



IT Corporation
312 Directors Drive
Knoxville, TN 37923-4799
Tel. 865.690.3211
Fax. 865.690.3626

A Member of The IT Group

October 4, 2002

IT-MC-CK10-0253
Project No. 796887

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

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

Subject: **Final Addendum to the July 2000 Work Plan, Underground Storage Tank (UST) Removals and Closure Reports for Removal of Three USTs (Parcels 24[7], 25[7], and 212[7]) at Motor Pool Area 3100, Parcel 146(7)**

Dear Mr. Coker:

In accordance with Contract Number DACA21-96-D-0018, Delivery Order CK10, Modification No. 10, IT Corporation (IT) will conduct underground storage tank (UST) removal activities at Motor Pool Area 3100, Parcel 146(7). This letter serves as an addendum to the IT July 2000 *Work Plan, Underground Storage Tank (UST) Removals and Closure Reports* to include the removal of three USTs at Motor Pool Area 3100 at Fort McClellan (FTMC). Benzene has been detected in groundwater samples from one monitoring well (FTA-146-MW02) at Motor Pool Area 3100 at concentrations up to 0.12 milligrams per liter. This monitoring well is adjacent to a 10,000-gallon UST used to store diesel fuel (Parcel 25[7]). Motor Pool Area 3100 is centrally located on the Main Post on Justice Avenue (formerly 13th Avenue) (Figures 1 and 2).

Figure 3 presents the analytical results for the monitoring wells at Motor Pool Area 3100 that were selected for quarterly sampling after the sampling of monitoring well FTA-146-MW02 indicated the concentration of benzene was greater than the SSSL. Groundwater flow direction is shown on Figure 4. In an attempt to remove the point source for this groundwater contamination, IT will

remove the three USTs at this site. The following is a list of the tanks to be removed at Motor Pool Area 3100:

- Parcel 24(7) - 2,500-gallon fiberglass waste oil UST
- Parcel 25(7) - 10,000-gallon steel diesel UST
- Parcel 212(7) - 3,000-gallon fiberglass heating oil UST.

IT has prepared this addendum for the removal and disposal of the abandoned USTs in accordance with current state and federal regulations. The purpose of this addendum is to provide technical guidance for removal, sampling, and disposal activities at Motor Pool Area 3100. The work covers site preparation and location of utilities; UST excavation and removal; removal and disposal of contaminated soil; confirmatory sampling of the excavations; cleaning, demolition and disposal of the USTs and piping; backfilling of the excavations; site restoration; and closure assessment report preparation. This work will be conducted in accordance with the approved IT July 2000 work plan and will be consistent with the IT February 2002 *Installation-Wide Sampling and Analysis Plan, Draft Revision 3*. Monitoring wells adjacent to the USTs will not be abandoned during the UST removal activities.

Site Description and History. Motor Pool Area 3100 is an inactive motor pool and covers approximately four acres (Figure 2). This site is where Building 3138 (vehicle maintenance), Building 3142 (wash rack), and Building 3144 (Tire Shop) are located (Figure 2). Facility 3143 (an oil/water separator [OWS]) was associated with the wash rack and was initially built around 1969 with a baffle-type OWS. This OWS was rebuilt in 1991 and has a settling basin attached to a coalescing plate OWS that discharged to the sanitary sewer. Also, a vehicle grease rack (3145) was located here. Other small buildings located within this motor pool included hazardous materials storage buildings containing flammable materials and used batteries. During the environmental baseline survey (EBS) visual site investigation by Environmental Science and Engineering, Inc. in 1998, light military vehicle maintenance was observed being conducted inside Building 3138.

The three USTs at Building 3138 in Motor Pool Area 3100 are listed in Table 1. As indicated in Table 1, two of the three USTs have been replaced. A review of Alabama Department of Environmental Management (ADEM) reports for these tanks included in the IT April 1999 *UST Summary Report*, indicates that the two tanks appear to have been removed in accordance with ADEM UST requirements.

Building 3138, Motor Pool Area 3100, Parcel 24(7). Parcel Number 24(7) covers one 2,000-gallon waste oil tank which was removed in 1994. The closure report prepared by Braun Intertec is presented in Appendix A, Attachment 12 of the *UST Summary Report*. This tank was replaced with a 2,500-gallon UST. According to the report, soil samples were collected from all sides of the excavation, the base of the pit, and the piping trench. The samples were analyzed for total petroleum hydrocarbon compounds (TPH) and total lead. The results from the samples collected from all sides of the excavation pit were at or below detection limits for TPH. However, high concentrations (12,300 parts per million [ppm]) of TPH were detected in the piping trench, but significantly decreased in a second sample collected two feet deeper in the same location (5 ppm). The soil sample collected at the base of the pit also showed elevated levels of TPH; however, an additional soil sample collected 3 feet below the base sample showed a decreased level of TPH. Groundwater was not encountered during the UST closure. The closure report indicates that two cubic yards of contaminated soils were removed from the excavation. However, the soils were used as topsoil fill materials during the installation of the new UST. The closure report prepared by Braun Intertec concluded that a petroleum release had occurred on site and that the vertical and horizontal extent of contamination in the soil had not been determined. The report provided in the *UST Summary Report* stated that the extent of soil contamination decreased considerably with depth and distance.

According to the closure report, a new fiberglass tank was installed in the excavation. Pea gravel was used for backfill up to 1 foot below the top of the tank. The soils removed during the excavation process were used as topsoil over the excavated area. According to the EBS, this site has received a “no further action” (NFA) from ADEM. A copy of the ADEM NFA letter can be found in Appendix E of the *UST Summary Report*.

Building 3138, Motor Pool Area 3100, Parcel 25(7). Building 3138 also contains one 10,000-gallon diesel UST. Table 5.1 of the EBS indicates that this tank was replaced in 1996; however, the list of tanks received from the Base indicates that the tank was installed in 1987 and upgraded in 1991. A closure report is not on file.

Building 3138 Motor Pool Area 3100, Parcel 212(7). One 5,000-gallon heating oil UST was removed at Building 3138 and replaced with a 3,000-gallon UST in 1996. A closure report prepared by SEMS Inc. was reviewed and is included in Appendix A, Attachment 7 of the *UST Summary Report*. The closure report documented that product odor was not detected within the excavation. According to the report, an examination of the removed tank noted that the tank was in good condition. The depth to groundwater was reported to be greater than five feet below the

bottom of the tank. This was determined by extending the excavation an additional five feet. Neither soil nor groundwater samples were collected. The report notes that evidence of contamination was not observed.

UST Removal. Chapter 2.0 of the IT July 2000 *Work Plan, Underground Storage Tank (UST) Removals and Closure Reports* outlines the steps necessary to ensure the safe removal of USTs using American Petroleum Institute (API) recommended practices API 1604 “Removal and Disposal of Used Underground Petroleum Storage Tanks” and National Fire Prevention Association 327 “Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry.” The ADEM *UST Closure Site Assessments, Guidance Manual, Section III*, November 1997, is included as Appendix C of the IT July 2000 work plan and provides UST closure guidance for sampling and analysis and ADEM forms required for the UST closure reports.

Sampling and Analysis. Three general types of samples will be collected during the Motor Pool Area 3100 UST removal activities:

- Soil confirmation samples
- Stockpile soil disposal characterization samples
- Tank cleaning water disposal characterization samples.

Excavation Pit Soil Confirmation Samples. Soil confirmation samples will be collected from the open excavation pit after the tank has been removed and excavation of any contaminated soil has been completed. Soil samples will be collected from the sides and base of the tank excavation pit and from the bottom of the piping trenches. Excavation pit wall samples will be collected every 25 feet. Soil samples will be collected from the lower one-third of each vertical wall of the tank excavation. One soil sample will be collected per each 10 linear feet of excavation from the base of the piping trenches. Additional samples will be collected from the floor of the excavations. Floor samples will be collected from a location directly underneath the tank. If a concrete slab is present in the excavation, floor samples will be collected from a location on the side of the slab at a depth equal to the bottom of the slab. Where groundwater is present in the excavation, soil samples will be collected from the excavation walls just above the groundwater elevation. Samples will be obtained from the excavation pit using a backhoe. Excavation pit confirmation sample locations are listed in Table 2. Excavation pit confirmation samples to be collected are listed in Table 3. Soil samples from the excavation pit walls and floor will be tested for the parameters listed in Tables 3 and 6.

Stockpile Soil. Stockpile soil from the UST removal sites will be sampled to complete disposal characterization activities. Samples from stockpiled soil are required by ADEM *Guidelines for the Disposal of Non-Hazardous Petroleum Contaminated Wastes*. Stockpiled material subjected to chemical confirmation testing will be used as backfill if it is found to contain less than 100 ppm of TPH. Also, excavated soil from the waste oil tank removal must be analyzed to determine if the soil contains less than 100 ppm total lead before it can be used as backfill soil. Additional sample analyses may be performed as required to complete waste characterization profiles for the disposal facility. Stockpile soil samples to be collected are listed in Table 2. The actual stockpile soil sample locations will be determined in the field by the on-site geologist, based on actual field observations and excavation stockpile conditions. Soil samples from stockpiles will be tested for the parameters listed in Tables 4 and 6.

UST Excavation Backfill Soil. The excavated soil from the UST removals will be used to backfill the excavations, if the excavated soil meets the ADEM testing requirements for using the excavated soil as backfill (less than 100 ppm of TPH, plus less than 100 ppm total lead for the waste oil tank). However, if additional backfill material is needed or if the excavated soil fails to meet the ADEM testing requirements, IT will contact the Transition Force for an approved on-post location to obtain additional backfill soil. Two possible sources for backfill soil would be the borrow pit near Range 30 and the borrow pit at the Stump Dump. Sample results from the analytical testing will be used to determine if the soil is suitable to be used as backfill. The backfill confirmation sample designations and analytical methods are listed in Tables 4 and 6, respectively.

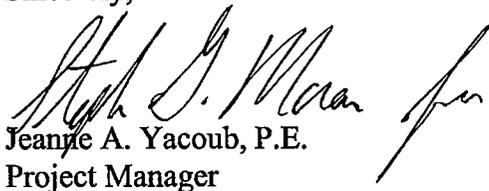
Tank Cleaning Water Sampling. Tank interiors will be decontaminated prior to being cut into sections. The tank interiors will be cleaned using a high-pressure, low-volume water spray and appropriate cleaning solution until all loose scale and residue are removed and contamination in the form of a sheen is no longer visible in the effluent stream. All contaminated water resulting from cleaning operations will be collected. Tank cleaning water samples will be collected after USTs are cleaned and inspected. Contaminated water will be disposed of off-site in accordance with federal and state regulations. Tank cleaning water samples to be collected are listed in Table 5. Sample analyses will be performed to complete waste characterization profiles for the disposal facility as required. Tank cleaning water samples will be tested for the parameters listed in Tables 5 and 6.

Closure Reports. A tank closure report will be prepared and submitted in accordance with the format presented in Chapter 6.0 of the IT July 2000 work plan and the ADEM *UST Closure Site Assessments, Guidance Manual, Section III*.

Safety and Health. The UST removal activities will be conducted safely under the site-specific safety and health plan (SSHP) attached as Appendix A to this addendum. The SSHP will be used in conjunction with the installation-wide safety and health plan. Site-specific hazard analyses are included in the SSHP. The specific field sampling and analysis procedures outlined in this addendum will be performed in accordance with Appendix B of the IT July 2000 work plan and are to be consistent with the IT 2002 Draft Revision 3 installation-wide sampling and analysis plan. The installation-wide sampling and analysis plan includes the installation-wide safety and health plan, waste management plan, and quality assurance plan.

I have distributed copies of this document according to the distribution list indicated below. If you have questions, or need further information, please contact me at (770) 663-1429 or Steve Moran at (865) 694-7361.

Sincerely,


Jeanne A. Yacoub, P.E.
Project Manager

Attachments

Distribution:

Lisa Holstein, FTMC (7 copies)
Doyle Brittain, EPA Region IV (1 copy)
Philip Stroud, ADEM (3 copies)
Hugh Vick, Gannett Fleming (3 copies)
Miki Schneider, JPA (1 copy)

TABLES

Table 1

USTs Located at Motor Pool Area 3100,
 Parcels 24(7), 25(7), and 212(7)
 Fort McClellan, Calhoun County, Alabama

Building Number	Parcel Number	Tank Contents	Tank Disposition	Tank Size (gal)	Tank Material	Date Installed	Date Removed	Depth to Water	Piping Removed	Amount of Soil Removed	Sampled
3138	24(7)	Waste oil	Removed	2000	Steel	1978	5/5/94	> 5.0 feet	yes - 5/18/94	2 yd ³ s	yes
		Waste oil	Replacement	2500	Fiberglass	5/20/94		below tank			
3138	25(7)	Diesel	Existing	10,000	Steel	N/A		N/A			N/A
3138	212(7)	Heating oil	Removed	5000	Steel	1978	10/18/96	> 5.0 feet	yes-10/28/96	0	no
		Heating oil	Replacement	3000	Fiberglass	10/22/96		below tank			

N/A - Information not available.

> - Greater than

2 yd³s - cubic yards

Table 2

**Sampling Locations
Motor Pool 3100, Parcels 24(7), 25(7), and 212(7)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
24	UST-24-CS01	Confirmatory soil	Shallow soil sample to be collected from the north wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-24-CS02	Confirmatory soil	Shallow soil sample to be collected from the east wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-24-CS03	Confirmatory soil	Shallow soil sample to be collected from the south wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-24-CS04	Confirmatory soil	Shallow soil sample to be collected from the west wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-24-CS05	Confirmatory soil	Shallow soil sample to be collected from the center of the floor of the excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-24-CS06	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-24-CS07	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the second 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-24-SP01	Stockpile soil	Waste oil tank excavation soil: Composite soil stockpile sample collected from five grab sample locations throughout the stockpile.
	UST-24-TCW01	Tank cleaning water	Tank cleaning water from cleaning the waste oil tank, Parcel 24(7) for disposal.
25	UST-25-CS01	Confirmatory soil	Shallow soil sample to be collected from the north wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-25-CS02	Confirmatory soil	Shallow soil sample to be collected from the east wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-25-CS03	Confirmatory soil	Shallow soil sample to be collected from the south wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-25-CS04	Confirmatory soil	Shallow soil sample to be collected from the west wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-25-CS05	Confirmatory soil	Shallow soil sample to be collected from the center of the floor of the excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-25-CS06	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-25-CS07	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the second 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-25-SP01	Stockpile soil	Diesel tank excavation soil: Composite soil stockpile sample collected from five grab sample locations throughout the stockpile.
	UST-25-TCW01	Tank cleaning water	Tank cleaning water from cleaning the diesel tank, Parcel 25(7) for disposal.
212	UST-212-CS01	Confirmatory soil	Shallow soil sample to be collected from the north wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-212-CS02	Confirmatory soil	Shallow soil sample to be collected from the east wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-212-CS03	Confirmatory soil	Shallow soil sample to be collected from the south wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-212-CS04	Confirmatory soil	Shallow soil sample to be collected from the west wall of the excavation at the lowest one third depth of the tank diameter. If groundwater is above the location where the soil sample is to be collected, then the soil sample is to be collected just above the waterline in the excavation.
	UST-212-CS05	Confirmatory soil	Shallow soil sample to be collected from the center of the floor of the excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-212-CS06	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.

Table 2

**Sampling Locations
Motor Pool 3100, Parcels 24(7), 25(7), and 212(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
212	UST-212-CS07	Confirmatory soil	Shallow soil sample to be collected from the bottom of the piping trench excavation in the center of the second 10 feet of piping trench nearest the UST excavation. If groundwater is above the location where the soil sample is to be collected, then this soil sample will not be collected.
	UST-212-SP01	Stockpile soil	Heating oil tank excavation soil: Composite soil stockpile sample collected from five grab sample locations throughout the stockpile.
	UST-212-TCW01	Tank cleaning water	Tank cleaning water from cleaning the heating oil, Parcel 212(7) for disposal.
Backfill Source Area	UST-BFS-BFC01	Backfill soil	Composite surface soil sample to be collected from the Transition Force approved source area for backfill soil to be used in UST excavations at Motor Pool Area 3100.

Table 3

Excavation Pit Confirmation Soil Sample Designations QA/QC Sample Quantities
 Motor Pool 3100, Parcels 24(7), 25(7), and 212(7)
 Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
UST-24-CS01	UST-24-CS01-CS-SA0001-REG	a		UST-24-CS01-CS-SA0001-MS/MSD	BTEX, TPH, and Pb
UST-24-CS02	UST-24-CS02-CS-SA0002-REG	a			BTEX, TPH, and Pb
UST-24-CS03	UST-24-CS03-CS-SA0003-REG	a	UST-24-CS03-CS-SA0004-FD		BTEX, TPH, and Pb
UST-24-CS04	UST-24-CS04-CS-SA0005-REG	a			BTEX, TPH, and Pb
UST-24-CS05	UST-24-CS05-CS-SA0006-REG	a			BTEX, TPH, and Pb
UST-24-CS06	UST-24-CS06-CS-SA0007-REG	a			BTEX, TPH, and Pb
UST-24-CS07	UST-24-CS07-CS-SA0008-REG	a			BTEX, TPH, and Pb
UST-25-CS01	UST-25-CS01-CS-SA0009-REG	a			BTEX, TPH, and Pb
UST-25-CS02	UST-25-CS02-CS-SA0010-REG	a			BTEX, TPH, and Pb
UST-25-CS03	UST-25-CS03-CS-SA0011-REG	a			BTEX, TPH, and Pb
UST-25-CS04	UST-25-CS04-CS-SA0012-REG	a			BTEX, TPH, and Pb
UST-25-CS05	UST-25-CS05-CS-SA0013-REG	a			BTEX, TPH, and Pb
UST-25-CS06	UST-25-CS06-CS-SA0014-REG	a			BTEX, TPH, and Pb
UST-25-CS07	UST-25-CS07-CS-SA0015-REG	a			BTEX, TPH, and Pb
UST-212-CS01	UST-212-CS01-CS-SA0016-REG	a			BTEX, TPH, and Pb
UST-212-CS02	UST-212-CS02-CS-SA0017-REG	a			BTEX, TPH, and Pb
UST-212-CS03	UST-212-CS03-CS-SA0018-REG	a			BTEX, TPH, and Pb
UST-212-CS04	UST-212-CS04-CS-SA0019-REG	a			BTEX, TPH, and Pb
UST-212-CS05	UST-212-CS05-CS-SA0020-REG	a			BTEX, TPH, and Pb
UST-212-CS06	UST-212-CS06-CS-SA0021-REG	a			BTEX, TPH, and Pb
UST-212-CS07	UST-212-CS07-CS-SA0022-REG	a			BTEX, TPH, and Pb

BTEX - Benzene, toluene, ethylbenzene, xylene.
 FD - Field duplicate.
 FS - Field split.
 MS/MSD - Matrix spike/matrix spike duplicate.
 REG - Field sample.

QA/QC - Quality assurance/quality control.
 TPH - Total petroleum hydrocarbons.
 Pb- lead.

Table 4

**Excavation Soil Stockpile and Backfill Sample Designations and QA/QC Sample Quantities
Motor Pool 3100, Parcels 24(7), 25(7), and 212(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
UST-24-SP01	UST-24-SP01-SP-SA0023-REG	(a)	UST-24-SP01-SP-SA0024-FD	UST-24-SP01-SP-SA0024-MS/MSD	TPH-DRO/GRO, lead (b)
UST-25-SP01	UST-25-SP01-SP-SA0025-REG	(a)			TPH-DRO/GRO
UST-212-SP01	UST-212-SP01-SP-SA0026-REG	(a)			TPH-DRO/GRO
UST-BFS-BFS01	UST-BFS-BFS01-SS-SA0027-REG	0-1(c)			TCL VOCs, TCL SVOCs, TAL metals, nitroaromatics/nitramine explosives, chlorinated pesticides and herbicides, organophosphorus pesticides, and PCBs.

(a) Composite sample composed of 5 grab samples for each 20 cubic feet of stockpile soil.

(b) If the results for TOX or total metals are greater than 50 mg/kg, then resample and analyze the sample for full list of TCLP parameters for waste characterization profile. Contact disposal facility to confirm list of analytes if first test fails ADEM requirements.

(c) A composite surface soil sample will be collected from the approved backfill source area.

If a stockpile sample result for TPH result is greater than 100 ppm (or total lead is greater than 100 ppm for the waste oil excavation), then resample stock pile soil for TOX and total metals.

BTEX - Benzene, toluene, ethylbenzene, xylene.

DRO - diesel range organics.

FD - Field duplicate.

FS - Field split.

GRO - gasoline range organics.

MS/MSD - Matrix spike/matrix spike duplicate.

PCB - Polychlorinated biphenyls.

ppm - Parts per million.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound

TCLP - Toxic Characteristic Leaching Procedure

TOX - total organic halogens

TPH - total petroleum hydrocarbons.

VOC - Volatile organic compound

Table 5

Tank Cleaning Water Sample Designations and QA/QC Sample Quantities
 Motor Pool 3100, Parcels 24(7), 25(7), and 212(7)
 Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
UST-24-TCW01	UST-24-TCW01-TCW-SA8001-REG	(a)	UST-24-TCW01-TCW-SA8002-FD	UST-24-TCW01-TCW-SA8001-MS/MSD	TPH-DRO/GRO, TAL Metals, BETX, and TOX (b)
UST-25-TCW01	UST-25-TCW01-TCW-SA8003-REG	(a)			TPH-DRO/GRO and BTEX
UST-212-TCW01	UST-212-TCW01-TCW-SA8004-REG	(a)			TPH-DRO/GRO and BTEX

(a) Composite sample representative of full depth of stored tank cleaning water.

(b) If the results for TOX is greater than 50 mg/l then resample and analyze the sample for full list of TCLP parameters for waste characterization profile. Contact disposal facility to confirm list of analyses.

DRO - diesel range organics.

GRO - gasoline range organics.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound

TCLP -Toxic Characteristic Leaching Procedure

TOX - total organic halogens

TPH - total petroleum hydrocarbons.

VOC - Volatile organic compound

Analytical Samples
Motor Pool Area 3100, Parcels 24(7), 25(7), and 212(7)
Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ⁽¹⁾				EMAX
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis
Tank Contents - Product/Water/Waste: Assume tanks are empty, therefore, no samples will be taken of tank contents.											
Soil Confirmation - Diesel and Heating Oil Tank Excavation Pits, Parcels 25(7) and 212(7)											
BTEX	8021B	soil	48-Hr	14	1	14					14
TPH-GRO	8015B	soil	48-Hr	14	1	14					14
TPH-DRO	8015B	soil	48-Hr	14	1	14					14
Soil Confirmation - Waste Oil Tank Excavation Pit											
BTEX	8021B	soil	48-Hr	7	1	7	1	1	1		11
TPH-GRO	8015B	soil	48-Hr	7	1	7	1	1	1		11
TPH-DRO	8015B	soil	48-Hr	7	1	7	1	1	1		11
Lead	6010B	soil	48-Hr	7	1	7	1	1	1		11
Soil Disposal - Diesel and Heating Oil Tank Excavation Stockpiles, Parcels 25(7) and 212(7)											
TPH-GRO	8015B	soil	48-Hr	2	1	2					2
TPH-DRO	8015B	soil	48-Hr	2	1	2					2
BTEX	8021B	soil	48-Hr	2	1	2					2
Soil Disposal - Waste Oil Tank Excavation Stockpile											
TPH-GRO	8015B	soil	48-Hr	1	1	1	1	1	1		5
TPH-DRO	8015B	soil	48-Hr	1	1	1	1	1	1		5
BTEX	8021B	soil	48-Hr	1	1	1	1	1	1		5
TAL Metals	6010B/7000	soil	48-Hr	1	1	1	1	1	1		5
TOX ⁽²⁾	9020B	soil	48-Hr	1	1	1	1	1	1		5
Backfill Source Soil											
TCL VOCs	8260B	soil	normal	1	1	1			1		2
TCL SVOCs	8270C	soil	normal	1	1	1					1
TAL Metals	6010B/7000	soil	normal	1	1	1					1
Explosives	8330	soil	normal	1	1	1					1
Cl Pesticides	8081A	soil	normal	1	1	1					1
Cl Herbicides	8151A	soil	normal	1	1	1					1
OP Pesticides	8141A	soil	normal	1	1	1					1
PCBs	8082	soil	normal	1	1	1					1
Tank Cleaning Water - Diesel and Heating Oil Tanks, Parcels 25(7) and 212(7)											
TPH-GRO	8015B	water	48-Hr	2	1	2					2
TPH-DRO	8015B	water	48-Hr	2	1	2					2
BTEX	8021B	water	48-Hr	2	1	2					2

**Analytical Samples
Motor Pool Area 3100, Parcels 24(7), 25(7), and 212(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Tank Cleaning Water - Waste Oil Tank

TPH-GRO	8015B	water	48-Hr	1	1	1	1	1	1	5
TPH-DRO	8015B	water	48-Hr	1	1	1	1	1	1	5
BTEX	8021B	water	48-Hr	1	1	1	1	1	1	5
TAL Metals	6010B/7000	soil	48-Hr	1	1	1	1	1	1	5
TOX ⁽²⁾	9020B	soil	48-Hr	1	1	1	1	1	1	5

UST Removal Sites Subtotal:	100	14	14	1	14	132
-----------------------------	-----	----	----	---	----	-----

⁽¹⁾ Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded up to the nearest whole number.

⁽²⁾ If TOX is greater than 50 mg/kg (soil) or 50mg/l (water) then the sample media must be resampled and analyzed for VOCs and SVOCs for waste characterization profile contact disposal facility to confirm analyses.

Trip blank samples will be collected in association with water matrix samples for VOC (BTEX) analysis only. 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 one week.

BTEX - Benzene, toluene, ethylbenzene, xylene.
 CL - Chlorinated.
 DRO - Diesel range organics.
 Explosives - Nitroraromatic/nitramine explosives.
 FD - Field duplicate.
 FS - Field split.
 GRO - Gasoline range organics.
 MS/MSD - Matrix spike/matrix spike duplicate.
 OP - Organophosphorus.
 PCB - Polychlorinated biphenyls.
 QA/QC - Quality assurance/quality control.
 REG - Field sample.

SVOC - Semivolatile organic compound.
 TAL - Target analyte list.
 TCL - Target compound list.
 TOX - Total Organic Halogens.
 TPH- Total Petroleum Hydrocarbons.
 VOC - Volatile organic compound.

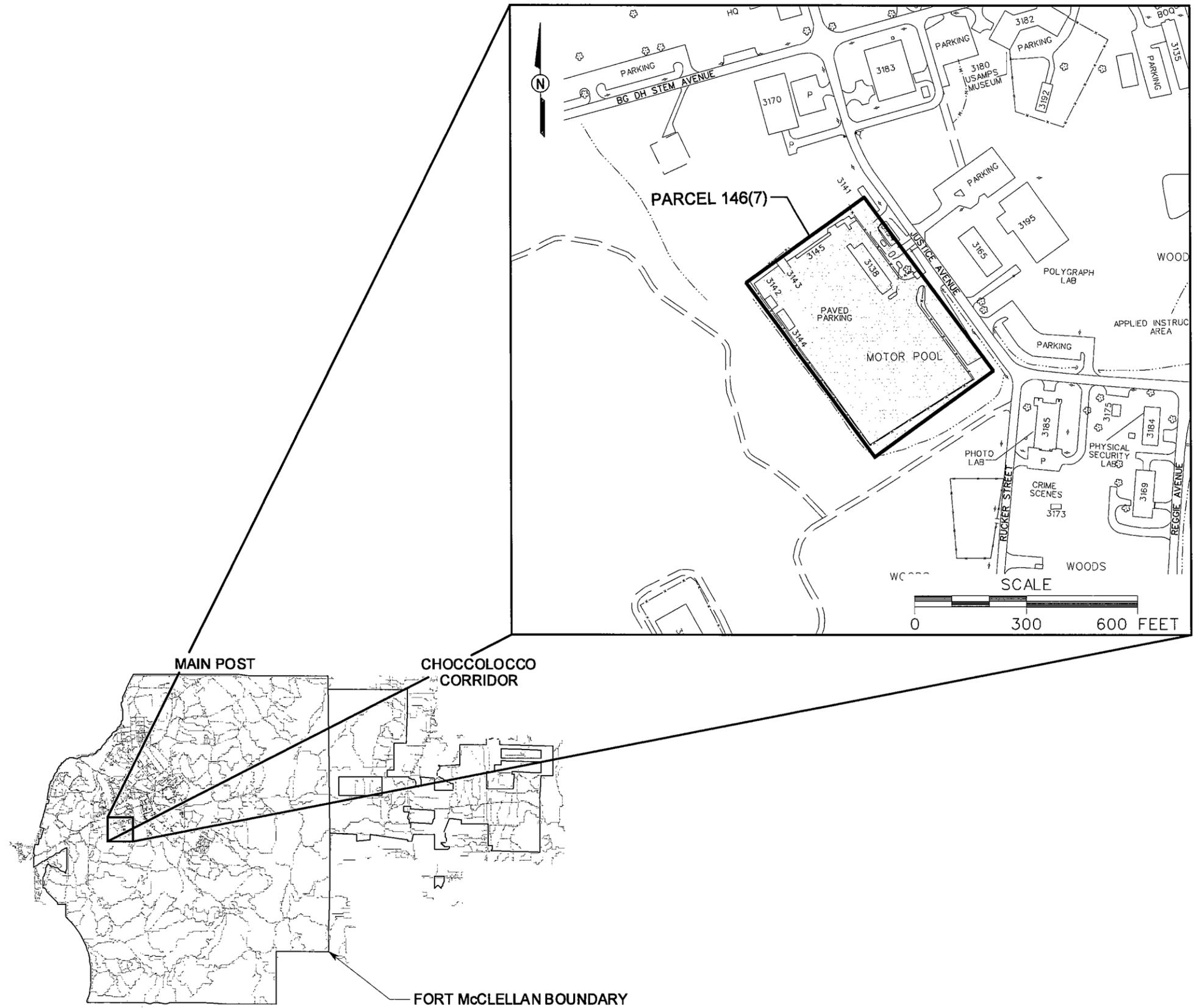
Ship samples to: EMAX Laboratories, Inc
 1835 205th Street
 Torrance, CA 90501
 Attn: Elizabeth McIntyre
 Tel: 310-618-8889
 Fax: 310-618-0818

FIGURES

DWG. NO.: ...V774645es.779
 PROJ. NO.: 774645
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOUB
 DRAFT. CHCK. BY: J. JENKINS
 ENGR. CHCK. BY: J. JENKINS
 DATE LAST REV.:
 DRAWN BY:

09/27/02
 STARTING DATE: 06/26/01
 DRAWN BY: D. BOMAR
 03:20:53 PM

c:\cadd\design\774645es.779



LEGEND

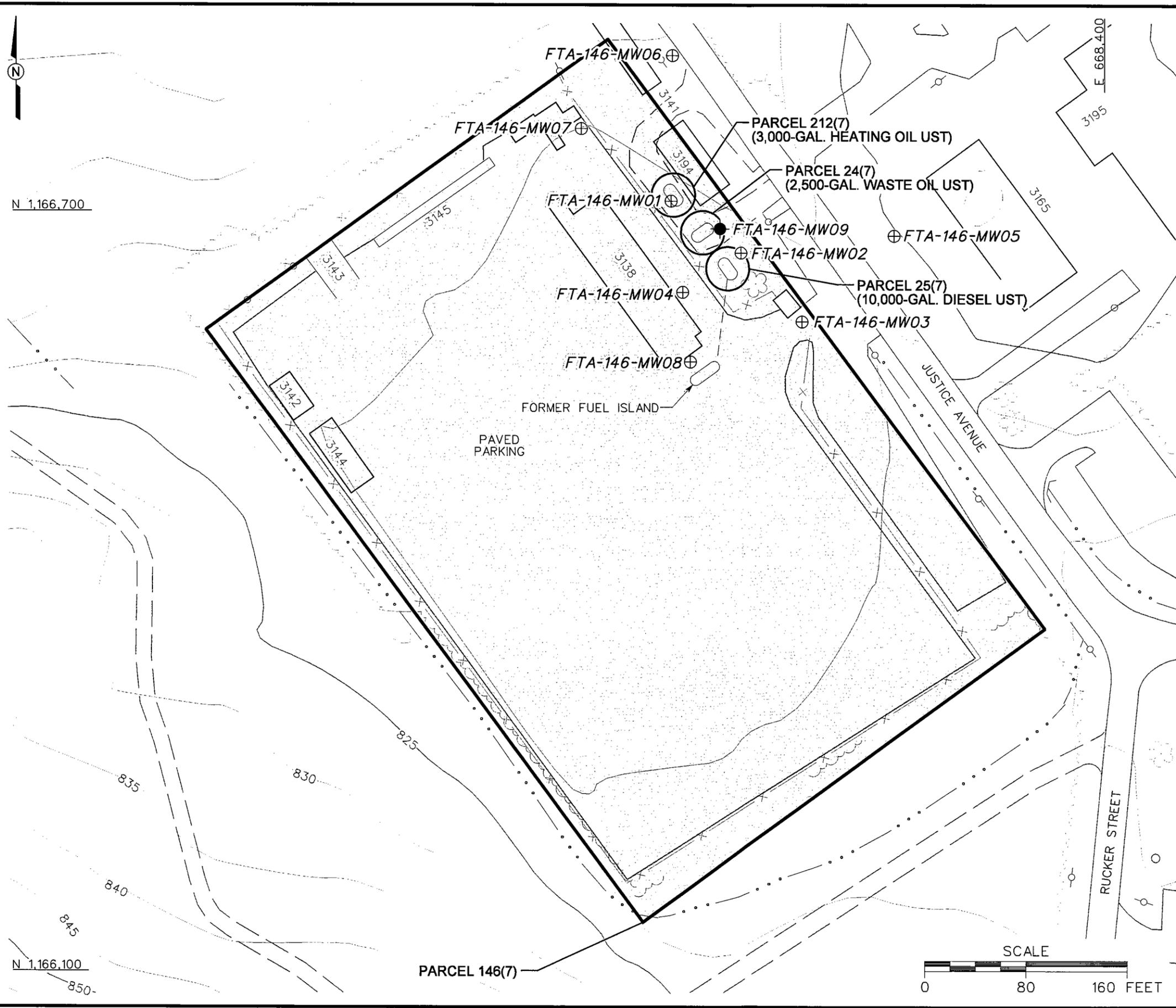
	UNIMPROVED ROADS AND PARKING
	PAVED ROADS AND PARKING
	BUILDING
	TREES / TREELINE
	MARSH / WETLANDS
	PARCEL BOUNDARY
	BRIDGE
	CULVERT WITH HEADWALL
	SURFACE DRAINAGE / CREEK
	MANMADE SURFACE DRAINAGE FEATURE
	FENCE
	RAILROAD
	UTILITY POLE

FIGURE 1
 SITE LOCATION MAP
 MOTOR POOL AREA 3100
 PARCEL 146(7)

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



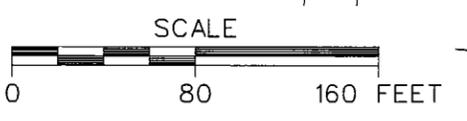
09/27/02
 03:22:47 PM
 dbomar
 c:\cadd\design\796887es.393
 STARTING DATE: 04/10/02
 DRAWN BY: D. BOMAR
 DATE LAST REV.:
 DRAWN BY:
 DRAFT. CHCK. BY:
 ENGR. CHCK. BY: J. JENKINS
 INITIATOR: L. O'HARE
 PROJ. MGR.: J. YACOB
 DWG. NO.: ...796887es.393
 PROJ. NO.: 796887



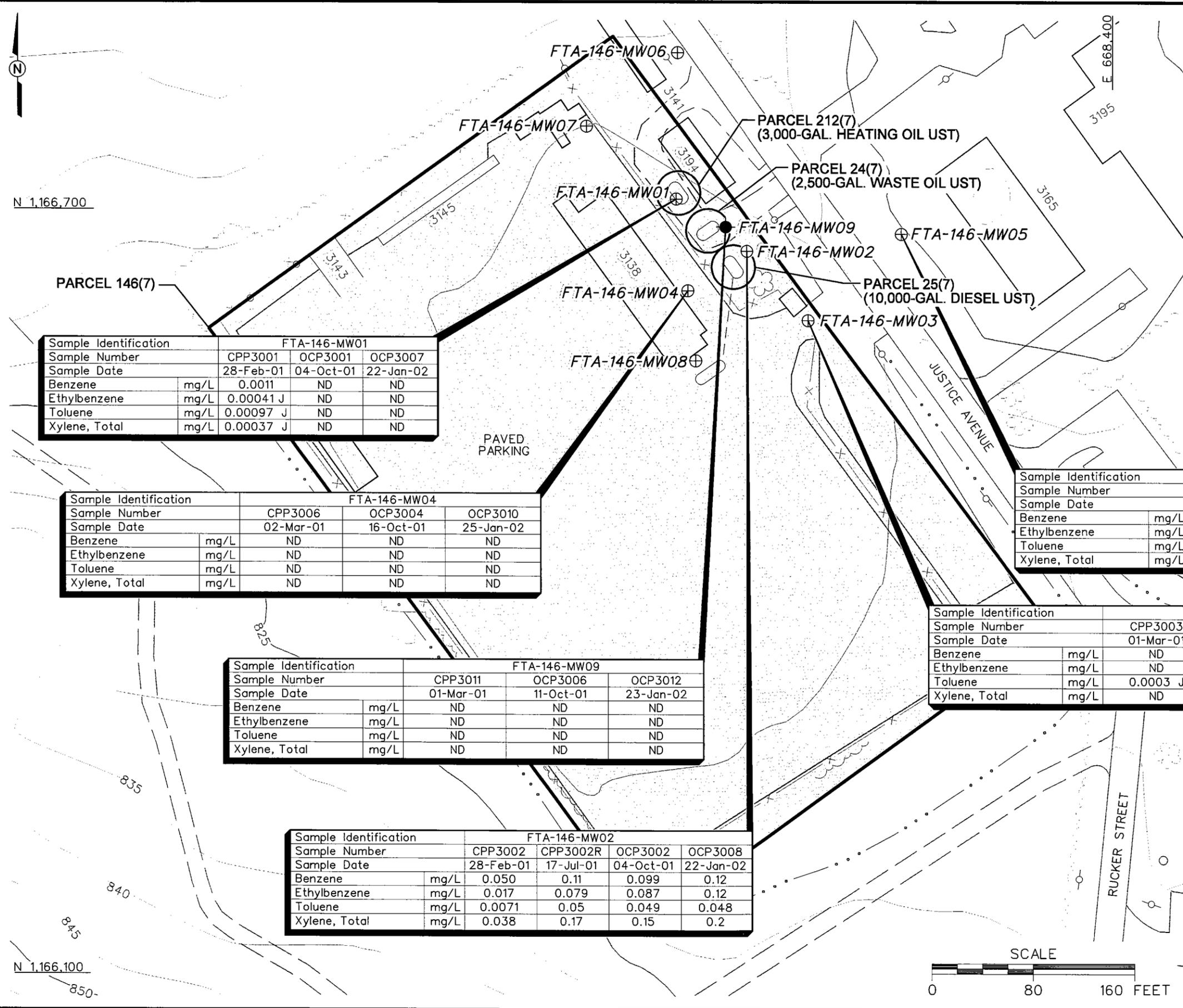
LEGEND	
	UNIMPROVED ROADS AND PARKING
	PAVED ROADS AND PARKING
	BUILDING
	TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
	TREES / TREELINE
	PARCEL BOUNDARY
	SURFACE DRAINAGE / CREEK
	CULVERT WITH HEADWALL
	FENCE
	UTILITY POLE
	RESIDUUM MONITORING WELL LOCATION
	BEDROCK MONITORING WELL LOCATION

FIGURE 2
 USTs [PARCELS 24(7), 25(7), AND 212(7)] AT MOTOR POOL AREA 3100 PARCEL 146(7)

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



DWG. NO.: ... \796887es.539
 PROJ. NO.: 796887
 INITIATOR: J. RAGSDALE
 PROJ. MGR.: J. YACOUB
 DRAFT. CHCK. BY: S. MORAN
 ENGR. CHCK. BY: S. MORAN
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 09/27/02
 DRAWN BY: D. BOMAR
 09/27/02
 03:29:52 PM
 c:\cadd\design\796887es.539



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- CULVERT WITH HEADWALL
- FENCE
- UTILITY POLE
- RESIDUUM MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- mg/L MILLIGRAMS PER LITER
- ND NOT DETECTED
- J POSITIVELY IDENTIFIED BUT THE CONCENTRATION IS ESTIMATED

Sample Identification		FTA-146-MW01		
Sample Number		CPP3001	OCP3001	OCP3007
Sample Date		28-Feb-01	04-Oct-01	22-Jan-02
Benzene	mg/L	0.0011	ND	ND
Ethylbenzene	mg/L	0.00041 J	ND	ND
Toluene	mg/L	0.00097 J	ND	ND
Xylene, Total	mg/L	0.00037 J	ND	ND

Sample Identification		FTA-146-MW04		
Sample Number		CPP3006	OCP3004	OCP3010
Sample Date		02-Mar-01	16-Oct-01	25-Jan-02
Benzene	mg/L	ND	ND	ND
Ethylbenzene	mg/L	ND	ND	ND
Toluene	mg/L	ND	ND	ND
Xylene, Total	mg/L	ND	ND	ND

Sample Identification		FTA-146-MW09		
Sample Number		CPP3011	OCP3006	OCP3012
Sample Date		01-Mar-01	11-Oct-01	23-Jan-02
Benzene	mg/L	ND	ND	ND
Ethylbenzene	mg/L	ND	ND	ND
Toluene	mg/L	ND	ND	ND
Xylene, Total	mg/L	ND	ND	ND

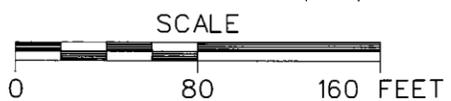
Sample Identification		FTA-146-MW02			
Sample Number		CPP3002	CPP3002R	OCP3002	OCP3008
Sample Date		28-Feb-01	17-Jul-01	04-Oct-01	22-Jan-02
Benzene	mg/L	0.050	0.11	0.099	0.12
Ethylbenzene	mg/L	0.017	0.079	0.087	0.12
Toluene	mg/L	0.0071	0.05	0.049	0.048
Xylene, Total	mg/L	0.038	0.17	0.15	0.2

Sample Identification		FTA-146-MW05		
Sample Number		CPP3007	OCP3005	OCP3011
Sample Date		15-Feb-01	10-Oct-01	24-Jan-02
Benzene	mg/L	ND	ND	ND
Ethylbenzene	mg/L	ND	ND	ND
Toluene	mg/L	ND	ND	ND
Xylene, Total	mg/L	ND	ND	ND

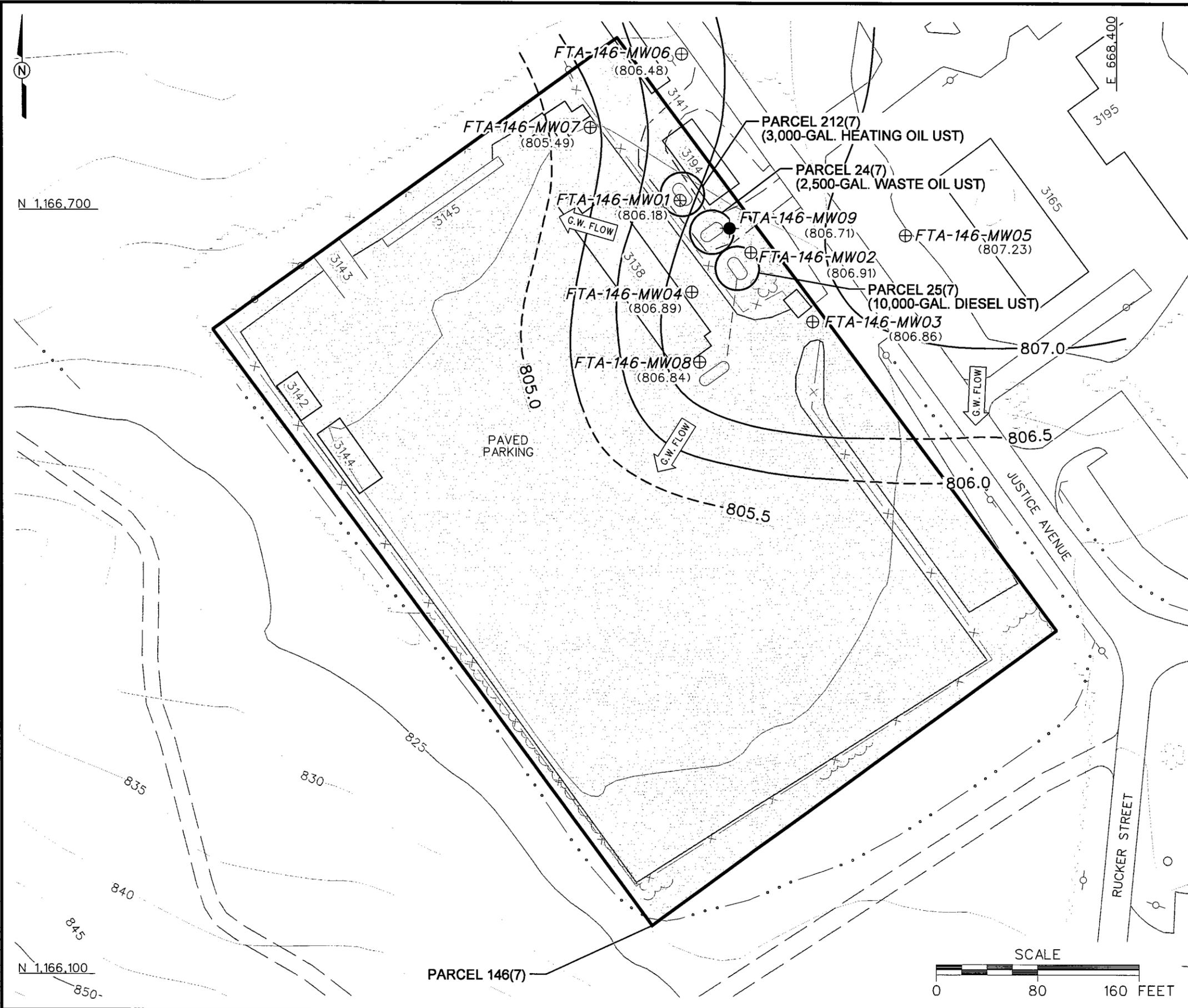
Sample Identification		FTA-146-MW03		
Sample Number		CPP3003	OCP3003	OCP3009
Sample Date		01-Mar-01	05-Oct-01	24-Jan-02
Benzene	mg/L	ND	ND	ND
Ethylbenzene	mg/L	ND	0.00041 J	ND
Toluene	mg/L	0.0003 J	ND	ND
Xylene, Total	mg/L	ND	0.0014 J	ND

FIGURE 3
BTEX CONCENTRATIONS IN
GROUNDWATER
MOTOR POOL AREA 3100
PARCEL 146(7)

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



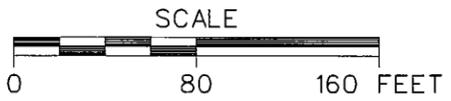
09/27/02
 STARTING DATE: 09/27/02
 DRAWN BY: D. BOMAR
 DATE LAST REV.:
 DRAWN BY:
 DRAFT. CHCK. BY: J. JENKINS
 ENGR. CHCK. BY: J. YACOB
 INITIATOR: J. RAGSDALE
 DWG. NO.: 796887es.540
 PROJ. NO.: 796887



- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
 - (806.86) GROUNDWATER ELEVATION (FT MSL) (JANUARY 2002)
 - G.W. FLOW
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK
 - CULVERT WITH HEADWALL
 - FENCE
 - UTILITY POLE
 - RESIDUUM MONITORING WELL LOCATION
 - BEDROCK MONITORING WELL LOCATION
 - mg/L MILLIGRAMS PER LITER

FIGURE 4
GROUNDWATER ELEVATION MAP
MOTOR POOL AREA 3100
PARCEL 146(7)

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



dbomar
 c:\cadd\design\796887es.540
 N 1,166,100

APPENDIX A

**FINAL
SITE-SPECIFIC SAFETY AND HEALTH PLAN FOR
UNDERGROUND STORAGE TANK REMOVALS
AT MOTOR POOL AREA 3100, PARCELS 24(7), 25(7) AND 212(7)**

**Final
Site-Specific Safety and Health Plan for
Underground Storage Tank Removals
at Motor Pool Area 3100, Parcel 24(7), 25(7), and 212(7)**

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

Prepared for:

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

Prepared by:

**IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923**

**Task Order CK10, Modification No. 10
Contract No. DACA21-96-D-0018
IT Project No. 796887**

October 2002

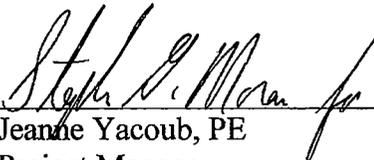
Revision 0

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

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 Approval Fort McClellan, Calhoun County, Alabama

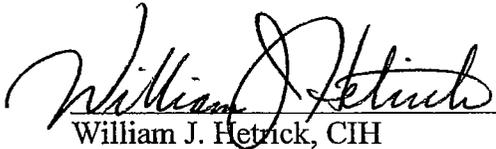
I have read and approve this site-specific safety and health plan attachment for the Underground Storage Tank Removal, at Motor Pool Area 3100, Parcels 24(7), 25(7), and 212(7), at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.



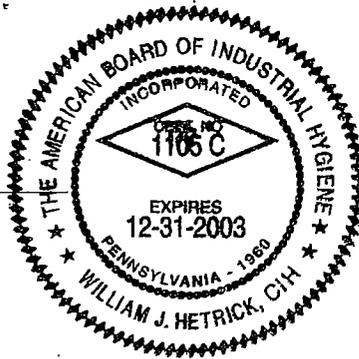
Jeanne Yacoub, PE
Project Manager

10/2/02

Date

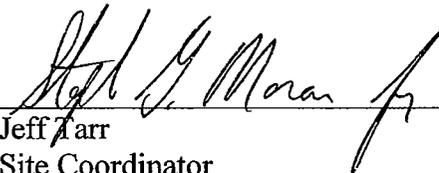


William J. Hetrick, CIH
Health & Safety Manager



9/26/02

Date



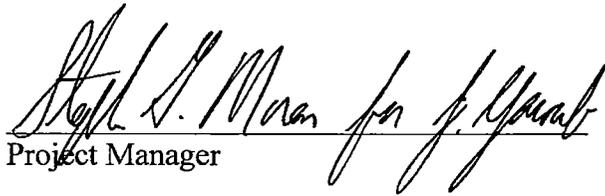
Jeff Farr
Site Coordinator

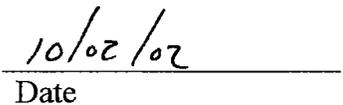
10/2/02

Date

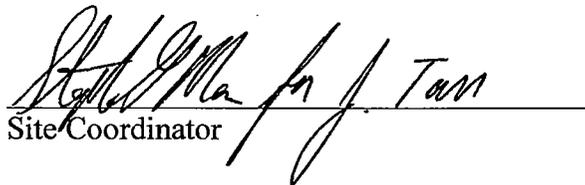
Acknowledgments

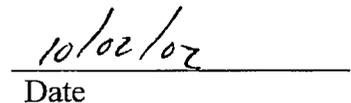
The final approved version of this site-specific safety and health plan (SSHP) for the Underground Storage Tank Removal at Motor Pool Area 3100, Parcels 24(7), 25(7), and 212(7), at Fort McClellan, Alabama, has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every 6 months until project completion.


Project Manager


Date

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


Site Coordinator


Date

Fort McClellan Gate Hours

Baltzell Gate	Baltzell Road. Open 24 hours daily, 7 days a week.
Galloway Gate	Galloway Road. Open 6 am to 6 pm Monday through Friday

Fort McClellan Project Emergency Contacts

Range Control Office (Main Post).....	(256) 848-6772
Fire Department (off post)	911
Ambulance (off post)	911
Regional Medical Center	(256) 235-5121
DOD Guard Force (Mr. Bolton)	(256) 848-5680, 848-4732
Anniston Police Department	(256) 238-1800
Chemical Agent Emergencies.....	(256) 895-1598
(Mike Smith, CEHNC)	cell phone (256) 759-3931
UXO Emergencies	(256) 895-1598
(Mike Smith, CEHNC)	cell phone (256) 759-3931
UXO Nonemergencies/Reporting Only (Ronald Levy)	(256) 848-6853
National Response Center & Terrorist Hotline.....	(800) 424-8802
Poison Control Center.....	(800) 222-1222
EPA Region IV	(404) 562-8725
Ronald Levy, BRAC Environmental Coordinator, FTMC Transition Force	(256) 848-6853
Lisa Holstein, FTMC Transition Force.....	(256) 848-7455
Lee Coker, U.S. Army Corps of Engineers, Mobile District.....	(251) 690-3099
Phillip Stroud, Alabama Department of Environmental Management.....	(334) 270-5646
Doyle Brittain, EPA Region IV	(404) 562-8259
Ross McCollum, U.S. Army Corps of Engineers, Mobile District.....	(251) 690-3113
Mike Moore, Fort McClellan Safety Office	(256) 848-5433
Darryl Stabile, U.S. Army Corps of Engineers.....	(251) 690-2784
Jeanne Yacoub, IT Project Manager	(770) 663-1429
Jeff Tarr, IT Site Manager	(256) 848-3482, -3499
Bill Hetrick, IT H&S Manager	Direct dial (865) 692-3571, and pager (888) 655-9529
Dr. Jerry H. Berke, Health Resources Occupational Physician.....	(800) 350-4511

Table of Contents

	Page
List of Tables	ii
List of Figures	ii
List of Acronyms	iii
1.0 Site Work Plan Summary	1
2.0 Site Characterization and Analysis	2
2.1 Anticipated Hazards	2
2.2 General UST Removal Practices	2
2.3 General Site Information	5
2.3.1 Site Descriptions	5
2.3.2 Duration of Planned Employee Activity	6
2.3.3 Pathways for Hazardous Substance Dispersion	6
3.0 Personal Protective Equipment	7
4.0 Site Monitoring	9
5.0 Activity Hazard Analysis	10

List of Tables

Number	Title	Follows Page
2-1	Toxicological and Physical Properties of Chemicals	2
4-1	Action Levels	9
4-2	Air Monitoring Frequency and Location	9
5-1	Activity Hazard Analysis	10

List of Figures

Number	Title	Follows Page
1-1	Organization Chart	1
5-1	Hospital Emergency Routes	10

Attachments

1	Evaluation of OE/UXO/CWM in Support of HTRW Activities
2	IT Procedure HS307, Excavation and Trenching
3	IT Procedure HS314, Hot Work in Hazardous Locations
4	IT Procedure HS309, Underground Storage Tank Removal

List of Acronyms

BDT	benzene detector tubes
BZ	breathing zone
eV	electron volt
FTMC	Fort McClellan
IT	IT Corporation
LEL	lower explosive limit
PPE	personal protective equipment
SHP	installation-wide safety and health plan
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
TPH	total petroleum hydrocarbons
UST	underground storage tank

1.0 Site Work Plan Summary

IT Corporation (IT), under contract to the U.S. Army Corps of Engineers, has prepared this site-specific safety and health plan (SSHP) in accordance with the work plan for Task Order CK10, Modification No. 10. The scope of work involves the removal of three underground storage tanks (UST) at Motor Pool Area 3100, Parcels 24(7), 25(7), and 212(7), Fort McClellan (FTMC), Alabama, and disposal of the USTs in accordance with current state and federal regulations.

Project Tasks

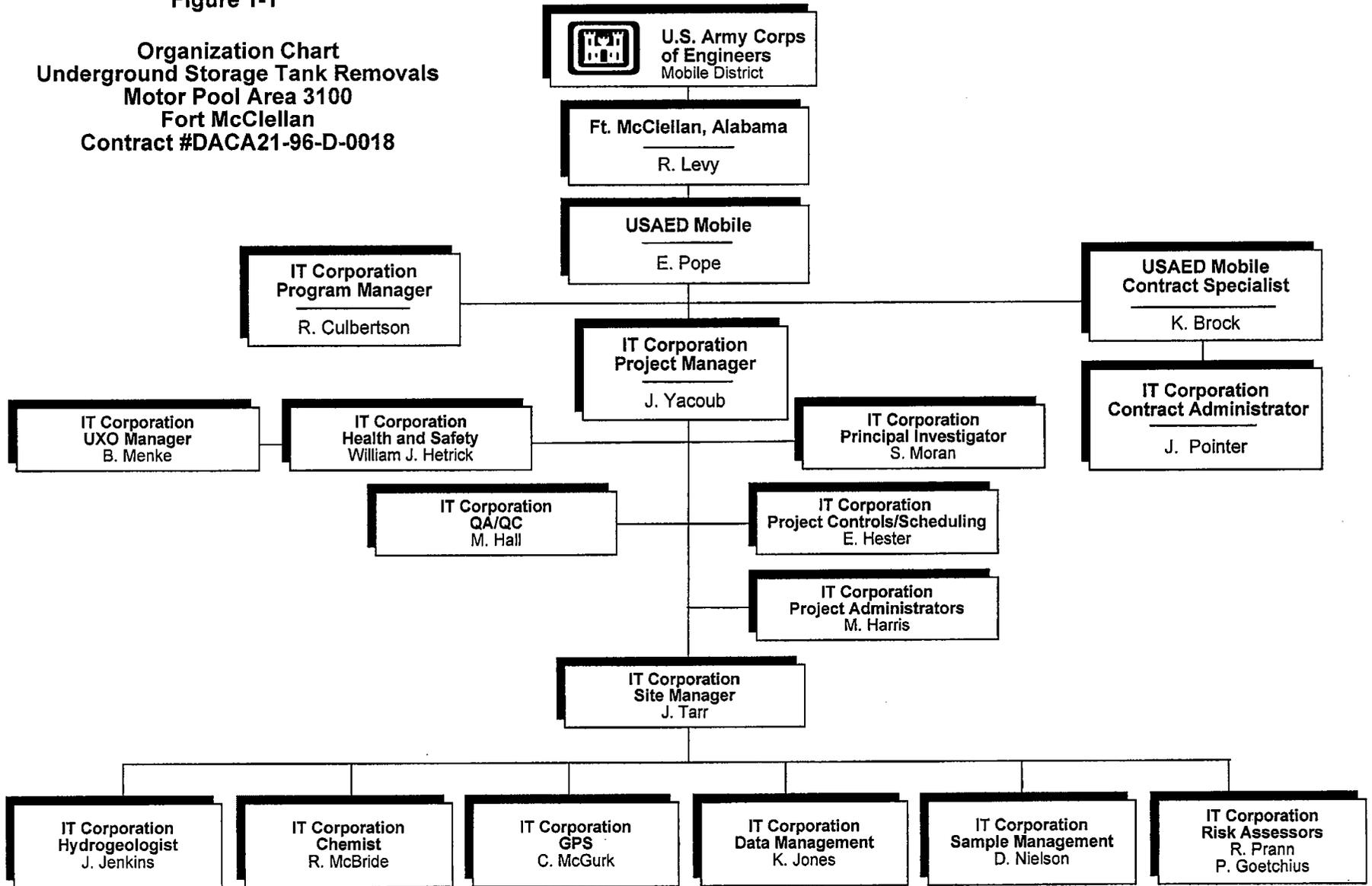
- Site preparation
- Removal and disposal of tank contents
- UST and piping excavation and removal
- Confirmation and waste sampling
- Removal and disposal of contaminated soil
- Backfilling of excavations
- Site restoration.

Personnel Requirements. Up to 15 employees. See Figure 1-1 for an organization chart.

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

Figure 1-1

**Organization Chart
Underground Storage Tank Removals
Motor Pool Area 3100
Fort McClellan
Contract #DACA21-96-D-0018**



2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE). Section 7.0 of the SHP details the use of the support zone, contamination reduction zone, and the exclusion zone that will be implemented to control the work area and reduce hazards.

Table 2-1 lists the toxicological and physiological properties of chemicals anticipated or to be used during UST removal activities. Contaminants of concern at the areas include benzene, total petroleum hydrocarbons (TPH) and diesel fuel.

Attachment 1, *Evaluating OE/UXO/CWM Hazards in Support of HTRW Activities*, confirms that the historical records available for the sites have been reviewed and that UXO support is not required for the UST removal activities. Additionally, based on all available information, it is anticipated that the potential for chemical warfare agents is low, and no real-time air monitoring for chemical warfare materials will be required.

2.2 General UST Removal Practices

- Hazard Assessment
 - At the beginning of each tank removal and as often as necessary to ensure safety, the site safety and health officer (SSHO) shall conduct an area survey to locate workplace hazards and determine appropriate safety control measures.
- Excavation Safety
 - All work involving excavation or trenching shall be subject to the requirements of HS307 (Excavation and Trenching) (Attachment 2 of this SSHP).
 - Personnel entry into any excavation or trench that is more than 4 feet deep shall only be permitted if the excavation or trench is properly shored or sloped and safe for entry as determined by a qualified person.

Table 2-1

**Toxicological and Physical Properties of Chemicals
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

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 Abs Ing Con	Irritation of eyes, skin, nose, and respiratory system; giddiness, headache, nausea, fatigue, anorexia; dermatitis; bone marrow depression; human carcinogen.	Eye: Irrigate immediately Skin: Soap wash immediately 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]
Ethyl benzene [100-41-4]	8.76	NA	Inh Ing Con	Irritation of eyes, skin, mucous membranes; headache; dermatitis; narcosis; coma.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention Aspirate: Immediate medical attention	100 ppm 100 ppm 100 ppm	125 ppm 125 ppm	REL TLV REL	800 ppm
Fuel oil (diesel oil, medium)	?	?	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage; aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho-pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention			PEL TLV REL	
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm	PEL TLV REL	?
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43-200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, headache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	500 ppm 500 ppm	PEL TLV REL	2,000 ppm

Table 2-1

**Toxicological and Physical Properties of Chemicals
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

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 ³
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	
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
Toluene [108-88-3]	8.82	0.16-37	Inh Abs Ing Con	Irritation of eyes, nose; fatigue, weakness, confusion; euphoria; dilated pupils, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis; liver and kidney damage.	Eye: Irrigate immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	200 ppm 50 ppm (skin) 100 ppm	C 300 ppm 150 ppm	PEL TLV REL	500 ppm
Xylene o - [95-47-6] m - [108-38-3] p - [106-42-3]	8.56 8.56 8.44	20	Inh Abs Ing Con	Irritation of eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; cornea vacuolization; anorexia, nausea, vomiting, abdominal pain; 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	PEL TLV REL	900 ppm

^aIP = Ionization potential (electron volts).

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

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

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

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

AEL = Airborne Exposure Limit.

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

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

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

NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub1998).

Table 2-1

Toxicological and Physical Properties of Chemicals Underground Storage Tank Removals at Motor Pool Area 3100 Fort McClellan, Calhoun County, Alabama

(Page 3 of 3)

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

Ca = Carcinogen.

NA = Not applicable.

? = Unknown.

LEL = Lower explosive limits.

LC₅₀ = Lethal concentration for 50 percent of population tested.

LD₅₀ = Lethal dose for 50 percent of population tested.

NIC = Notice of intended change (ACGIH).

References:

American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 1998, compiled by the American Conference of Governmental Industrial Hygienists.

Amoore, J. E. Hautula, "Odor as an Aid to Chemical Safety," Journal of Applied Toxicology, 1983.

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

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

Fazzuluri, F. A., Compilation of Odor and Taste Threshold Values Data, American Society for Testing and Materials, 1978.

Gemet, L. J. Van, Compilation of Odor Threshold Values in Air and Water, CIVO, Netherlands, 1977.

Gemet, L. J. Van, Compilation of Odor Threshold Values in Air and Water, Supplement IV, CIVO, Netherlands, 1977.

Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.

Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.

National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1998, National Institute for Occupational Safety and Health.

Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.

Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.

Verschueren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.

Warning Properties of Industrial Chemicals—Occupational Health Resource Center, Oregon Lung Association.

Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

- A daily inspection of an excavation shall be made by a competent person. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until the necessary safeguards have been taken.
 - Trenches more than 4 feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of egress. Ladders shall be placed at an angle not more than 30 degrees from vertical and secured. Ladder side rails shall extend at least 3 feet above the original ground surface.
 - All excavated soil shall be located at least two feet from the edge of the excavation to prevent soil from falling back into the excavation. No method that disturbs the soil in place (such as driving stakes) shall be used to contain soil material.
 - All excavations shall be guarded on all sides by means of physical barricades. A minimum of 2 feet from edges will be maintained.
 - All excavations shall be backfilled as soon as practical after work is completed and all associated equipment removed.
- Heavy Equipment Operation
 - Only experienced, proficient equipment operators will operate heavy equipment such as backhoes, front-end loaders, cranes, etc. Where certification or licensing requirements exist, such personnel shall possess appropriate certification and/or licensing for operating specified heavy equipment.
 - While operating heavy equipment in the work area, the equipment operator shall maintain communication with a designated signalman through either direct voice contact or approved, standard hand signals. In addition, all site personnel in the immediate work area shall be made aware of the equipment operations.
 - Materials, such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Equipment shall be stored so as not to endanger personnel at any time.
 - A flagman with roadwork vest, signs, cones, and high-level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles such as end-dumps entering or leaving the site.
 - Fire Safety
 - Hot work shall not be conducted unless all requirements of HS314 (Hot Work in Hazardous Locations) (Attachment 3 of this SSHP) have been met.

- Equipment on site shall be bonded and grounded, spark-proof, and explosion resistant, as appropriate. Particular attention to bonding/grounding shall be made during transfer of flammable/combustible liquids into vacuum trucks and when ventilation equipment is utilized.
 - UST excavation shall only commence once the tank's atmosphere has been checked for flammable or explosive vapor concentrations. Tanks indicating 10 percent or greater lower explosive limit (LEL) shall be purged of the hazardous vapor. Purging shall continue until oxygen concentrations are less than 5 percent and LEL less than 10 percent. Carbon dioxide (dry ice) or nitrogen can be utilized to purge the tanks. A minimum of 1.5 pounds of dry ice per 100 gallons of tank capacity is recommended by the American Petroleum Institute. The dry ice should be shaved or crushed to evenly distribute it over the greatest possible area of the tank.
 - Tank purging will cause flammable vapor to exit the tank, and vapor may surround the area. Therefore, where practical, plug all tank openings except the vent after introducing the solid dry ice. Increase flammable vapor air monitoring of the area and continue to observe all normal safety precautions regarding flammable or combustible vapors.
 - At least one fire extinguisher with a minimum rating of 20 A:B:C shall be strategically located in the area of active work.
 - No smoking shall be allowed in the work area.
 - The SSHO will issue hot work permits.
 - All UST removal activities shall follow the requirements of HS309 (Underground Storage Tank Removal), Attachment 4 of this SSHP.
- Air Monitoring
 - If chemical contaminants are present in air or surrounding soil, air monitoring for combustible or oxygen-deficient environments or specific toxic constituents shall be conducted by a qualified person.
 - Additional tests shall be selected and performed to the satisfaction of a qualified person based on the recommendations of the health and safety manager. All tests shall be repeated as often as necessary to assure safety, since changing conditions may result in varying atmospheric contaminant concentrations.
 - All work activity is prohibited in atmospheres where tests indicate that the concentration of flammable vapors is greater than 10 percent of the LEL or the concentration of oxygen is less than 20 percent or greater than 23 percent.

Positive steps such as ventilation shall be taken to establish acceptable atmospheric conditions prior to resumption of operations.

- Proper maintenance and operation of air monitoring equipment is an essential component of excavation operations. Use of combustible gas/oxygen indicators is subject to the following precautions:
 1. Combustible gas indicators must be routinely and properly calibrated based on known mixtures of gas (e.g., pentane, methane) in air. Other combustible gases or vapors will read approximately correct in terms of explosivity but, for maximum accuracy, a calibration curve for the specific substance or mixture of concern should be consulted.
 2. Ambient oxygen concentrations of less than 10 percent will cause an inaccurately low reading on the combustible gas meter scale.
 3. Carbon dioxide shortens the life of oxygen meter sensors. Use of an oxygen meter in atmospheres purged with carbon dioxide will have a cumulative effect; therefore, all such tests should be stopped as soon as a constant reading is obtained.

2.3 General Site Information

2.3.1 Site Descriptions

IT will remove USTs at the following sites:

Motor Pool Area 3100, Building 3138. Building 3138 has three USTs, two of which have been replaced. According to the FTMC environmental baseline study report, the three USTs are tracked under three different parcel numbers (Parcel Numbers 24[7], 25[7], and 212[7]). Reportedly, all three USTs to be removed have been emptied of their contents. IT field personnel will confirm the USTs to be product free prior to excavation activities.

Parcel 24(7) - Former Motor Pool Area 3100, Building 3138. Parcel 24(7) had one 2000-gallon waste oil tank reportedly removed on April 4, 1994. The removed waste oil tank was reportedly replaced with a 2,500-gallon fiberglass UST. According to the closure report for the removed UST, high concentrations (12,300 parts per million) of TPH were detected in the piping trench soil but decreased significantly in a second sample collected two feet deeper at the same location. The soil sample collected at the base of the tank pit also showed elevated levels of TPH; however, an additional soil sample collected 3 feet below the base sample showed a decreased level of TPH. The closure report also indicates that two cubic yards of contaminated soils were removed from the excavation. However, the soils were used as top fill material during

the installation of the new UST. Groundwater was not encountered during the initial UST closure. According to the closure report, the excavation for the new fiberglass UST was backfilled with pea gravel up to one foot below the top of the tank.

Parcel 25(7) - Former Motor Pool Area 3100, Building 3138. According to the environmental baseline study report, Parcel 25(7) had one 10,000-gallon diesel UST replaced in 1996; however, the list of active tanks received from the Base indicates that the tank was installed in 1987 and upgraded in 1991.

Parcel 212(7) - Former Motor Pool Area 3100, Building 3138. Parcel 212(7) had one 5,000-gallon heating oil UST that was removed and replaced with a 3,000-gallon fiberglass UST in 1996. The closure report prepared by SEMS Inc. documented that product odor was not detected within the excavation. The depth to groundwater was reported to be greater than five feet below the bottom of the removed tank basin. The report also noted that evidence of contamination was not observed; however, no soil or groundwater samples were collected during the 5,000-gallon UST removal.

2.3.2 Duration of Planned Employee Activity

Employee activity duration is anticipated to be two weeks.

2.3.3 Pathways for Hazardous Substance Dispersion

Possible pathways for hazardous substances in the area are groundwater, soils, and residual UST contents.

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
Site preparation	Level D
Removal and disposal of tank contents	Modified Level D*
UST and piping excavation and removal	Modified Level D*
Removal and disposal of contaminated soil	Modified Level D*
Confirmation and waste sampling	Modified Level D*
Backfilling of excavation	Level D
Site restoration	Level D

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

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

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

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

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

- Hearing protection (when working near/adjacent to operating equipment).

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

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
- Hooded, Saran-coated Tyvek, taped at gloves, boots, and respirator
- Nitrile gloves (outer)
- Latex or lightweight nitrile gloves (inner)
- Neoprene steel-toed boots or polyvinyl chloride overbooties/steel-toed safety boots
- Hard hat
- Hearing protection (when working near/adjacent to operating equipment)

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

4.0 Site Monitoring

The environmental contaminants of concern resulting from the UST removal activities are benzene, TPH, and diesel fuel. Table 4-1 contains action levels for site monitoring at the sites.

Chemical. Monitoring will be performed by the SSHO during the performance of ground-intrusive operations. A calibrated photoionization detector (e.g., Photovac 2020 or equivalent) organic vapor analyzer with a 10.2 eV or higher ionization lamp will be utilized to monitor the work areas and BZs to determine if any organic material may be present that would necessitate upgrading of protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the work areas and BZs to determine if any combustible/flammable oxygen levels may be present that would necessitate evacuation of the work area. Benzene detector tubes (BDT) will be utilized to monitor the work areas and BZs to determine if benzene levels may be present that would necessitate upgrading of protection levels. Table 4-2 contains the air monitoring frequency and location for site monitoring at the work sites.

Table 4-1

Action Levels
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

When in Level C PPE

Analyte	Action Level ^a	Required Action ^b
Volatile Organic Compounds (VOC)	≥ 10 ppm above background in BZ	Stop work, evacuate work area, upgrade to Level B.
Oxygen	≥ 20%, <23% < 20%, >23%	Normal operations. Stop work, evacuate work area.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area. Continue operations, monitor for VOCs.
Benzene	≥ 5 ppm in BZ	Stop work, evacuate work area.

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.
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.
Benzene	≥ 1 ppm in BZ	Upgrade to Level C PPE.

Table 4-1

**Action Levels
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

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
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

Work Activity	Instrument	Frequency	Location
Removal and disposal of tank contents	OV Monitor LEL/O ₂ Monitor BDT	Continuously Continuously As needed	Breathing zone (BZ) of employees and/or work area
UST excavation and removal; confirmation and waste sampling	OV Monitor LEL/O ₂ Monitor BDT	Continuously Continuously As needed	BZ of employees and/or work area
Removal and disposal of contaminated soil	OV Monitor LEL/O ₂ Monitor BDT	Continuously Continuously As needed	BZ of employees and/or work area

OV = Organic vapor.

LEL/O₂ = Lower explosive level/oxygen.

BDT = Benzene detector tube.

5.0 Activity Hazard Analysis

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

- Site preparation
- Surveying
- Removal and disposal of tank contents
- Stage equipment for pumping liquids
- Pumping liquids
- Material storage
- UST excavation and removal
- Confirmation and waste sampling
- High pressure water jetting operations
- Backfilling of excavations
- Site restoration.

All injuries and illnesses must be immediately reported to the site manager or the SSHO, who will then notify off-site personnel and organizations as necessary.

If hospital care must be provided, the victim shall be treated at Northeast Regional Medical Center. Directions to the hospital are provided in Figure 5-1.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 16)

Activity	Potential Hazards	Recommended Controls
Site Preparation	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Determine best access route before transporting equipment. • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards. • Look before you step; ensure safe and secure footing.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.
	Falling objects	<ul style="list-style-type: none"> • Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.
	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> • Wear safety glasses/goggles; ensure that eyewash is in proper working condition.
	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cuts/bruises	<ul style="list-style-type: none"> • Use cotton or leather work gloves for material handling.
	Bees, spiders, and snakes	<ul style="list-style-type: none"> • Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Ticks	<ul style="list-style-type: none"> • Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellent. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Fire	<ul style="list-style-type: none"> • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Hazard communication	<ul style="list-style-type: none"> • Label all containers as to contents and dispose of properly. • Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
	Cold stress	<ul style="list-style-type: none"> • Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (oF). • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water. 	

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 16)

Activity	Potential Hazards	Recommended Controls
Site Preparation (continued)	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> • Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic. • Barriers shall be used to protect workers from vehicular traffic. • Barriers shall be used to guard excavations adjacent to streets or roadways. • Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided. • Heavy equipment shall have backup alarms.
	Forklift operations	<ul style="list-style-type: none"> • Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Portable electric tools	<ul style="list-style-type: none"> • Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (do not use) and removed from service. • Portable electric tools and all cord and plug connected equipment shall be protected by a ground fault circuit interrupter (GFCI) device. • Electrical tools shall be inspected daily prior to use.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 16)

Activity	Potential Hazards	Recommended Controls
Site Preparation (continued)	Extension cords	<ul style="list-style-type: none"> • Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic. • Cords shall be suspended with a nonconductive support (rope, plastic ties, etc.). • Cords shall be designed for hard duty. • Cords shall be inspected daily.
	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than lying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • 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	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
Surveying	Slip, trip, fall	<ul style="list-style-type: none"> • Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toe boots when working in the field. • Provide adequate lighting in all work areas. • Whenever possible, avoid routing cords and hoses across walking pathways. • Flag or cover inconspicuous holes to protect against falls. • Work areas will be kept clean and orderly. • Garbage and trash will be disposed of daily in approved refuse containers. • Tools and accessories will be properly maintained and stored. • Work areas and floors will be kept free of dirt, grease, and slippery materials.
	Traffic accidents	<ul style="list-style-type: none"> • Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. • If working adjacent to roadways, have workers wear fluorescent orange vests. • Use warning signs or lights to alert oncoming traffic. • Assign flag person(s) if necessary to direct local traffic. • Set up temporary parking locations outside the immediate work area. • Motor vehicle operators shall obey all posted traffic signs, signals, and speed limits. • Pedestrians have the right-of-way. • Wear seat belts when vehicles are in motion.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 16)

Activity	Potential Hazards	Recommended Controls
Surveying (continued)	Wildlife hazards	<ul style="list-style-type: none"> Workers should be cautious when driving through the site in order to avoid encounters with passing animals.
	Biological hazards	<ul style="list-style-type: none"> Walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, and copperheads).
	Ticks	<ul style="list-style-type: none"> Wear light colored clothing (can see ticks better). Mow vegetated and small brush areas. Wear insect repellent. Wear long sleeves and long pants. Visually check oneself promptly and frequently after exiting the work area.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> Avoid plant areas if possible. Wear long sleeves and long pants. Promptly wash clothing that has contacted poisonous plants. Wash affected areas immediately with soap and water.
Removal of UST contents via explosion-proof pump	Contact with potentially contaminated materials	<ul style="list-style-type: none"> Real-time monitoring will take place. Appropriate PPE will be utilized. Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards. The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location.
	Noise	<ul style="list-style-type: none"> Sound levels above 85 decibels (dBA) mandates hearing protection.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> Good housekeeping. Keep work area picked up and as clean as feasible. Continually inspect the work areas for slip, trip and fall hazards.
	Pinch points	<ul style="list-style-type: none"> Keep hands, fingers, and feet clear of moving/suspended materials and equipment. Beware of contact points. Stay alert at all times!
	Strains/sprains	<ul style="list-style-type: none"> Use the proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment. Size up the lift.
	Cut hazards	<ul style="list-style-type: none"> Wear adequate hand protection.
	Falling objects	<ul style="list-style-type: none"> Remove unsecured tools and materials before operating equipment. Stay clear of materials suspended overhead.
	Biological hazards – bees, spiders, and snakes	<ul style="list-style-type: none"> Inspect the work area carefully and avoid placing hands and feet into concealed areas.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 5 of 16)

Activity	Potential Hazards	Recommended Controls
Removal of UST contents via explosion-proof pump (continued)	Working at elevated heights/falls	<ul style="list-style-type: none"> • Personnel working at heights of 6 feet or more must be secured with fall protection.
	Fire	<ul style="list-style-type: none"> • Real-time air monitoring will take place to determine oxygen and lower explosive limit. • No smoking or open flames within 50 feet of the work area (work area will be posted). • Fire extinguishes shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition. • All hoses, coupling, fixtures, etc., shall be properly bonded and grounded. • IT Corporation's HS314 "Hot Work in Hazardous Locations (May 19, 1999)" policy and procedure shall be adhered to at all time.
	Electrical safety	<ul style="list-style-type: none"> • Electrical equipment will be locked out and tagged.
	Staging equipment	<ul style="list-style-type: none"> • Signal person will assist in positioning equipment.
	Uneven terrain and poor ground support	<ul style="list-style-type: none"> • Inspections or determinations of road conditions and structure shall be made in advance to assure that clearances and load capacities are safe for the passage or placing of any machinery or equipment.
	Hazard Communication	<ul style="list-style-type: none"> • All containers shall be labeled as to contents and disposed of properly.
	Spills	<ul style="list-style-type: none"> • Absorbent/neutralization material and 55 gallon drums will be kept available where leaks, spills, or ruptures may occur.
	Ladders	<ul style="list-style-type: none"> • Ladder safety will be discussed at the Daily Tailgate Safety Meeting. • Ladders will be inspected prior to each use. • Faulty ladders will be tagged and taken out of service. • Ladders will be secured by top, bottom, and intermediate fastenings as required. • Personnel working at heights of 6 feet or more must be secured with fall protection.
	Faulty or damaged equipment being utilized to perform work	<ul style="list-style-type: none"> • All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Comply with IT Procedure HS 400 (May 13, 1999). • Bathe at end of work shift or day. • Apply powder to affected area.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 16)

Activity	Potential Hazards	Recommended Controls
Removal of UST contents via explosion-proof pump (continued)	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Comply with IT Procedure HS 400 (May 13, 1999). • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Comply with IT Procedure HS 400 (May 13, 1999). • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices. • Comply with IT Procedure HS 400 (May 13, 1999).
	Unattended worker	<ul style="list-style-type: none"> • "Buddy System" – visual contact will be maintained with personnel engaged in the transfer/removal of the tank contents.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
Stage equipment for pumping liquids	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size-up the lift.
	Moving equipment	<ul style="list-style-type: none"> • Signal person will assist in positioning equipment.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real-time air monitoring will take place. • Appropriate PPE protection will be utilized.
	Faulty equipment	<ul style="list-style-type: none"> • Equipment will be inspected prior to being placed into service and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out.
Pumping liquids	Pressurized systems	<ul style="list-style-type: none"> • All discharge hoses and connections shall be routinely inspected.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandate hearing protection.
	Fire	<ul style="list-style-type: none"> • A dry chemical fire extinguisher with a minimum UL rating of 5 A:B:C will be readily available.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 7 of 16)

Activity	Potential Hazards	Recommended Controls
Pumping liquids (continued)	Refueling	<ul style="list-style-type: none"> • Mechanized equipment shall be shut down prior to and during fueling operations. • Obtain a Hot Work Permit, per IT Procedure HS 314 (May 19, 1999) for any operation which could act as an ignition source. • Proper bonding and grounding. Only UL/FM approved safety cans will be used.
Excavation	Underground utilities	<ul style="list-style-type: none"> • All underground utilities will be located prior to excavating.
	Open excavations	<ul style="list-style-type: none"> • IT Policy and Procedure HS307 – “Excavation and Trenching” will be adhered to at all times.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real-time air monitoring will take place. • Appropriate PPE protection will be utilized.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandate hearing protection.
	Heavy equipment operations	<ul style="list-style-type: none"> • Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition. • 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. • Machinery and mechanized equipment shall be operated only by designated personnel. • Getting off or on any equipment while it is in motion is prohibited. • Machinery or equipment requiring an operator shall not be 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. • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. • All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair person. • Bulldozer and scraper blades end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. • All self-propelled construction equipment shall be equipped with a back-arm alarm.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Comply with IT Procedure HS 400 (May 13, 1999). • Bathe at end of work shift or day. • Apply powder to affected area.
Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Comply with IT Procedure HS 400 (May 13, 1999). • Move victim to shaded, cool area. 	

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 8 of 16)

Activity	Potential Hazards	Recommended Controls
Excavation (continued)	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Comply with IT Procedure HS 400 (May 13, 1999). • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices. • Comply with IT Procedure HS 400 (May 13, 1999).
	Fire	<ul style="list-style-type: none"> • Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C. • 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. • Tanks shall be monitored for oxygen and lower explosive limit. The lower explosive limit shall be less than 10% LEL prior to excavating or the tanks shall be purged with carbon dioxide or nitrogen.
Removal of UST	Open trenches	<ul style="list-style-type: none"> • IT Policy and Procedure HS307 – "Excavation and Trenching" will be adhered to at all times.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • Real-time monitoring will take place. Appropriate PPE will be utilized. • Good housekeeping will be stressed to safeguard against cross contamination of nearby areas and eliminate safety hazards. • All site personnel will practice good personal hygiene. • The work area will be demarcated. All unnecessary personnel will be kept out of the work area and in an upwind location. • Refer to SHSP for chemical hazard discussion.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandate hearing protection.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping. • Keep work area picked up and as clean as feasible. • Continually inspect the work areas for slip, trip and fall hazards.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 9 of 16)

Activity	Potential Hazards	Recommended Controls
Removal of UST (continued)	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Fire	<ul style="list-style-type: none"> • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition. • Mechanized equipment shall be shut down prior to and during fueling operations. • Obtain a Hot Work Permit, per IT Procedure HS 314 (May 19, 1999) for any operation which could act as an ignition source. • Real time air monitoring shall be performed do confirm the absence of explosive vapor mixtures in air.
	Strains/sprains	<ul style="list-style-type: none"> • Use the proper lifting techniques. • Lifts greater than 60 lbs require assistance or mechanical equipment. • Size up the lift.
	Heavy equipment operations	<ul style="list-style-type: none"> • Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition. • 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. • Machinery and mechanized equipment shall be operated only by designated personnel. • Getting off or on any equipment while it is in motion is prohibited. • Machinery or equipment requiring an operator shall not be permitted shall not be 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. • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. • All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair person. • Bulldozer and scraper blades end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. • All self-propelled construction equipment shall be equipped with a back-arm alarm.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 10 of 16)

Activity	Potential Hazards	Recommended Controls
Removal of UST (continued)	Ropes, slings, chains, and hooks	<ul style="list-style-type: none"> • The use of ropes, slings, and chains shall be in accordance with the safe recommendations of their manufacturer. • Rigging equipment shall not be loaded in excess of its recommended safe working load. • The use of open hooks is prohibited in rigging to lift any load where there is danger of relieving the tension on the hook due to the load or hook catching or fouling. • Hooks, shackles, rings, pad eyes and other fittings that show excessive wear or that have been bent, twisted or otherwise damaged shall be removed from service. • Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service. • Taglines shall be used to control the loads being handled by hoisting equipment. • All hoisting equipment shall be capable of passing a performance (operating) test prior to being placed into service.
	Hoisting Equipment	<ul style="list-style-type: none"> • At no time shall the hoisting equipment be loaded in excess of the manufacturers rating. • While hoisting equipment is in operation, the operator shall not perform any other work and he/she shall not leave his/her position at the controls until the load has been safely landed or returned to the ground. • A standard signal system shall be used on all hoisting equipment.
Material storage	Flammable and combustible liquids	<ul style="list-style-type: none"> • Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.
High-pressure water jetting operations	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.
	Fueling	<ul style="list-style-type: none"> • Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	<ul style="list-style-type: none"> • Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 11 of 16)

Activity	Potential Hazards	Recommended Controls
High-pressure water jetting operations (continued)	High-pressure water	<ul style="list-style-type: none"> • Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person shall be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	<ul style="list-style-type: none"> • Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out of control equipment	<ul style="list-style-type: none"> • No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	<ul style="list-style-type: none"> • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	<ul style="list-style-type: none"> • Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended
	Falling objects	<ul style="list-style-type: none"> • Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	<ul style="list-style-type: none"> • Impact-resistant safety glasses with side shields are required.
	Contact with potentially contaminated materials	<ul style="list-style-type: none"> • All site personnel will wear the appropriate PPE.
Confirmation Waste Sampling	Cross-contamination and contact with potentially contaminated materials	<ul style="list-style-type: none"> • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with soil. • 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	<ul style="list-style-type: none"> • Use care when handling glassware. • Wear adequate hand protection.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 12 of 16)

Activity	Potential Hazards	Recommended Controls
Confirmation Waste Sampling (continued)	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Bees, spiders, and snakes	<ul style="list-style-type: none"> • Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas. • Evaluate need for sensitive workers to have prescribed antibiotic or medicine to combat onset of symptoms.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Access/egress hazards	<ul style="list-style-type: none"> • Utilize good housekeeping practices. • Keep aiseways, pathways, and work areas free of obstruction. • Use appropriate footwear for the task assigned.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body-cooling devices.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 13 of 16)

Activity	Potential Hazards	Recommended Controls
Confirmation Waste Sampling (continued)	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornadoes	<ul style="list-style-type: none"> • 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.
Backfilling of Excavation	Open excavations	<ul style="list-style-type: none"> • IT Policy and Procedure HS307 – "Excavation and Trenching" will be adhered to at all times.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 dBA mandate hearing protection.
	Heavy equipment operations	<ul style="list-style-type: none"> • Before any machinery or mechanized equipment is placed into service, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition. • 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. • Machinery and mechanized equipment shall be operated only by designated personnel. • Getting off or on any equipment while it is in motion is prohibited. • Machinery or equipment requiring an operator shall not be 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. • All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. • All repairs on machinery or equipment will be made at a location which provides protection from traffic for repair person. • Bulldozer and scraper blades end-loader buckets, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. • All self-propelled construction equipment shall be equipped with a back-arm alarm.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 14 of 16)

Activity	Potential Hazards	Recommended Controls
Backfilling of Excavation (continued)	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Comply with IT Procedure HS 400 (May 13, 1999). • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Comply with IT Procedure HS 400 (May 13, 1999). • Move victim to shaded, cool area.
	Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the buddy system. • Comply with IT Procedure HS 400 (May 13, 1999). • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices. • Comply with IT Procedure HS 400 (May 13, 1999).
	Fire	<ul style="list-style-type: none"> • Each bulldozer, backhoe, or other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum UL rating of 5 A:B:C. • 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.
Site Restoration	Slip, trip, and fall hazards	<ul style="list-style-type: none"> • Determine best access route before transporting equipment. • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards. • Look before you step; ensure safe and secure footing.
	Heavy lifting	<ul style="list-style-type: none"> • Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.
	Falling objects	<ul style="list-style-type: none"> • Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.
	Flying debris, dirt, dust, etc.	<ul style="list-style-type: none"> • Wear safety glasses/goggles; ensure that eyewash is in proper working condition.

Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 15 of 16)

Activity	Potential Hazards	Recommended Controls
Site Restoration (continued)	Pinch points	<ul style="list-style-type: none"> • Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cuts/bruises	<ul style="list-style-type: none"> • Use cotton or leather work gloves for material handling.
	Bees, spiders, and snakes	<ul style="list-style-type: none"> • Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Ticks	<ul style="list-style-type: none"> • Wear light colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellent. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Fire	<ul style="list-style-type: none"> • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Hazard communication	<ul style="list-style-type: none"> • Label all containers as to contents and dispose of properly. • Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.
	Noise	<ul style="list-style-type: none"> • Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	<ul style="list-style-type: none"> • Adequate lighting will be provided to ensure a safe working environment.
	Poison ivy/oak/sumac	<ul style="list-style-type: none"> • Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Heat rash	<ul style="list-style-type: none"> • Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
Heat cramps	<ul style="list-style-type: none"> • Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area. 	
Heat exhaustion	<ul style="list-style-type: none"> • Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature) • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks. 	

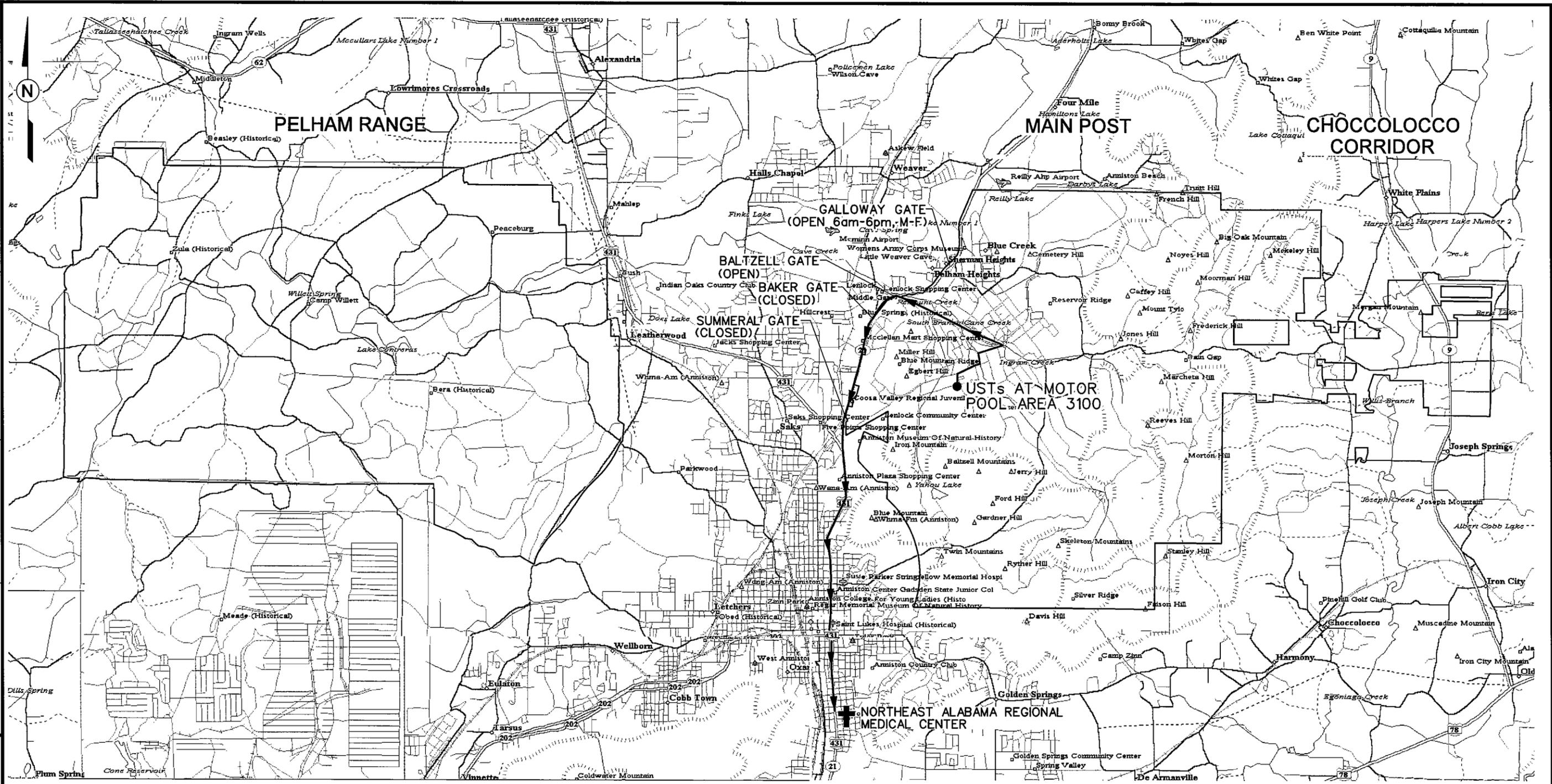
Table 5-1

**Activity Hazard Analysis
Underground Storage Tank Removals at Motor Pool Area 3100
Fort McClellan, Calhoun County, Alabama**

(Page 16 of 16)

Activity	Potential Hazards	Recommended Controls
Site Restoration (continued)	Heat stroke	<ul style="list-style-type: none"> • Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body cooling devices.
	Contact with moving equipment/vehicles	<ul style="list-style-type: none"> • Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic. • Barriers shall be used to protect workers from vehicular traffic. • Barriers shall be used to guard excavations adjacent to streets or roadways. • Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided. • Heavy equipment shall have backup alarms.
	Lightning strikes	<ul style="list-style-type: none"> • Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than lying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • 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	<ul style="list-style-type: none"> • Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.

INITIATOR: J. RAGSDALE DWG. NO.: 796887es.538
 PROJ. MGR.: J. YACOUB PROJ. NO.: 796887
 DRAFT. CHK. BY: ENGR. CHK. BY: S. MORAN
 DATE LAST REV.: DRAWN BY:
 STARTING DATE: 09/24/02 DRAWN BY: A.W. SMITH
 09/24/02 03:52:41 PM



LEGEND:

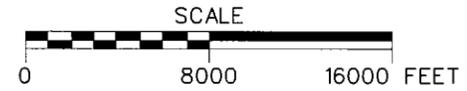
- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITALS
- INVESTIGATION SITE

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

- LEAVING FORT MCLELLAN ON BALTZELL GATE ROAD, TURN LEFT (SOUTH) ONTO AL HWY 21
- GO ~ 2.5 MILES WHERE AL HWY 21 MERGES WITH U.S. HWY 431 AND CONTINUE SOUTH
- CONTINUE SOUTH ON AL21/US431 FOR ~ 2.7 MILES
- TURN LEFT ONTO EAST 10th STREET
- GO ~ 0.2 MILE TO MEDICAL CENTER ON RIGHT
- NORTHEAST ALABAMA REGIONAL MEDICAL CENTER, 400 EAST 10th STREET
- PHONE NUMBER : (256) 235-5121

**FIGURE 5-1
 HOSPITAL EMERGENCY ROUTE**

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



ATTACHMENT 1

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

Site Name: Motor Pool Area 3100, Parcels 146(7), 212(7), 24(7), 25(7), and 73(7)

Job Number: 796887

Date: 09/10/02

Name of person completing form: John Ragsdale

Title: Plan Writer

Signature: John Ragsdale

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

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.

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

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:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Live fire testing of any ordnance:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Conventional or CWM OE training:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Storage of conventional or CWM OE:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Disposal or demilitarization of conventional or CWM OE:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other (specify):		

	Yes	No
2b. Manufacturing, production, or shipping of chemical agent:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Research or testing of chemical agent:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chemical agent related training:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Storage of chemical agent:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Disposal or demilitarization of chemical agent:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other (specify):		

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 –

Job Number: 796887

Date: 09/10/02

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:	<input type="checkbox"/>	<input type="checkbox"/>
Is there evidence that the CWM is/was containerized in nonexplosive containers:	<input type="checkbox"/>	<input type="checkbox"/>
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):	<input type="checkbox"/>	<input type="checkbox"/>
Is there evidence that the CWM hazard has been removed from the site or that the site has been decontaminated:	<input type="checkbox"/>	<input type="checkbox"/>
Has the site been previously monitored or sampled for chemical agent or agent breakdown products:	<input type="checkbox"/>	<input type="checkbox"/>
For any "YES" above, was the agent or breakdown product identified?	<input type="checkbox"/>	<input type="checkbox"/>

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"):

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 on page 3 of 4 -

Site Name: Motor Pool Area 3100, Parcels 146(7), 212(7), 24(7), 25(7), and 73(7)

Job Number: 796887

Date: 09/10/02

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:

(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:

<p>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).</p>	<p>Subject to review by the IT CIH, 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.</p>
<p>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).</p>	<p>Subject to review by the IT CIH, 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.</p>
<p>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).</p>	<p>Subject to review by the IT CIH, 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.</p>

Based on all available information, the exposure potential at this site is considered to be: **LOW**

Exceptions/Explanations:

Review Signatures:

IT UXO Technical Manager



Date: 9-28-02 IT H&S Specialist



Date: 9/26/02

Site Name: Motor Pool Area 3100, Parcels 146(7), 212(7), 24(7), 25(7), and 73(7)

Job Number: 796887

Date: 09/10/02

Additional Notes and Explanations:

The Motor Pool Area 3100, Parcels 146(7), 212(7), 73(7), 25(7), and 24(7) is centrally located on the Main Post on 13th Avenue. Motor Pool Area 3100 is no longer an active motor pool. This motor pool provided vehicle maintenance, wash rack services, and tire shop services. The site covers approximately four acres. An oil/water separator (OWS) is associated with the wash rack and has a settling basin attached to a coalescing plate OWS that discharged to the sanitary sewer. Also, a vehicle grease rack was located here. Other small buildings were located within this motor pool, including hazardous materials storage buildings used for flammable materials and used batteries. During the environmental baseline survey visual site investigation in 1998, light military vehicle maintenance was being conducted at the site.

Three underground storage tanks (UST) are recorded to be present at this site. Two of the three USTs have been replaced. In review of ADEM reports for these tanks, the two tanks appear to have been removed in accordance with Alabama Department of Environmental Management (ADEM) UST requirements.

The EBS parcel numbers for this site are assigned as follows:

- Parcel 146(7)- Motor Pool Area 3100, 13th Avenue
- Parcel 212(7)- 3000 gallon heating oil UST
- Parcel 24(7)- 2500 gallon waste oil UST
- Parcel 25(7)- 10,000 gallon diesel UST
- Parcel 73(7)- wash rack/OWS.

ATTACHMENT 2

**HTRW ACTIVITIES IT PROCEDURE HS307,
EXCAVATION AND TRENCHING**



PROCEDURE

Subject: EXCAVATION AND TRENCHING

1.0 PURPOSE AND SUMMARY

The purpose of this procedure is to describe the company requirements for excavation and trenching safety. These requirements are based on the federal Occupational Safety and Health Administration (OSHA) excavation standard found in 29 Code of Federal Regulations (CFR) 1926, Subpart P.

Some company activities are likely to occur in states or localities that either currently have or will have requirements that differ from those contained within the federal standard. In such circumstances, the local health and safety representative will be responsible for ensuring that these requirements are included in either a site health and safety plan or a similar document and conveyed to all affected employees. If federal, state, or local regulations vary or conflict, the more protective requirements and practices will be followed.

2.0 TABLE OF CONTENTS

- 1.0 Purpose and Summary
- 2.0 Table of Contents
- 3.0 Responsibility Matrix
 - 3.1 Procedure Responsibility
 - 3.2 Action/Approval Responsibilities
- 4.0 Definitions
- 5.0 Text
 - 5.1 Pre-Excavation Requirements
 - 5.1.1 Underground Utilities
 - 5.1.2 Surface Encumbrances
 - 5.1.3 Vehicular Traffic
 - 5.1.4 Training
 - 5.2 Excavation Work Practices
 - 5.2.1 General
 - 5.2.2 Supervision
 - 5.2.3 Soil Classification
 - 5.2.4 Access and Egress
 - 5.2.5 Protective Systems
 - 5.2.6 Exposure to Falling Loads
 - 5.2.7 Warning System for Mobil Equipment
 - 5.2.8 Hazardous Atmospheres
 - 5.2.9 Water Accumulation Hazards
 - 5.2.10 Stability of Adjacent Structures
 - 5.2.11 Protection from Loose Rock or Soil
 - 5.2.12 Inspections



Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS307
0
04/25/02
04/25/02
2 of 16

5.2.13 Fall Protection

- 6.0 Exception Provisions
- 7.0 Cross Reference
- 8.0 Attachments

3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The Vice President of Health & Safety is responsible for the issuance, revision, and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Accepted Engineering Practices

Those requirements or practices which are compatible with standards required by a registered professional engineer.

Angle of Repose

The greatest angle above the horizontal plane at which a material will lie without sliding.

Benching

A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels of steps, usually with vertical or near-vertical surfaces between levels.

Competent Person

An employee who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has the authority to take prompt corrective measures to eliminate them.

Company

All wholly-owned subsidiaries of Shaw Environmental & Infrastructure, Inc. (Shaw E & I).

Excavation

Any man-made cut, cavity, trench or depression in an earth surface, including its sides, walls, or faces, formed by earth removal.



Registered Professional Engineer

An individual currently registered as a professional engineer (preferably civil) in the state where work is to be performed.

Sheeting

Members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield

A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Shields may be pre-manufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring

Structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping

A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Support System

A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated Data

Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench

A narrow (in relation to its length) excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

Type A Soil

Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, soil is NOT Type A if:

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;



- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
- The material is subjected to other factors that would require it to be classified as a less stable material.

Type B Soil

This classification refers to:

- Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, silty clay loam and sandy clay loam.
- Previously disturbed soils except those which would otherwise be classified Type C soil;
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration;
- Dry rock that is not stable; or
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C Soil

This classification refers to:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less;
- Granular soils including gravel, sand, and loamy sand;
- Submerged soil or soil from which water is freely seeping;
- Submerged rock that is not stable; or
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

5.0 TEXT

5.1 Pre-Excavation Requirements

- 5.1.1 Underground Utilities.** Prior to opening an excavation, the estimated location of underground utilities such as sewer, telephone, fuel, electric, water, or any other underground installation that may be reasonably expected to be encountered during the excavation work shall be determined.



Procedure No.	HS307
Revision No.	0
Date of Revision	04/25/02
Last Review Date	04/25/02
Page	5 of 16

Utility companies or a utility location service shall be contacted within the established pre-notification time, advised of the proposed work, and asked to delineate the location of all underground utilities. Employees should be careful to protect and preserve the utility markings until they are no longer required for safe excavation. At least 3 feet of clearance between any underground utility and the cutting edge or point of powered excavation equipment will be maintained until the precise location of the utility is determined. Initial excavation within this 3 foot area will be conducted manually.

5.1.2 Surface Encumbrances. All surface encumbrances (trees, poles, boulders, etc.) that may create a hazard to employees shall be removed or supported.

5.1.3 Vehicular Traffic. Employees exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Traffic control devices (i.e., barricades, signs, cones, flagpersons, etc.) shall be specified and used in accordance with regulations applicable to the roadway or area in which excavation activities are occurring.

5.1.4 Training. Those who supervise the entry of personnel into an excavation must have completed a training course that included instruction in:

- Types of hazards associated with excavation operations;
- Safe work practices and techniques;
- A review of applicable Federal, state and local regulations; and
- A review of this procedure.

Employees who enter excavations are required to complete a site-specific training session to enable them to recognize unsafe conditions in and around the excavation. This training can be conducted during a tailgate safety meeting that emphasizes the specific excavation hazards that may be encountered.

Training documentation shall be maintained in the project file with a copy forwarded to the Knoxville Training Department.

As part of standard employee supervision process, training shall be complemented with on-the-job instruction and reinforcement of accepted practices to the extent necessary to assure compliance with this procedure and all other applicable regulations.



5.2 Excavation Work Practices

5.2.1 General. Each employee working within an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926 Subpart P, except when the excavation is made entirely in stable rock or when the excavation is less than 5 feet deep and examination of the ground by a competent person provides no indication of a potential cave-in. A competent person shall ensure that protective systems, when required, are installed and maintained per the design specifications.

No employees shall be permitted to enter an excavation unless it is absolutely essential to do so and all requirements of this procedure are met.

5.2.2 Supervision. Work in an excavation shall at all times be supervised by a competent person. This individual will remain outside of the excavation at all times, and will be responsible for identifying any unusual developments above ground which may warn of impending earth movement.

5.2.3 Soil Classification. Based on the results of tests described in Attachment 3, the competent person will classify each soil/rock deposit as stable rock, Type A, Type B, or Type C. When layers of soil/rock exist, the weakest layer will be classified; however, each layer may be classified individually when a more stable layer lies under a less stable layer. If the properties or conditions of a soil/rock deposit change in any way, re-evaluation will be required.

5.2.4 Access and Egress. Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 or more feet in depth so as to require no more than 25 feet of lateral travel for employees.

5.2.5 Protective Systems. Protective systems shall be designed in accordance with 29 CFR 1926.652(b) or (c) and shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

5.2.6 Exposure to Falling Loads. No employees shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials. Operators may remain in the cabs of vehicles being



Procedure No.	HS307
Revision No.	0
Date of Revision	04/25/02
Last Review Date	04/25/02
Page	7 of 16

loaded or unloaded provided the vehicles are equipped with a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

5.2.7 Warning System for Mobil Equipment. When mobile equipment is operated adjacent to an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

5.2.8 Hazardous Atmospheres. Where an oxygen deficient (less than 19.5% O₂) or hazardous atmosphere exists, or could reasonably be expected to exist, the excavation shall be tested before employees enter. Testing shall be conducted as often as necessary to ensure that the atmosphere remains safe. Some excavations may be considered confined spaces which require compliance with Shaw E & I Procedure HS300.

Adequate precautions shall be taken to prevent employee exposure to oxygen deficient or hazardous atmospheres. As appropriate, ventilation and/or respiratory protective devices shall be used.

5.2.9 Water Accumulation Hazards. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. If water is controlled or prevented from accumulating by the use of water removal equipment, the process shall be monitored by a competent person to ensure proper operation.

If the excavation work interrupts the natural drainage of surface water (streams, run-off channels), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to run-off from heavy rains shall be regularly inspected by a competent person.

5.2.10 Stability of Adjacent Structures. Structures adjoining an excavation shall be evaluated to assess their stability. Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall only be permitted when:

- A support system (underpinning) is provided to ensure the safety of employees and the stability of the structure;
- The excavation is in stable rock;
- A registered professional engineer has determined that the structure will be unaffected by the excavation; or
- A registered professional engineer has determined that such excavation will not pose a hazard to employees.



Procedure No.	HS307
Revision No.	0
Date of Revision	04/25/02
Last Review Date	04/25/02
Page	8 of 16

Sidewalks, pavements and other surface structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

5.2.11 Protection from Loose Rock or Soil. Employees shall be protected from loose rock or soil which could fall or roll from the excavation face or edge. Such protection could consist of scaling to remove loose materials, or the installation of protective barriers. All spoil shall be placed at least 2 feet from the edge of the excavation. It is strongly recommended that spoil be placed 4 or more feet from the excavation edge so as not to cover surface indicators of subsidence (such as fissures or cracks).

5.2.12 Inspections. The competent person shall make daily inspections of excavations, adjacent areas, and protective systems for evidence of conditions that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The inspection shall be made prior to start of work, and as needed throughout the shift. Inspections shall be made after each rainstorm or other hazard-increasing event and will be documented using Attachment (2).

Where the inspection finds evidence of any hazardous condition, exposed employees shall be immediately removed from the hazardous area until necessary precautions have been taken.

5.2.13 Fall Protection. Where employees or equipment are permitted to cross over excavations, walkways or bridges shall be provided. Standard guardrails shall be provided where walkways are 6 feet or more above lower levels.

Adequate barriers or other types of physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered and shall be backfilled as soon as possible.

6.0 EXCEPTION PROVISIONS

Variations and exceptions may be requested pursuant to the provisions of procedure HS013, Health and Safety Procedure Variations.



Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS307
0
04/25/02
04/25/02
9 of 16

7.0 CROSS REFERENCES

HS013 Health and Safety Procedure Variances
HS050 Training Requirements
HS051 Tailgate Safety Meetings
HS300 Confined Spaces
29 CFR 1926 Subpart P - Excavations

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Excavation Inspection
3. Soil Classification Worksheet
4. Selection of Protective Systems for Excavations 20 Feet or Less in Depth
5. Sloping Options
6. Shoring or Shielding Options



Procedure No.
 Revision No.
 Date of Revision
 Last Review Date
 Page

HS307
 0
 04/25/02
 04/25/02
 10 of 16

ATTACHMENT 1
EXCAVATION AND TRENCHING

Responsibility Matrix

Action	Procedure Section	Responsible Party					
		Employee	Supervisor	Registered Professional Engineer	VP Health and Safety	Local H&S Representative	Competent Person
Incorporate state, local, or client-specific excavation requirements into project plans.	1.0					X	
Issue, revise, and maintain procedure	3.1				X		
Coordinate identification of underground utilities.	5.1.1		X				
Determine need for traffic control devices.	5.1.3		X				
Participate in excavation training.	5.1.4	X	X			X	X
Ensure that protective systems are installed and maintained.	5.2.1						X
Classify Soil Type	5.2.3						X
Design Structural Ramps	5.2.4						X
Selection and design of protective system(s)	5.2.5			X			
Determine stability of adjacent structures.	5.2.10			X			
Inspecting excavation for hazardous conditions	5.2.12	X	X				X



Procedure No.
 Revision No.
 Date of Revision
 Last Review Date
 Page

HS307
 0
 04/25/02
 04/25/02
 11 of 16

ATTACHMENT 2
EXCAVATION INSPECTION

**THIS INSPECTION IS TO BE COMPLETED BY THE COMPETENT PERSON
 EACH DAY THAT EMPLOYEES WILL BE ENTERING AN EXCAVATION.**

Project Name: _____ Project No.: _____

Date: _____ Time: _____ Competent Person: _____

Soil Classification (see Soil Classification Worksheet): _____

Excavation Depth: _____ Excavation Width: _____

Type of Protective System Used: _____

	<input checked="" type="checkbox"/>		
	YES	NO	N/A
1 GENERAL			
Surface encumbrances removed or supported			
Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the			
Hard hats, steel-toed boots, and safety glasses worn by all employees.			
Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation.			
Walkways over excavations 6 feet or more above lower levels are equipped with standard guardrails.			
Warning vest or other highly visible clothing provided and worn by all employees exposed to public			
Employees required to stand away from vehicles being loaded or unloaded.			
Warning system established and utilized when mobile equipment is operating near excavation edge.			
Employees prohibited from going under suspended loads.			
2 UTILITIES			
Utility companies contacted and/or utility locations delineated.			
Underground installations protected, supported, or removed while excavation is open.			
3. MEANS OF ACCESS AND EGRESS:			
Lateral travel to means of egress no greater than 25 feet in trench excavations 4 feet or more in depth.			
Ladders used in excavations secured and extended 3 feet above the edge of the trench.			
Structural ramps used by employees designed by a competent person.			
Structural ramps used for equipment designed by a registered professional engineer.			
4. WET CONDITIONS:			
Precautions taken to protect from the accumulation of water.			



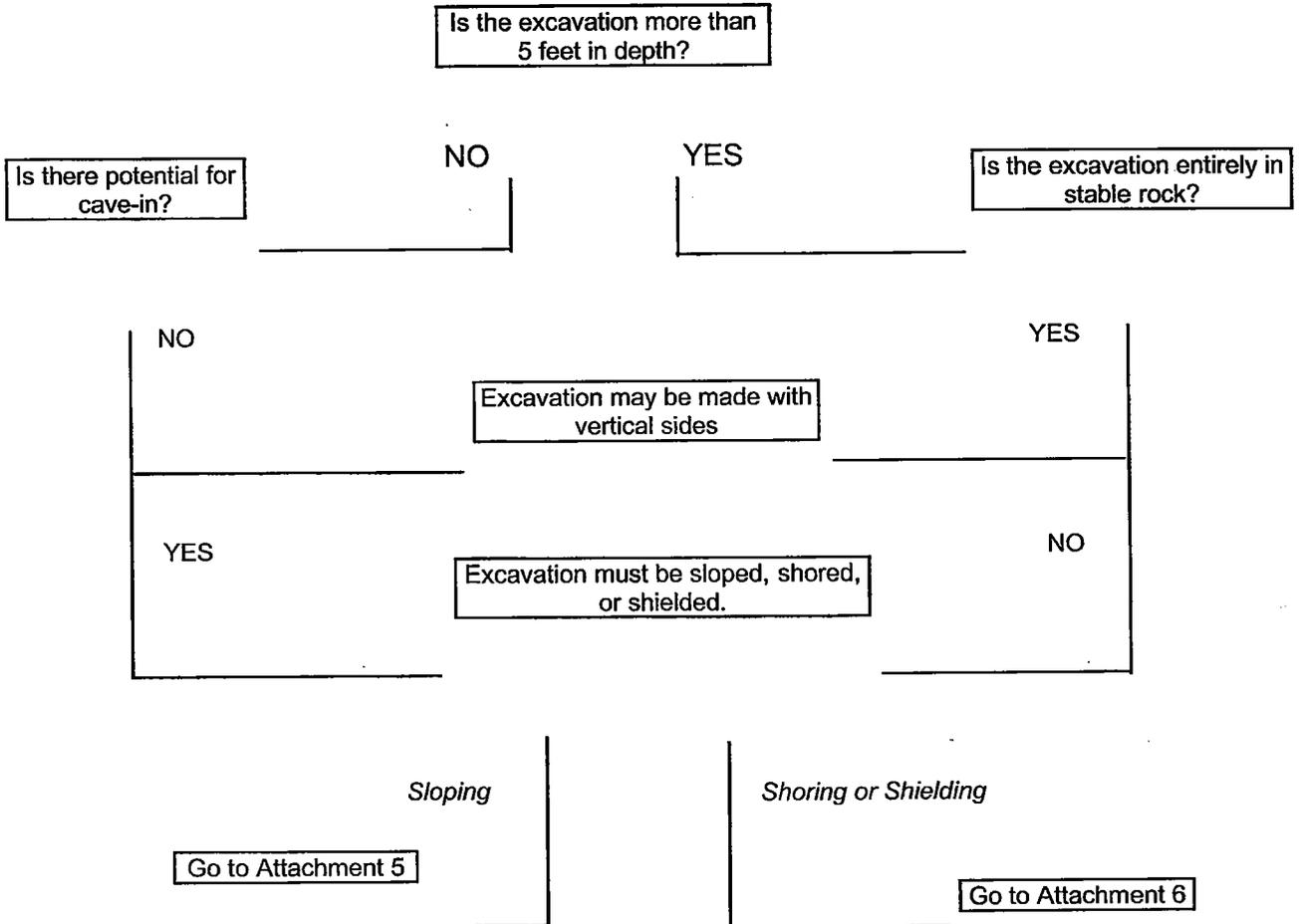
Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS307
0
04/25/02
04/25/02
12 of 16

Water removal equipment monitored by a competent person.			
Surface water or runoff diverted or controlled to prevent accumulation in the excavation.			
Inspections made after every rainstorm or other hazard-increasing occurrence.			
5. HAZARDOUS ATMOSPHERE:			
Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficient, combustible, or otherwise hazardous atmosphere.			
Adequate precautions taken to protect employee from exposure to a hazardous atmosphere.			
Testing conducted to ensure that the atmosphere remains safe.			
Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmosphere does exist.			
6. SUPPORT SYSTEMS:			
Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads.			
Materials and equipment used for protective systems inspected and in good condition.			
Damaged materials and equipment used for protective systems inspected by a Registered Professional Engineer after repairs and before being placed back into service.			
Protective systems installed without exposing employees to the hazards of cave-ins, collapses, or from being struck by materials or equipment.			
Members of support systems securely fastened to prevent failure.			
Support systems provided to insure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.			
Excavations below the level of the base or footings approved by a registered professional engineer.			
Removal of support systems progresses from the bottom, and members are released slowly as to note any indication of possible failure.			
Excavation of material to a level of greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.			
Shield system placed to prevent lateral movement.			
Employees are prohibited from remaining in shield system during vertical movement.			
7. REMARKS:			
<hr/> <hr/> <hr/>			



SELECTION OF PROTECTIVE SYSTEMS FOR EXCAVATIONS 20 FEET OR LESS IN DEPTH

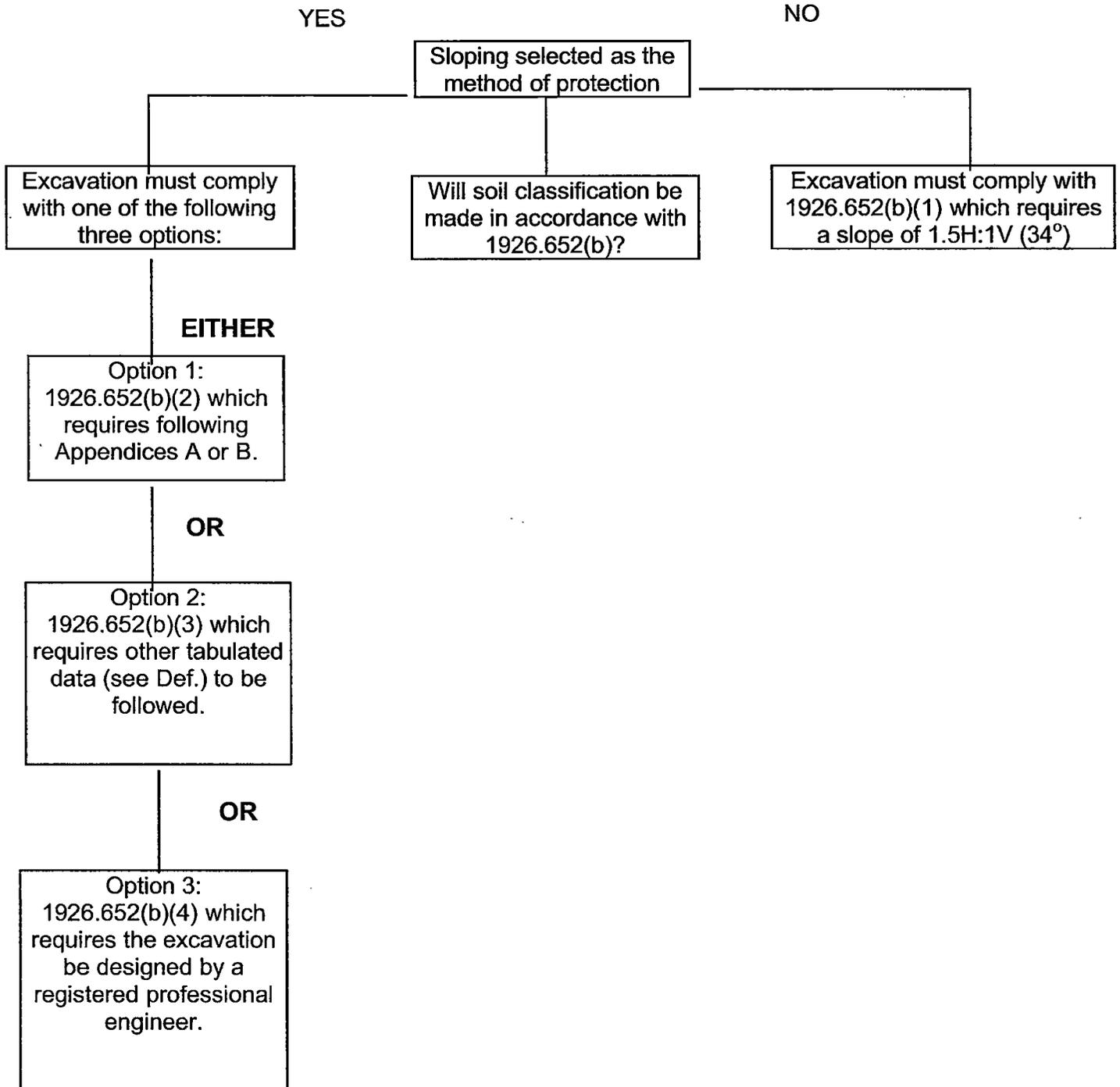


For excavations greater than 20 feet in depth, design by a registered professional engineer in compliance with 1926.652 (b) and (c) is required.



ATTACHMENT 5 OPTIONS

SLOPING





**ATTACHMENT 6
SHORING OR SHIELDING OPTIONS**

Shoring or shielding selected as the method of protection.

Soil Classification is required. The excavation must comply with one of the four options below.

EITHER

Option 1:
1926.652(c)(1) which requires Appendices A and C to be followed (Timber Shoring).

OR

Option 2:
1926.652(c)(2) which requires manufacturer's data to be followed (trench jacks, etc.).

OR

Option 3:
1926.652(c)(3) which requires tabulated data (see Def.) to be followed.

OR

Option 4:
1926.652(c)(4) which requires the excavation be designed by a registered professional engineer.

ATTACHMENT 3

IT PROCEDURE HS314, HOT WORK IN HAZARDOUS LOCATIONS



PROCEDURE

Subject: HOT WORK

1.0 PURPOSE AND SUMMARY

The purpose of this procedure is to establish guidelines for company hot work activities. The type of hot work activities covered by this procedure include all spark- or flame-producing operations capable of initiating a fire or explosion. These activities may include welding, braising, cutting, grinding, etc.

Some clients may have requirements that differ from those contained in this procedure. In such circumstances, the more protective requirements will be followed.

2.0 TABLE OF CONTENTS

- 1.0 Purpose and Summary
- 2.0 Table of Contents
- 3.0 Responsibility Matrix
 - 3.1 Procedure Responsibility
 - 3.2 Action/Approval Responsibilities
- 4.0 Definitions
- 5.0 Text
 - 5.1 Supervisor Responsibilities
 - 5.2 Fire Prevention Precautions
 - 5.3 Preparation for Hot Work
 - 5.4 Hot Work Permit
- 6.0 Exception Provisions
- 7.0 Cross References
- 8.0 Attachments

3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The Vice President, Health and Safety is responsible for the issuance, revision, and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.



4.0 DEFINITIONS

Company - All wholly-owned subsidiaries of Shaw Environmental & Infrastructure, Inc. (Shaw E & I).

5.0 TEXT

5.1 Supervisor Responsibilities

Based on fire/explosion potentials, project/location supervisors are to establish approved areas for welding, cutting, and other types of hot work. The supervisor will be aware of the hazards involved and familiar with the provisions of this procedure, and may delegate his/her responsibilities to a qualified employee.

The supervisor will ensure that cutters or welders are properly trained in the safe operation of their equipment, the safe use of the process, the requirements of this procedure, and emergency procedures. Only approved apparatus, such as torches, manifolds, regulators or pressure-reducing valves, and acetylene generators will be used by company employees and contractor personnel.

Only those contractors who have suitably qualified personnel to perform welding, cutting, and other types of hot work will be utilized. These contractors will be advised about specified hot work areas and hazardous locations where special procedures for hot work are necessary.

5.2 Fire Prevention Precautions

Hot work will only be permitted in areas that are or have been made firesafe. This can be achieved by using a specific area designed or approved for such work, such as a maintenance shop or a detached outside location which will be of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. When work cannot be relocated, the area will be made firesafe by removing combustibles or protecting combustibles from ignition sources.

Hot work will NOT be permitted in the following situations unless specific approval is given by a health and safety representative:

- In the presence of a potentially explosive atmosphere (mixtures of flammable gases, vapors, liquids, or dusts with air), or inside drums, tanks, or other containers, and equipment in which an explosive atmosphere may develop.
- In any area where combustible gases are in excess of ten percent (10%) of the lower explosive limit (LEL).
- On storage or process vessels or lines which contain or have contained flammable or combustible liquids, gases, vapors, or solids.



5.3 Preparation for Hot Work

Before hot work is permitted, the area will be inspected by a supervisor to ensure that the following requirements have been met:

- Equipment will be in safe operating condition and in good repair.
- Where practical, all combustible material will be relocated at least 35 feet horizontally from the area of work. Where relocation is impractical, combustibles will be protected with flame-proofed covers or otherwise shielded.
- Openings or cracks in walls, floors, or ducts within 35 feet of the area of hot work will be tightly covered to prevent the passage of sparks to adjacent areas.
- Where cutting or welding is to be done near walls, partitions, ceiling, or roof of combustible construction, fire-resistant shields or guards will be provided to prevent ignition. If welding is to be done on a metal wall, partition, ceiling, or roof, precautions will be taken to prevent ignition of combustibles on the other side, due to conduction or radiation.
- Fully charged and operable fire extinguishers, appropriate for the type of possible fire, will be available at the work area. Where fire hose lines are available, they will be connected and ready for use.
- Fire watchers will be required whenever hot work is performed in hazardous locations or when specified by the supervisor.
- Combustible gas readings will be taken in areas where combustible gases and vapors may exist.
- The work area is free of toxic contaminants at concentrations in excess of established threshold limit values, or all personnel who will work in the area have been provided respiratory protective devices and protective apparel appropriate for the degree of exposure.
- Prior to performing hot work on painted surfaces, a lead-based paint survey will be conducted.
- If hot work requires entry into a confined space, all provisions of Procedure HS300, Confined Spaces, will be met.
- When hot work is to be performed on tanks or other vessels that contain or have contained flammable or combustible liquids, the vessel will be properly isolated, purged, or inerted, as appropriate, to reduce the concentrations of flammable and toxic air contaminants to safe levels.



Procedure No.	HS314
Revision No.	0
Date of Revision	04/25/02
Last Review Date	04/25/02
Page	4 of 6

- When hot work is to be performed on the bottoms of tanks or other vessels that are not supported above grade, special procedures will be followed due to the possible entrapment of flammable liquids or vapors beneath the tank. For vessels that have at one time contained flammable materials, refer to "Preparing Tank Bottoms for Hot Work," Petroleum Safety Data 2207, American Petroleum Institute. Work will be performed on stationary tank bottoms only when personnel have become familiar with this reference and are prepared to follow the outlined procedures.

5.4 Hot Work Permit

When the supervisor is satisfied that all the requirements in the preceding section have been met, the Hot Work Permit (Attachment 2) will be completed, reviewed with employees who will perform the hot work, and maintained near the work area. The Hot Work Permit is good only for the date issued, and is valid only for the shift for which it is issued.

If at any time during the hot work operation a change in conditions at the work area is suspected, such as release of flammable gases or vapors, work will be stopped immediately and the supervisor will be notified. Such work stoppage invalidates the Hot Work Permit, and a new permit will be completed after inspections and tests have been performed by a supervisor.

6.0 EXCEPTION PROVISIONS

Variations and exceptions may be requested pursuant to the provisions of Procedure HS013, Health and Safety Procedure Variations.

7.0 CROSS REFERENCES

HS013 Health and Safety Procedure Variations
HS300 Confined Spaces

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Hot Work Permit



Procedure No.
 Revision No.
 Date of Revision
 Last Review Date
 Page

HS314
 0
 04/25/02
 04/25/02
 5 of 6

**ATTACHMENT 1
 HOT WORK**

Responsibility Matrix

Action	Procedure Section	Responsible Party		
		Project/Location Supervisor	Health and Safety Representative	Vice President Health and Safety
Issuance, Revision, and Maintenance of Procedure	3.1			X
Establish Approved Areas for Hot Work	5.1	X		
Ensure Employees Conducting Hot Work are Qualified	5.1	X		
Approve Hot Work in Hazardous Locations	5.2		X	
Inspect Hot Work Areas	5.3	X		
Complete Hot Work Permit	5.4	X		

ATTACHMENT 4

IT PROCEDURE HS309, UNDERGROUND STORAGE TANK REMOVAL



PROCEDURE

Subject: UNDERGROUND STORAGE TANK REMOVAL

1.0 PURPOSE AND SUMMARY

This procedure prescribes the training practices and recommended work practices for underground storage tank removal. The use of work practices required by local regulations is authorized (no variance required). The project-specific Health and Safety Plan or Work Plan shall document the practices to be used at a particular site.

2.0 TABLE OF CONTENTS

- 1.0 Purpose and Summary
- 2.0 Table of Contents
- 3.0 Responsibility Matrix
 - 3.1 Procedure Responsibility
 - 3.2 Action/Approval Responsibilities
- 4.0 Definitions
- 5.0 Text
- 6.0 Exception Provisions
- 7.0 Cross References
- 8.0 Attachments

3.0 RESPONSIBILITY MATRIX

3.1 Procedure Responsibility

The National Director, Health & Safety is responsible for the issuance, revision, and maintenance of this procedure.

3.2 Action/Approval Responsibilities

The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

Cold Cutting

Methods of material cutting that utilize a nonelectric or nonflammable gas system, such as pneumatic chisels or drills, or a high pressure water device.



Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS309
0
04/25/02
04/25/02
2 of 10

Confined Space

Normally considered to be enclosures having limited means for entry and exit, by reason of location, size, or number of openings; and unfavorable natural ventilation which could contain or produce dangerous air contaminants, flammable or explosive atmospheres, and/or oxygen deficiency. Confined spaces may include storage tanks, excavations, or trenches.

Competent Person - Excavation and Trenching

A person, such as a supervisor or engineer, who is capable of identifying existing and predictable hazards in the excavation/trenching work area and who has the authority to take prompt corrective measures to eliminate them.

Excavation

Any manmade cavity or depression in the earth's surface, including its sides, walls or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Hot Work

Any work involving burning, welding, riveting, or similar fire-producing operations, as well as work which produces a source of ignition, such as drilling, grinding, abrasive blasting, etc.

Ignition Sources

A heat source of sufficient energy to cause ignition of flammable vapors. The most commonly encountered categories of ignition sources in industry are open flames, hot surfaces, and electrical or frictional sparks.

Lead Hazard

The potential for exposure to organic (tetraethyl) lead in tanks which have been used for leaded petroleum products. Since these tanks will contain residual lead of varying concentrations, they must be regarded as dangerous to that extent the respiratory protective equipment and protective clothing must be used throughout the cleaning process. These tanks must not be considered lead-free unless indicated by lead-in-air analysis.

LEL (Lower Explosive Limit)

The minimum concentration of a combustible gas or vapor in air (usually expressed in percent by volume at sea level), which will ignite if an ignition source is present.

Oxygen Deficiency

For the purpose of this procedure, any atmosphere containing less than 20% oxygen shall be considered oxygen deficient and immediately dangerous to life and health.

Purging

The method by which gases, vapors, or other airborne impurities are displaced from a confined space. This may involve such measures as mechanical ventilation, steam ventilation, or introducing another gas, such as nitrogen or carbon dioxide, to control flammable vapors.



Qualified Person

■ **Qualified Person - Confined Space**

A person, such as a supervisor or engineer, who by reason of experience or instruction, has successfully demonstrated his ability to anticipate, recognize, and evaluate hazards to employees that may occur during underground storage tank closure projects. Training in the evaluation of employee exposure to toxic substances, confined space entry procedures, and in the use of atmospheric testing instruments is required. These training requirements can be satisfied through the successful completion of Shaw E & I's Excavation Safety, and the Hazards and Protection/Confined Space training courses.

■ **Qualified Person - Excavation and Trenching**

A person, such as an engineer, who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated his/her ability to design shoring, sloping/benching, or alternate systems that meet accepted regulatory and engineering requirements.

Trench

An excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

Underground Storage Tank

By regulatory definition, a tank with 10% or more of its volume below ground. Included in the volume is all piping attached to the tanks.

5.0 TEXT

Underground storage tank removal is considered a hazardous waste operation and is subject to the applicable training requirements listed in Shaw E & I Procedure HS050 Training Requirements.

This type of work is subject to significant local regulatory control, often with significant differences between jurisdictions. This procedure presents recommended practices, but authorizes use of locally required practices.

5.1 Preliminary Requirements

State or local agencies mandated to regulate the RCRA Underground Storage Tank Program shall be notified, and applicable permits obtained by the Shaw E & I Project Manager or the client.

Tank closure projects that involve trenching or excavation 5 feet or deeper and into which a person may be required to descend are subject to Shaw E & I Procedure HS307.

The project manager shall perform a site reconnaissance and confirm locations of underground storage tanks and all associated piping with the client.



Assure and record in writing that all existing utilities or other underground facilities in the work area are located before commencing excavation. Complete the Underground/Overhead Utility Checklist (Attachment 2).

Trees, boulders, poles and other surface encumbrances located at the work site shall be made safe or removed prior to initiation of the tank closure project.

Assure that construction equipment (not in transit) and personnel do not come closer than authorized to any energized overhead high voltage conductor such as electric utility lines.

5.2 Operating Requirements - Hazard Assessment

At the beginning of the project, each work shift, and as often as necessary to ensure safety, a competent person shall conduct an area survey to locate work place hazards and determine appropriate safety control measures.

Only experienced, demonstrably proficient equipment operators will be used to operate such heavy equipment as backhoes, front-end loaders, cranes, etc. Where certification or licensing requirements exist, such personnel shall possess appropriate certification and/or licensing for operating specified heavy equipment.

While operating heavy equipment in the work area, the equipment operator shall maintain communication with a designated signalman through either direct voice contact or approved, standard hand signals. In addition, all site personnel in the immediate work area shall be made aware of the equipment operations.

All equipment, such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Equipment shall be stored so as not to endanger personnel at any time.

A flagman with roadwork vest, signs, cones, and high-level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles, such as end-dumps, entering or leaving the site.

5.3 Fire Safety

Hot work shall not be conducted unless all requirements of Shaw E & I Procedure HS314 Hot Work in Hazardous Locations have been met.

Cold cutting of underground storage tanks to facilitate cleaning shall only be performed under direct supervision of a qualified person.

Equipment on-site shall be bonded and grounded, spark-proof, and explosion resistant, as appropriate. Particular attention to bonding/grounding shall be made during transfer of flammable/combustible liquids into vacuum trucks and when ventilation equipment is utilized.



A fire extinguisher with a minimum rating of 10B:C shall be strategically located in the area of active work.

No smoking shall be allowed in the work area.

5.4 **Underground Storage Tank Decontamination**

Underground storage tanks that have been removed, but not cleaned, are considered hazardous waste. These tanks must be transported in accordance with Department of Transportation hazardous material packaging and shipping requirements, including manifesting, and taken to a permitted hazardous waste disposal site.

Minimum decontamination procedures that shall be performed to allow transportation of removed tanks under a bill of lading, disposal at a non-hazardous waste facility, or tank demolition for scrap include:

- Removal of all residual liquid material, followed by triple rinsing with an appropriate cleaning solution to remove remaining sludge and/or scale from the interior surfaces of the tank.
- Routine tank testing to determine the effectiveness of the cleansing, flushing and rinsing procedure. Residual liquid in tanks shall not be less than a pH of 3, nor greater than 11. Tanks that have contained flammable or combustible liquids shall be checked with a combustible gas indicator. Readings above 0% LEL shall require additional tank cleansing.
- A physical examination of the tank interior to confirm that the rinsing process has removed all residual material. When triple rinsing is not sufficient to remove all sludge or scale, tanks shall be entered per Shaw Environmental & Infrastructure, Inc. (Shaw E & I) Procedure HS300 Confined Spaces so that personnel can physically scrape or effectively pressure-wash interior surfaces.
- The proper handling and disposal of all rinsate or residual material which is considered to be hazardous waste, unless an analysis of the material's hazardous constituents does not warrant this action.
- An inspection and certification of cleanliness, by a certified chemist in those cities and counties requiring such credentials, for each tank that has been scraped or pressure washed, and then rinsed.
- An awareness that tank cleaning may not remove all flammable substances in the tank, such as those that have absorbed to or penetrated walls of a container, or those that are retained in seams located at the junction of walls and ends of tanks. Low readings on a combustible gas indicator do not assure that explosive conditions will not occur later under conditions that promote vaporization of such residues.



Procedure No.	HS309
Revision No.	0
Date of Revision	04/25/02
Last Review Date	04/25/02
Page	6 of 10

- The purging of flammable vapors within the tank, prior to transportation from a site, to levels that preclude potential explosive atmospheres, or such lower levels as may be required by the local agency. A standard method of tank purging, once all liquids have been removed, is placement of one and one-half (1½) pounds of dry ice (carbon dioxide) per one hundred (100) gallons of tank liquid capacity while simultaneously sealing all tank openings except the vent(s). Nitrogen gas or other methods listed in API1604 Removal and Disposal of Used Underground Petroleum Storage Tanks may also be used to purge tanks.
- The proper disposal at a land-based facility, or demolition for reuse as scrap, of decontaminated storage tanks. Documentation shall be provided to the appropriate local regulatory agency.

5.5 Underground Storage Tank Removal

After the tank has been freed of vapors and before it is removed from the excavation, plug or cap all accessible holes. One plug should have an 1/8 inch vent hole to prevent the tank from being subjected to excessive differential pressure caused by temperature changes. The tank should always be positioned with this vent plug on top of the tank during subsequent transport and storage.

Excavate around the tank to uncover it for removal. Remove the tank from the excavation and place it on a level surface. Use wood blocks to prevent movement of the tank after removal and prior to loading on a truck for transportation. Use screwed (boiler) plugs to plug any corrosion holes in the tank shell.

Tanks should be removed from the site as promptly as possible after vapor-freeing procedures have been completed, preferably on the day of tank removal from the excavation. If a tank remains at the site overnight or longer, additional vapor may be released from any liquid absorbed in the tank walls or residues remaining in the tank.

Before the tank is removed from the site, the tank atmosphere should be checked with a combustible gas indicator to ensure that it does not exceed 10% of the lower flammable limit.

The tank should be secured on a truck for transportation to the storage or disposal site with the 1/8 inch vent hole located at the uppermost point on the tank. Tanks should be transported in accordance with all applicable local, state, and federal regulations.



5.6 Air Monitoring

Should chemical contaminants be present in an underground storage tank or surrounding soil, air monitoring for combustible or oxygen deficient environments, or specific toxic constituents, shall be conducted by a qualified person (see Shaw E & I Procedure HS300 Confined Spaces). Operations associated with underground storage tank closure that may require air monitoring includes:

- Excavation of soil
- Hot work or cold cutting
- Storage tank cleaning and purging
- Confined space entry
- Tank certification prior to removal from site

Additional tests shall be selected and performed to the satisfaction of the qualified person based on the recommendations of the regional Health & Safety professional. All tests shall be repeated as often as necessary to assure safety since changing conditions may result in varying atmospheric contaminant concentrations.

All work activity is prohibited in atmospheres where tests indicate that the concentration of flammable vapors is greater than 10% of the lower explosive limit (LEL), or the concentration of oxygen is less than 20% or greater than 23.5%. Positive steps, such as ventilation, shall be taken to establish acceptable atmospheric conditions prior to resumption of operations.

Tests indicating the presence of toxic contaminants in concentrations at or above the permissible explosive guidelines in the HASP mandate that work in such an atmosphere proceed only when personal protective equipment appropriate for the specific contaminants is provided to all affected associates, based on recommendations of the regional Health & Safety professional.

5.7 General Site Safety Requirements

Hearing protection shall be utilized when noise levels in the work area exceed 85 dBA, or when indicated by the Health & Safety Department.

Good housekeeping practices shall be implemented on site.

Work practices and personal protective equipment shall be used as required in the site-specific HASP.

5.8 Local Jurisdiction Requirements

Where local jurisdictions have established requirements different from those in this procedure, the more protective practices shall be utilized. No variance is required under these circumstances but the project-specific Health and Safety Plan or work plan shall fully document the alternate procedures.



Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS309
0
04/25/02
04/25/02
8 of 10

6.0 EXCEPTION PROVISIONS

Exceptions shall be per the requirements of Shaw E & I Procedure HS013.

7.0 CROSS REFERENCES

API1604 Removal and Disposal of Used Underground Petroleum Tanks
HS050 Training Requirements
HS300 Confined Space Entry
HS307 Excavation and Trenching

8.0 ATTACHMENTS

1. Responsibility Matrix
2. Underground/Overhead Utility Checklist



ATTACHMENT 1
UNDERGROUND STORAGE TANK REMOVAL

Responsibility Matrix

Action	Procedure Section	Responsible Party			
		Equipment Operator	Project Manager	Qualified Person	HS
Project-specific HASP or Work Plan shall document the practices to be used at a particular site.	1.0		X		X
State or local agencies shall be notified and applicable permits obtained.	5.1		X		
Perform site reconnaissance and confirm locations of underground storage tanks and all associated piping with client.	5.1		X		
Complete the Underground/Overhead Utility Checklist.	5.1		X		
A competent person shall conduct an area survey to locate workplace hazards and determine appropriate safety control measures.	5.2			X	
Only experienced, demonstrably proficient equipment operators will be used to operate such heavy equipment as backhoes, front-end loaders, cranes, etc.	5.2	X			
The equipment operator shall maintain communication with a designated signalman through either direct voice contact or approved, standard hand signals.	5.2	X			
A flagman with roadwork vest, signs, cones, and high-level warning signs shall be provided when necessary.	5.2		X		
Fire extinguisher with a minimum rating of 10B:C shall be strategically located.	5.3		X		
Decontamination procedures shall be performed.	5.4		X		X
Air monitoring shall be conducted by a qualified person (see HS300).	5.6			X	



Procedure No.
Revision No.
Date of Revision
Last Review Date
Page

HS309
 0
 04/25/02
 04/25/02
 10 of 10

ATTACHMENT 2
UNDERGROUND/OVERHEAD UTILITY CHECKLIST

Project Name/Number _____ Date _____

Location _____

This checklist must be completed for any intrusive subsurface work such as excavating or drilling. It records the fact that all underground and overhead structures and utilities in the work area are identified and located. The Project Manager must request utility markouts before the start of field operations to allow the client and utility companies time to complete them. If complete information is not available, a magnetometer survey must be performed to locate obstacles prior to excavating or drilling.

PROCEDURE:

A diagram of the project area depicting the proposed location of excavation or drilling sites must be attached to this Health and Safety Plan. The diagram must clearly indicate the areas checked for underground structures/utilities and overhead power lines. This form and the diagram must be signed by the Project Manager, the Shaw E & I Field Supervisor, and the client representative (if applicable).

CHECKLIST:

TYPE OF STRUCTURE	PRESENT	NOT PRESENT	METHOD OF MARKOUT
Electric Power Line			
Natural Gas Line			
Telephone Line			
Water Line			
Product Line			
Steam Line			
Sewer Line			
Drain Line			
Underground Tank			
Overhead Power Line			
Overhead Product Line			
Septic Tank/Drain			

Client Representative _____ (Date) _____
(If applicable) (Signature)

Shaw E & I Project Manager _____ (Date) _____
(Signature)

Shaw E & I Field Supervisor _____ (Date) _____
(Signature)