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OHM Remediation
Services Corp.

WORK PLAN
FOR
UNDERGROUND STORAGE TANK REMOVALS AT BUILDING NO. 25
MCB CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0078

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OHM Project No. 17418

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1.0 INTRODUCTION

This Work Plan (WP) presents OHM Remediation Services Corp.'s (OHM's) approach for removing five and up to nine underground storage tanks (USTs) at Building No. 25 (MWR dry cleaners), Marine Corps Base (MCB), Camp Lejeune, North Carolina. This WP has been prepared for the Department of the Navy, Naval Facilities Engineering Command (NAVFAC), Atlantic Division (LANTDIV) under Multi-Contaminant Remedial Action Contract (RAC), Contract Number N62470-93-D-3032. This document has been prepared in accordance with the following documents:

- Basic Contract
- NAVFAC Specifications Section No. 01010 - "General Paragraphs", dated February 1995
- Project Drawings which are referred to as Project Documents

Additional plans have been developed by OHM for this delivery order and are to be considered as integral components to this WP. As such, the have been appended to this plan as follows:

- Site Specific Health and Safety Plan (SSHSP)
- Sampling and Analysis Plan (SAP)
- Transportation and Disposal (T&D) Plan

This WP identifies and describes how OHM will implement the major tasks encompassing the removal of the USTs at Building 25 in conformance with the contract requirements. It includes the following sections:

- Section 2.0 Site Background
- Section 3.0 Site Description
- Section 4.0 Site Preparation and Mobilization
- Section 5.0 Site Control Plans
- Section 6.0 Site Work
- Section 7.0 Site Restoration and Demobilization
- Section 8.0 Reporting
- Section 9.0 Project Schedule

The purpose of this document is to facilitate the removal of the USTs at Building 25. The goal of this project is to safely remove and dispose the USTs and obtain a system closure status from the State of North Carolina, Department of Environment, Health, and Natural Resources, Division of Environmental Management (DEM).

2.0 SITE BACKGROUND

MCB Camp Lejeune is a training base for the U.S. Marine Corps, located in Onslow County, North Carolina as shown in Figure 1. The base covers approximately 236 square miles and includes 14 miles of coastline. MCB Camp Lejeune is bounded to the southeast by the Atlantic Ocean, to the northeast by State Route 24, and to the west by U.S. Route 17. The town of Jacksonville, North Carolina is located north of the base.

The underground storage tanks were reportedly installed in the 1940s and have been used in conjunction with dry cleaning operations. The capacity for two of the USTs has been reported as 1,000 gallons, the volumes of the remaining USTs are unknown. There are two known solvents that have occupied the USTs; 1) varsol (a petroleum based product), and 2) perchloroethylene. Varsol was used from the 1940s until the 1970s when the dry cleaners switched over to using perchloroethylene, which was used until the late 1980s when the tanks were taken out of service. Currently, the facility is still using perchloroethylene in its cleaning process; however, the solvent is contained in aboveground tanks and within the confines of Building 25.

Five of the USTs were identified during excavation and sampling activities previously conducted at the site. During these activities, samples were obtained from the excavated soil and submitted for laboratory analysis. Unconfirmed analytical data indicated that concentrations of trichloroethene and tetrachloroethene (perchloroethylene) exceeded RCRA characteristic levels and would require management and disposal as a hazardous material, if excavated and discarded. Subsequent to sampling, the excavation was backfilled and compacted to surface grade and seeded and mulched.

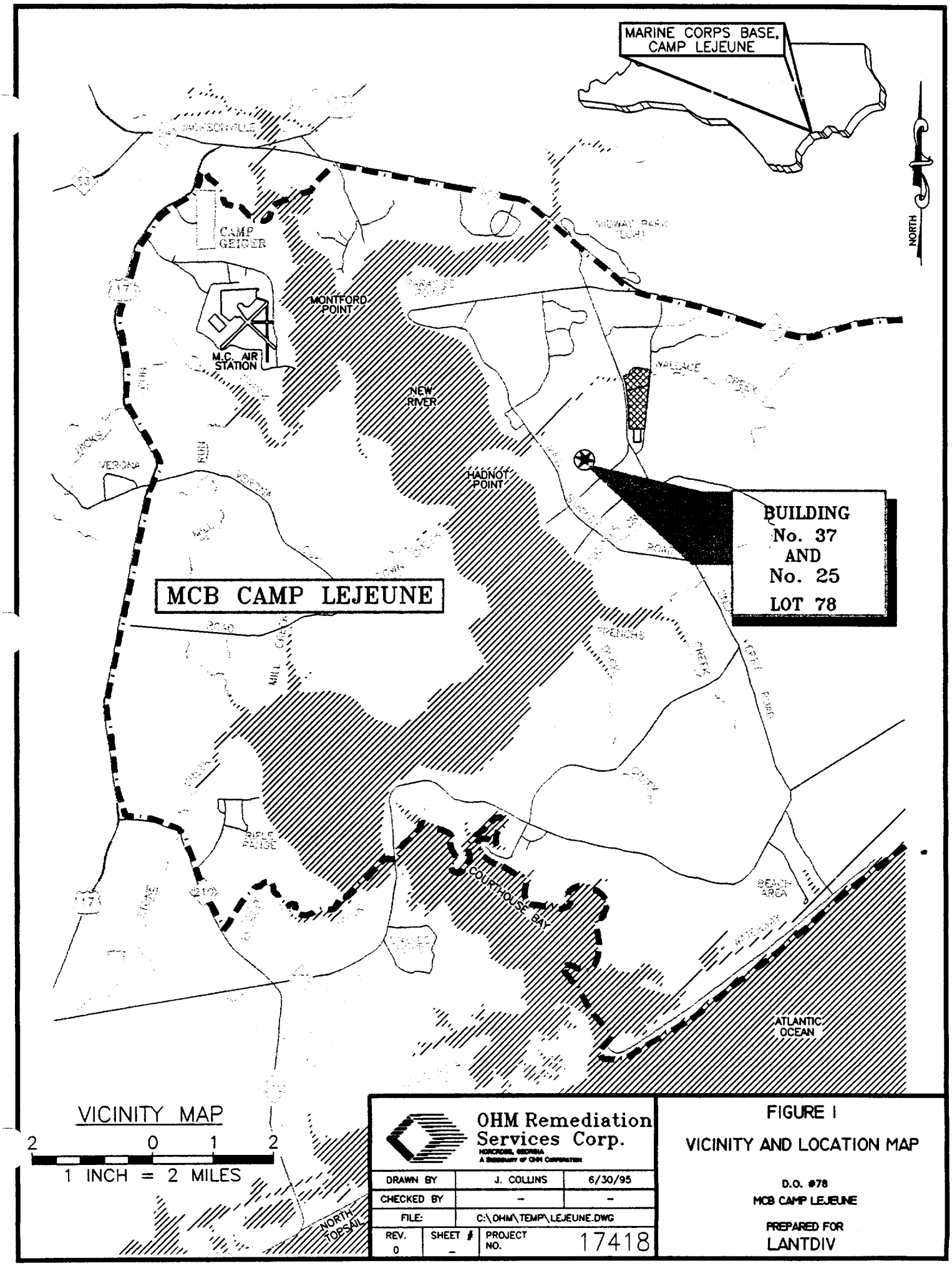

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FIGURE 1

VICINITY AND LOCATION MAP

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3.0 SITE DESCRIPTION

Building 25 is within a highly visible and densely populated area of MCB Camp Lejeune. Barracks, office buildings, and other occupied structures are adjacent to Building 25 in each direction. Aboveground and underground utilities, as noted during the site walk and from site drawings provided, are directly adjacent to Building 25 and more specifically within the immediate vicinity of the USTs. A site plan showing Building 25, the assumed locations of the USTs, aboveground and underground utilities, and other site improvements is provided as Figure 2. During excavation and removal of the USTs, extreme care will be required to ensure that utilities, vegetation, trees, and other site improvements, as identified herein, are protected.

The surface topography at the site is generally flat with surface water runoff flowing towards a drainage inlet located adjacent to and NW of the corner of Building 25. Based on previous subsurface investigations conducted at MCB Camp Lejeune, the site soils are expected to consist primarily of fine to medium-grained sands (15 to 30 feet thick) underlain by oolitic, fossilferrous limestone (6 to 20 feet thick) which is underlain by a unit of silty sand.

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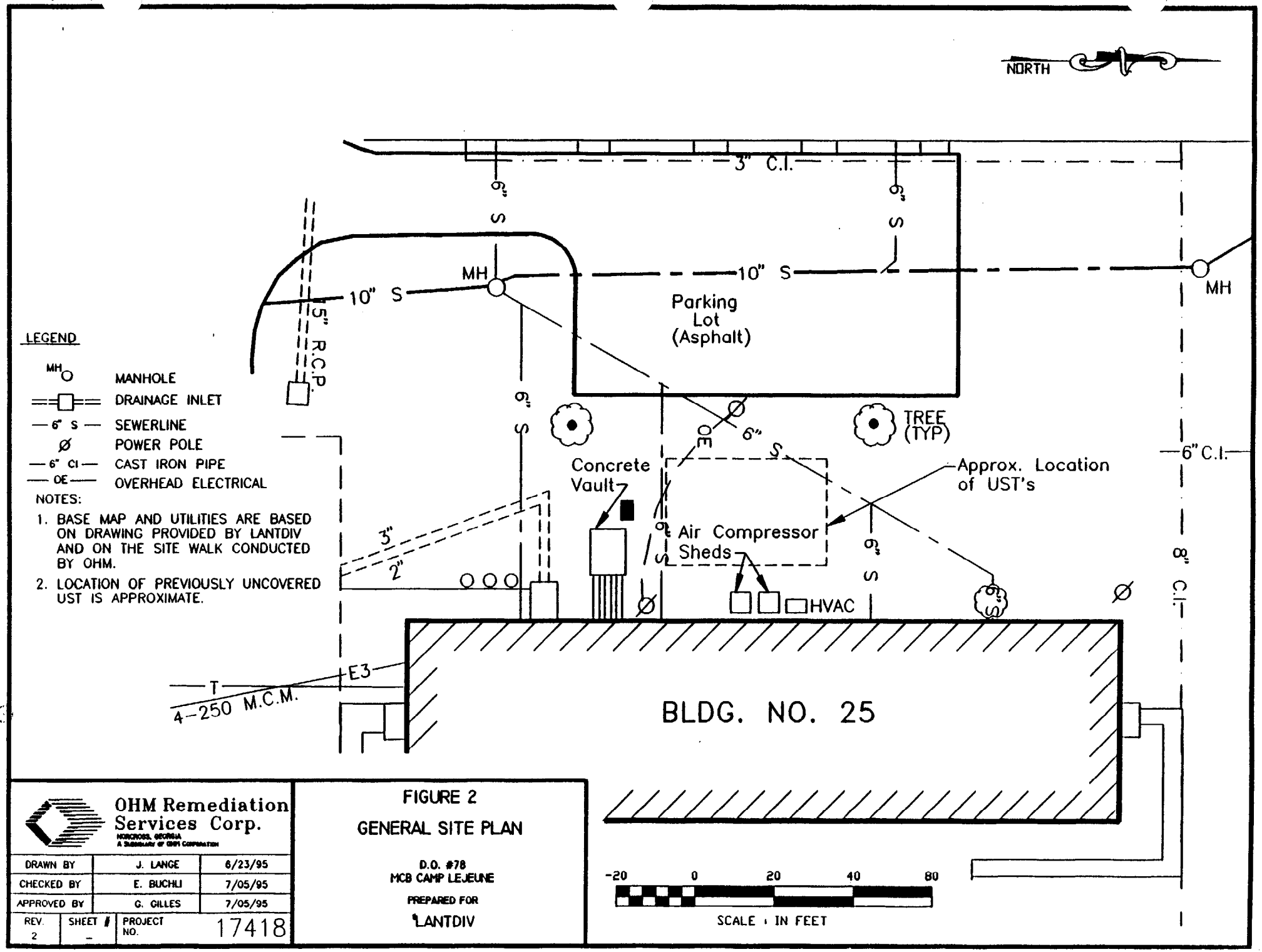

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FIGURE 2

GENERAL SITE PLAN

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4.0 SITE PREPARATION AND MOBILIZATION

Prior to mobilizing to the site to remove the USTs, a preliminary site investigation with limited excavation activities will be conducted to obtain the following information:

- Determine the location and exact number of USTs and associated piping to be removed.

- Obtain samples from the tanks for content identification and laboratory analysis.

- Procure samples from the excavation(s) (USTs and associated piping) for waste characterization.

The preliminary site investigation will also enable determination as to the quantity and final disposition of the tanks content and whether a release from the USTs has occurred. Upon receipt of analytical results and determination of the waste stream/characterization, OHM will remobilize to the site to remove the USTs.

OHM is currently performing work at MCB Camp Lejeune under multiple delivery orders with available personnel and equipment on the base. Supplementary personnel and equipment will be mobilized (for both phases of work) from OHM's Southeast Region offices. Prior to beginning work on site, a training meeting will be conducted to brief all site personnel on the SSHSP, construction drawings, and other relevant site-specific plans. Site hazards and conditions will be discussed and all personnel will acknowledge their understanding and compliance with all activities and the plan by signing an approved acceptance form.

Project mobilization and site setup will consist of the following main activities:

- Delivery of Equipment - OHM will deliver supplementary equipment necessary to perform the work. The heavy equipment will consist of a trackhoe, bull dozers, and compactors. Light weight equipment will consist of all sampling equipment, decontamination equipment, health and safety equipment, and general supplies.

- Temporary Office - OHM will utilize the project office at OHM's existing office trailer in Lot 203.

- Erosion and Sedimentation Control - OHM will establish controls to prevent erosion and sedimentation through the use of sediment fencing. Section 5.1 of the WP details the erosion and sedimentation control measures required by the State of North Carolina.

- Install Safety Fencing - OHM personnel will erect safety fencing around the UST excavation and associated piping. Fencing will be four feet high, bright orange,

polyethylene, mesh fence to prevent personnel from accidentally entering the open excavation.

- Health and Safety Zones - The site will be segregated into work areas on the basis of degree of hazard and PPE requirements. Personnel working within the CRZ will be required to wear the appropriate PPE as outlined in the SSHSP. Excavation areas within the CRZ will be designated the exclusion zone and will be delineated by orange safety fencing. OHM health and safety personnel will provide site air monitoring as specified in the SSHSP and will adjust work zone boundaries as appropriate.

- Decontamination Area - Personnel and equipment decontamination areas will be provided within the Contamination Reduction Zones (CRZ) upon exiting the contaminated working areas. The SSHSP addresses these areas in detail.

- Stockpile Area Preparation - The designated stockpile area will be cleared of debris. Plastic sheeting will be spread on the ground surface to temporarily store and separate the soil being excavated.

- Waste Characterization and Disposal Authorization - OHM will collect samples during both phases of work for disposal characterization. A disposal/treatment facility (or facilities) will be identified for acceptance of the contaminated soil and residual product in the tanks which will be removed. All disposal documentation necessary will be prepared and will be provided to the NTR for approval and authorization as described in the T&D Plan.

- Common Fill Identification - A borrow area on the base will be identified for the supply of common fill for site restoration. As required all chemical and geotechnical samples will be collected and forwarded to respective laboratories.

- Site Fence Installation - Since the project will be conducted on a secure military facility, only temporary orange plastic safety fencing will be installed around areas where open excavations are present.

5.0 SITE CONTROL PLANS

OHM will implement site control plans to prevent negatively impacting the surrounding environment while performing remedial activities. Three specific plans that are discussed in the following section are as follows:

- Erosion and Sedimentation Control Plan
- Spill Prevention and Control Plan
- Stormwater Management Plan

Portions of these pans will be implemented immediately once OHM mobilizes to the site, while other activities will be implemented as necessary. The following sections describe the activities for each of these plans.

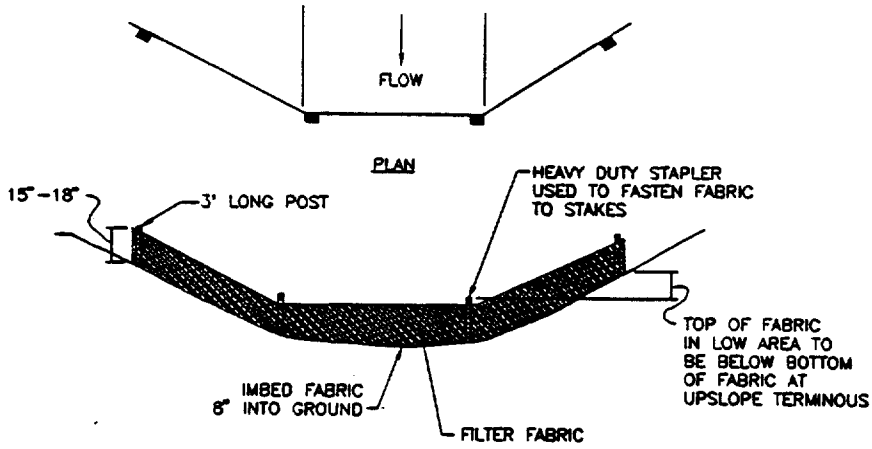
5.1 EROSION AND SEDIMENTATION CONTROL PLAN

This Erosion and Sedimentation Control Plan (ESCP) has been prepared to provide measures to protect nearby surface waters that could be negatively impacted by construction activities if proper sediment and erosion protection measures are not taken within this area having easily erodible sandy surface soils. To protect against damage, storm water surface run-off leaving the site will be controlled by temporary erosion/sediment control techniques such as silt fences and straw silt barriers as shown in Figures 3 and 4, respectively. Open excavations or stockpiled soil vulnerable to creating erosion problems during construction activities will be held to a minimum.

Silt fencing will be constructed around all high activity construction and excavation areas where off-site migration of soil may occur. Mulch will be placed over and around natural and/or wooded areas that are disturbed during excavation activities. Areas which are not expected to be reclaimed by natural vegetation will be seeded and mulched, sodded, and/or covered with seeded, biodegradable erosion control matting.

Upon completion of backfilling and compaction activities, permanent seeding will be performed over the affected areas, and any other areas where natural revegetation will not occur or will not occur quickly.

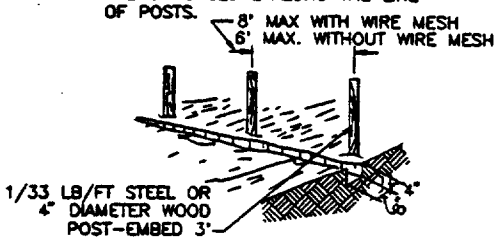
Erosion and sediment control structures will be required during both phases of work. The Construction Specifications, Construction Schedule, and Maintenance Plan that follows are applicable to proposed erosion and sediment control practices in both Phases I and II activities.



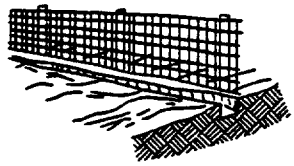
SILT FENCE CONSTRUCTION

NOT TO SCALE

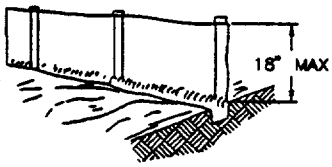
1. SET POSTS AND EXCAVATE A 8" X 4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



2. STAPLE OR ATTACH FENCING TO THE UPSLOPE SIDE OF POSTS. EXTEND WIRE 6" INTO TRENCH.

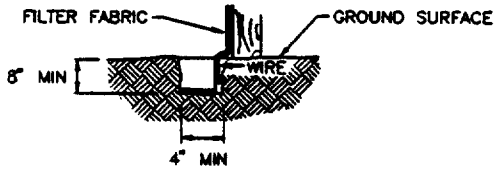


3. ATTACH THE FILTER FABRIC TO UPHILL SIDE OFTHE WIRE FENCE AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.



DETAIL – SILT FENCE

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FIGURE 3

SILT FENCE DETAIL

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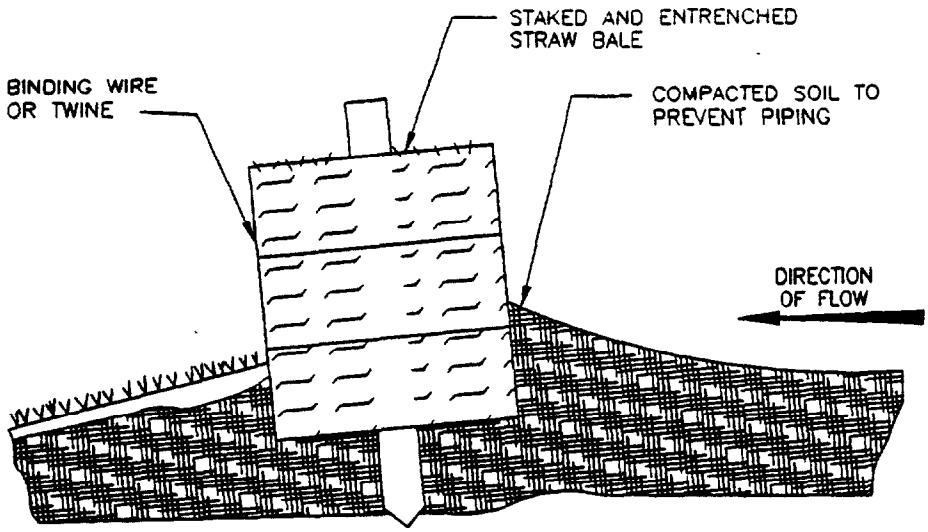
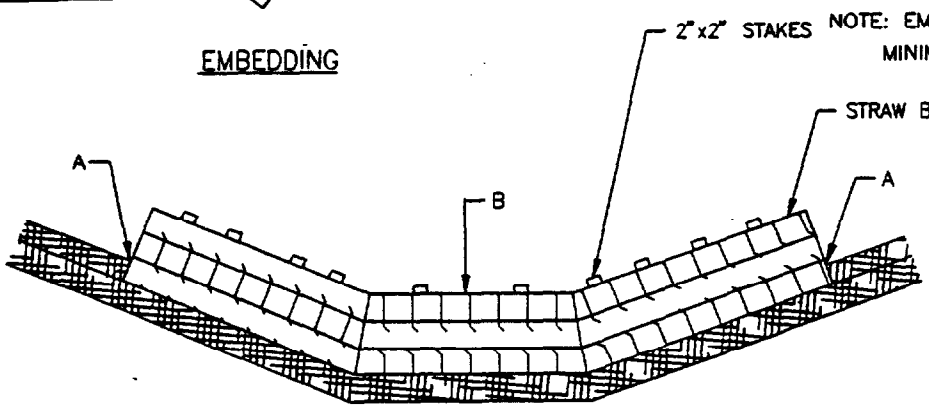


EMBEDDING

NOTE: EMBED STRAW BALES A MINIMUM OF 4 INCHES.

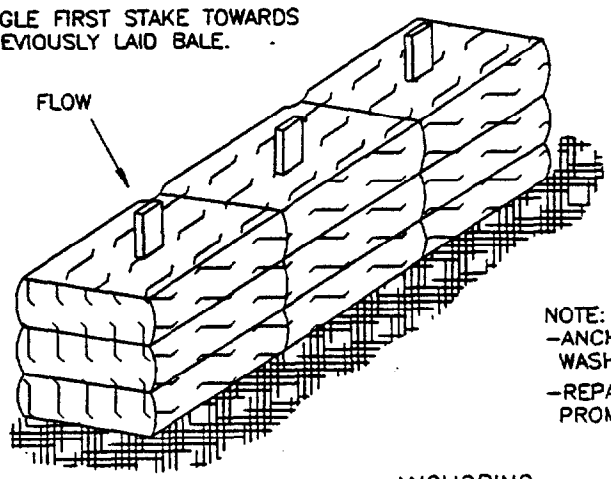


POINT "A" MUST BE HIGHER THAN POINT "B".

PLACEMENT IN DRAINAGE WAY

ANGLE FIRST STAKE TOWARDS PREVIOUSLY LAID BALE.

2"x2" STAKES EMBEDED 1'-6" TO 2'-0" IN GROUND.



NOTE:
- ANCHOR AND EMBED INTO SOIL TO PREVENT WASHOUT OR WATER WORKING UNDER BARRIER.
- REPAIR OR REPLACEMENT MUST BE MADE PROMPTLY AS NEEDED.

ANCHORING

STRAW SILT BARRIER

NOT TO SCALE

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FIGURE 4

STRAW SILT BARRIER

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5.1.1 Construction Specifications

1. Silt Fencing

- Construct silt fence at the location(s) shown on Figure 5 to prevent sediment from being washed into a drainage system.
- Locate posts downslope of fabric to help support fencing.
- Bury toe of fence a minimum of eight inches deep to prevent undercutting.
- When joints in fabric are necessary, securely fasten the fabric at a support post with overlap to the next post.
- Filter fabric to be of nylon, polyester, propylene or ethylene yarn with extra strength - 50 pounds/inch^2 (minimum) - and with a flow rate of at least 0.3 gallons/feet^2/minute. Fabric should contain ultraviolet ray inhibitors and stabilizers
- Post shall be four inches in diameter pine or suitable equivalent with a minimum length of four feet.

2. Straw Silt Barrier

- Construct straw silt barrier as required to prevent sediment from being washed into a drainage system.
- Embed straw bales a minimum of four inches to prevent undercutting.
- Use 2" x 2" stakes embedded a minimum of 1'-6" in the ground to secure the straw bales.
- Use a minimum of two stakes to secure each straw bale.
- Angle each stake toward adjacent straw bale.

3. Seed Bed Preparation

- Scarify existing subgrade. Seed will match existing vegetation and will be spread at five pounds/1,000 feet^2. A CID A-A-1909, Type I, Class 2, 10-10-10 analysis fertilizer will be spread at 25 pounds/1,000 feet^2. A grain strain mulch will then be applied at 100 pounds/1,000 feet^2.

Phase I

- Flag work limits, mark any tress to remain, and create buffer area for protection
- Identify/mark location of underground utilities within constructing limits.
- Install silt fence and/or straw silt barrier around proposed construction limits and/or at the locations shown on Figure 5.
- Excavate overburden fill material to top of tanks and piping.
- Sample contents of tanks.
- Obtain soil samples of excavation/piping trench
- Loosely backfill excavation/trench with material removed.
- Review analytical data.
- Wastestream approval/characterization.

Phase II

- Make necessary repairs and/or expand work/construction limits flagged during Phase I activities.
- Recheck underground utilities marked during Phase I activities. Replace utility markings as necessary.
- Identify any areas or locations that require additional erosion control devices.
- Reconstruct and/or repair silt fences and other erosion control structures installed during Phase I activities. Install new/additional silt fencing at the locations shown on Figure 5.
- Excavate overburden fill material to top of tanks and piping.
- Drain/flush product piping into tanks.
- Pump/remove and dispose of tanks contents.
- Excavate and remove USTs and associated piping.
- Segregate and stockpile clean soil at the location shown on Figure 5. Contaminated soil will be loaded directly into transport vehicles and routed to a permitted disposal facility.
- Obtain soil samples for cleanliness verification.
- Backfill excavation with uncontaminated soil or borrow material.
- Seed and mulch all disturbed areas.

5.1.2 Maintenance Plan

1. All erosion and sediment control practices will be checked by OHM personnel for stability and operation following every rainfall event but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.

2. Sediment will be removed from behind the sediment fence when it becomes greater than one foot deep at the fence. The sediment fence will be repaired as necessary to maintain a barrier.

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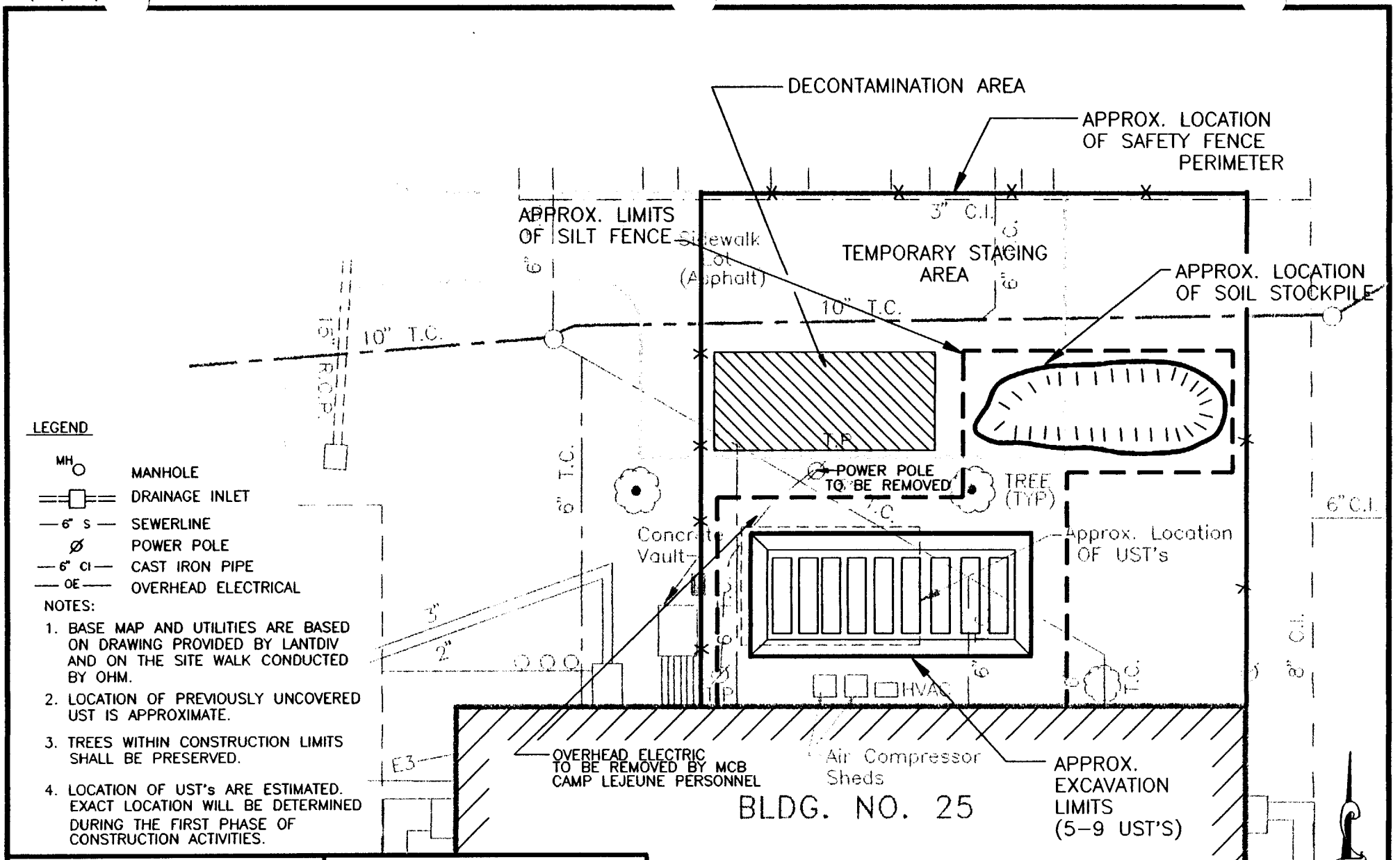

LEGEND

MH	MANHOLE
	DRAINAGE INLET
6" S	SEWERLINE
	POWER POLE
6" CI	CAST IRON PIPE
OE	OVERHEAD ELECTRICAL

NOTES:

1. BASE MAP AND UTILITIES ARE BASED ON DRAWING PROVIDED BY LANTDIV AND ON THE SITE WALK CONDUCTED BY OHM.
2. LOCATION OF PREVIOUSLY UNCOVERED UST IS APPROXIMATE.
3. TREES WITHIN CONSTRUCTION LIMITS SHALL BE PRESERVED.
4. LOCATION OF UST's ARE ESTIMATED. EXACT LOCATION WILL BE DETERMINED DURING THE FIRST PHASE OF CONSTRUCTION ACTIVITIES.

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FIGURE 5
PROPOSED SITE FEATURES

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3. All seeded areas will be fertilized, reseeded as necessary, and mulched according to specifications to maintain a vigorous, dense vegetation cover.

5.2 SPILL PREVENTION AND CONTROL PLAN

This Spill Prevention and Control Plan will address two categories of spills that may occur in association with the work: on site and off site. The types of spill most likely to occur are the release of soil from trucks and/or the release of product/contaminated water during contents removal and during removal of the tanks and piping.

Various methods will be employed during different project activities to prevent spills during construction activities. Prevention methods that will be enforced on site will be the control of the Exclusion Zone. All personnel and equipment leaving this area will be decontaminated. During loading of dump trucks and/or vacuum trucks destined for a disposal/treatment facility, a technician will monitor the loading of trucks for spillage, leaking, firm loading foundation, tight gate seals, tight valve seals, and tarping. Truck drivers will be under OHM supervision and will not be allowed to congest the area thus preventing accidents. Finally, drivers will be instructed to travel directly to the disposal facility, shortening time for opportunities for accidents while loaded.

5.2.1 Soil

Should a spill of contaminated soil occur, a response will be made as soon as possible to collect and remove the spill. If the spill occurs on site, OHM will respond immediately to contain and return the contaminated soil to a stockpile or truck that is secure. The cause of the spill will be determined and corrective action will be taken if necessary. Should the spill occur off site, the truck driver will immediately contact the OHM site supervisor so that the proper notifications may be made.

The site supervisor will carry a pager so that the truck dispatcher may contact him at any time. A special emergency code will be provided so that the site manager will be immediately alerted of the urgency to respond to the page. Action will be taken immediately to contain and recover material. Spills which occur on clean soil will be over excavated to verify that all contaminated soil is removed. Spills occurring on concrete will be swept with brooms or vacuumed to ensure that all contaminated soil is collected.

5.2.2 Product/Water

Should a release of product or contaminated water occur during the course of construction activities (i.e., contents removal, UST/piping removal), OHM will respond immediately to contain the release. OHM will make every effort to prevent a release from migrating into the subsurface environment, drainage system, stream, lake, or other surface bodies of water. Spilled product/water will be cleaned up using an adsorbent material and/or adsorbent booms/ pads.

Should a spill occur off-site, the driver will contain the release as described above and then contact the OHM Site Supervisor immediately for back-up and support help. Spills, both on-site and off-site, which occur on clean soils will be over excavated to verify that all contaminated material/debris is removed.

Material and debris generated to clean up a spill will be collected, contained and disposed of in accordance with the T&D Plan (Appendix A).

A report of all spills or leaks, regardless of their quantity, will be made to the NTR immediately following their discovery. A written follow up will be submitted after the initial report.

5.3 STORMWATER MANAGEMENT PLAN

The primary objective of this Stormwater Management Plan is to prevent the free and uncontrolled flow of water across the Exclusion Zone and contaminated soil stockpiles. Diversions and controls will prevent clean water from becoming contaminated and incurring additional costs and effort to dispose. Stormwater can be discharged to ditches. The secondary objective of the management is to identify what will be done with rain water that enters the excavation(s).

The excavation will be controlled to prevent the flow of stormwater runoff from adjacent areas into the excavation. This will be accomplished by the placement of berms and/or trenches around the perimeter of the excavation and stockpiles that will divert surface flows off site and away from the work area. The drainage paths will be constructed to assure that contaminated soil is not carried off site or onto uncontaminated areas.

To control erosion and cross contamination in the excavated areas and stockpiles, polyethylene sheeting will be used. Migration of contaminated soil from stockpiles onto uncontaminated soil areas will be controlled by covering contaminated soil stockpiles with polyethylene sheeting. If large volumes of water are collected that have come in contact with the contaminated soil, that water will be contained and sampled for laboratory analysis in accordance with the SAP (Appendix B). The water will be analyzed in accordance with the SAP. Upon receipt of the analytical results, a decision will be made for the appropriate disposal method.

6.0 SITE WORK

Field activities for this project will be conducted in two phases; 1) preliminary excavation and sampling, and 2) UST removal. Preliminary excavation and sampling activities will consist of sampling the tanks and profiling their contents for disposal, and sampling the excavation (required for sampling the tanks contents) for waste profiling. UST removal activities will include the excavation, cleaning, removal, and destruction of five to nine USTs and associated piping. Also, sampling and analysis of soil within the excavation(s), disposal of investigation derived wastes and state required reporting will be a part of the UST removal activities.

The following sections describe the various activities that will be conducted to remove and close the USTs at the Building 25.

6.1 NOTIFICATION

Based upon the regulations regarding UST permanent closure in the state of North Carolina; regional offices of the DEM should be notified at least 30 days prior to UST removal activities. Form GW/UST-3 should be completed and mailed to the regional office in Wilmington, North Carolina. OHM will prepare all forms and submit them to MCB Camp Lejeune for signing and forwarding to the state. Local officials, including fire marshals and building inspectors, should be contacted to determine any local requirements for UST closure activities.

6.2 PRELIMINARY EXCAVATION AND SAMPLING

Prior to conducting excavation activities, on site utilities will be located, flagged, and verified with base personnel to prevent damage. The name of the emergency contact person and a telephone number will be kept on site by the site superintendent for all utilities that are identified in the area. Utilities and pipe lines that are to remain during excavation activities will be flagged and supports will be provided to prevent sagging that may cause breakage of leakage. Hand digging around utilities may be required.

6.2.1 Tank Contents Sampling

The contents of each UST will be sampled for profiling purposes and to determine waste stream characterization. To enable procurement of these samples, the top of the tanks will be excavated to expose the tank openings. The tanks will be opened and gauged to determine the volume of each tank and the associated volume of liquid contained within each tank. Samples from each tank will be collected per OHM standard operating procedures for hazardous liquid waste sampling and characterization. The samples will be analyzed, in accordance with the SAP (see Appendix B), to determine the waste characteristics and to evaluate the disposal options available. The contents of the USTs will be profiled and manifest requirements met, in accordance with T&D Plan (see Appendix A), prior to UST removal activities.

6.2.2 Soil Sampling

In addition to sampling the contents of each tank, the fill material and bottom of the tank pit will also be sampled, in accordance with the SAP, for waste characterization. The soil samples will be analyzed and profiled for proper disposal based upon the laboratory analytical results. This task will save time during the excavation and removal of the USTs by allowing the field personnel to directly load soil into containers for disposal and transport the soil away from the excavation area.

The overburden material excavated from the top of the tanks will be temporarily staged on bermed sheets of plastic at the location(s) shown on Figure 5. The material will be covered with plastic sheeting to minimize contact of precipitation with the soil.

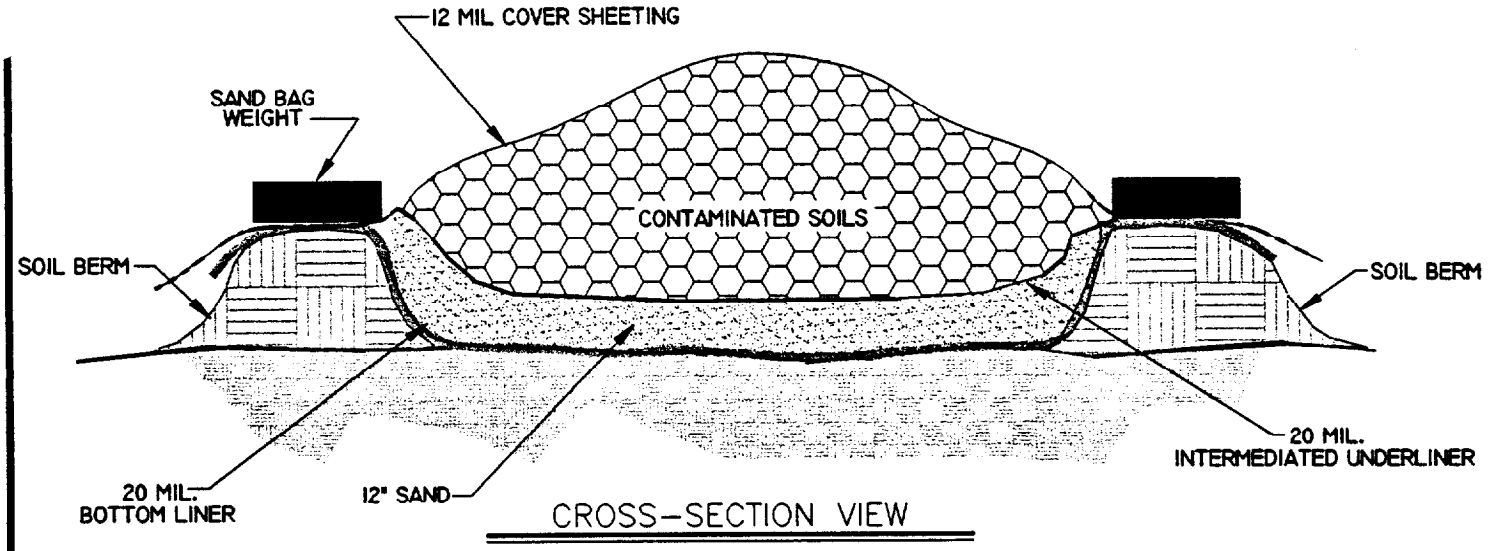
As the wastestream characterization and approval process could take up to 60 days, the excavation will be backfilled with the material removed. Prior to demobilizing from Phase I activities, all disturbed areas will be graded and erosion control measures will be left in-place.

6.3 UST REMOVAL

Upon completion of the waste stream characterization and approval process, OHM will remobilize to the site to remove the USTs at Building 25. The overburden material will be removed to expose the USTs, and the product piping from the tank connections to the point of entry into Building 25. The excavated material will be field screened (i.e., PID, OVA), segregated and stockpiled at the location(s) shown on Figure 5. A detail for constructing the soil stockpile contaminated area is provided as Figure 6. Any remaining product within the product lines will be drained and/or flushed into the tanks. The product piping will then be disconnected from the tanks and the contents will be removed, transported and disposed, in accordance with the T&D Plan.

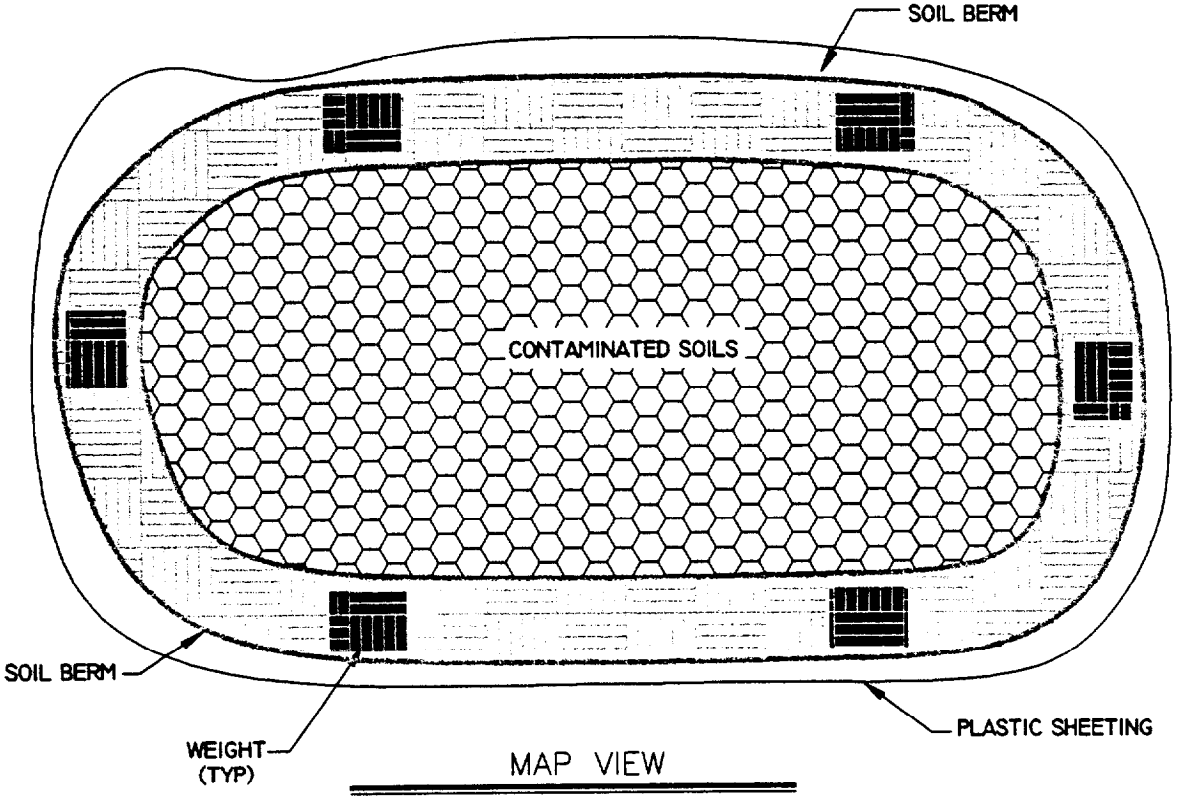
The product piping will be removed and capped (except the vent and fill lines). Dry ice will be introduced into each tank to purge explosive and organic vapors and obtain an inert atmosphere within each tank. When the atmosphere in each tank has been purged to the levels required in the SSHSP (Appendix C), the tanks will be excavated and removed from the ground for cleaning and shearing. The excavated soil will be field screened (i.e. PID, OVA), segregated (based on field screening), and stockpiled (see Figure 6) at the location(s) shown on Figure 5.

The tanks will be removed, one at a time, and placed in a bermed decontamination area (see Figure 5) where they will be cleaned in general accordance with American Petroleum Institute (API) Recommended Practice 1604 and 2015 Residues and rinse water generated during cleaning activities will be sampled and disposed of in accordance with the SAP and T&D, respectively. Subsequent to cleaning, each UST will be cut-up and routed to disposal as scrap metal at a recycling facility. Disposal of the tanks will be in accordance with the T&D Plan.



CROSS-SECTION VIEW

NOT TO SCALE



MAP VIEW

NOT TO SCALE

OHM Remediation Services Corp. NORCROSS, GEORGIA A SUBSIDIARY OF OHM CORPORATION			
DRAWN BY	J. COLLINS	6/30'95	
CHECKED BY	–	DATE	
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REV. 0	SHEET # –	PROJECT NO.	17418

FIGURE 6

SOIL STOCKPILE CONTAINMENT DETAIL

D.O. #78
MCB CAMP LEJEUNE
PREPARED FOR
LANTDIV

Any concrete tie down and/or pads located around and/or beneath the USTs will be removed and cleaned in the decontamination area prior to disposal. Residues and rinsate will be managed and disposed as outlined above. If any concrete is removed, it will be managed as debris in accordance with the T&D Plan.

To facilitate removal of the USTs, the tank pit will be over-excavated to dimensions approximately 2 feet beyond the nominal tank dimensions. The excavated soil will be field screened (i.e. PID, OVA), segregated (based on field screening), and stockpiled (see Figure 6) at the location shown on Figure 5. Confirmation soil samples will be collected from the tank pit(s), piping trench(s), and soil stockpiles and submitted for laboratory analysis. The specific sampling locations, parameters, methods, frequencies, and documentation are described in the SAP (Appendix B). Subsequent to sampling, the excavations (tank pit and piping trench) will be backfilled, compacted, and restored as outlined in Section 7.0.

Field documentation of information pertaining to the closure of the UST system and sampling activities will be recorded in a field log with consecutively numbered pages. Records will be recorded in non-erasable waterproof ink. If corrections are required, they will be made by crossing a single line through the error and entering the correct information. Corrections will be initialled and dated by the person making the correction. The log book will contain sufficient detail to reconstruct the events without reliance on the memory of field personnel for the report preparation. The information recorded in the log book will, at a minimum, include:

- Crew identification
- Dates and times on site
- Weather conditions
- Field observations
- Locations of the USTs and associated piping
- Sampling procedures
- Number and types of samples collected
- Decontamination procedures
- Variances from standardized work plan
- Sketches of excavation area and sample locations, including dimensions and references to fixed landmarks

- Identification of photographs

7.0 SITE RESTORATION AND DEMOBILIZATION

Once UST removal activities are complete, restoration of the site will be performed with subsequent demobilization of OHM personnel and equipment. Those activities described in this section consist of; 1) removal and disposal of contaminated soil, 2) placement and compaction of common fill, 2) site restoration, and 4) demobilization.

Based on analytical results of samples obtained from the stockpiles, the soil will be disposed of in accordance with the T&D Plan contained in Appendix A and/or used to backfill the excavation(s).

The tank pit excavation(s) and piping trench(s) will be backfilled with common fill material native to the Camp Lejeune area and/or uncontaminated stockpiled material (based on analytical results). Backfill material will be placed and compacted in lifts approximately one foot thick. If necessary, a bridging lift greater than one foot will be allowed for the first lift placed in the excavation to prevent piercing the compacted fill with the earthmoving equipment.

Upon completion of compaction, a layer of top soil will be placed across the excavated and disturbed areas and will be seeded and mulched to produce grass similar to that existing in the surrounding area.

When all work associated with site restoration has been completed (i.e. seeding and mulching, soil removal and disposal, site clean-up, etc.) OHM will demobilize from the site. All equipment and material that was mobilized to the site will be removed. All project related debris, trash and incidental waste will be disposed appropriately. Prior to complete demobilization, the NTR or delegate will be requested to perform a site walk to inspect the site and approve substantial completion.

8.0 REPORTING

During the course of the project, OHM will monitor and track project activities. This information will be reported to the appropriate parties during meetings or in submittals, permits, and periodic reports. These various documents are listed in the Submittal Register contained in NAVFAC Specifications Section No. 01010 - "General Paragraphs", dated February 1995.

OHM will prepare a Closure Report for the USTs removed. As required for site closure, the following information will be prepared by OHM and forwarded to MCB Camp Lejeune for submission to the appropriate regional DEM office within 30 days following the tank closure per 15A NCAC 2N .0800:

1) Completed and signed GW/UST-2 form

2) Base Map (including scale, name of U.S.G.S. Quadrangle map and North Arrow) showing all relevant features, including roads, buildings, and underground utilities.

3) Detailed scale map of UST excavation area including:
   - Orientation of USTs, pumps, and product lines
   - Length, diameter and volume of USTs
   - Type of material(s) stored (currently and previously)
   - Sample locations in UST and product line excavations identified by letter or number
   - North arrow
   - Buildings and road boundaries

4) Procedures utilized in sampling and description of the soil sampling points as follows:
   - Show location of samples in excavation
   - Indicate depth (below land surface) at which samples were collected
   - Indicate if sample was collected from side or floor of an excavation
   - Indicate depth of tank burial (from land surface to top of tank)
   - Identify each sample by letter or number

5) Description of quality control measures as follows:
   - Describe how sample was collected (i.e. shovel, auger, etc.)
   - Describe how sample was preserved and transported
   - Describe decontamination procedures used
   - Describe time and date sample was collected and date submitted to the laboratory

6) Sample results including:
   - Copy of all laboratory results
   - Method of analysis used

- Copy of completed chain-of-custody
- Reference to sampling points shown on map

7) Confirmation of final disposition of any contaminated soil

8) Final destination of tank and/or contents

9) Signature and seal of Professional Engineer or Licensed Geologist

9.0 SCHEDULES

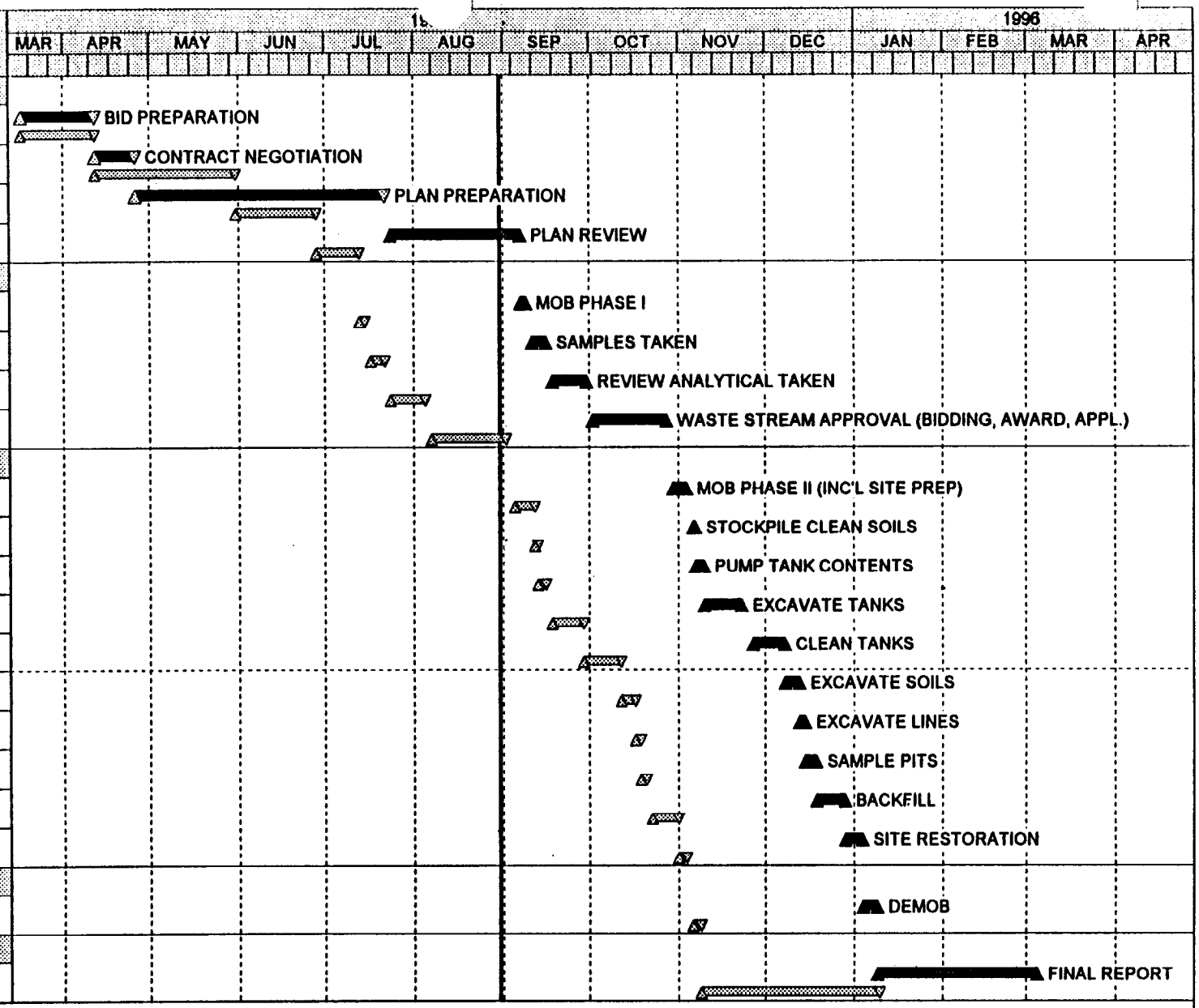
9.1 PROJECT SCHEDULE

The project schedule, outlining the major activities, is attached as Figure 7. It begins with receipt of notice to proceed (NTP) from LANTDIV and identifies the sequence and durations of the major tasks. Work progress will be tracked against this schedule.

9.2 CONSTRUCTION SCHEDULE

- Obtain plan approval and other applicable Marine Corps Base requirements.
- Hold preconstruction conference at least one week prior to starting construction.

Act ID	Orig Dur	Early Start	Early Finish
PRE-CONSTRUCTION ACT.			
1000	18	17MAR95 A	11APR95 A
1010	34	12APR95 A	25APR95 A
1020	20	26APR95 A	21JUL95 A
1030	10	24JUL95 A	06SEP95
MOB PHASE I / SITE WORK			
2000	2	07SEP95	08SEP95
2020	5	11SEP95	15SEP95
3000	10	18SEP95	29SEP95
3010	20	02OCT95	27OCT95
MOB PHASE II / SITE WORK			
4000	5	30OCT95	03NOV95
4010	1	06NOV95	06NOV95
4020	3	07NOV95	09NOV95
4030	9	10NOV95	22NOV95
4040	9	27NOV95	07DEC95
4050	3	08DEC95	12DEC95
4060	2	13DEC95	14DEC95
4070	2	15DEC95	18DEC95
4080	7	19DEC95	28DEC95
4090	3	29DEC95	03JAN96
DEMOBILIZATION			
5000	3	04JAN96	08JAN96
FINAL REPORT			
6000	40	09JAN96	04MAR96



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Data Date: 31AUG95

OHM REMEDIATION SERVICES CORP.
DELIVERY ORDER #78 BLDG. 25
REMOVE 5-9 UST's CONTAINING TCE

Appendix A

Transportation and Disposal Plan

OHM Remediation
Services Corp.

MATERIALS HANDLING, TRANSPORTATION AND DISPOSAL PLAN FOR REMOVAL ACTION AT BUILDING 25 MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY

Delivery Order 0078
N62470-93-D-3032

Prepared by

OHM Remediation Services Corp.
Norcross, Georgia

George E. Krauter, P.E.
Program Manager

James Dunn, P.E.
Project Manager

Hearn W. Tidwell, CHMM
T&D Coordinator

August 1994

OHM Project No. 17418

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Table 2.2 New Wastes

1.0 INTRODUCTION

This Materials Handling, Transportation and Disposal Plan (MHTDP) has been prepared for use during the removal action at Building 25, Marine Corps Base, Camp LeJeune, North Carolina. The MHTDP objective is to specify methods and procedures to be implemented by OHM to ensure that wastes generated during site activities will be handled, transported, stored, and disposed of in full compliance with applicable federal, state, and local rules and regulations.

Delivery Order 0078 was issued for source removal of several underground storage tanks (USTs), their contents, associated piping and concrete appurtenances. The exact number, location and volume of some of the USTs is unknown. The top of five USTs have been uncovered, but several more USTs are noted on drawings of the area. The USTs reportedly contain varsol, a petroleum-based dry cleaning solvent. Interviews with base personnel have indicated the storage of tetrachloroethylene (a.k.a. perchloroethylene, or perc) in two or more of these storage tanks adjacent to Building 25. Previous samples of soils from the area of the USTs indicated the possible presence of tetrachloroethylene and trichloroethylene at levels above regulatory thresholds.

2.0 CHARACTERIZATION OF WASTESTREAMS

Based on the information provided to OHM, items noted during a site visit on March 21, 1995, and in the Enclosure 2 of Delivery Order 0078, the following wastestreams have been identified:

- UST contents – varsol, PERC liquid and sludge
- Scrap steel – from tank carcasses after removal and cutting, general steel debris, including a locker, empty drums and cans, and posts
- Concrete debris from ballast slabs
- Contaminated soil surrounding the excavated tanks identified as hazardous waste based on analysis

Contaminants of concern include tetrachloroethylene (D039) and trichloroethylene (D040) in the soils surrounding the USTs, and varsol (D001) or tetrachloroethylene (D039) within the tanks. The source of the tetrachloroethylene is vital to the determination of appropriate waste codes.

Table 2.1 describes the materials for disposal, anticipated volumes, and potential treatment/disposal options. OHM anticipates generating additional waste materials during the remedial activities and these items are outlined in Table 2.2.

OHM will locate the tanks and uncover to expose them for sampling and volume assessment. Samples of each anticipated wastestream will be obtained and submitted for characterization and disposal analysis. Final characterization and proposed disposal alternatives for all waste materials generated is contingent on completion of those analyses. An addendum to this plan will be prepared with that information and submitted to the Navy when it is available.

Table 2.1
Estimated Existing Wastes

Waste Description	Estimated Volume	Treatment/Disposal Options
UST contents (varsol) D001	9,000 gallons	Recycle/fuels blend
Contaminated soils Tetrachloroethylene (D039) Trichloroethylene (D040)	100 cubic yards	Thermal desorption or incineration/ Subtitle D Landfill*
Decontaminated scrap steel from UST carcasses and metallic site debris	80 cubic yards	Recycle/scrap steel*
Decontaminated concrete from ballast slabs	80 cubic yards	Subtitle D Landfill*

*Assuming no U codes apply to waste

Table 2.2
Anticipated New Wastes

Waste	Description	Estimated Quantity	Treatment/ Disposal Options
Personal Protective Equipment (PPE)	PPE and other non-metallic contaminated debris generated during site cleanup	20 cubic yards	To be determined
Decontamination Water	Decontamination water from equipment and personnel cleanup during remedial actions	5,000 gallons	To be determined

3.0 WASTE DISPOSAL APPROVAL

OHM will assign a Transportation and Disposal (T&D) Coordinator to this project acting as a single point-of-contact for all waste management activities. The individual assigned to this project will be familiar with all the applicable portions of RCRA, CERCLA, and SARA regulations--especially 40 CFR 261 (Identification and Listing of Hazardous Wastes). In addition this individual will be familiar with the North Carolina regulations pertaining to hazardous and solid waste handling, treatment, storage, disposal, and transportation. This individual will review the analytical data and obtain pre-approval from the appropriate disposal facilities. The T&D Coordinator will also be responsible for preparing waste profiles to the selected disposal facilities and coordinating disposal approvals.

Based on the materials identified that will require off-site disposal, the T&D Coordinator, in consultation with the project management and procurement personnel, has reviewed potential vendors to prequalify transportation and disposal vendors based on:

- Notice of Violation (NOV) status
- Ability to handle the wastes identified
- Cost effectiveness of the available transportation and disposal options
- Past experience
- SB and SDB contract goals

At this time OHM has identified the following qualified vendors to provide transportation and disposal of wastes from this site:

Disposal

- LWD, Inc.
  Calvert City, Kentucky
- Browning-Ferris Industries
  Fayetteville, North Carolina
- Waste Management (Piedmont)
  Kernersville, North Carolina
- Laidlaw Environmental Services
  Bartow, Florida
- Laidlaw Environmental Services
  Roebuck, South Carolina
- ThermalKem, Inc.
  Rock Hill, South Carolina

Transportation

- A.R. Paquette & Company (SB)
  Glenwood, Florida
- Chemical Development Corp. (SB, WBE)
  Tierra Verde, Florida
- Hilco Transport Inc. (SB, WBE)
  Wilmington, North Carolina
- Robbie D. Wood
  Dolomite, Alabama
- Terra First
  Vernon, Alabama

All bids will be obtained based on a written solicitation and all bid responses will be in writing. All bids will be made in conjunction with OHM's procurement department. A condition of OHM's purchase order will be that the selected vendors must provide OHM with addresses, the name of a single point of contact, EPA ID numbers, permit verification, insurance verification, NOV status, and any other qualifying data necessary.

4.0 WASTE PACKAGING

OHM intends to remove the UST contents and decontamination waste by use of vacuum tanker(s). Scrap steel from the tanks and debris will be appropriately sized according to requirements of the selected disposal vendor and loaded into end dump trailers or flat bed trucks. The concrete debris will be appropriately sized and loaded into roll-off boxes or end dump trailers.

OHM plans to excavate and field screen soils utilizing immunoassay kits. Clean soils will be stockpiled on 6-mil plastic sheeting surrounded by a hay bale berm. Contaminated soils will be stockpiled in the stockpile with details in the work plan. Clean soils will be utilized as backfill. Contaminated soils will be loaded into lined end-dump trailers and transported to the disposal facility.

Non-hazardous materials will be accumulated on-site until sufficient quantities are available for shipment of a full load (≈80 drums, 5,500 gallons or 20-30 cubic yards). OHM will conduct weekly inspections of the waste storage areas. All temporary storage will be in compliance with 40 CFR 262.34 and the applicable North Carolina regulations.

5.0 PREPARATION OF REQUIRED DOCUMENTATION

OHM will prepare (or oversee the preparation of) all paperwork associated with off-site disposal for review and signature by LANTDIV and Camp Lejeune representatives. This will include TSDF waste profiles, hazardous waste manifests, land disposal restriction forms, labels and all other paperwork. The selected vendor(s) will be required to provide all labels, manifests, LDR forms, and other shipping paperwork. A completed example of these forms will be provided for OHM's review and approval at least one week in advance of the scheduled start of shipments. After these documents are reviewed by OHM, they will be provided to the Navy's representative for review and signature. Final copies of all labels, manifests, LDR forms and other shipping paperwork will be received by OHM's on-site personnel at least 24 hours in advance of the scheduled start of shipments.

Written verification that the proposed disposal sites are permitted to accept the contaminated materials specified is required for the disposal vendors with their approvals.. A written verification that all vehicles and containers were decontaminated prior to leaving the disposal site will be provided within three days of receipt of the waste materials. A written verification that wastes were actually delivered to the disposal site will be provided within seven days of receipt of waste materials. A certificate of destruction will be provided within seven days of the date of actual waste disposal and for final payment of all invoices.

6.0 TRANSPORTATION AND DISPOSAL

The T&D Coordinator or OHM's Site Supervisor will contact the selected vendor and schedule waste pick-ups in a timely manner to coordinate with the project schedule. Prior to shipment of wastes, OHM's on-site personnel, in conjunction with the T&D coordinator, will complete the attached Waste Disposal Activities Checklist. This checklist is to be completed for each waste shipment leaving the site. A copy of the completed form will be provided to the CO prior to waste transportation and with the Final Report.

OHM will maintain chronological organized files of weight tickets, manifest copies, LDR forms and other shipping paperwork for each shipment. OHM will also maintain a database of all pertinent information regarding each off-site shipment. Copies of the manifest file and database printouts will be provided to the LANTDIV and Camp Lejeune representatives upon request and at the completion of the project.

Appendix B

Sampling and Analysis Plan

OHM Remediation
Services Corp.

SAMPLING AND ANALYSIS PLAN
FOR
TANK REMOVAL AND SOIL REMEDIATION
BUILDING 25 TCE TANKS
MCB CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0078

Prepared by

OHM Remediation Services Corp.
Norcross, Georgia

For George E. Krauter, P.E.
Program Manager — Date: 9/1/95

James A. Dunn, P.E.
Project Manager — Date: 9/1/95

Terence A. Whitt
Senior Project Chemist — Date: 9/1/95

Theresa D. Rojas
Project Chemical QA/QC Officer — Date: 9/1/95

August 1995

OHM Project No. 17418

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Chain-of-Custody Record
OHM Shipping Label
Shipping Instructions for Sending Samples to the Laboratory
Federal Express Airbill

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) presents, in specific terms, the policies, organization, functions, and QA/QC requirements designed to achieve the data quality goals for Delivery Order 0078 under the contract N62470-93-D-3032 for the Navy Atlantic Division (LANTDIV) at the Marine Corps Base (MCB), Camp Lejeune, Jacksonville, North Carolina. This SAP integrates the required components of a quality assurance project plan (QAPP) and a field sampling plan.

This document shall be read, understood, and implemented by the Project Manager, Site Supervisor, Project QC Manager, Project Chemist, Field Chemist/Scientist, and Sample Technicians. Any field changes shall be approved by the Navy's Technical Representative (NTR), Project Manager, and Project Chemist. These changes shall be documented by the Field Chemist/Scientist and distributed to the appropriate persons as amendments to the SAP.

2.0 PROJECT MANAGEMENT

2.1 Project Background

The objective of this project is to remove and dispose of five to nine underground storage tanks (USTs), contents, piping and contaminated soils at Building 25 (Base Dry Cleaner) which is located at MCB Camp Lejeune. The tanks, installed during World War II, were originally used to store a petroleum-based product commonly known as varsol. In 1970, the base changed from the petroleum-based solvent to perchloroethylene.

During a site visit in 1994, the tops of five USTs were discovered and evidence of spillage was noted. In addition, the tanks were found to contain product.

2.2 Project Task Descriptions

The project tasks applicable to the SAP are the following:

- Accurate location of tanks and associated piping through non-intrusive methods
- Excavation to the tops of tanks
- Monitor field activities for vapor emissions and personal health and safety using direct-reading instruments
- Sampling of tank contents for analysis to determine wastestream characterization
- Sampling of contaminated soils for analysis
- If possible, verify the size of tanks by measuring through sampling ports
- Characterize wastestreams, prepare waste profiles and review disposal methods
- Sample and screen excavation sidewalls and pit floor using visual inspection and TCE/PCE immunoassay kits to delineate the limits of excavation
- Sample and screen excavated soils using visual inspection and immunoassay kits in order to separate the waste into "contaminated" and "uncontaminated" piles
- Sample and analyze excavation sidewalls following TCE/PCE screening to confirm that the soils remaining are indeed clean
- Sample and screen/analyze cleaning waste and final rinsate
- Sample and analyze "incidental waste"

- Transport and dispose of "contaminated" soils at an incineration facility
- Transport and dispose of tank contents at an incineration facility
- Dispose of water and "incidental waste"
- Perform surveillance and technical audits of site sampling activities

In the event that drums or potentially off-spec soils are encountered during the course of these tasks, the Navy Technical Representative (NTR) will be informed and consulted for further actions.

2.3 Project Organization

The project manager is the primary focal point for control of the project activities. The project manager will be supported by the QA Management team which will provide reviews, guidance, and technical advice on project execution issues. Members of this staff will be on an "as-needed" basis to assist in smooth project execution. The project manager will be supported by the project team consisting of a supervisory, health and safety, technical, and QA/QC staff to ensure that the project is safely executed in compliance with applicable laws, regulations, statutes, and industry codes. Individuals of the project team are responsible for fulfilling appropriate portions of the project QA program, in accordance with assignments made by the project manager. The project manager is responsible for satisfactory completion of the project QA program. Specific responsibilities may be assigned by the project manager and other members of the project staff. An organizational chart of the project team is shown on Figure 2.1.

The responsibilities of the key members in the project organization are:

Project Manager - James A. Dunn, Jr., P.E.
The project manager is responsible for the overall direction of this project executed under his/her supervision. He provides the managerial administrative skills to ensure that resource allocations, planning, execution, and reporting meet contract requirements. He is ultimately accountable for all work activities undertaken on this project. The global quality-related responsibilities of the project manager can include, but are not limited to, the following:

- Organization of the project staff and assignment of responsibilities

Figure 2.1

- Understanding of contract and scope of work for a specific project
- Communication to the project staff regarding client requirements and QA practices
- Identification, documentation, and notification to the client and project staff and QA personnel of changes in the scope of work, project documentation and activities
- Supervision of preparation and approval of project-specific procedures, work plans, and QA project plans
- Approval of project design basis, design parameters, drawings, and reports
- Approval of project remedial action/construction methodologies
- Dissemination of project-related information from the client such as design basis, input parameters, and drawings
- Liaison for communications with the client and subcontractors Liaison between the project staff and other internal groups
- Decision of whether or not drawings require independent review
- Investigation of nonconformances, notification of QA personnel, and implementation of corrective actions
- Determination of the effect of nonconformances on the project and the appropriateness for reporting such items to the client, and providing appropriate documentation for reporting
- Determination that changes, revisions, and rework are subject to the same QC requirements as the original work
- Serve as final reviewer prior to release of project information
- Approve and sign outgoing correspondence

Some of these responsibilities may be assigned by the project manager to the Site Supervisor, who will remain on site throughout the project field activities.

Site Supervisor - Randy E. Smith or Designee
The site supervisor is responsible for the day-to-day management of this specific delivery order. He will ensure sufficient resource allocations to maintain project schedule and budget. He will provide daily feedback to the project manager on project progress, issues requiring resolution, etc. The quality-related responsibilities of the site supervisor include, but are not limited to, the following:

- Notification to the project manager if the project cannot be completed with regard to quality, schedule, or cost
- Oversight and control of subcontractor services
- Liaison for communications with OHM project staff and other internal groups as well as with the NTR and on-site inspector
- Supervision day-to-day site activities in accordance with project and program requirements
- Preparing the Contractor Production Report
- Initiating corrective actions for non-conformance identified on-site

Project Chemical QA/QC Officer - Theresa D. Rojas
The chemical QA/QC officer is responsible for implementing the project chemical QA program. She is responsible for informing the project manager of any site-specific QA issues. Her responsibilities include, but is not limited to, the following:

- Determining if the project and data quality objectives are being met
- Reviewing subcontractor's QA Manuals and/or Laboratory Quality Management Plans (LQMPs) and if possible, performing audits on the labs
- Certifying the level of QA that has been achieved during the generation of analytical data
- Initiating and overseeing all audit functions
- Stopping work if quality objectives are not being met
- Initiating investigations for non-conformances, identifying appropriate corrective actions, and performing follow-up audits to ensure that the corrective actions were successful

Project Chemist - Carl Pampel
The project chemist is responsible for implementing the project plans and ensuring that the quality assurance and data quality objectives are being met for the project. He is also responsible for informing the chemical QA officer of any site-specific problems and for coordination QA efforts with the contracted laboratory. His specific responsibilities include, but is not limited to, the following:

- Evaluating chemical data for technical validity and ensuring adherence to published guidelines
- Analyze and interpret all subcontracted technical and laboratory results
- Implementing QA/QC procedures
- Assuring the continuity of chain-of-custody evidence
- Working with the QC engineer to compile and submit required QA Reports (QARs)
- Compiling, revising, updating, and submitting SAPs
- Implementing corrective actions as required by the QC engineer or chemical QC officer
- Ongoing QA/QC training of new and current personnel

Field Chemist - R. Mishra or Designee
The field chemist will:

- Implement the SAP and designated QA/QC procedures
- Oversee all field sampling activities
- Report all QC data to the project chemist for review
- Implement corrective actions as required by the project chemist
- Perform on-site screening and analyses of samples
- Fill out sample tracking forms and related analytical and QC forms and logbooks
- Ensuring that the samples are handled, packaged, and shipped according to the SAP

- Ensuring that the laboratory is supplied with the required field QC samples (i.e., trip blanks, rinsate blanks, etc.)

Sample Technician - To Be Determined
The sample technician will be responsible for:

- Carrying out all sampling in accordance with approved procedures and methodologies as defined in the SAP

- Generating field blanks, equipment rinsate blanks, and acquiring field duplicate samples as required by the SAP

- Completing sampling logbooks, sampling forms, labels, custody seals, and chain-of-custody forms

2.4 Data Quality Objectives for Measurement Data

Project-specific quality objectives are listed in Appendix A, Table A-2. These include the quantitation, action, accuracy, precision, and completeness limits by which the data will be evaluated.

A NEESA-certified laboratory will be used for all soil and waste analyses. The laboratory will also be North Carolina-approved. A copy of the laboratory's QA Manual, statement of qualifications, and appropriate certificates of approval are kept on file in the Norcross office and are available upon request.

Samples collected for the on-site immunoassay screening will meet, at a minimum, the requirements of USEPA QA/QC Level 2. Due to the prohibitive cost, the low probability of litigation, and the disposal facilities not requiring more stringent QC, all disposal samples such as the "contaminated" soils and incidental wastes (decon water, surface water, stormwater runoff, PPE, and disposal sampling equipment) will meet, at a minimum, EPA Level 3 requirements, as directed by the ROICC. All other samples such as the "clean" soils and confirmation samples will meet, at a minimum, NEESA 20.2-047B QA/QC Level C requirements. All sampling and analytical activities will be in accordance with federal, state, and local regulations. A summary of the field QC sampling requirements is shown in Table A-1 "Sampling Summary" in Appendix A.

2.5 Cleanup Criteria for Excavated Soil

Soil will be excavated 2 feet beyond the sides and bottom of the USTs. Composite soil samples will be sent to an off-site laboratory for analysis. The following criteria are specified as action levels for removal of contaminated soils:

- Perchloroethylene: 12,000 µg/kg
- Trichloroethene: 47,000 µg/kg
- Benzene: 22,000 µg/kg
- Toluene: 1,600 µg/kg
- Xylenes: 16,000 mg/kg
- DCE trans: 160,000 µg/kg
- Heptachlor: 40 µg/kg
- Dieldrin: 40 µg/kg
- DDD: 2,700 µg/kg
- DDT: 1,900 µg/kg
- Chlordane: 470 µg/kg
- CCL4: 4,900 µg/kg
- DCE cis: 78,000 µg/kg

All analytical data will be forwarded to the ROICC for determination of possible additional action.

3.0 SAMPLING

3.1 Sampling Methods and Procedures

Table A-1 "Sampling Summary" in Appendix A summarizes the sampling locations, frequencies, samples matrices, and measurement parameters of interest. Any changes or variances to these specifications and procedures must be documented, approved, and submitted as an addendum to this SAP.

Samples will be collected as described below and analyzed at an off-site laboratory for the parameters listed in Appendix A, Table A-1. Laboratory services will be procured on a competitive bid basis.

Results from the off-site laboratory will also be evaluated by the Regional Transportation and Disposal Coordinator for disposal options, and the Project Manager, Project Chemist, and the ROICC.

3.1.1 Sampling Tank Contents

After tanks and associated piping have been located, a backhoe will excavate to the tops of the tanks. Samples of the tank contents will be drawn for off-site analysis to determine wastestream characterization. Additional sampling may be accomplished employing a bacon-bomb sampler.Laboratory analysis will be performed as per Appendix A, Table A-1.

Sampling equipment will be cleaned between samples using decontamination procedures described in Section 3.5. Field sampling personnel will wear disposable gloves during sampling and will change them between samples.

3.1.2 Sampling Soils

Six samples of potentially contaminated soil from various locations within the tank pit will be collected and sent to the off-site laboratory for the analyses listed in Appendix A, Table A-1. The locations will be chosen based upon field screening techniques and visual observations. For volatile samples, a representative aliquot of each sample will be placed directly into the sample container.

Sampling equipment will be thoroughly cleaned between samples using decontamination procedures described in Section 3.5. Field sampling personnel will wear disposable gloves during sampling and will change gloves between sample locations to minimize the potential for cross-contamination.

3.1.3 Sampling Water from Incidental Wastes

One composite sample will be collected from water generated during the remedial action including, but not limited to, water from decontamination of personnel and equipment, and rainfall and surface water run-off accumulated in the open excavations.

Sampling equipment will be thoroughly cleaned between samples using decontamination procedures described in Section 3.5. Field sampling personnel will wear disposable gloves during sampling and will change gloves between sample locations to minimize the potential for cross-contamination.

Sampling will be performed by using either clean or disposable dip tubes or bailers. The appropriate sample containers will be filled and the samples sent off-site for analyses as specified in Appendix A, Table A-1. Because the sample represents water for disposal, no preservatives should be added in the field.

3.1.4 Sampling Excavation

Following excavation, grab samples will be collected at locations and frequency as directed by the NTR for off-site analysis of the parameters listed in Appendix A, Table A-1. The walls of the excavation will be sloped and will be accessible for sampling within the hole. The grab sample will be collected using a clean SS spoon and placing enough volume of material into a clean SS bowl or bucket. The sample will be thoroughly mixed to obtain a relatively homogeneous mixture prior to filling the appropriate sample containers as specified in Appendix A, Table A-1. For volatile samples, a representative grab sample will be placed directly into the sample container.

Sampling equipment will be thoroughly cleaned between samples using decontamination procedures described in Section 3.5. Field sampling personnel will wear disposable gloves during sampling and will change gloves between sample locations to minimize the potential for cross-contamination.

3.2 Sample Identification

All samples collected on-site will be provided with a unique sample designation. The number will serve to identify the site, location, and specific sample number. The sample designation format will appear as follows:

CLJXX-YY-NNN

Where:

CLJ = Camp Lejeune

XX = D.O. for the project (78)

YY = Sample Task:
Characterization Tank Samples (CT)
Characterization Soil Samples (CS)
Field Screening (FS)

Confirmation Sampling (CS)
Incidental Water (IW)
Incidental Other (IO)

NNN = Sequential number starting at 001

If the sample is a field QC sample, add the appropriate designations listed below to the end of the sample number.

FB = Field Blank
TB = Trip Blank
RB = Equipment Rinsate Blank
DP = Field Duplicate/Replicate

Additional information may be required in the sample identification (ID) column. This will include operable unit, site designation, truck or pile number, and any grid coordinates or location designations associated with the sample.

3.3 Sample Preservation and Holding Times

When samples are collected for off-site analyses, they will be sent to the laboratory within 24 hours after collection to ensure that the most reliable and accurate answers will be obtained as a result of the analysis. The holding time begins from the date of collection in the field.

All environmental samples, as well as QA/QC samples, will be preserved to a temperature of 4°C prior to shipment to the analytical laboratory, using ice or refrigeration. This temperature should be maintained during shipment by placing ice in leak-proof containers, and placing it above and below the sample containers. Other sample preservation requirements and holding times applicable to the sample matrix and analyses are listed in Appendix A, Table A-1.

3.4 Field QC Samples

The appropriate number of field QC samples, as specified in the NEESA 20.2-047B document will be collected during this project. These samples will include field blanks, equipment rinsate blanks and field duplicate samples. These samples will be collected at the following frequencies and analyzed for the parameters listed in Appendix A, Table A-1:

- Field Blanks – Field blanks consist of the source water used in decontamination and steam cleaning. At a minimum, one field blank from each sampling event and each source of water will be collected and analyzed for the same parameters and at the same QC levels as the related samples.

- Equipment Rinsate Blank – Equipment rinsate blanks are the final analyte-free water rinse from equipment cleaning collected daily during a sampling event. One equipment rinsate blank will be collected daily for NFESC Level C and E reporting. However, only samples from every other day are analyzed. The laboratory will be informed as to which rinsate blanks will be analyzed. The remaining rinsate blanks are to be held by the laboratory and analyzed only if evidence of contamination exists.

- Field Duplicate – Duplicates for soil samples are collected, homogenized, and split. All samples except volatiles are homogenized and split. Volatiles are not mixed, but select segments of soil are taken from the length of the core and placed in 4 oz glass jars. The duplicates for water samples will be collected simultaneously. Field duplicates will be collected at a frequency of 10% per sample matrix for Level C reporting and at a frequency of 5% per sample matrix for Level E reporting. All the duplicates will be sent to the primary laboratory responsible for analysis, along with the samples. The field duplicates will be used by the laboratory to prepare the laboratory duplicate or matrix spikes and designated on the COC as such.

- Trip Blank -- Trip blanks are defined as samples which originate from analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with the volatile samples. One trip blank will accompany each cooler containing volatiles, stored at the laboratory with the samples, and analyzed by the laboratory. Trip blanks are only analyzed for volatile organic compounds.

Note: A sampling event is considered to be from the time the sampling personnel arrive at the site until these personnel leave for more than a day.

3.5 Decontamination

All sampling equipment (hand augers, spoons, stainless steel/glass mixing bowls, etc.) will be decontaminated before sampling commences, between each sample location, and prior to leaving the site. The procedures for decontamination of equipment are described below.

1) Remove gross contamination by scraping or brushing

2) Clean with tap water and phosphate-free laboratory detergent (liquinox or alconox), using a stiff brush to remove all surface contaminants

3) Rinse thoroughly with tap water

4) Rinse thoroughly with deionized/distilled water

5) Rinse twice with reagent grade isopropanol or methanol

6) Rinse thoroughly with organic-free (ASTM Type II reagent grade) water and allow to air dry (Do not rinse with deionized/distilled water. If organic-free water is not available, allow equipment to air dry.)

7) Wrap equipment with aluminum foil prior to storage or transportation to sample locations

Decontamination fluids will be collected in properly labelled 55-gallon drums, and staged in a secure area until final disposal.

3.6 Cross-Contamination Minimization

Cross-contamination is the introduction of contaminants into the sample through the sampling and/or sample-handling procedures. It can cause an otherwise representative sample to become non-representative. The most important means of minimizing cross-contamination are as follows:

- Sampling expendables, i.e., sample gloves, pipettes, string, dip jars, etc., must not be reused. Used expendables should be labeled so they are not confused with non-contaminated trash

- Minimum contact should be made between the sampler and the sample medium. For example, a sampler should not walk across a contaminated area and then take a surface soil sample where he has just stepped.

- Sample collection activities should proceed progressively from the least contaminated area to the most contaminated area

- Sampling equipment should be constructed of Teflon, stainless steel, or glass that been properly precleaned for collecting samples. Equipment constructed of plastic or PVC should not be used to collect samples for trace organic analyses.

- Any tools used in sampling must be carefully decontaminated prior to first use and after each sample.

- Activities that could contaminate samples are prohibited in the sample handling and preparation area. These activities and the possible contaminants include:

Activity	Possible Contaminants
Smoking	PAHs
Spraying for insects	Pesticides, oils, solvents
Spraying for weeds	Herbicides, oils, solvents
Refueling	BTEX, hydrocarbons
Painting and paint stripping	Solvents

3.7 Sample Log Book

It is necessary for the sampling crew to maintain daily field notes. Items included are sampling protocol, any changes to the procedures, meetings, instructions, safety precautions, personnel protection, and activities pertaining to the samples. The person taking notes will be knowledgeable about these activities and record pertinent details.

Repetition of information recorded in other permanent logs should be avoided, but enough should be recorded to present a clear and accurate picture of technical activities. At a later date, should a question arise concerning a specific event or a procedure used, it will be answered from these notes. The following information should be logged into the logbooks and/or database:

- Date and time of sampling
- Sample number, locations, type, matrices, volumes, sample ID and descriptions, type and number of sample containers, names and signatures of individuals performing sampling tasks, COC and airbill numbers, preservatives, and date samples were sent
- Name of laboratories and contacts to which the samples were sent, TAT requested, and data results, when possible
- Termination of a sample point or parameter and reasons
- Unusual appearance or odor of a sample
- Measurements, volume of flow, temperature, and weather conditions
- Additional samples and reasons for obtaining them

- Levels of protection used (with justification)
- Meetings and telephone conversations held with LANTDIV, NTR, regulatory agencies, project manager, or supervisor.
- Details concerning any samples split with another party
- Details of QC samples obtained

These notes will be dated and signed (each page) for validity in a court of law. All logbooks will be bound and prenumbered. All log book entries will be made with indelible ink and legibly written. The language will be factual and objective. No erasures will be permitted. If an incorrect entry is made, the error will be crossed out with a single strike mark, initialed, and dated. When audits are performed, the auditor's remarks and decisions must also appear in these notes. These audits should be followed up by written report submitted by the auditor, including opinions and conclusions. A copy of this report should be placed in the project file and one copy kept in the sampling file for easy reference.

This information will also be entered into the database program that has been prepared for this site. It will be entered daily by the field chemist or sample tech. This person will be the point of contact for all sampling and analytical information. Report outputs from the database are acceptable substitutes for the sample log book.

3.8 Sample Labels

Any samples placed into a sample container will be identified by a sample label. Included on the label are the following information:

1) JOB NUMBER
2) DATE -- Month, day, year
3) TIME -- Military time
4) SAMPLE NUMBER -- see section 3.2 for designations
5) SAMPLE DESCRIPTION
6) SAMPLER -- Sampler's name
7) PRESERVATIVES
8) ANALYSIS REQUESTED -- see Appendix A, Table A-1

The information described above will be printed neatly using an indelible marker. After the sample is taken and the label is securely attached, the sample is logged into the sample log book. An example of a sample label is included in Appendix B.

3.9 Custody Seals

Custody seals are narrow strips of adhesive tape of glass fiber used to demonstrate that no tampering has occurred. They may be used on sampling equipment, sample transport containers, and individual sample jars. They will be signed and dated by the sampler and placed from one side, across the top, and to the other side of the sample bottle or across the openings of the sample transport containers. An example custody seal is included in Appendix B.

3.10 Chain-of-Custody Procedures

Because of the evidentiary nature of samples collected throughout the project, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. To maintain and document sample possession, chain-of-custody procedures are followed as described below:

A sample is under your custody if:

1) It is in your actual possession, or

2) It is in your view, after being in your physical possession, or

3) It was in your physical possession and then you locked it up to prevent tampering,

   or

4) It is in a designated secure area.

A copy of a COC form is included in Appendix B. The following information is required on the COC:

1) Project Name

2) Project Location -- City and State in which the project is located

3) Project Number

4) Project Contact -- OHM employee responsible for overseeing the sampling operation. This person should be the individual to whom questions are to be directed or verbal results given (Project Manager, Site Supervisor, or Project Chemist)

5) Site Telephone Number -- Telephone number where person responsible for samples can be contacted.

6) Sample Date -- Month, Day, Year

7) Sample Time -- Military time

8) Sample Identification -- Sample number/location

9) Sample Type -- Designation of sample as grab or composite

10) Sample Description -- Sample matrix and a brief description of the sampling location

11) Sample Preservation -- Preservatives used

12) Analytical Parameters Requested -- Analytical parameters, method numbers, and specific compounds of interest, if applicable.

13) Airbill Number

14) Laboratory -- Laboratory where samples are to be sent

15) Laboratory Phone -- Telephone number of laboratory

16) Laboratory Contact -- Contact for laboratory

17) Relinquished By -- Signature of sender (OHM)

18) Date Relinquished -- Date samples were relinquished

19) Accepted By -- Signature of acceptor

20) Date Received -- Date samples were accepted

21) Turnaround Time -- Turnaround times requested or date the results are required from the lab

22) Sampler's Signature -- Signature of sampler

The COC will be sealed in a ziploc bag and taped in place on the underside of the top of the sample transport container (cooler). An example COC is included in Appendix D.

3.11 Packaging, Handling, and Shipment of Samples

Samples will be packaged as to minimize shifting of the samples during shipment. An absorbent, such as vermiculite or kitty litter, will be placed at the bottom of the shipment container in order to absorb any liquids in the event of sample breakage. All samples will be individually placed into appropriately sized ziploc bags and sealed.

Samples which must be kept at 4°C will be shipped insulated containers with either freezer forms or ice. If ice is used, it will be placed in a container such as a trash bag and sealed so that water will not fill the shipping container as the ice melts.

Samples will be shipped via Federal Express to the appropriate laboratory. IATA regulations will be followed as they are more applicable to OHM's method of sample shipment. Instructions for filling out shipment papers are included in Appendix B. These instructions are for shipping samples with unknown or limited hazards. NO CHANGES OR SUBSTITUTIONS TO THESE INSTRUCTIONS ARE ALLOWED – NO MATTER HOW INSIGNIFICANT THEY MAY SEEM. A copy of the OHM sample shipping label is included in Appendix B.

4.0 DATA ACQUISITION

4.1 Analytical Method Requirements

Analytical requirements for this project are listed in Appendix A, Table A-1. All samples will be analyzed according to *USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* whenever possible. Alternative methods of analysis from other sources (ASTM, NIOSH, Standard Methods, etc.) may also be used.

4.2 Quality Control Requirements

Project Quality Control (QC) requirements for precision, accuracy, completeness, and quantitation limits are listed in Appendix A, Table A-2. QC procedures and acceptance limits will be met as specified in the individual methods. In addition, the laboratory will meet the specification and requirements as described in the NEESA 20.2-047B document.

4.3 Instrument Testing, Inspection, and Maintenance

Proper maintenance is critical to the performance of minimization of downtime of all equipment, whether it be for measurement or support. Inspection will be performed , at a minimum, prior to use of the instruments. Preventive maintenance will be performed as recommended by the manufacturer of the respective equipment. All routine maintenance and major repairs performed on field screening or analytical equipment will be recorded in bound maintenance logbooks that have been specifically designated for that instrument. Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent use, or will be tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated or completely replaced.

4.4 Instrument Calibration

All calibrations on field instruments will be performed, at a minimum, on a daily basis. Every calibration will be recorded in the maintenance logbook for each instrument. Quality control check standards from a separate source will be used to check initial calibration, and acceptance and rejection criteria.

Monitoring instruments, such as the OVA or PID, O2/LEL meter, Monitox, etc. will be calibrated as specified in the HASP. Off-site analytical instruments will be calibrated according to the method specifications and the laboratory's QA Manual

5.0 DATA MANAGEMENT

Data management is the system by which data is reduced, reviewed, validated, reported, distributed, and finally archived. The criteria in this system are designed to meet the project objectives.

5.1 Laboratory Data Reduction

Data reduction includes the identifications and calculations necessary to convert the raw instrument readings to the final reported compounds and their respective concentrations.

Responsibilities of Analyst
Each analyst is responsible for converting raw data into reportable values. These specific duties include:

- Proper identification of the analyte
- Generation of calculations
- Checking all calibrations to ensure support of data
- All QA/QC checks are supportive of data
- All documentation is complete and accurate in respective log books
- All chromatograms and strip chart recordings are labeled with data, instrument number, run parameters and analyst

5.2 Laboratory Data Validation

All data generated within the laboratory will be extensively checked for accuracy, precision completion. The data validation process consists of data generation, reduction, and three levels of review.

The analyst who generates the raw data has the prime responsibility for the accuracy and completion of the data. All data generated and reduced follows protocols specified in the laboratory (SOP). Each analyst reviews the quality of his work based on an established set of guidelines. The guidelines are:

- Sample preparation information is correct and complete
- Analysis information is correct and complete
- The appropriate SOPs have been followed
- Analytical results are correct and complete
- QC samples are within established control limits

- Blanks are within appropriate QC limits
- Special sample preparation and analytical have been met
- Documentation is complete

The next level of review is performed by the section supervisor or data review specialist. The review is structured to ensure that:

- Calibration data are scientifically sound, appropriate to method, and completely documented.
- QC samples are within established limits.
- Reporting units are consistent with the method and the matrix.
- Quantitative results are correct.
- Data results are consistent with information on the COC.
- Documentation is complete.
- The data is ready for incorporation into a final report.
- The data package is complete and ready for data archive.

The second level of review is structured to ensure all calibration data and QC sample results are reviewed and all of the analytical results from 10 percent of the samples are checked back to the bench sheet. If no problems are found with the data package, the review is complete. If problems exist, an additional 10 percent is reviewed, the process continues until no errors are found or the package has been reviewed in its entirety.

The final level of review by the laboratory comes from the program administrator or laboratory QA Officer. He/she reviews the report to ensure that the data meets the overall objectives of the project.

Once the data has been validated, it is ready for report production. The report will contain:

- Description of sample types
- Tests performed, problems encountered during testing
- Dates sampled

- Date received
- Date extracted
- Date analyzed
- Analytical results
- Reportable limits
- QC information: percent recovery, relative percent difference, control limits, blanks analyses, matrix spikes, and other additional special QC information
- Qualifiers for data falling outside of QC limits
- Methodology
- Name of the analyst
- Signature of laboratory representative
- Dual column confirmation results
- Calibrations (when requested)
- Instrument performance checks (when requested)

The report from the laboratory will also include a copy of the original COC for the samples analyzed.

5.3 Project Data Review

5.3.1 Field Chemist Data Review Responsibilities

The field chemist is responsible for initial review of the data from the laboratory. This review includes:

- Verifying that all requested data are reported
- Verifying that samples are analyzed according to the contract specified method
- Verifying that holding times are not exceeded

- Verifying that matrix spike, matrix spike duplicate, and surrogate recoveries fall within the laboratory's acceptable criteria

- Reviewing blank data for gross contamination

- Reviewing field quality control results for gross inconsistencies

The field chemist is then responsible for informing the Project Manager and Project QA/QC Officer of any laboratory and/or sampling deficiencies or issues. The field chemist alone should not make decisions on the acceptability of the data. These issues and subsequent decisions will be documented on a weekly report to the Regional QA/QC Director and Project Manager.

5.3.2 Project QC Engineer Data Review Responsibilities

The Project QC Engineer is responsible for interfacing with the project chemist, project manager, and the laboratory's QA Officer to resolve any QA/QC issues affecting the data. He/she is also responsible for finalizing any QA/QC issues with the laboratory and/or the project chemist. This includes obtaining a corrective action from the parties involved.

5.4 Project Data Validation

No independent data validation will be required for this project.

5.5 Data Reporting

The preliminary data will be faxed to the project chemist. This data may or may not have undergone the full laboratory review process and may contain errors and discrepancies. Prior to the use of data results for any decisions, the data will be reviewed by the project chemist and assessed against the project goals and quality objectives. A copy of the preliminary data, including review comments from the project chemist will be submitted to the site and/or the project manager.

When the hard and final copy is received, a copy of the level C data packages will be sent to the data validation subcontractor. All data packages will also be reviewed by the project chemist and assessed against the project goals and quality objectives. Any errors, discrepancies, and nonconformances will be brought to the laboratory's and project manager's attention.

When QA issues have been satisfactorily settled and data validation has been completed, the project manager may release the data to the client and/or regulating agencies.

5.6 Data Storage and Archive

After OHM has completed its work for the project, all documents generated will be assembled in the project file. Individuals may retain clean (no handwritten comments) copies of documents for their personal files but only after personally verifying that the original or similar copy is in the project file. The project manager/supervisor is responsible for ensuring the collection, assembly, and inventory of all documents relative to the project at the time the objectives are met. The file then becomes accountable. Any records leaving the file must be signed out.

When the project objectives have been met, all file documents are reviewed and submitted to the general file. The project file contains the following document classes:

A. Project logbooks
B. Drum logs and other forms
C. Sample identification documents
D. Chain-of-custody records
E. Analytical logbooks, laboratory data, calculations, graphs, etc.
F. Correspondence
   - Intra-office
   - Client
   - Regulating agencies
   - Record of confidential material
G. Report notes, calculations, drafts
H. References, literature
I. Sample (on-hand) inventory
J. Check-out logs
K. Litigation documents
L. Miscellaneous – photographs, maps, drawings, etc.

Once deposited in the file, documents must be checked out.

The final report is usually generated by use of computer. A back-up copy of the report on diskette is filed along with the project file. The original report remains in the hard drive of the computer until such a time is required to download it on a diskette. This diskette is also archived.

All information under the corresponding project number is maintained in the archive system for five years. All archives are accessed by the archives file master list which is maintained in a separate location from the archives.

6.0 DATA ASSESSMENT PROCEDURES

Reliability in analytical determination is maintained through strict adherence to quality control procedures. Procedures are designed to control both the accuracy and precision of analytical results. Depending on the level of certification of the data, a known method spike is routinely analyzed to ensure the accuracy of results. The procedure is to run the standard QA/QC and sample analysis with each lot of samples sent to the laboratory. If more than ten individual analyses are made, additional standards will be analyzed at a rate of one standard per ten analyses. Some procedures call for the use of either a surrogate spike or the standard addition of a known quantity of the analyte to a split of the sample being analyzed.

Control charts will be prepared using an estimate of the spike recovery obtained from the literature or determined by repeated analyses run in the laboratory. Each time the analyst runs a method spike, the results are entered on the control table. If a standard addition technique is used, a plot of instrument response versus added analyte concentration is made in order to determine analyte concentration in the original sample. These are further explained in the laboratory's QAM.

Replicate analyses will be performed on at least 10 percent of the samples processed by the laboratory. A record of the precision of most analyses is kept by calculating and plotting the industrial statistic I (which is equivalent to the coefficient of variation). Blanks are also run with each batch of samples or individual sample analyzed regardless of the level of certification of the data.

The purpose of spikes, blanks, and replicates is to provide a sound scientific basis from which the degree of certification of the resultant data can be objectively concluded. These are not management decisions, but follow naturally from the results of the above QC procedures.

6.1 Accuracy

Data accuracy is a reflection of the efficiency of the analytical procedure. It is determined by use of spiked samples and standard reference materials or laboratory control samples performed at the rate of one set every 20 samples. A control chart is generated using historical laboratory data where warning and control limits are established to assess data accuracy.

The accuracy (check standards) samples will have concentration values of the mid-standard. During analysis, a minimum of 10 percent of samples must be accuracy samples. The accuracy samples must be staggered through the analysis, not placed one after another. After a minimum of seven accuracy samples are analyzed, the percent recovery is calculated for each sample.

The accuracy criteria is determined by calculating the standard deviation of seven or more percent recovery values and setting the upper and lower control limits using the following equations:

$$\text{Upper control limit} = p + 3SD$$
$$\text{Lower control limit} = p - 3SD$$

Where:

p = Average percent recovery
SD = Standard deviation

After the standard deviation, for the seven or more samples has been calculated, the accuracy control limits will be used to determine if the analysis is out of control. This is done by checking the results against the control limits. If any values are above the upper control limit or below the lower control limit, all sample results after the last qualifying accuracy sample must be repeated or discarded. If seven consecutive values fall below the lower control limit, new limits must be calculated using the new accuracy check values. If the values fall between the upper and lower limits, then conditions are reported as "within limits."

6.1.1 Recovery Control

Recovery control is necessary to determine if the sample matrix is interfering with the constituent being analyzed. A minimum 5 percent of samples will be recovery check samples (matrix spikes). Samples involving different types of matrices must have at least one recovery check for each type.

Control limits will be determined for each matrix, determining the deviation for seven or more percent recovery values.

6.2 Precision

Duplicate and replicate samples analyzed by the laboratory assess the precision of the sampling effort. Control limits for duplicate/replicate RPDs are listed in Appendix A, Table A-2. Once a sufficient amount of replicate data becomes available, field precision control charts are constructed similar to the laboratory precision charts. For any given concentration, the mean and the standard deviation(s) of the replicates are calculated. The mean is the centerline of the control chart. Data from each sample set are pooled with the previous sample sets to generate control and warning limits for the next set. Warning and control limits for water samples are set at ±2s and ±3s, respectively. Control limits for solid samples are more liberally established due to matrix heterogeneity. Data outside any control limit are subject to QA review.

Precision is based upon the results of the relative percent differences as calculated from the percent recoveries of the matrix spike and duplicate samples. The control limits for precision is based on historical laboratory data.

Present practice is to include MS and MSD samples on a per batch basis or a minimum frequency of 5 percent. Duplicate results are compared and the relative percent difference (RPD) is then determined. The RPD will be entered into the laboratory's data system and will be used to define the precision of the analysis. Minimum limits are listed in Appendix A, Table A-2.

6.3 Completeness

The field supervisor is responsible for ensuring that all field instrumentation and equipment are functioning properly and calibrated according to set procedures, and that all data are recorded accurately and legibly. In addition, the field supervisor must ensure all sites are sampled for all the specified analyses, that sufficient sample volume has been provided to complete those analyses, and that all of the QA samples have been included with each sample set. The goal for completeness for each sample set shipped to the laboratory is 100 percent. Minimum limits are listed in Appendix A, Table A-2.

Completeness is expressed as the percentage of the amount of valid data obtained to the amount of data expected. For a set of data to be considered complete, it must include all QC data verifying its accuracy and precision.

If samples analyzed do not meet all QC requirements in terms of accuracy and precision for any specific parameter, the sample preparation and analysis will be repeated pending adequate volume.

6.4 Criteria for Rejection of Outlying Measurements

There are many statistical tests for rejection of outlying data points obtained from a set of measurements from a single population. A test recommended in "Statistical Manual of the Associate of Official Analytical Chemists," 2nd Edition, W. J. Youden and E. H. Steiner, 1975, pg. 86, is the Dixon Test. This test is not dependent on the distribution of the data and can be used for as few as three measurements. A more complete description for this broadly applicable test can be found in the referenced text.

Another reference is the USEPA National Functional Guidelines for Data Validation of Organics and Inorganics. Also, specific programs may have quality objectives with criteria for rejection of outlying measurements.

6.5 Method Detection Limits and Practical Quantitation Limits

Method detection limits (MDLs) will be established by the laboratory. This should, at a minimum, be established on a yearly basis. MDL is the minimum concentration of a substance

that can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero.

Practical quantitation limit (PQL) is the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. The PQLs are generally 5-10 times the MDL. The PQL is the most applicable limit of reporting for this program.

6.6 Laboratory and Field Contamination

It is not unusual to find the following analytes at trace levels in the samples:

- Methylene chloride
- Acetone
- Freon (1,1,2-trichlorotrifluorethane)
- Bis(2-ethylhexyl)phthalate
- Hexane
- Isopropanol
- 2-Butanone

These are common solvents used in the field and in the laboratory.

In order to fully evaluate data containing trace levels of these contaminants, one must have data from trip blanks, field blanks, equipment blanks, and all applicable laboratory blanks for that batch of samples.

The determination on the use of the data will be made during the Data Validation process.

7.0 PERFORMANCE AND SYSTEM AUDITS

Audit is defined as systematic check to determine the quality of operation of field and laboratory activities. It is comprised of the following:

- Performance audit
- System audits

These include a detailed review of each operating component of the network. Auditing will ultimately assist in determining if each element within a system is functioning appropriately per the QA program requirements.

7.1 Field Performance Audits

Field performance audits are performed on an ongoing basis during the project as field data is generated, reduced, and analyzed. All numerical analyses, including manual calculations are documented. All records of numerical analysis are legible, of reproduction quality, and supporting to complete permit logical reconstruction by a qualified individual other than the originator.

Other indicators of the level of field performance are the analytical results of the blank, duplicate, and replicate samples. Each blank analysis is an indirect audit of effectiveness of measures taken in the field to ensure sample integrity. The results of the field duplicate and replicate analysis is an indirect audit of the ability of each field team to collect representative sample portions of each matrix type.

7.2 Field System Audits

System audits of site activities are accomplished by an inspection of all field activities by the Project QC Officer. This audit is composed of comparisons between current field practices and standard procedures. The following is a list of criteria to be used in the evaluation of field activities:

- Overall level of organization and professionalism
- All activities conducted in accordance with work plan
- All procedures and analyses conducted according to procedures outlined in this document
- Sample collection techniques versus the site sampling and analysis plan or CDAP
- Level of activity and sample documentation

- Working order of instruments and equipment
- Level of QC conducted by each field team
- Contingency plans in case of equipment failure or other event preventing the planned activity from proceeding
- Decontamination procedures
- Level of efficiency which each team conducts planned activities at the site
- Sample packaging and shipment

After the audit, any deficiencies are discussed with the field staff, and corrections are identified. If any of these deficiencies might affect the integrity of the samples being collected, the QA Officer informs the field staff immediately, so corrections can be made. The field performance audit will be conducted in coordination with the NTR, as directed by the Project Manager.

OHM will also submit to all requests by regulatory agencies, or other clients for external field systems audits.

7.3 Laboratory Performance Audit

The laboratory performance audit verifies the ability of the laboratory to correctly identify and quantitate compounds in blind check samples submitted by an auditing agency. If the laboratory participates in Performance Evaluation (PE) programs such as USEPA WS/WP studies, AIHA, PAT studies, etc., results from these studies will be generally acceptable by OHM. However, during the course of the project, it may be necessary for the Project QA/QC Officer to send PE samples to the laboratory to evaluate specific parameters.

The contracted laboratories will undergo performance audits throughout the project consisting of field QC samples. Occasionally PE samples will be supplied by the client or external organizations which will be spiked with the same analytical parameters that are being investigated on site. External laboratory performance audits by auditing agencies such as the USEPA, USACE-MRD, DOD, NFESC, etc, are not routinely scheduled. However OHM and its subcontracted laboratories will submit to any external audit upon request by the USEPA or the client.

7.4 Laboratory System Audits

The laboratory system audit is a review of analytical laboratory operations to verify that the facility has the necessary equipment, staff, and procedures in place to generate acceptable data. It is also to determine that each element within an activity is functioning appropriately and within the guidelines of applicable methodology, approved procedures, and the site QAPP. An on-site inspection is routinely performed by the laboratory's QA Manager and may also be frequently performed by the OHM Project QC Officer. If the laboratory participates in certification programs, audits performed by the certifying agencies may satisfy the criteria of systems audits for the project.

If the laboratory is in question, a system audit can be directed by the client and performed by OHM or the client's representative. Any recommendations made will be considered for implementation and any corrective actions will be taken to correct any deficiencies found. Project-specific audit reports will be placed in the project files and laboratory audit reports will be kept by the laboratory for future reference.

8.0 CORRECTIVE ACTION

Corrective actions may be necessary as a result of the following QA activities:

- Field and laboratory performance audits
- Field and laboratory system audits
- Inter-laboratory comparison studies
- Calibration data fall out of specified limits
- Failure to adhere to the CQMP
- Failure to adhere to the site CDAP
- Failure to adhere to standard operating procedures and methods
- Data completeness below required limits
- Control limits are exceeded for QC samples

If, during system and performance audits, deficiencies or problems are discovered, corrective action will be initiated immediately. The appropriate field and laboratory personnel will be notified immediately an investigative process will be implemented immediately to find solutions to these issues. The investigative process will consist, but is not limited to, the following:

- Determining when the problem occurred
- Determining which systems were affected by the problem
- Determining the cause of the problem
- Determining a corrective action to eliminate the problem
- Assigning the responsibility for implementing the corrective action
- Implementing the corrective action
- Evaluating the effectiveness of the corrective action
- Investigating alternative corrective actions if the original action was not sufficient in eliminating the problem
- Documenting that the corrective action has eliminated the problem

The Project QC Officer has the authority to require that all site activities threatened by the problem be stopped or limited until the corrective action has been implemented and satisfactorily verified to eliminate the problem.

Corrective actions may include, but is not limited to:

- Modifications to procedures
- Recalibration of instruments
- Replacement of solvents, reagents, and/or standards
- Additional training of personnel
- Reassignment of personnel

8.1 Corrective Action Report

A Corrective Action Report (CAR) is necessary documentation of the investigative process. Depending on the issues, the CAR may be generated by the laboratory or the field personnel. Copies of the CAR will be given to the Project QC Officer and Project Manager, who will distribute it to the client. A copy of the CAR will be placed in the project files for future reference.

The CAR should include, but is not limited to:

- A description of the problem, deficiency, or issue
- Proposed resolutions
- Resulting actions
- Effectiveness of the resolutions
- Personnel responsible for implementation of the corrective actions
- Personnel responsible for monitoring the effectiveness of the actions.

8.2 Quality Assurance Report

The Project Manager, Project QC Engineer, and Project Chemist will converse on a regular basis to review possible and potential problem areas and to ensure that all QA/QC procedures are being carried out. It is important that all data abnormalities be investigated to ensure that they are not a result of operator or instrument deviation but are a true reflection of the methodology or task function. The project final report will contain a separate section that covers the data quality and validity. At a minimum, the following information will be included in the report:

- Assessment of measurement data precision, accuracy, and completeness
- System and performance audit results
- Significant QA problems and corrective actions implemented
- Copies of documentation such as memos, reports, etc.

The Project QC Engineer will be responsible for preparing this report, as well as monthly written QA reports to OHM QA management. The Regional QA/QC Director will be

responsible for reviewing and approving monthly reports. Verbal reports will be made on a more frequent basis. All reports will be made available to the Project Manager, client, and regulating agencies. If no project audits were performed and no significant QA/QC problems occurred, a letter stating these facts will be submitted to the referenced parties in lieu of a QA Report.

Appendix A

Table A-1, Sampling Summary
Table A-2, Project Quality Control Objectives

Table A-1 – ling Summary

Sample Type	Matrix	Sample Frequency	Approx. Number of Samples	Sampling Method	Sampling Equipment	Sample Containers	Preservatives	TAT	QC Level	Required Analysis	Analytical Method	Holding Times
Tank Contents	Liquid	Once	9	Grab	Bacon Bomb or sludge gauge	(1) 4-oz Glass with teflon lid (2) 16-oz glass with teflon lids	Cool 4°C	7 days	N/A	VOA SVOA Pest/PCB TAL Metals Reac. Cyanide Reac Sulfide Ignitability pH % water BTU Total Halogen Total TCLP	8240 3550/8270 3550/8080 6010/7000 7.3.3 7.3.4 1010 or 1020 9040 3550 5050 5050/9250 1311/8240/8270/ 8080/8150/6010 /7470	14 days 7 days to extract 40 days to analyze 6 months, 28 days, Hg 14 days
Soil Disposal	Soil	Once	6	Grab	SS bucket auger SS bucket or bowl	(1) 4-oz glass with teflon lid (2) 16-oz glass with teflon lid	Cool 4°C	7 days	N/A	VOA SVOA Pest/PCB TAL Metals Reac. Cyanide Reac Sulfide Ignitability pH % water BTU Total Halogen	8240 3550/8270 3550/8080 6010/7000 7.3.3 7.3.4 1010 or 1020 9040 3550 5050 5050/9250	14 days 7 days to extract 40 days to analyze
Decon Water Disposal	Water	Once	1	Comp	N/A	(2) 40 ml VOC vials (4) 1-liter amber glass with teflon lining	Cool 4°C Cool 4°C	7 days 7 days	N/A	VOA SVOA Pest/PCB Reac. Cyanide Reac Sulfide pH Ignitability Total Halogen	8240 8270 8080 7.3.3 7.3.4 9040 1010 or 1020 9250	7 days 7 days to extract 40 days to analyze 14 days
Post Excavation	Soil	Twice	10 + 2 dups (1 each event)	Comp of 6 grabs	SS auger SS bucket or bowl	(1) 4-oz with teflon lining (2) 16-oz teflon lining	Cool 4°C Cool 4°C	5 days 5 days	E	VOA SVOA Pest/PCB TAL Metals TPH	8240 3550/8270 3050/6010/7000 418.1	16 days 7 days to extract analyze within 40 days 6 months, 28 days, Hg
Equipment Rinsate Blanks	Water	One per day	3	N/A	N/A	(2) 40-ml VOC vials (2) 1-liter amber glass with teflon lid (1) 1-liter plastic	Cool 4°C Cool 4°C HN03 to pH <2	5 days 5 days 5 days	E	VOA SVOA Pest/PCB TAL Metals TPH	8240 8270 8080 6010/7000 418.1	14 days 7 days to extract analyze within 40 days 6 months, 28 days, Hg
Trip Blank	Water	One/cooler of volatiles	1	N/A	N/A	(2) 40-ml vials	Cool 4°C	5 days	E	VOA	8240	14 days
Field Blanks	Water	One/source event	1	N/A		(2) 40-ml VOC vials (2) 1-liter amber glass with teflon lid (1) 1-liter plastic	Cool 4°C Cool 4°C HN03 to pH <2	5 days 5 days 5 days	E	VOA SVOA Pest/PCB TAL Metals TPH	8240 8270 8080 6010/7000 418.1	14 days 7 days to extract analyze within 40 days 6 months, 28 days, Hg

Appendix C

Site Specific Health and Safety Plan

OHM Remediation
Services Corp.

SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR REMEDIATION AT BUILDING 25 TCE TANK REMOVALS MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0044

Prepared by

OHM Remediation Services Corp.
Norcross, Georgia

George E. Krauter, P.E.
Program Manager

James Dunn, P.E.
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Mark S. Wilson, CIH
Southern Region Health and Safety Manager

July 1995

OHM Project No. 17418

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed for United States Navy, LANTDIV, Delivery Order No. 0078 entitled, Remediation at Building 25 MCB, Camp Lejeune, North Carolina. The Delivery Order will be executed per the requirements stated in the Final Statement of Work (SOW) for Service Delivery Order per Contract No. N62470-93-D-3032, Delivery Order 0018, in cooperation with the Navy. This Delivery Order will also be executed in accordance with Naval Facilities Control Plan (NAVFAC) Specification No. 05-93-3124 dated September 27, 1994.

This HASP documents the policies and procedures which protect workers and the public from potential hazards posed by work at this site. OHM considers safety the highest priority during work at a site containing potentially hazardous materials and has established a goal of zero accidents for all projects. All projects will be conducted in a manner which minimizes the probability of injury, accident, or incident occurrence. This HASP is a key element in the proper planning of project work which is necessary to assure the goal of zero accidents. The HASP Certification (Appendix A) will be signed by all who actively participate at this project.

Although this plan focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require deviations from the original plan. This flexibility allows modification by the OHM supervisors and health and safety officials with approval from the project CIH.

This plan has been prepared in accordance with OSHA's "Hazardous Waste Operations and Emergency Response" standard contained in 29 CFR 1910.120 and the U. S. Army Corps of Engineers's (USACE's) Safety and Health Requirements Manual (COE EM-385-1-1, October 1992).

1.1 SITE HISTORY AND DESCRIPTION

Camp Lejeune is a training base for the U.S. Marine Corps, located in Onslow County, North Carolina. The base covers approximately 236 square miles and includes 14 miles of coast line. MCB Camp Lejeune is bounded to the southeast by the Atlantic Ocean, to the northeast by State Route 24, and to the west by U.S. Route 17. The town of Jacksonville, North Carolina is located north of the Base.

Building 25 houses the Base Dry Cleaner and is located at the Camp Lejeune Headquarters 0-999 Area off of Post Road. Nine underground storage tanks (USTs) were reportedly installed during World War II and have contained two basic types of solvents during their lifetime. The volumes of the tanks are unknown but at least two are reportedly 1,000-gallon. Behind Building 25, vent pipes are evident. Fill pipes are reportedly in the same vicinity but were not observed during the site visits.

The initial solvent used in the dry cleaning process and housed in the USTs was a petroleum-based product commonly known as varsol. In 1970, the base changed from the petroleum-

based solvent to perchloroethylene. The USTs were removed from service in the late 1980s. The facility currently uses perchloroethylene in its cleaning process; however the closed loop above grade solvent system is completely contained within the building.

During 1994, the base-wide UST program discovered these tanks and dug down to the top of five tanks. During the excavation process, evidence of spillage was noted. In addition, the tanks were found to contain product.

1.2 SCOPE OF WORK

Delivery Order No. 78 is being issued to perform a source removal action at Building 25 (base dry cleaners) consisting of the removal and disposal of five to nine USTs, contents, piping and contaminated soils.

- Mobilization and site preparation which may include construction and installation of an office facility and personnel and equipment decontamination facilities; utilities installation; access road construction and grading; establishment of erosion control and installation of berms; installation of fencing; locating/marking underground utilities and piping; delineation of work zones; and clearing and grubbing.

- Soil excavation will be performed to expose the top of the tanks and samples will be collected from the tank contents for further characterization.

- Tank contents will be removed and the tank will be inerted/purged in preparation of removal.

- Tank removals will be performed and tanks transported to decontamination areas for cleaning and shearing.

- Tanks will be sheared open with hydraulically activated shears attached to a backhoe.

- Tank interiors and piping will be decontaminated and the tank and piping sized for transport to a recycling facility.

- Contaminated soil will be directly loaded and transferred off-site.

- Concrete pads located under the tanks will be removed, cleaned and scarified in the decontamination area.

- Tank hole excavations will be sampled to confirm that contaminated soil above the regulatory limits have been removed.

- Excavations will be backfilled, graded, and seeded with native grass.
- Heavy equipment will be decontaminated
- Personnel and equipment will be demobilized from the site.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP.

2.1 PROJECT MANAGER

The PM has the overall responsibility for the project and to assure that the goals of the construction remedial action are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SS and the SSO to assure that the remedial action goals are completed in a manner consistent with the HASP. The PM will identify contacts and telephone numbers, with assistance from LANTDIV, of local health care providers, the NOSC/NOSCDR, the LEPC and other agencies that may be asked to provide emergency support during project activities. The PM will conduct a monthly health and safety audit of the project using the Management Health and Safety Report Form.

2.2 SITE SUPERVISOR

The SS is responsible for field implementation of the HASP. The SS will coordinate with the SSO to establish communications with local health care providers, the NOSC/NOSCDR, the LEPC and other outside organizations and agencies that may be asked to provide emergency support during project activities. The SS will be the main contact in any on-site emergency situation. The SS will conduct periodic inspection of the work site to confirm compliance with all health and safety requirements. The SS is also responsible for coordinating remedial actions for all deficiencies and for enforcing the OHM "Cardinal Safety Rules" (included in Appendix E) and the site specific health and safety procedures (included in Appendix B).

2.3 SITE SAFETY OFFICER

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's primary operational responsibilities include personal and environmental monitoring, coordination of job safety analyses, personal protective equipment maintenance, and assignment of protection levels. The SSO will direct all field activities involved with safety and is authorized to stop work when an imminent health or safety risk exists. The SSO is responsible for assuring that all on-site personnel understand all safety requirements.

2.4 CERTIFIED INDUSTRIAL HYGIENIST

The CIH is responsible for the contents of the HASP and ensures that the HASP complies with all federal, state and local health and safety requirements. If necessary, the CIH can modify specific aspects of the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the SSO on all modifications to the HASP and will be available for

consultation when required. The CIH will not necessarily be on site during OHM activities; however, he may perform site safety audits to confirm field compliance with the HASP.

2.5 EMPLOYEE SAFETY RESPONSIBILITY

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use all equipment provided in a safe and responsible manner as directed by the SS. All OHM personnel will follow the policies set forth in OHM's Health and Safety Procedures Manual, with particular emphasis on the OHM "Cardinal Safety Rules." which will be maintained on-site by the site safety officer. Specific health and safety procedures applicable to this project are provided in Appendix D of this plan.

2.6 KEY SAFETY PERSONNEL

The following individuals share responsibility for health and safety at the site.

Project Manager	James Dunn (404) 734-8072 (office)
Site Supervisor	Randy E. Smith (910) 451-2390
Site Safety Officer	Steven K. Grant (910) 451-2390
Program Manager for LANTDIV	George Krauter, P.E. (609) 588-6477 (office)
SR Health and Safety Director/Project CIH	J. Angelo Liberatore, CIH (404) 453-7671 (office) 1-800-999-6710 PIN 997-6102 (pager)
Vice President, Health and Safety	Fred Halvorsen, Ph.D., PE, CIH 800-231-7031 (office)

3.0 JOB HAZARD ANALYSIS

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. Table 3.1 lists significant contaminants identified at the site and their respective published occupational exposure limits. The OSHA permissible exposure limits (PELs) and the ACGIH threshold limit values (TLVs) were reviewed for these contaminants, evaluated, and the more stringent value of the two selected as exposure guidelines. An MSDS list is included in Appendix C.

3.1 CHEMICAL HAZARDS

Chemical Hazards			
Chemical	**Exposure Routes**	**PEL/TLV**	**Symptoms of Overexposure**
Varsol (mineral spirits, Type IV)	Inhalation, ingestion and dermal contact	100 ppm	Skin irritation, drying and defatting; narcotic effects; respiratory irritation, CNS depression; nausea, vomiting
Trichloroethylene (TCE)	Inhalation, ingestion, and dermal contact	50 ppm	Inhalation of high concentrations cause narcosis and anesthesia; prolong inhalation of moderate concentrations causes headache and drowsiness; chronic exposure may cause liver and other organ damage
Benzene	Inhalation, ingestion, and dermal contact	1 ppm	Skin irritation; CNS depression; respiratory tract irritation; headache, dizziness, nausea; bone marrow depression (carcinogen)
Ethylbenzene	Inhalation, ingestion, and dermal contact	100 ppm	Skin and mucous membrane irritation, headache, and drowsiness; CNS depression; respiratory paralysis
Xylene	Inhalation, ingestion and dermal contact	100 ppm	Irritation of the eyes, respiratory tract, skin and dermatitis; headache, dizziness, fatigue; Incoordination; kidney, liver damage; CNS depression, coma and death
Tetrachloroethylene	Inhalation, ingestion and dermal contact	25 ppm	Irritation and dry skin, irritation of the eyes, nose and throat; dizziness, headache, slurred speech, double vision, CNS depression; liver, kidney damage
Toluene	Inhalation, ingestion and dermal contact	50 ppm	Irritation of the eyes, respiratory tract and skin; headache; dermatitis; dizziness and fatigue; CNS depression

Two distinct composite samples were taken from the soils excavated from the UST sites and liquids which had accumulated within the depressions. Test parameters reportedly completed

on the composite samples included: pH, RCRA metals (eight primary), volatile (organics), TPH and PCBs. No problems were reported relative to TPH, PCB levels or pH. Upon completion of TCLP for the primary metals, all levels were well below RCRA and even North Carolina Subtitle D landfill levels. The only area of concern which has shown up in both the liquid and soil analysis involves trichloroethene (trichloroethylene) and the tetrachloroethene (perchloroethene), both results were/are above allowable limits and therefore will require management/handling as a hazardous waste.

In November, 1994, the following samples of UST contents were analyzed by Omega Environmental Services, Inc. The samples were all analyzed for volatiles by GC/MS scan and for ignitability.

First run results for these samples are as follows:

- Sample labeled Bldg. 25, #1 is an aqueous sample with a flashpoint >140°F. This sample is approximately 99 percent water and has the following estimated volatile organic compounds:
  - Tetrachloroethene: 1,200 µg/l
  - Toluene: 11,000 µg/l
  - Xylenes: 1,900 µg/l

- Sample labeled Bldg. 25, #2 is an aqueous samples with a flashpoint >140°F. This sample is approximately 99 percent water and has the following estimated volatile organic compounds:
  - 1,3-dichlorobenzene: 5,700 µg/l

- Sample labeled Bldg. 25, #3 consists of two layers. The bottom layer is aqueous and makes up approximately 95 percent of the sample. The top layer appears to be a solvent and makes up approximately 5 percent of the volume. The sample as a whole has a flashpoint of >140°F.

  This samples has the following estimated volatile organic compounds:
  - Bldg. 25, #3: Bottom layer
  - Cis-1,2 dichloroethene: 18,000 µg/l
  - Tetrachloroethene: 260,000 µg/l
  - Trichloroethene: 39,000 µg/l
  - Xylene: 13,000 µg/l

  Note: This sample also contains other heavier hydrocarbons.

  - Bldg. 25, #3: Top layer
  - Benzene: 23,000 µg/l

- Cis-1,2-dichloroethene: 657,000 µg/l
- Ethylbenzene: 2,600,000 µg/l
- Tetrachloroethene: 69,000,000 µg/l
- Toluene: 1,000,000 µg/l
- 1,1,2-trichloroethane: 120,000 µg/l
- Trichloroethene: 7,000,000 µg/l
- Xylenes: 4,000,000 µg/l

Note: This sample also contains other heavier hydrocarbons.

- Sample labeled Bldg. 35, #4 is over 99 percent solvent with a flashpoint of 122°F. This sample has the following estimated volatile organic compounds:
  - Cis-1,2-dichloroethene: 638,000 µg/l
  - Tetrachloroethene: 66,000 µg/l
  - Trichloroethene: 6,400,000 µg/l
  - Xylenes: 32,000,000 µg/l

  Note: This samples also contains other heavier hydrocarbons.

- Sample labeled Bldg. 25, #5 is an aqueous sample with a flashpoint >140°F. This sample is approximately 99 percent water and has the following estimated volatile organic compounds:
  - Cis-1,2-dichloroethene: 2,900 µg/l
  - Tetrachloroethene: 24,000 µg/l
  - Trichloroethene: 4,100 µg/l

Personnel will be removed from the work site and placed under observation immediately if the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

3.2 PHYSICAL HAZARDS

To minimize physical hazards, OHM has developed standard safety protocols which will be followed at all times. Failure to follow safety protocols will result in expulsion of an employee from the site and appropriate disciplinary actions.

The SS and SSO will observe the general work practices of each crew member and equipment operator, and enforce safe procedures to minimize physical hazards. Hard hats, safety glasses, and steel-toe safety boots are required in all areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The Health and Safety Procedures Manual for LANTDIV will be maintained at the project site as a reference document.

3.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants pose a hazard when performing outdoor work. The SSO and SS will take all necessary measures to alleviate these hazards should they arise.

3.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing result in the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Heat stress prevention is outlined in procedure No. 22 of the OHM Corp. Health and Safety Procedures manual. This information will be reviewed during safety meetings. Workers will be encouraged to increase consumption of water and electrolyte-containing beverages (eg, Gatorade).

The following is a summary of the signs and symptoms of heat stress disorders.

- Heat rash – characteristic rash which may develop on the skin in areas which may be chapped by clothing. Frequent clothing changes help to prevent chapping from contact with wet clothes.

- Heat cramps – caused by heavy sweating and inadequate electrolyte replacement. Provide frequent breaks with fluid replacement. Cramps are usually relieved when

victim is moved to a cool resting place and provided fluids every 15 minutes for approximately 1 hour. Symptoms include:
- Muscle spasms
- Pain in the hands, feet, abdomen

- Heat exhaustion – caused by increased stress of various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Immediately remove the victim from the hot environment and provide rest while lying the victim down with feet elevated, and care for shock. Attempt to cool the victim by fanning or applying wet towels. Provide fluid replacement every 15 minutes and refer for medical evaluation if not improved within 30 minutes. Symptoms include:
  - Pale, cool, moist skin
  - Heavy sweating
  - Dizziness
  - Nausea
  - Fainting

- Heat stroke – temperature regulation fails and the body core temperature rises to critical levels. Immediate action must be taken to cool the body. Remove clothing and apply water while treating for shock during transport or while awaiting competent medical care. Competent medical care must be obtained immediately since this is a life threatening disorder. Symptoms include:
  - Hot, dry skin, usually red, mottled or cyanotic
  - 104° temperature or higher
  - Confusion, dizziness
  - Loss of consciousness
  - Convulsions
  - Strong, rapid pulse

It is recommended that workers break at least every two hours for 10 to 15 minute rest periods when temperatures rise above 72.5 degrees F and protective clothing is worn. Ambient temperatures will be determined from a Hg/glass thermometer shielded from radiant heat. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO and SS. Heat stress can be prevented by assuring an adequate work/rest schedule; guidelines are printed below.

AMBIENT TEMPERATURE	LEVEL D PPE	LEVEL C PPE/ MODIFIED LEVEL D
90° F or above	After 45 minutes of work	After 15 minutes of work
87.5 F-90 F	After 60 minutes of work	After 30 minutes of work
82.5-87.5 F	After 90 minutes of work	After 60 minutes of work
77.5-82.5 F	After 120 minutes of work	After 90 minutes of work
72.5-77.5 F	After 150 minutes of work	After 120 minutes of work

The work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, decrease the work period by 1/3. The initial rest period should be at least 10 minutes.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 70 degrees Fahrenheit when wearing Level C PPE, or 80 degrees Fahrenheit for site activities performed in Level D. Monitoring will include pulse rate,weight loss, oral temperature and signs and symptoms of heat stress. The employees radial pulse will be monitored for 30 seconds to determine heart rate. When monitored, oral temperatures (OT) will be obtained utilizing a clinical thermometer or equivalent. If the employees' OT exceeds 99.6°F, the work period will be reduced by 1/3. If after this work period, the oral temperature still exceeds 99.6°F, the work period will again be shortened by 1/3. If the employee's OT exceeds 100.6°F, the employee will not be permitted to wear PPE. See Procedure 22 LANTDIV Health and Safety Procedures Manual.

3.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation. Since wind chill temperature takes into account the potential for loss of body heat through convection, the wind-chill adjusted temperature will be used to evaluate for potential cold stress occurrence.

In cold weather, the potential for frostbite exists, especially in body extremities. Personnel will be instructed to pay particular attention to hands, feet, and any exposed skin when

dressing. Personnel will be advised to obtain more clothing if they begin to experience loss of sensation due to cold exposure.

Employees will be encouraged to use the heated shelters on site at regular intervals depending upon the severity of ambient temperatures. When temperatures are less than 20°F (actual or wind chill) workers should break regularly to the heated shelter to warm up (every 45 minutes at a minimum). Since cold weather does cause significant water loss as a result of the dryness of the air, fluid intake will be encouraged to prevent dehydration which directly affects blood volumes and flow to the extremities. Warm, sweet, caffeine-free, nonalcoholic drinks and soup offer the best fluid replacement and provide calorie energy. Symptoms of cold stress, including heavy shivering, excessive fatigue, drowsiness, irritability, or euphoria necessitate immediate return to the shelter.

3.3.3 Biological Hazards

- *Ticks*

  Heavily vegetated areas of a site may have ticks. It is highly recommended that all personnel walking through such areas wear a tyvek coverall and latex boot covers taped at all joints. The ticks will stand out against the light colors. A tick or insect repellent containing DEET is recommended.

  Ticks can transmit several diseases, including Rocky Mountain spotted fever, a disease that occurs in the eastern portion of the United States as well as the western portion, and Lyme disease. Ticks adhere tenaciously to the skin or scalp. There is some evidence that the longer an infected tick remains attached, the greater is the chance that it will transmit disease.

  <u>First Aid</u>

  a. Cover the tick with heavy oil (mineral, salad, or machine) to close its breathing pores. The tick may disengage at once; if not, allow oil to remain in place for a half hour. Carefully (slowly and gently) remove the tick with tweezers, taking care that all parts are removed.

  b. With soap and water, thoroughly, but gently, scrub the area from which the tick has been removed, because disease germs may be present on the skin; also wipe the bite area with an antiseptic. Although use of tweezers for the removal of the tick and application of heat to the tick's body often have been attempted, these methods may leave tick parts in the wound or may injure the skin.

  c. If you have been bitten, place the tick in a jar labeled with the date, location of the bite, and the location acquired. If any symptom appears, such as an expanding red rash, contact a physician immediately.

- *Lyme Disease*
  Lyme disease may cause a number of medical conditions, including arthritis, that can be treated if you recognize the symptoms early and see your doctor. Early signs may include a flu-like illness, an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve and heart problems as well as a disabling type of arthritis.

  You are more likely to spot early signs of Lyme disease rather than see the tick or its bite. This is because the tick is so small (about the size of the head of a common pin or a period on this page and a little larger after they fill with blood), you may miss it or signs of a bite. However, it is also easy to miss the early symptoms of Lyme disease.

  In its early stage, Lyme disease may be a mild illness with symptoms like the flu. It can include a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. But this flu-like illness is usually out of season, commonly happening between May and October when ticks bite.

  Most people develop a large, expanding skin rash around the area of the bite. Some people may get more than one rash. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. Its easy to miss the rash and the connection between the rash and the tick bite. The rash develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash.

3.3.4 Project Hazard Communication

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at this field project site are transmitted (communicated) according to 29 CFR 1926.59 to all OHM personnel and OHM subcontractors. OHM's Corporate Hazard Communication Program is included in Appendix B for reference. Hazard communication will include the following:

- **Container Labeling**
  OHM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.

- **Material Safety Data Sheets (MSDSs)**
  There will be an MSDS located on site for each hazardous chemical known to be used on site. All MSDSs will be located in Appendix C of the SHSP. The site safety plan can be found in the project office trailer.

- **Employee Information and Training**
  Training employees on chemical hazards is accomplished through on ongoing corporate training program. Additionally, chemical hazards are communicated to employees through daily safety meetings held at OHM field projects and by an initial site orientation program.

At a minimum, OHM and related subcontractor employees will be instructed on the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals.
- How to read and interpret labels and MSDSs for hazardous substances found on OHM sites
- Emergency spill procedures
- Proper storage and labeling

Before any new hazardous chemical is introduced on site, each OHM and related subcontractor employee will be given information in the same manner as during the safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available for review by on site personnel. The information pertinent to the chemical hazards will be communicated to project personnel.

Morning safety meetings will be held and the hazardous materials used on site will be discussed. Attendance is mandatory for all on site employees. Refer to Appendix C of the site safety plan to find a list of hazardous chemicals anticipated to be brought to the site and the corresponding MSDSs for these chemicals.

3.3.5 Noise

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dBA (Time Weighted Average) as well as personnel working around heavy equipment. The SSO will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

3.4 TASK-SPECIFIC RISK ASSESSMENT/ACTIVITY HAZARD ANALYSIS

Prior to beginning each major phase of work, an activity hazard analysis (form included in Appendix E) will be performed. The analysis will define the activity being performed, identify the sequence of work, the specific hazards anticipated and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level.

Work will not proceed on that project phase until the activity hazard analysis has been accepted by the designated on-site authority, as well as being discussed with all site personnel that will perform the activity. The following Task-Specific Risk Assessment/Activity Hazard Analysis identifies the major project phases and anticipated hazards to be encountered and control measures that will be instituted during the execution of the scope of work, previously approved by LANTDIV for this project.

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 1: Mobilization and Site Preparation	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Understand and review posted hand signals
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment/crane load specifications when hoisting loads • Do not suspend loads over ground personnel
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs, cords, and receptacles out of water • Use approved water-proof, weather-proof type if exposure is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout/Tagout procedures in accordance with OHM Health and Safety Procedures Manual
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual

Task Breakdown	Potential Hazards	Hazard Control Measures

Task No. 2: Clearing and grubbing Utility relocation and verification and decon pad construction	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs, cords, and receptacles out of water • Use approved water-proof, weather-proof type if exposure is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout/Tagout procedures in accordance with OHM Health and Safety Procedures Manual
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 3: Sample and remove tank liquid contents	Inhalation, dermal contact with solvents	• Provide workers proper skin, eye and respiratory protection based on the hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear splash protection when sampling, pumping liquids and sludges
	Fire, explosion	• Perform real-time air monitoring with LEL/)$_2$ meter • Use only non-sparking (brass finished) tools to open fill pipes • Use non-sparking bailing devices to sample sludges • Use only intrinsically safe (pneumatic) double diaphragm pumps to remove liquids • Bond and ground pumping system prior to removal of liquids • Stage fire protection and spill cleanup equipment at each tank transfer location
	Pumping equipment	• Wear splash protection during pumping operations • Inspect pumps, motors, hoses and couplings prior to each use • Do not leave operating pumps or pressurized hoses unattended • Use only intrinsically safe pumping equipment
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 4: Soil excavation/segregation/ staging for tank removals	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contract with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Do not suspend loads over ground personnel
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Barricade excavation perimeter
	Fire/Explosion	• Purge/inert tank interior to less than 10% LEL and/or less than 8% oxygen using C)2 (dry ice) prior to uncovering tanks • Eliminate sources of ignition from the work area • Prohibit smoking in fuel dispensing area • Provide ABC (or equivalent) fire extinguishers in all work areas, flammable storage areas, generator and compressor facilities • Store flammable liquids in well ventilated areas • Post "NO SMOKING" signs in fuel dispensing areas and storage • Store combustible materials away from flammables
	Excavation/Cave-in	• Barricade or enclose the work areas • Slope/shore excavations 5 feet deep or greater 1-1/2:1 (horizontal to vertical) where personnel must enter excavations • Excavation must be supervised by OHM competent person • Restrict entry to authorized personnel only during work activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots
	Insect/Snake Bites	• Review injury potential and types of snakes with workers • Avoid insect nests areas, likely habitats of snakes outside work areas • Use the Buddy System where such injury potential exists • Use insect repellant, wear PPE to protect against sting/bit injuries
	Underground/Overhead Utilities	• Identify all underground utilities around the excavation site before work commences • Cease work immediately if unknown utility markers are uncovered • Maintain a minimum 15-foot buffer between the trackhoe stick and overhead electrical lines or de-energize overhead lines within 15 feet of equipment operations
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 5: Tank removals and staging	Task No. 4 and hoisting hazards	• Do not exceed rated lifting capacity of excavator • Do not suspend loads over ground personnel • Inspect all cables, slings, ropes prior to each use
	Fire/explosion	• Purge, inert tank interior to <10% LEL and/or <8% O2 prior to removing • Stage fire protection equipment at tank removal site • Monitor tank interior with LEL/)2 meter to verify tank atmosphere and excavation within safe operating parameters • Follow OHM SOP No. 29 for UST removals
	Line entry	• Flush lines back to tank prior to disconnecting • Use non-sparking tools to disconnect lines • Disconnect lines at existing flanges • Follow OHM SOP No. 25 for pipeline entry
	Electrical	• Ensure lockout/tagout of all ancillary electrical equipment prior to removing tank
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 6: Removal and concrete pad staging	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Understand and review posted hand signals
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment/crane load specifications when hoisting loads • Do not suspend loads over ground personnel
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period
	Caught In/Between Moving Parts	• Identify and understand part of equipment which may cause crushing, pinching, rotating or similar motions • Ensure guards are in place to protect from these parts of equipment during operation • Provide and use proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 7: Soil Sampling Operations	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contract with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Do not suspend loads over ground personnel
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Barricade excavation perimeter
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear splash shield and saran coveralls when soaking, handling wet materials, pressure washing • Collect and contain spent wash water for proper disposal

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 8: Backfill/ compact excavation	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contract with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Do not suspend loads over ground personnel
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Barricade excavation perimeter
	Excavation/Cave-in	• Barricade or enclose the work areas • Slope/shore excavations 5 feet deep or greater 1-1/2:1 (horizontal to vertical) where personnel must enter excavations • Excavation must be supervised by OHM competent person • Restrict entry to authorized personnel only during work activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots
	Insect/Snake Bites	• Review injury potential and types of snakes with workers • Avoid insect nests areas, likely habitats of snakes outside work areas • Use the Buddy System where such injury potential exists • Use insect repellant, wear PPE to protect against sting/bit injuries
	Underground/Overhead Utilities	• Identify all underground utilities around the excavation site before work commences • Cease work immediately if unknown utility markers are uncovered • Maintain a minimum 15-foot buffer between the trackhoe stick and overhead electrical lines or de-energize overhead lines within 15 feet of equipment operations

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 9: Tank/ Pipeline Decontamination and Demolition	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Isolate equipment swing areas • Make eye contract with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Do not suspend loads over ground personnel
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects
	High Noise Levels	• Use hearing protection when using high pressure washer
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment load specifications • Do not suspend loads over ground personnel
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear splash shield and saran coveralls when soaking, handling wet materials, pressure washing • Collect and contain spent wash water for proper disposal
	Fire/Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work areas, flammable storage areas, generator and compressor facilities • Store flammable liquids in well ventilated area • Post "NO SMOKING" signs • Store combustible materials away from flammables • Cold-cut tank with hydraulic shears only after ensuring tank interior atmosphere is below 10% LEL and/or less than 8% oxygen is present
	Flammable, Toxic, Oxygen Deficient Atmosphere	• Test tank atmosphere for flammable/toxic vapors, and oxygen deficiency prior to entry • Wear proper level of PPE for the type of atmosphere contaminants • Review emergency procedures before work commences
	Confined Space Entry	• Follow OHM SOP for Confined Space Entry

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 10: Demolition and loadout	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Isolate equipment swing areas • Make eye contract with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Do not suspend loads over ground personnel
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects
	High Noise Levels	• Use hearing protection when using high pressure washer
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment load specifications • Do not suspend loads over ground personnel
	Caught In/Between Moving Parts	• Identify and understand part of equipment which may cause crushing, pinching, rotating or similar motions • Ensure guards are in place to protect from these parts of equipment during operation • Provide and use proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs, cords, and receptacles out of water • Use approved water-proof, weather-proof type if exposure is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout/Tagout procedures in accordance with OHM Health and Safety Procedures Manual
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 11: Load-out of contaminated soil	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual
	Fire/Explosion	• Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work areas, flammable storage areas, generator and compressor facilities • Store flammable liquids in well ventilated area • Post "NO SMOKING" signs • Store combustible materials away from flammables • Cold-cut tank with hydraulic shears only after ensuring tank interior atmosphere is below 10% LEL and/or less than 8% oxygen is present
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 12: Equipment Decontamination	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects
	High Noise Levels	• Use hearing protection when using high pressure washer
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment load specifications • Do not suspend loads over ground personnel
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on exposure hazards present • Review hazardous properties of potential site contaminants with workers before operations begin • Wear splash shield and saran coveralls when soaking, handling wet materials, pressure washing • Collect and contain spent wash water for proper disposal
	Burns	• Use proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating hot water/steam laser (high pressure washers)

Task Breakdown	Potential Hazards	Hazard Control Measures
Task No. 13: Demobilization	Struck by, Against Heavy Equipment, Flying Debris, Protruding Objects	• Use reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Restrict entry to the work area to authorized personnel • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 pounds maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large awkward loads • Do not exceed equipment/crane load specifications when hoisting loads • Do not suspend loads over ground personnel
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs, cords, and receptacles out of water • Use approved water-proof, weather-proof type if exposure is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout/Tagout procedures in accordance with OHM Health and Safety Procedures Manual
	Slips, Trips, Falls	• Clear walkways of equipment, construction debris and other materials • Mark, identify or barricade other obstructions • Use body harness and lifeline when working 6 feet or more above the ground • Use approved ladders in accordance with OHM Health and Safety Procedures Manual

4.0 WORK AND SUPPORT AREAS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas and personal protective equipment will be clearly specified prior to beginning operations. OHM has designated work areas or zones as suggested by the NIOSH/OSHA/ USCG/EPA'S document titled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." Each work area will be divided into three zones as follows:

- An Exclusion or "hot" Zone (EZ)
- A Contamination Reduction Zone (CRZ)
- A Support Zone (SZ)

4.1 EXCLUSION ZONE

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone.

4.2 CONTAMINATION REDUCTION ZONE

The CRZ or transition zone will be established between the EZ and SZ. In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ.

4.3 SUPPORT ZONE

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment or clothing will not be allowed in the SZ. The support facilities should be located upwind of site activities. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the SSO and the SS to ensure proper safety protocols are followed.

4.4 SITE CONTROL LOG

A log of all personnel visiting, entering or working on the site shall be maintained in the main office trailer location. The log will record the date, name, company or agency, and time entering or exiting the site.

No visitor will be allowed in the EZ without showing proof of training and medical certification. Visitors will supply their own boots and respiratory equipment, if required. Visitors will attend a site orientation given by the SSO and sign the HASP.

4.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.

- All personnel exiting the exclusion zone or the contamination reduction zone, must at a minimum, thoroughly wash their face and hands.

- A **buddy system** will be used. Hand signals will be established to maintain communication.

- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance. All personnel will be aware of dangerous situations that may develop.

- Visual contact will be maintained between buddies on site when performing hazardous duties.

- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.

- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.

- Proper decontamination procedures must be followed before leaving the site.

- All employees and visitors must sign in and out of the site.

5.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) which are or may be required at this job site. OHM personnel are trained in the use of all PPE utilized.

5.1 ANTICIPATED PROTECTION LEVELS

Task	Protection Level	Comments/Modifications
Site preparation and mobilization	Level D	
Clearing, grubbing, utility line location; decontamination pad construction	Level D	Level C when working on contaminated surface areas and PID action levels are met.
Sample and remove tank liquid contents	Level B with sarans	
Soil excavation and staging	Level C with tyvek	
Tank removal and staging	Level B with sarans	
Concrete pad removal	Level C with tyvek	
Confirmation sampling	Level C with tyvek	Wear Level C protection when sampling in known to be contaminated areas on-site; Downgrade to Modified Level D for background area sampling or for on-site analytical procedures performed under a ventilation hood
Backfill/compact excavation	Level C with tyvek/ Modified Level D	First lift – Level C with tyvek; remaining lifts – Modified Level D
Tank pipeline decontamination/ demolition	Level B with sarans	
Concrete pad decontamination/ demolition	Level C with tyvek	
Load-out Contaminated Soil	Level C with tyvek/ Modified Level D	Potential for downgrade to Modified Level D with air monitoring documentation in accordance with Section 7.0
Vehicle and Equipment Decontamination	Level C with sarans	Pressure washing requires face shield and hearing protection
Demobilization	Level D	

5.2 PROTECTION LEVEL DESCRIPTIONS

This sections lists the minimum requirements for each protection level. Modification to these requirements will be noted above.

5.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather

5.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC overboots
- Outer nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)
- Tyvek coverall [Polyethylene-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges.]

5.2.3 Level C

Level C consists of the following:

- Full-face, air-purifying respirator with appropriate cartridges
- Hooded Tyvek Coveralls [Polyethylene- or saran-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges].
- Hard hat
- Steel-toed work boots

- Nitrile, neoprene, latex or PVC overboots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

5.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator.

5.3 AIR-PURIFYING RESPIRATORS

A NIOSH-approved full-face respirator with appropriate air-purifying cartridges will be used for Level C work.

5.4 RESPIRATOR CARTRIDGES

The crew members working in Level C will wear respirators equipped with air-purifying cartridges approved for the following contaminants.

- Organic vapors <1,000 ppm
- Chlorine gas <10 ppm
- Hydrogen chloride <50 ppm
- Sulfur dioxide <50 ppm
- Dusts, fumes and mists with a TWA <0.05 mg/m^3
- Asbestos-containing dusts and mists
- Radionuclides

5.5 CARTRIDGE CHANGES

All cartridges will be changed a minimum of once daily, or more frequently if personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property. Cartridges will be labeled with the date service began.

5.6 INSPECTION AND CLEANING

Respirators are checked periodically by a qualified individual and inspected before each use by the wearer. All respirators and associated equipment will be decontaminated and hygienically cleaned after each use.

5.7 FIT TESTING

All personnel required to wear an air-purifying respirator as part of their employment will be fit-tested at the time of assignment and a minimum of annually thereafter. The test will use isoamyl acetate or irritant smoke. The fit test must be for the style and size of the respirator to be used.

5.8 FACIAL HAIR

Personnel who have facial hair which interferes with the respirator's sealing surface will not be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

5.9 CORRECTIVE LENSES

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators will be provided.

5.10 CONTACT LENSES

Contact lenses will not be worn with any type of respirator.

5.11 MEDICAL CERTIFICATION

Only workers who have been certified by a physician as being physically capable of respirator usage will be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respiratory protection. Employees receive a written physicians opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f)(7).

5.12 SITE-SPECIFIC RESPIRATORY PROTECTION PROGRAM

The primary objective of respiratory protection is to prevent employee exposure to atmospheric contamination. When engineering measures to control contamination are not feasible, or while they are being implemented, personal respiratory protective devices will be used.

The criteria for determining respirator need have been evaluated based on the site contaminants and expected levels of protection are outlined in Section 5.1. Air monitoring will be conducted to confirm that respiratory protection levels are adequate (Section 7.0). All respirator users are OSHA trained in proper respirator use and maintenance. The SS and SSO will observe workers during respirator use for signs of stress. The SS, CIH, and SSO will also evaluate

this HASP periodically to determine its continued effectiveness with regard to respiratory protection. All persons assigned to use respirators will have medical clearance to do so.

6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

6.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the work area, the task, the protection level, etc.

1. Go to end of EZ
2. Wash outer boots and gloves in detergent solution
3. Rinse outer boots and gloves in water
4. Remove outer boots and let dry
5. Remove outer gloves and let dry
6. Cross into CRZ
7. Remove first pair sample gloves
8. Remove outer saran or tyvek
9. Remove and wash respirator
10. Rinse respirator and hang to dry
11. Remove second pair sample gloves and discard

6.1.1 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination facility. Here the worker will remove clothing, shower, don clean clothing, and immediately be taken to the first-aid station. Medical attention will be provided as determined by the degree of injury.

6.1.2 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face. A personnel decontamination facility will be provided for site operations consisting of showers, change rooms, and separate lockers for street clothes and work clothes. Site personnel are required to shower daily at the completion of that day's work. Also, eye wash facilities and emergency showers will be provided at personnel decontamination facilities and at the water treatment system where hazardous chemicals are handled.

6.2 EQUIPMENT DECONTAMINATION

All contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribed by the SSO.

Trucks being directly loaded at the excavation area will be placed on polyethylene (PE) sheeting and draped along the truck sides when loading. Truck tires and wheels will be scraped of any visual contamination and inspected before tarping and leaving the site. The trackhoe will not enter the excavation area and the bucket will be decontaminated using high pressure washing and manual removal methods between excavations and at project demobilization.

6.3 DISPOSAL

All decontamination liquids and disposable clothing will be collected, containerized and treated as contaminated waste, unless determined otherwise by accepted testing methods. Wastes will be disposed of according to state and federal regulations.

7.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered. The following air monitoring efforts will be used at this site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the air monitoring required and appropriate action levels.

Monitoring Device	*Action Level*	*Action*
LEL/O_2 (work area) To be performed during soil excavation and direct loadout operations	>10% LEL <20.8% O_2	Evacuate area, ventilate to less than 10% LEL before continuing
PID (Breathing Zone) To be performed during soil excavation, staging and load-out operations and prior to, during tank removals and confined space entry	5 ppm for 5 min. >25 ppm for 5 min. >500 ppm for 5 min.	Level C, monitor with benzene drager tubes Upgrade to Level B Stop operations and allow vapors to dissipate to less than 500 ppm before continuing
Trichloroethylene Drager Tubes when PID readings exceed 10 ppm (breathing zone)		
Benzene Drager Tubes When PID readings are >10 ppm in Breathing Zone	>0.5 ppm >25 ppm	Upgrade to Level C Stop operations and allow vapors to dissipate prior to continuing
Mini-Ram (Breathing Zone) To be performed during soil excavation and direct loadout operations	>2.5 mg/m3 for 5 min. >5.0 mg/m3 for 5 min	Level C Stop operations and institute dust control measures

7.1 LOWER EXPLOSIVE LIMIT/OXYGEN (LEL/O2) METER

Prior to entering a confined-space area or performing hot work involving welding, cutting, or other high heat-producing operations where flammable or combustible vapors may be present, LEL/O_2 measurements will be taken.

7.2 PHOTOIONIZATION DETECTOR (PID)

A PID will be used to monitor total ionizable organic content of the ambient air. A PID will prove useful as a direct reading instrument to aid in determining if respiratory protection needs to be upgraded and to define the EZ. Although organic compounds are not anticipated to be present at the site, monitoring will be performed to detect the presence of pesticide carrier solvents which may be present in contaminated soils.

For known contaminants only, to determine a protection level from PID data, the SSO will multiply the TLV of the known compound by 25. This will be the limit for Level C protection for that compound. If PID readings exceed 25 times the TLV, Level B protection will be required. Also, regardless of the TLV, a PID reading of 1,000 ppm or more will indicate that the GMC-H cartridges may become overloaded and will necessitate Level B protection. (Note: PID readings do not always indicate the actual air concentration of a compound. Consult the manual, HNU, or the CIH for clarification.)

The SSO will take measurements before operations begin in an area to determine the amount of organic compounds naturally occurring in the air. This is referred to as a background level.

Levels of volatile organic compounds will be measured in the air at active work sites once every hour and at the support zone once every hour when levels are detected above background in the exclusion zone. If levels exceed background at any time in the support zone, work in the exclusion zone will cease and corrective actions will be taken, e.g., cover soil with polyethylene sheeting. Work will not resume until levels reach background in the support zone.

7.3 BENZENE DETECTOR TUBE MONITORING

Benzene and trichloroethylene detector tubes with Drager pump will be used to monitor personnel breathing zone when the PID/OVA action level of 10 ppm for 10 seconds is exceeded, requiring Level C protection. Should benzene detector tube results exceed 25 ppm, the operations will be shut down and vapors will be allowed to ventilate to less than 25 ppm or personnel will be upgraded to Level B protection before operations resume. Benzene detector tubes (Drager benzene tube 0.5 a 67-28561), with a measurement range of 0.5 to 10 ppm benzene, will be used in conjunction with Drager pump at pump strokes from 40 to 2. Benzene detector tubes will be pulled four times daily in personnel breathing zone to determine personnel exposure when 10 ppm PID/OVA readings are obtained.

7.4 REAL-TIME AEROSOL MONITOR (MINIRAM)

A real-time aerosol monitor (miniram) will be used to measure airborne particulate in personnel breathing zones and site work area locations. A breathing zone action level has been specified that requires upgrading to Level C protection based on sustained (5-minute average) miniram results of 2.5 mg/m^3. The miniram will also be used to monitor personnel breathing zone when wearing Modified Level D protection and to determine when an upgrade to Level C is warranted.

7.5 AIR MONITORING LOG

The SSO will ensure that all air-monitoring data is logged into a monitoring notebook. Data will include all information identified in Procedure 12 of the ER Safety Procedures Manual. The log will be signed by the individual conducting the monitoring daily. The Project CIH will periodically review this data

7.6 CALIBRATION REQUIREMENTS

The PID, LEL/O_2 meter and sampling pumps required with fixed-media air sampling will be calibrated daily prior to and after each use. A separate log will be kept detailing date, time, span gas, or other standard, name and signature of person performing the calibration.

7.7 AIR MONITORING RESULTS

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings.

8.0 EMERGENCY RESPONSE

8.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, OHM will plan for possible emergency situations and have available adequate supplies and manpower to respond. The PM will coordinate this plan with the NOSC/NOSCDR prior to commencing work. In addition site personnel will receive training during the site orientation concerning proper emergency response procedures. This training will include review of the elements of this plan and all action procedures described herein.

The following situations would warrant implementation of the Emergency Response and Contingency Plan (ERCP):

Fire/Explosion	•The potential for human injury exists •Toxic fumes or vapors are released •The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions •The use of water and/or chemical fire suppressants could result in contaminated run-off •An imminent danger of explosion exists
Spill or Release of Hazardous Materials	•The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard •The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health
Spill or Release of High Temperature Liquid or Vapor	•The spill can be contained on site, but the potential exists for ground-water contamination •The spill cannot be contained on site, resulting in off-site soil contamination and/or ground-water or surface water pollution •The spill quantity is greater than the reportable quantity limit for the material
Natural Disaster	•A rain storm exceeds the flash flood level •The facility is in a projected tornado path or a tornado has damaged facility property •Severe wind gusts are forecasted or have occurred and have caused damage to the facility
Medical Emergency	•Overexposure to hazardous materials •Trauma injuries (broken bones, severe lacerations/bleeding, burns) •Eye/skin contact with hazardous materials •Loss of consciousness •Heat stress (Heat stroke) •Cold stress (Hypothermia) •Heart attack •Respiratory failure •Allergic reaction

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.

- On-site emergency responders will be current in regards to training and medical surveillance programs. Copies of all applicable certificates will be kept on file for on-site personnel required to respond.

- It will be the responsibility of the emergency coordinator to brief the on-site response team on anticipated hazards at the site. The emergency coordinator shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

- Emergency response activities will be coordinated with the Local Emergency Planning Committee (LEPC) in compliance with SARA Title III requirements.

- Incident critiques will be prepared by the Site Supervisor and Site Safety Officer for submission to the OHM Regional Health and Safety Director for review. A "lessons learned" summary of the critique will be distributed to all site personnel within 30 days of the incident closure.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. The primary communication device will be two-way radios. Air horns may be used to alert personnel of emergency conditions. A telephone will be located at the command post to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

8.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the Site Supervisor and Site Safety Officer, through daily site inspections and employee feedback (Safety Observation Program, daily safety meetings, and activity hazard analyses) to recognize and identify all hazards that are found at the site. These may include:

Chemical Hazards	• Materials at the site • Materials brought to the site
Physical Hazards	• Fire/explosion • Slip/trip/fall • Electrocution • Confined space • IDLH atmospheres • Excessive noise
Mechanical Hazards	• Heavy equipment • Stored energy system • Pinch points • Electrical equipment • Vehicle traffic
Environmental Hazards	• Electrical Storms • High winds • Heavy Rain/Snow • Temperature Extremes (Heat/Cold Stress) • Poisonous Plants/Animals

Once a hazard has been recognized, the Site Supervisor and/or the SSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Lockout/tagout
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all OHM standard operating procedures
- Practice drills for fire, medical emergency, and hazardous substances spills

Table 8.1
Emergency Telephone Numbers

Local Agencies All services	
Police Dept.	911 on-base (910) 451-3855 (off-base)
Fire Department	911 on-base
Ambulance	911 on-base (910) 455-9119 (off-base)
Hospital	
Onslow County Hospital	(910) 577-2240
On-Base Facilities	(910) 451-4840
USMC Hospital	
Federal Agencies	
EPA Region Branch Response Center	(404) 347-3931
National Response Center	800-424-8802
Agency for Toxic Substances and Disease Registry	(404) 639-0615 (24 HR)
Navy ROICC / NTR	
National Response Center	800-424-8802
Project Manager	
James Dunn	(404) 734-8072
Director, Health and Safety, Angelo Liberatore, CIH	(404) 453-7671
OHM Corporation (24 hour)	800-537-9540
NOSC/NOSC DR	
Vann Marshbern	(910) 451-5006
Note:	
Additional Phone Numbers in Section 2.0 this HASP	

Routes to Hospital: (MAPS ARE POSTED ON-SITE)

On-Base

1. From Bldg. 25, proceed west to Holcomb Blvd. and turn left (north).
2. Proceed north on Holcomb Boulevard and turn left on Brewster Street
3. Base hospital is approximately 1/2 mile ahead on right.
4. Follow signs to the emergency room entrance.

Off-Base

1. From Bldg. 25, proceed west to Holcomb Blvd. and turn left (north).
2. Proceed north on Holcomb Boulevard and exit MCB Camp Lejeune through the main gate.
3. Follow Highway 24 West (approximately 2.5 miles) to Western Boulevard and turn right (north).
4. Continue on Western Boulevard (approximately 1.5 miles) to the fifth stoplight and the hospital is on the left side of the street.
5. Follow signs to the emergency room entrance.

A map depicting the route to the Onslow County Memorial Hospital and the Base Naval Hospital will be posted in each trailer.

8.3 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the Site Supervisor. In the event an emergency occurs and the emergency coordinator is not on site, the Site Safety Officer or the highest ranking employee on site will serve as the emergency coordinator until he arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment. Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

8.3.1 Responsibilities and Duties

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. OHM will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required. OHM will defer to the local Fire Department chief to assume the role of Incident Commander upon arriving on site. Additional on-site personnel may be added to the Site Emergency Response Team as required to respond effectively.

8.3.2 On-site Emergency Coordinator Duties

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.

- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where appropriate.

- Notify the NOSC/NOSCDR if outside emergency response help is necessary to control the incident. Table 8.1 provides telephone numbers for emergency assistance.

- Direct on-site personnel to control the incident until, if necessary, outside help arrives.

- Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if appropriate. The Emergency Response Team is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.

- If fire or explosion is involved, notify Base Fire Department.

- Notify LANTDIV ROICC

- Notify OHM Project Manager

- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required (as determined by the NOSC/NOSCDR), notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.

- Containers of waste are removed or isolated from the immediate site of the emergency.

- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.

- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.

- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.

- Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator. Report is due to USEPA within 15 days of the incident.

- Perform post incident evaluation and response critique and submit a written report to the Regional Health and Safety Director within 30 days of the incident conclusion.

8.4 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the SS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

In the event of a major hazardous material release (large spills of high toxicity/greater than 55 gallons), workers will be evacuated from the building/site. Workers will assemble at the entrance to the site for a head count by their foremen and to await further instruction.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 8.1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the crew trailers, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

8.5 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

8.5.1 Evacuation Signals and Routes

Two-way radio communication and an air horn will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. Each crew supervisor will have a two way radio. A base station will be installed in the OHM office trailer to monitor for emergencies. Total site evacuation will be initiated only by the emergency coordinator; however, in his absence, decision to preserve the health and safety of employees will take precedence. Evacuation routes will be posted in each outside work area. Signs inside buildings will be posted on walls or other structural element of a building. Periodic drills will be conducted to familiarize each employee with the proper routes and procedures.

8.5.2 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders (e.g., foreman). Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency spill control coordinator.
- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of OHM or other employees by reentry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Site Supervisor. The security guard will aid in accounting for visitors, contractors, and truckers by reference to sign-in sheets available from the guard shack.

- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.

- Reentry into the site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for reentry into the facility.

- Drills will be held periodically to practice all of these procedures and will be treated with the same seriousness as an actual emergency.

8.6 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 8.1 provide a quick reference guide to follow in the event of a major spill.

8.6.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

The on-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.
- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

8.6.2 Procedure for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and

involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 8.1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), OHM's practice is to report a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA. OHM also follows the same practice for any substances not listed in the Acts noted above but which can be classified as a hazardous waste under RCRA.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.

- Spray the spill area with foam, if available, if volatile emissions may occur.

- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.

- For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

8.6.3 Emergency Response Equipment

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses:

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Eyewash/safety shower (This equipment will be in conformance with ANSI Z358.1-1990.)
- Emergency oxygen unit
- Emergency signal horn
- Self contained breathing apparatus (two)
- Stretcher/backboard

In addition to the equipment listed above, OHM maintains direct reading instrumentation that may be used in emergency situations to assess the degree of environmental hazard. This equipment will only be used by the Site Safety Officer or other specially trained personnel. This equipment will be stored, charged and ready for immediate use in evaluating hazardous chemical concentrations. The equipment will be located at the OHM office trailer.

EQUIPMENT NAME	*APPLICATION*
Portable H-NU Photoionization Meter	Measures selected inorganic and organic chemical concentrations
MSA Oxygen and Combustible Gas Meter	Measures oxygen and combustible gas levels
Drager Detector Tubes	Assorted detector tubes to measure specific chemical concentrations

8.6.4 Personal Protective Equipment

A supply of two (minimum) SCBAs will be located in the support zone for use in emergency response to hazardous materials releases. They will be inspected at least monthly, according to

OSHA requirements. In addition, all emergency response personnel will have respirators available for use with cartridge selection determined by the Site Safety Officer based on the results of direct reading instruments. Emergency response personnel will also be provided with protective clothing as warranted by the nature of the hazardous material and as directed by the Site Safety Officer. All OHM personnel who may be expected to wear SCBAs are trained at assignment and annually thereafter on the proper use and maintenance of SCBAs and airline respirators.

8.6.5 Emergency Spill Response Clean-Up Materials and Equipment

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be inventoried and inspected, visually, on a weekly basis.

The materials listed below will be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.
- Lime (calcium oxide), soda ash (sodium carbonate), or baking soda (sodium bicarbonate) for neutralizing acid (pH <7) spills.
- Activated charcoal (carbon) to adsorb organic solvents (hydrocarbons) and to reduce flammable vapors.
- Citric acid for neutralizing caustic (pH >7) spills.
- Vapor-suppressing foam, if required by the Client, for controlling the release of volatile organic compounds.
- Appropriate solvents e.g. CITRIKLEEN, for decontamination of structures or equipment.

The following equipment will be kept on site and dedicated for spill cleanup:

- Plastic shovels for recovering corrosive and flammable materials.
- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers.
- Sorbent sheets (diapers) for absorbing liquid spills.
- Overpack drums for containerizing leaking drums.
- 55-gallon open-top drums for containerization of waste materials.

*NOTE: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labelled, and disposed of off-site.

8.7 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures OHM will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

8.7.1 Medical Emergency Contingency Measures

The procedures listed below will be used to respond to medical emergencies. The SSO will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two First-Aid/CPR trained personnel will be maintained on site. All OHM first aid and CPR Responders have received training as required by 29 CFR 1910.1030 Bloodborne Pathogen Standard. A copy of the OHM exposure control plan may be obtained from the Site Safety Officer or Regional Health and Safety Director.

8.7.1.1 Response

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The crew foreman will be summoned.

The crew foreman will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The foreman will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Site Safety Officer. The following actions will then be taken depending on the severity of the incident:

- Life-Threatening Incident--If an apparent life-threatening condition exists, the crew foreman will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by OHM personnel to a clean area for treatment by EMS personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.

- Non Life-Threatening Incident--If it is determined that no threat to life is present, the Site Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

*NOTE: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Site Safety Officer.

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures which must be performed.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the SSO or the Site Supervisor. An accident/injury/illness report will be completely and properly filled out and submitted to the Regional Health and Safety Director/Project CIH, in accordance with OHM's reporting procedures.

A list of emergency telephone numbers is given in Table 8.1.

8.7.1.2 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

8.7.1.3 Directions To Hospital

Written directions to the hospital and a map will be posted in all trailers in the staging area.

8.7.2 Fire Contingency Measures

OHM personnel and subcontractors are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.

- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.

- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.

- Fire extinguishers will be placed in all areas where a fire hazard may exist.

- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.

- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.

- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.

- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

8.7.3 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

8.7.3.1 Response

- Excavation/soil stock piles will be covered with plastic liner.

- All equipment will be shut down and secured to prevent damage.

- Personnel will be moved to safe refuge, initially crew trailers. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.

8.7.3.2 Notification

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- OHM employees and subcontractors
- Client Representative
- Local Civil Defense Organization

8.7.4 Spill/Release Contingency Measures

In the event of release or spill of a hazardous material the following measures will be taken.

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. Unsuspecting persons/vehicles will be warned of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve or temporarily sealing a hole with a plug.

Utilizing radio communications, the emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and SSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth
- Digging a sump, installing a polyethylene liner and diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the LANTDIV ROICC, of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The major supply of material and equipment will be located in the Support Zone. Smaller supplies will kept at active work locations. The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the ROICC. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the ROICC and obtain his concurrence with the remedial action plan.

9.0 TRAINING REQUIREMENTS

As a prerequisite to employment at OHM, all field employees are required to take a 40-hour training class and pass a written examination. This training covers all forms of personal protective equipment, toxicological effects of various chemicals,hazard communication, bloodborne pathogens, handling of unknown tanks and drums confined-space entry procedures, and electrical safety. This course is in full compliance with OSHA requirements in 29 CFR 1910.120. In addition, all employees receive annual 8-hour refresher training and three day on-site training under a trained experienced supervisor. Supervisory personnel receive an additional 8-hour training in handling hazardous waste operations. Copies of certification of this training will be maintained on-site for all workers assigned to this project.

All personnel assigned to this project will receive training on this HASP and other pertinent site-specific information (as determined by the SSO and SS) prior to starting work.

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the Health and Safety Plan Certification in Appendix A.

10.0 MEDICAL SURVEILLANCE PROGRAM

All OHM personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of OHM's worker medical profile is shown below. This program was developed in conjunction with a consultant toxicologist and OHM's occupational health physician. Other medical consultants are retained when additional expertise is required. Medical certification for all site workers assigned to the project will be maintained on-site.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120 (f).

Table 10.1
Worker Medical Profile

Item	*Initial*	*Annual*
Medical History	X	X
Work History	X	X
Visual Acuity and Tonometry	X	X
Pulmonary Function Tests	X	X
Physical Examination	X	X
Audiometry Tests	X	X
Chest X-Ray	X	X
Complete Blood Counts	X	X
Blood Chem. (SSAC-23 or equivalent)	X	X
Urinalysis	X	X
Dermatology Examination	X	X
Electrocardiogram/Stress Test	X	X (based on age)

10.1 EXAMINATION SCHEDULE

Employees are examined initially upon start of employment, annually thereafter, and may be examined upon termination of employment. Unscheduled medical examinations are conducted:

- At employee request after known or suspected exposure to toxic or hazardous materials
- At the discretion of the client, the CIH, SSO, or OHM occupational physician after known or suspected exposure to toxic or hazardous materials
- At the discretion of the OHM occupational physician

All nonscheduled medical examinations will include, as a minimum, all items specified above for periodic surveillance examination, with the exception of the chest x-ray, which will be conducted at the discretion of the occupational physician performing the examination.