ONIS "TREY" GLENN, III
DIRECTOR

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BOB RILEY
GOVERNOR

October 1, 2009

Mr. Scott Bolton
Site Manager
US Army Transition Force
P.O. Box 5022
Fort McClellan, Alabama 36205

RE: ADEM Review and Concurrence: *Letter Work Plan for Monitoring Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 88(6), 108(7)/82Q-X, 112Q, 113Q-X, 231Q, and 214Q*, dated July 13, 2009
Fort McClellan, Calhoun County, Alabama
Facility I.D. No. AL4 210 020 562

Dear Mr. Bolton:

The Alabama Department of Environmental Management (ADEM or the Department) has reviewed the Army's *Letter Work Plan for Monitoring Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A*. The Department notes that the Army plans to install one bedrock monitoring well and collect groundwater samples from the newly installed well as well as 16 existing wells at the site. The well installation and sampling procedures are reasonable and appropriate; therefore, the Department concurs with the work plan.

If you have any questions or concerns regarding this matter, please contact Mrs. Ashley T. Mastin of the Remediation Engineering Section at 334-271-7797 or via email at atmastin@adem.state.al.us.

Sincerely,

Stephen A. Cobb, Chief
Governmental Hazardous Waste Branch
Land Division

SAC/TPS/ATM/mal

Cc: Mrs. Tracy Strickland/ADEM
Mrs. Brandi Little/ADEM
Ms. Lisa Holstein/Army
Mr. Doyle Brittain/USEPA
Mr. Robin Scott/MDA
Mr. Lee Coker/USACE

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July 13, 2009

SHAW-MC-CK10-1164
Project No. 796887

Mr. Lee Coker
U.S. Army Corps of Engineers, Mobile District
Attn: EN-GE/Lee Coker
109 St. Joseph Street
Mobile, Alabama 36602

Contract: **DACA21-96-D-0018, Task Order CK10**
Fort McClellan, Alabama

Subject: **Letter Work Plan for Monitoring Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 88(6), 108(7)/82Q-X, 112Q, 113Q-X, 231Q, and 214Q**

Dear Mr. Coker:

In accordance with Alabama Department of Environmental Management (ADEM) guidelines and the *Fort McClellan (FTMC) Installation-Wide Sampling and Analysis Plan* (SAP), Shaw will collect two rounds of groundwater samples from 16 existing monitoring wells at the Ranges Near Training Area T-24A. In addition, one new bedrock monitoring well will be installed as mutually agreed upon during the Base Closure Team (BCT) meeting held on December 11-12, 2008. The purpose of the newly installed well and sampling efforts are to more accurately delineate the extent of groundwater contamination and determine current groundwater conditions at the site. The new double-cased bedrock monitoring well will be installed to a projected depth of approximately 300 feet below ground surface. Bedrock core samples will be collected to provide a detailed geologic log. In addition, discrete groundwater samples will be collected to provide vertical contaminant profiling to aid in the appropriate placement of the well screen. Following well installation and development, a groundwater sample will be collected from the newly installed well and 16 existing wells. All groundwater samples will be submitted to an offsite laboratory for volatile organic compound analysis.

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1.0 Site Description and History

The Ranges Near Training Area T-24A are located in the southeastern portion of the FTMC Main Post (Figure 1) and consist of all or portions of the following parcels, some of which are overlapping ranges:

- Training Area T-24A, Former Chemical Munitions Disposal Area, Parcel 187(7)
- Range 24A, Multi-Purpose Range, Parcel 108(7)/82Q-X
- Range 24A, Fog Oil Drum Storage, Parcel 88(6)
- Former Machine Gun Range, Parcel 112Q
- Former Demolition Area, Parcel 113Q-X
- Former Bandholtz Machine Gun Qualification Range, Parcel 213Q
- Former Bandholtz Field Firing Range No. 2, Parcel 214Q.

The Former Chemical Munitions Disposal Area, Parcel 187(7), is an approximately 1.8-acre fenced area located near the center of these overlapping ranges (Figure 2). The Army has instituted temporary land use controls for maintaining the fence to prevent unauthorized access to the site. The history of this former chemical munitions disposal site indicated decontamination training was conducted within the fenced area from the 1960's to 1973 using chemical agents and decontamination agents.

Shaw conducted an RI in several phases from late 2000 through August 2004. The RI included the collection of 91 surface and depositional soil samples, 51 subsurface soil samples, 118 groundwater samples, 6 surface water samples and 6 sediment samples. In addition, 43 monitoring wells (17 residuum wells and 26 bedrock wells) were installed and sampled and four existing wells were sampled. Well depths ranged from 18.8 to 350 feet bgs. Other RI field activities included XRF soil screening, slug testing, discrete groundwater sampling, bedrock coring, and borehole geophysical logging. Additionally, Shaw conducted one previous round of groundwater sampling in September 2006. A total of 16 groundwater samples were collected from the 61 monitoring wells previously installed at the Ranges Near Training Area T-24A. The wells selected for sampling during that event were based on previous RI results and plume delineation.

The RI report concluded that the two predominant types of environmental contamination at the Ranges Near Training Area T-24A are metals (primarily lead) in soil and VOCs in groundwater. The metals contamination in soil was caused by small-arms ammunition from historical use of Parcels 112Q, 213Q and 214Q as weapons firing ranges. The RI report concluded that the most probable source of chlorinated VOC contamination in groundwater was due to chemical agents and decontaminants discharged directly onto the ground surface during CWM disposal and decontamination training activities. The possible source for the benzene contamination was attributed to fog oil and/or other petroleum products (e.g. gasoline) used during training / disposal activities involving smoke generation, demolition and open burning.

2.0 Field Activities

The proposed field activities at the Ranges Near Training Area T-24A are discussed in the following sections. All work conducted during this field effort will be performed in accordance with this letter work plan and the FTMC *Installation-Wide Sampling and Analysis Plan (SAP)* (IT, 2002). Additionally, Shaw field personnel will follow the health and safety requirements specified in the *Site-Specific Safety and Health Plan* (SSHP) included as Appendix A of this work plan. The presence of UXO is considered remote because a separate contractor (Tetra Tech, Inc) is currently conducting MEC clearance activities at the site. The MEC clearance is tentatively scheduled for completion in August, 2009. However, as a conservative measure Shaw will conduct UXO avoidance procedures prior to and during drilling operations to a maximum depth of 12 feet below ground surface (bgs) or until native soil is encountered. The *Site-Specific Munitions and Explosives of Concern (MEC) Safety Plan* has been written in conjunction with the *Installation-Wide OE Management Plan* Appendix E of the SAP (IT, 2002) and is included as Appendix B of this work plan. Additionally, the form Evaluating *OE/UXO/CWM Hazards in Support of HTRW Activities* is also included as Attachment 1 of the SSHP.

2.1 Bedrock Monitoring Well Installation

Shaw will install one deep bedrock monitoring well as part of this effort. The bedrock well (R24A-187-MW52) will be installed approximately 120 feet northwest of existing well cluster R24A-187-MW04 \ R24A-187-MW10 at the location shown on Figure 3. Bedrock well R24A-187-MW52 will be installed using a combination of hollow-stem auger and air-rotary drilling techniques. Prior to installing 10-inch outer isolation casing into bedrock, a pilot hole will be advanced with nominal 4¼-inch diameter auger flights. Soil samples will be collected continuously for the first 12 feet and at 5-foot intervals thereafter until either split-spoon refusal is encountered or bedrock is reached. Soil samples will be collected using a 24-inch long, 2-inch diameter split-spoon sampler. However, at the discretion of the Shaw site manager, subsurface soil samples may be collected using a 6-inch diameter sonic core barrel with an 8-inch diameter temporary casing until competent bedrock is reached. If this option is chosen, subsurface soil samples will be collected continuously from ground surface to the top of competent bedrock. The soil samples will be retrieved in 5- or 10-foot section and placed in clear plastic sleeves for a detailed lithologic log.

Regardless of the method chosen, all soil samples will be logged in accordance with the American Society for Testing and Materials (ASTM) Method D 2488 *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)* (ASTM, 2000) using the Unified Soil Classification System (USCS). Additionally, all soil samples will be screened in the field using a photoionization detector (PID) and flame ionization detector (FID).

The pilot hole will then be over-drilled with either a 12-inch temporary casing and sonic bit or 14 ¼-inch air rotary bit for the installation of permanent 10-inch inside diameter (ID) carbon steel International Pipe Standard (IPS) outer steel isolation casing a minimum of 5-feet into competent

bedrock. The 10-inch outer casing will be grouted in-place using a tremie pipe suspended in the annulus between the casing and borehole wall. A grout plug may be placed at the bottom of the 10-inch casing to ensure that grout does not migrate inside the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water and 5 pounds of bentonite per 94-pound bag of Type I or Type II Portland cement.

Bedrock core samples will be collected continuously from the bottom of the outer casing to the bottom of the borehole using either an NQ or PQ-size wireline triple tube core barrel with a longitudinally split inner tube. Bedrock coring will be performed to provide additional information of site geologic features (e.g., folding, fracturing, and brecciation) that may be indicative of faulting. Bedrock coring will be performed in accordance with ASTM Method D2113, *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation* (ASTM, 1999). Additionally, bedrock core samples will be described in accordance with methods outlined in USACE South Atlantic Division Manual DM 1110-1-1 (USACE, 1983) to provide a detailed lithologic log.

Based on previous air-rotary drilling operations at Training Area T-24A, alternating zones of hard quartzite, and softer siltstone, sandstone, and/or shale will likely be encountered. If borehole collapse, broken rock formations, washout zones, or lost circulation prohibits the advancement of the borehole with air, eccentric rotary bit drilling (ODEX or equivalent) may be used to advance the borehole using smaller diameter casing (e.g., 6 or 8-inch casing).

During rock coring, an estimated 14 discrete groundwater samples will be collected from the bottom of the outer isolation casing to the target depth of the borehole. These samples will be collected with a single-packer system that allows 20-foot intervals to be isolated for sampling. The samples will be collected using a decontaminated submersible pump made of stainless steel and Teflon (e.g. Grundfos Redi-Flo 2 or equivalent), affixed with a Teflon-coated polyethylene discharge line, and an inflatable packer located above the pump (to effectively seal off upper intervals). Prior to collecting a discrete groundwater sample, five volumes of water from the isolated sampling zone will be removed. In poor recharge zones or tight formations that yield little groundwater, the isolated sampling zone will be allowed to recharge for a maximum period of one hour. If there is an insufficient volume of water to sample after one hour, the borehole will be advanced 20 feet and the discrete sampling procedure will be repeated. However, the one-hour recharge period may be extended at the discretion of the Shaw site manager. Groundwater samples collected from the sampling zone will be screened for field parameters (pH, temperature, specific conductivity, dissolved oxygen, and oxidation-reduction potential), and a representative sample will be sent to an off-site laboratory for 24-hour turn-around time for VOC analysis. Discrete groundwater sampling at 20-foot intervals will provide information on groundwater quality and will aid in determining the appropriate placement of the well screen. The discrete groundwater sampling data will be used for screening purposes only and will not be considered definitive data. Therefore, the screening data will neither be reported with data packages nor validated. Instead, only laboratory certificate of analysis deliverables will be

required. Discrete groundwater sampling methodology (outlined in Attachment 5, Procedure No. FTMC-GW-002 of the SAP) will be followed when collecting groundwater samples in bedrock.

After rock coring and discrete groundwater sampling to approximately 300 feet bgs, a 7⅞-inch ID air rotary or percussion bit will be used to ream the borehole to the target depth. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit. Only clean filtered air, potable water, and bentonite drilling fluids may be used during the drilling operations.

The bedrock well will be installed at a projected depth of 300 feet or potentially deeper. Therefore, the well casing will consist of new 2 ½-inch ID, Schedule 80, threaded, flush-joint, PVC pipe. New threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10-20 feet long, will be attached to the bottom of the well casing. After the casing and screen materials are lowered into the borehole, the filter materials will be tremied into the annulus. The filter pack will consist of Number 1 filter sand (sieve size 20 to 40). The filter pack will be tremied in place from the bottom of the borehole to approximately 5 feet above the top of the well screen. Extra fine sand seal (30/70 silica sand), approximately 5 feet thick, will be tremied in place above the filter pack.

If bedrock fracturing is prevalent, bentonite chips will be placed into the borehole and extended a minimum of 5 feet into the bottom of the 8-inch outer casing (or smaller diameter casing if used) to inhibit the potential of cement bleeding into the formation. At the discretion of the Shaw site manager, "bentonite slurry" may be used to minimize potential bridging. Once the bentonite seal is installed, it will be allowed to hydrate a minimum of eight hours prior to completion of the well. Prior to grouting, the bentonite seal will be measured using a weighted tape (or equivalent) to ensure the "seal" has not dropped in the borehole or within the casing. If this occurs, additional chips or bentonite slurry will be added and allowed to hydrate prior to commencing grouting of the annular space.

The annular space above the bentonite seal or slurry (if used) will be filled with bentonite-cement grout. The grout will be mixed with 6.5 to 7 gallons of water per 94-Ib bag of Type I Portland cement and 5 to 10 percent (by weight) powdered bentonite. Type II Portland cement may be substituted at the discretion of the Shaw site manager. The grout will be tremied in place from the top of the bentonite seal to ground surface. A watertight well cap will be placed atop the well casing. All filter pack materials, grout, and installation techniques will conform to requirements presented in the USACE Engineering Manual *Monitoring Well Installation and Documentation at Hazardous and/or Toxic Waste Sites* (USACE, 1998).

2.2 Well Development

The newly installed bedrock monitoring well will be developed as specified in Section 5.1 and Appendix C of the SAP (IT, 2002). After well development, the well will be allowed to equilibrate for 14 days prior to sample collection.

2.3 Groundwater Sampling

Following well installation and development activities, groundwater samples will be collected from the newly installed well and from 16 existing site wells. A second round of groundwater samples will be collected from these same wells at a later date.

The locations of the 16 monitoring wells and newly installed well to be sampled are shown on Figure 3. To reduce the chance of cross-contamination, the most contaminated monitoring wells will be sampled last. Table 1 summarizes pertinent information about the wells including well diameter, total depth, screened interval depths, turbidity, and purge volume. In addition, the table provides the total VOC concentration from the most recent sampling event completed in September 2006. Wells with the greatest concentration of total VOCs will be purged and sampled last to minimize the potential for cross-contamination.

Table 2 lists the wells to be sampled, the groundwater sample designations, the associated QA/QC samples, and the parameters to be analyzed. All samples will be analyzed for VOCs using EPA Method 8260B. Groundwater sampling activities will follow the procedures outlined in Section 6.1.1.5 and Attachment 5 of the SAP. The procedures described in the SAP address the supplies and equipment to be used and establishes protocol for field personnel to use. Table 3 summarizes the analytical sampling scope for the groundwater sampling at the Ranges Near Training Area T-24A.

2.4 Surveying

The newly installed monitoring well will be surveyed following the methodology outlined in the SAP (IT, 2002).

3.0 Investigation-Derived Waste (IDW) Management

Solid IDW generated from drilling and well installation activities will be placed in a 20 or 30-cubic yard roll-off container prior to characterization and final disposal. Solid IDW will be characterized using toxicity characteristic leaching procedure analysis. It is anticipated that one solid IDW characterization sample will be collected and the waste disposed as non-hazardous waste.

Liquid IDW generated from drilling/coring, discrete sampling and purging of the wells will be staged on site in poly tanks pending waste characterization. It is assumed that four liquid IDW characterization samples will be collected and analyzed for target analyte list metals, VOCs, and semivolatile organic compounds using standard EPA analytical methods. The analytical results will be reported directly to the Shaw site manager to ensure the IDW can be disposed in a timely manner. It is assumed that the IDW will be discharged to the sanitary sewer system as nonhazardous waste.

4.0 Schedule

Shaw is prepared to initiate field activities at the Ranges Near Training Area T-24A after the MEC removal activities are completed. It is our understanding the MEC removal will be finished in August, 2009.

5.0 References

IT Corporation (IT), 2002, ***Draft Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama,*** Revision 3, Prepared for U.S. Army Corps of Engineers, Mobile District, February.

American Society for Testing and Materials (ASTM), 2000, ***Standard Practice for Description and Identification of Soils (Visual-Manual Procedure),*** ASTM D2488-00.

American Society of Testing and Materials (ASTM), 1999, ***Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigations,*** ASTM D 2113-99.

U.S. Army Corps of Engineers (USACE), South Atlantic Division, 1998, ***Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radiological Waste Sites,*** Division Manual, DM 1110-1-4000, November.

U.S. Army Corps of Engineers (USACE), 1983, ***Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations,*** DM 1110-1-1, South Atlantic Division, July.

At your request, I have distributed copies of this document as indicated below. If you have questions, or need further information, please contact me at (865) 694-7361.

Sincerely,

Stephen G. Moran, P.G.
Project Manager

Attachments

Distribution: Lisa Holstein, U.S. Army TF (4 copies; 2 CDs)
Brandi Little, ADEM (2 copies; 1 CD)
Doyle Brittain, EPA Region 4 (1 copy; 1 CD)
Richard Henry, USFWS (1 copy; 1 CD)
Peter Tuttle, USFWS (1 copy; 1 CD)
Steve Miller, USFWS (1 copy; 1 CD)
Pete Jerome, USFWS (1 copy; 1 CD)

TABLES

Table 1

Existing Site Wells to be Sampled
Groundwater Sampling at the Ranges Near Training Area T-24A
Fort McClellan, Calhoun County, Alabama

Well Description	Well Diameter (inches)	Well Depth (ft bgs)	Start Depth	End Depth	Final Turbidity (NTU)	Purge Volume (gal)	Total VOCs (µg/L)
R24A-187-MW09	4	75	61.8	71.8	18.5	112.5	ND
R24A-187-MW11	4	70	58.8	68.8	14	55	ND
R24A-187-MW12	4	147	135	145	1.1	210	ND
R24A-187-MW13	4	75	64	74	2.1	110	ND
R24A-187-MW14	4	100.2	82.6	97.6	45	49.9	1.3 J
R24A-187-MW20	4	151.7	138.3	158.7	55	204	ND
R24A-187-MW21	**4**	**132.2**	**118.8**	**128.8**	**1**	**195**	**43.5**
R24A-187-MW22	**2**	**245.3**	**233**	**243**	**0.7**	**117.5**	**2,345 J**
R24A-187-MW42	2.5	242.5	222	242	36	179.5	ND
R24A-187-MW43	2.5	220	200	220	4.5	169	ND
R24A-187-MW44	2.5	224	204	224	17.9	156.3	1.1 J
R24A-187-MW45	**2**	**183**	**163**	**183**	**0.9**	**65**	**42.3 J**
R24A-187-MW46	2.5	350	330	350	18.7	240	0.65 J
R24A-187-MW48	2.5	290	270	290	2.1	155	2.8
R24A-187-MW49	**2.5**	**287**	**267**	**287**	**5.6**	**195**	**51.6 J**
R24A-187-MW51	2.5	260	240	260	1.3	185	ND

Notes:
Wells listed in BOLD will be sampled last to reduce potential for cross-contamination.
Total VOCs - Sum of all detected VOCs (excludes analytes detected in laboratory blank or field blank at concentration greater than the reporting limit) from September 2006 sample event.
gal - Gallon.
ND - Not detected.
NTU - Nephelometric turbidity unit.
µg/L - Micrograms per liter.
VOC - Volatile organic compound.

Table 2

Groundwater Sample Designations
Groundwater Sampling at the Ranges Near Training Area T-24A
Fort McClellan, Calhoun County, Alabama

Sample	Sampling Round 1 Sample Designation	QA/QC Samples		Analytical Parameter*
		Field Duplicates	MS/MSD	
R24A-187-MW09	R24A-187-MW09-GW-SN3038-REG			VOCs
R24A-187-MW11	R24A-187-MW11-GW-SN3039-REG			VOCs
R24A-187-MW12	R24A-187-MW12-GW-SN3040-REG			VOCs
R24A-187-MW13	R24A-187-MW13-GW-SN3041-REG			VOCs
R24A-187-MW14	R24A-187-MW14-GW-SN3042-REG			VOCs
R24A-187-MW20	R24A-187-MW20-GW-SN3043-REG			VOCs
R24A-187-MW21	R24A-187-MW21-GW-SN3044-REG			VOCs
R24A-187-MW22	R24A-187-MW22-GW-SN3045-REG	R24A-187-MW22-GW-SN3046-FD		VOCs
R24A-187-MW42	R24A-187-MW42-GW-SN3047-REG			VOCs
R24A-187-MW43	R24A-187-MW43-GW-SN3048-REG			VOCs
R24A-187-MW44	R24A-187-MW44-GW-SN3049-REG			VOCs
R24A-187-MW45	R24A-187-MW45-GW-SN3050-REG		R24A-187-MW45-GW-SN3050-MS/MSD	VOCs
R24A-187-MW46	R24A-187-MW46-GW-SN3051-REG			VOCs
R24A-187-MW48	R24A-187-MW48-GW-SN3052-REG			VOCs
R24A-187-MW49	R24A-187-MW49-GW-SN3053-REG	R24A-187-MW49-GW-SN3054-FD		VOCs
R24A-187-MW51	R24A-187-MW51-GW-SN3055-REG			VOCs
R24A-187-MW52	R24A-187-MW52-GW-SN3056-REG			VOCs

*Volatile organic compounds (VOC) by EPA Method 8260B.

FD - Field duplicate.
MS - Matrix spike.
MSD - Matrix spike duplicate.
QA/QC - Quality assurance/quality control.

Table 2

Groundwater Sample Designations
Groundwater Sampling at the Ranges Near Training Area T-24A
Fort McClellan, Calhoun County, Alabama

Sample	Sampling Round 2 Sample Designation	QA/QC Samples		Analytical Parameter*
		Field Duplicates	MS/MSD	
R24A-187-MW09	R24A-187-MW09-GW-SN3057-REG			VOCs
R24A-187-MW11	R24A-187-MW11-GW-SN3058-REG			VOCs
R24A-187-MW12	R24A-187-MW12-GW-SN3059-REG			VOCs
R24A-187-MW13	R24A-187-MW13-GW-SN3060-REG			VOCs
R24A-187-MW14	R24A-187-MW14-GW-SN3061-REG			VOCs
R24A-187-MW20	R24A-187-MW20-GW-SN3062-REG			VOCs
R24A-187-MW21	R24A-187-MW21-GW-SN3063-REG			VOCs
R24A-187-MW22	R24A-187-MW22-GW-SN3064-REG	R24A-187-MW22-GW-SN3065-FD		VOCs
R24A-187-MW42	R24A-187-MW42-GW-SN3066-REG			VOCs
R24A-187-MW43	R24A-187-MW43-GW-SN3067-REG			VOCs
R24A-187-MW44	R24A-187-MW44-GW-SN3068-REG			VOCs
R24A-187-MW45	R24A-187-MW45-GW-SN3069-REG		R24A-187-MW45-GW-SN3069-MS/MSD	VOCs
R24A-187-MW46	R24A-187-MW46-GW-SN3070-REG			VOCs
R24A-187-MW48	R24A-187-MW48-GW-SN3071-REG			VOCs
R24A-187-MW49	R24A-187-MW49-GW-SN3072-REG	R24A-187-MW49-GW-SN3073-FD		VOCs
R24A-187-MW51	R24A-187-MW51-GW-SN3074-REG		R24A-187-MW51-GW-SN3074-MS/MSD	VOCs
R24A-187-MW52	R24A-187-MW52-GW-SN3075-REG			VOCs

*Volatile organic compounds (VOC) by EPA Method 8260B.

FD - Field duplicate.
MS - Matrix spike.
MSD - Matrix spike duplicate.
QA/QC - Quality assurance/quality control.

Table 3

Sampling Scope Summary
Groundwater Sampling at the Ranges Near Training Area T-24A
Fort McClellan, Calhoun County, Alabama

Parameters	Analytical Method	Sample Matrix	Turn-Around Time	Field Samples			QA/QC Samples [1]				EMAX
				Sample Points	Events	Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk /matrix)	Total No. Analysis
Groundwater Sampling											
TCL VOCs	8260B	GW	Normal	17	2	34	4	3	17	6	64
IDW Disposal - Liquid											
TCL VOCs	8260B	Liquid	21-day	2	2	4					4
TCL SVOCs	8270C	Liquid	21-day	2	2	4					4
Total TAL Metals	6010B/7000	Liquid	21-day	2	2	4					4
IDW Disposal - Solid											
TCLP Metals	1311/6010/7470	Soil	21-day	1	1	1					1
TCLP VOCs	1311/8260B	Soil	21-day	1	1	1					1
TCLP SVOCs	1311/8270C	Soil	21-day	1	1	1					1

[1] Field duplicate and MS/MSD samples are calculated as a percentage of field samples collected and rounded up to the nearest whole number.
Trip blank samples will be collected with water matrix samples for VOC analysis. Assume 2 field samples per day to estimate trip blanks.
Equipment blanks will be collected once per week. Assume 10 field samples will be collected per week to estimate number of blanks.

1/ship - One per shipment.
1/wk/matrix - One per week per matrix.
Dups - Duplicates.
Eq. Rinse - Equipment rinsate sample.
GW - Groundwater.
IDW - Investigation-derived waste.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance quality control.
TAL - Target analyte list.
TCL SVOCs - Target compound list semivolatile organic compounds.
TCL VOCs - Target compound list volatile organic compounds.

FIGURES

LEGEND

- UNIMPROVED ROAD
- PAVED ROAD
- PARCEL BOUNDARY

FIGURE 1
SITE LOCATION MAP
RANGES NEAR TRAINING AREA T-24A
PARCELS 187(7), 88(6), 108(7)/82Q-X,
112Q, 113Q-X, 213Q, AND 214Q

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

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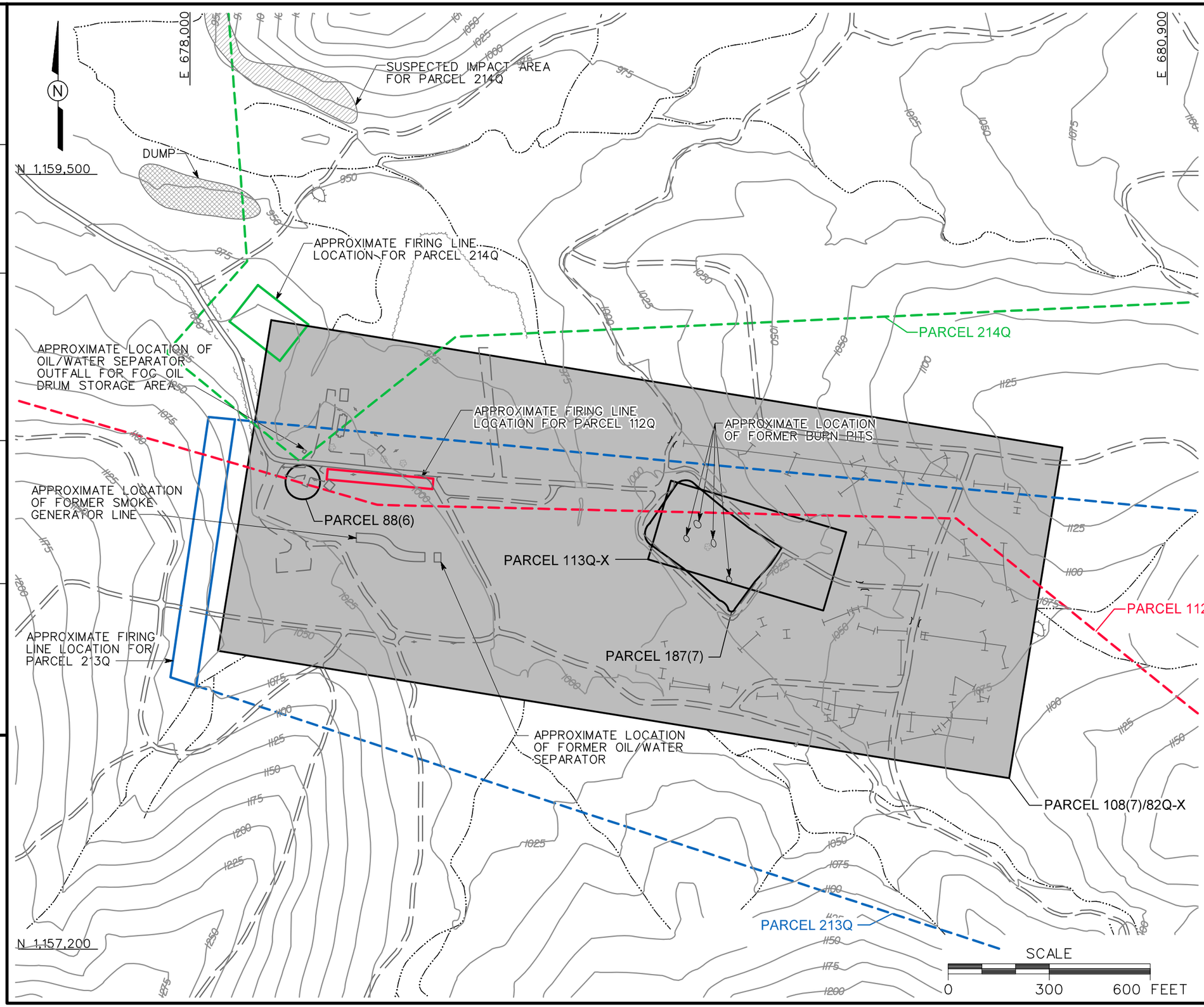

LEGEND

- UNIMPROVED ROAD
- PAVED ROAD AND PARKING
- TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- PARCEL 112Q RANGE SAFETY FAN
- PARCEL 213Q RANGE SAFETY FAN
- PARCEL 214Q RANGE SAFETY FAN
- BRIDGE
- SURFACE DRAINAGE / CREEK
- FENCE
- UTILITY POLE
- TRENCHES
- MOUNDS
- DEPRESSIONS

FIGURE 2
SITE MAP
RANGES NEAR TRAINING AREA T-24A
PARCELS 187(7), 88(6), 108(7)/82Q-X, 112Q, 113Q-X, 213Q, AND 214Q

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

Shaw® Shaw Environmental, Inc.

DWG. NO.: 796887es.929
PROJ. NO.: 796887
INITIATOR: J. TARR
PROJ. MGR.: S. MORAN
DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 08/31/06
DRAWN BY: D. BOMAR
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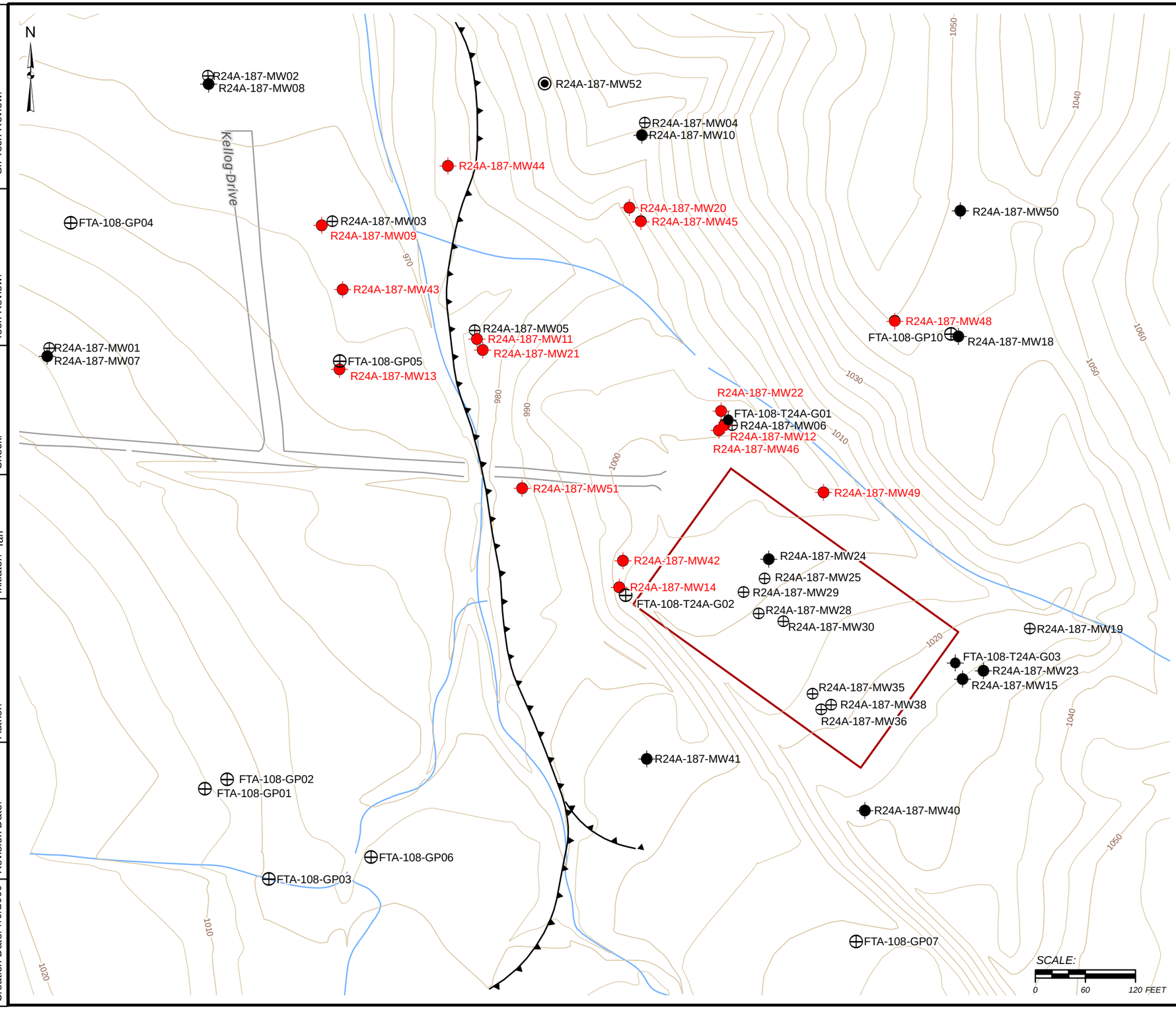

LEGEND

- PROPOSED BEDROCK WELL R24A-187-MW52
- BEDROCK MONITORING WELL LOCATION TO BE SAMPLED
- RESIDUUM MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- PARCEL 187(7)
- THRUST FAULT (OSBORNE ET AL., 1997)
- TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL = 5 FOOT)
- ROADS
- STREAMS

FIGURE 3

MONITORING WELL LOCATION MAP
RANGES NEAR TRAINING AREA T-24A
PARCELS 187(7), 88(6), 108(7), 112Q, 113Q-X, 213Q, AND 214Q

U.S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, AL
CONTRACT NO. DACA21-96-D-0018

Shaw® Shaw Environmental, Inc.

Project Directory: X:\FTMC\GIS_Documents\map_documents\24_Alpha\Supplemental_RI_Work_Plan_Draft_July2009\fig_3.mxd
Creation Date: 7/9/2009 | Revision Date: | Author: | Initiator: Tarr | Check: | Tech Review: | Sr. Tech Review:

APPENDIX A

SITE-SPECIFIC SAFETY AND HEALTH PLAN

Appendix A
Site-Specific Safety and Health Plan Attachment
Bedrock Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q

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

Prepared for:

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

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

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

July 2009

This site-specific safety and health plan (SSHP) must be used in conjunction with the installation-wide safety and health plan, Fort McClellan, Alabama. The following SSHP has been designed for the methods presently contemplated by the company for execution of the proposed work. Therefore, the SSHP may not be appropriate if the work is not performed by or using the methods presently contemplated by the company. In addition, as the work is performed, conditions different from those anticipated may be encountered and the SSHP may have to be modified. Therefore, the company only makes representations or warranties as to the adequacy of this SSHP for currently anticipated activities and conditions.

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

I have read and approve this site-specific safety and health plan attachment for the Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112Q, 113Q-X, 213Q, and 214Q at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and Shaw procedures.

Stephen G. Moran, PG
Shaw Project Manager

07/09/09
Date

Doug Russell
Shaw Health & Safety Manager

7-9-09
Date

Jeffrey J. Tarr, PG
Shaw Site Manager

7-8-09
Date

Acknowledgments

The final approved version of this site-specific safety and health plan (SSHP) attachment for the Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112Q, 113Q-X, 213Q, and 214Q at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every six months until project completion.

Project Manager — Date: 7/07/09

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

Site Manager — Date: 7-8-09

Site-Specific Safety and Health Plan Acknowledgment Form

I have been informed of, and will abide by, the procedures set forth in this site-specific safety and health plan attachment for remedial investigation activities at the Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112Q, 113Q-X, 213Q, and 214Q, Fort McClellan, Calhoun County, Alabama.

Printed Name	***Signature***	***Representing***	***Date***

Fort McClellan Project Emergency Contacts

Range Control Office (Main Post) ..... (256) 848-6772
Fire Department (off post) 911
Ambulance (off post) 911
Northeast Regional Medical Center ..... (256) 235-5121
Southern Family Practice Occupational Medicine ..... (256) 236-9400
Anniston Police Department ..... (256) 238-1800
Poison Control Center ..... (800) 222-1222

U.S. Army

Lisa Holstein, Army Transition Force ..... (256) 848-7455
Lee Coker, USACE-Mobile Contracting Officer's Representative ..... (251) 690-3099

Alabama Department of Environmental Management

Brandi Little, Remedial Project Manager ..... (334) 274-4226

U.S. Environmental Protection Agency

Doyle Brittain, Remedial Project Manager ..... (404) 562-8549

Shaw Environmental, Inc.

Steve Moran, Shaw Project Manager ..... (865) 690-3211 (office)
(865) 607-9148 (cell)
Jeff Tarr, Shaw Site Manager ..... Site (256) 848-3482, Cell (256) 310-4376
Doug Russell, Shaw H&S Manager ..... Direct dial (865) 692-3584, Cell (865) 414-9545
Melissa Smith, CIH ..... (865) 690-3211

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List of Attachments

Attachment 1 – Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities

Attachment 2 – Incident Reporting Management Procedure-Federal

List of Acronyms

BZ	breathing zone
CWM	chemical warfare material
FTMC	Fort McClellan
MEC	munitions and explosives of concern
PPE	personal protective equipment
RI	remedial investigation
Shaw	Shaw Environmental, Inc.
SSHP	site-specific safety and health plan
UXO	unexploded ordnance

1.0 Site Work Plan Summary

Project Objective. The objective of this supplemental remedial investigation (RI) at Fort McClellan (FTMC), Calhoun County, Alabama, is to collect and analyze groundwater samples at the Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112Q, 113Q-X, 213Q, and 214Q. Specifically, Shaw Environmental, Inc. (Shaw) will collect groundwater samples from 16 existing wells and install and sample one bedrock monitoring well. The new double-cased bedrock monitoring well will be installed to a projected depth of approximately 300 feet below ground surface. Bedrock core samples will be collected to provide a detailed geologic log. In addition, discrete groundwater samples will be collected to provide vertical contaminant profiling to aid in the appropriate placement of the well screen. Following well installation and development, a groundwater sample will be collected from the newly installed well. The sample media, locations, and analytical parameters are identified in the letter work plan.

Project Tasks

- Conduct a surface and near-surface unexploded ordnance (UXO) survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling activity to determine the presence of potential downhole hazards.
- Install one bedrock groundwater monitoring well.
- Collect groundwater samples from 16 existing wells and the new bedrock well.
- Equipment decontamination

Personnel Requirements. Up to 5 employees are anticipated onsite.

Note: All personnel on this site shall have received training, informational programs, and medical surveillance as outlined in the installation-wide safety and health plan for site investigations at FTMC and shall be familiar with the requirements of this site-specific safety and health plan (SSHP). This SSHP must be used in conjunction with the installation-wide safety and health plan for FTMC, Alabama.

2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

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

Shaw conducted an RI in several phases from late 2000 through August 2004. The RI included the collection of 91 surface and depositional soil samples, 51 subsurface soil samples, 118 groundwater samples, 6 surface water samples and 6 sediment samples. In addition, 43 monitoring wells (17 residuum wells and 26 bedrock wells) were installed and sampled and four existing wells were sampled. Well depths ranged from 18.8 to 350 feet below ground surface. Other RI field activities included x-ray fluorescence soil screening, slug testing, discrete groundwater sampling, bedrock coring, and borehole geophysical logging. Additionally, Shaw conducted one previous round of groundwater sampling in September 2006. A total of 16 groundwater samples were collected from the 61 monitoring wells previously installed at the Ranges Near Training Area T-24A. The wells selected for sampling during that event were based on previous RI results and plume delineation.

The RI report concluded that the two predominant types of environmental contamination at the Ranges Near Training Area T-24A are metals (primarily lead) in soil and volatile organic compounds in groundwater. The metals contamination in soil was caused by small-arms ammunition from historical use of Parcels 112Q, 213Q and 214Q as weapons firing ranges. The RI report concluded that the most probable source of chlorinated volatile organic compound contamination in groundwater was due to chemical agents and decontaminants discharged directly onto the ground surface during chemical warfare material (CWM) disposal and decontamination training activities. The possible source for the benzene contamination was attributed to fog oil and / or other petroleum products (e.g. gasoline) used during training / disposal activities involving smoke generation, demolition and open burning.

Table 2-1 contains the toxicological and physiological properties of chemicals anticipated or to be used at the Ranges Near Training Area T-24A.

Table 2-1

Toxicological and Physical Properties of Chemicals
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Benzene [71-43-2]	9.24	34-119	Inh Ing Con Abs	Irritated eyes, skin, nose, respiratory system, giddiness, headache, nausea, dermatitis, bone marrow depression.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	1 ppm 0.5 ppm 0.1 ppm	5 ppm 2.5 ppm 1 ppm	PEL TLV REL	Ca (500 ppm)
Fuel oil (diesel oil, medium) [68476-30-2]	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho-pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention	-- 100 mg/m^3 --	-- -- --	PEL TLV REL	--
Carbon tetrachloride [56-23-5]	11.47	?	Inh Abs Ing Con	Irritated eyes, skin; CNS depressant, nausea, vomiting, liver and kidney damage, dizziness incoordination.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention	10 ppm 5 ppm --	C 25 ppm 10 ppm 2 (60 min)	PEL TLV REL	Ca (200 ppm)
Gasoline [8006-61-9]	?	?	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	-- 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	-- 500 ppm --	PEL TLV REL	Ca 1,400 ppm [10% LEL]
Isopropyl alcohol (isopropanol) [67-63-0]	10.10	?	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, head-ache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	-- 500 ppm 500 ppm	PEL TLV REL	2,000 ppm [10% LEL]

Table 2-1

Toxicological and Physical Properties of Chemicals
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Lead [7439-92-1]	NA	NA	Inh Ing Con	Weak, insomnia, facial pallor, constipated, abdominal pain, colic, anemia, irritated eyes, paralysis of wrists and ankles, encephalopathy.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	0.05 mg/m 0.05 mg/m <0.1 mg/m	-- -- --	PEL TLV REL	100 mg/m
Motor Oil [NA]	?	?	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention	-- -- --	500 ppm 500 ppm 500 ppm	PEL TLV REL	None
Nitric acid [7697-37-2]	11.95	0.3-1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	-- 4 ppm 4 ppm	PEL TLV REL	25 ppm
Portland cement	NA	NA	Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	10 mg/m^3 10 mg/m^3/ total dust 5 mg/m^3 respirable fraction 15 mg/m^3 total dust 5 mg/m^3 respirable	-- -- --	TLV REL PEL	5,000 mg/m^3
Toluene [108-88-3]	8.82	.02-69	Inh Ing Con Abs	Irritated eyes, nose, fainting, weakness, confusion, dizziness, headache, dilated pupils, dermatitis.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	200 ppm 50 ppm (skin) 100 ppm	C 300mg/m^3 -- 150 ppm	PEL TLV REL	500 ppm
Xylene (o-,m-,p-isomers) [95-47-6] [108-38-3] [106-42-3]	8.56	.08-40	Inh Ing Con Abs	Irritated eyes, skin, nose, throat, dizziness, excitement, drowsiness, incoherence, staggering, nausea, vomiting, dermatitis.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	150 ppm -- 150 ppm	TLV PEL REL	900 ppm

Table 2-1

Toxicological and Physical Properties of Chemicals
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

[a]IP = Ionization potential (electron volts).
[b]Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.
[c]TWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day without adverse effect.
[d]STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.
[e]PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).
AEL = Airborne Exposure Limit.
TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value-TWA.
REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.
[f]IDLH (NIOSH) = Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. 1998).
C = Ceiling limit value which should not be exceeded at any time.
Ca = Carcinogen.
NA = Not applicable.
? = Unknown.
LEL = Lower explosive limits.
LC_{50} = Lethal concentration for 50 percent of population tested.
LD_{50} = Lethal dose for 50 percent of population tested.
NIC = Notice of intended change (ACGIH).

References:

American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 2008, compiled by the American Conference of Governmental Industrial Hygienists.
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Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.
Verschuseren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.
Warning Properties of Industrial Chemicals Occupational Health Resource Center, Oregon Lung Association.
Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

As referenced in the correspondence from Mr. Ellis Pope (Contacting Officer's Representative) and Dr. John Potter (Huntsville Center of Expertise), the sites addressed in this SSHP have had a CWM engineering evaluation/cost analysis completed and all soil samples taken were clean of CWM and CWM by-products. Based on this information, no CWM monitoring will be required during site operations.

The presence of UXO is considered remote because the contractor, Tetra Tech, Inc. is currently conducting and is scheduled to complete munitions and explosives of concern (MEC) removal operations at the site in August, 2009. However, as a conservative measure Shaw will conduct UXO avoidance procedures during drilling operations to 12 feet below ground surface or until native soil is encountered as outlined in Appendix E of the SAP. Attachment 1, *Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities*, has been prepared to identify additional ordnance and explosives site information. The Site Specific MEC Safety Plan is provided in Appendix B of the work plan.

2.2 General Site Information

Duration of Planned Employee Activity. Employee activity duration is anticipated to be approximately one month.

Pathways for Hazardous Substance Dispersion. Possible pathways for hazardous substances in the area are groundwater and soils. The primary exposure routes include inhalation, absorption, and ingestion.

Site Topography. The elevation of the ranges near Training Area T-24A ranges from approximately 985 feet to 1,145 feet above mean sea level, with the ground surface sloping from the southeast to the northwest across the site. A small creek that bisects the site flows north along a small valley to the South Branch of Cane Creek.

3.0 Personal Protective Equipment

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

Task	Initial Level of PPE
MEC avoidance and equipment staging	Level D
Well development and sampling	Level D*
Bedrock well installation	Level D*
Equipment decontamination	Modified Level D

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

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

- Coveralls or work clothing
- Leather work gloves (when additional material handling hand protection is necessary)
- Safety-toed work boots
- Safety glasses
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment)

NOTE: For MEC avoidance UXO personnel shall wear sturdy work boots free of metallic components. When foot impact hazards are present during MEC avoidance sweeps composite toe work boots are required. If an overhead hazard is present hard hats shall be used with chin straps.

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

- Permeable Tyvek, Kleenguard, or its equivalent (polycoated Tyvek for pressure washing)
- Latex boot covers
- Nitrile, heavy work, or latex gloves
- Steel-toed safety boots

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

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

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

- National Institute of Occupational Safety and Health-approved full-face, air-purifying respirator equipped with organic vapor/acid gas/P100 cartridge
- Poly coated Tyvek®, hooded with elastic cuffs and wrists
- Nitrile gloves (outer)
- Lightweight Nitrile gloves (inner)
- Neoprene steel-toed boots or polyvinyl chloride overbooties/steel-toed safety boots
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment).

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

4.0 Site Monitoring

The environmental contaminants of concern in groundwater at Ranges Near Training Area T-24A are low levels of benzene, carbon tetrachloride, and chloroform. Low levels of lead were detected in surface soil as a result of small arms ammunition use. Table 4-1 contains action levels for site monitoring at the sites.

Chemical. Monitoring will be performed by the site safety and health officer or qualified task geologist during the performance of ground-intrusive operations. A calibrated photoionization detector organic vapor monitor with a 10.6 electron volt lamp will be utilized to monitor the

sampling locations and BZs to determine if any organic material may be present that would necessitate upgrading of protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the work areas and BZs to determine if any combustible/flammable levels may be present that would necessitate evacuation of the work area. A combination 4 gas photoionization detector is recommended (i.e., MSA Sirius or equivalent). Table 4-2 contains the air monitoring frequency and location for site monitoring at the work sites.

Unexploded Ordnance. MEC safety will be achieved by employing UXO specialists to ensure that field personnel do not come into contact with MEC. Avoidance operations will follow the guidelines outlined in the Site Specific MEC Safety Plan, provided in Appendix B of the work plan.

If UXO is encountered, personnel will contact the site manager and UXO specialist immediately. Personnel will evacuate the immediate area and secure it and contact the Shaw Project Manager and Health and Safety Manager.

5.0 Activity Hazard Analysis

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

- MEC avoidance and staging equipment
- Groundwater sampling
- Installation and development of deep bedrock well
- Disposal of investigation-derived waste
- High pressure water jetting (decontamination).

All injuries and illnesses must be immediately reported to the site manager or the site safety and health officer, who will then notify off-site personnel and organizations as necessary in accordance with Shaw health and safety policy *HS020, Accident Prevention Program: Reporting, Investigation and Review*, and the Incident Reporting Management Procedure-Federal. A copy of the Incident Reporting Management Procedure-Federal has been provided in Attachment 2.

If emergency hospital care must be provided, the victim shall be treated at Northeast Regional Medical Center. For non life threatening injuries which may require medical treatment beyond onsite first aid the injured shall be transported by the site manager or site safety and health officer to the nearest Health resources occupational health facility. The nearest occupational clinic is Southern Family Practice and Occupational Medicine.

Table 4-1

Action Levels
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

When in Level C PPE

Analyte	Action Level[a]	Required Action[b]
Volatile Organic Compounds (VOC)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, initiate benzene detector test.
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for VOCs.

When in Level D Modified/D PPE

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

Table 4-1

Action Levels
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

When in Support Zone

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

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

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

Table 4-2

Air Monitoring Frequency and Location
Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Work Activity	Instrument	Frequency	Location
MEC Avoidance and Staging Equipment	OV Monitor	Initially for area	BZ of employees
Groundwater Sampling	OV Monitor	Initially	Well Head Space and BZ of employees
Installing Deep Bedrock Well	OV Monitor	Continuously	BZ of employees and/or work area
	LEL/O_2	Continuously	BZ of employees and/or work area

BZ = Breathing zone.
OV = Organic vapor.
LEL/O_2 = Lower explosive level/oxygen.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
MEC avoidance and staging equipment	Unexploded ordnance (UXO)	• UXO specialists will perform UXO surface avoidance and/or UXO downhole avoidance. See site-specific safety and health plan (SSHP).
	Slip, trip, and fall hazards	• Determine best access route before transporting equipment. • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards. • Look before you step; ensure safe and secure footing.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.
	Falling objects	• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.
	Flying debris, dirt, dust, etc.	• Wear safety glasses/goggles; ensure that eye wash is in proper working condition.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cuts/bruises	• Use cotton or leather work gloves for material handling.
	Bees, spiders, and snakes	• Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Ticks	• Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellant. • Wear long sleeves and long pants. • Visually check oneself and coworker promptly and frequently.
	Fire	• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
MEC avoidance and staging equipment (continued)	Contact with moving equipment/vehicles	• Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • High visibility ANSI/ISEA vest shall be work by personnel exposed to moving equipment or vehicles.
	Hazard communication	• Label all containers as to contents and dispose of properly. • Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.
	Noise	• Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	• • Adequate lighting will be provided to ensure a safe working environment.
	Cold stress	• Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (°F). • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Heat rash	• • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
MEC avoidance and staging equipment (continued)	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Contact with moving equipment/vehicles	• Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic. • Barriers shall be used to protect workers from vehicular traffic. • Barriers shall be used to guard excavations adjacent to streets or roadways. • Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided. • Heavy equipment shall have backup alarms.
	Forklift operations	• Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Portable electric tools	• Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (do not use) and removed from service. • Portable electric tools and all cord and plug connected equipment shall be protected by a ground fault circuit interrupter (GFCI) device. • Electrical tools shall be inspected daily prior to use.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
MEC avoidance and staging equipment (continued)	Extension cords	• Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic. • Cords shall be suspended with a nonconductive support (rope, plastic ties, etc,). • Cords shall be designed for hard duty. • Cords shall be inspected daily.
	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Remain 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornadoes	• Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Groundwater sampling	Cross-contamination and contact with potentially contaminated materials	• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with water. • Handle samples with care. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	UXO	• UXO specialists will perform UXO surface avoidance and/or UXO downhole avoidance.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
	Hazard communication	• MSDSs shall be obtained for chemicals brought on site. • Label all containers as to contents.
	Strains/sprains	• Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Unattended worker	• Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Groundwater sampling (continued)	Cross-contamination and contact with potentially contaminated materials	• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with groundwater. • Handle samples with care. • Only essential personnel will be in the work area. • All personnel will follow good hygiene practices.. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
	Slip, trip, and fall hazards	• Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	UXO	• UXO specialists will perform UXO surface avoidance and/or UXO downhole avoidance.
	Bees, spiders, and snakes	• Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas. • Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Access/egress hazards	• Use qualified and trained bushhog operator. • Keep employees out of the bushhog work area. • Utilize good housekeeping practices. • Keep aisle ways, pathways, platforms and work areas free of obstruction. • Clean ice or snow off of walkways or work stations. • Use appropriate footwear for the task assigned.
	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Groundwater sampling (continued)	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornadoes	• Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorms or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
	UXO	• UXO specialist will perform UXO surface avoidance and/or UXO downhole avoidance.
Installation and Development of Monitoring Well	Overhead hazards	• Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Faulty or damaged equipment being utilized to perform work	• All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out. • Drill rigs and geoprobes shall be equipped with reverse signal alarm, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.
Installation and Development of Monitoring Well (continued)	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Comply with Shaw Procedure HS 400 • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Comply with Shaw Procedure HS 400 • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Comply with Shaw Procedure HS 400 • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices. • Comply with Shaw Procedure HS 400
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	• Inspections or determinations of road conditions and structures shall be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Aboveground and belowground utilities will be located prior to staging equipment. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Inexperienced operator	• Machinery and mechanized equipment shall be operated only by designated personnel. • Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgment.
	Jacks/outriggers	• Ensure proper footing and cribbing.
	Falling objects	• Remove unsecured tools and materials before raising or lowering the derrick. • Stay alert and clear of materials suspended overhead.
Installation and Development of Monitoring Well (continued)	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert at all times!
	Fire	• Mechanized equipment shall be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available. • Obtain a Hot Work Permit, per IT Procedure HS 314 (May 19, 1999) for any operation which could act as an ignition source.
	Fall hazards	• Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Noise	• Hearing protection is mandatory above 85 dBA.
	Contact with rotating or reciprocating machine parts	• Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	• Practice good housekeeping, keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Contact with potentially contaminated materials	• Real time air monitoring will take place. Proper personal protective clothing and equipment will be utilized. • Do not breathe air surrounding boring any more than necessary. • Upgrade to respirator if necessary. • Avoid skin contact with soil cuttings. Wear gloves. • Stay clear of moving parts of drill rig and geoprobe.
	Respirable dust	• Utilize engineering controls to eliminate breathing zone exposure to dust generated while coring/drilling/over drilling bedrock. • If engineering controls are not affective upgrade to a NIOSH approved particulate respirator for protection from silica.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Drum handling	• Be careful not to breathe air from around open drum any more than necessary. Monitor with photoionization detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary. • When filling a drum (with either soil or water), be careful not to make contact with the contained waste. Wear appropriate gloves. Make sure lid or bung of drum is secure. • If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boots. • When using a drum dolly, make sure straps and lid catch are securely attached. Leverage properly when tilting drum. Be sure toes stay away from drum.
	UXO	• UXO specialist will perform UXO surface avoidance and/or UXO downhole avoidance.
Moving and shipping collected samples	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cut hazards	• Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	• Label all containers as to contents and associated hazards.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
Material storage	Flammable and combustible liquids	• Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.
Disposal of investigation-derived waste (IDW) (Forklift Operation)	Personnel injury, property damage, and/or equipment damage	• Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
High-pressure water jetting operations	Heavy lifting	• Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Slip, trip, and fall hazards	• Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
High-pressure water jetting operations (continued)	Fueling	• Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	• Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High-pressure water	• Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. he work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	• Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	• No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	• Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	• All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.

Table 5-1

Activity Hazard Analysis
Ranges Near Training Area T-24A, Ranges Near Training Area T-24A, Parcels 187(7), 108(7)/82Q-X, 88(6), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended
	Falling objects	• Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	• Impact-resistant safety glasses with side shields are required.
High-pressure water jetting operations (continued)	Contact with potentially contaminated materials	• All site personnel will wear the appropriate PPE as described in SSHP.

Directions to the hospital are provided in Figure 5-1 and a direction to the occupational clinic is Figure 5-2.

FIGURE 5-1 Hospital Route Map

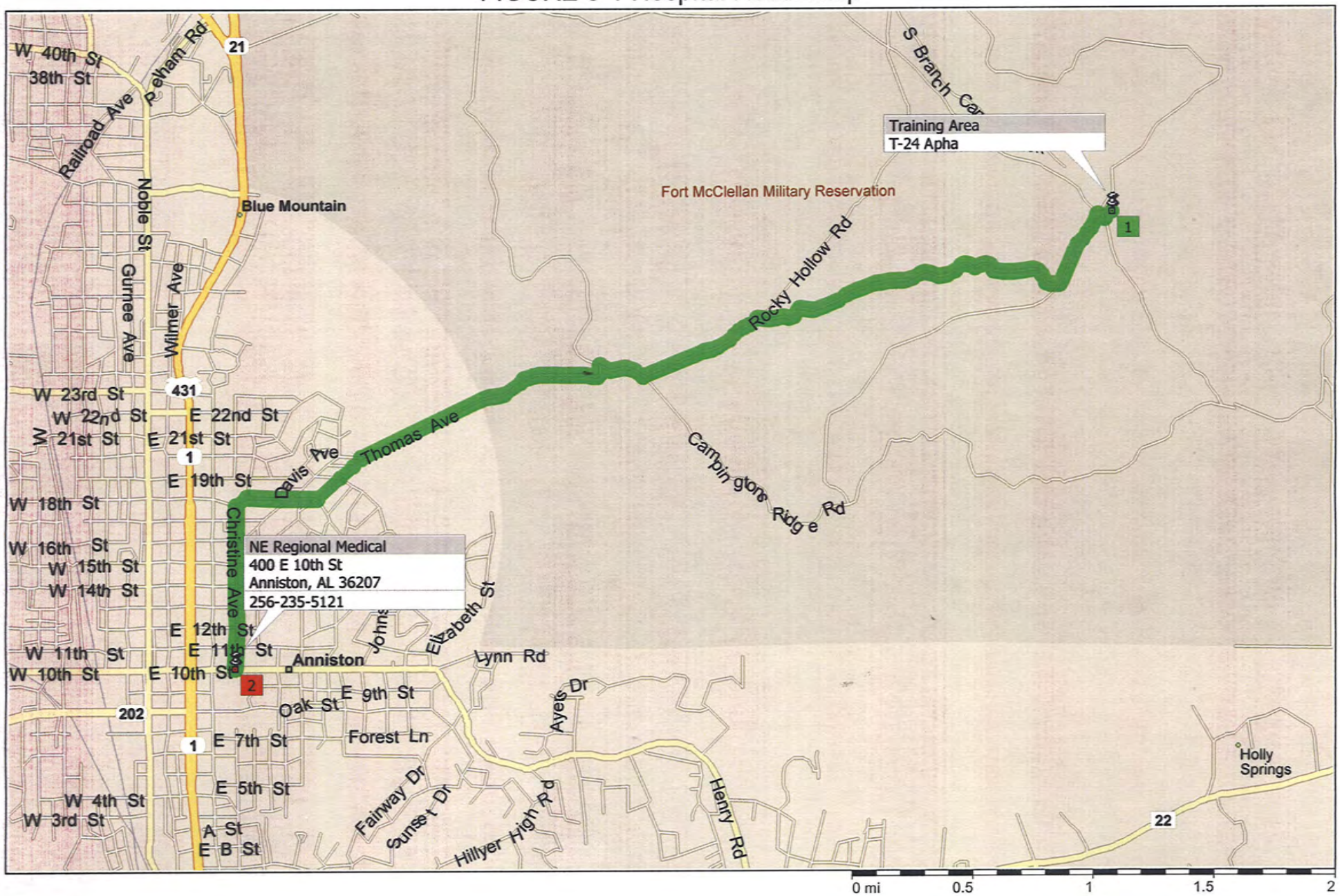

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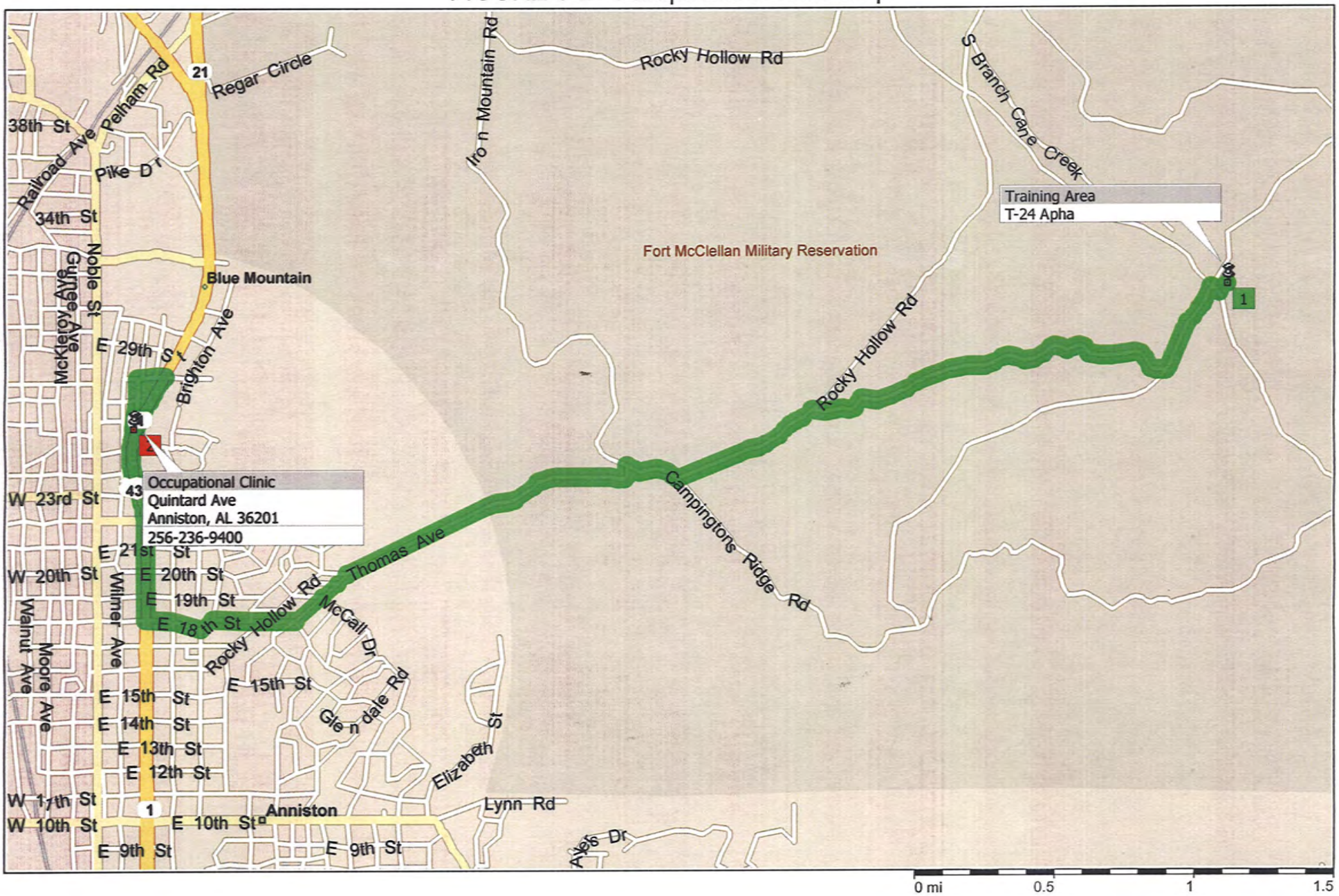
FIGURE 5-2 Occupational Clinic Map



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ATTACHMENT 1

EVALUATING OE/UXO/CWM HAZARDS IN SUPPORT OF HTRW ACTIVITIES

Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities

Site Name: Range 24 Alpha Well Installation \ Sampling

Job Number: 796887 **Date: July 1, 2009**

Name of person completing form: Jeffrey Tarr **Title: Geologist**

Signature: Jeff Tarr

	Yes	No
1a. Have the historical records available for this HTRW site been reviewed?	☒	☐

If the answer to **1a.** is yes, proceed to **1b.**
If the answer to **1a.** is no, review site information prior to completing this form.

	Yes	No
1b. Is there recent information (site walk, worker interviews, etc.) that indicates a potential OE/CWM hazard at this site?	☒	☐

Proceed to **2.**

2. According to the records review, is this site known or suspected to have been used for:

	Yes	No
2a. Manufacturing, production, or shipping of conventional or chemical warfare materiel (CWM) OE:	☐	☒
Live fire testing of any ordnance:	☐	☒
Conventional or CWM OE training:	☒	☐
Storage of conventional or CWM OE:	☐	☒
Disposal or demilitarization of conventional or CWM OE:	☒	☐
Other (specify):		

	Yes	No
2b. Manufacturing, production, or shipping of chemical agent:	☐	☒
Research or testing of chemical agent:	☐	☒
Chemical agent related training:	☒	☐
Storage of chemical agent:	☐	☒
Disposal or demilitarization of chemical agent:	☒	☐
Other (specify): Former CWM Areas only.		

Any **2a** question answered "YES" indicates UXO support is required for all site activities. If all **2a** questions are answered "NO", UXO support may not be required. Refer to Installation-Wide Safety and Health Plan (SHP) for additional information concerning UXO support. Proceed to question **2b.**

Any **2b** question answered "YES" requires the remainder of this form to be completed. If all **2b** questions are answered "NO", real-time monitoring for chemical agent will not be required and completing the remainder of this form is not required. Refer to SHP for additional information concerning agent monitoring.

Additional space for notes and explanations on page 4.
Continue to page 2 of 4 –

3. For sites where the manufacturing, testing, storage, or disposal of CWM is suspected:	Yes	No
Is there evidence that the CWM is/was containerized in potentially unexploded ordnance:	☐	☒
Is there evidence that the CWM is/was containerized in nonexplosive containers:	☐	☒
Is there evidence that the CWM is open to the environment (i.e., in an open container or free liquid/solid in the soil/water):	☐	☒
Is there evidence that the CWM hazard has been removed from the site or that the site has been decontaminated:	☒	☐
Has the site been previously monitored or sampled for chemical agent or agent breakdown products:	☒	☐
For any "YES" above, was the agent or breakdown product identified?	☐	☐

For any "Yes", list types of agent (mustard, lewisite, etc.) and the form (in ordnance, in drum, etc.) the CWM is expected to be found (or state "unknown"):

The scope of work involves the installation of one deep bedrock well and sampling 16 existing wells using UXO anomaly avoidance.

List agent breakdown products identified:

4. Defining the Potential for the Presence of CWM:	Agent Monitoring Requirements for Site Activities:
4a. High Presence Potential – Definition: CWM is known or highly suspected to be present at the site in a condition (within ordnance and/or nonexplosive container, or in an uncontainerized form in sufficient volume that weathering of the product has not rendered it harmless) that will cause potential harm to personnel if it is encountered.	Mandatory personal and perimeter air monitoring using the DAAMS, MINICAMS, and RTAP collection/analysis methods with off-site surety laboratory confirmation of all environmental samples. Specific monitoring criteria (equipment types and sampling station placement, percentage of personnel monitored, etc.) to be established in the Site Specific Safety and Health Plan (SSHP).
4b. Moderate Presence Potential - Definition: CWM is suspected to have been present at the site, but has been previously removed and/or decontaminated, or has been open to the environment such that it is expected to have degraded and been rendered harmless.	The need for personal and perimeter air monitoring using the DAAMS, MINICAMS, and RTAP collection/analysis methods with off-site surety laboratory confirmation of all environmental samples will be reviewed on a site-by-site basis. Specific monitoring criteria (equipment types and sampling station placement, percentage of personnel monitored, etc.) to be established in the Site Specific Safety and Health Plan (SSHP).
4c. Low Presence Potential – Definition: No indications that CWM will be present in quantity or reactivity (in munitions, projectiles, drums, etc.).	No specific personal or area monitoring for chemical agents required beyond what is specified in the SHP.

Continue to page 3 of 4 -

Site Name: Range 24 Alpha Well Installation \ Sampling

Job Number: 796887 **Date: July 1, 2009**

Based on the information available for this site, including information gathered during completion of this form, the potential for CWM to be present at this site, as defined above, is expected to be: *LOW*

Exceptions/Explanations: Extensive work has been completed for all these sites. (additional space for notes and explanations on page 4)

5. Based on the information provided in questions 1 through 5, above, the following guidelines will be used for establishing PPE requirements for activities to be performed at this site; Specific details are provided in the SSHP:

5a. High Exposure Potential - High exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the Shaw health and safety manager, PPE for all personnel in the exclusion zone at a site identified as having a "High Exposure Potential" will be Level B (supplied air) or Level C (full-face respirator with HEPA/Acid Gas/OV cartridges w/ emergency egress hood) and chemically resistant coveralls. Specific PPE requirements are in the SSHP for this site.
5b. Moderate Exposure Potential - Moderate exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the Shaw health and safety manager, PPE for all personnel in the exclusion zone at a site identified as having a "Moderate Exposure Potential" will be Modified Level D (disposable coveralls and emergency egress hood) carried by all personnel. Specific PPE requirements are in the SSHP for this site.
5c. Low Exposure Potential - Low exposure potential is determined by evaluating the potential presence of CWM in conjunction with the task(s) to be performed, as well as the specific location and duration of the task(s).	Subject to review by the Shaw health and safety manager, no additional PPE requirements above those stated in the SSHP are needed for sites identified as having "Low Exposure Potential." Specific PPE requirements are in the SSHP for this site.

Based on all available information, the exposure potential at this site is considered to be: *LOW*
Exceptions/Explanations: Please see page 4.

Review Signatures:
Shaw UXO Technical Manager _____ Date: 7/7/09 Shaw H&S Specialist _____ Date: 7-7-09

Site Name: Range 24 Alpha Well Installation \ Sampling

Job Number: 796887 **Date: July 1, 2009**

Additional Notes and Explanations:

The work tasks for Range 24 Alpha involve the installation of one deep bedrock well and resampling of 16 existing wells. Currently, a separate contractor (Tetra Tech, Inc.) is conducting MEC removal operations at Range 24 Alpha. Shaw field personnel will be working in the same location after the MEC removal project is completed. Thus there is a very remote chance of any ordnance safety concerns. However, as a conservative measure Shaw will perform MEC anomaly avoidance procedures including surface sweeps and down-hole monitoring at the proposed well to a maximum depth of 12 feet bgs. This conservative approach will assure the safety of all field personnel. In addition, the Shaw UXO technician (in conjunction with the Shaw site manager and\or safety manager) will provide a UXO safety meeting prior to commencing field activities to ensure proper safety procedures are being followed each work day.

Shaw has completed several phases of work from 2000 through 2005 and submitted a draft RI report in April 2005. A total of 57 monitoring wells were installed by Shaw and 132 groundwater samples collected. Additionally, Shaw collected groundwater samples from 16 existing wells in September 2006. VOCs (primarily benzene, carbon tetrachloride, and chloroform) were detected in groundwater at concentrations exceeding site-specific screening levels. It should be noted that all work for this effort will be conducted outside the 1.8-acre fenced area. The 1.8-acre fenced area is the Former Chemical Munitions Disposal Area, Parcel 187(7). Reportedly, chemical warfare munitions were buried at this site. Decontaminants used within the fenced area consisted of supertropical bleach (STB) and Decontamination Solution No.2. After each training exercise the area was sprayed with STB.

SAIC and Parsons conducted investigations to address the presence or absence of CWM and other subsurface disposal activities. These investigations consisted of excavation of suspected anomalies, air monitoring, trenching, soil sampling and analysis for GB, HD and breakdown products. The analytical results did not show any residual agents or degradation products. In addition, a total of 1,312 cubic yards of soil, 3X materials, and MEC scrap were excavated and screened at the site. A total of 14,932 pounds of 3X scrap material were transported to a thermal treatment facility where they were incinerated. All 3X scrap, OE, and non-OE scrap metal identified in six anomalies (as reported by Parsons [2002]) were removed from Fort McClellan.

ATTACHMENT 2

INCIDENT REPORTING MANAGEMENT PROCEDURE-FEDERAL

Shaw
Shaw E & I, Inc.

Incident Reporting and Management Procedure - Federal

Action	Who? *When?*	Under what circumstances?	How?	Notes:
1. Notify Supervisor for all incidents **(no matter how minor)**	Injured person, first person recognizing incident, driver/passenger, or employee causing damage *Immediately*	**All incidents no matter how minor**	In person or by telephone	
2. For ***life-threatening injuries/illnesses*** - contact local emergency personnel For ***non life-threatening injuries/illnesses*** - transport injured person to doctor at an occupational medical facility For ***vehicle accidents*** – make scene safe, notify police, aid injured parties For ***equipment/property damage*** - make scene safe, prevent further damage or injuries	Site Supervisor *Immediately (concurrently with next step if injury or illness)* Site Supervisor *Immediately (concurrently with next step if injury or illness)* Driver/passenger *Immediately* Employee causing damage *Immediately*	In case of serious injury or illness requiring off-site medical care	Via ambulance Via vehicle	Site Supervisor or Site Safety Officer must immediately go to emergency care facility. Site Supervisor or Site Safety Officer must transport and stay with injured person until released from care
3. Notify Health Resources **(for injuries/illnesses to Shaw employees only)**	Site Supervisor *Immediately, prior to transporting the injured employee, unless injuries are life threatening*	◆ Serious injury requiring off-site medical care ◆ If employee states that he/she has been exposed to any chemical or biological substance	**800-350-4511** **Note: Outside Continental US call** **781-935-8581**	◆ Not required for temporary agency and contract labor ◆ Provide name of injured employee, name and phone # of treating medical facility, description of the incident ◆ Health Resources will help with medical facility coordination and follow-up care
4. Notify Regional/Program H&S Manager	Site Supervisor *Immediately (concurrently with providing transportation to occupational medical facility or EMS transport to hospital)*	All incidents	See Federal Incident Notification and Communication Contact List (attached)	◆ Contact should be made prior to sending the individual for medical care ◆ Regional/Program H&S Manager will notify Dave Mummert or Mike Zustra as appropriate

Incident Reporting and Management Procedure – Federal (continued)

Action	Who? *When?*	Under what circumstances?	How?	Notes:
5. Notify Shaw Notification Hotline/Help Desk	Site Supervisor *As soon as possible. Prior to sending an individual for medical treatment*	◆ Illness and/or injury (doctors cases and above) ◆ Property damage (damage > $2,500.00) ◆ Vehicle accidents (All) ◆ Criminal activity (i.e. bomb threat, theft) ◆ Natural disaster (all) ◆ Explosion and/or fires (damage > $2,500.00 or result in injury) ◆ Environmental spills/releases (incidents that requires regulatory notification or have an offsite impact) ◆ Regulatory agency visit ◆ Fatalities	Shaw Notification Hotline/Help Desk Phone Number **866-299-3445** **Note: Outside the Continental US call** **225-215-5056**	
6. Complete forms: ***Injuries and illnesses*** ◆ Authorization for Release of Protected Medical Information ◆ Authorization for Treatment of Occupational Injury/Illness ◆ Return-To-Work Examination Form ***and*** fax to Health Resources ***and*** fax to Loss Prevention Manager (Casey Parker)	Injured employee and medical facility personnel (Site Supervisor is responsible for verifying forms are completed) *Prior to leaving medical facility*	◆ Serious injury requiring off-site medical care ◆ If employee states that he/she has been exposed to any chemical or biological substance	Fax to Health Resources at 800-853-2641 Fax to Loss Prevention Manager (Casey Parker at 225-987-3080)	Site Supervisor or Site Safety Officer must take these forms with him/her to occupational medical facility or hospital (Contained in HS 020)
7. Call Project Manager and notify of incident	Site Supervisor *As soon as reasonably possible*			Project Manager will report incident to upper levels of Operations/Business Line Management

Incident Reporting and Management Procedure – Federal (continued)

Action	Who? When?	Under what circumstances?	How?	Notes:
8. Call back Regional/Program H&S Manager to report on status of ***injured/ill employee***	Site Supervisor *Prior to employee leaving medical facility*	All injuries and illnesses requiring off-site medical care	See Federal Incident Notification and Communication Contact List (attached)	
9. Complete forms: ***OSHA Recordable Cases*** Supervisor's Employee Injury/Illness Report Form Injured Employee Statement Witness Statement Form(s) ***First Aid Cases*** Supervisor's Employee Injury/Illness Report Injured Employee Statement Witness Statement Form(s) **Fax completed forms** to Shaw Corporate Claims and Regional/Program H&S Manager and Health Resources.	♦ Site Supervisor ♦ Witnesses *As soon as possible – no later than 24 hours*	All injuries, illnesses, and first aide cases	Shaw Corporate Claims Department Fax (225-932-2636) Health Resources Fax 800-853-2641 See Federal Incident Notification and Communication Contact List (attached)	Site Supervisor should have these forms with him/her at all times (Contained in HS 020)
10. Complete forms: ***Chargeable Vehicle Accidents*** Vehicle Accident Report Witness Statement Form(s) Driving Record Certification (Procedure HS800) ***Non-Chargeable Vehicle Accidents*** Vehicle Accident Report Witness Statement Form(s) ***Equipment, Property Damage and General Liability Incidents*** Equipment, Property Damage and General Liability Loss Report Witness Statement Form(s) **Fax completed forms** to Shaw Corporate Claims and Regional/Program H&S Manager.	♦ Site Lead / Supervisor ♦ Witnesses *As soon as possible – no later than 24 hours*	All vehicle accidents and /or all property damage	Shaw Corporate Claims Department (225-932-2636) See Federal Incident Notification and Communication Contact List (attached)	Supervisor should have these forms with him/her at all times (Contained in HS 020)

Incident Reporting and Management Procedure – Federal (continued)

Action	Who? *When?*	Under what circumstances?	How?	Notes:
11. Complete forms: ***OSHA Recordable Cases*** Incident Investigation Report ***First Aid Cases*** Incident Investigation Report ***Chargeable Vehicle Accidents*** Incident Investigation Report ***Non-Chargeable Vehicle Accidents*** Incident Investigation Report ***Equipment, Property Damage and General Liability Incidents*** Incident Investigation Report ***Near Miss*** Incident Investigation Report Fax completed forms to Regional/Program H&S Manager	Site Supervisor *As soon as possible – no later than 72 hours of incident*		Shaw Corporate Claims Department (225-932-2636) See Federal Incident Notification and Communication Contact List (attached)	Supervisor should have these forms with him/her at all times (Contained in HS 020)
12. Perform "Accident Review Board" (ARB) and fax to Regional/Program H&S Manager.	Site Supervisor/Project Manager *Within 10 days of incident*	OSHA Recordable Cases Chargeable Vehicle Accidents		ARB must include: Regional Manager, Project Manager, Employee's Direct Supervisor, Regional/Program H&S Manager, and Employee(s) involved in the incident. Lost time injuries will require Bill Winkler and Mike Zustra.

FEDERAL INCIDENT NOTIFICATION AND COMMUNICATION CONTACT LIST

Project Number: 796887 Project: Ranges Near T 24 Alpha Office: Fort McClellan Field Office Facility Location: Aniston AL

Name	Phone Number(s)	Fax Number	E-mail
Shaw Notification Hotline / Helpdesk	866-299-3445 225-215-5056 (Outside Continental US)	N/A	N/A
Health Resources	800-350-4511	800-853-2641	
Shaw Corporate Claims Department		225-932-2636	
Program/Project H&S Manager – Doug Russell	865-692-3584 (office) / 865-414-9545 (cell)	865-690-3626	winston.russell@shawgrp.com
East Region Army H&S Manager - Doug Russell	865-692-3584	865-690-3626	winston.russell@shawgrp.com
Shaw E&I H&S Director – Mike Zustra	614-834-4819 (office) / 740-215-3431 (cell)	614-834-4819	mike.zustra@shawgrp.com
ERC Division H&S Manager-Dave Mummert	419-425-6129 (office) / 419-348-1544 (cell)	419-425-6039	david.mummert@shawgrp.com
Project Manager – Steve Moran	865-694-7361 (office) / 865-607-9148 (cell)	865-690-3626	steve.g.moran@shawgrp.com
Army Programs Manager – Bob Culbertson	865-694-4702 (office) / 865-717-3293 (cell)	865-690-3626	bob.culbertson@shawgrp.com
Loss Prevention Manager (Casey Parker)	225-932-2763 (office) / 225-405-1246 (cell)	225-987-3080	casey.parker@shawgrp.com

Note: Notifications to operations chain will be verbal and as soon as reasonably possible, but no later than 24-hours following the incident.

APPENDIX B

SITE-SPECIFIC MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) SAFETY PLAN

Site-Specific MEC Safety Plan Attachment
Bedrock Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 112(Q), 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Prepared for:

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

Prepared by:

Shaw E&I
312 Directors Drive
Knoxville, Tennessee 37923

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

July 2009

Site-Specific MEC Safety Plan Attachment
Bedrock Well Installation and Groundwater Sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q.

I have read and approve this site-specific munitions and explosives of concern (MEC) safety plan attachment for the Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and Shaw E&I UXO procedures.

Al Grant
UXO Technical Manager

7/7/09
Date

Doug Russell
Health & Safety Manager

7/7/09
Date

Deleted: 7/6/2009

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List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms, of the Site-Specific Field Sampling Plan Attachment contained in this binder.

1.0 Introduction

This document defines anomaly avoidance procedures for activities to be performed by Shaw unexploded ordnance (UXO) personnel in conjunction with the well installation and groundwater sampling at the Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q, at Fort McClellan (FTMC), Calhoun County, Alabama. This document is not a stand-alone document; it must be used in conjunction with the *Fort McClellan Unexploded Ordnance Supplementary Procedures* (IT, 2002), attached as Attachment 1.

Shaw UXO personnel will perform visual surveys, assisted by hand-held magnetometers and metal detectors, to support the installation of one additional monitoring well and the collection of samples for chemical analysis at the Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q. The purpose is to avoid any ordnance and explosives (OE) during hazardous, toxic and radioactive waste (HTRW) drilling and sampling activities. Intrusive anomaly investigation is not authorized for this site work.

The Ranges Near Training Area T-24A are located on the southeast portion of the Main Post and consist of a 1.8 acre fenced chemical munitions disposal area and four overlapping ranges. The following five parcels make up the Ranges Near Training Area T-24A: Former Chemical Munitions Disposal Area, Parcel 187(7); Former Machine Gun Range, Parcel 112Q; Former Demolition Area, Parcel 113Q-X; Former Bandholtz Machine Gun Qualification Range, Parcel 213Q, and Bandholtz Field Firing Range, Parcel 214Q.

Previous investigations conducted at the Ranges Near Training Area T-24A included a geophysical survey, soil sampling, surface water sampling, sediment sampling, groundwater sampling and trenching operations. The geophysical survey was conducted inside of the Former Chemical Munitions Disposal Area, Parcel 187(7) (the fenced area at Training Area T-24A) in 2001 by Parsons Engineering Science, Inc. as part of a chemical warfare material (CWM) Engineering Evaluation / Cost Analysis (EE/CA). Numerous geophysical anomalies were observed and evaluated. Twenty-one CWM items were encountered during investigative trenching of the anomalies but did not contain chemical warfare agents nor were they explosively configured. Eight soil samples were collected during the trenching and analyzed for chemical warfare agents (GB, HD, 1,4-thioxane, or 1,4-dithiane). There were no concentrations of GB, HD, 1,4-thioxane, or 1,4-dithiane detected above the reporting limits. Groundwater sample results from previous investigations conducted by IT Corporation (IT) and Science Applications

International Corporation (SAIC) indicated the presence of volatile organic compounds (namely benzene, carbon tetrachloride and chloroform) at Training Area T-24A. The drilling and installation of the one bedrock monitoring well is being conducted to better define the horizontal and vertical extent of contamination in groundwater.

2.0 UXO Team Composition

UXO team and personnel requirements will be in accordance with EP 75-1-2 (USACE, 2004) and the Installation-Wide Sampling and Analysis Plan (SAP) (IT, 2002) for FTMC. A UXO team will be on site during all sampling or intrusive activities where OE is suspected.

3.0 Responsibilities

The UXO Team Leader is responsible for ensuring that personnel performing UXO tasks at FTMC have the required qualifications. The UXO Team Leader supervises and coordinates UXO work activities.

The UXO team member(s) will provide UXO avoidance, explosive ordnance recognition, location, and safety functions for Shaw employees and any subcontractors during drilling and sampling activities. Sampling activities at this site may include surface and subsurface soil sampling, drilling and installing monitoring wells, sampling of monitoring wells, survey of sample points, and safe access and egress to and from the site in support of HTRW operations.

4.0 Authority

UXO personnel are authorized to perform UXO avoidance activities only. UXO personnel are not permitted to initiate OE investigative or disposal activities.

5.0 UXO Avoidance Procedures to Support HTRW Sampling Activities at FTMC

The scope of work for site investigation activities associated with the Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q, includes the following UXO tasks:

- Provide UXO avoidance support during the installation of one bedrock monitoring well located outside the fenced area at Training Area T-24A. The location is shown in the site-specific field-sampling plan contained in this binder.

- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.

- Provide surveys for all intrusive field activities (e.g., digging, grading, drilling, excavation, etc).

Since these areas may contain OE contamination, the UXO team must conduct a surface access survey for UXO before any type of activities commence. This includes foot and vehicular traffic. UXO avoidance activities at the Ranges Near Training Area T-24A, will include:

a) Access Corridors and Sampling Sites

(1) Access surveys are defined as those UXO sweeps performed to allow entry to and exit from sampling sites. In cases where hand auger sampling is required, the UXO team may consist of a UXO technician and sampling personnel. The UXO technician will sweep ahead of the non-UXO technician team member and mark a clear route. Access surveys will begin in a known clear area and proceed by the most direct route to the sampling site. The boundaries of the access route, whether for vehicle or personnel traffic, and the area of the sampling site, will be marked with white tape or white pin flags.

(2) If an OE item is found during the survey, the location will be conspicuously marked with a red pin flag and avoided by altering the route. Additionally, UXO personnel will complete the Shaw FTMC "Unexploded Ordnance Report Form." Subsurface anomalies will be marked with a yellow flag.

(3) The boundaries of the access route and sampling site will be recorded in the Shaw FTMC "UXO Sketch Log" by the UXO technician. Additionally, anomaly locations will be recorded on this form.

(4) Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or the Whites Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or MG-230 will be set up for downhole monitoring. All equipment will be operated as specified in the appropriate operator's manual. All equipment will be function tested prior to use following the procedure in paragraph 3.2, *FTMC UXO Supplementary Procedures* (IT, 2002) and the operator's instructions. The Whites Metal Detector will be used in conjunction with hand-held

magnetometers in areas of high concentrations of rocks with a magnetic signature to assist in eliminating anomalies created by "hot rocks."

(5) The access route will be twice as wide as the widest vehicle that will use the route. Footpath lanes will be a minimum of three feet wide.

(6) If surface OE or subsurface anomalies are encountered that cannot be avoided, the access route must be diverted to avoid contact. No personnel will be allowed outside of the surveyed areas without a UXO escort. No unescorted access is permitted inside the corridor area until a survey has been completed and boundaries established.

(7) At the actual investigation site, the UXO team must also complete a survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations. As a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the largest vehicle or piece of equipment to be brought on site. White pin flags or tape will be used to mark the boundaries of the surveyed site.

(8) Surface soil samples are normally collected at depths of 0 to 12 inches below ground surface. The UXO team will survey the area of the soil sampling site for any indication of OE. Sampling is not permitted at any location where an anomaly has been detected.

(9) Tracked or other vehicles whose movement would disturb the soil are authorized for use only in areas that have been surveyed and in which no anomalies have been detected.

(10) If grading or soil movement is required to support access corridor development or a sampling location, UXO personnel will perform a survey. After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per cut. If additional grading is required, another survey will be performed after each one foot of soil has been removed.

(11) Erosion and weathering will typically cause some OE items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional surveys may be required. The decision regarding the performance of follow-on surveys will be made by the site superintendent with input provided by the FTMC UXO Safety Officer and FTMC UXO Team Leader. The decision will be based on such factors as: the amount of time since the last survey was performed, the weather during this

period, the terrain in the area of concern, the former use of the area, and the type of quantity of OE found during initial surveys.

(12) Incremental geophysical surveys at drill hole locations will be initially accomplished using a hand auger to install a pilot hole. An access survey of the immediate vicinity of the pilot hole location will precede the installation of the pilot hole. The UXO team will use a manual or mechanical portable auger to install the pilot hole. The augured hole will be inspected for anomalies with a geophysical instrument (configured for downhole utilization) in two-foot increments as the hole is advanced below ground surface. Hand augering of a hole will not proceed if an anomaly is detected that cannot be positively identified as inert material. If a suspect OE item is encountered, the sampling personnel must select a new drill hole location. The pilot hole will also be inspected with the geophysical instrument upon reaching the final depth of the hand augered hole, providing a total clearance depth equal to pilot hole depth plus two feet. If the proposed site is still free of magnetic anomalies, the drilling equipment may be brought on site and utilized. The UXO team will continue to inspect the drill hole for anomalies at two-foot increments as the drilling is advanced from the clearance depth of the pilot hole until a depth of 12 feet is reached.

b) Vegetation Removal

In cases where large trees or other vegetation removal is required to support access or sampling operations, the procedures in paragraph 4.2, *FTMC UXO Supplementary Procedures* (IT, 2002) will be followed.

c) Magnetometer/Metal Detector Checkout and Field Procedures

The procedures in paragraph 3.0, *FTMC UXO Supplementary Procedures* (IT, 2002) will be followed. The function test will utilize the function test ordnance that most closely approximates the 75 mm projectile. The UXO Team Leader may designate another function test item if other types of ordnance are discovered.

d) UXO Logbooks and Documentation

All UXO personnel identified in paragraph 5.0, *FTMC UXO Supplementary Procedures* (IT, 2002) will maintain a logbook in accordance with that procedure.

6.0 Safety

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

a) During the access and subsurface surveys conducted with a geophysical instrument, the UXO team members will not wear safety shoes or other footwear that would cause the instrument to present a false response.

b) The UXO team will not be required to wear protective helmets unless an overhead hazard is present.

c) The FTMC UXO Safety Officer will monitor UXO activities to ensure compliance with applicable safety requirements.

d) The FTMC UXO Safety Officer will certify that all FTMC UXO workers are capable of performing UXO activities at FTMC based on observation of work performance.

e) The FTMC UXO Safety Officer is responsible for all site-specific UXO training.

f) The UXO technician on site will advise project personnel regarding all evacuation and/or exclusion zones as appropriate. The UXO technician will monitor all sampling site activities to ensure that only the minimum numbers of personnel are present on site.

7.0 Quality

The Shaw FTMC UXO Quality Control Officer will follow quality control instructions and procedures listed in Section 9.0 of the Installation-Wide OE Management Plan contained in Volume IV of the SAP (IT, 2002) appropriate to this task and the FTMC UXO Supplementary Procedures. The Shaw FTMC UXO Quality Control Officer will also utilize the "UXO Avoidance Quality Control Report" to document his activities. Copies of this form will be provided to the Shaw FTMC quality assurance representative upon request.

8.0 References

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

IT Corporation (IT), 2002, ***Fort McClellan Unexploded Ordnance Supplementary Procedures***, October.

IT Corporation (IT), 2002, ***Draft Installation-Wide Sampling and Analysis Plan, Revision 3, Fort McClellan, Calhoun County, Alabama***, Revision No 3, February.

U. S. Army Corps of Engineers (USACE), 2004, ***Engineering Publication, EP 75-1-2, Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radiological (HTRW) and Construction Activities,*** 1 August.

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

ATTACHMENT 1

FTMC UXO
SUPPLEMENTARY PROCEDURES

FTMC UXO SUPPLEMENTARY PROCEDURES

Subject: Ordnance and Explosives

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) has been retained by the U.S. Army Corps of Engineers-Mobile District, under Contract Number DACA21-96-D-0018, to provide environmental services related to Base realignment and closure (BRAC) of Fort McClellan, Alabama. The Installation-Wide Ordnance and Explosives (OE) Management Plan for Fort McClellan (FTMC) was prepared by Shaw and submitted as a final document in March 2000. The Installation-Wide OE Management Plan was prepared to provide general guidance for conducting unexploded ordnance (UXO) work associated with hazardous, toxic, and radiological waste (HTRW) investigations and remedial activities currently in progress at FTMC. Shaw prepares site-specific field sampling, health and safety, and UXO safety plans for sites where fieldwork will occur that may potentially contain OE. A UXO Safety Plan is not prepared for sites that are not reported to be in areas containing OE.

1.1 Purpose

This document is intended to provide procedures to the field staff that outline UXO operations and clarify activities currently permitted under "anomaly avoidance." The document is not intended to replace any of the project documents currently approved; rather, it is intended to complement those documents with additional information that allows successful completion of the job.

2.0 FTMC EMPLOYEE ORIENTATION/TRAINING AND CERTIFICATION

The Shaw FTMC orientation program is designed to:

- Indoctrinate new employees to FTMC-unique procedures
- Verify compliance with regulatory certification requirements
- Provide continuing instruction and updating in UXO fundamentals to sustain readiness to safely perform UXO tasks

2.1 Responsibilities

The Shaw OE Service Center Operations Manager will oversee the training programs and maintain a master record of UXO employee training and certification status.

The UXO person designated as the senior Shaw UXO individual at FTMC will schedule the orientation listed below.

The FTMC UXO Safety Officer will:

- Conduct all UXO-specific orientation and training at FTMC
- Certify that each new UXO employee is capable of performing UXO work activities at FTMC
- Maintain FTMC training files and records on each UXO technician on site reflecting his or her current training status.

2.2 UXO Employee Orientation

Every UXO employee assigned to FTMC will receive a site-specific UXO orientation in addition to training required by the Occupational Health and Safety Administration (OSHA). This orientation will include, as a minimum, the following topics:

- Local emergency response drills and procedures
- Personal protective equipment (PPE) and personnel decontamination procedures
- Ordnance recognition/UXO expected to be encountered at FTMC
- Equipment safety
- FTMC site orientation
- Chemical warfare material (CWM) awareness and procedures
- Communications procedures
- FTMC Logbook/data recording procedures
- Shaw administrative policies and procedures
- Magnetometer checkout procedures
- Accident reporting procedures.

Upon completion of the UXO employee orientation, the FTMC UXO Safety Officer will monitor the performance of the new hire for at least three workdays while conducting typical UXO activities. The FTMC UXO Safety Officer will then certify that the individual is capable of performing UXO activities at FTMC based upon satisfactory performance of the three-day period. A copy of this certification will be maintained in the individual's site FTMC training file (see example at Attachment 1).

2.3 UXO Sustainment Training

All UXO technicians have had the OSHA 40-hour hazardous waste operations and emergency response (HAZWOPER) course in order to be initially certified at FTMC. They are also required to maintain the certification with an 8-hour OSHA refresher course on an annual basis. Additionally, all Shaw FTMC UXO personnel will have 8 hours of site-specific annual UXO sustainment training. This training can be performed incrementally (2 hours every quarter) at the discretion of the site superintendent in coordination with the FTMC Shaw UXO Safety Officer. Topics will include, but are not limited to, the following subjects:

- Site-specific environmental hazards
- Site-specific UXO hazards, ordnance fuzing, functioning and precautions
- Topics which the Shaw UXO Team Leader or Shaw Safety UXO Officer determines necessary to support FTMC UXO activities

Sustainment training will be conducted for a period of no less than 8 hours. Daily safety briefings, tailgate safety meetings, and other required site-specific training are not a substitute for this training. The purpose of this training is to provide each UXO employee with site-specific UXO training over and above OSHA requirements. The site-specific UXO training will be recorded in the project file and the UXO employee's personnel file.

3.0 FTMC MAGNETOMETER/METAL DETECTOR FUNCTION TEST AND FIELD PROCEDURES

This section provides FTMC magnetometer/metal detector function tests and operating procedures to be employed at all work sites that have been identified as requiring avoidance support.

3.1 Geophysical Test Plot

The purpose of a test plot is to provide a consistent environment where the equipment can be evaluated. This plot will be established as follows

- The test plot will be located in a clear area within the Main Post of FTMC.

- The test plot will contain inert ordnance items at depths and attitudes characteristic of previous ordnance encounters at FTMC. Examples of test items include: a 37mm APT buried at a depth of eight inches and in a 45-degree, nose-down attitude; an aluminum alloy snap flare buried four inches in a horizontal attitude; a 60mm mortar twelve inches deep and in a 60-degree, nose-down attitude; a 2.36-inch rocket at a depth of twelve inches and in a 60-degree, nose-down attitude; and a 75mm canister projectile buried eight inches deep in a horizontal attitude. Each burial location will be marked with a wooden stake located to the east of the object. Each stake will be tagged or marked to denote the depth, type of item, and orientation of the item. The site will utilize native soils; no fill material will be brought in from another area. Sand may be used to cover the area to mitigate the effects of wet weather.

- For downhole magnetometer testing, a length of 2-inch PVC pipe will be buried to a depth of 48 inches. The location of the test item, similar in size and mass to a 2.36 inch rocket, will be marked with a wooden stake tagged to denote the depth, type of item, orientation, and reference number assigned. This item will be buried at a depth of twelve inches.

3.2 Magnetometer/Metal Detector Check-Out Procedures

- Prior to field use, all magnetometers and metal detectors will be set up following the guidelines in the manufacturer's operating manual for the specific instrument used. Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or White's Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or MG-230 will be set up for downhole monitoring. All equipment will be operated in a manner consistent with instructions contained in the appropriate operator's manual. All equipment will be function-tested prior to use. The White's Metal Detector will be used in conjunction with hand-held magnetometers in areas of high concentrations of rocks with a magnetic signature, to assist in eliminating anomalies created by "hot

rocks." The operating manual for each of the instruments used at FTMC will be available for use with the equipment.

- Once the instrument has been determined to be working according to the manufacturer's operating manual, the operator will perform a function test on the FTMC geophysical test plot using the detection methods described in the manual. A function test will consist of using the instrument over a minimum of three test sources. The same sources will be used during each function test to ensure consistency. The instrument detection indicator, as described in the operator's manual, will be noted in the instrument logbook. For site checks, a 6-inch length of 1/2-inch steel reinforcing rod will be available to each operator at the work site.

- Instruments that fail to reproduce a detection indication consistent with previous tests will be checked to ensure that the power supply or batteries are sufficient. If the power supply is determined to be sufficient and the operator cannot find a fault in accordance with the operator's manual, the instrument will be tagged and removed from service.

- Function tests will be performed each morning before the equipment is put into service.

- If an instrument is determined to be working improperly, the FTMC UXO Team Leader and the site superintendent will be immediately notified. Any activities performed using that instrument since its last positive test procedure will be considered invalid and will require reevaluation.

- Upon completion of the function test, the function test will be secured in the operator's Daily Field Log Book.

- After an instrument has been function-tested at the beginning of each day, the instrument will be checked at least once during every hour of use or each time the instrument is turned on after having been turned off. This check will consist of dropping the 6-inch length of 1/2-inch reinforcing rod in a clear area and passing the detector over the rod in a manner consistent with the operator's instructions. The instrument indication will be compared to the indication produced during the morning function test. Instruments that fail to produce a consistent indication will be checked and removed from service as required.

3.3 Equipment Documentation

Each piece of equipment will be assigned a logbook noting the make, model, manufacturer, and serial number of the equipment. The following information will be recorded:

- Factory (off-site) maintenance
- On-site repair activities
- Other actions which could alter the performance of the instrument

The Shaw FTMC Quality Control (QC) Officer will perform random audits of equipment function tests and will record the fact that the test was performed in accordance with these procedures.

3.4 Magnetometer/Metal Detector Field Procedures

All intrusive field actives in potential OE areas (e.g., digging, fence post driving, grading, well installation or excavation) will be preceded by a UXO sweep. Each hole made in areas where OE may potentially be found will have a check immediately over the spot of the intrusion. Magnetometer operations at FTMC will assume a detection depth of one foot when surveying an area for excavation.

All magnetometers and metal detectors will be operated in accordance with the manufacturers specifications and procedures.

When surveying a potential area for a sampling well, an area of sufficient size will be surveyed to allow for installation of required pads and bollards. After the well is installed, the location of bollards will be adjusted as required if an anomaly is detected during the bollard installation process.

The White's Metal Detector will be used to augment the magnetometers on sites where "hot rocks" are suspected. The purpose of using the metal detector in addition to the magnetometers is to eliminate the probability of "hot rocks."

4.0 FTMC ACCESS CLEARANCES, VEGETATION REMOVAL, AND ROAD MAINTENANCE

This section is designed to provide specific procedures regarding activities associated with the building of access corridors, vegetation removal, and road maintenance in support of FTMC operations.

4.1 Access Corridors

The purpose of access corridors is to enable Shaw personnel access to well and/or other types of sampling sites within FTMC. Access corridors will be created by marking the route, both length and width, in which a UXO survey has been performed. The marking method will be defined in each site-specific UXO safety plan. No unescorted access is permitted until a corridor has been established. If an anomaly is detected during the survey or during a subsequent excavation, it must be avoided, since investigation is not authorized. The route will be altered to avoid the anomaly for FTMC activities. A magnetometer is considered to reliably detect anomalies to a depth of one foot.

The size of each area to be surveyed is dependent on the type and quantity of equipment expected to be used on that site. The UXO survey crew will follow the procedures outlined in the site-specific UXO safety plan to determine the dimensions of the area to be surveyed. Normally, the width of the access route will be at least twice as wide as the widest vehicle that will use the route; footpaths will be a minimum of 3 feet wide.

Tracked or other vehicles that disturb the soil are authorized for use only in areas that have been surveyed and no anomalies have been detected.

Erosion and weathering will typically cause some UXO items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional UXO surveys may be required. The decision regarding the performance of additional surveys will be made by the FTMC UXO team leader and the Shaw FTMC UXO Safety Officer. The site superintendent will be notified of this decision. This decision will be based on, but not limited to, such factors as: the amount of time since the last survey was performed; the weather during this period; the terrain in the area of concern; and the type and quantity of UXO found during initial surveys.

4.2 Vegetation Removal

In cases where removal of large trees or other types of vegetation is required, the following procedures will be followed:

- The UXO technician will survey around the base of the tree or vegetation, and, if no anomaly is detected, direct the bulldozer or other equipment to proceed. If an anomaly is detected, the location will be recorded and

marked and another route will be selected. The size of the area to be surveyed will depend on the size of the suspected root system of the tree to be removed.

- Once the tree has been pushed over, the UXO technician will survey around the root ball and the area in and around the hole. If an anomaly is detected, the anomaly will be recorded and marked and an alternate route will be selected. If no anomaly is detected, the UXO technician will direct the equipment operator to proceed with the excavation.

4.3 Road Maintenance

Remote range roads and trails frequently require a certain amount of repair to remain passable. This section describes authorized actions regarding the maintenance of dirt or gravel range roads by Shaw UXO personnel.

- Bulldozers or grader-type equipment is authorized to repair roads and trails as long as a UXO survey has been performed and no anomalies have been detected.

- The UXO technician will observe the blade of the equipment as the earth is moved. If a potential UXO is uncovered, the UXO technician will signal the equipment operator to immediately stop the equipment. The UXO technician will then attempt to visually identify the object. If the object cannot be positively identified as a non-hazardous item, the equipment will be moved, the location of the object marked and recorded on the Shaw FTMC Unexploded Ordnance Report Form (Attachment 2), and the route changed to avoid the object. If no suspicious objects are detected, the equipment will continue to move earth at a rate of no more than one foot of depth at a time. If, more grading is required after the first past is complete the UXO technician will perform another survey. If no anomalies are detected, the equipment can repeat the grading process. If an anomaly is detected, the operation will be halted and the route changed.

- After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per lift. If additional grading is required, a survey will be performed after each one-foot increment the soil has been removed.

- Earth may not, at any time, be moved at a rate of more than one foot in each lift.

5.0 FTMC UXO LOG BOOKS

All UXO team leaders or UXO technicians supporting HTRW operations will maintain a logbook. The purpose of the logbook is to record UXO actions and activities taken at each work site.

5.1 Responsibilities

UXO personnel will maintain an individual daily logbook of work activities.

The logbooks will be routinely inspected weekly by the UXO QC Officer and will be made available to the FTMC site superintendent upon request. Copies will be made daily and filed in the Shaw Field Project office.

Logbooks will contain bound and numbered pages. Entries will be on successive pages as work is performed. The individual using the logbook will sign the page after the last entry for that page has been made. Logbooks are part of the project legal file and will be filed with the project files upon completion of each investigation.

5.2 Data Requirements

As a minimum, individual logbooks will contain the following information:

- Date, time and location of UXO activities
- Personnel involved in the activities
- UXO activities performed, including UXO/anomalies found
- A description of areas swept
- A record of the magnetometer or other equipment used, including instrument serial number
- Weather conditions.

Shaw UXO personnel will utilize the Shaw FTMC Unexploded Ordnance Report Form (Attachment 2) to document the discovery of UXO/OE items.

The Shaw FTMC QC Officer will utilize the Shaw FTMC UXO Avoidance Quality Control Report (Attachment 3) to document checks of field activities.

Additionally, UXO personnel will complete Shaw FTMC Form UXO Sketch Log (Attachment 4) and Shaw FTMC Unexploded Ordnance Report Form. The UXO Sketch Log will contain a description of activities, including the dimensions of the area surveyed. A description of the length and width will be recorded, as well as the manner in which the survey was performed. These forms will be completed as required and presented to the site superintendent.

ATTACHMENT 1

FTMC Employee Certification
(Example)

I certify that (name of individual) has fulfilled all UXO orientation requirements and has been observed by me for a period of 3 work days and is therefore eligible to perform UXO activities at FTMC.

_____

FTMC UXO Safety Officer

ATTACHMENT 2

Unexploded Ordnance Report Form

Report Tracking Number:

Discovery and Reporting Time

Time of Discovery	
Date	Time

Time Reported to Base Transition Force	
Date	Time

Employee Name:_____

Reported to FTMC Transitional Force Personnel

Name:_____

Location of Ordnance

Location, Description, and Parcel Number:

Coordinates of Ordnance:	State Plane Coordinates	
	Northing	Easting

Picture Taken of Ordnance			
Yes	No	Date	Time

Written Description and/or Sketch of Ordnance:

Corrective Action Taken by Fort McClellan Transition Force

Date	

ATTACHMENT 3

UXO Quality Control Report

Project Location: _____ **Date:** _____

Work Site Location: _____ **Day:** _____

1. **Personnel Involved:**

_____
_____
_____
_____
_____

2. **Description of Work Being Performed:**

_____
_____
_____
_____
_____

3. **Equipment Utilized:**

_____
_____
_____
_____
_____

4. **Comments:**

_____
_____
_____
_____
_____

_____ _____
Completed By **Printed Name & Title**

_____ _____
Signature **Date**

ATTACHMENT 4

UXO Sketch Location Log

District:_____ **Hole Number:**_____ **Date:**_____

Company Name: Shaw Environmental, Inc.

Subcontractor:_____

Parcel Location:_____ Well Location:_____ Date Started:_____ Date Completed:_____

Type of UXO Work Being Performed:

Most Probable Munition:	
Down-Hole Depth Achieved for UXO Avoidance:	
Total Number of Surface UXO Marked:	
Total Number of Anomalies Marked:	

Location Sketch/Comments:	**Not to Scale**
Signature of UXO Technician:	Date: