusion zone will carry a compressed air horn. In the event of fire, hazardous substance spill, vapor release, or other hazardous event, three short blasts will signal all personnel to evacuate the site. All personnel evacuating the exclusion zone will proceed to a predetermined location upwind, where the SHSO will conduct a head count and provide further instructions.
- The SHSO will be responsible for ensuring that all site personnel understand Fort McClellan facility-specific emergency signals and procedures, if any.

Should an accident occur, the SHSO will immediately notify the Fort McClellan Fire Department (Post extension 17 or 1-205-820-1117), complete an accident report and investigate the cause. Accidents must be reported by telephone to the U.S. Army Environmental Center (USAEC) Health and Safety Officer at (410) 671-4811, as soon as possible, but not later than 2 hours after occurrence and reported in writing within 5 days of occurrence. All other incidents must be reported by telephone to USAEC at (410) 671-4811, within 8 hours of occurrence, or sooner if conditions permit. Any recommended hazard control must be discussed with the SAIC Health and Safety Manager and meet his approval prior to implementation. Any chemical exposure or occupational injuries and illnesses also shall be reported and recorded, if recordable per 29 CFR 1904, on OSHA Form No. 200. Any incident resulting in a fatality, or lost-time injury, five or more persons hospitalized, or damage to government or contractor property (which occurs during the performance of the contract at the project site) in excess of \$2,000 must be reported. Records of all site accidents and first aid treatments will be maintained by the SHSO.

Table 6-1 provides emergency information for personnel working at Fort McClellan. The quickest route from Fort McClellan to the Anniston Regional Medical Center is as follows:

Summerall Gate Road to Summerall Gate. After leaving the post turn left on McClellan Boulevard (State Highway 21 South) and follow it approximately 2 miles to the intersection of McClellan Boulevard and Tenth Street. Turn left (eastbound) on Tenth Street, drive one block, and

the hospital is on the right at the intersection of Tenth Street and Leighton Avenue.

The quickest route from Pelham Range to the Regional Medical Center is as follows:

Use Gate 3 Road and proceed to Gate 3. After leaving the post, stay on Gate 3 Road to the intersection of Gate 3 Road and U.S. Highway 431/State Highway 1. Turn right (southbound) on U.S. Highway 431/State Highway 1 and follow it approximately 2 miles to the intersection of U.S. Highway 431/State Highway 1 and McClellan Boulevard (State Highway 21). Turn right (southbound) on McClellan Boulevard and drive approximately 2 miles to the intersection of McClellan Boulevard and Tenth Street. Turn left (eastbound) on Tenth Street, drive one block, and the hospital is on the right at the intersection of Tenth Street and Leighton Avenue.

All accidents and/or injuries shall be immediately reported to the site safety officer. An accident report and, if necessary, an exposure report will be initiated by the site safety officer and provided to the Program Safety Officer for processing. Examples of these reports are provided in Appendix E. Also, a U.S. Army Corps of Engineers Accident Investigation Report shall be required. An example of this form is provided in Appendix F.

In addition to the above, Fort McClellan has implemented specific Hazard Communication and Accident Prevention Programs. Copies of these programs are provided in Appendix G (Hazard Communication Program) and Appendix H (Accident Prevention Program).

6.1 FIRE

In the event of a fire, attempts will be made to extinguish it with a Class A, B, or C fire extinguisher, if safe to do so. If the fire appears to be growing "out of control," the following steps will be performed:

- Pull site horn warning alarm
- Egress field team to the site entrance
- Verify all present
- Notify the Fort McClellan Fire Department and Post Safety Officer

- Remove vehicles if safely possible
- Remove flammable field solvents and fuels if safely possible
- Await fire-fighting forces
- Contact the Project Manager and the SAIC Program Safety Officer once the Fire Department is in control of the situation.

6.2 HAZARDOUS MATERIAL RELEASE

In the event a hazardous material release occurs during RI/FS activities, attempts may be made to control, divert, absorb, neutralize, or secure the source if direct contact or inhalation hazards are not present. If direct contact or inhalation hazards are present, remedial measures should not be attempted. All hazardous material release incidents shall be immediately reported to the Fort McClellan Post Fire Department, and, as soon as possible, to the SAIC Program Safety Officer. In addition, a Hazardous Materials Exposure Report (Appendix E) and a Corps of Engineers Accident Report (Appendix F) will be completed, as required.

The following information will be helpful during a notification:

- Chemical/oil name or U.S. Department of Transportation (DOT) I.D. number
- Chemical/oil hazard class
- Cause of release
- Quantity/concentration of the release
- Potential for fire
- Potential for site release evaluation
- Injuries caused by release
- Actions taken.

6.3 INJURIES

In the event of an injury, the victim should be stabilized and provided onsite first aid in the "clean zone." If an injury involves a potential trauma to the spinal cord, the victim shall remain where injured, if safely possible, and be moved by trained emergency medical technicians only. Minor injuries such as small lacerations, cuts, and strains shall be initially

treated onsite by a first aid qualified member of the field team. Ambulance and hospital support shall be provided for all major injuries, such as head wounds, broken bones, and deep lacerations.

If decontamination does not interfere with essential treatment, the following should be performed:

- Escort victim to the decontamination station
- Wash, rinse, or cut off protective clothing and equipment
- Wash exposed body areas with a potable water flush (10 minutes)
- Cover with blanket or (if injury is not serious) dress victim in clean clothing
- Transport victim to hospital if necessary or request ambulance support, if needed.

If decontamination cannot be performed, the following should be completed:

- Wrap the victim in blankets, plastic, or rubber to reduce contamination of other personnel
- Alert emergency and offsite medical personnel to potential contamination; instruct them in specific decontamination procedures, if necessary
- Send along site personnel familiar with the incident.

In many cases, communications will not be readily accessible in the field. In an emergency situation, an individual will be immediately dispatched to contact appropriate emergency response individuals by telephone. If a life threatening injury precludes decontamination of a contaminated individual, the Fort McClellan HAZ MAT Team and Fire Department will be contacted immediately by telephone. First-aid will be performed if it does not endanger the safety of the individual administering first aid.

7. SPILL CONTAINMENT PROGRAM

The activities covered in this plan, with the exception of the steam cleaning operations, are not expected to generate significant quantities of liquid waste. Investigation derived wastes, including decontamination fluids, will be containerized on site, tested chemically, and disposed of in an appropriate manner, according to guidance established in the RI/FS project work plan and sampling plan.

8. RECORDKEEPING

Recordkeeping requirements for health and safety are discussed in the SAIC/TSC EC&HS Manual Chapter 20. A list of the documents that should be retained and the distribution is presented below.

<u>Document</u>	<u>Distributed to:</u>
Most recent copy of Site Health and Safety Plan	SHSO, Local EC&HS Official, Corporate EC&H Records Retention Center
Documentation on the site-specific training session, and other EC&HS training records (including verification of 40-hour, 8-hour and supervisor training)	SHSO, Project File, Corporate EC&HS Records Retention Center
Maintenance and calibration records of all monitoring equipment	SHSO, Project File
Incident and accident reports	SHSO, Local EC&HS Official, SAIC Personnel, Corporate EC&HS Records Retention Center
Verification of medical qualifications	SHSO, Local EC&HS Official, SAIC Personnel Corporate EC&HS Records Retention Center
Employee exposure monitoring results	SHSO, Local EC&HS Official, SAIC Personnel, Corporate EC&HS Records Retention Center
Changes to approved Site Health and Safety Plan and documentation as to why the changes were made	SHSO, Local EC&HS Official, SAIC Personnel, Corporate EC&HS Records Retention Center
Results of audits	SHSO, Project Manager, Corporate EC&HS Records Retention Center
Debriefings	SHSO, Project Manger, Local EC&HS Official, Corporate EC&HS Records Retention Center

9. REFERENCES

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- Federal Register, Volume 54, No. 12, January 19, 1989, Department of Labor, Rules and Regulations, 29 CFR Part 1910-Air Contaminants.
- National Institutes for Occupational Safety and Health (NIOSH), September 1985. *Pocket Guide to Chemical Hazards.*, DHHS Publication No. 85-114.
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- Science Applications International Corporation, *Site Investigation Report, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, 1993.
- Sittig, M. 1985, *Handbook of Toxic and Hazardous Chemicals and Carcinogens*, 2nd Edition, Noyes Publications, New Jersey.
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