

1D-00636

**FINAL INTERIM MEASURES WORK PLAN
RCRA FACILITY INVESTIGATION
NAVAL AIR STATION MEMPHIS**

**SWMU 19
REMOVAL OF UNDERGROUND WASTE TANK 1648**

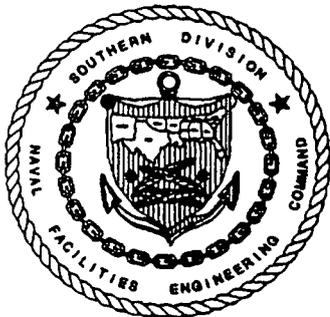
Revision: 01

**CTO-106
Contract No. N62467-89-D-0318**



Prepared for:

**Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina**



Prepared by:

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May 9, 1995

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1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long Term Environmental Action Navy (CLEAN) program, the following Resource Conservation and Recovery Act (RCRA) Interim Measures Work Plan has been prepared for the removal of Underground Waste Tank (UST) 1648 (SWMU 19) at NAS Memphis, Millington, Tennessee. Another waste UST, Tank 341D, has been identified as part of SWMU 19. However, this UST has been closed in place and will be investigated for any possible contamination under a separate investigation. The primary references for this Work Plan are the *Comprehensive RCRA Facility Investigation Work Plan, Naval Air Station Memphis, Millington, Tennessee* (RFI Work Plan, E/A&H, 1994) and the *RCRA Facility Assessment, NAS Memphis, Millington, Tennessee* (Appendix A). A time line for this project is included as Appendix B.

2.0 ENVIRONMENTAL SETTING

Figure 1 presents a site location map for SWMU 19, which is approximately 150 feet north of Navy Road on the north side of NAS Memphis. SWMU 19 is bounded to the north by SWMU 49 and a wooded area and to the south by Navy Road and Building 341 of the Navy Exchange Service Station. SWMU 19 is bordered to the east by Building 757 of the Navy Exchange Service Station and to the northwest by the Aircraft Fire Fighting Training Facility (SWMU 5).

2.1 Topography and Drainage

SWMU 19 and surrounding area are characterized by relatively level, low-relief topography. The immediate area is asphalted and descends slightly to the west and northwest toward two storm drains and a wooded area to the north (Figure 2). Both storm drains discharge into a ditch that drains SWMU 5. This ditch leads into a tributary of North Fork Creek.

2.2 Hydrogeologic Information

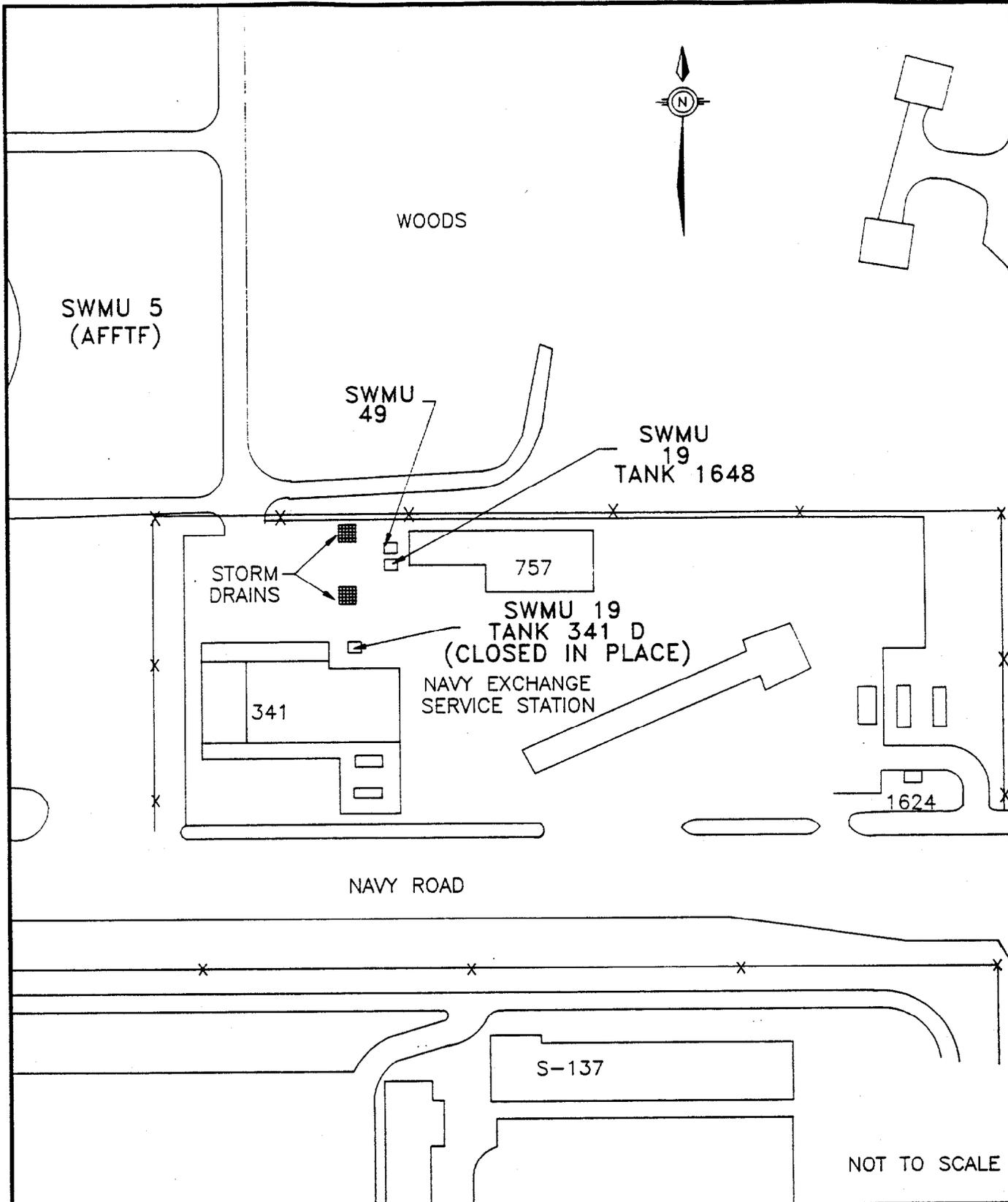
The regional and local hydrogeology are described in Sections 2.11 and 2.12 of the RFI Work Plan.

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 NAS MEMPHIS
 MILLINGTON, TENNESSEE

FIGURE 2
 SITE MAP
 UST 1648
 SWMU 19

DWG DATE: 04/10/95 DWG NAME: 16IMWP19

Stratigraphy

Site-specific stratigraphic data from the RFI at SWMU 5, conducted by E/A&H and the U.S. Geological Survey (*in press*), indicates a complex shallow geology of low to very low permeability silty clays and clays overlying a silt horizon. Laboratory-measured hydraulic conductivities for the silty-clay unit were reported to be 1.4×10^{-7} cm/sec; no conductivity data are available for the underlying silt unit. Based on the 65-foot boring for Monitoring Well 5 at SWMU 5, the silty clays changed to a yellowish to pinkish gray sand at about 40 feet below the surface. This continued as sand until the Cockfield Formation was encountered, at about 65 feet below the surface. Boring logs and hydraulic conductivity data from the SWMU 5 investigation are included in Appendix C of this document.

To obtain deeper geologic information that could be related to SWMUs in the area, the USGS drilled stratigraphic Test Hole 4 to a total depth of approximately 200 feet at a location approximately 500 feet south of the main runway and about 1,500 feet north of SWMU 19. The test hole was originally to be advanced approximately 15 feet into the Cook Mountain Formation. The Cook Mountain Formation is the confining unit separating the Memphis Aquifer from the overlying Cockfield Formation and shallower units. Due to the unanticipated thinness of the Cockfield Formation, this borehole was advanced approximately 50 feet into the Memphis Sand. The test hole was visually logged by a field geologist during drilling and geophysically logged following completion. Lithologies encountered in the Monitoring Well 5 boring and the test hole were:

- Loess:** Approximately 40 feet of wind-blown silt deposits (loess). These materials were described as silt and clay.
- Fluvial Deposits:** Approximately 25 feet of fluvial deposits. These materials were described as sand and gravel.

Cockfield Formation: Approximately 30 feet of alternating sand, clay and some lignite.

Cook Mountain Formation: Characterized as a gray to blue-gray dense clay. Defined as the upper confining unit between the surficial aquifer(s) and the Memphis Aquifer. The Cook Mountain Formation was described as approximately 44 feet thick at this location.

Shallow Groundwater

Information from a previous UST investigation at SWMU 5 (E/A&H, 1992) indicates that groundwater is typically encountered at the interface between the silt-clay and silt units in the loess. Potentiometric data indicate that shallow groundwater at SWMU 5 is held under confining pressures; water levels in monitoring wells screened in the loess were observed to equilibrate several feet higher than the silty clay/silt interface where water was generally encountered during drilling. At SWMU 5, groundwater in the loess flows toward the drainage ditch (SWMU 4) that flows east-west across the north side of SWMU 5. Water in this ditch eventually drains into North Fork Creek. It is unknown if shallow groundwater at SWMU 19 flows in a similar direction.

Well measurements collected from the monitoring and production wells screened in the fluvial deposits across the north side of the base during the RFI indicate that groundwater in the fluvial deposits flows toward the southwest.

2.3 Climatological Data

Regional climatological data are provided in Section 2.8 of the RFI Work Plan.

3.0 SOURCE CHARACTERIZATION

There are no records of any previous investigations having occurred in relation to SWMU 19 or adjacent SWMU 49. Tank 1648, located at Building 757, has a capacity of 280 gallons and holds waste automotive oil and hydraulic fluid generated by automotive repair activities at Building 757 of the Navy Exchange Service Station. Tank 341 was used to collect waste oil from automobile maintenance operations at Building 341 of the Navy Exchange Service Station. Tank 341 has been closed in place by filling in with concrete, but the date of closure is not known. Both tanks were installed in 1979.

SWMU 49 is adjacent to SWMU 19 and may have impacted the area. This SWMU served as an accumulation point for used automobile batteries, waste paints, containerized waste mineral spirits, and tires. Stains were seen migrating from the surface of SWMU 49 during past inspections.

4.0 CHARACTERIZATION OF HAZARDOUS CONSTITUENT RELEASES

4.1 Previous Investigations

There are no known previous investigations related to SWMU 19. SWMU 49 is adjacent to SWMU 19, and there is also no record of any previous investigations at this SWMU. SWMU 19 is scheduled for a Confirmatory Sampling Investigation (CSI) in February 1996; followed by a CSI for SWMU 49 in August 1996.

4.2 Tank Removal

The tank will be removed by a Navy UST program contractor according to the specifications shown in Section 02082 of *UST Removals and Replacements at the NEX Service Station, NAS Memphis* (Appendix D). The specifications were prepared by the NAS Memphis Public Works Office and a private environmental consulting contractor (ETI) and are summarized below.

- Before tank removal activities begin, NAS Memphis Public Works Environmental Division personnel will sample the contents of the tank. If multiple phases (i.e., sludge, oil, water) are present, each phase will be sampled. The samples will be analyzed for VOCs, SVOCs, PCBs, TCLP benzene, TCLP metals, pH, and flash point to determine if the contents should be considered hazardous waste.
- After the tank is sampled, it will be secured and taken out of service to prevent the introduction of additional wastes.
- After test results have been received and the material(s) in the tank characterized, the tank contents will be removed by the tank removal contractor. Any material removed from the tank will be containerized in DOT-approved 55-gallon drums, properly labeled based on the characterization, and transported to Building N-1694 for storage pending disposal through the Navy's Defense Reutilization and Marketing Office (DRMO). According to the specifications in Appendix D, an estimated 50-gallons of sludge remains in Tank 1648.
- The tank will be washed out using water and detergent and rinsed to remove any dirt, sludge, or waste oil remaining in the tank (see subsection 3.16.7 of Section 02082, Appendix D). The tank will then be removed and the piping secured as described in subsections 3.21 and 3.22 of Section 02082, Appendix D. After removal, the tank will be rendered unserviceable and properly disposed of by the contractor. The tank will be rendered unserviceable and labeled according to the specifications outlined in subsection 3.22.4 of Section 02082, Appendix D. All wash water generated during this process will be containerized, sampled, and analyzed for VOCs, SVOCs, TPH (Method 418.1), PCBs, pH, and metals. The number and types of analyses performed on the wash water could be modified based on the results of the testing of the tank contents. The results of these analyses will be submitted (within 24-hours of receipt) to the NAS Memphis

Public Works Office prior to discharge of the wash water to an onsite oil/water separator.

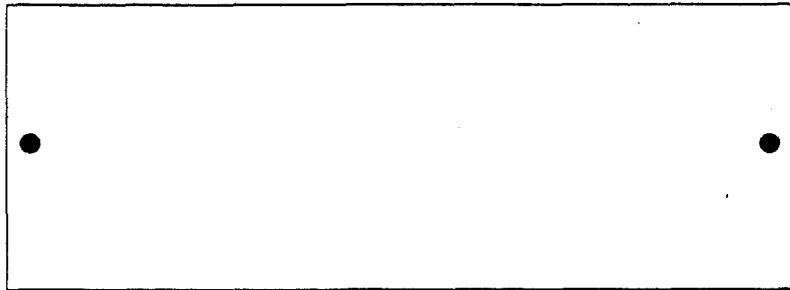
- All excavated material will be sampled using the procedures outlined in subsection 3.18.1 of Section 02082, Appendix D. A field screening sample will be collected and analyzed using an Organic Vapor Analyzer (OVA) for every 10 cubic yards of excavated material. Field screening results will be used to segregate the excavated material.
- All excavated materials will be containerized in two covered, lined roll-off boxes. One roll-off will be designated to receive any materials exhibiting organic vapor concentrations above background, while the second roll-off box will be designated for "clean" material. A composite sample will be collected from each roll-off for disposal characterization. Analyses will include an F001-F005 solvent scan, PCBs, TCLP-TPH, and a full TCLP analysis less pesticides. Samples for VOC analysis will not be homogenized.
- The Removal Contractor will provide the necessary documentation to the Tennessee Department of Environment and Conservation (TDEC) within the required 30 days. E/A&H will submit a Site Assessment Report to the Navy within 2 weeks of receipt of validated confirmation sample data.

4.3 Confirmation Sampling

Based on Tennessee Department of Environment and Conservation (TDEC) UST guidance, two confirmation soil samples will be collected by E/A&H personnel from each end of the bottom of the tank pit as shown on Figure 3. Composite samples will not be collected. Soils from the tank pit of Tank 1648 will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Appendix IX metals, and polychlorinated biphenyls (PCBs) because of the potential wastes stored in the UST and possible impacts from SWMU 49.

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TANK PIT FROM TANK 1648

LEGEND

- - SOIL SAMPLE LOCATIONS



INTERIM MEASURES
WORK PLAN
NAS MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 3
TANK PIT SOIL SAMPLE LOCATIONS
UST 1648
SWMU 19

DWG DATE: 04/07/95 | DWG NAME: 16TPSL09

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Soil samples will be collected after all fill material has been removed from the excavation. Areas of obvious contamination will be overexcavated prior to sampling. Samples will be obtained from the pit floor at a depth of 1 foot into the native soil using a backhoe bucket. To avoid sample contamination from the bucket wall, soil samples will be collected from the center of the bucket. Grab samples will be collected with a plastic scoop in accordance with the procedures described in Section 4.4.3 of the RFI Work Plan. A normal 28-day turnaround will be requested for all analytical results.

Any water encountered in the tank pit will be containerized and sampled to determine proper disposal options.

4.4 Backfilling

The tank pit will be backfilled immediately after the tank is removed. The decision to further investigate the tank pit at a later date will be made by the BRAC Cleanup Team after data review. The UST will be replaced by an aboveground storage tank.

4.5 Analytical Requirements

Estimated sampling and analytical requirements will be for two discrete confirmation samples analyzed for VOCs (Method 8240), SVOCs (Method 8270), Appendix IX metals (Method 6010/7000 Series), and PCBs (Method 8080). A normal 28-day turnaround will be requested for all analytical data. Two samples will be submitted for waste characterization. Analyses will include an F001-F005 solvent scan, PCBs, TCLP-TPH, and a full TCLP analysis less pesticides. Level IV Data Quality Objectives will be used. Field measurements at SWMU 19 will be conducted in accordance with Section 4.10.1 of the RFI Work Plan. Field measurements will include organic vapor detection for soil samples.

4.6 Sample Management

Sample management procedures will be performed in accordance with Section 4.12 and Section 5 of the RFI Work Plan.

4.7 Sample Custody

Sample custody will be maintained in accordance with Section 4.12.5 of the RFI Work Plan.

4.8 Quality Assurance/Quality Control

Quality assurance/quality control procedures to be followed during sampling activities will be in accordance with Section 4.14.2 of the RFI Work Plan.

4.9 Decontamination Procedures

Decontamination procedures will be performed in accordance with Section 4.11 of the RFI Work Plan.

4.10 Investigation Derived Waste

Investigation-derived waste will be handled in accordance with Section 4.13 of the RFI Work Plan.

5.0 POTENTIAL RECEPTORS

SWMU 19 is approximately 500 feet northeast of the nearest offsite residence, which is on Navy Road. The nearest base office personnel are the employees of the Building 757 Navy Exchange Service Station.

Surface-water drainage from SWMU 19 enters North Fork Creek via one of two storm water drains west of SWMU 19. North Fork Creek serves as a water and food source for various animals and could expose humans through infrequent uses such as wading. It is not certain which direction groundwater in the loess is flowing or what receptors it may be impacting. There are five production wells on base which are used for drinking water. The nearest production well, PW-3, is approximately 1,200 feet east of SWMU 19 and is screened in the Fort Pillow Aquifer at a depth of 1,450 feet. A more detailed analysis of potential receptors will be conducted and presented in the RFI Report if contamination is found at SWMU 19.

6.0 QUALITY ASSURANCE PLAN

The Quality Assurance Plan presented in Section 4.14 of the RFI Work Plan will be followed for sampling activities at SWMU 19.

7.0 DATA MANAGEMENT PLAN

The Data Management Plan presented in Section 5.0 of the RFI Work Plan will be followed for sampling activities at SWMU 19.

8.0 HEALTH AND SAFETY PLAN

Because E/A&H does not have responsibility for the removal of the tank, SOUTHDIV's tank removal contractor shall provide a written health and safety plan for tank removal activities for their employees. The Health and Safety Plan shall meet, at a minimum, the requirements specified in the NAS Memphis Comprehensive Health and Safety Plan (CHASP) and include all site specific information concerning types of activities, site contaminants, etc. During confirmation sampling, E/A&H personnel will comply with the CHASP (Section 7 of the RFI Work Plan), included as Appendix E.

9.0 REFERENCES

EnSafe/Allen & Hoshall (October 1994). *Comprehensive RCRA Facility Investigation Work Plan, Naval Air Station Memphis*. E/A&H: Memphis, Tennessee.

EnSafe/Allen & Hoshall (October 1992). *Environmental Assessment Report, Tank Systems 1489 and 1508, Aircraft Firefighting Training Facility, Naval Air Station Memphis, Millington, Tennessee*.

ERC/EDGE (September 1990). *RCRA Facility Assessment (RFA), NAS Memphis*. ERC/EDGE: Nashville, Tennessee.

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APPENDIX A

RCRA FACILITY ASSESSMENT — SWMU 19

**RCRA FACILITY ASSESSMENT (RFA)
NAS MEMPHIS
MILLINGTON, TENNESSEE**

**Prepared For:
Department of the Navy
Southern Division
Naval Facilities Engineering Command
Charleston, South Carolina
Contract No. N62467-88-C-0198**

**Prepared By:
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725 Pellissippi Parkway
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August 1990

REVISED FINAL REPORT

7.19 SWMU NO. 19: BUILDING 341 UNDERGROUND WASTE TANK AND TANK 1648

7.19.1 UNIT CHARACTERISTICS

7.19.1.1 TYPE OF UNIT

Active Underground Tanks.

7.19.1.2 DESIGN FEATURES

The Building 341 UST is 280 gallons in capacity and holds waste automotive oil and hydraulic fluid. Piping connected to the tank include feed lines which run from Building 341 and a vent line which runs to the north side of Building 341.

Tank No. 1648 is a UST used to collect waste oil from Building 757. It consists of the UST and associated feed and vent lines.

7.19.1.3 OPERATING PRACTICE (PAST AND PRESENT)

According to Department of the Navy information, the Building 341 UST system is used to temporarily store waste oil and hydraulic fluid generated by the Navy Exchange Service Station as automobile maintenance wastes.

Tank No. 1648 is similarly used for storage of waste oil from Building 757 automobile maintenance operations.

7.19.1.4 PERIOD OF OPERATION

Period of operation is from approximately 1979 to the present.

7.19.1.5 AGE OF UNIT

The tank was installed within the last 11 years.

7.19.1.6 LOCATION OF UNIT

The Building 341 UST and Tank No. 1648 are located on the north side of Building 341 and the west side of Building 757, respectively. See Figure 7-19.

7.19.1.7 GENERAL PHYSICAL CONDITIONS

Unknown.

7.19.1.8 CLOSURE METHOD

Not applicable at the present time (active tank).

7.19.2 WASTE CHARACTERISTICS

7.19.2.1 TYPE OF WASTE

In addition to heavier hydrocarbons, waste material may include volatile petroleum constituents such as benzene, xylene, and toluene, and heavy metals. PCBs are possible but unlikely.

7.19.2.2 MIGRATION CHARACTERISTICS

Wastes such as those previously characterized in this description are reasonably mobile in the environment. Preliminary investigation of this SWMU indicates the most likely release mechanism to be leaking underground tanks or product lines. Therefore, the release point is likely to be below grade. Surface infiltration of rain water can transport these wastes into the soil and groundwater.

7.19.2.3 TOXICOLOGICAL CHARACTERISTICS

Used engine oil and hydraulic fluid include toxic volatile and semivolatile organics, toxic polynuclear aromatic hydrocarbons, and heavy metals (lead, cadmium). Organic constituents include known and suspected carcinogens, and toxic liquids and vapors. Acute effects of exposure may include nausea, vomiting, dizziness, drowsiness, central nervous system, depression, damage to nerves, liver, or kidney.

7.19.2.4 PHYSICAL/CHEMICAL CHARACTERISTICS

Substances remaining in the tanks would be in the form of liquids or semiliquids/sludges. Substances that may have leaked from the tanks could exist as waste-saturated soils or soil moisture/groundwater contaminants.

7.19.3 MIGRATION PATHWAYS

7.19.3.1 GEOLOGIC SETTING

See Section 3.2.

7.19.3.2 HYDROGEOLOGIC SETTING

See Section 3.3.

7.19.3.3 ATMOSPHERIC CONDITIONS

See Section 4.0.

7.19.3.4 TOPOGRAPHIC CHARACTERISTICS

See Section 3.1 for general information. The area has been disturbed by past activities, but is generally level. Surface drainage is toward the south and west.

7.19.3.5 PATHWAYS

AIR

Because no surface releases of waste oil are evident at this location, it is felt that air is not a transport mechanism.

SOIL

Should a leak exist, hazardous constituents of the waste oils and fluids at this location would likely be released into the soil mass around and beneath the tank. Soil particle bonding, which naturally exists in the silt and clay type soils typical to this area, provide strong attenuation for these potential contaminants. Minor releases from this system would be trapped in the vadose soil zone until natural driving forces are exerted (surface water infiltration) to transport these substances to the groundwater surface.

SURFACE WATER/SEDIMENT

Preliminary evaluation of the UST system at SWMU No. 19 indicates no obvious points of surface contamination attributable to these units. Therefore, the likelihood of surface water transport is remote.

GROUNDWATER

Contaminants contained in the UST at this SWMU are generally heavier than water and slightly soluble in water. They would be transported generally down gradient with the flow of groundwater.

SUBSURFACE GAS

There is a limited potential for migration of VOCs from the waste oil tanks. VOC source is limited by size of tanks.

7.19.4 CONTAMINANT RELEASE IDENTIFICATION

7.19.4.1 PRIOR INSPECTION REPORTS

None available.

7.19.4.2 PUBLIC COMPLAINTS

None.

7.19.4.3 MONITORING/SAMPLING DATA

None available.

7.19.4.4 EVIDENCE OF RELEASE

None.

7.19.5 EXPOSURE POTENTIAL

7.19.5.1 PROXIMITY TO AFFECTED POPULATION

SWMU No. 19 is located in the NAS North Side industrial area, which is distant from the permanent NAS population but near off-Station residences along Navy Road.

7.19.5.2 PROXIMITY TO SENSITIVE ENVIRONMENTS

The unit is distant from sensitive environments.

7.19.5.3 LIKELIHOOD OF MIGRATION TO POTENTIAL RECEPTORS

It has not been previously determined whether a release of hazardous material has occurred from this tank system.

7.19.6 DOCUMENTS REVIEWED

See PR .

7.19.7 SUMMARIZED DATA GAP

7.19.7.1 SIL

No available data.

7.19.7.2 GROUNDWATER

No available data.

7.19.7.3 SURFACE WATER/SEDIMENT

No surface water/sediment sampling is needed.

7.19.7.4 AIR

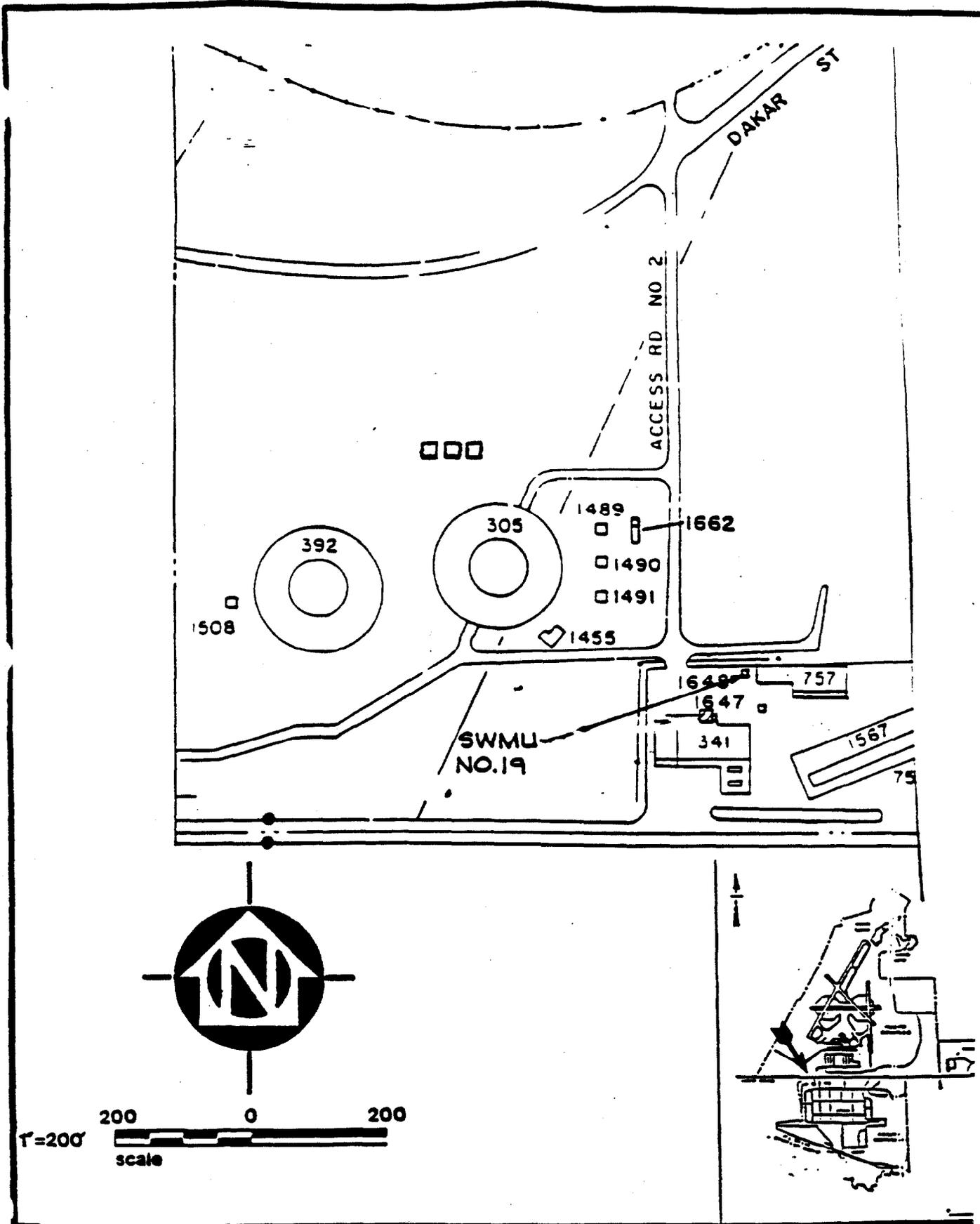
No air sampling is needed.

7.19.7.5 SUBSURFACE GAS

No data available in 1989.

7.19.8 RECOMMENDED ACTIONS

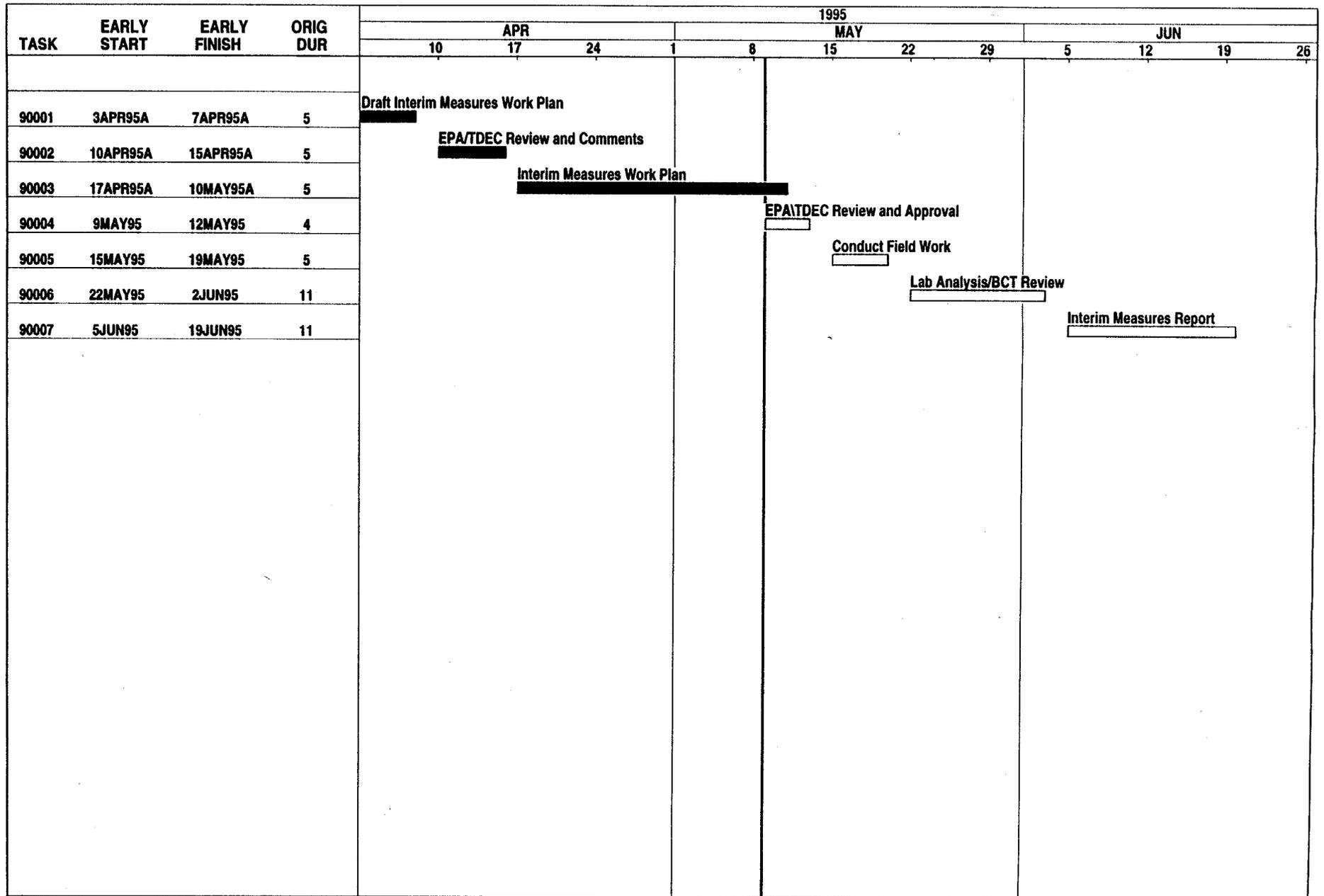
This site has been determined to require a RCRA Facility Investigation (preliminary sampling and analysis) by SOUTHDIV NAVFACENCOM, EPA Region IV, and the Tennessee Department of Health and Environment.



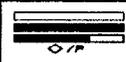
**SWMU NO. 19
FIGURE 7-19**

**341 UNDERGROUND WASTE TANK
LOCATION MAP**

APPENDIX B
PROJECT TIME LINE SCHEDULE



Plot Date 04MAY95
 Data Date 04MAY95
 Project Start 3APR95
 Project Finish 19JUN95


 Activity Bar/Early Dates
 Critical Activity
 Progress Bar
 Milestone/Flag Activity

RFT

NAS Memphis RFI
Interim Measures Project Schedule
SWMU 19, Tank 1648

Sheet 1 of 1

Date	Revision	Checked	Approved

APPENDIX C

BORING LOGS AND HYDRAULIC CONDUCTIVITY FOR SWMU 5

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SWMUK5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0855 on 1/29/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1000 on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>65.5 feet</i>
Geologist: <i>David Ladd</i>	Well Screen: <i>55.5 to 65.5 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
5			1		BG			<p>The first 40 feet of 5MW-5LF was logged from 05-SB-01 (05-MW-01UF).</p> <p>0' to 12' Clayey silt, moderate to dark yellowish-brown. Stiff, moist. Slightly wet around 11'.</p>		<p>2" ID, Sch. 40 PVC w/ 8" surface casing</p> <p>Betonite and grout</p>
10			2		BG					
15			3		BG		<p>12' to 25' Clayey fine silt. Medium gray to medium dark gray. Sample getting darker about 16.5'. By 18' color is brownish-gray. Moist. Sample becomes firm at about 21'.</p>			
20			4		BG	ML				
25			5		BG		<p>25' to 40' fine silt, clayey, grayish-orange very firm starting at 36'. 36' to 40' contains light gray silt seams. 25' to 31.5' transitional zone (gray silt mottled with yellowish-gray clayey silt).</p>			
30			6		BG					
35			7		BG					
40			8		BG		SW			

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN. SWMM#5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0855 on 1/29/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1000 on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>65.5 feet</i>
Geologist: <i>David Ladd</i>	Well Screen: <i>55.5 to 65.5 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45				42	BG			40' to 65' Sand, yellowish gray to pinkish gray, wet. Some gravel, increasing at 45'.		<p>2" ID, Sch. 40 PVC w/ 8" surface casing</p> <p>0.01 slot, PVC screen</p> <p>10/20 silica sand</p> <p>Betonite and grout</p>
46							(46' to 47') Clay, fine, with gravel, light gray.			
47							(47' to 52') Turning dark yellowish-orange to moderate yellowish-brown with abundant gravel.			
50							(52' to 53') Sand, dark yellowish-orange, gravel diminishes.			
55			2	90	BG		(53' to 56') Coarse sand, grayish-orange, not much gravel.			
58						SW	(56' to 61.5') Coarse sand, dark yellowish-orange, wet, abundant gravel.			
60							(61.5 to 63.5') Sand becoming lighter color.			
65			3	100	BG		(63.5' to 64.5') Coarse sand, yellowish-gray, no gravel. (64.5' to 65') Sand, moderate brown, iron-stained, large pieces of gravel.			
70							Top of Cockfield Formation Total depth of boring at 65'. First forty feet of log from MW-01-UF. Analytical samples collected from paired well MW-01-UF.			
75										
80										



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-1UF

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SHMU#5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0850 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>0945 on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>52 feet</i>
Geologist: <i>David Ladd</i>	Well Screen: <i>42 to 52 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45			9	38	BG		SP	Sand, yellowish gray to pinkish gray, wet. Some gravels, increasing around 45'. Clay with gravel. (46'-47')		
50						GP	Gravel, dark yellowish orange to moderate yellowish brown. (47'-50')			
55			10	90	BG		End of soil boring AT 52'. Sample number five and six from adjacent MW-05-LF. BG = Background (1.0 ppm) through grout and bentonite to set screen at 52'.			
60										
65										
70										
75										
80										

Project: <i>NAS Memphis</i>	Location: <i>Milington, TN SHMUH5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at: <i>0850 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at: <i>0945 on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>52 feet</i>
Geologist: <i>David Ladd</i>	Well Screen: <i>42 to 52 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
0								0' to 12' Clayey silt, moderate to dark yellowish-brown. Stiff, moist. Slightly wet around 11'.		<p>2" ID, Sch. 40 PVC w/ 8" surface casing</p> <p>Bentonite and grout</p> <p>Concrete seal</p>
5			1	70	BG					
10			2	107	BG			12' to 25' Clayey fine silt. Medium gray to medium dark gray. Sample getting darker about 16.5'. By 18' color has become brownish-gray. Moist. Sample becomes firm at about 21'.		
15			3		BG					
20			4	110	BG		ML			
25			5		BG			25' to 40' fine silt, clayey, grayish-orange very firm starting at 36'. 36' to 40' contains light gray silt seams. 25' to 31.5' transitional zone (gray silt mottled with yellowish-gray clayey silt).		
30			6		BG					
35			7		BG					
40			8	88	BG		SP			



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-3S

Project: <i>NAS Memphis</i>	Location: <i>Milington, TN SWMU#5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>Unknown on 2/12/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 2/12/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>19 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>9 to 19 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
5			1	70	BG			<p>Boring information taken from 05-SB-03. Silt, clayey, moderate yellowish-brown.</p> <p>3.5' to 12' Clay, silty, dark gray to brownish gray. Very hard, stiff material, getting softer near bottom of sample and lighter in color. Lithologic break could be here, with softer lighter material being pushed down below 8'.</p>		
10			2	50	BG	ML	<p>12.5' to 19.5' silt, clayey, dark to moderate yellowish-brown. Picks up some dark gray silty clay about 16.5' to 18. 18' to 19.5' silty, dark moderate yellowish-brown mixed with dark yellowish-brown silt, dry.</p>			
15			3		BG		<p>19.5' to 26' silt, clayey, medium gray.</p>			
20			4	130	BG		<p>End of boring at 20. Boring information taken from paired well 05-MW-03</p>			
25										
30										
35										
40										



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-6S

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN. SWMU#5 - FF.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0830 on 1/29/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>18 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>8 to 18 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
5			1	100	BG			Dark yellowish-brown silt with organics (root zone 0" to 5"). 0.5' to 4' Yellowish-brown clayey silt (moderately stiff). Moist; wet. 4' to 5' Olive black to brownish-black silty clay. Very hard and dry. Grading into olive gray to 6'. 6' to 8' Light olive gray stiff silty clay; hard. 8' to 15' Dusky yellow to yellowish-gray soft clayey silt (moist to wet).		<p>0.01 slot, PVC screen 6" sump Bentonite seal 10/20 silica sand</p>
15			2	69	BG		ML	15' to 20' Grayish-green moderately stiff silt (moist); slightly clayey.		
20			3	80	BG			19' to 20' Darker gray in color.		
25								Total depth of boring is 20'.		
								BG = Background		



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-7S

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1050 on 1/29/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 1/29/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>18 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>8 to 18 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
0								0' to 4.5' Moderate to pale brown clayey silt, moist, moderately stiff to soft with organics.		
5			1	58				4.5' to 7' Dusky yellowish-brown silty clay. Very stiff and dry.		
7								7' to 10.5' Light to dark olive gray silty clay with Fe staining and organics. Very stiff and hard.		
10			2	100			ML	10.5' to 13.5' Light olive gray to brown silt. Very moist to wet. Soft.		
15			3	98				13.5' to 15' Grayish-green moderately stiff silt. Moist to wet.		
20			4	100				15' to 20' Grayish green moderately stiff silt. Moist to wet.		
25								End of boring.		
30										
35										
40										

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SHMUM5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1030 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1565 on 2/11/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PTD (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
5			1	70	BG			Clayey silt, moderate yellowish brown to grayish-orange, firm. (0'-10')		<p>2" ID, Sch. 40 PVC and 8" steel casing</p> <p>Betonite and grout</p>
10			2	100	BG		Clayey silt; most turns medium gray to medium dark gray. Sample loses brown at 13'. Gets progressively darker to a dark gray to brownish-gray.			
15			3		BG					
20			4	110	BG		ML			
25			5		BG					
30			6		BG			Clayey silt; grayish-orange to moderate yellowish-brown. Stiff. Still contains some gray silt.		
35			7		BG					
40			5	94	BG		SM	Boring stopped at 1150 on 1/28/95. Boring completed and drilling resumed at 1430 on 2/11/95.		

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN. SWMU#5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1030 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1565 on 2/11/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45			5	72	BG		SM	Started boring, no recovery from 38'-40'. First run from 38' to 48, hit PVC cap at 38'.		
50			6	90	BG		GP	Sand, fine, occasional gravel to 1", silty, dense, yellowish-gray stained yellowish-orange. Wet. 45' to 47.5' Sand, fine, occasional gravel to 1", silty, dense, yellowish-gray stained yellowish-orange. Wet. 47.5' to 50' Gravel, sandy, some silt; grayish-orange to dark yellowish-orange, wet. End of boring at 50'.		
55										
60										
65										
70										
75										
80										

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SWMU#5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1410 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>0850 on 2/12/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
								Silt, clayey, moderate yellowish-brown.		<p>2" ID, Sch. 40 PVC w/8" surface casing</p> <p>Bentonite and grout</p>
5			1	70	BG			3.5' to 12' Clay, silty, dark gray to brownish gray. Very hard, stiff material, getting softer near bottom of sample and lighter in color. Lithologic break could be here, with softer lighter material being pushed down below 8'.		
10			2	50	BG					
15			3		BG			12.5' to 19.5' silt, clayey, dark to moderate yellowish-brown. Picks up some dark gray silty clay about 16.5' to 18. 18' to 19.5' silty, dark moderate yellowish-brown mixed with dark yellowish-brown silt, dry.		
20			4	130	BG		ML	19.5' to 26' silt, clayey, medium gray.		
25			5		BG			22' to 27.5' Color turns medium gray.		
30			6		BG			26' to 36.5' Gray silt mottled with silt, dark yellowish-orange becoming much more orange at 34' to 36' and more clay rich.		
35			7		BG					
40			8	90	BG		SP	Sand, fine to coarse, with gravel and some silt. About a one inch layer of clay with gravel. (45'-48') Very gravelly from 43' to 45'. Color ranges from pale orange to moderate reddish-brown.		



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-3UF

Project: <i>NAS Memphis</i>	Location: <i>Milington, TN SHMUM5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1410 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>0850 on 2/12/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45			9		BG		SP			
50			10	87	BG			<p>End of boring at 50'. 2/12/95, 0830, Resumed drilling in the 8" surface casing set to 33' in 05-SB-03, boring down to 38'. The core from bottom of surface casing to 38' will be disregarded. Will start logging core at 40'.</p> <p>0840 First run from 33' to 38' had very little return.</p> <p>38' to 50' Sand, fine to coarse with gravel, some silt. About a 1" clayey zone with gravel 45' to 48'. Very gravelly zone at 43' to 45'. Color ranges from very pale orange to moderate reddish-brown.</p> <p>End of boring. Installed 05-MW-03UF from 40' to 50'.</p>		
55										
60										
65										
70										
75										
80										

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SHMU#5 - FF.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1605 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1100 on 2/11/95</i>	Depth to Groundwater: <i>Unknown feet Measured: Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screenshot: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
0								0' to 3' Hand dug to 3'.		<p>2" ID, Sch. 40 PVC w/ 8" surface casing</p> <p>Bentonite and grout</p> <p>Bentonite seal</p>
3							3' to 6' Silty, clayey, dark gray, firm, moist.			
5			1	100	100			Color change at 6', grayish-orange to moderate yellowish-brown (dark color above may be due to contamination).		
10			2	100	BG			Saturated 10' to 12'.		
15			3		BG			Gray clayey silt mottled with brown at 20', and becomes more clay rich and wet at 22'.		
20			3	105	BG		ML	(22.5' to 27') Color turns medium gray.		
25			4		BG					
30			5		BG			27.5' to 35' Transitional stage. 27.5' to 31' gray clayey silt mottled with dark yellowish-orange silt. 31' to 35' Reworked material. Dark yellowish-orange silt, iron-stained. Becoming sandy near 35', very wet. 4' of sample is loess and sand (fine) mixed zone.		
35			6		BG					
40			7	100	BG		SW			

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SHMU#5 - FF.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1605 on 1/28/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>1100 on 2/11/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	X RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45			8		BG		SW	40' to 45' Sand, fine to coarse silty with gravel; yellowish-gray to dark yellowish-orange; some 3" to 6" layers of sandy clay, light gray to yellowish-gray; wet.		
					BG		CL			
50			9	110	BG		SW			
								45' to 50' Sand, fine to coarse with some gravel, trace silt; pale yellowish- to dark yellowish-orange, wet.		
								End of boring at 50'.		
								BG = Background (ppm)		
55										
60										
65										
70										
75										
80										



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-4AUF

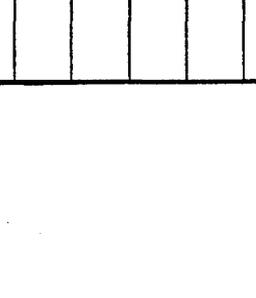
Project: <i>NAS Memphis</i>	Location: <i>Millington, TN. SHMU#5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0840 on 2/26/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 2/26/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
0								0' to 3.5' Brownish black stiff silty clay.		<p>2" ID, Sch. 40 PVC and a 7" surface casing</p> <p>Bentonite seal</p> <p>Betonite and grout</p>
3.5			1	100	5.8			3.5' to 8' Greenish gray silt clay. Fuel odor.		
8								8' to 13.5' Yellowish-brown to light olive gray with organics. Clayey silt. Medium stiff to soft; moist.		
13.5			7	93	BKG		ML	13.5' to 15' Dusky yellow with light olive gray and light gray clayey silt.		
15								15' to 20' Light olive gray with iron (orange streaks) clayey silt. Medium stiff to soft. Moist.		
20								21' to 25' Light olive gray silt with dusky yellow streaks. Dry and fractured.		
25			11	120	BKG			25' to 33' Light olive gray and pale yellowish-brown clayey silt. Yellowish orange silt nodules at 25' to 25.5'. Moderate stiff.		
30										
34			12	80	BKG		SP	Fine sandy silt. Yellowish-orange. Moderately stiff to soft. Moist. 34' to 35' Yellowish-orange fine to medium silty clayey sand.		
35								35' to 39.5' Yellowish-orange to light brown medium sand.		
39.5							CL	39.5' to 40' Very light gray sandy stiff clay.		
40							SW			

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Monitoring Well 05-MW-4AUF

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SWMU#5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>0840 on 2/26/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 2/26/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
45							SW	40' to 45' Yellowish-orange coarse to very coarse gravelly sand. Chert gravel up to 1".		 <p>0.01 slot, PVC screen</p> <p>10/20 silica sand</p>
50			13	93	BKG		CL	45.5 to 50' Grayish-orange and yellowish-gray and yellowish-orange medium sand.		
50							SW	End of boring BG = Background		
55								Steel surface casing was driven to a depth of 20' bgs.		
60										
65										
70										
75										
80										



Environmental & Safety Designs, Inc.

Monitoring Well 05-MW-4BUF

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN. SHMUM5 - F.F.T.A.</i>
Project No.: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1515 on 2/26/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 2/26/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Carmichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
0								0' to 6.5' Brownish-black stiff silty clay with organics.		<p>2" ID, Sch. 40 PVC</p> <p>Bentonite and grout</p>
5			1	100	NR			6.5' to 9' Greenish-gray moist silty clay.		
10			2	100	NR			9' to 15' Yellowish-brown to dusky yellow and light olive gray clayey silt; with organics. Faint traces of greenish-gray extending to 13.5'.		
15			3	80	NR		ML	Silt, medium dark gray, clayey from 15' to 17'. Light olive gray with iron-staining and organics 17' to 25'. Clayey silt.		
20								Light olive gray silt with dusky yellow streaks to 25'.		
25			4	80	NR			Light olive gray to pale yellowish-brown clayey silt 25' to 31'.		
30								Pale yellowish-brown sandy silt 31' to 33'.		
35							SP	Yellowish-orange to grayish-orange fine to medium sand 33' to 40'.		
40							CL			

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Monitoring Well 05-MW-4BUF

Project: <i>NAS Memphis</i>	Location: <i>Millington, TN SHMUM5 - F.F.T.A.</i>
Project No: <i>0094</i>	Surface Elevation: <i>Unknown feet msl</i>
Started at <i>1515 on 2/26/95</i>	TOC Elevation: <i>Unknown feet msl</i>
Completed at <i>Unknown on 2/26/95</i>	Depth to Groundwater: <i>Unknown feet</i> Measured: <i>Unknown</i>
Drilling Method: <i>Rotasonic</i>	Groundwater Elevation: <i>Unknown feet msl</i>
Drilling Company: <i>North Star Drilling</i>	Total Depth: <i>50 feet</i>
Geologist: <i>David Ladd/Jack Camichael</i>	Well Screen: <i>40 to 50 feet</i>

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PID (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft- <i>msl</i>)	WELL DIAGRAM
45			5	80	NR		CL SW	6" clay lenses at 40' and 45'. Yellowish-orange to grayish-orange coarse to very coarse gravelly sand.		<p>0.01 slot, PVC screen</p> <p>10/20 silica sand</p>
50			6	80	NR		CL SW	Clay at 45' (6" thick); maroon mixed with gray. Grayish-orange to yellowish-orange medium sand.		
55								End of boring.		
60										
65										
70										
75										
80										



Measurement of Hydraulic Conductivity

Client: EnSafe/Allen & Hoshall

Date of Report: 02/27/95

Project No.: E-2-837

Project Name: NAS Memphis, Tennessee

Sample I.D.: 005S000620

Boring 6

(18-20')

Soil Description: Gray Silty Clay

	<u>Pre-Test</u>	<u>Post Test</u>
Wet Density (Lbs/ft ³)	128.4	127.6
Dry Density (Lbs/ft ³)	101.3	98.4
Moisture (% Dry Wt)	26.7	29.7
Porosity (n)	.388	.379
Degree of Saturation (%)	.98	1.0

Permeability

Temperature Correction, $R_t = 1.103$

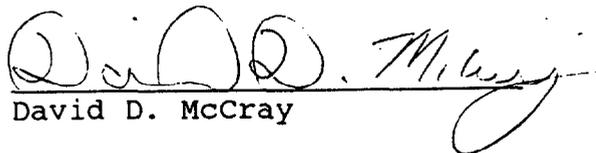
$$\begin{aligned}K_1 &= 1.5 \times 10^{-7} \text{ cm/sec} \\K_2 &= 1.2 \times 10^{-7} \text{ cm/sec} \\K_3 &= 1.1 \times 10^{-7} \text{ cm/sec} \\K_4 &= 1.3 \times 10^{-7} \text{ cm/sec}\end{aligned}$$

Coefficient of Permeability, $K_{20} = 1.4 \times 10^{-7} \text{ cm/sec}$

Tested in accordance with Method 9100 of Test Methods for evaluation Solid Waste, Third Addition (SW-846) and in general accordance with ASTM D-5084-90.

Lab No. P-95-0012

Reviewed By:


David D. McCray

SECTION 01560

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SUMMARY

Not used.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.94-Subpart G	Occupational Health and Environmental Control
40 CFR 61-Subpart M	National Emission Standards for Asbestos
40 CFR 112	Oil Pollution Prevention
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specifications

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA PL 96-510

**Comprehensive Environmental Response Compensation and
Liability Act of 1980**

NAVAL ENERGY ENVIRONMENTAL SUPPORT ACTIVITY (NEESA)

NEESA PS-015

1980 Disposal of Lead-Acid Battery Electrolyte

1.3 DEFINITIONS

1.3.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.3.2 Solid Wastes

Rubbish, debris, and other discarded solid materials, except hazardous waste as defined in paragraph entitled, "Hazardous Waste," resulting from industrial, commercial, and agricultural operations and from community activities.

1.3.3 Rubbish

Combustible and noncombustible wastes including paper, boxes, glass, crockery, metal, lumber, cans, and bones.

1.3.4 Debris

Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

1.3.5 Chemical Wastes

Salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

1.3.6 Sanitary Wastes

1.3.6.1 Sewage

Waste characterized as domestic sanitary sewage.

1.3.6.2 Garbage

Refuse and scraps resulting from consumption of food.

1.3.7 Hazardous Wastes

Hazardous substances as defined in 40 CFR 261 or as defined by applicable state and local regulations.

1.3.8 Oily Wastes

Petroleum products and bituminous materials.

1.3.9 Landscape Features

Trees, plants, shrubs and ground covers.

1.3.10 Hazardous Substances

As defined in EPA PL 96-510.

1.3.11 Hazardous Materials

As defined in DOT Regulation 49 CFR 171 and listed in 49 CFR 172.101.

1.4 SUBMITTALS

Submit the following to the Contracting Officer in accordance with Section 01300, "Submittals."

1.4.1 SD-08, Statements

- a. Environmental protection plan
- b. Management plan
- c. Solid wastes disposal permit
- d. Disposal permit for hazardous wastes
- e. Hazardous waste certification
- f. Laboratory analysis of debris

1.4.1.1 Environmental Protection Plan

Submit the proposed environmental protection plan including preconstruction survey.

1.4.1.2 Management Plan

Identify the hazardous wastes expected to be generated and submit a management plan before commencing work.

1.4.1.3 Solid Wastes Disposal Permit

Submit one copy of a state or local permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.4.1.4 Disposal Permit for Hazardous Wastes

Submit a copy of the applicable EPA or state permits or licenses for transportation, treatment, storage, and disposal of hazardous wastes by permitted facilities before transporting wastes off Government property.

1.4.1.5 Hazardous Waste Certification

Submit written certification that hazardous wastes turned-in for disposal were generated on Government property and are identified, packaged and labeled in accordance with 49 CFR 172 and 49 CFR 178.

1.4.1.6 Laboratory Analysis of Debris

Submit a copy of a laboratory analysis of debris collected as a result from abrasive blasting operations before disposing of debris.

1.5 QUALITY ASSURANCE

1.5.1 Environmental Protection Requirements

Provide and maintain, during the life of the contract, environmental protection as specified. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances and noise pollution.

1.5.1.1 Environmental Protection Plan Meeting

Five calendar days after the award of the contract, meet with the Contracting Officer to discuss the proposed environmental protection plan and to develop mutual understandings relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. (Perform a preconstruction survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Fourteen calendar days after the meeting, submit the proposed environmental plan and preconstruction survey.) Commence work after approval as directed by the Contracting Officer.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. Remove displaced rocks from uncleared areas.

3.1.1 Landscape Features

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy existing landscape features without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages, unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.

3.1.1.1 Protection

Protect existing landscape features which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. By approved excavation, remove trees with 30 percent or more of their root systems destroyed.

3.1.1.2 Replacement

Remove existing landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged features. Obtain the Contracting Officer's approval before replacement.

3.1.2 Water Resources

3.1.2.1 Stream Crossings

The Contracting Officer's approval is required before equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges.

3.1.2.2 Oily and Hazardous Substances

Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Take precautions to ensure that no oil or other hazardous material is released to the water, land, sanitary sewer system, or storm sewer system (except as permitted in Section 13219 "Cleaning Petroleum Storage Tanks"). Environmental requirements for the prevention of oil spills are contained in 40 CFR 112. For oil and hazardous substance spills which may be large enough to violate Federal, State or Local Regulations, verbally notify the Contracting Officer immediately. Immediately clean up spills of oil or hazardous substances which result from the Contractor's operations. If the Contractor fails to clean up spills in a timely manner, the Government will perform the cleanup at the Contractor's expense.

3.1.3 Fish and Wildlife Resources

Do not disturb fish and wildlife. Do not alter water flows or otherwise disturb the native habitat on or adjacent to the project, which is critical to the survival of fish and wildlife, except as indicated or specified.

3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Protect in-place and report to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work.

3.3 EROSION AND SEDIMENT CONTROL

3.3.1 Burnoff

Burnoff of the ground cover is prohibited.

3.3.2 Borrow Pit Areas

Not used.

3.3.3 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

3.3.4 Temporary Protection of Erodible Soils

Provide the following methods to prevent erosion and control sedimentation.

3.3.4.1 Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. Provide diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses.

3.3.4.2 Sediment Basins

Not used.

3.3.4.3 Borrow

Permitted only in areas where suitable environmental controls are possible. Unless specifically indicated otherwise, there are no borrow areas on Government property at Naval Air Station Memphis.

3.3.4.4 Vegetation and Mulch

Not used.

3.3.4.5 Seeding

Refer to Section 02930, "Turf."

3.4 SOLID AND SANITARY WASTES

Pick up solid wastes, and place in containers which are regularly emptied. Prevent contamination of the site and other areas when handling and disposing wastes. On completion, leave the areas clean. Control and dispose of wastes.

3.4.1 Disposal of Solid Wastes

Dispose of solid wastes in accordance with the requirements specified.

3.4.1.1 Removal From Government Property

Remove solid wastes from Government property.

3.4.2 Garbage Disposal

Place garbage in approved containers, and move to a pickup point or disposal area, where directed.

3.4.3 Sewage, Odor, and Pest Control

Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. If sanitary sewage system is not available, use chemical toilets. Empty wastes into a municipal, district, or station sanitary sewage system, or construct and maintain an approved type of sanitary convenience for the use of persons employed on the work in accordance with the Additional General Paragraph entitled "Sanitation." Provide pest control and elimination of odors. Do not dispose of substances which will interfere with treatment plant operations in accordance with 40 CFR 403.

3.5 HAZARDOUS WASTES

3.5.1 General

Hazardous wastes shall be handled, packaged, labeled, and stored in accordance with Federal, State and local regulations, including 49 CFR 172, 49 CFR 178, 40 CFR 261, 40 CFR 262, and 40 CFR 263. Identify the hazardous wastes expected to be generated and submit a management plan to the Contracting Officer before commencing work. Hazardous wastes generated within the confines of Government facilities shall be identified as being generated by the Government and shall not be removed from Government property but shall be delivered to a site specified by the Contracting Officer. Submit written certification that hazardous wastes turned in for disposal were generated on Government property and are identified, packaged and labeled in accordance with 49 CFR 172 and 49 CFR 178. No hazardous wastes shall

be brought onto Government property. For hazardous waste spills, verbally notify the Contracting Officer immediately. Hazardous wastes include waste paints, acids, caustics, solvents, waste oils, and chemical wastes.

3.5.1.1 Waste

Provide Material Safety Data Sheets (sample at end of Section) to the Contracting Officer for all hazardous materials prior to being brought on the site. The Contractor must also provide the Contracting Officer a storage log (sample at end of Section) to the Contracting Officer identifying amounts, percentages, and types of any materials added to the collection drums. At any one time the total volume of all containers must not exceed 55 gallons. Each container must be marked with words identifying the waste. When 55 gallon capacity is accumulated, the Contractor shall, within 72 hours, turn over possession of all containers to the Contracting Officer/Hazardous Waste Storage Building. Containers for storage of wastes shall be new and DOT approved. Keep all containers of waste closed except while adding or removing hazardous wastes.

3.5.2 Petroleum Products

Conduct the fueling and lubricating of equipment and motor vehicles to protect against spills and evaporation. Dispose of lubricants and excess oils.

3.5.3 Lead-Acid Battery Electrolyte

Dispose of electrolyte solution from lead-acid batteries. Do not dump electrolyte onto the ground or into storm drains or sanitary sewers. Use one of the following alternatives for disposal of waste electrolyte:

- a. An industrial waste treatment plant, if available and a Officer for neutralizing and disposing of battery acid
- b. Transport the electrolyte to a state-approved hazardous method of transportation and equipment shall comply state regulations.
- c. Use an EPA-approved existing tank located on station neutralization tank. The neutralization process shall t NEESA PS-015.

3.5.4 Mercury

Prior to starting work remove thermostats, switches, and other components that contain mercury. Upon removal, place items containing mercury in doubled

polyethylene bags, labeled and delivered to a location on the Station specified by the Contracting Officer. If a mercury container is broken and spilled, cease work in the area involved, verbally notify the Contracting Officer immediately. Workmen in the area shall remain until cleared to leave by the Contracting Officer.

3.6 DUST

Keep dust down at all times, including during nonworking periods. Sprinkle or treat the soil at the site, haul roads, and other areas disturbed by operations with dust suppressants. Do not use dry power brooming. Vacuuming, wet mopping, wet sweeping, or wet power brooming is acceptable. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not shake bags of cement, concrete mortar, or plaster.

3.7 ABRASIVE BLASTING

The Contractor shall not utilize any abrasive cleaning procedures (i.e., sandblasting, power wire brushing, etc.) to remove materials from the exterior or interior of the tank without prior written approval of the Public Works Department - Environmental Division and the Contracting Officer.

3.8 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

3.9 FOOD

Preparation, cooking and dispensing of food products is prohibited.

3.10 TEMPORARY CONSTRUCTION

Remove temporary construction facilities including haul roads, work areas, structures, foundations of temporary structures, and stockpiles of excess or waste materials. Grade temporary roads, parking areas, and temporarily used areas to conform with surrounding contours. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition.

—End of Section—

MATERIAL SAFETY DATA SHEETS
DOD Hazardous Materials Information System
DOD 6050.5-LR
AS OF FEBRUARY 1992

FSC: 9130
NIIN: 002732379
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: JP-5 JET FUEL

General Information

Item Name: TURBINE FUEL, AVIATION, JP-5 F44
Manufacturer's Name: AMOCO OIL CO.
Manufacturer's Street: 200 EAST RANDOLPH DRIVE
Manufacturer's P. O. Box:
Manufacturer's City: CHICAGO
Manufacturer's State: IL
Manufacturer's Country:
Manufacturer's Zip Code:
Manufacturer's Emerg Ph #: 800-447-8735
Manufacturer's Info Ph #: 312-856-3907
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: D
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 012
Status: SE
Date MSDS Prepared: 29APR88
Safety Data Review Date: 07JUL89
Supply Item Manager: KY
MSDS Preparer's Name: STEPHEN A. ELBERT
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BGXMT
Specification Number: MIL-T-5624
Spec Type, Grade, Class: GRADE JP-5
Hazard Characteristic Code: F4
Unit Of Issue: GL
Unit Of Issue Container Qty:
Type Of Container: BULK
Net Unit Weight:
NRC/State License Number: N/R
Net Explosive Weight:
Net Propellant Weight-Ammo: N/R
Coast Guard Ammunition Code:

SECTION 01560-A1

Ingredients/Identity Information

Proprietary: NO
Ingredient: JP-5 JET FUEL (NAVY)
Ingredient Sequence Number: 01
Percent: 100
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: NY9350000
CAS Number: 64742-81-0
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: HMIS:100 PPM/5MG/M3

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS TO AMBER LIQUID, KEROSENE ODOR.
Boiling Point: N/K
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): N/K
Specific Gravity: <1
Decomposition Temperature: N/K
Evaporation Rate And Ref: N/K
Solubility In Water: NEGLIGABLE
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY):
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: 140-150F/60-66C
Flash Point Method: N/K
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: FOAM, CARBON DIOXIDE, DRY CHEMICAL, WATER FOG. WATER BE INEFFECTIVE AND MAY SPREAD FIRE IF IMPROPERLY USED.
Special Fire Fighting Proc: USE SELF CONTAINED BREATHING APPARATUS ESPECIALLY ENCLOSED AREAS. WATER SPRAY MAY BE USED TO COOL FIRE EXPOSED CONTAINERS AND EQUIPMENT.
Unusual Fire And Expl Hazrds: WHEN HEATED SUFFICIENTLY, VAPORS MAY FORM EXPLOSIVE MIXTURES WITH AIR. SATERATED NEWSPAPERS, RAGS, ETC. MAY UNDERGO SPONTANEOUS COMBUSTION.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, IGNITION SOURCES
Materials To Avoid: STRONG OXIDIZERS.
Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): N/R

Health Hazard Data

LD50-LC50 Mixture: N/K
 Route Of Entry - Inhalation: YES
 Route Of Entry - Skin: NO
 Route Of Entry - Ingestion: YES
 Health Haz Acute And Chronic: PRODUCT IS A MILD IRRITANT. MOST HAZARDOUS EXPOSURE; EXPOSURE IS TO AIRBORN MIST OR OTHER ASPIRATION OF LIQUID INTO LUNGS. PROLONGED/REPEATED OVEREXPOSURE MAY CAUSE LIVER KIDNEY DAMAGE.
 Carcinogenicity - NTP: NO
 Carcinogenicity - IARC: NO
 Carcinogenicity - OSHA: NO
 Explanation Carcinogenicity: API HAS DONE STUDIES INDICATING THAT REPEAT OVER EXPOSURES MAY CAUSE CANCER IN MICE.
 Signs/Symptoms Of Overexp: EYE: MILD IRRITATION. SKIN: DRYING, DEFATTING WITH PROLONGED/REPEATED CONTACT. INHALED: HEADACHE, NAUSEA, CONFUSION, DROWNING. ASPIRATION OF LIQUID MAY CAUSE CHEMICAL PNEUMONITIS. INGESTED: G/ I IRRITATION, NAUSEA, POSSIBLE VOMITING.
 Med Cond Aggravated By Exp: NONE EXPECTED
 Emergency/First Aid Proc: EYE: FLUSH WITH WATER 15 MIN. SKIN: REMOVE CONTAMINATED CLOTHING (LAUNDRY BEFORE REUSE) AND THOROUGHLY WASH AREA OF CONTACT WITH SOAP AND WATER. INHALED: REMOVE FROM EXPOSURE. RESUSCITATE OR GIVE OXYGEN IF NEEDED THEN GET MEDICAL ATTENTION. INGESTED: DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION. IF ANY IRRITATION PERSISTS OR IS SEVERE, MEDICAL CARE.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE IGNITION SOURCES. USE APPROPRIATE PROTECTIVE EQUIPMENT. CONTAIN LEAK. PREVENT LEAK FROM ENTERING SEWER WATER WAY, ETC. RECOVER AS LIQUID. REPORT SPILL IF APPROPRIATE.
 Neutralizing Agent: NONE
 Waste Disposal Method: DISPOSE I/A/W FEDERAL, STATE, LOCAL REGULATIONS. INCINERATION IS RECOMMENDED FOR DISPOSAL.
 Precautions-Handling/Storing: STORE IN COOL AREA AWAY FROM OXIDIZERS AND IGNITION SOURCES. DETACHED STORAGE PREFERRED. GROUND CONTAINERS DURING TRANSFER.
 Other Precautions: 'EMPTY' CONTAINERS MAY CONTAIN RESIDUE AND/OR FUMES WHICH ARE EXPLOSIVE. DO NOT CUT, WELD, ETC.

Control Measures

Respiratory Protection: NOT EXPECTED TO BE NECESSARY. USE NIOSH/MSHA RESPIRATOR IF PRODUCT IS MISTED OR IF TLV/PEL IS EXCEEDED.
 Ventilation: USE LOCAL EXHAUST TO MAINTAIN EXPOSURE BELOW TLV/PEL IF NORMAL ROOM VENTILATION IS INSUFFICIENT.
 Protective Gloves: RUBBER, PLASTIC, OR OTHER IMPERVIOUS
 Eye Protection: SAFETY GLASSES OR SPLASH GOGGLES.
 Other Protective Equipment: WEAR PROTECTIVE CLOTHING AS NEEDED TO PREVENT PROLONGED/REPEATED CONTACT.
 Work Hygienic Practices: USE GOOD INDUSTRIAL HYGIENE PRACTICE. AVOID UNNECESSARY CONTACT.
 Suppl. Safety & Health Data:

=====
Transportation Data
=====

Transportation Action Code:
Transportation Focal Point: U
Trans Data Review Date: 89188
DOT PSN Code: GNN
DOT Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
DOT Class: COMBUSTIBLE LIQUID
DOT Label: NONE
Limited Quantity: NO
DOT Mode Indicator:
Identification Number: UN1863
Reportable Qty - Trans File:
DOT/DoD Exemption Number:
IMO PSN Code: HNZ
IMO Proper Shipping Name: FUEL OIL NO. 1
IMO Regulations Page Number: SEE 3375
IMO UN Number: 1223
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MMF
IATA UN ID Number: 1863
IATA Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
IATA UN Class: 3
IATA Subsidiary Risk Class:
IATA Label: FLAMMABLE LIQUID
AFR 71-4 PSN Code: ZZZ
AFR 71-4 Prop. Shipping Name: NOT REGULATED FOR THIS MODE OF
TRANSPORTATION
AFR 71-4 Class: N/R
AFR 71-4 Label: N/R
AFR 71-4 ID Number: N/R
AF MMAC Code:
Tech Entry NOS Shipping Name:
Additional Trans Data:

=====
Disposal Data
=====

Disposal Data Action Code:
Disposal Data Focal Point:
Disposal Data Review Date:
Rec # For This Disp Entry:
Tot Disp Entries This Stock:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code UnUsed:
1st EPA Haz Wst Name UnUsed:
1st EPA Haz Wst Char UnUsed:
1st EPA Acute Hazard UnUsed:
2nd EPA Haz Wst Code UnUsed:
2nd EPA Haz Wst Name UnUsed:
2nd EPA Haz Wst Char UnUsed:
2nd EPA Acute Hazard UnUsed:
3rd EPA Haz Wst Code UnUsed:
3rd EPA Haz Wst Name UnUsed:
3rd EPA Haz Wst Char UnUsed:
3rd EPA Acute Hazard UnUsed:

 Label Data

Label Required: YES
 Date of Technical Review:
 Label Date:
 Manufacturer's Label No.:
 Label Status: E
 Common Name of Product:
 Chronic Hazard:
 Signal Word:
 Acute Health Hazard-None:
 Acute Health Hazard-Slight:
 Acute Health Hazard-Moderate:
 Acute Health Hazard-Severe:
 Contact Hazard-None:
 Contact Hazard-Slight:
 Contact Hazard-Moderate:
 Contact Hazard-Severe:
 Fire Hazard-None:
 Fire Hazard-Slight:
 Fire Hazard-Moderate:
 Fire Hazard-Severe:
 Reactivity Hazard-None:
 Reactivity Hazard-Slight:
 Reactivity Hazard-Moderate:
 Reactivity Hazard-Severe:
 Special Hazard Precautions: MAY BE POISONOUS IF INHALED OR ABSORBED
 THROUGH SKIN. VAPORS MAY CAUSE DIZZINESS OR SUFFOCATION. CONTACT MAY
 IRRITATE OR BURN SKIN AND EYES. FIRE MAY PRODUCE IRRITATING OR POISONO
 GASES. RUNOFF FROM FIRE CONTROL OR DILUTION WATER MAY CAUSE POLLUTION.
 Protect Eye:
 Protect Skin:
 Protect Respiratory:
 Mfg's Name From Label: AMOCO OIL CO
 Mfg's Street From Label: 200 E RANDOLPH DR MC 1408
 Mfg's P.O. Box From Label:
 Mfg's City From Label: CHICAGO
 Mfg's State From Label: IL
 Mfg's Zip Code From Label: 60601-6401
 Mfg's Country From Label: US
 Emergency Ph. No. From Label:
 Year Procured:

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

Not used.

1.2 REFERENCES

The publications listed below forms a part of this specification to the extent referenced. The publication is referred to in the text by the basic designation only.

DEFENSE LOGISTICS AGENCY (DLA)

DLA H4/H8

Federal Cataloging Handbook Commercial and Government Entity (CHEE), Sections A and B, United States and Canada, Sections C and D, NATO, Supply Code for Manufacturers

1.3 SUBMISSION OF OPERATION AND MAINTENANCE DATA

Submit operation and maintenance (O&M) data which is specifically applicable to this contract and a complete and concise depiction of the provided equipment or product. Data containing extraneous information to be sorted through to find applicable instructions will not be accepted. Present information in sufficient detail to clearly explain user O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with Section 01300, "Submittals."

1.3.1 Quantity

Submit five copies of the manufacturers' information specified herein for the components, assemblies, subassemblies, attachments, and accessories. The items for which O&M data is required are listed in the technical sections which specify that particular item.

1.3.2 Package Content

For each product, system, or piece of equipment requiring submission of O&M data, submit the package required in the individual technical section. Package content shall be as required in the paragraph entitled "Schedule of Operations and Maintenance Data Packages."

1.3.3 Delivery

Submit O&M data to the Contracting Officer for review and acceptance; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

1.3.4 Change to Submittals

Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M data. Changes, additions, or revisions required by the Contracting Officer for final Acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

1.4 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.4.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation:

1.4.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all operating conditions.

1.4.1.2 Operator Prestart

Include requirements to set up and prepare each system for use.

1.4.1.3 Startup, Shutdown, and Postshutdown Procedures

Include a control sequence for each of these operations.

1.4.1.4 Normal Operations

Include control diagrams with data to explain operation and control of systems and specific equipment.

1.4.1.5 Emergency Operations

Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency

shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.

1.4.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustments, and inspection.

1.4.1.7 Environmental Conditions

Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which equipment should not be allowed to run.

1.4.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

1.4.2.1 Lubrication Data

Include lubrication data, other than instructions for lubrication in accordance with paragraph entitled "Operator Service Requirements":

- a. A table showing recommended lubricants for specific temperature ranges and applications;
- b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities; and
- c. A lubrication schedule showing service interval frequency.

1.4.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests, and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair. Provide manufacturer's projection of preventive maintenance man-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft.

1.4.3 Corrective Maintenance

Include manufacturer's recommendations on procedures and instructions for correcting problems and making repairs.

1.4.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.4.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identifiably to actual installation numbering.

1.4.3.3 Maintenance and Repair Procedures

Include instructions and list tools required to restore product or equipment to proper condition or operating standards.

1.4.3.4 Removal and Replacement Instructions

Include step-by-step procedures and list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.4.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operations without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead time to obtain.

1.4.3.6 Corrective Maintenance Man-Hours

Include manufacturer's projection of corrective maintenance man-hours including craft requirements by type of craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.

1.4.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.4.4.1 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.

- a. **Manufacturer's standard commercial practice:** The parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.
- b. **Other than manufacturer's standard commercial practice:** End item manufacturer may add a cross-reference to implement components' assemblies and parts requirements when implementation in manual form varies significantly from the style, format, and method of manufacturer's standard commercial practice. Use the format in the following example:

End Item Manufacturer's Alphanumeric Sequence	Actual Manufacturer's Name and FSCM	Actual Manuf. Part No.
100001	John Doe & Co. 00000	2000002

List FSCM in accordance with DLA H4/H6.

1.4.4.2 Warranty Information

List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force.

1.4.4.3 Personnel Training Requirements

Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.

1.4.4.4 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.4.4.5 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.

1.5 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

1.5.1 Data Package 1

- a. Safety precautions
- b. Maintenance and repair procedures
- c. Warranty information
- d. Contractor information

1.5.2 Data Package 2

- a. Safety precautions
- b. Normal operations
- c. Environmental conditions
- d. Lubrication data
- e. Preventive maintenance plan and schedule
- f. Maintenance and repair procedures
- g. Removal and replacement instructions
- h. Spare parts and supply list
- i. Parts identification
- j. Warranty information
- k. Contractor information

1.5.3 Data Package 3

- a. Safety precautions
- b. Normal operations
- c. Emergency operations
- d. Environmental conditions
- e. Lubrication data
- f. Preventive maintenance plan and schedule
- g. Troubleshooting guides and diagnostic techniques
- h. Wiring diagrams and control diagrams
- i. Maintenance and repair procedures
- j. Removal and replacement instructions
- k. Spare parts and supply list
- l. Parts identification
- m. Warranty information
- n. Testing equipment and special tool information
- o. Contractor information

1.5.4 Data Package 4

- a. Safety precautions
- b. Operator prestart
- c. -- Startup, shutdown, and postshutdown procedures

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- d. Normal operations
- e. Emergency operations
- f. Operator service requirements
- g. Environmental conditions
- h. Lubrication data
- i. Preventive maintenance plan and schedule
- j. Troubleshooting guides and diagnostic techniques
- k. Wiring diagrams and control diagrams
- l. Maintenance and repair procedures
- m. Removal and replacement instructions
- n. Spare parts and supply list
- o. Corrective maintenance man-hours
- p. Parts identification
- q. Warranty information
- r. Personnel training requirements
- s. Testing equipment and special tool information
- t. Contractor information

1.5.5 Data Package 5

- a. Safety precautions
- b. Environmental conditions
- c. Preventive maintenance plan and schedule
- d. Troubleshooting guides and diagnostic techniques
- e. Wiring and control diagrams
- f. Maintenance and repair procedures
- g. Spare parts and supply list
- h. Warranty information

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

--End of Section--

SECTION 02050

DEMOLITION AND REMOVAL

PART 1 GENERAL

1.1 REFERENCES

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.6

1983 Demolition Operations - Safety Requirements

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 61-SUBPART M

National Emission Standard for Asbestos

1.2 GENERAL REQUIREMENTS

Do not begin demolition until authorization is received from the Contracting Officer. Remove rubbish and debris from the station daily; do not allow accumulations inside or outside the building(s). Store materials that cannot be removed daily in areas specified by the Contracting Officer.

1.3 SUBMITTALS

Submit the following in accordance with Section 01300, "Submittals."

1.3.1 SD-08, Statements

- a. Demolition plan
- b. Notification of demolition and renovation

Submit proposed demolition and removal procedures to the Contracting Officer for approval before work is started.

1.3.1.1 Required Data

Demolition plan shall include procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," safety requirements shall conform with ANSI A10.6, "Demolition Operations - Safety Requirements."

1.4.1 Notifications

Furnish timely notification of demolition and renovation projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61-SUBPART M. Notify the State's environmental protection agency and the Contracting Officer in writing 10 days prior to the commencement of work in accordance with 40 CFR 61 - SUBPART M.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.6.2 Existing Work

Protect existing work which is to remain in place, be reused, or remain the property of the Government. Repair items which are to remain and which are damaged during performance of the work to their original condition, or replace with new. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement must have Contracting Officer approval.

1.6.3 Weather Protection

Not used.

1.6.4 Trees

Conform to Section 01560, "Environmental Protection", for protection of natural resources.

1.6.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

1.7 BURNING

Burning will not be permitted.

1.8 FOREIGN OBJECT DAMAGE (FOD)

Not used.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Structures

Remove indicated existing structures as indicated on the project drawings.

3.1.2 Utilities and Related Equipment

Remove existing utilities uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. Remove meters and related equipment and deliver to a location on the station in accordance with instructions of the Contracting Officer. If utility

lines are encountered that are not shown on drawings, contact the Contracting Officer for further instructions.

3.1.3 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs as indicated on project drawings. Provide neat sawcuts at limits of pavement removal as indicated.

3.1.4 Roofing

Not used.

3.1.5 Masonry

Not used.

3.1.6 Concrete

Saw concrete along straight lines to a depth of not less than 2 inches. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

3.1.7 Airfield Lighting

Not used.

3.1.8 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

- a. Holes and depressions left as a result of removals in existing masonry walls to remain shall be completely filled with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

3.1.9 Air Conditioning Equipment

Not used.

3.2 FILLING

Fill holes, open basements, and other hazardous openings in accordance with Section 02082, "Removal and Disposal of Underground Storage Tanks."

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except where specified in other sections, all uncontaminated materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition and removal procedures, and authorization by the Contracting Officer to begin demolition. The Government will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated and specified as "SALVAGE" to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site to be decided upon by the Contracting Officer.

3.4 DISPOSITION OF MATERIAL IN BERMUDA

Not used.

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3.5 CLEANUP

3.5.1 Debris and Rubbish

Remove and transport debris and rubbish in a manner that will prevent spillage on pavements, streets or adjacent areas. Clean up spillage from pavements, streets and adjacent areas to prevent FOD potential.

--End of Section--

SECTION 02082

REMOVAL AND DISPOSAL OF UNDERGROUND STORAGE TANKS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

- | | |
|----------------|--|
| API RP 1604 | 1987 (Supp. 1989) Removal and Disposal of Used Underground Petroleum Storage Tanks |
| API PUBL 1628 | 1989 Assessment and Remediation of Underground Petroleum Releases |
| API PUBL 2015 | 1991 Safe Entry and Cleaning of Petroleum Storage Tanks |
| API PUBL 2015A | A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning (Supplement to API 2015) |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- | | |
|-------------|--|
| ASTM D 4397 | 1991 Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications |
|-------------|--|

CODE OF FEDERAL REGULATIONS (CFR)

- | | |
|-------------|--|
| 40 CFR 280 | Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks |
| 29 CFR 1910 | Occupational Safety and Health Standards |

CORPS OF ENGINEERS (COE)

- | | |
|----------------|--|
| COE EM-385-1-1 | 1992 Safety and Health Requirements Manual |
|----------------|--|

ENVIRONMENTAL PROTECTION AGENCY (EPA)

- | | |
|------------|-----------------------------|
| EPA SW-846 | 1986 Evaluating Solid Waste |
|------------|-----------------------------|

EPA 600-4-79-20 1976 Contaminant Monitoring

TENNESSEE DEPT. OF ENVIRONMENT AND CONSERVATION (TDEC)

Rule 1200-1-15 Division of Underground Storage Tanks, Underground Storage Tank
Program

1.2 DESCRIPTION OF WORK

The work includes removing and disposing of underground storage tanks and related work.

1.2.1 Tank Closure

Perform work to close, remove, and dispose of underground storage tank systems, connecting piping and other appurtenances; including but not limited to dewatering (if approved); collection, sampling and testing of excavated soils, tank cleaning residuals, and tank sludges; providing reports, permits and approvals which are required by regulatory agencies; and backfilling and restoration. Other than the decontaminated (cleaned) tanks, piping, concrete rubble, and recyclable fuel not removed from the tanks by the Government, the Contractor shall not be responsible for the off-site disposal of excavated contaminated soils, tank cleaning residuals, and tank sludges or other wastes generated by tank closure activities. The Contractor shall provide appropriate laboratory analysis for these wastes and deliver wastes to the Government for disposal.

1.2.2 Regulations

Perform work in accordance with local, State, and Federal regulations including 40 CFR 280 and TDEC Rule 1200-1-15, including Closure Assessment Guidelines dated January 1994 and other applicable TDEC Technical Guidelines.

1.3 SUBMITTALS

1.3.1 Plans

1.3.1.1 Site Safety and Health Plan

Describe safety and health plan and procedures as related to underground tank removal and pipe removal, and as related to operations associated with petroleum contaminated soils, waters, residual fuels and waste sludges. Furnish the name and qualifications based on education, training, and work experience of the proposed Site Safety and Health Officer.

1.3.1.2 Excavation and Material Handling Plan

Describe methods, means, equipment, sequence of operations and schedule to be employed in excavation, transport, handling, and stockpiling of soil during underground tank removal. Fifteen days before beginning tank removal work, submit to the Contracting Officer for approval a material handling plan that describes phases of dealing with the contaminated soils, waters, residual fuels and waste sludges as it relates to the proposed tanks and piping removal, including methods of excavating, a material handling plan for the contaminated material, soil and waste testing requirements, safety precautions and requirements, and water pumping and collection requirements.

1.3.1.3 Field Sampling and Laboratory Testing Plan

Describe field sampling methods and quality control procedures. Identify laboratory and laboratory methods to be used for contamination testing. Sample reports shall show sample identification for location, date, time, sample method, contamination level, name of individual sampler, identification of laboratory, and quality control procedures.

1.3.1.4 Tank and Piping Removal and Disposal Plan

Describe methods, means, sequence of operations, and schedule to be employed in the testing, pumping, cleaning, de-vaporizing, inspecting, removal, and disposal of underground storage tanks and piping.

1.3.1.5 Qualification

Prior to start of work, submit documentation of recent experience and resumes of personnel working on the project.

1.3.1.6 Spill and Discharge Control Plan

Describe procedures and plan related to potential spills and discharge of contaminated soils, waters or other wastes.

1.3.2 SD-09, Reports

- a. Identification of tanks removed and disposed of, including site map showing location of tank and piping
- b. Starting and ending dates of reporting period

- c. Closure report in accordance with paragraph titled "CLOSURE REPORT" in this Section. Incorporate reports, records, and data into a single binder with the title "SITE ASSESSMENT REPORT" on the cover of the binder
- d. Laboratory testing reports, including location of soil excavated and associated OVA/FID (organic vapor analyzer/flame ionization device) readings, TPH (total petroleum hydrocarbons), and BTEX (benzene, toluene, ethylbenzene, and xylene), and possibly TCLP (toxicity characteristic leaching procedure) sampling and test results. If BTEX indicates gasoline, then provide TCLP analysis results
- e. Cumulative quantities of soil excavated, beginning with start date for each tank and associated piping

1.3.3 SD-18, Records

- a. Building permit, inspection permits, and other permits required for underground tank removal
- b. Results of excavation including sketch showing location of underground storage tank, sampling locations, and extent of excavation
- c. Tank disposal paperwork, such as copy of UST Notification Form and method of conditioning tank for disposal
- d. Contaminated soil disposal paperwork, such as laboratory testing reports
- e. Contaminated water disposal paperwork, such as laboratory testing results
- f. Contaminated sludge disposal paperwork, such as laboratory testing results
- g. Residual fuel recycling paperwork, such as laboratory testing results if necessary.

1.4 AREAS OF CONTAMINATION

Assume for bidding purposes that soil, bituminous pavement, concrete slabs, and water encountered during the removal of the underground tanks are contaminated with JP-5, fuel oil, waste oil, diesel fuel, and/or gasoline, and shall be handled as specified herein. Bituminous pavement and concrete slabs shall be washed and disposed of as demolition debris. Wash water shall be collected, stored, and managed in accordance with Section 13219, "Cleaning Petroleum Storage Tanks."

1.5 QUALIFICATION (CONTRACTOR EXPERIENCE)

Prior to start of work, submit data for approval showing that the tank removal Contractor, subcontractors, and personnel employed on the project have been engaged in removal, transportation, and disposal of underground tanks and associated piping, are familiar with and shall abide with the following:

- a. API RP 1604.
- b. 40 CFR 280, TDEC Rule 1200-1-15, and other applicable State and local regulations and procedures.
- c. Applicable safety rules and regulations.

- d. Use of equipment and procedures for testing and vapor-freeing tanks.
- e. Handling and disposal of types of wastes encountered in underground tank and pipe removal including disposal of underground tanks and associated piping.
- f. Excavation, testing, and disposal of petroleum contaminated soils, liquids, and sludge.
- g. Provide documentation that tank removers are certified if locality of project has this requirement. In addition, furnish data proving experience on at least three prior projects which included types of activities similar to those in this project. Provide project titles, dates of projects, owners of projects, point of contact for each project, and phone numbers of each point of contact.

1.6 COMPLIANCE

Comply with applicable local, State, and Federal regulations, procedures, 40 CFR 280, and TDEC Rule 1200-1-15.

PART 2 PRODUCTS

2.1 PLASTIC SHEETING

ASTM D 4397.

PART 3 EXECUTION

3.1 REMOVAL AND DISPOSAL OF TANKS

After the Government has removed fuel from the tanks to the extent possible with the existing in-place pumps, furnish labor; materials; necessary permits, closure applications, and other documents required by TDEC Rule 1200-1-15; laboratory tests; and reports and equipment to remove any remaining recyclable waste fuel and transport to permitted off-site fuel recycling facility; remove, containerize, and deliver to the Government wash products and sludge remaining in the underground tanks; clean and vapor free the underground tanks and connecting piping; excavate, remove underground tanks and associated piping, and backfill to the level of the adjacent ground; sample soils, waters and sludges to determine if contaminated; dispose of tanks and associated piping. Provide work in accordance with 40 CFR 280, TDEC rule 1200-1-15, and in accordance with appropriate Federal, State, and local regulations.

3.2 SITE SAFETY AND HEALTH PLAN (SSHP)

Furnish safety, health, and accident prevention provisions and develop a Site Safety and Health Plan (SSHP). The SSHP shall incorporate the requirements of 29 CFR 1910 and COE EM-385-1-1. Site work shall not start until the SSHP is approved by the Contracting Officer.

3.3 SITE SAFETY AND HEALTH OFFICER

Identify an individual to serve as the Site Safety and Health Officer (SSHO) or Certified Industrial Hygienist (CIH). The SSHO (or CIH) shall report problems and concerns regarding health and safety to the Contracting Officer. The SSHO shall have a working knowledge of local and Federal occupational safety and health regulations, and shall provide training to Contractor employees in air monitoring practices and techniques. The SSHO shall also provide day to day industrial hygiene support, including air monitoring, training, and daily site safety inspections. The SSHO shall be trained in the use of the monitoring and sampling equipment, interpretation of data required to implement the SSHP, and to administer the elements of the SSHP. The SSHO shall remain on site during project operations and may be assigned other duties, such as project foreman or quality control manager.

3.4 SPILL AND DISCHARGE CONTROL PLAN

Develop, implement, and maintain a comprehensive spill and discharge control plan. The plan shall provide contingency measures for potential spills and discharges from handling and transportation of contaminated soils and water. A possible source of guidance for assessment and remediation is API PUBL 1628.

3.5 EXCLUSION ZONE (EZ) AND CONTAMINATION REDUCTION ZONE (CRZ)

Do not permit personnel not directly involved with the project to enter work zones, called the EZ and CRZ. The EZ shall be an area around the tank a minimum of 10 feet from the limits of the tank excavation. At the perimeter of the EZ, establish a CRZ. Limits of the CRZ shall be established by the Contractor. Within the CRZ, equipment and personnel shall be cleaned as stated in the paragraph entitled "Personnel and Equipment Decontamination." The Contractor's site office, parking area, and other support facilities shall be located outside the EZ and CRZ. Boundaries of the EZ and CRZ shall be clearly marked and posted. Include a site map, outlining the extent of work zones and location of support facilities, in the SSHP.

3.6 TRAINING

Provide health and safety training in accordance with 29 CFR 1910 prior to starting work. Furnish copies of current training certification statements for personnel prior to initial entry into the work site.

3.6.1 On-Site Training

Prior to starting on-site work, a health and safety training class shall be held by the SSHO to discuss the implementation of the SSHP. Notify the Contracting Officer 24 hours prior to beginning the training class.

3.6.2 Training Outline

Provide the following:

- a. Health and safety organization, including discussion of distribution of functions and responsibilities
- b. Organization and components of the SSHP
- c. Physical and chemical site hazard identification
- d. Basic toxicology and toxicity information
- e. Discussion of the EZ and CRZ
- f. Protective clothing
- g. Respiratory protection
- h. Air quality monitoring
- i. Personnel exposure guidelines
- j. Decontamination procedures
- k. Basic first aid review
- l. Emergency procedures and contingency plan
- m. Site entry and exit procedures
- n. Sampling procedures

3.7 PERSONNEL PROTECTION

Furnish appropriate personal safety equipment and protective clothing to personnel and ensure that safety equipment and protective clothing is kept clean and well maintained. Furnish three clean sets of personal protective equipment and clothing for use by the Contracting Officer or official visitors as required for entry into the EZ.

3.8 RESPIRATORY PROTECTION PROGRAM

Develop a respiratory protection program, addressing respirator usage and training, in accordance with 29 CFR 1910 and COE EM-385-1-1.

3.9 DECONTAMINATION

Decontaminate or properly dispose of personal protective equipment and clothing worn in contaminated areas at the end of the work day. The SSHO shall be responsible for ensuring that personal protective clothing and equipment are decontaminated before being reissued.

3.10 FIRST AID AND EMERGENCY RESPONSE EQUIPMENT AND PROCEDURES

Provide appropriate emergency first aid equipment for treatment of exposure to site physical and chemical hazards. Provide and post a list of emergency phone numbers and points of contact for fire, hospital, police, ambulance, and other necessary contacts. Provide and post a route map detailing the directions to the nearest medical facility.

3.11 IGNITION SOURCES

Do not permit ignition sources in the EZ and CRZ.

3.12 PERSONNEL AND EQUIPMENT DECONTAMINATION

Decontaminate personnel and equipment before exiting the work zones.

3.13 WASTE DISPOSAL

The SSHP shall detail the practices and procedures to be utilized to dispose of wastes. Upon completion of the project, certify that equipment and materials were properly decontaminated prior to being removed from the site.

3.14 EMERGENCY RESPONSE REQUIREMENTS

Furnish emergency response and contingency plan in accordance with 29 CFR 1910. In an emergency, take action to remove or minimize the cause of the emergency, alert the Contracting Officer, and institute necessary measures to prevent repetition of the emergency. Equip site-support vehicles with route maps providing directions to the medical treatment facility.

3.15 UNFORESEEN HAZARDS

Notify the Contracting Officer of any unforeseen hazard or condition which becomes evident during work.

3.16 ADDITIONAL REQUIREMENTS

Provide additional requirements for cleaning and vapor freeing tank as specified in Section 13219, "Cleaning Petroleum Storage Tanks."

3.16.1 Table of Tank History

A tabular summary of UST's is not utilized here, in lieu of information on the project UST demolition drawings summarizing Tank No., Capacity, and Contents.

3.16.2 Fuel Removal

The Government will remove fuel from the tanks to the extent possible with the in-place pumps. The Contractor shall remove and segregate remaining fuels, water, waste sludges and all other materials and transfer into 55 gallon drums or other suitable, DOT-approved containers. The Contractor shall manage residual products and sludges in accordance with paragraphs "Water, Waste Fuels, Sediment, and

Sludge Analysis", "Residual Product Removal and Disposal" and "Sludge and Sediment Removal and Disposal" of this Section.

3.16.3 Identification of Tanks with Waste Sludge and Residue

The following tanks are known or suspected to contain waste sludges and residues. These sludges and residues shall be removed and analyzed by the Contractor in accordance with paragraphs "Water, Waste Fuels, Sediment and Sludge Analysis" and "Sludge and Sediment Removal and Disposal" of this Section.

Tank No.	Product	Suspected Waste Types and Characteristics
T-1546	Gasoline	Sludge residue; ignitability and lead
T-1547	Gasoline	Sludge residue; ignitability and lead
T-1617	Gasoline	Sludge residue; ignitability and lead
T-1648	Waste Oil	Sludge residue; ignitability, lead and other RCRA metals

3.16.4 Water, Waste Fuels, Sediment, and Sludge Analysis

The Contractor shall analyze any water, waste fuels, sediment, and sludge removed from the tanks to determine their hazardous characteristics. Waste removed from fuel tanks shall be analyzed for flash point, TCLP for benzene and TCLP for lead. Waste removed from waste oil tanks shall be analyzed for flash point, TCLP for benzene and TCLP for eight (8) RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). Hazardous wastes shall be packaged, labeled, stored and transported in DOT-approved containers in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266. Deliver hazardous waste to the Government at Building N-1694 for disposal (by the Government) as directed by the Contracting Officer. Nonhazardous or hazardous wastes shall be managed as described below.

3.16.5 Residual Product Removal and Disposal

After the Government has removed existing product from the tank to the extent possible, pump or otherwise remove remaining fuel from the tank. Package, label, accumulate, analyze and transport hazardous waste fuels in DOT-approved containers in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266. Transport recyclable fuels to an EPA and/or State permitted off-site facility for recycling. Provide the Contracting Officer with a copy of the manifest and other appropriate records for all recycled waste fuels. Deliver non-recyclable waste fuels to the Government at Building N-1694 for disposal (by the Government) as directed by the Contracting Officer. For bidding purposes, each tank is assumed to contain the following estimated quantities of residual product to be removed by the Contractor:

Tank No.	Product	Estimated Quantity of Residual Product
T-1546	Gasoline	600 gallons
T-1547	Gasoline	600 gallons
T-1617	Gasoline	300 gallons
T-1648	Waste Oil	Not Applicable (residual wastes assumed to be sludge only; see paragraph 3.16.6 below)

3.16.6 Sludge and Sediment Removal and Disposal

Squeegee or brush any sludge, sediment, or other loose material into piles, shovel into buckets or other suitable containers, and remove from the tank.

3.16.6.1 Removal of Sludge

For bidding purposes, each tank is assumed to contain the following estimated quantities of sludge to be removed by the Contractor:

Tank No.	Product	Estimated Quantity of Sludge
T-1546	Gasoline	200 gallons
T-1547	Gasoline	200 gallons
T-1617	Gasoline	100 gallons
T-1648	Waste Oil	50 gallons

3.16.6.2 Delivery of Sludge to the Government

Package, label, accumulate, analyze and transport hazardous sludge and sediment removed from the tanks in DOT-approved containers in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266. Deliver waste sludge to the Government at Building N-1694 for disposal (by the Government) as directed by the Contracting Officer.

3.16.7 Wash Water, Detergent Solution, and Sediment Removal

During the washing process, operate a portable pump continuously with suction hose extended to the tank bottom to remove water, detergent, dirt, oil, or other loose materials washed off. Following the final rinse, pump, squeegee, and mop the tank dry.

- a. With the approval of the Public Works Department - Environmental Division, and in accordance with the following procedures, the water and detergent solution may be disposed of into the municipal sewer system through an on-site oil/water

separator (OWS) at the direction of the Contracting Officer. The Contractor shall provide analysis of the accumulated wash waters for the following parameters:

Wastewater Parameters for Discharge to Oil/Water Separators

- (1) BTEX
- (2) TPH (GRO, DRO or Method 418.1, as applicable)
- (3) pH
- (4) Surfactant (MBAS)
- (5) Lead

The Contractor shall submit the results of the wash water analysis to the Contracting Officer within 24 hours after the results are obtained. The Contractor shall only discharge the wash waters into an on-site OWS with the approval of the Contracting Officer, and in the presence of the Contracting Officer or his designee. Prior to discharge the Contractor shall visually inspect the wastewater for the presence of free product or visible sheen. Any free product or visible sheen shall be removed prior to discharge. Prior to discharge the Contractor shall test the vapor space of the wastewater storage tank or container(s) with an explosion hazard meter to determine the concentration of explosive gases based on percentage (%) of the Lower Explosive Limit (LEL). The wastewater shall not be discharged into the OWS if the %LEL is above the limit established by the Contracting Officer. Prior to or during discharge, the Contractor shall screen the wastewater to remove any particles larger than ½ inch in any dimension. The discharge rate shall not exceed the capacity of the OWS and no more than 1,000 gallons of wastewater shall be discharged in any 24 hour period. The Contractor shall notify the Contracting Officer within 24 hours prior to any planned OWS discharge if there is any reason to believe that the introduction of these wastewaters may cause the discharge from NAS-Memphis not to comply with the provisions set forth by the Public Works Department - Environmental Division.

- b. If the discharge of wash waters is not approved by the Public Works Department - Environmental Division and the Contracting Officer, the Contractor shall analyze the water and detergent solution in accordance with paragraph titled "Water, Waste Fuels, Sediment, and Sludge Analysis" of this Section. The Contractor shall manage the wash waters in accordance with paragraph entitled "Sludge and Sediment Removal and Disposal" as directed by the Contracting Officer. The Contractor shall furnish temporary tanks to hold water and detergent solution until testing is completed. The Contractor may pretreat the wash water to make it suitable for discharge to the sanitary sewer system if approved by the Contracting Officer. Submit the plan for pretreatment to the Contracting Officer for approval 21 days prior to scheduling pretreated discharges.

3.17 TEMPORARY CONTAINMENT OF EXCAVATED SOIL

Provide temporary containment area(s) near the excavated area as shown on the project drawings. Cover containment area with 30 mil polyethylene sheeting. Place excavated soil on the impervious barrier and cover with 6 mil polyethylene sheeting. Provide straw bale berm around the outer limits of the containment area and cover with polyethylene sheets. Secure edges of sheets to keep the polyethylene sheeting in place. The Contractor shall provide a temporary security fence around the tank removal work area or, at a minimum, around the soils stockpile area. The temporary security fence shall be equipped with a lockable gate. The Contractor shall post a wooden or metal sign at each segregated pile of excavated soil. The Contractor shall mark or label each sign to identify the contents of each pile of soil as directed by the Contracting Officer.

3.18 EXCAVATION

Provide Contracting Officer with written documentation, no later than 30 days before work begins, that proper State or local authorities have been notified, including the "Application for Permanent Closure of Underground Storage Tank Systems" as required by TDEC Closure Assessment Guidelines. Notify the Contracting Officer at least 48 hours prior to start of tank removal work. Stage operations to minimize the time that tank excavation is open and the time that contaminated soil is exposed to the weather. Provide protection measures around the excavation area to prevent water runoff and to contain the soil within the excavation area.

3.18.1 Excavation Procedures

Excavate soils and other materials (i.e., sand, pea gravel or other backfill material) as required to remove existing tanks and piping as shown on the project drawings. Stockpile soil removed from the excavation in a temporary containment area. Overexcavate areas of obvious contamination and store in a segregated containment area or pile. Notify the Contracting Officer within 24 hours if over 100 cubic yards of soils are overexcavated due to obvious contamination. No contaminated soil materials may be used as backfill for tank and pipe excavations. To determine soil contamination levels, field screen one sample for every ten (10) cubic yards of soils excavated to remove tanks with an OVA/FID in accordance with TDEC Technical Guidance Document 005 (TGD-005). The OVA/FID shall be capable of detecting volatile organic vapors to a minimum of one (1) ppm. Contaminated soils with the highest OVA/FID readings shall be further tested for TPH and BTEX as specified herein (see paragraph "Stockpiled Soils" in this Section).

Contaminated soils shall be segregated from other soils and shall be stored in bulk stockpiles awaiting removal, transportation and disposal by the Government. As an alternative, the Contractor shall provide unit costs for transferring contaminated soils into 55 gallon drums or other suitable, DOT-approved containers and for delivery of

containers to Building N-1694 for disposal (by the Government) in accordance with Federal, State, and local regulations.

The Contractor shall collect and temporarily store water encountered in tank excavations and runoff from stockpiled soils, and shall manage these waters in accordance with "Wash Water, Detergent Solution, and Sediment Removal" in this Section.

3.18.2 Excavation Methods

Select methods and equipment to remove soil to minimize disturbance to areas beyond the limits of the excavation area." Material that becomes contaminated as a result of the Contractor's operations shall be removed and disposed of through the Government at no additional cost to the Government. Where excavation extends into groundwater levels, dewatering methods shall be employed on a localized basis to facilitate excavation operations. Water generated by dewatering during excavation required for removal of tanks or piping, surface water collected in open excavation, or water used for washing equipment or existing concrete or bituminous surfaces, shall be collected, analyzed and managed in accordance with "Wash Water, Detergent Solution, and Sediment Removal" of this Section.

3.18.3 Structures

During excavation activities, if asphalt pavement, concrete slabs, or other structures are encountered, remove and wash with high pressure water cleaning equipment. Remove and dispose of the pavement, concrete, and other structures as specified in Section 02050, "Demolition and Removal."

3.19 SOILS TESTING

3.19.1 Stockpiled Soils

Excavated and stockpiled soils with the highest OVA/FID field screen readings (see paragraph "Excavation Procedures" in this Section) shall be analyzed for TPH and BTEX in accordance with EPA SW-846 and EPA 600-4-79-20. The minimum number of field screen samples to be analyzed shall be as required by TDEC Technical Guidance Document 005. Soils excavated around fuel tanks T-1546, T-1547 and T-1617 shall be analyzed for TPH-GRO and BTEX. Soils excavated around waste oil tank T-1648 shall be analyzed for TPH using EPA Method 418.1 and BTEX. In order to minimize the amount of time that an excavation is open, laboratory testing of excavated soils shall be expedited to make test results available within 48 hours of submittal. Furnish results to the Contracting Officer within 24 hours after results are obtained.

Excavated soils which contain total TPH and BTEX concentrations less than 100 ppm and 10 ppm, respectively, may be used as clean backfill. Soils that contain 100 ppm or more TPH, 10 ppm or more BTEX, or virgin petroleum products are considered contaminated materials and cannot be used as backfill. Soils that are determined to be contaminated shall be further analyzed using TCLP for benzene, TCLP for TPH and TCLP for lead.

Contaminated soils shall be segregated from other soils and shall be stored in bulk stockpiles awaiting removal, transportation and disposal by the Government. As an alternative, the Contractor shall provide unit costs for transferring contaminated soils into 55 gallon drums or other suitable, DOT-approved containers and for delivery of containers to Building N-1694 for disposal (by the Government) in accordance with Federal, State, and local regulations.

3.19.2 Testing Under Tank After Removal of Tank

Soils under fuel tanks T-1546, T-1547 and T-1617 shall be sampled and analyzed for TPH-GRO and BTEX in accordance with TDEC UST System Closure Assessment Guidelines, EPA SW-846 and EPA 600-4-79-20. The minimum number and the proposed locations of soil samples in the bottom of the tank excavation(s) shall be as shown on the project drawings. In order to minimize the amount of time that an excavation is open, laboratory testing of soils under fuel tanks shall be expedited to make test results available within 48 hours of submittal. Furnish results to the Contracting Officer within 24 hours after results are obtained. Along with the results furnish a sketch showing the underground tank(s), sampling locations, and extent of excavations. The Contractor shall not backfill the tank removal excavation prior to receiving approval from the Contracting Officer.

Soils under waste oil tank T-1648 shall be analyzed for TPH using EPA Method 418.1, BTEX and TCLP for eight (8) RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). In order that a timely determination be made regarding the replacement of T-1648 (see Section 01010 "General Paragraphs", for "Removal and Replacement of Waste Oil Tank"), the laboratory analysis of soils beneath Waste Oil Tank T-1648 at Building 757 shall be expedited to make test results available as soon as possible, but not later than 7 days after submittal. Furnish results to the Contracting Officer within 24 hours after results are obtained. The Contractor shall not backfill the tank removal excavation prior to receiving approval from the Contracting Officer. Along with the results furnish a sketch showing the underground tank(s), sampling locations, and extent of excavations.

3.19.3 Testing Along Piping

For every 25 linear feet of product delivery piping, and at every mechanical joint take one soil sample and analyze for TPH and BTEX. Sampling and analysis of soil materials shall conform to standards specified above in the paragraph entitled "Stockpiled Soils."

3.20 WATER DISPOSAL

Water generated by dewatering of the tank excavations or from runoff of stockpiled soils during removal of tanks and piping shall be temporarily stored, analyzed and managed in accordance with "Wash Water, Detergent Solution, and Sediment Removal" of this Section.

3.21 SECURING TANK SYSTEM

- a. API PUBL 2015. Remove stored product from the tank using one of the following methods:
 - (1) Drain product lines into the tanks.
 - (2) Remove liquids and sludge from tanks. Hydrocarbon products, sludge, and wastewater recovered from the tanks shall be handled according to Section 3.16.2
 - (3) Remove flammable or combustible liquids.
- b. Cap the fill pipe, gage pipe, tank vapor recovery fitting, and vapor return.
- c. Cap the product piping at the service station island, at associated buildings, or where indicated if pumps are removed.
- d. Disconnect electric power to the pumps.
- e. Leave vent piping open.

3.22 REMOVAL OF UNDERGROUND TANKS ANCHORS, SLABS, AND ASSOCIATED PIPING

3.22.1 Preparation

API PUBL 2015. Remove the fill pipe, gage pipe, vapor recovery truck connection, submersible pumps, and drop tube. Cap or remove non-product piping, except vent piping. Plug tank openings so that vapors will exit through vent piping during the vapor-freeing process.

3.22.2 Purging

Remove flammable vapors in accordance to API PUBL as "vapor free" prior to further work.

3.22.3 Cleaning and Testing

Cleaning and tank atmosphere testing shall be in accordance with Section 13219, "Cleaning Petroleum Storage Tanks," specification, and with API PUBL 2015. Distribution (product delivery) piping shall be cleaned and removed unless noted otherwise on the demolition drawings. Test the tank atmosphere and the excavation area for flammable or combustible vapor concentrations, with a combustible gas indicator until the tank is removed from the excavation and from the site.

3.22.4 Tank Removal

Plug or cap accessible holes. One plug shall have a minimum 1/8-inch vent hole. Excavate around the tank to uncover it for removal. Remove the tank from the excavation and place it on a level surface and render it useless in accordance with API RP 1604. Provide warning labels on tank if tank contained leaded fuels. Warning shall read as follows or similar wording:

"TANK HAS CONTAINED LEADED GASOLINE

NOT VAPOR FREE

NOT SUITABLE FOR STORAGE OF FOOD OR
LIQUIDS INTENDED FOR HUMAN OR ANIMAL
CONSUMPTION

DATE OF REMOVAL: MONTH/DAY/YEAR"

Make tank unusable for future use, then transport and dispose of tank in accordance with Federal, State, and local regulations.

3.23 INSPECTIONS

Arrange for and perform required inspections. Provide copies of inspections to Contracting Officer.

3.24 CLOSURE REPORT (SITE ASSESSMENT REPORT)

Provide the Contracting Officer a Site Assessment Report in a single binder notebook which shall contain a collection of reports, records, inspections, documentation, and data as required by the TDEC Closure Assessment Guidelines, including but not limited to, the following:

- a. Complete UST Notification Form including "Permanent Closure Report" as required by TDEC Closure Assessment Guidelines (within 30 days of closure).

- b. Description of work, including removal procedures, number of tanks removed, identification of tanks removed and disposed of, cubic yards of excavated soil, location of disposal sites, and dates of excavation.
- c. Site plan, including location of tanks and piping, limits of excavation, sampling points, results of excavation, and depths.
- d. Laboratory testing reports, copies of data and test results from testing laboratory.
- e. Tank disposal paperwork, contaminated soil disposal paperwork, and contaminated water disposal paperwork.
- f. Certifications required by implementing agency.
- g. Building permit, inspection permits, and other permits required for underground tank removal, notifications, and inspection reports.
- h. Cumulative quantities of soil excavated, beginning with start date for each tank and associated piping.

3.25 SPILLS OF CONTAMINATED SOILS

Use appropriate vehicles and operating practices to prevent spillage or leakage of contaminated materials from occurring during operations. Inspect vehicles leaving the area of contamination to ensure that no contaminated materials adhere to the wheels or undercarriage.

3.26 BACKFILL

Provide backfill, compaction, grading, and seeding in accordance with Section 02220, "General Excavation, Filling, and Backfilling" and Section 02930, "Turf."

--End of Section--

SECTION 02220

GENERAL EXCAVATION, FILLING, AND BACKFILLING

PART 1 GENERAL

1.1 SUMMARY

Not used.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	1990 Concrete Aggregate
ASTM C 136	1984 (Rev. A) Sieve Analysis of Fine Coarse Aggregates
ASTM D 698	1978 (R 1990) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12-in. (305-mm) Drop
ASTM D 1140	1954 (R 1990) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556	1990 Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	1978 (R 1990) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 2321	1989 Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 2487	1990 Classification of Soils for Engineering Purposes
ASTM D 2922	1981 (R 1990) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	1988 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	1984 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

APPENDIX E
NAS MEMPHIS
COMPREHENSIVE HEALTH AND SAFETY PLAN

7.0 COMPREHENSIVE HEALTH AND SAFETY PLAN (CHASP)

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) is being conducted at the Naval Air Station (NAS) Memphis, Tennessee. The purpose of this program is to assess the nature and extent of contamination at the site and to determine if follow-up action is required to maintain compliance with environmental regulations.

This Comprehensive Health and Safety Plan (CHASP) is applicable to field operations to be conducted during the RFI at NAS Memphis. The Navy project contract number with EnSafe/Allen & Hoshall (E/A&H) is N62467-89-D-0318. A Site-Specific Health and Safety Plan (SSHSP) will be developed and implemented to address site-specific activities and hazards.

The provisions of this plan are mandatory for E/A&H personnel and those personnel under contract to E/A&H or the Navy e.g., the United States Geological Survey (USGS) whose work responsibilities call for them to enter a work zone (See 7.3 Work Areas). Such personnel must read this plan and sign the plan acceptance form (See Attachment C) before starting site activities. In addition, such personnel will operate in accordance with the most current requirements of 29 CFR 1910.120, *Standards for Hazardous Waste Workers and Emergency Responders* (HAZWOPER). These regulations include the following provisions for employees exposed to hazardous substances, health hazards, or safety hazards: training as described in 120(e), medical surveillance as described in 120(f), and personal protective equipment (PPE) described in 120(g).

All non-E/A&H personnel present in E/A&H work areas shall either adopt and abide by this CHASP and the corresponding SSHSP or shall have their own safety plan which, at a minimum, meets the requirements of the E/A&H CHASP and SSHSP.

At least one person certified in CPR and First Aid will be present during field activities. In addition, the E/A&H employees that are onsite will be certified in CPR and First Aid.

7.1 Site Characterization

Upon review of available information, the following chemicals are representative of the types of chemical hazards (contamination) known or suspected to be present on NAS Memphis: benzene, toluene, ethylbenzene, xylene, polychlorinated biphenyls (PCBs), naphtha, waste oils, and cleaning solutions. SSHSPs shall be designed to protect workers from chemical hazards known or suspected to be present at a specific location. The following information will be included in the SSHSP:

- A site map displaying the location of planned work areas within the site
- The expected site-specific contaminants of concern and the (suspected) magnitude and scope of the situation
- Decontamination procedures
- A material safety data sheet (MSDS) for each contaminant known or expected of being present

7.1.1 Work Areas

Site control for all work areas will be established and maintained according to the recommendations in the EPA's *Interim Standard Operating Safety Guides*, Revised September, 1982. Three general zones of operation, each described below, will be established to reduce the potential for contaminant migration and risk of personnel exposure:

- The exclusion zone (EZ) or "hot zone"

- contamination reduction zone (CRZ), and the
- support zone (SZ)

Field personnel shall enter the SZ and don their PPE, then they will move through the CRZ and into the EZ. After completing their work or when taking a break they will leave the EZ through the CRZ, decontaminate themselves and their equipment, and leave the area through the SZ.

The exclusion zone is the area being investigated, sampled, or otherwise of interest. It is where chemical contamination is known or suspected to exist. The EZ includes the work area except for areas set aside as either the CRZ or SZ. The EZ will be defined and demarcated in the field; in the case of drilling, the EZ is typically about 50 feet in diameter with the borehole located in the middle.

Only authorized personnel that meet the training requirements of OSHA 29 CFR 1910.120 (40 hour HAZWOPER course with an annual 8-hour refresher course or equivalent training) are permitted within the exclusion and contamination reduction zones. Prior to entering the EZ, and at all times when in the EZ, all personnel shall be outfitted in and properly use all required PPE. A checkpoint may be established at the edge of the EZ to regulate the flow of personnel and equipment in and out of the area.

When using Level A, B, or C PPE, all personnel entering the EZ must use the "buddy system". All persons entering the EZ must be able to:

- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical or heat exposure
- Periodically check the integrity of his or her partner's protective clothing
- Notify the shift supervisor, his representative, or others if emergency help is needed

Additionally, at least one person shall remain outside the EZ and have available at least the same level of PPE as those who entered the EZ. The person outside the EZ will provide logistical and safety support as needed.

The **contamination reduction zone** serves as a buffer between the EZ and the SZ and is intended to prevent the spread of contaminants from the work areas. All decontamination procedures will be conducted in this area. The CRZ shall be adjacent to and upwind of the EZ and include all decontamination stations. When leaving the SZ and entering the CRZ, personnel must be wearing the prescribed PPE. Exiting the CRZ requires the removal of all contaminants through compliance with established decontamination procedures as contained herein and in the corresponding SSHSP.

The **support zone** is the outermost area and is considered a non-contaminated or clean area. The support area will be equipped with an appropriate first-aid station and equipment to perform gross decontamination of health and safety equipment (e.g., air monitoring equipment). The SZ is adjacent to and upwind of the CRZ.

The actual location and boundary of work zones will be determined and demarcated in the field. Existing site conditions such as prevailing wind direction, location of utilities, roads, security, etc., shall be considered when determining zone locations.

Changes in meteorologic conditions or site conditions may necessitate relocating the CRZ or SZ. These conditions (e.g., wind direction, surface water run-off patterns, etc.) will be monitored at all times. A wind sock or similar device will be placed in a location visible to all site workers.

7.1.2 Work Area Access

A file will be maintained onsite that includes a current OSHA initial HAZWOPER training certificate (or copy) and an up-to-date refresher certificate for all employees involved in field activities. Employees that are unsure that a copy of their certificate is onsite shall bring a copy of their certificate with them and present it to the Site Health and Safety Officer before beginning field work. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

Subcontractors, DOD oversight personnel, and other site visitors must provide the Site Health and Safety Officer with documentation showing that their HAZWOPER training is current and must agree to comply with this CHASP and the corresponding SSHSP or equivalent health and safety requirements prior to site entry. Personnel that fail to meet or abide by the criteria established in the CHASP or SSHSP shall be restricted from entering work areas.

The Site Health and Safety Officer may suspend site work and may instruct personnel to evacuate the area. Examples of situations when this may happen are:

- Site conditions have changed, for whatever reason, such that the SSHSP does not adequately address the current situation,
- Safety precautions being used are inadequate for the situation, or
- Personnel including E/A&H, subcontractors, visitors, or DOD are or may be exposed to an immediate health hazard.

7.1.3 Site History and Description

A review of the existing site data will be conducted to assess the potential hazards to be encountered by E/A&H and contractor personnel and addressed in the SSHSP. The location of NAS Memphis is shown on Figure 2-1, Vicinity Map.

7.2 Site Activities

Field activities to be conducted as part of this RFI (e.g., soil borings, well installations, and well development) are described in the E/A&H Comprehensive Sampling and Analysis Plan (CSAP). Specific health and safety procedures associated with specific activities, hazards, and/or sites are addressed in the appropriate SSHSP.

The Site Supervisor will manage the day-to-day field operations which includes assigning field staff to specific work tasks and coordinating any required logistical support. The Site Supervisor has the authority to suspend or postpone specific field operations if he or she believes that worker health and safety concerns have not been adequately addressed.

Certain activities present a level of hazard that must be dealt with on a case by case basis. These activities are neither covered by this CHASP nor by a SSHSP. Examples of such activities are: confined space entry; moving or sampling of unknown drums or containers; and entering excavations, trenches, or test pits that are more than three feet deep. Should the Project Manager or Site Supervisor deem it necessary to perform an activity such as those listed above, it is that person's responsibility to contact the Project Health and Safety Officer and request an addendum to the SSHSP specifying the health and safety procedures, training, and conditions necessary for undertaking that task. These activities are prohibited until the SSHSP addendum is reviewed, accepted, and implemented.

7.3 Chemical Hazards

Information about specific site chemical hazards will be provided in each SSHSP. Such information will include National Fire Protection Association (NFPA) ratings, symptoms of acute and chronic exposure, carcinogenicity, and OSHA permissible exposure limits (PELs). A table of exposure guidelines for expected site chemicals will be provided. Information in this table will include odor thresholds, OSHA PELs, American Conference of Governmental Industrial Hygienists threshold limit values (ACGIH TLVs), National Institute for Occupational Safety and

Health recommended exposure limits (NIOSH RELs), auto-ignition temperatures, and flammability ranges. Material Safety Data Sheets for these materials will be included in Attachment A of each SIP.

7.4 Operations and Physical Hazards

Field personnel should be aware of and act in a manner to minimize the dangers associated with physical hazards typically encountered during environmental investigations. These hazards include heat-related illnesses, uneven terrain, slippery surfaces, lifting, and use of heavy equipment. Electrical lines may be present either above or below ground, and underground gas lines may be present. Prior to the initiation of drilling activities, drilling locations must be cleared by the Naval Public Works Center (PWC).

Heavy equipment and drill rig operations will be conducted in accordance with the procedures outlined in Attachment A — *Drilling Safety Guide*, provided in this plan. Personnel conducting drill rig operations shall keep clear of all moving parts. To prevent entanglement with the drill rig, loose clothing shall not be worn. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and shall implement appropriate work regimens to minimize the likelihood of field personnel becoming ill. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling. When working in areas that support habitat for poisonous snakes, personnel shall wear protective chaps made of a heavy material designed to prevent snake bites to the legs.

7.5 Employee protection

Employee protection for this project includes standard safe work practices, NAS Memphis rules of conduct, PPE, personal decontamination procedures, equipment for extreme weather conditions, work limitations, and exposure evaluation.

7.5.1 Standard Safe Work Practices:

- Eating, drinking, chewing gum or tobacco, smoking, or any activity that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as contaminated, unless authorized by the Site Health and Safety Officer.
- Hands and face must be thoroughly washed upon leaving the work area.
- No contact lenses will be worn in work areas while invasive actions are conducted.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, or discolored surfaces, or lean, sit, or place equipment on drums, containers, or on soil suspected of being contaminated.
- Medicine and alcohol can exacerbate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel on cleanup or response operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Consumption of alcoholic beverages is prohibited.
- Due to the possible presence of overhead power lines, adequate side and overhead clearance should be maintained to ensure that the drill rig boom does not touch or pass close to any overhead lines.

- Due to the possible presence of underground utilities (including electric, natural gas, water, sewer, telephone, etc.), the activity and local utility representatives should be contacted and requested to identify all lines at the ground surface using characteristic spray paint or labeled stakes. A 3-yard buffer zone should be maintained during all subsurface investigations.
- Due to the flammable properties of some of the potential chemical hazards, all spark or ignition sources should be bonded and/or grounded or mitigated before soil boring advancement or other site activities begin.

7.5.2 NAS Memphis General Rules of Conduct:

- Liquor, firearms, narcotics, tape recorders, and other contraband items are not permitted on the premises.
- Any violation of local, state, or federal laws, or conduct which is outside the generally accepted moral standards of the community is prohibited.
- Violation of the Espionage Act, willfully hindering or limiting production, or sabotage is not permitted.
- Willfully damaging or destroying property or removing government records is forbidden.
- Misappropriation or unauthorized altering of any government records is forbidden.
- Securing government tools in a personal or contractor's tool box is forbidden.
- Gambling in any form, selling tickets or articles, taking orders, soliciting subscriptions, taking up collections, etc., is forbidden.

- Doing personal work in government shop or office, using government property or material for unauthorized purposes, or using government telephones for unnecessary or unauthorized local or long distance telephone calls is forbidden.
- Compliance with posted signs and notices is required.
- Boisterousness and noisy or offensive work habits, abusive language, or any verbal, written, symbolic, or other communicative expression which tends to disrupt the work or morale of others is forbidden.
- Fighting or threatening bodily harm to another is forbidden.
- Defacing any government property is forbidden.
- Wearing shorts of any type and/or offensive logos, pictures, or phrases on clothing is forbidden. Shirts, shoes, and pants or slacks or coverall-type garments will be worn at all times on government property.
- All persons operating motor vehicles will obey all NAS Memphis traffic regulations.

7.5.3 Selection of Personal Protective Equipment

It is important that PPE be appropriate to protect against the potential or known hazards at each cleanup or investigation site. Protective equipment will be selected based on the types, concentrations, and routes of personal exposure that may be encountered. In situations where the types of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required, based on past experiences and sound safety practices.

Table 7-1 Level of Protection and Criteria		
Level of Protection	Criteria for Use	Equipment
Level A	<ul style="list-style-type: none"> • When atmospheres are "immediately dangerous to life and health" (IDLH in the NIOSH/OSHA Pocket Guide to Chemical Hazards or other guides.) • When known atmospheres or potential situations exist that would affect the skin or eyes or be absorbed into the body through these surfaces. Consult standard references to obtain concentrations hazardous to skin, eyes, or mucous membranes. • Potential situations include those where immersion may occur, vapors may be generated, or splashing may occur through site activities. • Where atmospheres are oxygen deficient. • When the type(s) and or potential concentration of toxic substances are not known. 	<ul style="list-style-type: none"> • Positive-pressure full facepiece self-contained breathing apparatus (SCBA) or positive-pressure supplied air respirator with escape SCBA. • Fully-encapsulating chemical protective suit. • Chemical-resistant inner and outer gloves. • Steel toe and shank chemical resistant boots. • Hard hat under suit. • Two-way radios worn inside suit. • Optional: coveralls, long cotton underwear, disposable protective suit, gloves and boots, over fully encapsulating suit.
Level B	<ul style="list-style-type: none"> • When respiratory protection is warranted and cartridge respirators are not appropriate. Examples of these conditions are: When work areas contain less than 19.5 percent oxygen, When expected contaminants do not have appropriate warning properties e.g. vinyl chloride, or When cartridges are not available to protect against all contaminants of concern. 	<ul style="list-style-type: none"> • Chemical resistant clothes, long sleeves, hooded, one or two pieces. • Positive-pressure full facepiece supplied air breathing apparatus or airline system with a 30-minute escape bottle. • Hard hat. • Inner gloves and chemical resistant gloves. • Steel toe and shank boots. • Optional: coveralls and disposable outer boots.
Level C	<ul style="list-style-type: none"> • When respiratory protection is warranted and cartridge respirators are appropriate. • When work areas contain at least 19.5 percent oxygen. 	<ul style="list-style-type: none"> • Chemical resistant clothes, long sleeves, hood optional, one or two pieces. • Full-facepiece, air purifying respirator equipped with cartridges suitable for the hazard. • Hard hat. • Inner gloves and chemical resistant gloves. • Steel toe and shank boots. • Coveralls and disposable outer boots.

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Table 7-1 Level of Protection and Criteria		
Level of Protection	Criteria for Use	Equipment
Level D	<ul style="list-style-type: none"> • When level B or C is not indicated. • When airborne particulates do not warrant respiratory protection. • When work areas contain at least 19.5 percent oxygen. 	<ul style="list-style-type: none"> • Inner gloves and chemical-resistant gloves needed to handle soil or water samples. • Steel toe and shank boots. • Hard hat (ANSI Z891-1969 standard). • Eye protection (ANSI Z87.1-1968) standard. • Optional: coveralls and disposable outer boots.

Notes:

Level A protection will be selected when the highest available level of respiratory, skin, and eye protection is needed.

Contraindications for use of Level A:

- Environmental measures contiguous to the site indicate that air contaminants do not represent a serious dermal hazard.
- Reliable, accurate historical data do not indicate the presence of severe dermal hazards.
- Open, unconfined areas.
- Minimal probability of vapors or liquids (splash hazards) present which could affect or be absorbed through the skin.
- Total vapor readings indicate 500 ppm to 1,000 ppm.

Level B protection will be selected when the highest level of respiratory protection is needed, but cutaneous exposure to the small unprotected areas of the body, (neck and back of head) is unlikely, or where concentrations are not known to be within acceptable standards. Additionally, the permissible limit for exposure to mixtures of all site gases will be checked using the requirements of 1910.1000(d)(2)(i) to ensure that PEL is not exceeded. If the value calculated using this method exceeds 1.0, Level B PPE is required.

Level C protection will be selected when the types and concentrations of inseparable material are known, or reasonably assumed to be no greater than the protection factors associated with air-purifying respirators, and exposure to the unprotected areas of the body is unlikely to cause harm.

Dust concentrations require Level C PPE, where the respirable fractions exceed the PEL of 5 mg/m³ or the total concentrations exceed the PEL of 15 mg/m³.

Level D protection will be chosen when measurements of atmospheric concentrations are less than 2 ppm above background levels and work functions preclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemicals.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. **The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.**

Field activities which disturb soils will be initiated in Modified Level D protection except when stated otherwise in the SSHSP or site conditions (e.g., sampling results from previous studies) indicate that modified Level D is inappropriate. Modified Level D protection consists of a hard hat, appropriate chemical-resistant gloves (vinyl or nitrile), eye protection, and chemical-resistant, steel-toed and shank boots. Work coveralls (full length sleeves and pants) will be worn if free product or contaminants identified as skin irritants are encountered. This level of protection was selected because the levels of contamination detected in previous studies were low and free product was not detected.

PPE upgrades to Level C will be initiated if airborne concentrations exceeds 2 ppm above the background concentration in the breathing zone or if concentrations of any contaminant exceeds 50 percent of the OSHA PEL. See Table 7-1 for the specific criteria for use and the equipment required for each level of protection.

7.5.4 Air Monitoring

Previous site work indicates that workers may potentially be exposed to low concentrations of numerous chemicals including volatile organic compounds (VOCs), halogenated compounds, and combustible gases/vapors. Based on site history and existing sampling data, "worst case" contaminated areas will be identified prior to initiation of field activities.

Air monitoring using a photoionization detector (PID) and/or other appropriate sampling equipment will be conducted prior to beginning field activities at a new EZ and during ground disturbing activities. The PID will be field calibrated to measure VOCs relative to a 100 ppm

isobutylene standard. If VOCs are detected downhole, colorimetric detector tubes and/or other sampling media may be used to determine the identification and approximate concentration of these compounds.

A combustible gas indicator (CGI) will be used during all soil borings and well installations. The CGI will be field calibrated to measure flammable gases relative to a 23 percent lower explosive limit (LEL) methane standard. Downhole CGI readings will be collected continuously during all soil disturbing operations. Field activities will immediately cease if downhole readings exceed 10 percent LEL. If CGI readings do not subside, a careful investigation and mapping of the area will be made. Operations may not proceed until readings are below 10 percent LEL. The area will be immediately evacuated and the situation re-evaluated to determine how to proceed.

If breathing zone levels exceed 2 ppm or site conditions indicate that additional health and safety precautions are needed, field activities in the area shall stop. Field staff shall notify the Site Supervisor of the situation and he/she shall contact both the Project Manager and the Project Health and Safety Officer. The Project Health and Safety Officer will be responsible for reassessing the hazards and prescribing revised health and safety requirements as necessary, including upgraded PPE requirements, revised work schedules, and revised decontamination procedures. (Typically, PPE will be upgraded to Level C assuming that cartridge respirators are appropriate, otherwise Level B.) See Table 7-1 for specific criteria for each protection level. Work shall not proceed until breathing zone levels return to background levels, and it is reasonably anticipated that breathing zone samples will stay approximately at background levels; or the chemical constituent(s) are identified and appropriate PPE is donned.

Field monitoring values will be recorded in a field logbook and copies must be posted for field personnel review.

On a daily basis, PIDs, CGIs, and other monitoring equipment shall be calibrated or their proper function verified before being used. Throughout the day this equipment shall be periodically checked to ensure that it is working properly. A final calibration shall be conducted at the end of the work day at which time each instrument will be checked to ensure that it is free from surface contamination. Field staff shall record in their field notebooks the fact that they conducted these calibrations and checks and note whether the equipment was or was not functioning properly. When equipment is not functioning properly, it should be brought to the attention of the Site Supervisor or Site Health and Safety Officer who will arrange for repairs and/or replacement of that equipment as needed.

7.5.5 Procedures and Equipment for Extreme Weather Conditions

The seasonal climate in Memphis can be expected to be hot with high relative humidity in the summer months and moderately cold to extremely cold in the winter months. Therefore, heat-and-cold stress will be of concern for all personnel. Adverse weather conditions are important considerations in planning and conducting site operations. Extremes in hot and cold weather can cause physical discomfort, loss of efficiency, and personal injury.

7.5.5.1 Exposure to Hot Weather

Heat stress can result when the protective clothing decreases natural body ventilation even when temperatures are moderate. Various levels of personal protection may require wearing low permeability disposable suits, gloves, and boots which will prevent most natural body ventilation. Discomfort due to increased sweating and body temperature (heat stress) will be expected at the work site.

Heat stress is the metabolic and environmental heat to which an individual is exposed. The manifestations of heat strain are the adjustments made by an individual in response to the stress. The three most important categories of heat-induced illness are: heat exhaustion, heat cramps, and heat stroke. These disorders can occur when the normal responses to increased sweat

production are not adequate to meet the needs for body heat loss or when the temperature regulating mechanisms fail to function properly.

Heat exhaustion is a state of collapse brought about by an insufficient blood supply to the cerebral cortex portion of the brain. The crucial event is low blood pressure caused by inadequate heart output and widespread dilation of blood vessels.

Heat Exhaustion Factors — Factors which can lead to heat exhaustion are as follows:

- Increased dilation of blood vessels causing a decreased capacity of circulation to meet the demands for heat loss to the environment from exercise and from digestive activities.
- Decreased blood volume due to dehydration.
- Reduced blood volume due to lack of physical training, infection, intoxication (from industrial contaminants as well as from drinking alcohol), or heart failure.

Heat Exhaustion Symptoms — The symptoms include extreme weakness or fatigue, dizziness, nausea, or headache. More severe cases may also involve vomiting and possible unconsciousness. The skin becomes clammy and moist, the complexion pale, and the oral temperature stays normal or low, yet the rectal temperature is usually elevated (99.5°F - 101.3°F). Workers who are unacclimated run the highest risk.

Heat Exhaustion Treatment — In most cases, treatment of heat exhaustion is fairly simple. The victim will be moved to a cool place. If the victim is unconscious, medical assistance must be sought. Mild cases may experience immediate recovery; however, more severe cases may require several days care. No permanent effects have ever been reported.

Heat cramps result when the working muscles go into painful spasms. This may occur in people who perspire profusely in heat and who drink large quantities of water, but who fail to replace their bodies' salt. It is the low salt content in the blood that causes the cramping. The abdominal muscles as well as the muscles in the arms and legs may be affected. The cramps may appear during or even after work hours. Persons on a low sodium diet should not be given salt. A physician must be consulted for care of people with this condition.

Heat stroke is the most serious of the health problems that can arise while working in hot environments. It is caused by the breakdown of the thermo-regulatory system under conditions of stress. When this happens, perspiration stops, and the body can no longer regulate its own temperature.

Heat Stroke Symptoms — A heat stroke victim may be identified by hot, dry, and unusually red or spotted skin. The body core temperature can exceed 105°F. Mental confusion, irritability, and chills are common. These are all early warning signs of heat stroke; if the sufferer is not removed from the hot environment at once, more severe symptoms can follow, including unconsciousness, delirium, and convulsions, possibly ending in death.

Heat Stroke Treatment — Heat stroke must be treated as a major medical emergency; medical assistance must be summoned immediately.

Additional treatment:

- First aid must be administered.
- Individual must be moved to a cool location.
- Individual must be cooled through wetting, fanning, or immersion.

Care should be taken to avoid over-cooling and to begin treatment for shock by raising the legs. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

To reduce the potential for heat strokes:

- Drink plenty of fluids (to replace loss through sweating).
- Wear cotton undergarments to act as a wick to absorb moisture.
- Make adequate shelter available for taking rest breaks to cool off.

Additional Measures for Extremely Warm Weather:

- Wear cooling devices to aid in ventilation. (NOTE: the additional weight may affect efficiency.)
- Install portable showers or hose down facilities to cool clothing and body.
- Shift working hours to early morning and early evening. Avoid the hottest time of the day.
- Frequently rotate crews wearing protective clothing (if required).

7.5.5.2 Exposure to Cold Weather

Persons working outdoors in temperatures at or below freezing may experience frostbite or hypothermia. Extreme cold for a short time may cause severe injury to the surface of the body. Areas of the body that have a high surface-area-to volume ratio, such as fingers, toes, and ears, are the most susceptible.

Two factors influence the development of cold injury: ambient temperature and wind velocity. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air, thus, on a cold day the body can cool quickly when PPE is removed and if a person has wet clothing underneath.

Frostbite is a condition in which the cold temperature forms ice crystals in the cells and tissues, dehydrating protoplasm and killing tissues. At the same time, circulation of the blood is blocked. Frostbite could lead to gangrene and amputation.

Frostbite damage occurs in several degrees:

- Frost nip, or incipient frostbite is characterized by sudden whitening of the skin.
- When superficial frostbite occurs, the skin has a waxy or whitish look and is firm to the touch; however, the tissue underneath has retained its resiliency.
- In deep frostbite, the tissues are cold, pale, and solid. The injury is severe. In addition to frostbite, other physiological reactions to cold may be experienced as well. Trench foot, for example, may result from prolonged exposure to low temperatures near, though possibly above, freezing. Walking on the foot is very painful. In very severe cases, the flesh dies and the foot may have to be amputated. Immersion foot is very similar although it is less severe. Although amputation is unusual, some mobility of the limb is lost. Blisters may occur around the lips, nostrils, and eyelids.

Chilblain (pernio), which is an inflammation of the hands and feet caused by exposure to cold and moisture, is characterized by a recurrent localized itching, swelling, and painful inflammation on the fingers, toes, or ears, produced by mild frostbite. Such a sequence produces severe spasms and is accompanied by pain.

Hypothermia occurs when the body loses heat faster than it can produce it. The initial reaction involves the constriction of blood vessels in the hands and feet in an attempt to conserve the heat. After the initial reaction, involuntary shivering begins in an attempt to produce more heat.

Temperature is only a relative factor in cases of hyperthermia. Cases of exposure have occurred in temperatures well above freezing. Humidity is another important factor. Moisture on the skin and clothing will allow body heat to escape many times faster than when the skin and clothing are dry.

- Hypothermia occurs when the body's core temperature drops below 96°F. When this happens, the affected person becomes exhausted. He may begin to behave irrationally, move more slowly, stumble, and fall. The speech becomes weak and slurred. If these preliminary symptoms are allowed to pass untreated, stupor, collapse, and unconsciousness occur, possibly ending in death.

To reduce effects of cold exposure:

- **Stay dry.** When the temperature drops below 40°F, change perspiration soaked clothes frequently. When clothes get wet, they lose about 90 percent of their insulating value.
- **Beware of the wind.** A slight breeze carries heat away from bare skin much faster than still air. Wind drives cold air under and through clothing. Wind refrigerates wet clothes. Wind multiplies the problems of staying dry.
- **Understand cold.** Most hypothermia cases develop in temperatures between 30°F and 50°F. Cold water running down the neck and legs or cold water held against the body by wet clothes causes hypothermia.
- **Have shelter available.** Make adequate dry, warm shelter available.
- **Provide warm drinks.**

- **Never ignore shivering.** Persistent shivering is a clear warning that a person is on the verge of hypothermia. Allow for the fact that exposure greatly reduces normal endurance. Warmth generated by physical activity may be the only factor preventing hypothermia.

7.5.6 Personal Decontamination

A CRZ will be established immediate to each sampling/boring site and will include a station for decontaminating equipment and personnel. The CRZ will be covered with sheets of 6-mil polyethylene (typically an area 20-feet by 20-feet is sufficient) with specific stations that will accommodate the removal and disposal of the protective clothing, boot covers, gloves, and respiratory protection if required.

As a general rule, equipment will be decontaminated using a soap and clean water wash solution. Equipment decontamination will be completed by personnel in Level D PPE. In the event of inclement weather (e.g., lightning) or an emergency requiring immediate evacuation, all contaminated equipment will be wrapped and taped in 6-mil polyethylene sheeting and tagged as "contaminated" for later decontamination.

Personnel working in the CRZ will be in one Level of PPE lower than personnel in the EZ. For example, if personnel in the EZ are in Level B, decon workers will be in Level C.

7.5.6.1 Personal Decontamination Procedures

The decontamination procedures, based on Level D protection, will consist of the following:

- **Brushing heavily soiled boots and rinsing outer gloves and boots with soap and water.**
- **Removing outer gloves and depositing them in a plastic-lined container.**
- **Removing outer chemical protective clothing.**

- Washing and rinsing inner gloves.
- Hard hats and eye protection should be washed thoroughly at the end of each work day with a soap and water solution.
- Disposable gloves and any disposable clothing will be disposed of in sealable bags and placed in a clearly labeled 55-gallon drum for disposal by the Navy.
- All field personnel are to be instructed to shower as soon as possible after leaving the site.

Decontamination procedures will be conducted at the lunch break and at the end of each work day. If higher levels of PPE are needed, adjustments will be made to these procedures and an amendment will be made to this CHASP.

All wastes (soil and water) generated during personal decontamination will be collected in clearly labelled 55-gallon drums. The drums will be labeled and characterized by E/A&H or USGS personnel for final disposal by the Navy.

7.5.6.2 Closure of the Personal Decontamination Station

All disposable clothing and plastic sheeting used during site activities will be double-bagged and disposed of in a refuse container. Decontamination and rinse solutions will be placed in a clearly labeled 55-gallon drum for later analysis and disposal. All washtubs, pails, buckets, etc., will be washed, rinsed, and dried at the end of each workday.

7.5.7 Work Limitations

All site activities will be conducted during daylight hours only. All personnel scheduled for these activities will have completed initial health and safety training and actual field training as

specified in 29 CFR 1910.120(e). All supervisors must complete an additional 8 hours of training in site management. All personnel must complete an 8-hour refresher training course on an annual basis in order to continue working at the site.

7.5.8 Exposure Evaluation

All personnel scheduled for site activities will have had a baseline physical examination which includes a stressing exam of the neurologic, cardiopulmonary, musculoskeletal and dermatological systems, pulmonary function testing, multi-chemistry panel and urinalysis, and will have been declared fit for duty. An exposure history form will be completed for each worker participating in site activities. An examination and updated occupational history will be repeated on an annual basis and upon termination of employment, as required by 29 CFR 1910.120(f). The content of the annual or termination examination will be the same as the baseline physical. A qualified physician will review the results of the annual examination and exposure data and request further tests or issue medical clearances as appropriate.

After any job-related injury or illness, there will be a medical examination to determine fitness for duty or any job restrictions. The Site Health and Safety Manager will review the results with the examining physician before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job related injury or illness requiring medical attention. Medical records shall be maintained by the employer or the physician for at least 30 years following the termination of employment.

7.6 Medical Monitoring Program

All E/A&H or USGS personnel who enter hazardous-waste/spill sites or have the potential for exposure to hazardous materials from these sites must participate in the E/A&H Medical Monitoring Program or an equivalent program. The program is conducted by E/A&H's company doctor with the company Health and Safety Officer. The purpose of the program is to identify any pre-existing illnesses or problems that would put an employee at unusual risk

from certain exposures or respirators, and to monitor and evaluate exposure-related events where workers are involved in handling hazardous materials. Project managers should consult with the Health and Safety Officer and/or the company doctor concerning the scope of work and known or anticipated chemical hazards associated with each project.

E/A&H maintains the right to exclude certain individuals from particular jobs based on reports from the company doctor. The program will be reviewed on an annual basis to determine its effectiveness. The company doctor has been employed as an independent contractor to provide medical monitoring for E/A&H.

The doctor is responsible for the following aspects of the Medical Monitoring Program:

- Selection and quality assurance of medical and laboratory services involved in carrying out the monitoring program.
- Development of a uniform medical record.
- Record retention.
- Employee notification of examination results.
- Determination of content of the medical and biological monitoring programs.
- Record review and correlation between potential exposure and effect.
- Monitoring job-related illness and injury for each employee.

7.6.1 Preplacement Examinations

Each E/A&H employee will be given a preplacement examination: to identify any preexisting illness or problem that would put the employee at an unusual risk from certain exposures; to assure that each employee can safely use negative-pressure respirators; and to develop a database to assess any exposure-related events detected during periodic medical monitoring. Data accumulation will include variables such as age, sex, race, smoking history, prior employment history, and other conditions that might bear upon the occurrence of subsequent events once employment begins.

The preplacement examination includes:

- Occupational history including previous chemical and carcinogenic exposures.
- Medical history including demographic data, family history, personal habits, past medical history, and a review of current systems.
- Fertility history.
- Physical examination stressing the neurologic, cardiopulmonary, musculoskeletal, and dermatological systems.
- Physiological parameters including blood pressure and visual acuity testing.
- Pulmonary function testing including FVC, FEV₁, and FEV₂₅₋₇₅.
- Electrocardiogram.
- PA and lateral chest X-ray.

- A multi-chemistry panel including tests of kidney and liver function.
- Red blood cell cholinesterase.
- Audiogram.

The history, physiological parameters, X-ray, screening tests, and laboratory studies will be conducted before the physical examination. After the physical examination, the medical examiner will review the results of the examination and special studies with each employee and facilitate referral for further evaluation of abnormalities detected during this examination. The Site Health and Safety Officer will provide each employee with a written summary and detailed results of the examination along with identification of any job restrictions. Additional medical testing procedures (e.g., ophthalmology/optometric assessment, specialized audiometric testing, etc.) may be required at the discretion of E/A&H's attending physician.

7.6.2 Periodic and Exit Examinations

An examination and updated occupational history will be repeated annually and include:

- Updated occupational and medical history.
- Physical examination stressing the neurologic, cardiopulmonary, musculoskeletal, and dermatological systems.
- Pulmonary function testing including FVC, FEV1, and FEV 25-75.
- Multi-chemistry panel including tests of kidney and liver function.
- Urinalysis.

The company doctor will review the results of annual examination and exposure data and request further tests or issue medical clearances as appropriate. An examination will also be administered when an employee leaves the company. The company doctor will be consulted for the contents of the exam except when the employee has had an exam within 6 months, or when there has been no site work since the last examination.

7.6.3 Return-to-Work Examinations

After any job-related injury or illness, a medical examination is required to determine fitness for duty or to identify any job restrictions. The medical examiner will review the results of this back-to-work examination with the company doctor before releasing the employee for work. A similar examination will be performed if an employee has missed at least three days of work due to a non-job-related injury requiring medical attention.

7.6.4 Confidentiality

Medical records will be maintained in a confidential manner so that only authorized persons will have access to the records. The authorized personnel will include medical staff of the joint venture or contract medical personnel, the individual, the individual's personal physician, or the individual's designated representative. Upon written request, the individual may obtain a copy of the medical file which will be provided within 15 days of the receipt of the written request. Information used for research, testing, statistical, or epidemiologic purposes will have all identifying data removed including the identity of the individual. Any medical information or findings obtained which do not affect the individual's job performance will not be made available to E/A&H in order to maintain the patient-physician confidentiality. Upon death, retirement, resignation, or other termination of services, the records will be retained by E/A&H or contracting physician.

7.7 Authorized Personnel

Personnel anticipated to be onsite at various times during site activities include:

- Principal-In-Charge — Dr. James Speakman (E/A&H)
- Task Order Manager — Mr. Lawson Anderson (E/A&H)
- Project Manager — Ms. Ginny Gray (E/A&H)
- Project Health & Safety Officer — Mr. Doug Petty (E/A&H)
- Field Environmental Scientist — Mr. Robert Smith (E/A&H)
- Field Geologist — Mr. Ben Brantley (E/A&H)
- Site Supervisor — To Be Determined
- Site Health & Safety Officer — To Be Determined
- Engineer-in-Charge — Mr. Mark Taylor (SOUTHDIV)
- Naval Air Station Memphis, Tennessee Site Contact — Ms. Tonya Barker

7.7.1 Responsibilities of Site Supervisor

The Site Supervisor will direct the site operations and, relative to health and safety, is responsible for assuring that:

- Field staff follow the CHASP, SSHSP, and other safety and health standard operating procedures (SOPs). Personnel that do not comply are retrained and/or instructed to leave the site and not allowed to return.
- Field staff have current HAZWOPER training.
- Field staff know who the Site Health and Safety Officer is.
- Field staff know the site-specific safety and health concerns.
- There is an adequate onsite supply of health and safety equipment.

- Field staff participate in the E/A&H Medical surveillance program (or in the case of subcontractors, an equivalent program).
- Field staff attend safety and health "kick-off" orientation and other site safety briefings.
- The Site Supervisor is also responsible for assuring that field staff who may be exposed to unique or special hazards have the training or experience necessary to safely conduct their work.

7.7.2 Responsibilities of Site Health and Safety Officer

The responsibilities of the Site Health and Safety Officer include:

- Providing the Site Supervisor with technical input on site health and safety issues.
- Observing field personnel and reporting to the Site Supervisor on the effectiveness of the CHASP and SSHSP, and observing whether field staff are utilizing proper work practices and decontamination procedures.
- Reporting significant safety violations to the Project Manager and/or Project Health and Safety Officer.
- Conducting safety briefings during field activities.
- Assuring that a copy of the Health and Safety Plan is maintained onsite during all field activities.
- Maintaining a file of HAZWOPER training certificates and appropriate refresher training certificates for onsite personnel.

The Site Health and Safety Officer will have the following qualifications: (1) 40 hours OSHA training or equivalent experience, (2) 24 hours of supervisory training or equivalent experience, (3) knowledge of the health and safety concerns for the specific work tasks being conducted, and (4) shall be trained to use the air monitoring equipment; be able to interpret the data collected with the instruments; be familiar with symptoms of chemical exposure, heat stress, and cold exposure; and know the location and proper use of onsite safety equipment. He will also be familiar with this CHASP.

The position of Site Health and Safety Officer may rotate. Often, particularly on small projects, this function is not a full time responsibility. Rather, a member of the field team is selected to serve as the Site Health and Safety Officer during a particular task. When that task is completed and/or field staff change, the Site Health and Safety Officer may change as well.

The following criteria outline when the Site Health and Safety Officer will be replaced: (1) termination of employment, (2) end of work task, (3) end of shift, (4) sickness, (5) injury, or (6) death. The SAP calls for one work shift per day. If circumstances arise that require multiple work shifts, an alternate Site Health and Safety Officer will be designated.

7.7.3 Responsibilities of Onsite Field Staff

The health and safety responsibilities of field staff include:

- Being familiar with and complying with the CHASP and SSHSP.
- Attending site health and safety briefings and being aware of anticipated chemical, physical, and biological hazards and knowing what to do when these hazards are encountered.
- Being properly trained on PPE use, safe work practices, decontamination procedures to be followed, and emergency procedures and communications.

- Properly utilizing required PPE, including respiratory protective equipment.
- Having up to date HAZWOPER training and then providing the Site Supervisor with documentation that their training is current.
- Being an up to date participant in an acceptable medical surveillance program.
- Using the buddy system when wearing respiratory protective equipment. When working in Level C or higher, a third person shall be at the work area. This person shall be suitably equipped to provide logistical and safety support to the entry team.
- Being fit-tested and physically capable of using a respirator. Should the use of respiratory protection be required, then field workers shall not have facial hair which interferes with achieving a proper fit.

In addition, field staff should always be alert and use their senses (sight, smell, etc.) to identify and react to potentially dangerous situations. When working in the EZ, visual contact should be maintained between personnel and field personnel should be close enough to assist each other during an emergency. Procedures for leaving a contaminated area must be planned and implemented before going onsite in accordance with the SSHSP.

The number of personnel and equipment in the contaminated area should be kept to a minimum in order to achieve effective site operations. All visitors to the job site must comply with the SSHSP procedures. PPE may be modified for visitors depending on the situation. Modifications must be approved by the Project Health and Safety Officer.

7.8 Emergency Information

All hazardous-waste site activities present a potential risk to onsite personnel. During routine operations risk is minimized by establishing good work practices, staying alert, and by using proper PPE. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated.

If any situation or unplanned occurrence requires outside or support service, Ms. Tonya Barker, NAS Memphis Site Contact, will be informed and the appropriate contact from the following list will be made:

Contact	Agency or Organization	Telephone
Tonya Barker	Naval Air Station, Memphis	(901) 873-5461/5462
Mark Taylor	SOUTHDIV Engineer-in-Charge	(803) 743-0573
Law Enforcement	NAS Memphis Base Security	9-911
Fire Department	NAS Memphis	9-911
Ambulance Service	Naval Hospital, Millington Navy Road	(901) 873-5801/5802 or 9-911
Hospital	Methodist North Hospital 3960 Covington Pike	(901) 372-5211 or 9-911
Southern Poison Control Center	—	(901) 528-6048
Lawson Anderson	EnSafe/Allen & Hoshall Memphis, Tennessee	(901) 372-7962
Doug Petty	EnSafe/Allen & Hoshall	(901) 372-7962

Mark Taylor, SOUTHDIV Engineer-in-Charge will be contacted after appropriate emergency measures have been initiated onsite.

7.8.1 Site Resources

Cellular telephones will be used for emergency use and communication/coordination with NAS Memphis. First aid and eye wash equipment will be available at the work area.

7.8.2 Emergency Procedures

Conditions which may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite, or if a condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer.
- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately halt work and act according to the instructions provided by the Site Health and Safety Officer.
- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer that indicate possible routes for upwind escape.

- The discovery of any conditions that would suggest the existence of a situation more hazardous than anticipated will result in the suspension of work until the Site Health and Safety Officer has evaluated the situation and provided the appropriate instructions to the field team.
- If an accident occurs, the Project Manager is to complete an Accident Report Form (See Attachment C) for submittal to the managing principal-in-charge of the project.
- If a member of the field crew suffers a personal injury, the Site Health and Safety Officer will call (901) 372-5211 or 9-911 (serious injury) to alert appropriate emergency response agencies, or administer onsite first aid (minor injury) as the situation dictates. An Accident Report Form will be completed for any such incident.
- If a member of the field crew suffers chemical exposure, the affected body areas should be flushed immediately with copious amounts of clean water, and if the situation dictates, the Site Health and Safety Officer should alert appropriate emergency response agencies or personally ensure that the exposed individual is transported to the nearest medical treatment facility for prompt treatment. (See Attachment B for directions to the emergency medical facility.) An Accident Report Form will be completed for any such incident.

Additional information on appropriate chemical exposure treatment methods will be provided through MSDS in Attachment A of each SIP. Directions to the nearest emergency medical facility capable of providing general emergency medical assistance and treating chemical burns

are provided in Attachment B of this CHASP. Directions from individual sites to the NAS Memphis South Gate will be provided as Attachment B of each SIP.

7.9 Forms

The following forms will be used in implementing this CHASP:

Plan Acceptance Form
Plan Feedback Form
Exposure History Form
Accident Report Form

A SSHSP Plan Acceptance Form will be filled out by all employees working on the site before site activities begin. The Plan Feedback Form will be filled out by the Site Health and Safety Officer and any other onsite employee who wishes to fill one out. The Exposure History Form will be completed by both the Project Manager and the individual(s) for whom the form is intended. Examples of each form are provided in Attachment C of this plan.

All completed forms must be returned to the Task Order Manager at EnSafe/Allen & Hoshall, Memphis, Tennessee.