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A Member of The IT Group

August 14, 2001

IT-MC-CK10-0138
Project No. 796887

Mr. Ellis Pope
U.S. Army Corps of Engineers, Mobile District
Attn: CESAM-EN-GE (Pope)
109 St. Joseph Street
Mobile, AL 36602

Contract: **Contract No. DACA21-96-D-0018/CK10**
Fort McClellan, Alabama

Subject: **Revised - Site-Specific Field Sampling Plan Addendum for the Supplemental Remedial Investigation at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)**

Dear Mr. Pope:

Enclosed is the revised description of IT Corporation's (IT) proposed field activities of the final SFSP of the Addendum for the Supplemental Remedial Investigation at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) that was issued on July 25, 2001. This revised description of field activities reflects the monitoring well installation strategy discussed during the May 24, 2001 BCT meeting. Please remove pages 1 through 5 of the July 25, 2001 SFSP Addendum and replace them with this enclosed revised SFSP Addendum.

Background

Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) is located on the Main Post of Fort McClellan and encompasses most of Reservoir Ridge. Included in Parcel 186(6) is a six-acre fenced area at the crest of Reservoir Ridge that was used for training in the 1960s and 1970s.

Previous investigations at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) include a geophysical survey, soil sampling, and groundwater sampling. In addition, four springs, located along the base of Reservoir Ridge, were sampled. Two of the four springs were found to contain volatile organic compounds (VOC) at concentrations above site-specific screening levels (SSSLs). During the previous investigations, 25 groundwater monitoring wells were installed at the site (20 by IT, 5 by Science Applications International Corporation). Depth to water in these wells was measured in June 2001 and a groundwater elevation map was constructed from the data (Figure 1). Based on this data, little difference in the potentiometric head exists between individual

hydraulic communication exists between shallow and deep bedrock wells due to the extensive fracturing evident in cores. The map shows radial groundwater flow, which apparently is largely controlled by topography. The horizontal hydraulic gradient is approximately 0.123 foot per foot (ft/ft) on the western side of the ridge and 0.071 ft/ft on the eastern side. Two gaining streams, one to the north-northeast and one to the southeast, are interpreted as having formed a shallow groundwater divide along the east flank of the ridge. Groundwater appears to flow toward the divide as shown on Figure 1.

Figures 2, 3, and 4 are cross-sections showing the structure and stratigraphy interpreted for the northeast portion of the site. The cross-sections are based on cored lithologic sample data from exploratory boreholes drilled to collect groundwater samples for VOC screening. Included on the cross-sections are the monitoring well clusters which were subsequently installed at these screening locations. Analytical data (unvalidated) showing VOCs detected above SSSLs are shown opposite the depth-intervals screened and sampled in the wells. Where no data is shown, VOCs were not detected above SSSLs from that depth. Figures 2, 3, and 4 show that the extent of VOC contamination exceeding SSSLs in groundwater has not been defined to the north-northeast of the site. This information, in conjunction with the apparent groundwater flow directions, suggests that additional investigations are required to delineate the horizontal extent of contaminants in groundwater north-northeast of the site. As shown on Figures 2, 3 and 4, the cross-sections have been extended beyond the existing well control and the inferred lithology has been added where additional delineation of VOCs is required.

Field Activities

As discussed at the May 24, 2001 BCT meeting, IT proposes to install six groundwater monitoring wells at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) to define the extent of VOCs in the bedrock aquifer at the site. The groundwater monitoring wells will be installed as monitoring well clusters at three locations (as shown on Figure 1). The monitoring well locations were selected to fill data gaps determined during the analysis of existing groundwater analytical data.

The bedrock monitoring wells will be drilled and installed using rotosonic drilling techniques. It is estimated that the shallow bedrock wells will be installed to depths ranging from 195 to 253 feet bgs, and the deep bedrock wells will be installed to depths ranging from 275 to 333 feet bgs. The sampling rationale and the anticipated monitoring well total depths and screen depths are included in Table 1. The lithology and screen depths shown are based on the projections made from the cross-sections (Figures 2, 3, and 4) and may vary according to ground elevation and the lithology encountered during drilling. Deep bedrock wells will be installed first at each cluster, and set below the Jacksonville Fault in the Athens/Newala lithology. As shown on Figures 2, 3, and 4, deep bedrock wells will be completed at elevations projected to be 20 to 30 feet below the deepest screen interval elevation in the closest existing well with contamination. Shallow

bedrock wells will be screened in the Weisner Formation (quartzite, or residuum if quartzite is not present), overlying the Jacksonville Fault. The top of the screen depth will be at, or approximately 10 feet below the elevation of the base of the screen interval in the closest existing contaminated shallow monitoring well (Figures 2, 3, and 4). To maximize the groundwater capture zone, 20-foot screens will be utilized.

Deep Bedrock Wells

Prior to installing deep bedrock monitoring wells, subsurface soil samples will be collected using a 6-inch diameter sonic core barrel with an 8-inch diameter temporary sonic casing. Soil samples will be collected continuously from ground surface to the top of competent bedrock. Soil samples will be retrieved in 5- or 10-foot sections and placed in clear plastic sleeves provided by the subcontractor. Lithologic samples will be collected and described to provide a detailed lithologic log. The soil samples collected will be logged in accordance with ASTM Method D 2488 using the Unified Soil Classification System and screened in the field using a photoionization detector (PID). There will not be any samples collected for laboratory analyses. Competent bedrock will be determined by the driller by observing drilling pressure and penetration rates.

Upon reaching competent bedrock, continuous bedrock coring will be performed in competent rock using a 6-inch sonic core barrel. Rock cores will be placed in core boxes to be provided by the subcontractor. Bedrock cores will be described to provide a detailed lithologic log in accordance with methods outlined in USACE South Atlantic Division Manual DM 1110-1-1 (July, 1983).

Should harder competent bedrock formations be encountered such as limestone and sandstone, sonic coring will be discontinued and continuous coring will be performed with a PQ wireline triple-tube core barrel with a longitudinally split inner tube. The coring tools will be inserted through the temporary outer casing to continue drilling. If broken rock zones, washouts, and/or lost circulation are encountered during coring which inhibit the advancement of the core barrel and core recovery, the 6-inch outer casing will be advanced to the broken rock zone with the sonic drill head, the borehole will be cleaned out, and continuous coring will be resumed with the 4-inch sonic core barrel until competent rock is again encountered. Rock cores will be placed in core boxes to be provided by the subcontractor. Bedrock cores will be described to provide a detailed lithologic log in accordance with methods outlined in USACE South Atlantic Division Manual DM 1110-1-1 (July, 1983).

Upon reaching the target depth (Table 1), the holes will be reamed with sonic methods to 8-inches diameter, the temporary casing will be retracted, and four-inch monitoring wells will be installed at each proposed well location. The well casing will consist of new, 4-inch ID, Schedule 80, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well

casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap 4-inch ID PVC well screen, approximately 20 feet long. Attached to the bottom of the screen will be a sump, borehole. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately five feet above the top of the screen. The filter pack shall consist of approximately three to five feet long, composed of new, 4-inch ID, Schedule 80, threaded, flush joint PVC pipe. The sump may be eliminated at the discretion of the IT Site Manager or Drilling Supervisor. The subcontractor shall ensure that the well materials are installed plumb in the 20/40 silica sand. A fine sand seal (30/65 silica sand), approximately 5 feet thick, will be placed above the filter pack and bentonite pellets will be tremied 5 feet above the fine sand seal. Bentonite chips will be added from the top of the pellets to approximately 5-feet above the residuum-bedrock interface. After a minimum of 8 hours, the remaining annular space will be grouted with a bentonite-cement mixture and tremied in place from the top of the bentonite seal to ground surface. A water-tight well cap will be placed atop the well casing, and the wells will be completed with stick-up type protection.

Shallow Bedrock Wells

Shallow bedrock wells will be installed without the need for continuous lithologic information. Shallow bedrock wells will be advanced to competent rock using 6 by 8- inch temporary sonic casing. Upon reaching competent rock, the 8-inch temporary sonic casing shall be left in place, and the borehole shall be advanced with 7 7/8-inch diameter conventional air rotary or air percussion methods. The drilling subcontractor shall be responsible for diverting drill cuttings to rolloff containers and/or frac tanks to be provided by IT.

Upon reaching the target depth (Table 1), 4-inch monitoring wells will be installed at each proposed well location. The well casing will consist of new, 4-inch ID, Schedule 80, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap 4-inch ID PVC well screen, approximately 20 feet long. Attached to the bottom of the screen will be a sump, approximately 3 to 5 feet long, composed of new, 4-inch ID, Schedule 80, threaded, flush joint PVC pipe. The sump may be eliminated at the discretion of the IT Site Manager or Drilling Supervisor. The subcontractor shall ensure that the well materials are installed plumb in the borehole. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack shall consist of 20/40 silica sand. A fine sand seal (30/65 silica sand), approximately 5 feet thick, will be placed above the filter pack and bentonite pellets will be tremied 5 feet above the fine sand seal. Bentonite chips will be added from the top of the pellets to approximately 5 feet above the residuum-bedrock interface. After a minimum of 8 hours, the remaining annular space will be grouted with a bentonite-cement mixture and tremied in place from the top of the bentonite seal to ground

surface. A water-tight well cap will be placed atop the well casing, and the wells will be completed with stick-up type protection.

Groundwater samples will not be collected from bedrock wells for a period of at least 14 days after well development.

Following completion of well installation and development activities, groundwater samples will be collected from the six newly installed monitoring wells. Groundwater sample designations and QA/QC sample quantities are listed on Table 2. Groundwater samples will be collected in accordance with Section 5.2.6.2 of the Site-Specific Field Sampling Plan for the Supplemental Remedial Investigation, Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), August 2000, and Section 4.9.1.4 of the Installation-Wide Sampling and Analysis Plan (SAP), March 2000. The groundwater samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 3. Equipment decontamination procedures will follow the methodology presented in Section 4.10.1.2 of the SAP.

The monitoring well locations and elevations will be surveyed following the methodology outlined in Section 5.4 of the Site-Specific Field Sampling Plan for the Supplemental Remedial Investigation, Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), August 2000, and Section 4.17 of the SAP.

Investigative-derived waste generated during well installation and sampling will be managed in accordance with the procedures outlined in Appendix D of the SAP.

All work conducted during the Supplemental Remedial Investigation at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), will be performed in accordance with the Site-Specific Safety and Health Plan Attachment presented in the Site-Specific Field Sampling Plan for the Supplemental Remedial Investigation, Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), August 2000.

The presence of unexploded ordnance (UXO) is possible at the Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6). Therefore, IT will conduct UXO avoidance activities as outlined in Appendix E of the SAP and the attached Revised Site-Specific UXO Safety Plan prior to initiating intrusive field activities at Training Area T-38.

Schedule

IT is prepared to initiate field activities at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) during the week of August 20, 2001.

If you have any questions, or need further information, please contact me at (770) 663-1429 or Steve Moran at (865) 690-3211.

Sincerely,

Jeanne Yacoub

Jeanne A. Yacoub, P.E.
Project Manager

Attachments

Distribution:
Ron Levy, Fort McClellan
Lisa Kingsbury, Fort McClellan
Doyle Brittain, EPA Region IV
Philip Stroud, ADEM

STARTING DATE:	DATE LAST REV.:	DRAFT. CHCK. BY:	INITIATOR: A. BARNES	DWG. NO.: ...\796887es.131
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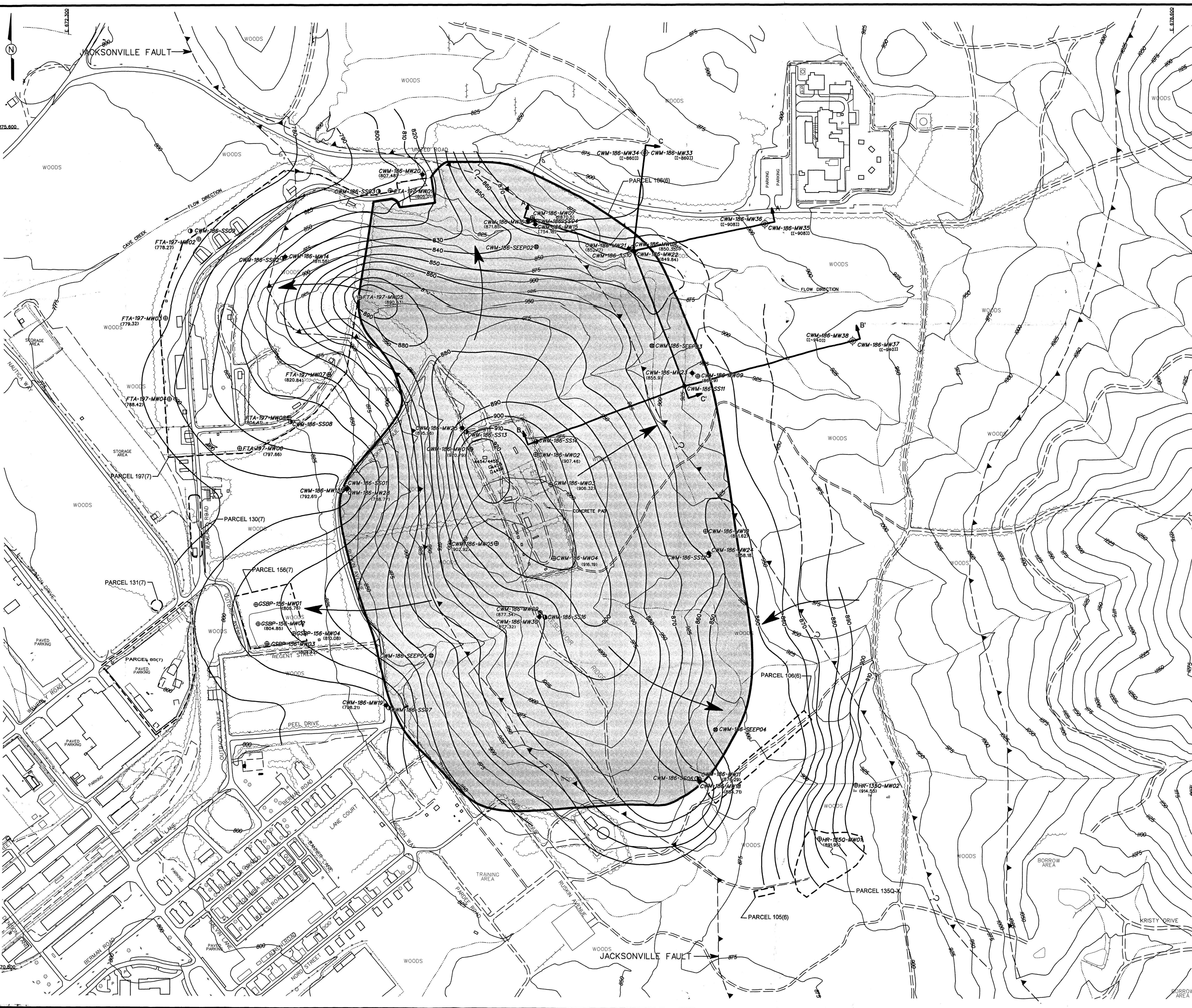

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- (850.35) GROUNDWATER ELEVATION (FT MSL) (JUNE 2001)
- [754.18] GROUNDWATER ELEVATION NOT USED IN CONTOURING
- GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- INFERRED DISPOSAL PIT AREA
- GROUNDWATER SCREENING SAMPLE LOCATION
- SEEP/SPRING WATER SAMPLE LOCATION
- RESIDUUM MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- [[~940]] PROPOSED MONITORING WELL CLUSTER [[APPROXIMATE GROUND ELEVATION]]
- JACKSONVILLE AND OTHER MAJOR THRUST FAULTS (OSBORNE, ET AL, 1997)
- ? INFERRED SPLAY FAULT
- A A' CROSS-SECTION LOCATION (SEE FIGURES 2,3,4)

SCALE

0 200 400 FEET

FIGURE 1
GROUNDWATER ELEVATION AND CROSS-SECTION LOCATION MAP
TRAINING AREA T-38
FORMER TECHNICAL ESCORT REACTION AREA
PARCEL 186(6)

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

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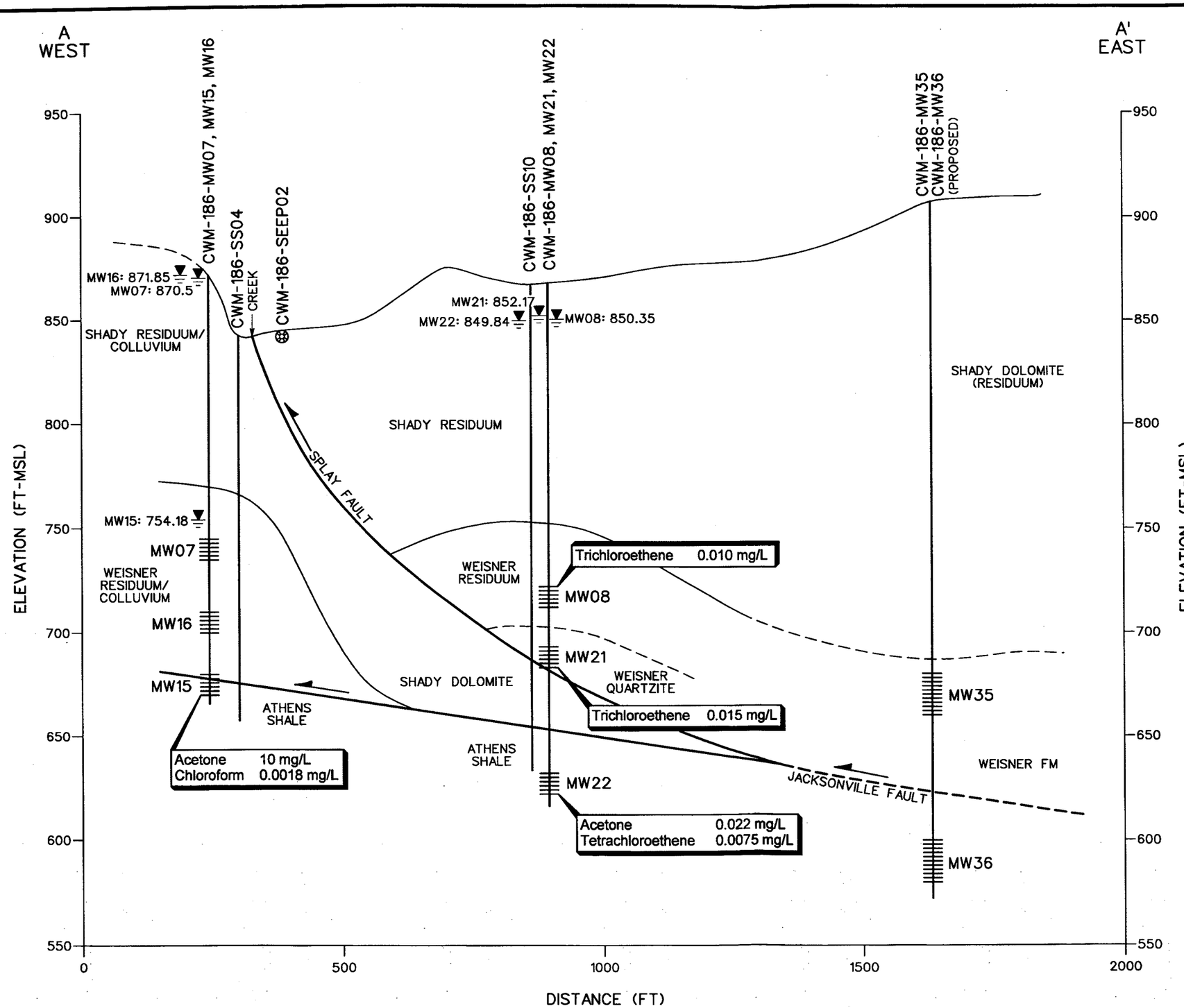

LEGEND

- SCREEN INTERVAL
- 775.68 GROUNDWATER ELEVATION (FT MSL) (JUNE 2001)
- mg/L MILLIGRAMS PER LITER
- RELATIVE MOVEMENT OF THRUST FAULT

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. DASHED WHERE INFERRED.
3. INTER WELL TOPOGRAPHY APPROXIMATE.

VERTICAL
0 50 100 FEET

HORIZONTAL
0 200 400 FEET

FIGURE 2
GEOLOGIC CROSS-SECTION A-A'
TRAINING AREA T-38
FORMER TECHNICAL ESCORT
REACTION AREA
PARCEL 186(6)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
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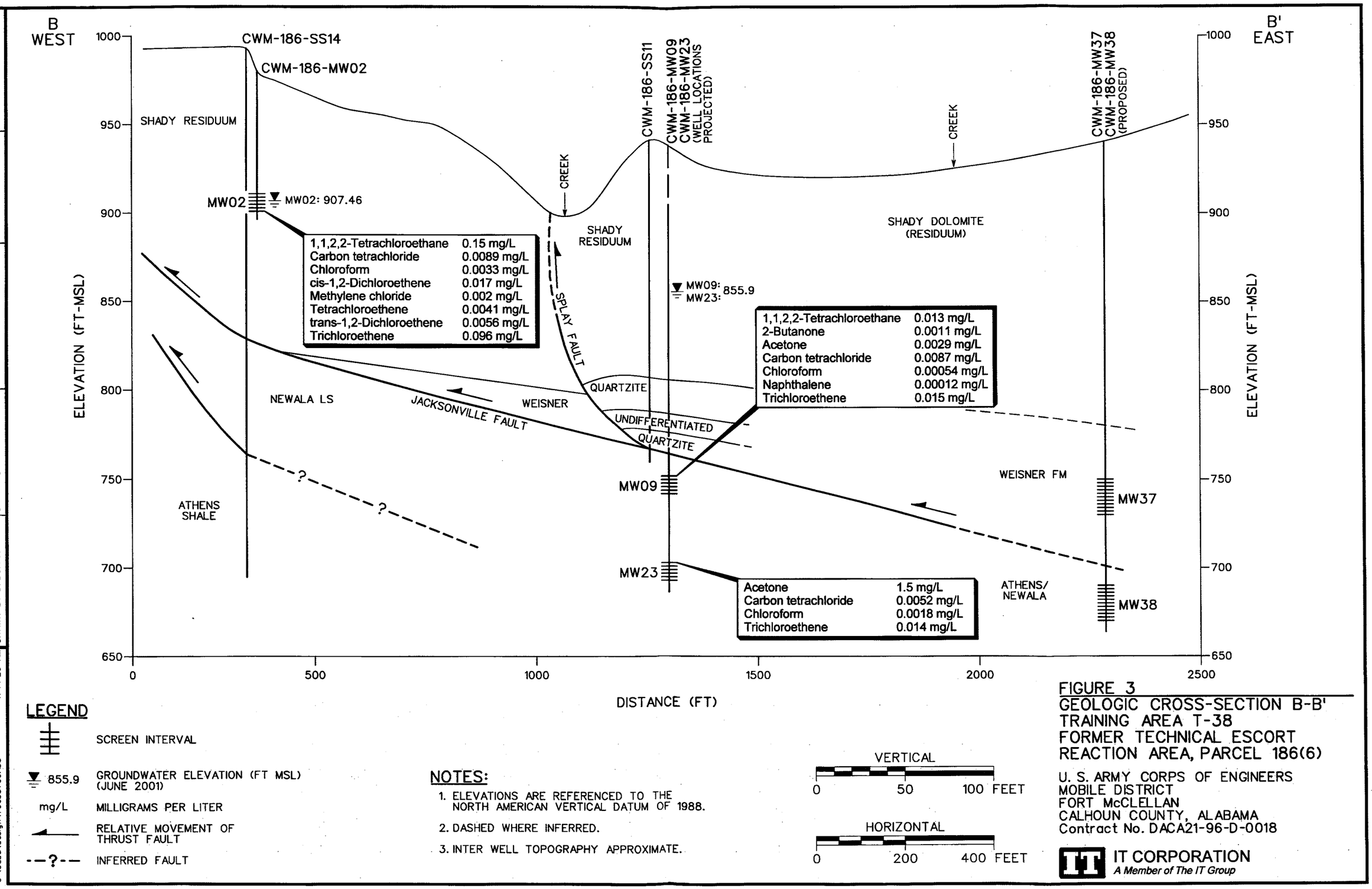

LEGEND

- SCREEN INTERVAL
- 855.9 — GROUNDWATER ELEVATION (FT MSL) (JUNE 2001)
- mg/L — MILLIGRAMS PER LITER
- RELATIVE MOVEMENT OF THRUST FAULT
- --?-- INFERRED FAULT

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. DASHED WHERE INFERRED.
3. INTER WELL TOPOGRAPHY APPROXIMATE.

VERTICAL
0 50 100 FEET

HORIZONTAL
0 200 400 FEET

FIGURE 3
GEOLOGIC CROSS-SECTION B-B'
TRAINING AREA T-38
FORMER TECHNICAL ESCORT
REACTION AREA, PARCEL 186(6)

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

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C
NORTH

C'
SOUTH

1,1,2,2-Tetrachloroethane	0.1 mg/L
Carbon tetrachloride	0.0018 mg/L
Chloroform	0.00079 mg/L
cis-1,2-Dichloroethene	0.0015 mg/L
Tetrachloroethene	0.0012 mg/L
Trichloroethene	0.034 mg/L

1,1,2,2-Tetrachloroethane	0.013 mg/L
2-Butanone	0.0011 mg/L
Acetone	0.0029 mg/L
Carbon tetrachloride	0.0087 mg/L
Chloroform	0.00054 mg/L
Naphthalene	0.00012 mg/L
Trichloroethene	0.015 mg/L

Trichloroethene 0.010 mg/L

Trichloroethene 0.015 mg/L

Acetone	0.022 mg/L
Tetrachloroethene	0.0075 mg/L

Acetone	1.5 mg/L
Carbon tetrachloride	0.0052 mg/L
Chloroform	0.0018 mg/L
Trichloroethene	0.014 mg/L

CWM-186-MW33
CWM-186-MW34
(PROPOSED)

CWM-186-MW08, MW21, MW22
CWM-186-SS10

CWM-186-SEEP03

CWM-186-MW09
CWM-186-MW23

CWM-186-SS11

CREEK

CREEK

MW08: 850.35

MW21: 852.17

MW22: 849.84

MW09: MW23: 855.9

SHADY RESIDUUM

SHADY RESIDUUM

SHADY DOLOMITE
(RESIDUUM)

WEISNER
QUARTZITE

WEISNER
RESIDUUM

MW08

MW21

MW22

MW33

MW34

MW09

MW23

QUARTZITE

SPLAY FAULT

JACKSONVILLE FAULT

SHADY
DOLOMITE

ATHENS
SHALE

WEISNER FM

ATHENS
SHALE

ELEVATION (FT-MSL)

950
900
850
800
750
700
650
600
550

0
500
1000
1500
2000

DISTANCE (FT)

LEGEND

SCREEN INTERVAL

855.9 GROUNDWATER ELEVATION (FT MSL) (JUNE 2001)

mg/L MILLIGRAMS PER LITER

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. DASHED WHERE INFERRED.
3. INTER WELL TOPOGRAPHY APPROXIMATE.

VERTICAL
0 50 100 FEET

HORIZONTAL
0 200 400 FEET

FIGURE 4
GEOLOGIC CROSS-SECTION C-C'
TRAINING AREA T-38
FORMER TECHNICAL ESCORT
REACTION AREA
PARCEL 186(6)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
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Table 1

Sampling Locations and Rationales
Supplemental Remedial Investigation
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Anticpated Screen Depth (ft bgs)	Anticipated Geology At Screen Depths	Anticipated Total Depth (ft bgs)	Sample Location Rationale
CWM-186-MW33	Groundwater	170 - 190	Weisner Formation	195	Shallow bedrock monitoring well to be installed adjacent to proposed deep bedrock monitoring well CWM-186-MW34 approximately 600 feet north of existing wells CWM-186-MW08, CWM-186-MW21, and CWM-186-MW22. The well location will aid in defining the horizontal and vertical extent of contamination. Completed depth of the well is anticipated to be approximately 195 feet below ground surface (bgs).
CWM-186-MW34	Groundwater	270 - 290	Athens Shale	295	Deep bedrock monitoring well to be installed adjacent to proposed shallow monitoring well CWM-186-MW33 approximately 600 feet north of existing wells CWM-186-MW08, CWM-186-MW21, and CWM-186-MW22. The well location will aid in defining the downgradient horizontal and vertical groundwater contamination. Completed depth of the well is anticipated to be approximately 295 feet bgs.
CWM-186-MW35	Groundwater	228 - 248	Weisner Formation	253	Shallow bedrock monitoring well to be installed adjacent to proposed deep bedrock monitoring well CWM-186-MW36 approximately 780 feet northeast of existing wells CWM-186-MW08, CWM-186-MW21, and CWM-186-MW22. The well location will aid in defining the horizontal and vertical extent of contamination. Completed depth of the well is anticipated to be approximately 253 feet bgs.
CWM-186-MW36	Groundwater	308 - 328	Athens Shale	333	Deep bedrock monitoring well to be installed adjacent to proposed shallow monitoring well CWM-186-MW35 approximately 780 feet northeast of existing wells CWM-186-MW08, CWM-186-MW21, and CWM-186-MW22. The well location will aid in defining the downgradient extent of horizontal and vertical groundwater contamination. Completed depth of the well is anticipated to be approximately 333 feet bgs.
CWM-186-MW37	Groundwater	190 - 210	Weisner Formation	215	Shallow bedrock monitoring well to be installed adjacent to proposed deep bedrock monitoring well CWM-186-MW38 approximately 820 feet northeast of existing wells CWM-186-MW09 and CWM-186-MW23. The well location will aid in defining the horizontal and vertical extent of contamination. Completed depth of the well is anticipated to be approximately 215 feet bgs.
CWM-186-MW38	Groundwater	250 -270	Athens Shale/Newala Limestone	275	Deep bedrock monitoring well to be installed adjacent to proposed shallow monitoring well CWM-186-MW37approximately 820 feet northeast of existing wells CWM-186-MW09 and CWM-186-MW23. The well location will aid in defining the downgradient extent of horizontal and vertical groundwater contamination. Completed depth of the well is anticipated to be approximately 275 feet bgs.

Table 2

Groundwater Sample Designations and QA/QC Sample Quantities
Supplemental Remedial Investigation
Training Area T-38, Former Technical Escort Reaction Area
Parcel 186(6)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
CWM-186-MW33	CWM-186-MW33-GW-TA3044-REG	Groundwater			CWM-186-MW33-GW-TA3044-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives
CWM-186-MW34	CWM-186-MW34-GW-TA3045-REG	Groundwater	CWM-186-MW34-GW-TA3046-FD			TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives
CWM-186-MW35	CWM-186-MW35-GW-TA3047-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives
CWM-186-MW36	CWM-186-MW36-GW-TA3048-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives
CWM-186-MW37	CWM-186-MW37-GW-TA3049-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives
CWM-186-MW38	CWM-186-MW38-GW-TA3050-REG	Groundwater				TCL VOCs, TCL SVOCs, TAL Metals, CWM BD, & Explosives

CWM BD - Chemical warfare material break down product
FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound
TAL - Target analyte list
TCL - Target compound list.
VOC - Volatile organic compound.

Table 3

Analytical Samples
Supplemental Remedial Investigation
Training Area T-38, Former Technical Escort Reaction Area
Parcel 186(6)
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (0%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	EMAX: Total No. Analysis	QA Lab: Total No. Analysis
Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6): 6 water matrix samples (6 groundwater samples)													
TCL VOCs	8260B	water	normal	6	1	6	1		1	1	1	11	0
TCL SVOCs	8270C	water	normal	6	1	6	1		1		1	10	0
TAL Metals	6010B/7000	water	normal	6	1	6	1		1		1	10	0
CWM BD Products	CWM/8321/MOD 8270	water	normal	6	1	6	1		1		1	10	0
Explosives	8330	water	normal	6	1	6	1		1		1	10	0
Training Area T-38, Former Technical Escort Reaction Area Subtotal:						30	5	0	5	1	5	51	0

[a]Field duplicate and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:

EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM - American Society for Testing and Materials.
CWM BD - Chemical warfare material break down
Dups - Duplicates
Eq. Rinse - Equipment rinse
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Final
Site-Specific Unexploded Ordnance Safety Plan Attachment
Site Investigation at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)
Fort McClellan, Calhoun County, Alabama

Prepared for:

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

July 2001

Revision 0

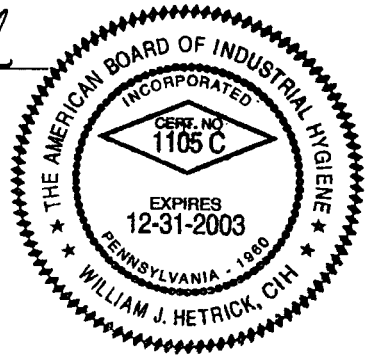
Final
Site-Specific Unexploded Ordnance Safety Plan Attachment Site Investigation at Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6)

I have read and approve this site-specific unexploded ordnance (UXO) safety plan attachment for the Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6) at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation UXO procedures.

Robert W. Hickman, Jr.
UXO Technical Manager

18 JUL 01
Date

William J. Hetrick, CIH
Health & Safety Manager



7/23/01
Date

Table of Contents

List of Acronyms

See Attachment 2, List of Abbreviations and Acronyms.

1.0 Introduction

This document defines anomaly avoidance procedures for activities to be performed by IT Corporation (IT) unexploded ordnance (UXO) personnel in conjunction with the site investigation at the Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), 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, 2001), attached as Attachment 1.

IT UXO personnel will perform visual surveys, assisted by hand-held magnetometers and metal detectors, to support the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analysis at the Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6). The purpose is to avoid any ordnance and explosives (OE) during hazardous, toxic and radioactive waste (HTRW) sampling activities. Intrusive anomaly investigation is not authorized for this site work.

Training Area T-38 is located on the Main Post of Fort McClellan and encompasses most of the Reservoir Ridge. Included in Parcel 186(6) is a six acre fenced area at the crest of Reservoir Ridge that was used for training in the 1960s and 1970s.

This area was reportedly used from 1961 to 1972 for training technical escort personnel in techniques of eliminating toxic hazards caused by mishaps to chemical munitions during transport. The area was also used during the 1980s as a chemical agent identification area. Sampling activities conducted at this site will be outside the fenced area.

2.0 UXO Team Composition

UXO team and personnel requirements will be in accordance with EP 75-1-2 (USACE, 2000) and installation-wide sampling and analysis plan (SAP) (IT, 2000) 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 IT employees and any subcontractors during sampling activities. Sampling activities at this site 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 with the Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), includes the following UXO tasks:

- Provide UXO avoidance support during the collection of samples. Sample locations are defined 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, fence post driving, grading, or excavation).

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 Training Area T-38, Former Technical Escort Reaction Area, Parcel 186(6), will include:

a) Access Corridors and Sampling Sites

(1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the investigation sites. 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 and 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 IT 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 IT 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, 2001) 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, 2001) will be followed.

c) Magnetometer/Metal Detector Checkout and Field Procedures

The procedures in paragraph 3.0, *FTMC UXO Supplementary Procedures* (IT, 2001) will be followed.

d) UXO Logbooks and Documentation

All UXO personnel identified in paragraph 5.0, *FTMC UXO Supplementary Procedures* (IT, 2001) 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 number of personnel are present on site.

7.0 Quality

The IT 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, 2000) appropriate to this task and the FTMC UXO Supplementary Procedures. The IT 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 IT 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), 2001, ***Fort McClellan Unexploded Ordnance Supplementary Procedures***, June.

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

U. S. Army Corps of Engineers (USACE), 2000, ***Engineering Publication, EP 75-1-2, Unexploded Ordnance (UXO) Support During Hazardous, Toxic, and Radiological (HTRW) and Construction Activities,*** 20 November.

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

ATTACHMENT 1

FORT MCCLELLAN UNEXPLODED ORDNANCE SUPPLEMENTARY PROCEDURES

FTMC UXO SUPPLEMENTARY PROCEDURES

Subject: Ordnance and Explosives

1.0 INTRODUCTION

IT Corporation (IT) 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 IT Corporation 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. IT Corporation 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 IT 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 IT 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 IT 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
- IT administrative policies and procedures
- Magnetometer checkout 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 IT 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 IT 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 IT UXO Team Leader or IT 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. The location of the geophysical test plot will be inside the IT compound. It will be established as follows

- The test plot will consist of an area approximately 20 x 20 feet and clear of vegetation and magnetic anomalies, located in the IT compound next to the southeast end of the office trailers.

- Five metal test objects will be buried at depths varying from 6 inches to 24 inches. The objects will approximate the weight, diameter, and length of an MK 2 grenade, a 60mm mortar, a 2.36-inch rocket warhead, a 75mm projectile, and a 37mm projectile. Additionally, three non-ferrous test objects will be buried at a depth of 2 inches to 8 inches. A 6-inch length of 1/2-inch reinforcing rod will be placed on the surface for use as a surface check source. Items with greater mass will be buried at greater depths. Each burial location will be marked with a wooden stake located about 6 inches to the north of the object. Each stake will be assigned a reference number and 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 will 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 36 inches. The pipe should be of sufficient length to allow at least another 24 inches to extend above the surface of the ground. A metal object will be buried at a depth of 24 inches and 24 inches from the side of the pipe. The location of the item, similar in size and mass to a 75mm projectile, will be marked with a wooden stake tagged to denote the depth, type of item, orientation, and reference number assigned.

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 "Magnetometer/Metal Detector Functions Test Data Sheet" (Attachment 2) and the equipment logbook will be filled out.

- 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 logbook and manufacturer's operating manual will be present when the equipment is tested. The following information will be recorded:

- Date and time
- The test plot object used (assigned stake number)
- The reading or indication at each test site
- Whether or not the reading or indication was satisfactory
- The name of the individual performing the test.

The IT FTMC Quality Control (QC) Officer will observe the daily testing of all equipment and will record the results of each test in his field logbook.

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 IT 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 IT 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 IT 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 IT FTMC Unexploded Ordnance Report Form (Attachment 3), 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 IT 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.

The IT FTMC QC Officer will utilize the IT FTMC "UXO Avoidance Quality Control Report" (Attachment 4) to document checks of field activities.

Additionally, UXO personnel will complete IT FTMC Form "UXO Sketch Log" (Attachment 5) and IT 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.

_____

Jim Kerr
FTMC UXO Safety Officer

ATTACHMENT 2

Magnetometer/Metal Detector Functions Test Data Sheet

Each magnetometer and/or metal detector will receive a function test at the beginning of each workday and after changing batteries. The function test will include operating the magnetometer/metal detector over a test area developed specifically for ensuring that detection instruments are operating properly. Instruments that do not pass the function test will be tagged out until repairs are made or a replacement instrument is available.

Project Number: _____

Instrument Model: _____

Instrument Serial Number: _____

Date	Person Performing Test	Function Test Results	Remarks

ATTACHMENT 3

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 4

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 5

UXO Sketch Location Log

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

Company Name: IT Corporation **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:

ATTACHMENT 2

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

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

List of Abbreviations and Acronyms (Continued)

GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative-derived media
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LOAEL	lowest-observed-advserse-effects-level
LT	less than the certified reporting limit
max	maximum
MCL	maximum contaminant level
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NCP	National Contingency Plan
ND	not detected
NE	no evidence; northeast
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded
ns	nanosecond
N-S	north to south
NS	not surveyed
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	Pesticide
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PRG	preliminary remediation goals
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan

List of Abbreviations and Acronyms (Continued)

QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
'R'	rejected; resample
RAO	removal action objective
RBC	EPA Region III Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
SLERA	Screening-Level Risk Assessment
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	submersible pump
Sr-90	strontium-90
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA's *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time-weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

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

N/A – Not analyzed

ND – Not detected

Boolean Codes

- LT – Less than the certified reporting limit

Flagging Codes

- 9 – Non-demonstrated/validated method performed for USAEC
- B – Analyte found in the method blank or QC blank
- C – Analysis was confirmed
- D – Duplicate analysis
- I – Interfaces in sample make quantitation and/or identification to be suspicious
- J – Value is estimated
- K – Reported results are affected by interfaces or high background
- N – Tentatively identified compound (match greater than 70%)
- Q – Sample interference obscured peak of interest
- R – Non-target compound analyzed for but not detected (GC/MS methods)
- S – Non-target compound analyzed for and detected (GC/MS methods)
- T – Non-target compound analyzed for but not detected (non GC/MS methods)
- U – Analysis in unconfirmed
- Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

- J – The low-spike recovery is low
- N – The high-spike recovery is low
- R – Data is rejected