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SOIL REMEDIATION WORK PLAN AND HEALTH AND SAFETY PLAN PETROLEUM-  
CONTAMINATED SOIL REMEDIATION NAS DETROIT NS GREAT LAKES IL  
4/1/2004  
TOLTEST, INC

**EJOC CONTRACT NO. N689500-00-D-0200  
DELIVERY ORDER NO. 0078**

**SOIL REMEDIATION WORK PLAN &  
HEALTH AND SAFETY PLAN  
PETROLEUM-CONTAMINATED SOIL REMEDIATION  
NAVAL AIR STATION DETROIT  
DETROIT, MICHIGAN**

**PREPARED FOR**



**DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND  
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GREAT LAKES, ILLINOIS 60088-5600**

**SUBMITTED  
APRIL 2004**

**BY**



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**TOLTEST PROJECT NO. 73736.01**

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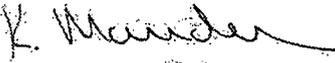
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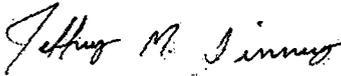
*TolTest, Inc. hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under this contract is complete, accurate, and complies with all requirements of the contract.*

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## LIST OF ACRONYMS

ASTM	American Society of Testing and Materials
AHA	Activity Hazard Analyses
CFR	Code of Federal Regulations
DO	Delivery Order
EJOC	Environmental Job Order Contract
HASP	Health and Safety Plan
MDEQ	Michigan Department of Environmental Quality
NAS	Naval Air Station
OSHA	Occupational Safety and Health Administration
PID	photo-ionization detector
PPE	Personal Protection Equipment
SOW	Statement of Work
SSHO	Site Safety and Health Officer
TolTest	TolTest, Inc.
UFGS	Unified Facilities Guide Specifications
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WMI	Waste Management, Inc.
WP	Work Plan



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## PART I - WORK PLAN

### 1.0 INTRODUCTION

TolTest, Inc. (TolTest) has prepared this Work Plan (WP) and Health and Safety Plan (HASP) for the Department of the Navy (Navy), Naval Facilities Engineering Command, Engineering Field Activity Midwest in Great Lakes, Illinois. This WP explains the approach TolTest will use for petroleum-contaminated soil remediation and soil sampling at the former Naval Air Station (NAS) in Detroit, Michigan. TolTest will be performing this work under Environmental Job Order Contract (EJOC) N68950-00D-0200, Delivery Order (DO) 0078. The Statement of Work (SOW) prepared by the Navy in August 2003 and information obtained during a site visit in August 2003 by Mr. Khushwant Mander of TolTest was used to develop this WP and HASP. A site layout map and several government provided drawings depicting the locations of where the soil remediation activities are to take place are provided in **Appendix A**.

TolTest understands that Tetra Tech NUS, Inc. previously investigated six different sites (F1419, F1422, F1424, F1426, F1445, and F1446) at NAS Detroit. The soil samples collected from these sites exceed the Michigan Department of Environmental Quality (MDEQ) action levels for residential criteria. Information obtained during these investigations has been used to estimate the quantity and locations of petroleum-impacted soil and to determine the contaminants of concern.

This document is presented in two parts. Part I consists of our WP, which systematically addresses the methods and procedures required to perform the project activities and provides a completion schedule for each action, personnel, and equipment needed to complete work items in the SOW. Part II consists of our HASP, which identifies applicable health and safety requirements and includes the identification of site locations, DO planned activities, HASP organization, hazard analysis, worker training, personal protection equipment (PPE), medical surveillance, monitoring, site controls, and emergency response. These plans have been specifically developed for the successful execution of this DO.

The WP contains the following sections:

- **Section 2.0, Project Coordination** – This section summarizes the overall project objectives, the SOW, and the pre-field preparations.
- **Section 3.0, Soil Remediation Regulatory Framework**– This section list the applicable regulations and standards that will generally be adhered to during the execution of this project.
- **Section 4.0, Soil Remediation Equipment, Personnel, and Subcontractors**
- **Section 5.0, Soil Excavation and Disposal** – This section highlights operations that will be undertaken during the excavation and disposal of non-hazardous, petroleum-contaminated soils.



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- **Section 6.0, Site Restoration** – This section discusses demobilization procedures, backfill procedures, and site maintenance.
  - **Section 7.0, Environmental Protection** – This section discusses TolTest’s methodology to preserve the environmental quality conditions of the various work areas.
  - **Section 8.0, Record Keeping and Report Preparation** – This section discusses the record keeping requirements and report submittals.
  - **Section 9.0, Scheduling and Time Management** - This section discusses project organization and scheduling.
  - **Section 10.0, Residual and Waste Management Objectives** –This section discusses the management and disposal of waste streams.



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## 2.0 PROJECT COORDINATION

The purpose of this project is to perform soil remediation services at six different sites at NAS in Detroit, Michigan. The project objectives, SOW summary, and pre-field work preparations are discussed below:

### 2.1 Project Objectives

- Excavate, transport, and dispose of an estimated 5,200 cubic yards of non-hazardous, petroleum-contaminated soil at six different sites (F1419, F1422, F1424, F1426, F1445, and F1446) at NAS Detroit. TolTest will collect soil samples to confirm that the MDEQ action levels in Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, have not been exceeded.
- Conduct excavation, transportation, disposal, and site restoration activities in a manner that minimizes disruption to NAS Detroit and maximizes safety.
- Provide testing and monitoring necessary to complete the remediation in accordance with the SOW and applicable guidelines.
- Manage waste streams on site to minimize environmental liabilities.
- Provide the necessary administrative and management controls to ensure the project is completed according to the SOW and all applicable regulations.
- Perform the project within the proposed schedule, with administrative controls providing accurate documentation and project reporting.

### 2.2 Scope of Work

This project at NAS Detroit involves excavation and offsite landfill disposal of petroleum-contaminated soil; restoration of the sites; and preparation of a Delivery Order Closure Report. A site location map, located in **Appendix A**, shows the areas of petroleum-impacted soil. The SOW is summarized as follows:

- Attend and conduct required meetings necessary for the safe and efficient execution of this project.
- Obtain utility clearance from the local utility protection service and from the NAS Detroit Public Works prior to the start of work.
- Obtain required Wetland and Erosion permits related to the completion of the tasks in this WP.
- Excavate, transport and dispose of an estimated 5,200 cubic yards of non-hazardous petroleum-impacted soil from six sites (F1419, F1422, F1424, F1426, F1445, and F1446) at NAS Detroit.
- Provide necessary safety barricades and signage around excavation areas.



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- Collect soil samples for laboratory analysis, after completion of excavation, to confirm that the regulatory action levels have been achieved.
  - Complete Delivery Order Completion Reports, which will include applicable documentation of work activities.
  - Submit soil sample to analytical laboratory for disposal characterization.
  - Waste materials resulting from site operations will be effectively managed according to applicable regulations.
  - Backfill and restore the site to its original condition in accordance with Specification Section 02315 attached to the SOW.

### 2.2.1 Site Preparation

Preparatory work involves the orientation of all crewmembers and subcontractor personnel with the project sites. Orientation will include review of NAS Detroit security procedures for entering/exiting the site, emergency procedures, and other signals or standard site procedures. Review of site security and Health and Safety procedures will be conducted prior to allowing personnel to work on site.

### 2.2.2 Site Work

The tasks associated with site work activities include the safe operation of heavy excavating equipment and working with non-hazardous petroleum-contaminated soils. All site work will be conducted in strict accordance with associated HASP. All site personnel involved in the excavation, stockpiling and handling of wastes will be required to have Occupational Safety and Health Administration (OSHA) 40-hr. Hazardous Waste Site Operations training and to have received current refresher training.

### 2.2.3 Pre-Site Work

Prior to the start of field activities, TolTest will obtain NAS Detroit Public Works and local public utility clearances. TolTest will arrange for utility mark-outs through Miss Dig Utility Communication System at (800) 482-7171. Tetra Tech NUS, Inc. will mark the excavation boundaries prior to having the underground utilities marked. Coordination for site activities will be made through the NAS Detroit Resident Officer in Charge of Construction office. Work will not begin without utility clearances by both NAS Detroit Public Works and Miss Dig Utility Communication System. Wetland and Soil Erosion and Sedimentation Control permits will be obtained from the MDEQ and/or the County prior to performing any excavation activities.



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### 3.0 SOIL REMEDIATION REGULATORY FRAMEWORK

This section details the specific operational tasks required to accomplish this project. The following list includes applicable regulations and/or standards that will generally be adhered to during the execution of the project:

- Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.
- Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.
- Part 303, Wetlands Protection of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.
- 40 Code of Federal Regulations (CFR) 261.2, Definition of Solid Waste
- 40 CFR 261 Subpart C, Characteristics of Hazardous Wastes
- 40 CFR 262.11, Hazardous Waste Determination
- 40 CFR 262.20, General Manifest Requirements
- 40 CFR 264, Standards for Treatment, Storage, and Disposal Facilities
- 40 CFR 265, Interim Status Standards for Treatment, Storage, and Disposal Facilities
- 40 CFR 267, Interim Status Standards for Owners and Operators of a New Hazardous Waste Land Disposal Facility
- 40 CFR 268, Land Disposal Restrictions
- 40 CFR 271, Requirements for Authorization of a State Hazardous Waste Program
- 40 CFR 272, Standards Applicable to Transporters of Hazardous Waste
- 49 CFR Part 130, Oil Spill Prevention and Response Plans
- 49 CFR Part 171, General Information, Regulations, and Definitions for Hazardous Materials
- 49 CFR Part 172, Hazardous Materials Table
- 49 CFR Part 173, General Requirements for Shipments
- 49 CFR Part 177, Carriage by Highway
- 49 CFR Part 61, United States Department of Transportation
- U.S. Army Corps of Engineers (USACE) Safety Manual EM385-1-1
- Unified Facilities Guide Specifications (UFGS) Section 01525, Safety Requirements
- UFGS Section 01572, Waste Management
- UFGS Section 01575N, Temporary Environmental Controls
- UFGS Section 02315, Excavation and Fill



#### 4.0 SOIL REMEDIATION EQUIPMENT, PERSONNEL, AND SUBCONTRACTORS

The following section details the equipment, key TolTest personnel, and subcontractors that will be utilized during this project. TolTest will perform soil excavation, disposal, transportation, and sample collection during the remediation activities. TolTest will maintain a safe working environment at each site.

Personnel assigned to this project may change in order to more efficiently complete the tasks defined in this WP. Any personnel changes that may be required will be with comparable TolTest personnel. The following table lists the equipment, personnel, and subcontractors to be used for the soil remediation services of the petroleum-contaminated soil.

**Table I-1 Petroleum-impacted Soil Remediation, NAS, Detroit, Michigan**

EQUIPMENT/SUPPLIES	TOLTEST PERSONNEL	SUBCONTRACTORS
Backhoe Dump trucks for soil transportation to landfill Pickup truck 6-mil polyethylene sheeting Hard hats and safety glasses Disposable gloves Trowel Photoionization detector Resealable plastic bags Laboratory-supplied glass sampling containers Cooler with ice Radios/cell phone Barricades Caution tape First aid kit	<b>Khushwant Mander</b> Project Manager  <b>Michael Hubans</b> Site Superintendent/Health and Safety  <b>Tim Boos</b> Certified Storm/Equipment Operator  <b>Bill Webster</b> Equipment Operator	<b>Pinetree Acres Recycling and Disposal Facility (RDF)</b> Transportation of petroleum – contaminated soil  Disposal of petroleum-impacted soil  <b>STL Laboratories Chicago</b> Laboratory Analysis



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## 5.0 SOIL EXCAVATION AND DISPOSAL

Soil excavation will be necessary to accomplish the SOW. Non-hazardous, petroleum-contaminated soil will be excavated from six different sites at NAS Detroit and transported off-site for disposal.

### 5.1 Waste Characterization Sampling

Waste characterization samples will be collected using a stainless steel hand auger. Soil samples will be collected from approximately four feet below ground surface from one to four locations at each site. Equal parts of each sample will be combined to make two composite samples, which will be submitted, to STL Laboratories in University Park, Illinois for disposal characterization.

This sample will be analyzed for the following analytical parameters required by Waste Management, Inc. (WMI) Pinetree Acres RDF waste disposal facility:

- Toxicity Characteristic Leaching Procedure volatile organic compounds (VOCs) using United States Environmental Protection Agency (USEPA) Solid Waste Methods 1311 and 8260B.
- Toxicity Characteristic Leaching Procedure Resource, Conservation, and Recovery Act (RCRA) metals using USEPA Solid Waste Methods 1311, 6010B, 7470 and 7471.

The sample results will be submitted to the Navy before coordinating final transportation and disposal with the disposal facility.

### 5.2 Site Control

TolTest will maintain control at the site through the use of barricades, plastic safety fencing, and signage, as needed. The site supervisor will coordinate the excavation activities and the loading of trucks in a manner that causes minimum disruption to the surrounding area, vehicular and pedestrian traffic.

### 5.3 Soil Excavation Procedures

Approximately 5,200 cubic yards of non-hazardous, petroleum-impacted soil will be excavated from six different sites (F1419, F1422, F1424, F1426, F1445, and F1446) at NAS Detroit. The impacted soils will be loaded directly onto trucks to eliminate the need for double handling of the soil. TolTest plans to use a backhoe equipped with a grading bucket to remove the impacted material. The estimated volume of petroleum-impacted soil to be excavated from each site is listed below:

- 230 cubic yards from one area at F1419
- 4,133 cubic yards from two areas at F1422
- 11 cubic yards from one area at F1424



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- 6 cubic yards from one area at F1426
  - 620 cubic yards from six areas at F1445
  - 200 cubic yards from one area at F1446

#### **5.4 Air Monitoring/Soil Screening**

While excavation activity is taking place, TolTest will periodically monitor air in the breathing zone for volatile organic contaminants with a photo-ionization detector (PID). Action levels and appropriate responses are outlined in the HASP for this activity.

Grab samples of the excavated material will be periodically screened to evaluate the presence of potential organic contaminants. The grab samples will be placed into resealable plastic bags. The samples will be field screened for volatile organic compounds using a PID equipped with a 10.6 electron volt (eV) lamp. PID screening results will be documented in the final report.

#### **5.5 Transportation and Disposal**

As previously stated, TolTest will pre-characterize material from each area using samples collected with a stainless steel hand auger and/or trowel. Pre-characterization makes sense from a logistical standpoint and also allows for direct hauling of soil for transportation and disposal. Soil samples collected from the sites will be combined and equally divided into two composite samples.

The waste characterization samples will be analyzed for parameters established by the disposal facility. These samples will be placed on ice and sent under chain-of-custody restriction to STL Laboratories in University Park, Illinois.

Approximately 5,2000 cubic yards of non-hazardous petroleum-impacted soil will be transported and disposed by WMI Pinetree Acres RDF, a Subtitle D landfill in Macomb County, Michigan.

#### **5.6 Erosion Control**

Erosion control procedures and methods to be implemented by TolTest during the excavation and site restoration activities for this project are provided in this section. These procedures and methods provide a guideline for runoff and erosion control measures that will be used during the excavation and restoration phases of this project. It will be TolTest's responsibility to inspect, repair, and upgrade all erosion control measures in accordance with MDEQ specifications.

Methods and actions to reduce soil erosion include, but are no limited to:

- Planning, conducting, and controlling the work to reduce the areas disturbed by construction.
- Prompt stabilization of disturbed areas.
- Controlling precipitation runoff.



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- Effective maintenance of erosion and sediment control measures during the excavation and restorations phases.

Prior to beginning soil excavation at any of the locations, silt fencing will be installed along the downslope portions of the work area, except across roadways and areas where vegetation exists to act as a natural means of erosion control. These areas will be confirmed with the Navy prior to initiating demolition. The silt fence will be installed and maintained in accordance with UFGS Section 01356A, Storm Water Pollution Prevention Measures. In addition to the installation of silt fence and the use of natural erosion control measures, silt fence material will be placed over any storm water gratings in the vicinity of the work area.

Weekly inspections of the excavation areas and installed erosion control measures will be made to check the effectiveness of the control measures and to evaluate conditions needing maintenance or repair. The control measures will also be inspected within 24 hours of any significant rain event.

#### **5.7 Confirmation Sampling**

After removal of the contaminated soil and before backfilling with clean fill, soil samples will be collected from each excavation. The samples will be collected using a stainless steel trowel. A total of 121 soil samples will be collected from the floor and sidewalls of the excavation areas. There is one excavation area at each site except for site numbers F1442 and F1445, which have two and six excavation areas, respectively. The sampling areas and quantities are listed below:

- 5 samples (4 sidewall and 1 floor) from one excavation at F1419.
- 30 samples (20 sidewalls and 10 floor) from two excavations at F1422.
- 5 samples (4 sidewall and 1 floor) from one excavation at F1424.
- 5 samples (4 sidewall and 1 floor) from one excavation at F1426.
- 30 samples (24 sidewall and 6 floor ) from six excavations at F1445
- 5 samples (4 sidewall and 1 floor) from one excavation at F1446

Decontamination of sampling equipment will include an Alconox® and distilled water wash followed by a distilled water rinse after collection of each sample. Each soil sample collected will be split into two components: one for field screening and one for potential laboratory analysis. During the confirmation sampling, a TolTest environmental professional will describe the soil samples, record the soil screening results and record the field observations.

The samples for potential laboratory analysis will be placed in laboratory-supplied sample containers. As specified in the Request for Proposal, the samples will be analyzed for VOCs using USEPA Method 8260B and semi-volatile organic compounds (SVOCs) using USEPA Method 8270. Samples collected for VOCs will be collected pursuant to USEPA Method 5035 using EnCore® samplers or field methanol preservation techniques. If sufficient groundwater for sampling is encountered in an excavation, a groundwater sample will be collected in lieu of a



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soil sample and analyzed for the same parameters as the soil sample. Groundwater samples will be collected using the low flow sampling technique (peristaltic pump and disposable tubing). Groundwater samples will be transferred from the tubing to clean containers supplied by the laboratory.

The analytical results for the confirmation samples will be compared to the appropriate MDEQ action levels. If any of the analytical results exceed the MDEQ action levels, TolTest will notify the Navy Technical Representative. Restoration activities will not commence until the confirmation sample analytical results are below the MDEQ action levels.

### **5.8 Water Control**

If groundwater enters an excavation in sufficient quantity to interfere with the work being conducted, TolTest will implement groundwater control. TolTest will assess the groundwater situation and prepare and submit a plan to the Contracting Officer for review and approval. The plan will include the proposed method to control groundwater during excavation activities, the equipment that will be used, and a discussion of permits needed for discharge, if any. If significant groundwater is encountered, the situation will be evaluated for the most cost-effective and least disruptive approach that meets applicable environmental regulations.



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## 6.0 SITE RESTORATION

Following receipt of confirmatory sample results from STL Chicago Laboratories below the applicable MDEQ action levels, TolTest will backfill and compact the excavation areas. After backfill activities, TolTest will schedule a final walk-through of the sites, remove temporary facilities/barricades, and demobilize construction equipment.

### 6.1 Backfill

Following excavation and offsite landfill disposal of impacted soil, the excavations will be backfilled with tested and approved material that conforms to the SOW. The excavations will be backfilled with materials that meet the following American Society of Testing and Materials (ASTM) requirements:

- ASTM D 2487, classification well-graded gravels (GW), poorly-graded gravels (GP), well-graded sands (SW), poorly-graded sands (SP) and silty-sands (SM):
- Maximum ASTM D 4318 liquid limit of 35 and plasticity index of 12.
- Maximum of 25 percent by weight passing ASTM D 1140, Number 200 sieve.

The excavations may also be backfilled with approved, unclassified soil material with the characteristics required compacting to the soil density specified for the intended location.

Fill will be placed in 12-inch lifts and machine compacted to 85 percent of ASTM D 698 maximum density. Four to six inches of topsoil, which meets the requirements listed in the SOW, will be used to cap each excavation area, except those in the gravel parking lot area of F-1445 and F-1446. The areas topped with topsoil will be seeded and the areas in the gravel parking lot will be topped with crushed stone.

### 6.2 Walk-through and Punch List

After site restoration is complete, TolTest will schedule a final inspection to ensure all tasks have been completed in accordance with the SOW and to the Navy's satisfaction. A punch list of any remaining items or necessary repairs to landscape will be developed as a guideline for the TolTest completion crew.

### 6.3 Cleanup

Crews will implement good housekeeping measures throughout the execution of this project. Any residual general trash or debris on site at project completion will be appropriately removed and disposed.



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#### **6.4 Remove Temporary Facilities**

Any temporary contractor facilities will be removed and demobilized after all site activities are completed and the Navy has approved the work. All debris and temporary facilities, barriers, etc. will be removed, and the affected areas returned to their original condition.

#### **6.5 Demobilize Construction Equipment and Facilities**

Following the completion of all site work, TolTest will demobilize all equipment and personnel from the site. Demobilization will be coordinated with site security to ensure a smooth transition, without impact to NAS Detroit operations.



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## 7.0 ENVIRONMENTAL PROTECTION

TolTest and its subcontractors will provide and maintain environmental protection throughout the duration of this project. A pre-construction meeting will be held prior to the commencement of field activities to discuss the proposed environmental protection. The meeting will develop a mutual understanding relative to required reports and measures to be taken should there be an incident that requires a response. Due to the close proximity of potential wetlands to the excavation sites, it will be a high priority on this project to practice contaminant avoidance, minimize to the extent possible the disturbance of impacted areas, and minimize spreading of potential contaminants.

Environmental protection will be provided to correct conditions that develop during demolition or that are required to control pollution that develops during normal construction practices. TolTest will comply with applicable federal, state, and local regulations pertaining to water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

TolTest and its subcontractor's will at all times be aware of and adhere to the Environmental Protection Policies in force at the NAS. TolTest will maintain compliance with 40 CFR 263, 264, and 265.

Any hazardous waste created, used, or brought onto Government property by TolTest and its subcontractor's will be TolTest's responsibility. Hazardous waste will be stored and transported in approved containers in accordance with 49 CFR 178. Wastes will be properly labeled with the proper shipping description, accumulation start date and generator information. Containers will be removed from the project site and stored and treated/disposed of in accordance with 40 CFR 263, 264, and 265.

Special measures will be taken to prevent hazardous substances from entering the ground, drainage areas, or local bodies of water. Environmental requirements for the prevention of any spills is contained in Environmental Protection Agency Regulations on Oil Pollution Prevention, Title 40 CFR 112. For oil and hazardous substance spills that may be large enough to be a reportable quantity under federal, state, or local regulations, the NS Great Lakes and NAS Environmental Departments will be notified immediately and appropriate regulatory notifications will be made.

TolTest and its subcontractor's will preserve the integrity of the natural resources of the project area. This includes ensuring that the surrounding area is not environmentally damaged in any way and preventing the release of hazardous substances into the surrounding air, lands, or water. Absorbent pads and containment measures will be available at all times to clean and wipe up any small spills. Heavy equipment and storage containers will be inspected daily to ensure that they are not leaking. A spill kit containing absorbent pads, absorbent pillows, and containment socks will always be kept at the site.



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## 8.0 RECORD KEEPING AND REPORT PREPARATION

The following paragraphs discuss the record keeping and reporting requirements for this project.

### 8.1 Supervision and Management

TolTest will provide daily on-site supervision. A Daily Quality Control Report will be prepared by the Site Superintendent to document and outline the day's activities. Each Daily Quality Control Report will be submitted to the TolTest Project Manager and to the Navy to monitor project progress and identify any problems or issues as early as possible.

### 8.2 Regulatory/Permit Issues

Wetland and Soil Erosion and Sediment Control permits will be obtained prior to the initiation of site work. TolTest will be responsible for obtaining required clearances for such items as mark-out of underground utilities and traffic control (if needed).

### 8.3 Completion Report

At the completion of field work, TolTest will provide a Delivery Order Closure Report which will include a description of interim measures implemented; summaries of results; summaries sampling methodologies; pictures of all phases of project; quantities of excavated material, summaries of results, copies of all relevant data; and description of all major activities related to the effort. TolTest will incorporate Navy and regulator comments into the report prior to finalization.



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## 9.0 SCHEDULING AND TIME MANAGEMENT

Effective administration and management of the DO will be accomplished using defined lines of communication throughout the project organization, a well-planned project schedule, a set of drawings provided by the Navy, and follow-up reporting.

### 9.1 Project Organization

TolTest has selected personnel who can provide the experience and capability necessary to successfully complete a project of this type. Subcontractors have been selected based not only on price, but also on a thorough evaluation of their experience and capability to perform projects of this nature.

The following TolTest Team personnel have been selected for this project.

- EJOC Program Manager – Ernest Enrique
- Project Manager – Khushwant Mander
- Site Superintendent – Michael Hubans

### 9.2 Project Schedule

Prior to the start of on-site construction activities, TolTest will submit a finalized project schedule of work to the Navy for approval. Mobilization will commence after all approvals are obtained from the Navy.

### 9.3 Schedule Management Procedures

TolTest will use Microsoft Project<sup>®</sup> software to develop and track the project schedule. This baseline schedule will be used for the identification and timing of project deliverables and for the purchasing and scheduling of supplies and materials.

As the project progresses, the schedule will be reviewed and audited to identify variances in resource and material utilization, timing of supplies, and timing of work item initiation and completion. The Project Manager will then identify and propose changes to the Navy for schedule modifications to minimize any effects the variances may have on the completion of a DO work item.

### 9.4 Proposed Project Schedule

As established by the contracting officer, the projected schedule is based on working six days per week (Monday through Saturday, excluding Government holidays), 8.5 hours per day from 0700 to 1530. Any requests for working extended hours/days will be submitted to the Navy for approval prior to initiating any additional work activity. The project schedule milestones are depicted in **Appendix B**.



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## 10.0 RESIDUAL AND WASTE MANAGEMENT OBJECTIVES

The waste streams to be generated during this project are non-hazardous petroleum-impacted soil based on review of prior project data and the SOW. Transportation of the petroleum-impacted soil will be performed by subcontracted entities that possess the required applicable local, state and federal permits and licenses, under strict material manifest procedures. The soil will be disposed of in a permitted Subtitle D landfill. TolTest anticipates utilizing WMI's Pinetree Acres Landfill for disposal of non-hazardous, petroleum-contaminated soil. Specific elements of our residual and waste management plan are described in the following sections.

Licensed carriers under subcontract will transport non-hazardous impacted soil with WMI's Pinetree Acres Landfill, located in Macomb County, Michigan. This landfill is a permitted Subtitle D facility which has the required approvals to accept waste streams that meet their permit criteria. The waste is expected to meet this approval process and will be sampled as part of our pre-mobilization site activities. Sample frequency and analytical parameters will be in accordance with the landfill's specific permit requirements. Following receipt of analytical results, a specific waste stream profile will be developed. This profile will require a signature from a Navy representative as the generator of the waste. Upon receipt from the landfill of an approved profile, waste load-out and transportation will be scheduled. Waste will be transported under strict non-hazardous manifest procedures. Certified weight tickets and completed waste manifests will be provided with the final report.



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## PART II - HEALTH AND SAFETY PLAN

### 1.0 INTRODUCTION

TolTest is responsible for the safety, health, and emergency response provisions for each task order under this contract. These provisions are provided through the development and implementation of TolTest's Corporate Health and Safety Plan and this Site HASP. All personnel, visitors, contractors, and subcontractors will be informed of this plan and any potential health and safety hazards of the operation.



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## 2.0 APPLICABILITY

This plan will be followed during all site activities starting with site mobilization through site demobilization. This plan incorporates the requirements of the following regulations and/or appropriate guidance:

- Federal Acquisition Regulation (FAR) clause 52.236-13, Accident Prevention
- OSHA Construction Industry Standards, 29 CFR 1926
- OSHA General Industry Standards, 29 CFR 1910 (including, but not limited to, 29 CFR 1910.120, Hazardous Waste Site Activities)
- USACE Health and Safety Manual EM385-1-1
- Other applicable federal, state, and local safety and health requirements

The implementation of the Petroleum-contaminated Soil Remediation Work Plan (Part I of this document) includes the necessary tasks that will be performed to excavate impacted soil at NAS Detroit and to collect confirmation samples for laboratory analysis.



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### 3.0 SITE SAFETY AND HEALTH

This section addresses the responsibilities for safety and health oversight, PPE, and site-specific control measures and operating procedures.

#### 3.1 Key Personnel

The Site Safety and Health Officer (SSHO) for this project has the overall responsibility for ensuring that the provisions of this HASP are implemented in the field. The SSHO will be present during the period that heavy equipment is operating and will observe and document the activities. The SSHO is responsible for conducting daily tailgate safety meetings and site inspections to ensure the effectiveness of this plan. As field conditions change, decisions will be made regarding additional protective measures. Personnel assigned to this project are experienced, meet the supervisory training requirements specified by OSHA in 29 CFR 1910.120, and have First Aid training.

#### 3.2 Personal Protective Equipment

PPE is to be used by employees for each of the site tasks and operations being performed. The type of PPE will depend upon the level of potential exposure to hazards. TolTest personnel will be equipped, at a minimum, with the PPE listed below:

- Working uniform
- Coverall suit (use depends on site conditions)
- Steel-toe boots/shoes
- Hard hat
- Safety glasses
- Hearing protection if noise level exceeds 85 dB
- Work gloves

Level C PPE may include:

- Level D PPE, minus safety glasses (eye protection supplemented along with breathing protection (See next entry)
- Full Face, Negative Pressure Respirator equipped with filters specific to the contaminant of concern.

Level C PPE is not anticipated to be utilized for this remediation project.

#### 3.3 Site Control Measures

Control procedures will be implemented to prevent unauthorized access to the work area. Orange, plastic safety fencing and/or barricades may be installed around the work area, if



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needed. The SSHO will ensure that all personnel entering the site have the necessary training and medical approval documentation. Personnel entering the site will be given a thorough briefing on the site hazards and safe work procedures prior to proceeding. A safety meeting will be conducted on a daily basis and will be documented. The topics of discussion will include potential physical and chemical hazards involved in the excavation activities. This HASP will be used as a reference to discuss in detail the pertinent topics that are applicable for each days work activities.

All visitors will be expected to comply with applicable regulatory OSHA requirements as well as the requirements of this HASP. Visitors will also be expected to provide their own PPE. In the event visitors do not adhere to the provisions of the HASP, they will be requested to leave the work area. All non-conformance incidents will be recorded in the site log. The SSHO will document a written record of all personnel entering and exiting the site.

### **3.4 Site Standard Operating Safety Procedures**

The following safety rules will be adhered to during all site activities:

- At least one copy of this HASP will be available at the project site in a location readily available to all personnel, including visitors.
- Personnel will practice contamination avoidance.
- No food or beverages will be present or consumed in the work area.
- No tobacco products will be used on the project site.
- No alcohol or drugs will be present or consumed on site or in any vehicle or worksite equipment.
- No personnel will be permitted to work while under the influence of alcohol or drugs while on site or operating a vehicle or worksite equipment.
- Emergency equipment consisting of fire extinguishers, a first aid kit, and a mobile telephone will be located in a company vehicle in a readily accessible location.
- Visual contact will be maintained between crew members at all times, and crew members will be required observe each other for signs of exposure to chemical, biological, or physical agents. *Indications of adverse effects include, but are not limited to:*
  - Changes in complexion and skin coloration
  - Changes in coordination
  - Changes in demeanor
  - Excessive salivation and pupillary response
  - Changes in speech pattern



- 
- All personnel will inform their partners or team members of visible or non-visible effects of overexposure to chemical, biological, or physical agents. *General symptoms of overexposure and specific overexposure symptoms for petroleum hydrocarbons and metals may include:*

**From Inhalation:**

- Headache
- Drowsiness
- Dizziness/lack of coordination
- Nausea
- Weakness
- Blurred vision
- Cramps
- Irritation of the eyes, skin, or respiratory tract

**From Ingestion:**

- Abdominal pain
- Stomach pain
- Thirst

**From Contact:**

- Dry skin
- Redness

**From Absorption:**

- Redness
- Stomach Pain

### **3.5 Site-Specific Respiratory Protection**

During this project, respiratory protection is not anticipated to be required. In the case that a respirator will be required, TolTest will submit a copy of medical documentation for the personnel expected to wear respirators to the Navy. A copy of TolTest personnel's current respirator fit test will also be submitted to the Navy. The respirator fit test will be conducted in accordance with 29 CFR 1910.134. TolTest personnel will wear full-face negative air purifying respirators.

TolTest personnel will be required to perform fit checks of their respirators prior to engaging in any activity in which the use of a respirator is required. The following procedures for respirator fit checks will be adhered to in accordance with 29 CFR 1910.134:



- 
- **Perform positive pressure fit checks.** Positive fit checks are performed by sealing the exhalation valve and exhaling gently. The check is considered to be successful if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal
  - **Perform negative pressure fit checks.** Negative pressure fit checks are performed by placing the palm of the hands over the respirator cartridge off the air inlet. Once the inlet is sealed, personnel will gently inhale so that the face piece slightly collapses, then hold their breath for 10 seconds. The fit check will be considered successful if the seal remains in the slightly collapsed condition with no inward leakage of air detected.
  - **Perform manufacturer's recommended user seal checks.**

TolTest personnel will be responsible for the maintenance and upkeep of their respirators. Cleaning and maintenance procedures will be adhered to in accordance with 29 CFR 1910.134 as follows:

- Step 1.** Remove respirator cartridges after each day's use.
- Step 2.** Rinse the respirator and respirator components in warm water.
- Step 3.** Wash the respirator and respirator components with warm water and a cleaning solution with a disinfecting agent that is approved by the manufacturer.
- Step 4.** Rinse the respirator and respirator components in warm water.
- Step 5.** Hand dry the respirator and respirator components.
- Step 6.** Replace all respirator components including the cartridges.
- Step 7.** Place the respirator in a plastic bag and store in a safe area.

### 3.6 Material Safety Data Sheets

A material safety data sheet for gasoline, diesel, aviation fuel and jet fuel (JP-4 and JP-8) can be found in **Appendix C**.



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## 4.0 INCIDENT PREVENTION

Daily safety inspections, incident reporting, excavation safety, and liquid/soil handling safety are discussed in the following paragraphs. In addition, this section includes a list of Activity Hazard Analyses (AHAs), documents that describe the work activity, probable hazards related to the work, and proactive or precautionary measures that will be taken for safeguarding against and minimizing or eliminating each particular hazard.

### 4.1 Daily Safety Inspections

All machinery and equipment will be inspected daily by the Site Supervisor/SSHO to ensure a safe operating condition. Inspections will be in accordance with the manufacturer's recommendations and will be documented. Records of inspections will be maintained at the site, will be made available upon request, and will become part of the project file.

In addition to daily inspections, the SSHO will conduct a daily safety meeting. The SSHO will discuss safety topics relevant to the hazards involved in that day's work. All employees and visitors will review and sign the safety log, which documents the topics of discussion. The safety log will be submitted to the Navy with the Contractor Quality Control Reports.

### 4.2 Incident Reporting

All incident reporting and record-keeping requirements will be followed. TolTest forms will be completed for all incidents, including personal injury, safety incident, equipment damage and vehicle incident reports. (Copies of these forms are provided in **Appendix D**) All reports will be submitted to the Navy representative within 24 hours of any incident.

### 4.3 Excavation Safety

All excavating work will be conducted, at a minimum, in strict conformance with 29 CFR 1926.650 through 29 CFR 1926.652, including requirements for continuously sloping excavations, if required. Excavation and trenching procedures are outlined in **Appendix E**.

It is not anticipated that shoring or bracing of the excavations will be required; however, shoring and sheeting of the excavation will be used, if necessary, to prevent personal injury, damage to structures, injurious caving, and erosion. If used, the shoring, sheeting, and bracing will be carefully removed, as the excavation is backfilled.

Excavation work will not commence until TolTest has contacted the Base Utilities/PWC a minimum of 72 hours prior to excavation activities. TolTest will visually survey the area to ensure that clearances to overhead utility lines will be sufficient for the movement of vehicles and operation of excavation equipment. The requirements stated in OSHA 29 CFR 1926 General Construction Industry Standard will be followed by TolTest and its subcontractors.



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During periods when the work site is unoccupied (i.e., overnight, weekends, and similar off periods), barricades and orange construction fencing will be placed around the excavations in such a manner as to alert personnel to the danger and prevent them from entering the work area if additional protection is needed.

#### **4.4 Activity Hazard Analyses**

The protective measures to be implemented during completion of the tasks/operations associated with this work are identified in the AHAs provided in **Appendix F**. Tasks/operations for which AHAs have been developed are:

- Site Preparation/Layout
- Soil Excavation
- Backfill and Site Restoration
- Equipment Decontamination



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## 5.0 EMERGENCY RESPONSE

This section addresses work zones and evacuation procedures, decontamination, emergency medical treatment and first aid, emergency response procedures, and spill and discharge control. TolTest will implement emergency response and contingency procedures in accordance with OSHA standards 29 CFR 1910.120(L).

### 5.1 Work Zones and Evacuation Procedures

Daily safety meetings will identify the work zones for excavation activities. The three general work zones that will be established at the site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone.

The **Exclusion Zone** is defined as the area where contamination is either known or likely to be present, or, because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone will initially require the use of PPE. Downgrading PPE requirements will be made by the SSHO. Barricades will surround this zone.

The **Contamination Reduction Zone** is defined as the area where personnel conduct personal and equipment decontamination should contact with contaminated soil or concrete be suspected. It is essentially a buffer zone between potentially contaminated and clean areas.

The **Support Zone** is defined as a clean area where the chance to encounter hazardous materials or conditions is minimal. PPE is, therefore, not required in this zone.

**Safe Distances** are outside the Exclusion Zone, and **Places of Refuge** are outside the Contamination Reduction Zone.

In the event of an emergency that necessitates evacuation of the site, all personnel will be expected to leave the work zone and mobilize at a safe distance to an area designated by the SSHO using the prescribed evacuation routes. Personnel will remain at that area until the SSHO provides further instructions.

### 5.2 Decontamination

All site personnel should minimize contact with contaminants in order to minimize the need for extensive decontamination. The SSHO is responsible for monitoring decontamination procedures and determining their effectiveness. Eye wash stations will be available in the work area.

### 5.3 Emergency Medical Treatment and First Aid

There are no anticipated hazards on site that require specific medical attention or protocols. If an injury/illness or exposure occurs, employees must seek medical attention immediately.



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### 5.3.1 Cold Stress

Cold and/or wet environmental conditions can place workers at risk of cold-related illness. Most cold-related worker fatalities have resulted from failure to escape low air temperatures, or from immersion in low temperature water.

**Frostbite** is the freezing of body tissue, ranging from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will only occur when the ambient temperatures are below 32°F. The risk of frostbite increases as the temperature drops and the wind speed increases.

**Frostbite First Aid.** To administer first aid for frostbite, take the exposed worker indoors. Provide the worker with warm drinks, but no coffee, tea, or alcohol. Rewarm the affected areas as quickly as possible by placing them in warm water (102°F to 105°F) or covering them with warm clothing. Keep the frozen tissue submerged or covered for 20 to 30 minutes or until the frozen tissue regains its original color, even though the tissue may be very painful as it thaws. If present, do not allow blisters to be broken. Cover the injured area with sterile, soft, dry material, keep the patient warm, and get medical attention.

- *Do not rub the frostbitten areas, as additional damage could occur.*
- *Do not use heat lamps or hot water bottles to warm the frostbitten areas.*
- *Do not place the exposed part near a hot stove.*

**Hypothermia** can occur whenever temperatures are below 45°F. The principal cause of hypothermia in these conditions usually involves the loss of insulating properties of clothing due to moisture; heat loss due to increased air movement, and evaporation of moisture on the skin.

*Extremely low temperatures are not necessary to induce hypothermia.* Hypothermia can occur in temperatures as high as 65°F, depending on the *wind chill factor*. Wind increases the body's heat loss by dispersing layers of warm air trapped between layers of clothing and skin. This heat loss increases as the wind speed increases.

General hypothermia is more life threatening than frostbite because it affects the entire body system. Lower body temperatures will very likely result in:

- reduced mental alertness
- reduction in rational decision making
- loss of consciousness with the threat of fatal consequences

*The single most important aspect of life-threatening hypothermia is a drop in the deep core body temperature.* Once the core body temperature drops to 95°F, thermal control is lost, and the body is no longer in thermal balance. If the core body temperature drops below 95°F, a coma may occur. Death can occur *within two hours* of the first signs and symptoms.



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The general symptoms of hypothermia are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body
- Unconsciousness, glassy stare, slow pulse and respiratory rate
- Freezing of the extremities
- Death

Site workers should be protected from exposure to cold so that the deep core body temperature does not fall below 98.6°F. To prevent this from occurring, the following controls will be implemented:

- Site workers should wear warm clothing such as gloves and heavy socks when the air temperature is below 45°F. Protective clothing such as Tyvek or other disposable overalls may be used to shield employees from the wind.
- When the air temperature is below 32°F, *clothing* for warmth should include:
  - Insulated suits such as whole-body thermal underwear
  - Wool socks or polypropylene socks to keep moisture off the feet
  - Insulated gloves
  - Insulated boots
  - Insulated head cover such as hard hat, winter liner, or knit cap
  - Insulated jacket, with wind- and water-resistant outer layer
- When the air temperature is below 32°F, the following *work practices* must be implemented:
  - Site workers shall dress in layers, with thinner, lighter clothing worn next to the body.
  - If a site worker's underclothing becomes wet from sweat (and the worker is uncomfortable), the worker may finish the task at hand prior to changing into dry clothing. If the underclothing becomes wet in any other way, the worker must change into dry clothing immediately.
  - The intake of caffeinated beverages should be limited due to their circulatory and diuretic effects.
  - Site workers will be provided with a warm (65°F or above) break area.
  - The buddy system will be practiced at all times on site. Any site worker observed with severe shivering will be directed to go immediately to the heated break area.

### 5.3.2 Heat Stress

Physical hazards may involve heat-related symptoms such as heat stress, heat cramps, heat exhaustion, or heat stroke.



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**Heat stress** is the aggregate of environmental and physical work factors that make up the total heat load imposed on the body. The environmental factors of heat stress include air temperature, humidity, radiant heat exchange, and wind/water vapor pressure (related to humidity). Physical work contributes to the total heat stress by producing metabolic heat in the body proportional to the intensity of the work. Heavy physical labor can greatly increase the likelihood of heat fatigue, heat exhaustion, and *heat stroke*, the latter being a life threatening condition. Heat stress monitoring and observation of personnel will commence when the ambient temperature is 80°F or above (70°F if chemical protective clothing is worn).

All employees will be informed of the possibility and symptoms of heat stress. If an employee experiences extreme fatigue, cramps, dizziness, headache, nausea, profuse sweating, or pale, clammy skin, the employee and the SSHO/Site Supervisor will take control measures. If the symptoms do not subside after a reasonable rest period, the SSHO/Site Supervisor will seek medical assistance.

To prevent heat stress, the following control measures will be implemented:

- Site workers will be encouraged to drink plenty of water throughout the day.
- On-site drinking water will be kept cool to encourage personnel to drink frequently.
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Employees will be instructed to observe and monitor themselves and coworkers for signs of heat stress and to take additional breaks as necessary.
- All breaks will take place in cool, shaded rest areas.

**Heat Cramps** are caused by heavy sweating and inadequate electrolyte replacement. Symptoms include muscle spasms and pain in the hands, feet, or abdomen.

**Heat Exhaustion** is caused by increased stress on various body organs. Signs and symptoms include:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness, nausea
- Fainting

**Heat stroke** is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Symptoms of heat stroke include:



- Red, hot, usually dry skin
- Lack of or reduced perspiration
- Nausea
- Dizziness and confusion
- Strong, rapid pulse
- Coma

#### **5.4 Emergency Alerting and Response Procedures**

The following information will be used for on-site emergencies that require immediate action to prevent additional problems or harm to responders, the public, property, or the environment.

The on-site emergency phone number is **911**. A telephone is located inside the TolTest support truck. In the event of any injuries or accidents, the TolTest Corporate Health and Safety Manager, Mr. Jan Launder, will be notified within four hours of the occurrence. Mr. Launder can be reached at **(419) 241-7175**.

Mr. Khushwant Mander, Project Manager, can be contacted at the TolTest Great Lakes, Illinois office at **(847) 689-0697** or by cellular phone at **(847) 812-2424**. The cellular phone number of the SSHO, Mr. Michael Hubans, is **(847) 812-3148**.

The following table lists the emergency telephone numbers.

**Table II-2 Emergency Telephone Numbers**

EJOC Project Manager, Carlito Luciano	(847) 688-5999 ext. 150
<b>Fire Department</b>	<b>911</b>
<b>Police Department</b>	<b>911</b>
<b>Ambulance Service</b>	<b>911</b>
CHEMTREC Emergency Response	(800) 424-9300
<b>Hospital – St. Joseph’s Mercy-East</b>	<b>(586) 466-9300</b>
TolTest Office, Waukegan IL	(847) 689-0697
TolTest Corporate Office, Toledo, OH	(419) 241-7175

Directions to the nearest hospital are provided in **Appendix G**.

#### **5.5 Spill and Discharge Control**

This section provides contingency measures for potential spills and discharges from the handling and transportation of any hazardous substances imported to the site by TolTest or their subcontractors. The SSHO will conduct spill prevention briefings daily during safety meetings



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for all personnel who are involved with handling, receipt, storage, and/or cleanup of spilled material.

If a spill or discharge occurs, the following actions, at a minimum, will be taken:

- Take immediate measures to control and contain the spill within the site boundaries. This will include, at a minimum, the following:
  - Keep unnecessary people away, isolate hazardous areas, and deny entry.
  - Do not allow anyone to touch spilled material.
  - Stay upwind and keep out of low areas where fluids/ vapors may accumulate.
  - Keep combustibles away from the spilled material
  - Use water spray or foam to reduce vapor or dust generation, as needed.
  - Take samples for analysis to determine that clean up is adequate.
  - Take other corrective measures as needed.
- Notify the Navy representative immediately after the situation is under control.
- If the spill or discharge exceeds the reportable quantity for the substance involved, notify the federal and state regulatory authorities as appropriate.
- Submit a written report to the Department of the Navy within seven days of a verbal report.

#### 5.5.1 Storage

All tanks, containers, and pumping equipment used for the storage or handling of flammable and combustible liquids will be labeled or placarded in accordance with the US DOT. Oils or fuels temporarily stored will be kept in tightly sealed containers (with the exception of proper venting), in fire-resistant areas and at safe distances from ignition sources. All transfer vessels will be emptied at the end of the workday.

#### 5.5.2 Pumping Flammable and Combustible Liquids

Flammable liquid pumping systems will be electrically bonded and grounded. Flammable liquid will be drawn from, or transferred into vessels, containers, or tanks through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring flammable liquid by means of air pressure on the container or portable tank is prohibited.

#### 5.5.3 Equipment Inspection

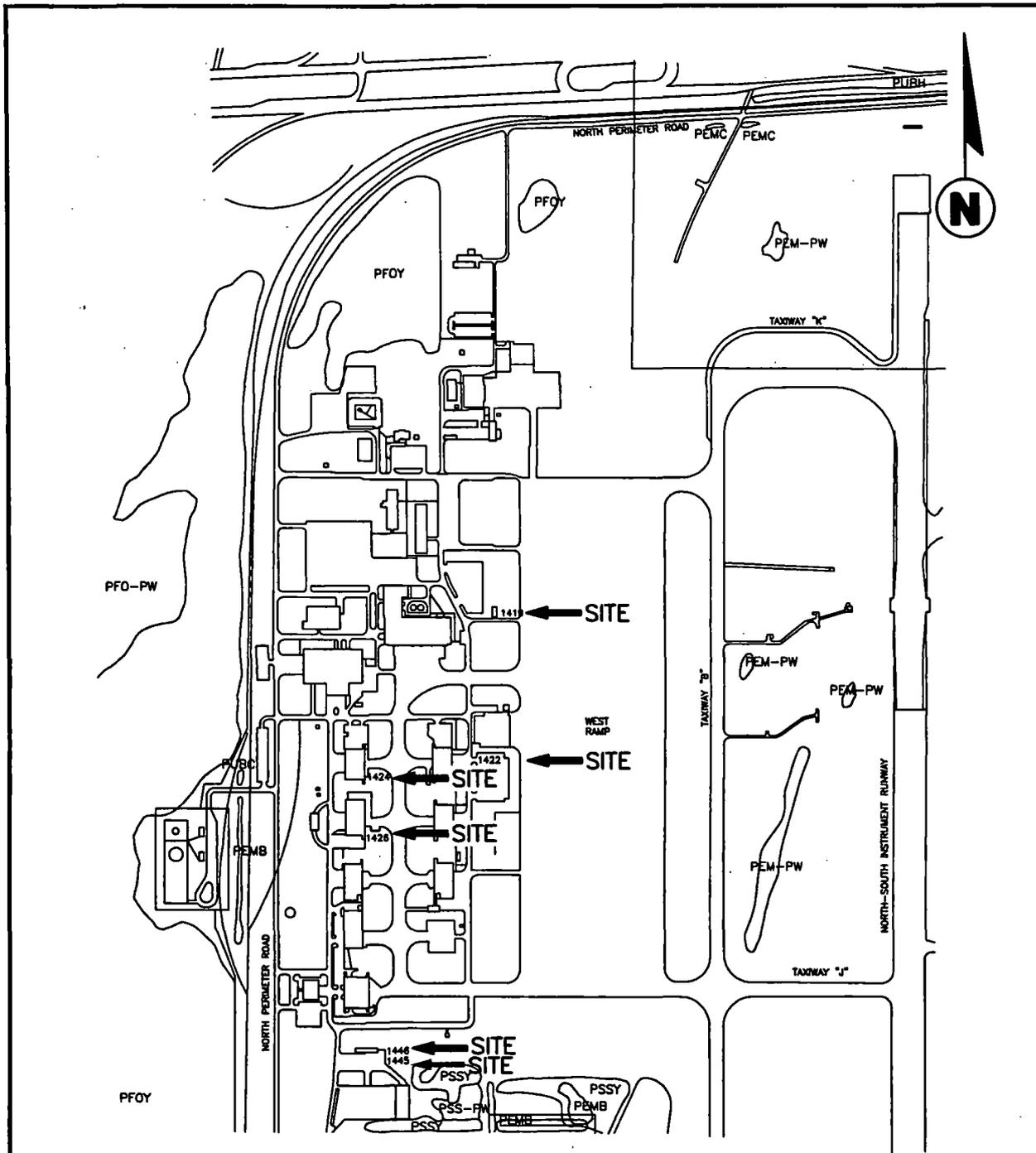
Equipment inspection is part of the daily routine during field activities. The Site Supervisor is to ensure that no oil/fuel spill has accumulated in any area by conducting daily visual inspection of the equipment. Equipment and safety issues will be documented in the daily report.



**APPENDIX A**

**FIGURES**

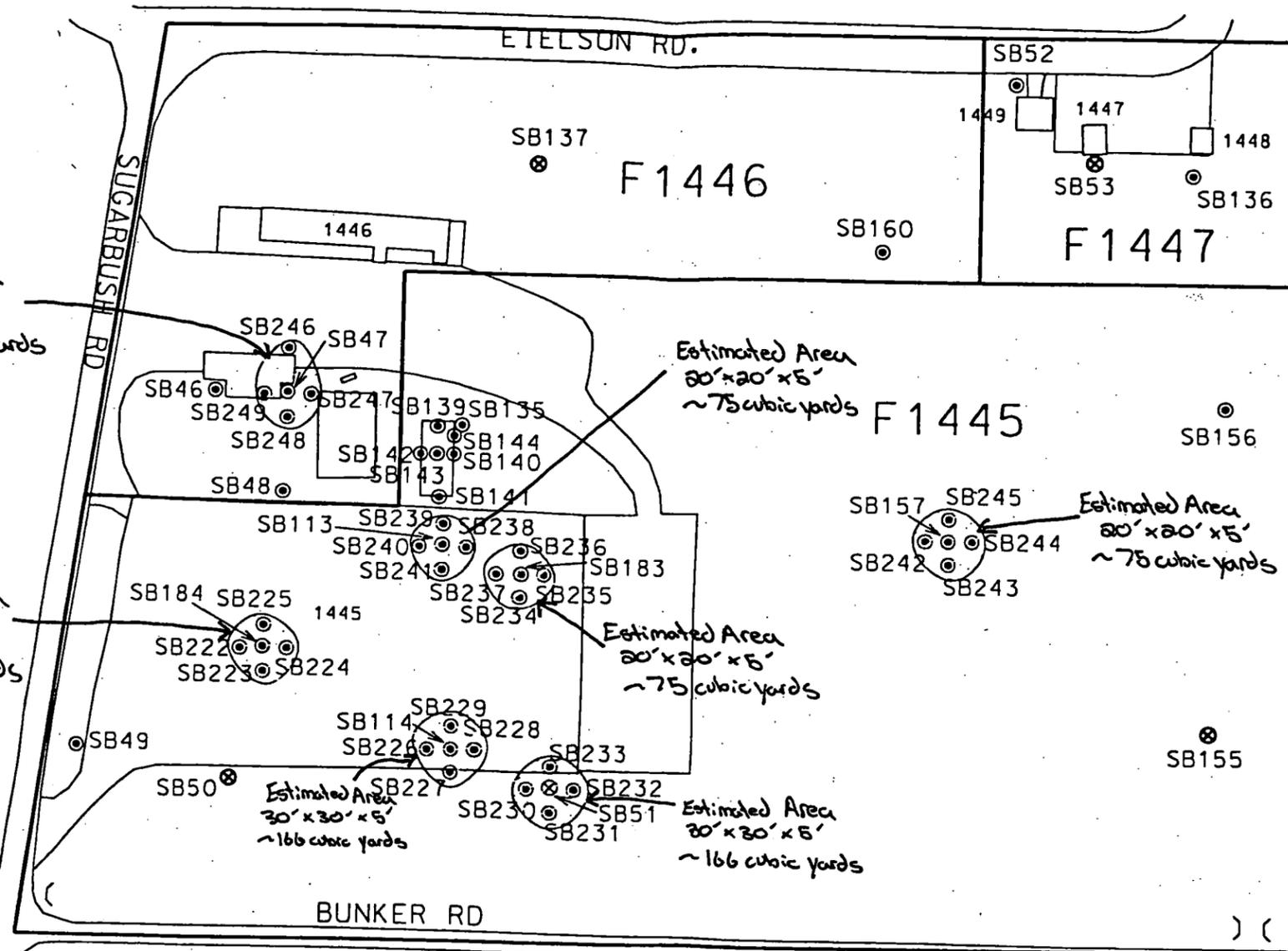
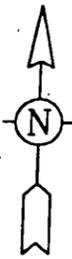
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NOT TO SCALE

		<b>TITLE:</b> SITE LOCATION MAP (SITES 1419, 1422, 1424, 1426, 1446 AND 1445)	
<b>SUBMITTED BY:</b> TOLTEST, INC.		PETROLEUM-CONTAMINATED SOIL REMEDIATION NAVAL AIR STATION DETROIT, MICHIGAN	
<b>DESIGNED BY:</b>		<b>DEPARTMENT OF THE NAVY</b> 201 DECATUR AVENUE GREAT LAKES, ILLINOIS	
<b>DRAWN BY:</b> M. CIESLEWSKI			
<b>CHECKED BY:</b>		<b>DATE:</b> 11 MAR. 04	<b>SCALE:</b> NONE
<b>APPROVED BY:</b>		<b>TASK ORDER NO:</b> 0078	
<b>TOLTEST, INC. PROJECT NO:</b> 73736.01	<b>DWG NO:</b> 7373601-01F	<b>SIZE:</b> A	<b>SHEET NO:</b> 1 of 1





LEGEND	
⊙	SOIL BORING LOCATION
⊗	SOIL BORING LOCATION TO BE RESAMPLED
⊕	AREA OF SOIL CONTAMINATION

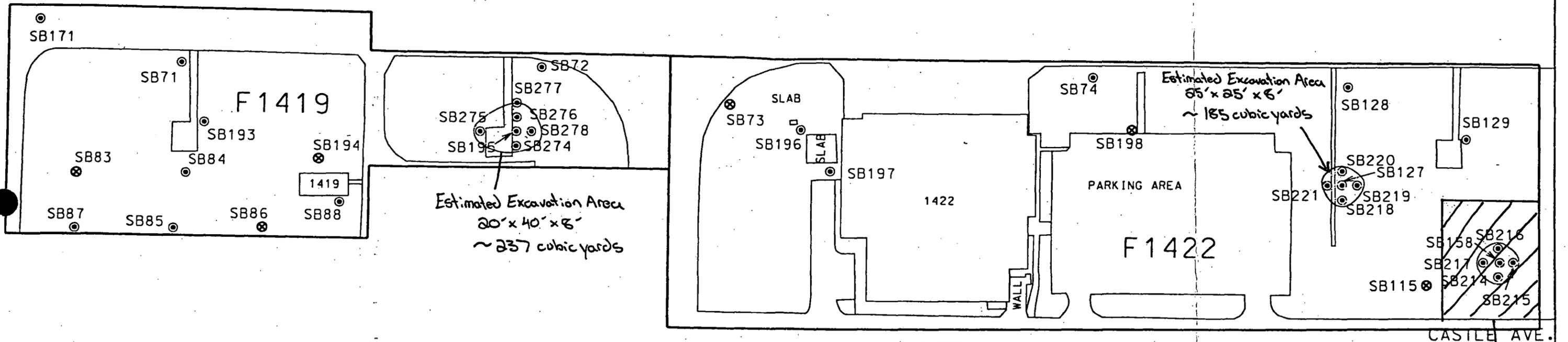
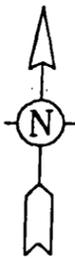


DRAWN BY J. WILSON	DATE 06/06/03
CHECKED BY D. HAMEL	DATE 06/06/03
REVISED BY	DATE
SCALE AS NOTED	



SITES 1445, 1446, & 1447  
NON-SEABEES AREA  
NAVAL AIR FACILITY - DETROIT  
MT. CLEMENS, MICHIGAN

CONTRACT NO. N62467-94-D-0888	
OWNER NO. -----	
APPROVED BY G. SMITH	06/09/03
DRAWING NO.	REV.



LEGEND	
⊙	SOIL BORING LOCATION
⊗	SOIL BORING LOCATION TO BE RESAMPLED
⊘	AREA OF SOIL CONTAMINATION



DRAWN BY J. WILSON	DATE 06/06/03
CHECKED BY D. HAMEL	DATE 06/06/03
REVISED BY ---	DATE ---
SCALE AS NOTED	



SITES 1419 & 1422  
NON-SEABEE'S AREA  
NAVAL AIR FACILITY - DETROIT  
MT. CLEMENS, MICHIGAN

CONTRACT NO. N62467-94-D-0888	
OWNER NO. ---	
APPROVED BY G. SMITH 06/09/03	
DRAWING NO.	REV. 0

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

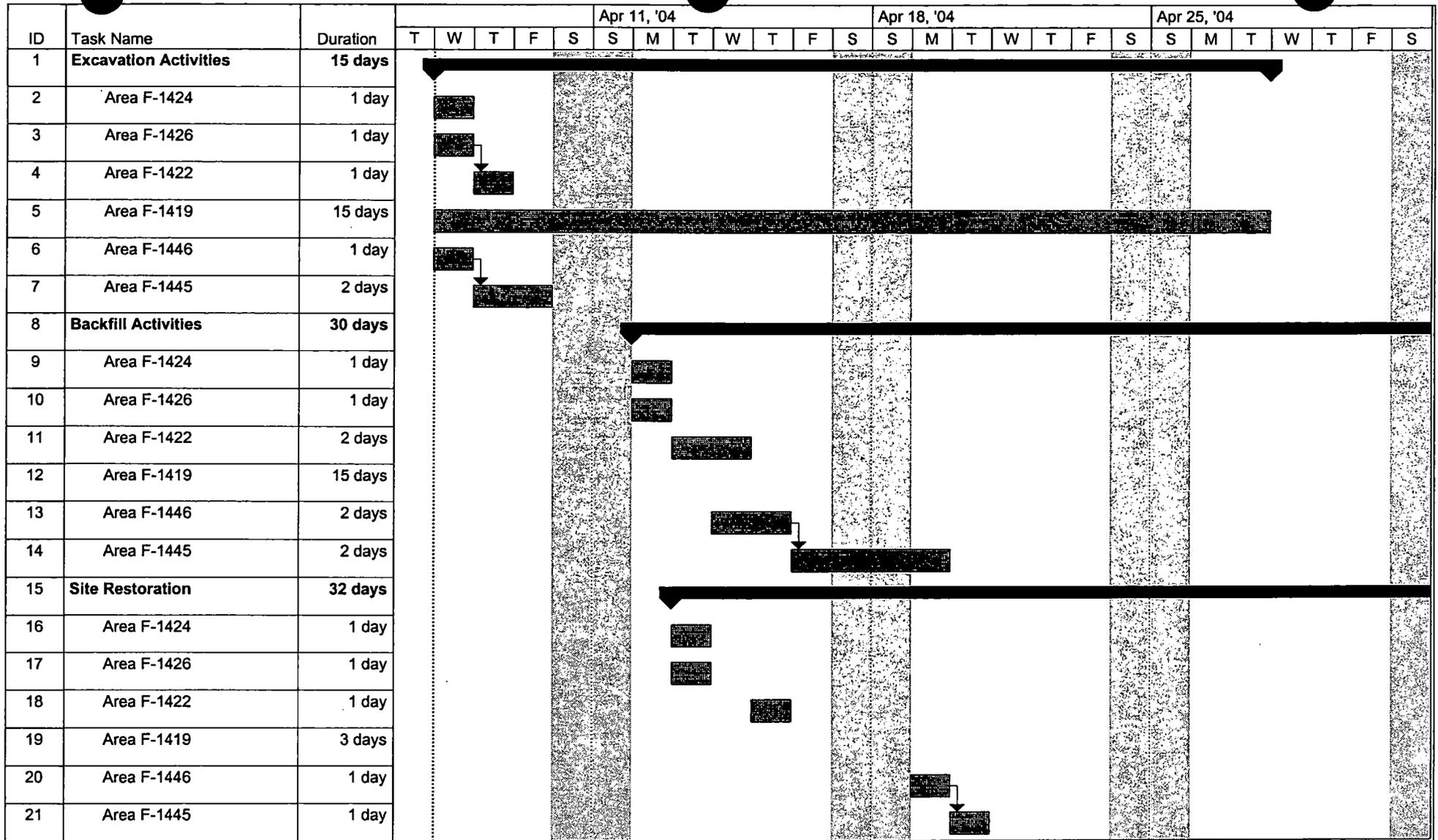
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**TOLTEST** INC.

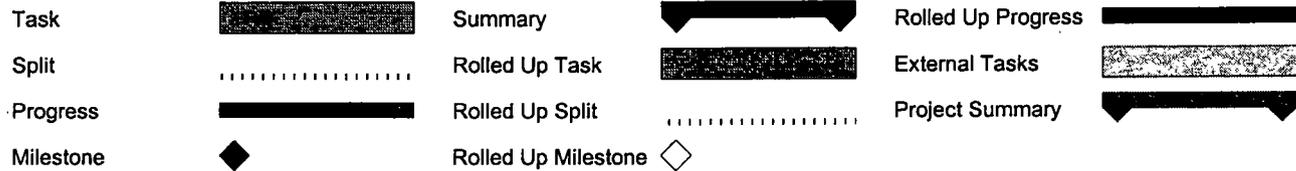


**APPENDIX B**  
**PROJECT SCHEDULE MILESTONES**

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Project: Project Station, Selfridge AFB  
 Date: Wed 4/7/04  
 EJOC Delivery Order No. 0078



ID	Task Name	Duration	May 2, '04							May 9, '04							May 16, '04							May 23, '04				
			S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T
1	<b>Excavation Activities</b>	<b>15 days</b>																										
2	Area F-1424	1 day																										
3	Area F-1426	1 day																										
4	Area F-1422	1 day																										
5	Area F-1419	15 days																										
6	Area F-1446	1 day																										
7	Area F-1445	2 days																										
8	<b>Backfill Activities</b>	<b>30 days</b>																										
9	Area F-1424	1 day																										
10	Area F-1426	1 day																										
11	Area F-1422	2 days																										
12	Area F-1419	15 days																										
13	Area F-1446	2 days																										
14	Area F-1445	2 days																										
15	<b>Site Restoration</b>	<b>32 days</b>																										
16	Area F-1424	1 day																										
17	Area F-1426	1 day																										
18	Area F-1422	1 day																										
19	Area F-1419	3 days																										
20	Area F-1446	1 day																										
21	Area F-1445	1 day																										

Project: Project Station, Selfridge AFB Date: Wed 16/05 EJOC Delivery Order No. 0078	Task		Summary		Rolled Up Progress	
	Split		Rolled Up Task		External Tasks	
	Progress		Rolled Up Split		Project Summary	
	Milestone		Rolled Up Milestone			

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

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**TOLTEST** INC.



## APPENDIX C

### MATERIAL SAFETY DATA SHEETS

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## MOBILE OIL CORP. -- AUTOMOTIVE GASOLINES -- 9130-00-142-9457

## ===== Product Identification =====

Product ID:AUTOMOTIVE GASOLINES  
MSDS Date:01/08/1987  
FSC:9130  
NIIN:00-142-9457  
MSDS Number: BHFXX  
=== Responsible Party ===  
Company Name:MOBILE OIL CORP.  
Address:3225 GALLOWS RD.  
City:FAIRFAX  
State:VA  
ZIP:22037  
Info Phone Num:800-662-4525 703-249-3265  
Emergency Phone Num:212-883-4411  
CAGE:KO244

## === Contractor Identification ===

Company Name:MOBIL OIL CORP, NORTH AMERICAS MARKETING AND REFINING  
Address:3225 GALLOWS ROAD  
Box:City:FAIRFAX  
State:VA  
ZIP:22037  
Country:US  
Phone:800-662-4525/ 856-224-4644  
CAGE:3U728  
Company Name:MOBILE OIL CORP.  
Address:3225 GALLOWS RD.  
Box:City:FAIRFAX  
State:VA  
ZIP:22037  
Phone:800-662-4525 703-249-3265  
CAGE:KO244

## ===== Composition/Information on Ingredients =====

Ingred Name:GASOLINE  
CAS:8006-61-9  
RTECS #:LX3300000  
Fraction by Wt: >95%  
OSHA PEL:300 PPM/500 STEL  
ACGIH TLV:300 PPM/500STEL;9192

Ingred Name:BENZENE (SARA III)  
CAS:71-43-2  
RTECS #:CY1400000  
Fraction by Wt: <5%  
OSHA PEL:1PPM/5STEL;1910.1028  
ACGIH TLV:10 PPM; A2; 9192  
EPA Rpt Qty:10 LBS  
DOT Rpt Qty:10 LBS

Ingred Name:TETRAETHYL LEAD (SARA III)  
CAS:78-00-2  
RTECS #:TP4550000  
OSHA PEL:S, 0.075MG/M3 (PB)  
ACGIH TLV:S, 0.1 MG/M3 (PB) 9192  
EPA Rpt Qty:10 LBS

DOT Rpt Qty:10 LBS

=====  
 ===== Hazards Identification =====  
 =====

LD50 LC50 Mixture:ORAL RAT LD50 18,800 MG/KG  
 Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO  
 Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:YES  
 Health Hazards Acute and Chronic:PRODUCT IS IRRITATING TO EYES,SKIN  
 RESPIRATORY TRACT AND DEPRESSES THE CENTRAL NERVOUS SYSTEM. CHRONIC  
 OVER EXPOSURE MAY CAUSE LIVER,KIDNEY, OR NERVOUS SYSTEM DAMAGE.  
 Explanation of Carcinogenicity:VONTAINS BENZENE;LISTED BY ALL THREE.  
 ALSO,AN API STUDY FOUND LIVER CANCER IN MICE EXPOSED TO GASOLINE  
 VAPORS.  
 Effects of Overexposure:EYE/SKIN CONTACT:TRANSITORY IRRITATION.  
 INHALED: RSSPIRATORY IRRITATION,CENTRAL NERVOUS SYSTEM DEPRESSION  
 INCLUDING, EUPHORIA, HEADACHE, DIZZINESS, DROWINESS, FATIGUE, TREMORS, CON  
 VULSIONS, NAUSEA, VOMITING, DI ARRHEA, LOSS OF CONSCIOUSNESS.AND  
 FINALLYDEATH. INGESTED:G/I IRRITATION,PLUS SYMPTOMS SIMILAR TO  
 THOSE UNDER "INHALED".  
 Medical Cond Aggravated by Exposure:PRE-EXISTING,SKIN CONDITIONS OR  
 IMPAIRED LIVER,KIDNEY FUNCTION MAY BE AGGRAVATED BY THIS PRODUCT.

=====  
 ===== First Aid Measures =====  
 =====

First Aid:EYE:FLUSH WITH WATER 15 MIN, SKIN:WASH WITH SOAP & WATER.  
 REMOVE CONTAMINATED CLOTHING;LAUNDER BEFORE REUSE. INHALED:REMOVE  
 TO FRESH AIR.RESUSCITATE OR GIVE OXYGEN AS NEEDED. GET MEDICAL  
 CARE. INGESTED:GET IMMEDIATE MEDICAL ATTENTION. DO NOT INDUCE  
 VOMITING. IF VOMITING OCCURS,MINIMIZE ASPIRATION HAZARD.

=====  
 ===== Fire Fighting Measures =====  
 =====

Flash Point Method:TCC  
 Flash Point:-40F  
 Lower Limits:1.3  
 Upper Limits:7.6  
 Extinguishing Media:DRY CHEMICAL, CARBON DIOXIDE,FOAM,WATER FOG. WATER  
 MAY BE INEFFECTED,AS PRODUCT WILL FLOAT AND MAY SPREAD FIRE.  
 Fire Fighting Procedures:WEAR SELF CONTAINED BREATHING APPARATUS IN  
 ENCLOSED AREAS. WATER SPRAY MAY BE USED TO COOL FIRE EXPOSED  
 CONTAINERS.  
 Unusual Fire/Explosion Hazard:VAPORS ARE HEAVIER THAN AIR,ACCUMULATING  
 IN LOW AREAS,TRAVELING ALONG GROUND AND MAY FLASH BACK FROM DISTANT  
 IGNITION SOURCE.

=====  
 ===== Accidental Release Measures =====  
 =====

Spill Release Procedures:ELIMATE IGNITION SOURCES. ISOLATE AREA. USE  
 PROTECTIVE EQUIPMENT AS NECESSARY. STOP LEAK AND CONTAIN SPILL.  
 DIKE AS NEEDED TO KEEP SPILL FROM DRAINS,WATER WAYS ETC. WATER FOG  
 MAY BE USED TO REDUCE VAP ORS & PERSONAL HAZARD. REPORT SPILL  
 PERLAW.  
 Neutralizing Agent:NONE

=====  
 ===== Handling and Storage =====  
 =====

Handling and Storage Precautions:STORE IN A COOL, DRY, ISOLATED, WELL  
 VENTILATED AREA. KEEP IGNITION SOURCES AWAY. GROUND CONTAINERS TO  
 PREVENT STATIC DISCHARGE DURING TRANSFERS.  
 Other Precautions:FIRE AND EXPLOSION ARE THE ACUTE HAZARDS OF THIS

PRODUCT. TAKE EXTRAORDINARY STEPS TO PREVENT THEM.

=====  
Exposure Controls/Personal Protection  
=====

Respiratory Protection: IF NEEDED, USE NIOSH/MSHA RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE OR PREFERABLY, A POSITIVE PRESSURE AIR SUPPLIED RESPIRATOR OR SELF CONTAINED BREATHING APPARATUS.

Ventilation: USE EXPLOSION PROOF VENTILATION EQUIPMENT TO MAINTAIN EXPOSURE BELOW PEL/TLV.

Protective Gloves: IMPERVIOUS RUBBER OR POLYMER.

Eye Protection: SAFETY GLASSES, OR SPLASH GOGGLES.

Other Protective Equipment: SAFETY SHOWER/EYE WASH. WORK CLOTHING AS NEEDED TO PROTECT FROM PROLONGED/REPEATED CONTACT.

Work Hygienic Practices: USE GOOD CHEMICAL HYGIENE PRACTICE. AVOID UNNECESSARY CONTACT. MINIMIZE ALL CONTACT.

Supplemental Safety and Health

=====  
Physical/Chemical Properties  
=====

HCC: F1

Boiling Pt.: 23.9C, 75.F

B.P. Text: 75-430F

Vapor Density: 3.5 (AIR)

Spec Gravity: 0.72 - 0.76

pH: K

Solubility in Water: NEGLIGIBLE

Appearance and Odor: CLEAR RED LIQUID; GASOLINE ODOR.

Percent Volatiles by Volume: 100 N/

=====  
Stability and Reactivity Data  
=====

Stability Indicator/Materials to Avoid: YES

STRONG OXIDIZERS

Stability Condition to Avoid: HEAT, SPARKS AND OTHER IGNITION SOURCES, VAPOR ACCUMULATIONS.

Hazardous Decomposition Products: CARBON DIOXIDE, CARBON MONOXIDE

=====  
Disposal Considerations  
=====

Waste Disposal Methods: DISPOSE I/A/W FEDERAL, STATE, LOCAL REGULATIONS.

PRODUCT QUALIFYS AS IGNITABLE WASTE AND CANNOT BE LANDFILLED. IF RECOVERY OR RECYCLE ARE UNACCEPTABLE, INCINERATION MAY BE ACCEPTABLE DISPOSAL METHODS.

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## PHILLIPS PETROLEUM CO. -- GASOLINE,AVIATION, 100 LL -- 9130-00-179-1122

## ===== Product Identification =====

Product ID:GASOLINE,AVIATION, 100 LL  
 MSDS Date:06/01/1985  
 FSC:9130  
 NIIN:00-179-1122  
 MSDS Number: BHFND  
 === Responsible Party ===  
 Company Name:PHILLIPS PETROLEUM CO.  
 Address:4TH & KEFLER  
 City:BARTLESVILLE  
 State:OK  
 ZIP:74004  
 Info Phone Num:918-661-3865  
 Emergency Phone Num:918-661-3865 OR 918-661-8118 NIGHT  
 CAGE:46916  
 === Contractor Identification ===  
 Company Name:PHILLIPS PETROLEUM CO  
 Address:613 ADAMS  
 Box:City:BARTLESVILLE  
 State:OK  
 ZIP:74004  
 Country:US  
 Phone:800-234-6603  
 CAGE:46935  
 Company Name:PHILLIPS PETROLEUM COMPANY  
 CAGE:46916

## ===== Composition/Information on Ingredients =====

Ingred Name:GASOLINE  
 CAS:8006-61-9  
 RTECS #:LX3300000  
 Fraction by Wt: 100%  
 OSHA PEL:300 PPM/500 STEL  
 ACGIH TLV:300 PPM/500STEL;9192

Ingred Name:TETRAETHYL LEAD (SARA III)  
 CAS:78-00-2  
 RTECS #:TP4550000  
 Fraction by Wt: <0.1%  
 OSHA PEL:S, 0.075MG/M3 (PB)  
 ACGIH TLV:S, 0.1 MG/M3 (PB) 9192  
 EPA Rpt Qty:10 LBS  
 DOT Rpt Qty:10 LBS

## ===== Hazards Identification =====

LD50 LC50 Mixture:ORAL RAT LD50 18,800 MG/KG  
 Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO  
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO  
 Health Hazards Acute and Chronic:PRODUCT IS IRRITATING TO  
 EYES,SKIN,RESPIRATORY TRACT AND DEPRESSES THE CENTRAL NERVOUS  
 SYSTEM. CHRONIC OVER EXPOSURE MAY CAUSE LIVER,KIDNEY, OR CENTRAL  
 NERVOUS SYSTEM DAMAGE. MFR SHOWS NO BENZENE IN L IST OF HAZARDOUS  
 COMPONENTS.  
 Explanation of Carcinogenicity:AL,AN API STUDY FOUND LIVER CANCER IN

MICE EXPOSED TO GASOLINE VAPORS.

Effects of Overexposure: EYE/SKIN CONTACT: TRANSITORY IRRITATION.

INHALED: DEPRESSION

INCLUDING, EUPHORIA, HEADACHE, DIZZINESS, DROWSINESS, FATIGUE, TREMORS, CONVULSIONS, NAUSEA, VOMITING, DIARRHEA, LOSS OF CONSCIOUSNESS AND FINALLY DEATH. INGESTED: G/I IRRITATION, PLUS SYMPTOMS SIMILAR TO THOSE UNDER "INHALED".

Medical Cond Aggravated by Exposure: PRE-EXISTING EYE, SKIN CONDITION OR IMPAIRED LIVER, KIDNEY FUNCTION MAY BE AGGRAVATED BY THIS PRODUCT.

=====  
First Aid Measures  
=====

First Aid: EYE: FLUSH WITH WATER 15 MIN. SKIN: WASH WITH SOAP & WATER. REMOVE CONTAMINATED CLOTHING; LAUNDRY BEFORE REUSE. INHALED: REMOVE TO FRESH AIR. RESUSCITATE OR GIVE OXYGEN AS NEEDED. GET MEDICAL CARE. INGESTED: GET IMMEDIATE MEDICAL ATTENTION. DO NOT INDUCE VOMITING. IF VOMITING OCCURS, MINIMIZE ASPIRATION HAZARD.

=====  
Fire Fighting Measures  
=====

Flash Point: -35F

Lower Limits: 1.3

Upper Limits: 7.6

Extinguishing Media: DRY CHEMICAL, CARBON DIOXIDE, FOAM, WATER FOG. WATER MAY BE INEFFECTIVE, AS PRODUCT WILL FLOAT AND MAY SPREAD FIRE.

Fire Fighting Procedures: WEAR SELF CONTAINED BREATHING APPARATUS IN ENCLOSED AREAS. WATER SPRAY MAY BE USED TO COOL FIRE EXPOSED CONTAINERS.

Unusual Fire/Explosion Hazard: VAPORS ARE HEAVIER THAN AIR, ACCUMULATING IN LOW AREAS, TRAVELING ALONG GROUND AND MAY FLASH BACK FROM DISTANT IGNITION SOURCE.

=====  
Accidental Release Measures  
=====

Spill Release Procedures: ELIMINATE IGNITION SOURCES. ISOLATE AREA. USE PROTECTIVE EQUIPMENT AS NECESSARY. STOP LEAK AND CONTAIN SPILL. DIKE AS NEEDED TO KEEP SPILL FROM DRAINS WATER WAYS ETC. WATER FOG MAY BE USED TO REDUCE VAPORS & PERSONAL HAZARD. REPORT SPILL PER LAW.

Neutralizing Agent: NONE

=====  
Handling and Storage  
=====

Handling and Storage Precautions: STORE IN A COOL, DRY, ISOLATED, WELL VENTILATED AREA. KEEP IGNITION SOURCES AWAY. GROUND CONTAINERS TO PREVENT STATIC DISCHARGE DURING TRANSFERS.

Other Precautions: FIRE AND EXPLOSION ARE THE ACUTE HAZARDS OF THIS PRODUCT. TAKE EXTRAORDINARY STEPS TO PREVENT THEM.

=====  
Exposure Controls/Personal Protection  
=====

Respiratory Protection: IF NEEDED, USE NIOSH/MSHA RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE OR PREFERABLY, A POSITIVE PRESSURE AIR SUPPLIED RESPIRATOR OR SELF CONTAINED BREATHING APPARATUS.

Ventilation: USE EXPLOSION PROOF VENTILATION EQUIPMENT TO MAINTAIN EXPOSURE BELOW PEL/TLV.

Protective Gloves: IMPERVIOUS RUBBER OR POLYMER.

Eye Protection: SAFETY GLASSES, OR SPLASH GOGGLES.

Other Protective Equipment: SAFETY SHOWER/EYE WASH. WORK CLOTHING AS NEEDED TO PROTECT FROM PROLONGED/REPEATED CONTACT.

Work Hygienic Practices:USE GOOD CHEMICAL HYGIENE PRACTICE. AVOID  
UNNECESSARY CONTACT. MINIMIZE ALL CONTACT.

Supplemental Safety and Health  
PRODUCT NO 21223.

===== Physical/Chemical Properties =====

HCC:F1

Boiling Pt:=32.2C, 90.F

B.P. Text:90-338F

Vapor Density:3.5 (AIR)

Spec Gravity:0.72 - 0.76

Evaporation Rate & Reference:>1 ( BUAC)

Solubility in Water:NEGLIGABLE

Appearance and Odor:CLEAR,BLUE LIQUID;GASOLINE ODOR.

Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZERS

Stability Condition to Avoid:HEAT,SPARKS AND OTHER IGNITION

SOURCES,VAPOR ACCUMULATIONS.

Hazardous Decomposition Products:CARBON DIOXIDE,CARBON MONOXIDE

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE I/A/W FEDERAL,LOCAL REGULATIONS. PRODUCT  
QUALIFYS AS IGNITABLE WASTE AND CANNOT BE LANDFILLED. IF RECOVERY  
OR RECYCLE ARE UNACCEPTABLE, INCINERATION MAY BE ACCEPTABLES  
DISPOSAL METHOD.

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assume responsibility for the suitability of this information to their  
particular situation.

MATERIAL SAFETY DATA SHEET  
Revision Date: 04/22/2003

-----  
SECTION 1 PRODUCT AND COMPANY IDENTIFICATION  
-----

PRODUCT: BR HS Diesel 2 Dyed (.5%  
MSDS NUMBER: 401476E - 1  
PRODUCT CODE(S): 26967

MANUFACTURER ADDRESS: Shell Oil Products US, P. O. Box 4453, Houston, TX.  
77210-4453

TELEPHONE NUMBERS

Spill Information: (877) 242-7400  
Health Information: (877) 504-9351  
MSDS Assistance Number: (877) 276-7285

-----  
SECTION 2 PRODUCT/INGREDIENTS  
-----

CAS#	CONCENTRATION	INGREDIENTS
Mixture	100 %weight	#2 Diesel
68814-87-9	0 - 99.99 %weight	Full Range Straight Run Middle Distillate
64742-46-7	0 - 99.99 %weight	Hydrotreated Middle Distillate
64741-59-9	0 - 39.99 %weight	Light Catalytic Cracked Distillate
71-43-2	0.01 - 0.64 %weight	Benzene
7704-34-9	0 - 0.49 %weight	Sulfur

NOTE: H2S is a naturally occurring constituent in the petroleum stream and is not added separately to the product.

-----  
SECTION 3 HAZARDS IDENTIFICATION  
-----

EMERGENCY OVERVIEW

Appearance & Odor: Bright and clear liquid (Tax Exempt Diesels - pale red liquid). Oil-type odor.  
Health Hazards: Hydrogen sulfide (H2S), an extremely flammable and toxic gas, may be present. Causes severe skin irritation. Toxic and harmful if inhaled. May be harmful or fatal if swallowed. Do not induce vomiting. May cause aspiration pneumonia.  
Physical Hazards: Combustible Liquid.  
NFPA Rating (Health, Fire, Reactivity): 2, 2, 0  
Hazard Rating: Least - 0 Slight - 1 Moderate - 2 High - 3  
Extreme - 4

Inhalation:

In applications where vapors (caused by high temperature) or mists (caused by mixing or spraying) are created, breathing may cause a mild burning sensation in the nose, throat and lungs. Toxic and harmful if inhaled. Hydrogen

Sulfide (H<sub>2</sub>S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen Sulfide is an extremely flammable, toxic gas. Inhalation of vapors, mist or fumes (generated at high temperatures) may cause irritation to the nose, throat and respiratory tract.

**Eye Irritation:**

May cause slight irritation of the eyes. If irritation occurs, a temporary burning sensation, minor redness, swelling, and/or blurred vision may result.

**Skin Contact:**

Severely irritating to the skin causing pain, redness and swelling. Other adverse effects not expected from brief skin contact.

**Ingestion:**

This material may be harmful or fatal if swallowed. Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis. Generally considered to have a low order of acute oral toxicity.

**Other Health Effects:**

Carcinogenic in animal tests. It is probable that the material causes cancer in laboratory animals.

Material may release hydrogen sulfide (H<sub>2</sub>S), a highly toxic and extremely flammable gas, when heated to 180 Degrees F or higher. H<sub>2</sub>S can cause irritation of the eyes and respiratory tract, headache, dizziness, nausea, vomiting, diarrhea, and pulmonary edema. The odor ("rotten egg") threshold is 0.02 ppm. Do not depend on sense of smell for warning; H<sub>2</sub>S rapidly deadens the sense of smell.

Refer to Section 11, Toxicological Information, for specific information on the following effects:

**Genotoxicity**

**Signs and Symptoms:**

Irritation as noted above. Aspiration pneumonitis may be evidenced by coughing, labored breathing and cyanosis (bluish skin); in severe cases death may occur.

For additional health information, refer to section 11.

-----  
SECTION 4            FIRST AID MEASURES  
-----

**Inhalation:**

Vaporization of H<sub>2</sub>S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from victim to rescuer. Mechanical ventilation should be used to resuscitate the victim. DO NOT attempt to rescue victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

**Skin:**

Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes and follow by washing with soap if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

**Eye:**

Flush eyes with plenty of water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling occur, transport to nearest medical facility for additional treatment.

**Ingestion:**

DO NOT take internally. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

**Note to Physician:**

If more than 2.0ml/kg body weight has been ingested and vomiting has not occurred, emesis should be induced with supervision. Keep victim's head below hips to prevent aspiration. If symptoms such as loss of gag reflex, convulsions, or unconsciousness occur before emesis, gastric lavage using a cuffed endotracheal tube should be considered.

---

**SECTION 5 FIRE FIGHTING MEASURES**

---

Flash Point [Method]: >125 °F/>51.67 °C [ Closed Cup]  
Autoignition Temperature: 500 °F/260 °C  
Flammability in Air: 0.5 - 4.4 %volume

**Extinguishing Media:**

Material will float and can be re-ignited on surface of water. Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water.

**Fire Fighting Instructions:**

CAUTION! COMBUSTIBLE. Clear fire area of all non-emergency personnel. Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. Cool surrounding equipment, fire-exposed containers and structures with water. Container areas exposed to direct flame contact should be cooled with large quantities of water (500 gallons water per minute flame impingement exposure) to prevent weakening of container structure.

---

**SECTION 6 ACCIDENTAL RELEASE MEASURES**

---

**Protective Measures:**

CAUTION! COMBUSTIBLE. Eliminate potential sources of ignition. Handling equipment must be bonded and grounded to prevent sparking.

Wear appropriate personal protective equipment when cleaning up spills. Refer to Section 8.

**Spill Management:**

Shut off source of leak if safe to do so. Dike and contain spill.

FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.



## EXPOSURE CONTROLS

Adequate explosion-proof ventilation to control airborne concentrations.

## PERSONAL PROTECTION

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation.

Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

## Eye Protection:

Chemical Goggles - If liquid contact is likely., or Safety glasses with side shields

## Skin Protection:

Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:

Neoprene, or Nitrile Rubber

## Respiratory Protection:

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include: Supplied-Air Respirator. Air-Purifying Respirator for Organic Vapors. Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

-----  
SECTION 9            PHYSICAL AND CHEMICAL PROPERTIES  
-----

Appearance & Odor: Bright and clear liquid (Tax Exempt Diesels - pale red liquid). Oil-type odor.

Substance Chemical Family: Petroleum Hydrocarbon, Fuel Oil

Appearance: Bright and clear liquid (Tax Exempt Diesels - pale red liquid).

Auto Ignition Temperature: 500 °F

Flammability in Air: 0.5 - 4.4 %volume

Flash Point: > 125 °F [Closed Cup]

Specific Gravity: 0.85 Typical

Stability: Stable

Vapor Pressure: 0.02 mmHg Typical [Calculated]

Viscosity: 1.9 - 4.1 cSt @ 40 °C

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**SECTION 10 REACTIVITY AND STABILITY**

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**Stability:**

Material is stable under normal conditions.

**Conditions to Avoid:**

Avoid heat and open flames.

**Materials to Avoid:**

Avoid contact with strong oxidizing agents.

**Hazardous Decomposition Products:**

Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Ketones and other unidentified organic compounds may be formed upon combustion.

---

**SECTION 11 TOXICOLOGICAL INFORMATION**

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**Acute Toxicity**

Dermal LD50 > 5 ml/kg (Rabbit) OSHA: Non-Toxic Based on similar material(s)

Eye Irritation Non-Irritating [Rabbit] OSHA: Non-Irritating Based on similar material(s)

Oral LD50 9 ml/kg (Rat) OSHA: Non-Toxic Based on similar material(s)

Skin Irritation Draize Extremely irritating [Rabbit] OSHA: Irritating Based on similar material(s)

**Carcinogenicity Classification****#2 Diesel**

NTP: No IARC: No ACGIH: No OSHA: No

**Benzene**

NTP: Yes IARC: Carcinogen (1) ACGIH: A1 OSHA: Yes

**Light Catalytic Cracked Distillate**

NTP: No IARC: Possible Carcinogen (2B) ACGIH: No OSHA: No

**Carcinogenicity**

Related materials have caused the development of skin tumors in lifetime mouse skin painting studies. However, these tumors have a long latency period and may be associated with the repeated severe irritation caused by the test materials. Prolonged and repeated exposure to high concentrations (10s to 100s ppm) of benzene may cause serious injury to blood-forming organs and is associated with anemia (depletion of blood cells) and is linked to the later development of acute myelogenous leukemia (AML).

**Genotoxicity**

A closely related component (Hydrodesulfurized Middle Distillate) did not cause detectable mutations in two different in vivo (live animal) studies. Some evidence of genotoxicity was seen in separate in vitro (test tube) studies, usually in cases where the test material was metabolically activated.

## SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:  
There is no ecological data available for this product.

## SECTION 13 DISPOSAL CONSIDERATIONS

## RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

## SECTION 14 TRANSPORT INFORMATION

## US Department of Transportation Classification

Proper Shipping Name: Diesel Fuel  
Identification Number: NA1993  
Hazard Class/Division: Combustible Liquid  
Packing Group: III  
Hazardous Substance/Material RQ: Benzene / 1546.2005 lbs  
Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.  
Emergency Response Guide # 128

## International Air Transport Association

Hazard Class/Division: 3 (Flammable Liquid)  
Identification Number: UN1202  
Packing Group: III  
Proper Shipping Name: Diesel Fuel

## International Maritime Organization Classification

Hazard Class/Division: 3 (Flammable Liquid)  
Identification Number: UN1202  
Packing Group: III  
Proper Shipping Name: Diesel Fuel

## SECTION 15 REGULATORY INFORMATION

## FEDERAL REGULATORY STATUS

## OSHA Classification:

Product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA):

Benzene RQ 10 lbs Reportable Spill => 10 lbs or 1 gal

## Ozone Depleting Substances (40 CFR 82 Clean Air Act):

This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

## Superfund Amendment &amp; Reauthorization Act (SARA) Title III:

## SARA Extremely Hazardous Substances (302/304):

Hydrogen sulfide RQ 100 lbs Reportable Spill => 702028 lbs or 99066 gal

## SARA Hazard Categories (311/312):

Immediate Health: YES Delayed Health: YES Fire: YES Pressure: NO  
Reactivity: NO

## SARA Toxic Release Inventory (TRI) (313):

Benzene

## Toxic Substances Control Act (TSCA) Status:

This material is listed on the EPA/TSCA Inventory of Chemical Substances.

## Other Chemical Inventories:

Australian AICS, Canadian DSL, European EINECS, Korean Inventory,

## State Regulation

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

## California Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

## New Jersey Right-To-Know Chemical List:

Benzene (71-43-2)	0.01 - 0.64	%weight	Carcinogen
Benzene (71-43-2)	0.01 - 0.64	%weight	Mutagen
Light Cat Cracked Distillate	0 - 39.99	%weight	Mutagen

## Pennsylvania Right-To-Know Chemical List:

Benzene (71-43-2)	0.01 - 0.64	%weight	Spec Haz Sub/Env Hazardous
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SECTION 16 OTHER INFORMATION

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Revision#: 1

Revision Date: 04/22/2003

Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been newly reviewed to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-1998). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

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SECTION 17 LABEL INFORMATION  
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READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 26967

BR HS Diesel 2 Dyed (.5%<sub>s</sub>)

WARNING!

COMBUSTIBLE LIQUID! MAY BE FATAL IF INHALED. CAUSES SEVERE SKIN IRRITATION. ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAINS BENZENE WHICH IS A CANCER HAZARD - LINKED TO DEVELOPMENT OF ACUTE MYELOGENOUS LEUKEMIA.

Refer to Section 11, Toxicological Information, for specific information on the following effects:

Genotoxicity

Precautionary Measures:

Avoid heat and open flames. Hydrogen Sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Hydrogen Sulfide is an extremely flammable, toxic gas. Respiratory protection should be worn when venting tanks. Avoid breathing of vapors, fumes, or mist. Do not take internally. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Keep container closed when not in use. Wash thoroughly after handling.

FIRST AID

Inhalation: DO NOT attempt to rescue victim unless proper respiratory protection is worn. Vaporization of H<sub>2</sub>S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from victim to rescuer. Mechanical ventilation should be used to resuscitate the victim. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin Contact: Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes and follow by washing with soap if available.

If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye Contact: Flush eyes with plenty of water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling occur, transport to nearest medical facility for additional treatment.

Ingestion: DO NOT take internally. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

#### FIRE

In case of fire, Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

#### SPILL OR LEAK

Dike and contain spill.

FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Full Range Straight Run Middle Distillate, 68814-87-9; Hydrotreated Middle Distillate, 64742-46-7; Light Catalytic Cracked Distillate, 64741-59-9; Benzene, 71-43-2; Sulfur, 7704-34-9

NFPA Rating (Health, Fire, Reactivity): 2, 2, 0

#### TRANSPORTATION

US Department of Transportation Classification

Proper Shipping Name: Diesel Fuel

Identification Number: NA1993

Hazard Class/Division: Combustible Liquid

Packing Group: III

Hazardous Substance/Material RQ: Benzene / 1546.2005 lbs

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

Emergency Response Guide # 128

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

#### Name and Address

Shell Oil Products US

P. O. Box 4453

Houston, TX 77210-4453

## ADMINISTRATIVE INFORMATION

MANUFACTURER ADDRESS: Shell Oil Products US, P. O. Box 4453, Houston, TX.  
77210-4453

Company Product Stewardship & Regulatory Compliance Contact: David Snyder  
Phone Number: (281) 874-7728

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT : IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. THE UNDERLYING DATA, AND THE INFORMATION PROVIDED HEREIN AS A RESULT OF THAT DATA, IS THE PROPERTY OF SHELL OIL PRODUCTS US AND IS NOT TO BE THE SUBJECT OF SALE OR EXCHANGE WITHOUT THE EXPRESS WRITTEN CONSENT OF SHELL OIL PRODUCTS US.

38407-11799-100R-04/22/2003

EXXON COMPANY, USA, A DIV OF EXXON CORP. -- JET FUEL GRADE JP-8 -- 9130-01-031-5816

===== Product Identification =====

Product ID:JET FUEL GRADE JP-8  
 MSDS Date:09/15/1993  
 FSC:9130  
 NIIN:01-031-5816  
 MSDS Number: BKSWB  
 === Responsible Party ===  
 Company Name:EXXON COMPANY, USA, A DIV OF EXXON CORP.  
 Address:800 BELL ST  
 Box:2180  
 City:HOUSTON  
 State:TX  
 ZIP:77252-2180  
 Country:US  
 Info Phone Num:713-656-5949 FAX: 713-656-3631  
 Emergency Phone Num:713-656-3424/2443 (MEDICAL)  
 CAGE:DO850

=== Contractor Identification ===

Company Name:EXXON COMPANY U.S.A.  
 Box:2180  
 City:HOUSTON  
 State:TX  
 ZIP:77252-2180  
 Country:US  
 Phone:713-656-5949 / 713-656-3424  
 CAGE:29700  
 Company Name:EXXON COMPANY, USA, A DIV OF EXXON CORP.  
 Address:800 BELL ST  
 Box:2180  
 City:HOUSTON  
 State:TX  
 ZIP:77252-2180  
 Country:US  
 Phone:713-656-5949 FAX: 713-656-3631  
 CAGE:DO850

===== Composition/Information on Ingredients =====

Ingred Name:DISTILLATES (PETROLEUM), HYDROTREATED LIGHT. (WHICH IS  
 COMPRISED ALSO OF THE FOLLOWING COMPONENTS).

CAS:64742-47-8  
 Fraction by Wt: 100%  
 Other REC Limits:100 PPM/8 HOURS (MFG)  
 OSHA PEL:100 PPM  
 ACGIH TLV:100 PPM

Ingred Name:ANTIOXIDANT, ANTI-STATIC, CORROSION INHIBITOR, AND METAL  
 DEACTIVATOR

Fraction by Wt: <0.01%  
 Other REC Limits:NONE SPECIFIED

===== Hazards Identification =====

LD50 LC50 Mixture:TLV 750 MG/M3 RECOMMENDED BY EXXON  
 Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO  
 Health Hazards Acute and Chronic:EYE IRRITATION, RESPIRATORY TRACT  
 IRRITATION, CENTRAL NERVOUS SYSTEM DISTURBANCES, SKIN IRRITATION.  
 PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMATITIS. ASPIRATION  
 HAZARD.

Explanation of Carcinogenicity:PRODUCT CONTAINS NO INGREDIENTS  
 CURRENTLY CLASSIFIED AS CARCINOGENIC BY NTP, IARC OR OSHA.

Effects of Overexposure:EYE IRRITATION, COUGHING, WHEEZING, PULMONARY  
 INJURY, HEADACHES, DIZZINESS, ANESTHESIA, DROWSINESS,  
 UNCONSCIOUSNESS, SKIN IRRITATION, DERMATITIS.

Medical Cond Aggravated by Exposure:SKIN CONTACT MAY AGGRAVATE EXISTING  
 DERMATITIS.

===== First Aid Measures =====

First Aid:EYES: FLUSH WITH WATER FOR 15 MINUTES. IF IRRITATION  
 PERSISTS, CONSULT PHYSICIAN. SKIN: WASH WITH SOAP AND WATER. IF  
 INJECTED INTO OR UNDER THE SKIN, IT SHOULD BE EVALUATED BY  
 PHYSICIAN IMMEDIATELY. I NHALATION: REMOVE FROM EXPOSURE. CALL  
 APHYSICIAN. INGESTION: DO NOT INDUCE VOMITING. CALL A PHYSICIAN  
 IMMEDIATELY.

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:100F,38C

Autoignition Temp:Autoignition Temp Text:210C

Lower Limits:0.9 %

Upper Limits:7 %

Extinguishing Media:FOAM, WATER SPRAY (FOG), DRY CHEMICAL, CARBON  
 DIOXIDE, VAPORIZING LIQUID TYPE EXTINGUISHING AGENTS

Fire Fighting Procedures:USE WATER TO KEEP FIRE-EXPOSED CONTAINERS  
 COOL. IF A LEAK OR SPILL HAS NOT IGNITED, USE WATER SPRAY TO  
 DISPERSE VAPORS AND PROVIDE PROTECTION FOR PERSONNEL.

Unusual Fire/Explosion Hazard:LIQUID OR VAPOR MAY SETTLE IN LOW AREAS OR  
 TRAVEL SOME DISTANCE ALONG THE GROUND OR SURFACE TO IGNITION  
 SOURCES WHERE THEY MAY IGNITE OR EXPLODE.

===== Accidental Release Measures =====

Spill Release Procedures:SHUT OFF AND ELIMINATE ALL IGNITION SOURCES.  
 KEEP PEOPLE AWAY. RECOVER FREE PRODUCT. ADD SAND, EARTH OR OTHER  
 SUITABLE ABSORBENT TO SPILL AREA. KEEP PRODUCT OUT OF SEWERS AND  
 WATERCOURSES BY DIKING OR IMPOUNDING. ADVISE AUTHORITIES OF SPILL.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:KEEP CONTAINERS CLOSED WHEN NOT IN  
 USE. DO NOT STORE NEAR HEAT, SPARKS, FLAME OR STRONG OXIDANTS.

Other Precautions:LAUNDER OR DRY-CLEAN CONTAMINATED CLOTHING BEFORE  
 REUSE. CLEAN CONTAMINATED SHOES BEFORE REUSE; DISCARD IF  
 OIL-SOAKED.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE SUPPLIED AIR RESPIRATORY PROTECTION IN  
 CONFINED OR ENCLOSED SPACES, IF NEEDED.

Ventilation:USE ONLY WITH VENTILATION SUFFICIENT TO PREVENT EXCEEDING  
 RECOMMENDED LIMITS OR BUILDUP OF EXPLOSIVE CONCENTRATIONS.

Protective Gloves:SPLASH GOGGLES/ FACE SHIELD  
 Eye Protection:CHEMICAL-RESISTANT  
 Other Protective Equipment:CHEMICAL-RESISTANT APRON  
 Work Hygienic Practices:WASH WITH SOAP AND WATER AFTER HANDLING PRODUCT  
 AND BEFORE EATING DRINKING OR SMOKING.

Supplemental Safety and Health

EMPTY CONTAINERS RETAIN RESIDUE AND CAN BE DANGEROUS. DO NOT  
 PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH  
 CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY OR OTHER  
 SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

===== Physical/Chemical Properties =====

HCC:F4

Boiling Pt:B.P. Text:320F,160C

Melt/Freeze Pt:M.P/F.P Text:NOT GIVEN

Vapor Pres:< 5

Vapor Density:> 5

Spec Gravity:0.775 TO 0.840

pH:7

Viscosity:8 CST

Evaporation Rate & Reference:<0.05 (N-BUTYL ACETATE=1)

Solubility in Water:NEGLIGIBLE

Appearance and Odor:CLEAR, WATER-WHITE LIQUID, FAINT PETROLEUM  
 HYDROCARBON ODOR

Percent Volatiles by Volume:100%

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDANTS SUCH AS LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM  
 HYPOCHLORITE, CALCIUM HYPOCHLORITE, ETC.

Stability Condition to Avoid:IGNITION SOURCES, SUCH AS HEAT, SPARKS,  
 PILOT LIGHTS, STATIC ELECTRICITY, OPEN FLAMES

Hazardous Decomposition Products:FUMES, SMOKE, CARBON MONOXIDE, SULFUR  
 OXIDES, ALDEHYDES

===== Disposal Considerations =====

Waste Disposal Methods:PREVENT WASTE FROM CONTAMINATING SURROUNDING  
 ENVIRONMENT. DISCARD ANY PRODUCT, RESIDUE, DISPOSAL CONTAINER OR  
 LINER IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):  
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 disclaims all liability for its use. Any person utilizing this  
 document should seek competent professional advice to verify and  
 assume responsibility for the suitability of this information to their  
 particular situation.

EXXON CO USA, A DIV OF EXXON CORP. -- JET FUEL GRADE JP-4 -- 9130-00-273-2380

## ===== Product Identification =====

Product ID:JET FUEL GRADE JP-4  
 MSDS Date:09/11/1992  
 FSC:9130  
 NIIN:00-273-2380  
 MSDS Number: BJPSD  
 === Responsible Party ===  
 Company Name:EXXON CO USA, A DIV OF EXXON CORP.  
 Address:800 BELL ST  
 Box:2180  
 City:HOUSTON  
 State:TX  
 ZIP:77252-2180  
 Country:US  
 Info Phone Num:713-656-3424/5949  
 Emergency Phone Num:713-656-3424/800-424-9300 (CHEMTREC)  
 CAGE:29700

## === Contractor Identification ===

Company Name:EXXON COMPANY U.S.A.  
 Box:2180  
 City:HOUSTON  
 State:TX  
 ZIP:77252-2180  
 Country:US  
 Phone:713-656-5949 / 713-656-3424  
 CAGE:29700  
 Company Name:EXXONMOBIL CHEMICAL CO, DIV OF EXXON MOBILCORP.  
 Address:13501 KATY FWY  
 Box:3272  
 City:HOUSTON  
 State:TX  
 ZIP:77253-3272  
 Country:US  
 Phone:281-870-6000 / 800-726-2015  
 CAGE:72190

## ===== Composition/Information on Ingredients =====

Ingred Name:NAPHTHA, HYDROTREATED LIGHT (SEE OTHER INGREDIENTS OF THIS MIXTURE TOTAL - 100%)

CAS:64742-49-0  
 Fraction by Wt: 100%  
 Other REC Limits:NONE SPECIFIED

Ingred Name:HYDROTREATED HEAVY NAPHTHA

CAS:64742-48-9  
 Fraction by Wt: SEE #1%  
 Other REC Limits:NONE SPECIFIED

Ingred Name:HYDROTREATED LIGHT PETROLEUM DISTILLATE

CAS:64742-47-8  
 Fraction by Wt: SEE #1%  
 Other REC Limits:NONE SPECIFIED  
 OSHA PEL:100 PPM  
 ACGIH TLV:100 PPM

Ingrid Name:ANTIOXIDANT, ANTI-STATIC, METAL DEACTIVATOR, AND CORROSION  
 INHIBITOR ADDITIVES  
 Fraction by Wt: PPM  
 Other REC Limits:NONE SPECIFIED

Ingrid Name:2-METHOXYETHANOL (EGME) (SARA III)  
 CAS:109-86-4  
 RTECS #:KL5775000  
 Fraction by Wt: 0.10%  
 Other REC Limits:NONE SPECIFIED  
 OSHA PEL:S, 25 PPM  
 ACGIH TLV:S, 5 PPM; 9192

Ingrid Name:BENZENE (SARA III)  
 CAS:71-43-2  
 RTECS #:CY1400000  
 Fraction by Wt: 1%  
 Other REC Limits:NONE SPECIFIED  
 OSHA PEL:1PPM/5STEL;1910.1028  
 ACGIH TLV:10 PPM; A2; 9192  
 EPA Rpt Qty:10 LBS  
 DOT Rpt Qty:10 LBS

=====  
 ===== Hazards Identification =====  
 =====

LD50 LC50 Mixture:LD50 (ORAL RAT) IS ESTIMATED > 5 G/KG  
 Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES  
 Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:YES  
 Health Hazards Acute and Chronic:EYE:IRRITATION. SKIN:MILDLY  
 IRRITATING. PROLONGED CONTACT MAY CAUSE DERMATITIS AND TISSUE  
 DEFATTING. INHALATION: RESPIRATORY SYSTEM IRRITATION AND LIGHT  
 HEADEDNESS. MAY CAUSE NAUSEA, HEADACHE, DROWSINESS, VOMITING.  
 INGESTION:SOLVENT ASPIRATION INTO LUNGS AS A RESULT OF VOMITING MAY  
 CAUSE LUNG AND DIGESTIVE SYSTEM DAMAGE  
 Explanation of Carcinogenicity:THIS PRODUCT CONTAINS APPROX. 1%  
 BENZENE, A CARCINOGEN ALSO LINKED TO BLOOD, KIDNEY, AND NERVOUS  
 SYSTEM DISORDERS.  
 Effects of Overexposure:VAPORS IN HIGH CONCENTRATION ARE ANESTHETIC.  
 OVEREXPOSURE MAY RESULT IN FATIGUE, WEAKNESS, CONFUSION EUPHORIA,  
 DIZZINESS, HEADACHE, DILATED PUPILS, LACRIMATION, NERVOUSNESS,  
 MUSCLE FATIGUE, INSOMNIA, PARESTHESIA, DERMATITIS, AND  
 PHOTOPHOBIA. CAN CAUSE TEARING, REDNESS OF EYES AND BLURRED VISION.  
 IRRITATION OF SKIN.  
 Medical Cond Aggravated by Exposure:PERSONS WITH A HISTORY OF AILMENTS  
 OR WITH A PRE-EXISTING DISEASE INVOLVING THE EYES, SKIN,  
 RESPIRATORY TRACT OR NERVOUS SYSTEM MAY BE AT INCREASED RISK FROM  
 EXPOSURE. DRYING/CRACKING OF SKIN.

=====  
 ===== First Aid Measures =====  
 =====

First Aid:EYES: FLUSH WITH RUNNING WATER FOR 15 MINUTES WHILE HOLDING  
 EYELID. GET MEDICAL ATTENTION IMMEDIATELY. SKIN: WASH WITH SOAP &  
 WATER. REMOVE CONTAMINATED CLOTHING. GET MEDICAL ADVICE.  
 INHALATION: REMOVE TO FRESH AIR. GIVE MOUTH-TO-MOUTH RESUSCITATION  
 IF NOT BREATHING. GET MEDICAL ATTENTION. INGESTION: DO NOT INDUCE  
 VOMITING. GIVE NOTHING BY MOUTH IF UNCONSCIOUS. GET MEDICAL  
 ATTENTION IMMEDIATELY.

=====  
 ===== Fire Fighting Measures =====  
 =====

Flash Point Method:TCC  
Flash Point:<-9F,<-23C  
Autoignition Temp:Autoignition Temp Text:464F  
Lower Limits:0.9 %  
Upper Limits:8 %  
Extinguishing Media:USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY  
CHEMICAL.

Fire Fighting Procedures:FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA &  
FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER  
SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.

Unusual Fire/Explosion Hazard:FIRE OR EXCESSIVE HEAT MAY CAUSE  
PRODUCTION OF HAZARDOUS DECOMPOSITION PRODUCTS. MATERIAL IS VERY  
VOLATILE AND GIVES OFF INVISIBLE VAPORS.

===== Accidental Release Measures =====

Spill Release Procedures:REMOVE ALL SOURCES OF IGNITION. VENTILATE AND  
REMOVE WITH INERT ABSORBENT. USE NON-SPARKING TOOLS. IF SPILL HAS  
NOT IGNITED, USE WATER SPRAY TO DISPERSE THE VAPORS AND TO PROVIDE  
PROTECTION FOR MEN AT TEMPTING TO STOP A LEAK.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:CONTENTS ARE FLAMMABLE. KEEP AWAY FROM  
HEAT, SPARKS, AND OPEN FLAME. DURING USE AND UNTIL ALL VAPORS ARE  
GONE: KEEP AREA VENTILATED-DO NOT SMOKE.

Other Precautions:AVOID BREATHING OF VAPORS. EMPTY CONTAINERS RETAIN  
RESIDUE (LIQUID AND/OR VAPOR) AND CAN BE DANGEROUS. DO NOT  
PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH  
CONTAINERS TO HEAT, FLAM E, SPARKS -- THEY MAY EXPLODE.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:WEAR A NIOSH/MSHA APPROVED RESPIRATOR IF  
VENTILATION DOES NOT MAINTAIN INHALATION EXPOSURES BELOW PEL/TLV.  
WEAR SELF-CONTAINED BREATHING APPARATUS IF REQUIRED FOR HIGH LEVELS  
OF CONTAMINATES.

Ventilation:LOCAL EXHAUST PREFERABLE. GENERAL EXHAUST ACCEPTABLE IF THE  
EXPOSURE IS MAINTAINED BELOW APPLICABLE EXPOSURE LIMITS.

Protective Gloves:NEOPRENE OR NATURAL RUBBER GLOVES

Eye Protection:PAINT GOGGLES/SAFETY GLASSES AS REQUIRED

Other Protective Equipment:INDUSTRIAL-TYPE WORK CLOTHING, HAT AND APRON  
AS REQUIRED. AN EYE WASH AND DRENCH SHOWER FACILITY SHOULD BE  
AVAILABLE.

Work Hygienic Practices:USE WITH ADEQUATE VENTILATION. AVOID BREATHING  
VAPOR/SPRAY MIST. AVOID CONTACT WITH SKIN & EYES. WASH HANDS AFTER  
USE.

Supplemental Safety and Health

KEEP CONTAINER CLOSED WHEN NOT IN USE. TRANSFER ONLY TO APPROVED  
CONTAINERS WITH COMPLETE AND APPROPRIATE LABELING. DO NOT TAKE  
INTERNALLY.

===== Physical/Chemical Properties =====

HCC:F2

Boiling Pt:B.P. Text:130 - 518F

Melt/Freeze Pt:M.P/F.P Text:-72F,-58C

Vapor Pres:2.0-3.0

Vapor Density:>5 AIR=1

Spec Gravity:0.751-0.802

pH:7

Viscosity:1 CST @20C

Evaporation Rate & Reference:1-5 (N-BUTYL ACETATE=1)

Solubility in Water:NEGLIGIBLE

Appearance and Odor:CLEAR WATER-WHITE LIQUID, FAINT PETROLEUM

HYDROCARBON ODOR

Percent Volatiles by Volume:100 %

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZING AGENTS

Stability Condition to Avoid:HIGH TEMPERATURES, SPARKS, PILOT LIGHTS,  
STATIC ELECTRICITY, AND OPEN FLAMES

Hazardous Decomposition Products:BY FIRE: CARBON MONOXIDE, CARBON  
DIOXIDE, ALDEHYDES AND KETONES, OTHER INCOMPLETE COMBUSTION  
PRODUCTS.

===== Disposal Considerations =====

Waste Disposal Methods:WASTE MATERIAL WILL LIKELY BE A HAZARDOUS WASTE  
(CODE D001) WHICH MUST BE DISPOSED OF ACCORDINGLY. DO NOT  
INCINERATE CLOSED CONTAINER. DISPOSE OF IN ACCORDANCE WITH FEDERAL,  
STATE AND LOCAL REGULATION S.

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particular situation.

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

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**TOLTEST, INC.**



**APPENDIX D**  
**INCIDENT REPORTS**

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Approved By:

Signature on File

Richard L. Barcum, CSP, CHMM  
Manager, Corporate Health and Safety

Signature on File

David D. Alleman, CPA  
Vice President, CFO

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## Procedure

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# INCIDENT PREVENTION PROGRAM: REPORTING, INVESTIGATION, AND REVIEW

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## 1.0 PURPOSE AND SUMMARY

The purpose of this procedure is to establish the requirements for incident reporting, investigation, and review. This procedure is an integral part of the company's overall incident prevention program and aids in the determination of causal factors and corrective actions necessary to prevent incident re-occurrence. Key elements of this procedure include:

- **Prompt reporting and investigation of all occupational injuries/illness, vehicle incidents, property damage incidents, and near miss incidents.**
- Review by an Incident Review Board of all Occupational Safety and Health Administration (OSHA) recordable injuries/illnesses and at-fault vehicle incidents. The Incident Review Board report is submitted/approved up through management to the appropriate Vice President.
- Immediate reporting to the Manager, Corporate Health and Safety, all incidents involving a fatality, injury/illness, or resulting in property damage in excess of \$1000.

## 2.0 RESPONSIBILITY MATRIX

### 2.1 Procedure Responsibility

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

### 2.2 Action/Approval Responsibilities

See Responsibility Matrix (See Attachment 1)

## 3.0 DEFINITIONS

- 3.1 **Company** - TolTest, Incorporated.

- 3.2 **OSHA Recordable Case** – All work-related fatalities and illnesses and those work-related injuries which result in loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid (see Attachment 6).
- 3.3 **Lost Workday Case** – Cases which involve days away from work or days of restricted work activity or both. Days away from work are the number of work days (consecutive or not), excluding the date of injury, the employee **would have worked**, but could not because of occupational injury or illness; and/or the number of work days (consecutive or not), excluding the date of injury, on which, because of injury or illness:
- The associate was assigned to another job on a temporary basis, or
  - The associate worked at a permanent job less than full time, or
  - The associate worked at a permanently-assigned job, but could not perform all duties **normally** connected with it.
- 3.4 **Near Miss Incident** – Any incident where no injury or property damage occurred, but where the potential for injury or property damage existed.
- 3.5 **At-Fault Vehicle Incident** – Any vehicle incident will be considered an At-Fault Incident when specific action or inaction by a TolTest associate or subcontract employee directly contributed to the cause and/or severity of the incident.
- 3.6 **Vehicle** – Any vehicle, including trucks, used upon the highway or in private facilities for transporting passengers and/or property. For the purpose of this procedure, off-road vehicles such as earthmoving equipment, forklifts, non-highway used trucks, etc. are not considered vehicles.
- 3.7 **Property Damage Incident** – Any incident, in which a company associate or subcontractor is a party which results in property damage, regardless of ownership, in excess of \$1000. For the purpose of this procedure, off-road vehicles such as earthmoving equipment, forklifts, non-highway used trucks, etc. are considered property, even if the equipment is rented.

#### 4.0 TEXT

##### 4.1 Incident Reporting Process

Associates are required to immediately report to their direct supervisor all occupational injuries, illnesses, incidents and near miss incidents that have the potential for injury.

Any supervisor (but preferably the supervisor directly responsible for the involved associate(s)) with first-hand knowledge of the incident is required to *immediately* arrange for appropriate medical attention, *including drug and alcohol testing*, and contact the Manager, Corporate Health and Safety, **prior** to the associate receiving medical treatment (not applicable for life threatening situations). See Section 4.8 for the requirements regarding post incident drug and alcohol screening.

Prior to an injured associate returning to his/her job duties, a medical release shall be provided to the Manager, Corporate Health and Safety. The medical release shall be completed and signed by the attending physician and include probable release date, work restrictions (if any), dates of restrictions (if any), medicine prescribed (if any) and the date(s) of any required medical follow-up (if any).

If the supervisor does not feel that they will be able to accommodate the work restrictions, approval by the Manager, Corporate Health and Safety **and** the Manager, Human Resources is required **prior** to sending the associate home.

- The supervisor is to initiate/complete the appropriate company documentation in accordance with the following incident classifications:
  - Injury/Illness
    - a. Associate Injury Report (Attachment 2)
    - b. Incident Investigation Report (Attachment 4)
    - c. Incident Review Board (Attachment 5) – if determined by Health and Safety to be an OSHA Recordable Incident
  - Vehicle Incidents
    - a. Vehicle Incident Report (Attachment 6)
    - b. Incident Investigation Report (Attachment 4)
    - c. Incident Review Board - if company associate or subcontractor is at fault and damage exceeds \$1000 (Attachment 5)
  - Near Miss
    - a. Incident Investigation Report (Attachment 4)
  - Property Damage/General Liability
    - a. General Liability, Property Damage, and Loss Report (Attachment 3)
    - b. Incident Investigation Report (Attachment 4)

- c. Incident Review Board - if company associate or subcontractor is at fault and damage exceeds \$1000 (Attachment 5)

All forms, with the exception of the Incident Review Board and Incident Investigation Report, must be completed and forwarded to the Manager, Corporate Health and Safety within one business day of the incident.

**4.2 Associate Injury Report**

The Associate Injury Report (Attachment 2) is to be completed for all incidents that result in an associate occupational injury or illness. It is to be initiated by the supervisor or the injured employee. The Manager, Corporate Health and Safety must receive a **completed** copy (including all signatures) of the report within one business day of the incident.

**4.3 Vehicle Incident Report**

The Vehicle Incident Report (Attachment ) must be completed for any vehicle incident in which a company vehicle is involved. This includes company-owned or leased vehicles, rental vehicles, and personal vehicles being used for company business. This report is to be initiated by the associate involved in the incident or his/her direct supervisor. The Manager, Corporate Health and Safety must receive a **completed** copy (including all signatures) of the report within one business day of the incident.

**4.4 General Liability, Property Damage, and Loss Report**

The General Liability, Property Damage and Loss Report (Attachment 3) is to be used for all losses or damage to company property in excess of \$1000. This form must be completed for all third party property damage, regardless of value, which occurred as a result of company activities. The associate most familiar with the events that contributed to the loss or damage will initiate the form, then forward it to the supervisor responsible for the project where the damage occurred. The Manager, Corporate Health and Safety must receive a **completed** copy (including all signature) of the report within one business day of the incident.

**4.5 Incident Investigation Report**

All injuries, illnesses, incidents, and near miss incidents will be investigated. Once arrangements for immediate medical care have been made, the associate's direct supervisor, with assistance from the appropriate Corporate Health and Safety Committee Representative and/or the Manager, Corporate Health and Safety, will:

- Reconstruct the conditions which lead to the incident (collect the facts)

- Describe and document (include sketch, photos, etc.) how the incident occurred.
- List witnesses and collect written statements when possible
- Identify and discuss the causative factors
- Identify the unsafe act(s) or unsafe condition(s) that contributed to the incident
- Identify possible systematic/management deficiencies
- List corrective action(s) which are to be taken to prevent re-occurrence of the incident, the person responsible for the corrective action, and the date by which the action(s) is/are to be completed.

The investigation will be started as soon as possible after the incident and a **completed** (i.e. including signatures) written report (Attachment 4) submitted to the Manager, Corporate Health and Safety within 3 business days.

#### 4.6 Incident Review Board

The purpose of the Incident Review Board is to review the information gathered for each incident and take appropriate action to prevent its recurrence. The Incident Review Board shall be composed of the involved associate's direct supervisor, the appropriate Corporate Health and Safety Committee Representative, and the associate(s) involved in the incident. When appropriate, the Manager, Corporate Health and Safety should be involved.

An Incident Review Board will be convened, within **10 working days** of the incident, for all OSHA Recordable Incidents, At Fault Vehicle Incidents and Property Damage Incidents in which a company associate or subcontractor is at fault and damage exceeds \$1000.

The involved associate's Health and Safety Committee Representative is responsible for convening the Incident Review Board and completing the Incident Review Board form (Attachment 5). The Manager, Corporate Health and Safety must receive a **completed** copy (including supervisor and associate signatures) of the report within three (3) business day of the convening of the Incident Review Board.

It is generally not acceptable to discipline an associate for having an incident. However, if the Incident Review Board determines that the incident resulted

from an unsafe act or violation of company procedure on the associate's part, the employee may be subject to disciplinary action in accordance with the company's progressive disciplinary action system. Disciplinary action is NOT authorized to be taken without all of the appropriate (Manager, Corporate Health and Safety, Manager, Human Resources, Division Vice President) reviews and approvals.

#### 4.7 Insurance Notification

Notification to the appropriate insurance carrier is the responsibility of the Health and Safety Department. No other individuals are authorized to contact an insurance carrier to report an incident.

#### 4.8 Post Incident Drug and Alcohol Screening

Post incident drug and alcohol screening is required for the following associates:

- Associate's who receive **off site medical evaluation or treatment** as a result of an injury.
- Associate's who are at fault in a **vehicle incident or property damage** incident resulting in greater than **\$5000 damage**.
- Associate's involved in **near misses and/or minor injuries** in which the **potential consequence** was much more **severe** than the actual result of the incident. This should be at the discretion of the Supervisor with the concurrence of a member of the Corporate Health and Safety Committee Representative.

#### 5.0 EXCEPTION PROVISIONS

Variances to this procedure shall be requested in accordance with established variance procedures.

#### 6.0 ATTACHMENTS

1. Responsibility Matrix
2. Associate Injury Report
3. General Liability, Property Damage, and Loss Report
4. Incident Investigation Report
5. Incident Review Board Report
6. Vehicle Incident Report

## ATTACHMENT 1 RESPONSIBILITY MATRIX

Action	Procedure Section	Responsible Party					
		Associate	Supervisor	Corp. Health and Safety Committee Rep.	Manager, Corporate Health & Safety	Division Vice President	Manager, Human Resources
Issue, Revise and Maintain Procedure	2.1					X	
Report All Incidents to Supervisor	4.1	X					
Notify Manager, Corporate Health and Safety	4.1	X	X				
Arrange Medical Care	4/1		X	X		X	
Initiate/Complete Company Forms	4.1, 4.2, 4.3, 4.4, 4.5		X				
Complete Investigation of Incident	4.5, 4.6		X	X (if appropriate)	X (if appropriate)		
Conduct Incident Review Board	4.6			X			
Report Injury/Incident to Insurance	4.7				X		
Participate in Incident Review Board	4.6	X	X	X	X (if appropriate)		
Review and Sign Incident Review Board Report	4.6	X	X		X	X	X

## ATTACHMENT 2 ASSOCIATE INJURY REPORT

This report is to be initiated by the associate's supervisor. Please answer all questions completely. This report must be forwarded to the Manager, Corporate Health and Safety within 24 hours of the injury/illness.

Injured's Name \_\_\_\_\_ Sex \_\_\_\_\_ SSN \_\_\_\_\_ Birth Date \_\_\_\_\_

Home Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone ( ) \_\_\_\_\_

Job Title \_\_\_\_\_ Hire Date \_\_\_\_\_ Hourly Wage \_\_\_\_\_

Date of Incident \_\_\_\_\_ Time \_\_\_\_\_ Time Reported \_\_\_\_\_ To Whom? \_\_\_\_\_

Project/Department Name \_\_\_\_\_ Address \_\_\_\_\_

Project No \_\_\_\_\_ Time Shift Began \_\_\_\_\_ Did Associate Leave Work?  No  Yes When? \_\_\_\_\_

Has associate returned to work?  No  Yes When \_\_\_\_\_ Did associate miss a regularly scheduled shift?  No  Yes

Doctor/Hospital Name \_\_\_\_\_ Address \_\_\_\_\_

Witness Name(s) \_\_\_\_\_ Statement Attached?  No  Yes

Nature of Injury \_\_\_\_\_ Exact Body Part \_\_\_\_\_

Medical Attention:  None  First Aid On Site  Doctor's Office  Hospital ER  Hospitalized

Job Assignment at Time of Incident \_\_\_\_\_

Describe Incident \_\_\_\_\_

Associate: \_\_\_\_\_  
Print Signature Date

Comments on Incident and Corrective Action(s) \_\_\_\_\_

What Unsafe Condition(s) and/or Act(s) Contributed to the Incident? \_\_\_\_\_

What Corrective Action(s) Have Been Taken to Prevent Recurrence? \_\_\_\_\_

Supervisor: \_\_\_\_\_  
Print Signature Date

## ASSOCIATE INJURY REPORT

### CONTINUED

Concur With Action Taken?  Yes  No Remarks \_\_\_\_\_

OSHA Classification:  First Aid  Recordable, No Lost/Restricted Workdays  
 Recordable, Lost Workdays  Recordable, Restricted Activity  Fatality

Days Away From Work \_\_\_\_\_ Days Restricted Work \_\_\_\_\_

Worker's Compensation Claim Number (if applicable) \_\_\_\_\_

TolTest Tracking No. \_\_\_\_\_

Verbal Received (Date/Time) \_\_\_\_\_ Report Received (Date/Time) \_\_\_\_\_

Drug Screen  Yes  No Alcohol Screen  Yes  No

Manager, Corporate Health and Safety:

\_\_\_\_\_  
Print Signature Date

A. Type of Injury or Illness Code: \_\_\_\_\_ E. Agent Code: \_\_\_\_\_

B. Injured Body Part Code: \_\_\_\_\_ F. Safety Rule Violated Code: \_\_\_\_\_

C. Activity at Time of Incident Code: \_\_\_\_\_ G. Incident Prevention Code: \_\_\_\_\_

D. Injury Cause Code: \_\_\_\_\_ H. Instruction/RE-Instruction Code: \_\_\_\_\_

Manager, Corporate Health and Safety

### ATTACHMENT 3 GENERAL LIABILITY, PROPERTY DAMAGE AND LOSS REPORT

This report is to be completed for all losses or damage to company property in excess of \$1000 and all third party damage, regardless of value, resulting from company activities.

Project/Department/Location \_\_\_\_\_ Project No. \_\_\_\_\_ Date \_\_\_\_\_

Address \_\_\_\_\_

How Did Damage or Loss Occur: \_\_\_\_\_

Description and Value (\$) of Damaged/Lost/Stolen Property: \_\_\_\_\_

Location of Damaged/Lost/Stolen Property (Before Loss): \_\_\_\_\_

Date and Time of Damage, Loss or Theft: \_\_\_\_\_

**Owner of Damaged/Lost/Stolen Property:**

Name \_\_\_\_\_ Phone No. ( ) \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

Employer and Address \_\_\_\_\_

**Injured Parties (Also completed a Supervisor's Associate Injury Report if a Company Associate):**

Name \_\_\_\_\_ Phone No. ( ) \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

Employer and Address \_\_\_\_\_

Description of Injury \_\_\_\_\_

**Witnesses:**

1. Name \_\_\_\_\_ Phone No. ( ) \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

Employer and Address \_\_\_\_\_

2. Name \_\_\_\_\_ Phone No. ( ) \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_

Employer and Address \_\_\_\_\_

Were Pictures Taken? Yes No  
Were Police Notified? Yes No Dept \_\_\_\_\_ Report No. \_\_\_\_\_

**Completed By:**

\_\_\_\_\_ Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

**Manager, Corporate Health and Safety:**

\_\_\_\_\_ Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

## ATTACHMENT 4 INCIDENT INVESTIGATION REPORT

**MUST BE COMPLETED WITHIN 72 HOURS**

Investigation Date \_\_\_\_\_ Date of Incident \_\_\_\_\_

Employee Name \_\_\_\_\_

Supervisor Name \_\_\_\_\_

Dept. Name/Project Number/Project Name \_\_\_\_\_

Location of Incident \_\_\_\_\_

- Incident Classification
- |               |                    |                  |                |                          |                |
|---------------|--------------------|------------------|----------------|--------------------------|----------------|
| <u>Injury</u> | First Aid          | <u>Vehicle</u>   | Chargeable     | <u>DOT</u>               | DOT Vehicle    |
|               | OSHA Recordable    |                  | Non-Chargeable |                          | DOT Reportable |
|               | Lost Workday       |                  |                |                          |                |
|               | Restricted Workday | <u>Near Miss</u> |                | <u>General Liability</u> |                |

▪ Description (Provide facts, describe how incident occurred, provide diagram [on back] or photos)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

▪ Analysis 1 (What unsafe acts or conditions contributed to the incident?)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

▪ Analysis 2 (What systematic or management deficiencies contributed to incident?)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

▪ Corrective Action(s) (List corrective action items, responsible person, scheduled completion date)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

▪ Witnesses (Attach statements or indicate why unavailable)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Investigated By \_\_\_\_\_  
Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Manager, Corp. \_\_\_\_\_  
Health and Safety Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

## ATTACHMENT 5 INCIDENT REVIEW BOARD

DATE:	LOCATION:
BOARD MEMBERS:	
INCIDENT DATE:	ASSOCIATE(S) INVOLVED IN INCIDENT:
INVESTIGATION COMPLETE: YES NO	INCIDENT CLASSIFICATION
<b>THE FOLLOWING INFORMATION <u>MUST</u> BE PROVIDED BY THE REVIEW BOARD FOR THIS INCIDENT (PRINT)</b>	
SUPERVISOR: _____	
CAUSE OF INCIDENT:	
ACTION(S) RECOMMENDED BY BOARD*:	
*ALL ACTIONS BY THE INCIDENT REVIEW BOARD ARE SUBJECT TO FINAL REVIEW BY THE INDIVIDUALS LISTED BELOW.	
ACCEPTED:	
_____ ASSOCIATE SIGNATURE	_____ SUPERVISOR SIGNATURE
ACCEPTED:	REJECTED FOR:
_____ MANAGER, CORPORATE HEALTH AND SAFETY	_____ _____
ACCEPTED:	REJECTED FOR:
_____ MANAGER, HUMAN RESOURCES	_____ _____
ACCEPTED:	REJECTED FOR:
_____ DIVISION VICE PRESIDENT	_____ _____



## VEHICLE INCIDENT REPORT (continued)

ROADWAY \_\_\_\_\_ NUMBER OF LANES EACH DIRECTION \_\_\_\_\_ RESIDENTIAL \_\_\_\_\_  
 \_\_\_\_\_ DIVIDED HIGHWAY \_\_\_\_\_ UNDIVIDED HIGHWAY \_\_\_\_\_

Draw and name roadways showing each vehicle, direction of travel, and point of impact. Indicate travel direction before the incident with a solid line and post-incident movement with a broken line.

**SYMBOLS:**

- Your Vehicle 
- Other Vehicle(s) 
- 
- Pedestrian 
- 
- Stop Sign 
- Yield 
- Railroad 

ADDITIONAL INFORMATION: \_\_\_\_\_

ASSOCIATE	_____	_____	_____
	(Print)	(Signature)	(Date)
SUPERVISOR	_____	_____	_____
	(Print)	(Signature)	(Date)
DEPARTMENT SAFETY REPRESENTATIVE	_____	_____	_____
	(Print)	(Signature)	(Date)
CORPORATE HEALTH & SAFETY MNGR.	_____	_____	_____
	(Print)	(Signature)	(Date)

HEALTH & SAFETY DEPARTMENT

TRACKING # \_\_\_\_\_ INCIDENT REPORT ORDERED \_\_\_\_\_ AT FAULT Y N  
 ORIGINAL: \_\_\_ H&S FILE \_\_\_\_\_ D&A SCREEN \_\_\_\_\_ DEFENSIVE DRIVING Y N  
 CC: \_\_\_ ASSOCIATE \_\_\_ DEPT. SAFETY REP \_\_\_ W/C FILE \_\_\_ DENISE

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

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**TOLTEST, INC.**



## **APPENDIX E**

### **EXCAVATING AND TRENCHING PROCEDURES**

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Approved By:

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Richard L. Barcum, CSP, CHMM  
Manager, Corporate Health and Safety

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David D. Alleman, CPA  
Vice President, CFO

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## **Procedure**

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# **EXCAVATION AND TRENCHING**

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## **1.0 PURPOSE AND SUMMARY**

This procedure presents the federal requirements for excavation safety. Excavation operations pose unique and serious hazards.

With very few exceptions, protective systems must be designed and installed to protect associates who enter excavations. Accepted protective systems include; sloping (including benching), shoring and shielding.

The protective system must be designed by a registered professional engineer (civil), and plans must be available for inspections on-site, under prescribed conditions.

In addition to federal requirements, some states (such as California) and localities may require notification of trenching/excavation operations prior to beginning work.

Compliance is mandatory to ensure associate protection when working in or around excavations. The programs in this manual on confined space, hazard communication, lock-out/tag-out, respiratory protection, and any other safety programs or procedures deemed essential for associate protection, are to be used in conjunction with this program.

## **2.0 RESPONSIBILITY MATRIX**

### **2.1 Procedure Responsibility**

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

### **2.2 Program Responsibility**

This program will be monitored by the Corporate Health and Safety Department.

### **2.3 Supervisors and Managers**

It is the responsibility of each Project Supervisor and Project Manager to implement and maintain the procedures and steps set forth in this program.

### **2.4 Associates**

Each associate involved with excavation and trenching work is responsible to comply with all applicable safety procedures and requirements of this program.

## **3.0 DEFINITIONS**

- 3.1 ACCEPTED ENGINEERING REQUIREMENTS** – Those requirements or practices which are compatible with standards required by a registered professional engineer (civil).
- 3.2 ANGLE OF REPOSE** – The greatest angle above the horizontal plane at which a material will lie without sliding.
- 3.3 BENCHING** - A method of protecting associates from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels.
- 3.4 CAVE-IN** - The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by failing or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.
- 3.5 COMPETENT PERSON** - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to associates, and who has authorization to take prompt corrective measures to eliminate them.
- 3.6 CONFINED SPACE** – A space that:

- Is large enough and so configured that an associate can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry); and
- Is not designed for continuous associate occupancy.

**3.7 DESIGN ENGINEER** – An individual, currently registered as a civil engineer in the applicable state, who, in all other respects, meets the requirements of a pertinent State OSHA Program, or Federal OSHA in terms of his or her ability to design shoring, sloping, benching, or alternate trench/excavation systems.

**3.8 DURATION OF EXPOSURE** - The longer an excavation is open, the longer the other factors have to work on causing it to collapse.

**3.9 EXCAVATION** - Any man-made cut, trench, or depression in an earth surface, formed by earth removal.

**3.10 HAZARDOUS ATMOSPHERE** - An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

**3.11 PROJECT MANAGER** – An individual who is responsible to coordinate and direct the activities of both the Design Engineer and the Project Supervisor. The Project Manager is responsible to assure that all pre-excavation requirements are met.

**3.12 PROJECT SUPERVISOR** – An individual, such as a supervisor or engineer, who is familiar with the installation of shoring or sloping/benching systems and the attendant hazards of excavation or trenching operations. Project supervisors shall meet the particular requirements of State OSHA programs, or where applicable, the requirements of a Federal OSHA competent person. Project Supervisors shall assure that excavation/trenching work practices are properly followed.

**3.13 PROTECTIVE SYSTEM** - A method of protecting associates from cave-ins, from material that could fall or roll from an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide necessary protection.

- 3.14 **SHEETING** – Means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.
- 3.15 **SHIELD** - A structure that is capable of withstanding the forces imposed on it by a cave-in and thereby protects associates within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. All shields must be in accordance with 29 CFR 1926.652(c)(3) or (c)(4).
- 3.16 **SHORING** – Means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.
- 3.17 **SLOPING** - A method of protecting workers from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences such as soil type, length of exposure, and application of surcharge loads.
- 3.18 **SPOIL** – The earth material that is removed in the formation of an excavation or trench.
- 3.19 **SUPPORT SYSTEM** – Means a structure, such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.
- 3.20 **SURCHARGE LOADS** - Generated by the weight of anything in proximity to the excavation, push starts for a cave-in (anything up top pushing down). Common surcharge loads:
- weight of spoil pile
  - weight of nearby buildings, poles, pavement, or other structural objects.
  - weight of material and equipment
- 3.21 **TABULATED DATA** – Means a table and charts approved by a registered professional engineer (civil) and used to design and construct a protective system.
- 3.22 **TRENCH** - A narrow excavation below the surface of the ground, less than 15 feet wide, with a depth no greater than the width.

3.23 **UNDERMINING** - Undermining can be caused by such things as leaking, leaching, caving or over-digging. Undermined walls can be very dangerous.

3.24 **VIBRATION** - A force that is present on construction sites and must be considered. The vibrations caused by backhoes, dump trucks, compactors and traffic on job sites can be substantial.

#### **4.0 EXCAVATION COMPETENT PERSON**

Before any excavation activity begins, TolTest will designate an excavation competent person who will oversee all activity in and around the excavation. This procedure applies regardless of whether personnel will enter a trench or an excavation. The competent person will determine the safety measures needed at all TolTest projects which involve excavation.

##### **4.1 Competent Person Responsibilities**

The competent person is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to associates, and who has authorization to take prompt corrective measures to eliminate them.

Additionally, the competent person must be on-site during any excavation activity for which he or she is responsible. The competent person must also perform or be capable of performing the following tasks:

- Application of 29 CFR 1926 Subpart P to the excavation activity;
- Daily inspections of the excavation, including an inspection after a hazard increasing event such as rain;
- Classifying soil at the excavation;
- Determining proper protective requirements;
- Determining the need for excavation de-watering operations and monitoring all de-watering activity;
- Complete the TolTest Excavation Permit.

## 5.0 SOIL CLASSIFICATION

Appendix A of 29 CFR 1926 Subpart P outlines the minimum requirements for the classification of soil at TolTest project sites. Upon determining the soil type, the competent person must then determine the protection systems which will be used to protect any associate or subcontractor who may enter the excavation.

### 5.1 OSHA Soil Classifications

The following are the soil classifications recognized by OSHA in 29 CFR 1926 Subpart P. The competent person must classify the soil based on the manual and visual tests conducted at the excavation site.

#### 5.1.1 Type A soil means:

Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (TSF) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam, and, in some cases, silty clay loam and sandy clay loam. Cemented soils like caliche and hardpan are considered Type A.

However, Soil is **NOT** Type A if:

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

The exclusions for Type A most generally eliminate it from most construction situations.

**5.1.2 Type B soil means:**

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

However, Soil is **NOT** Type B if:

- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater.

**5.1.3 Type C soil means:**

- Cohesive soil with an unconfined compressive strength of 0.5 TSF (48 kPa) or less; or
- Granular soils including gravel, sand, and loamy sand; or
- Submerged soil or soil from which water is freely seeping; or

- Submerged rock that is not stable; or
- Material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper.

## **5.2 Soil Classification Requirements**

The competent person must be able to classify each soil and rock deposit associated with a trench or excavation as stable rock, Type A soil, Type B soil, or Type C soil.

## **5.3 Basis of Classification**

The classification of soil type must be accomplished by at least one visual and one manual test. There are several allowable tests that can be used to determine soil type. This testing must be done by the competent person and performed prior to and during the job.

These tests should be run on freshly excavated samples from the excavation and are designed to determine stability based on a number of criteria: the cohesiveness, the presence of fissures, the presence and amount of water, the unconfined compressive strength, the duration of exposure, undermining, and the presence of layering, prior to excavation and vibration.

The cohesion tests are based on methods to determine the presence of clay. Clay, silt, and sand are size classifications, with clay being the smallest sized particles, silt intermediate and sand the largest. Clay minerals exhibit good cohesion and plasticity (can be molded). Sand exhibits no elasticity and virtually no cohesion unless surface wetting is present. The degree of cohesiveness and plasticity depend on the amounts of all three types and water.

When examining the soil, three questions must be asked: Is the sample granular or cohesive? Fissured or non-fissured? What is the unconfined compressive strength measured in TSF?

Note: The competent person has the option of following the requirements in section 5 of this procedure to determine soil type or assuming the soil to be Type C and following the protection requirements for Type C soil.

### Methods of testing soils:

- *Visual test:* If the excavated soil is in clumps, it is cohesive. If it breaks up easily, not staying in clumps, it is granular.
- *Wet manual test:* Wet your fingers and work the soil between them. Clay is a slick paste when wet, meaning it is cohesive. If the clump falls apart in grains, it is granular.
- *Dry strength test:* Try to crumble the sample in your hands with your fingers. If it crumbles into grains, it is granular. Clay will not crumble into grains, only into smaller chunks.
- *Pocket penetrometer test:* This instrument is most accurate when soil is nearly saturated. This instrument will give unconfined compressive strength in tons per square foot. The spring-operated device uses a piston that is pushed into a coil up to a calibration groove. An indicator sleeve marks and retains the reading until it is read. The reading is calibrated in tons per square foot (TSF) or kilograms per cubic centimeter.
- *Thumb Penetration Test:* The competent person attempts to penetrate a fresh sample with thumb pressure. If the sample can be dented but penetrated only with great effort, it is Type A. If it can be penetrated several inches and molded by light pressure, it is Type C. Type B can be penetrated with effort and molded.

The following should be used as guidelines when performing the Thumb Penetration Test.

Type A – Penetrated to ½ of the thumb nail length with great effort.

Type B – Penetrated to the first thumb knuckle with great effort.  
Can be molded with effort

Type C – Penetrated several inches and easily molded with little effort or crumbles apart during the Thumb Penetration Test.

- *Shearvane*: Measures the approximate shear strength of saturated cohesive soils. The blades of the vane are pressed into a flat section of undisturbed soil, and the knob is turned slowly until soil failure. The dial is read directly when using the standard vane. The results will be in tons per square foot or kilograms per cubic centimeter.

The competent person will perform several tests of the excavation to obtain consistent, supporting data along its depth and length. The soil is subject to change several times within the scope of an excavation and the moisture content will vary with weather and job conditions. The competent person must also determine the level of protection based on what conditions exist at the time of the test, and allow for changing conditions.

#### **5.4 Reclassification**

If, after the soil has been classified, conditions change, the competent person is responsible for evaluating the situation and, if necessary, change the classification.

#### **5.5 OSHA Soil Types**

##### **5.5.1 Stable Rock**

Stable rock is not one of the texture classes. However, it is one of the OSHA classifications of soil. Stable rock is solid mineral material which can be excavated; and the sides stand vertical and remain stable and vertical throughout construction. Coral is not considered stable rock.

##### **5.5.2 Cemented Soil**

Cemented soils are soils that are held together by a chemical agent such as calcium carbonate. Examples of cemented soils would include caliche and hardpan. Cemented soils are classified as Type A soils with an unconfined compressive strength greater than 1.5 TSF.

##### **5.5.3 Cohesive Soil**

Cohesive soils are basically fine grained soils. Cohesive soils range from clay through clay loam. A cohesive soil will stand unsupported when excavated and is plastic when moist. That is, cohesive soil can be rolled into a ribbon. A cohesive soil is hard to break up when it is dry. Cohesive soils are classified as Type A soils with an unconfined compressive strength greater than 1.5 TSF

#### **5.5.4 Granular Soil**

Granular soils are composed of coarse grained material that have very little cohesive strength. Granular soils include loamy sand, sand and gravel. A soil is classified as granular if more than 65% of the grains are distinguishable with the unaided eye. Granular soils, when excavated, will not stand and the walls of the excavation can crumble easily. Some granular soils will exhibit cohesion when wet, but when dry will fall apart. This type of soil is especially dangerous when found at a construction site because the walls of the trench appear to stand with no support, however, when they dry they could crumble and fall into the trench bottom. Granular soils are classified as soil Type B or C, and may require the highest degree of protection. Type C soils would have an unconfined compressive strength of less than 0.5 TSF.

#### **5.5.5 Granular Cohesionless**

Soils that range from silt through sandy loam or are composed of angular particles are said to be granular cohesionless soils. These are difficult soils to work with because the group ranges from a very stable Type B soil to the unstable Type C soil. Course angular granular soils are classified as Type B soils and have an unconfined compressive strength range from 0.5 TSF to 1.5 TSF.

#### **5.5.6 Layered Soil System**

A layered soils system is composed of two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered. The layers may lay on a horizontal plane or be sloped. When they are sloped into the excavation they represent a collapse hazard to the trench wall. A slope greater than 4H:1V would classify any soil as Type C. Sloped layers less than 4H:1V may be classified as Type B soil,

depending upon the soil classification. No layered system can be by Type A soil.

## 6.0 SELECTION OF PROTECTIVE SYSTEMS

29 CFR 1926.652 requires that each associate in an excavation be protected from cave-ins by an adequate protective system unless excavations are:

- made in stable rock; or
- are less than five (5) feet in depth **and** examination by the competent person provides no indication of potential cave-in.

Additionally, whichever protective system is chosen must have the capacity to resist without failure all loads that are intended or could reasonably be applied to the system.

### 6.1 Design of Sloping and Benching Systems

The slopes and configurations of sloping and benching systems must be determined by the competent person in accordance with the requirements of 29 CFR 1926(b)(1) through (b)(4) as well as 29 CFR 1926 Subpart P – Appendix B.

After the competent person has determined the soil type based on one visual and one manual test, he or she may design the sloping and benching systems for excavations less than 20 feet deep using the following table.

#### MAXIMUM ALLOWABLE SLOPES BASED ON SOIL CLASSIFICATION

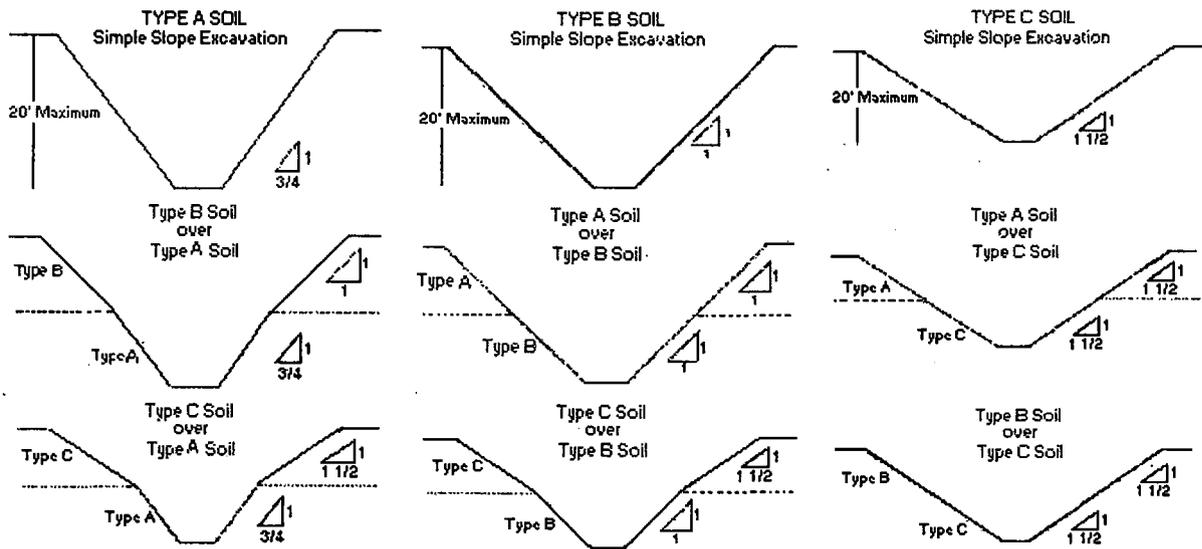
<u>Soil Line</u>	<u>Maximum Allowable Slope/Bench for Excavations Less Than 20 Feet Deep</u>
Stable Rock	Vertical Sides (90°)
Type A Soil	3/4H:1V (53°)
Type B Soil	1H:1V (45°)
Type C Soil	1 1/2H:1V (34°)

Note: If your sloped/benched soil shows any sign of distress you must increase the layback an additional 1/2H:1V.

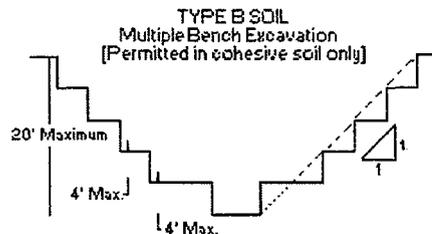
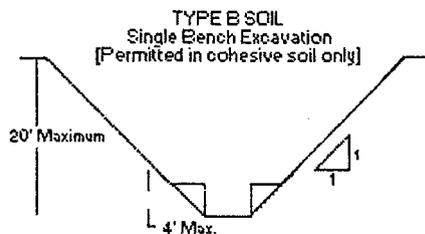
Note: Sloping and Benching for excavations greater than 20 feet deep must be designed by a registered professional engineer (civil).

Note: Benching is not permitted in Type C soil unless the excavation is designed by a registered professional engineer (civil) and tabulated data provided..

### SLOPE CONFIGURATIONS



### BENCH CONFIGURATIONS



## 6.2 Design of Support Systems, Shield Systems, and Other Protective Systems

If the competent person determines that personnel will be protected from cave-ins by a protective system other than sloping and benching, the design of the support systems, shield systems, and other protective systems be based on the conditions at the project site and data provided by a ToITest or subcontracted registered professional engineer or from tabulated data provided by the manufacturers of the protective systems.

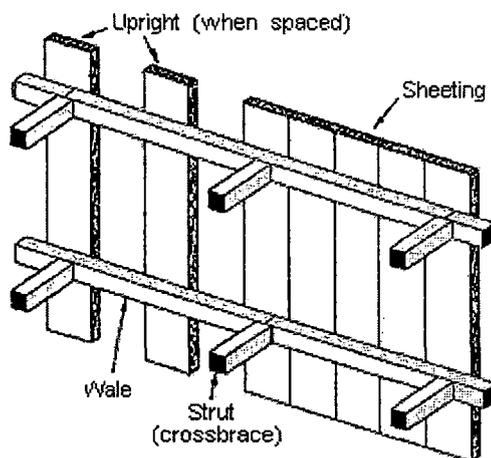
The design of the protective system must be in accordance with the requirements of 29 CFR 1926.652(c)(1) through (c)(4) and 29 CFR 1926 Subpart P - Appendices C, D, E.

In large/deep excavations where traditional shoring and sloping are not practical, alternate protective measures may be implemented to protect personnel in the excavation. Additionally, the top of the excavation must be protected with stop logs, earthen berms, or other types of protective barriers which will keep pedestrians and vehicles from approaching the edge of the excavation. Any deviations from traditional protective systems must be approved by the Manager, Corporate Health and Safety and a registered professional engineer (civil).

### 6.2.1 Shoring Types

Shoring is the provision of a support system for trench faces used to prevent movement of soil, underground utilities, roadways, and foundations. Shoring or shielding is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical. Shoring systems consist of posts, wales, struts, and sheeting. There are two basic types of shoring, timber and aluminum hydraulic.

## TIMBER SHORING



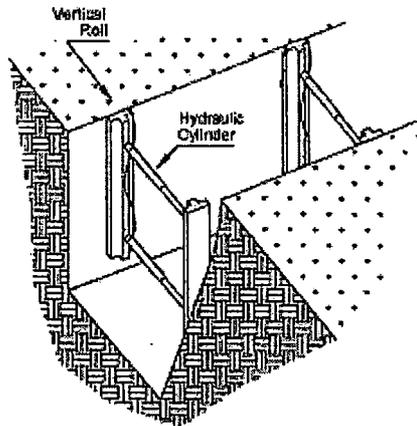
### 6.2.1.1 Hydraulic Shoring

Hydraulic shoring provides a critical safety advantage over timber shoring because workers do not have to enter the trench to install or remove hydraulic shoring. Other advantages of most hydraulic systems are that they:

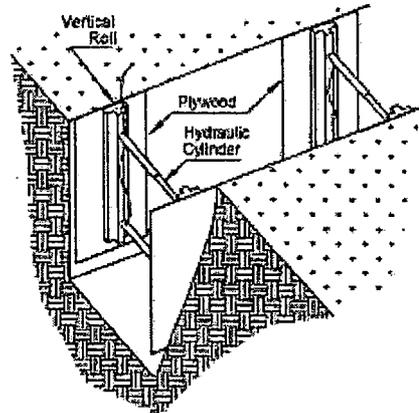
- Are light enough to be installed by one worker;
- Are gauge-regulated to ensure even distribution of pressure along the trench line;
- Can have their trench faces "preloaded" to use the soil's natural cohesion to prevent movement; and
- Can be adapted easily to various trench depths and widths.

All shoring should be installed from the top down and removed from the bottom up. Hydraulic shoring should be checked at least once per shift for leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, and any other damaged or defective parts.

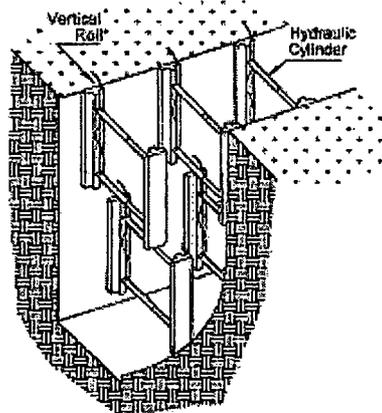
## TYPICAL ALUMINUM HYDRAULIC SHORING INSTALLATIONS



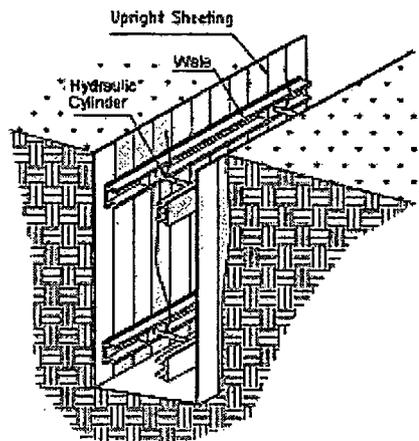
Vertical Aluminum Hydraulic Shoring  
(Spot Bracing)



Vertical Aluminum Hydraulic Shoring  
(With Plywood)



Vertical Aluminum Hydraulic Shoring  
(Stacked)



Aluminum Hydraulic Shoring Water System  
(Typical)

### 6.2.1.2 Pneumatic Shoring

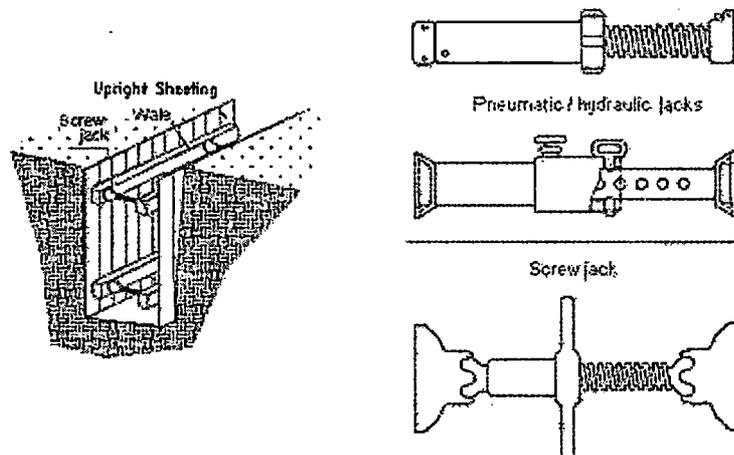
Pneumatic Shoring works in a manner similar to hydraulic shoring. The primary difference is that pneumatic shoring uses air pressure in place of hydraulic pressure. A disadvantage to the use of pneumatic shoring is that an air compressor must be on site.

1. Screw Jacks. Screw jack systems differ from hydraulic and pneumatic systems in that the struts of a screw jack system

must be adjusted manually. This creates a hazard because the worker is required to be in the trench in order to adjust the strut. In addition, uniform "preloading" cannot be achieved with screw jacks, and their weight creates handling difficulties.

2. Single-Cylinder Hydraulic Shores. Shores of this type are generally used in a water system, as an assist to timber shoring systems, and in shallow trenches where face stability is required.
3. Underpinning. This process involves stabilizing adjacent structures, foundations, and other intrusions that may have an impact on the excavation. As the term indicates, underpinning is a procedure in which the foundation is physically reinforced. Underpinning should be conducted only under the direction and with the approval of a registered professional engineer.

### SHORING VARIATIONS



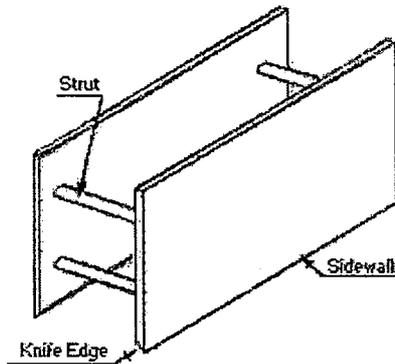
## 6.2.2 Shielding Types

### 6.2.2.1 Trench Boxes

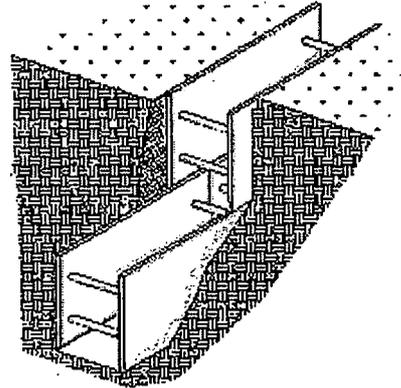
Trench Boxes are different from shoring because, instead of shoring up or otherwise supporting the trench face, they are intended primarily to protect workers from cave-ins and similar incidents. The excavated area between the outside of the trench box and the face of the trench should be as small as possible. The space between the trench boxes and the excavation side are

backfilled to prevent lateral movement of the box. Shields may not be subjected to loads exceeding those which the system was designed to withstand.

### TRENCH SHIELD



### TRENCH SHIELD STACKED

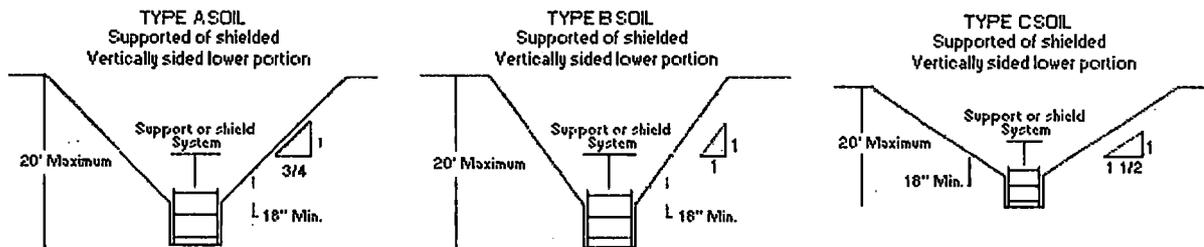


## 6.3 Combined Use

Trench boxes are generally used in open areas, but they also may be used in combination with sloping and benching. The box should extend at least 18 in (0.45 m) above the surrounding area if there is sloping toward excavation. This can be accomplished by providing a benched area adjacent to the box.

Earth excavation to a depth of 2 ft (0.61 m) below the shield is permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of possible loss of soil from behind or below the bottom of the support system. Conditions of this type require observation on the effects of bulging, heaving, and boiling as well as surcharging, vibration, adjacent structures, etc., on excavating below the bottom of a shield. Careful visual inspection of the conditions mentioned above is the primary and most prudent approach to hazard identification and control.

## SLOPE AND SHIELD CONFIGURATIONS



## 7.0 EXCAVATION SAFETY REQUIREMENTS

Excavation activity exposes TolTest personnel and subcontractors to many dangers which, if not recognized, can cause death or serious injury.

### **7.1 General**

Each associate in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926.652. The competent person shall ensure that the required protective system is installed and maintained per the design specifications.

No associates shall be permitted to enter the excavation unless they are specifically required to do so. Unauthorized persons shall not be allowed access.

### **7.2 Supervision**

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

### **7.3 Surface Hazards**

The excavation area should be inspected and any debris, structures, and surface protrusions that are located so as to create a hazard to associates shall be evaluated for structural integrity and supported or removed if necessary.

### **7.4 Underground Installations/Utility Locations**

Before conducting any excavation work, the location of utility installations, such as sewer, telephone, fuel, electric, water lines, fiber optic, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined.

Utility companies or the state utility protection service shall be contacted at least two (2) working days prior to excavation activities to be advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

TolTest personnel and subcontractors should be careful to protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations.

If the markings of utility locations are destroyed or removed before excavation commences or is completed, the TolTest competent person must notify the utility company or utility protection service to inform them that the markings have been destroyed and need replaced. Normally, it will take two (2) working days advance notice for the utility protection service to remark the locations.

Note: Some states and localities have notification requirements which differ from Federal OSHA. Prior to excavating in any area, the Project Manager should contact the local service to identify their location specific requirements.

TolTest equipment operators shall maintain at least 3 feet clearance between any underground utility and the cutting edge or point of powered equipment. When excavating within 36 inches of the markings of underground facilities, personnel should conduct the excavation in a careful and prudent manner, excavating by hand (i.e. shovel) to determine the precise location of the facility/utility and to prevent damage.

While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard associates and prevent damage.

## **7.5 Access and Egress**

TolTest will provide a safe means of access to and egress from all excavations. The following are considered acceptable methods of entering and exiting excavations.

### **7.5.1 Structural Ramps**

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

Structural members used for ramps and runways shall be of uniform thickness. Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or

shall be attached in a manner to prevent tripping. Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

#### **7.5.2 Means of Egress from Trench Excavations**

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for associates. Any ramp used for associate egress must be sloped at an angle which would allow associates to walk upright out of the excavation.

#### **7.6 Exposure to Vehicular Traffic**

TolTest and subcontract personnel who may be exposed to vehicular traffic both on projects and public highways shall be provided with and shall wear warning vests or other suitable garments marked with or made of reflectorized or high-visibility material

#### **7.7 Exposure to Falling Loads**

No TolTest associate or subcontractor shall be permitted underneath loads handled by lifting or digging equipment. Personnel must stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Truck drivers may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with over-cab protective structures, in accordance with 29 CFR 1926.601(b)(6), to provide adequate protection for the operator from falling objects during loading and unloading operations.

#### **7.8 Warning System for Mobile Equipment**

When heavy equipment and trucks operate adjacent to an excavation or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals or stop logs. If possible, the approach grade should be away from the excavation.

#### **7.9 Hazardous Atmospheres**

Because there is a possibility that excavation activity at TolTest project sites involve hazardous atmospheres, the TolTest competent person must ensure that acceptable atmospheric conditions exist.

The TolTest competent person or his/her designee shall perform direct reading atmospheric monitoring in all excavations of any depth into which TolTest personnel or subcontractors must enter where a hazardous atmosphere exists or could reasonably be expected to exist. If there are any questions, the competent person should treat the excavation like a confined space and follow Procedure HS401 - Confined Spaces.

Based on the competent person's visual observation of the excavation and the soil and/or fill material, atmospheric monitoring may not be necessary. However, if conditions change, the competent person must re-evaluate whether atmospheric monitoring is required.

#### **7.9.1 Atmospheric Monitoring**

When atmospheric monitoring is required, the competent person or his/her designee must check the atmosphere for the following in the order shown:

- Oxygen Content - acceptable conditions: 20.8%, 20.9% or 21%
- Flammable Conditions - acceptable conditions: less than 10% LEL
- Toxic Atmospheres - based on the established PEL or TLV

Note: Any reading other than those listed above, must be investigated prior to associates entering the excavation.

#### **7.9.2 Ventilation**

Adequate precautions shall be taken, for example providing ventilation to prevent associate exposure to harmful atmospheres. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, direct reading air monitoring shall be conducted periodically as determined by the competent person or his/her designee to ensure that the atmosphere remains safe.

### **7.9.3 Emergency Response Equipment**

Emergency rescue equipment, such as self-contained breathing apparatus (SCBA), a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be kept close to the excavation for use in an emergency.

### **7.10 Protection from Hazards Associated With Water Accumulation**

Associates shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect associates against the hazards posed by water accumulation. The precautions necessary to protect associates adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

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

### **7.11 Stability of Adjacent Structures**

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing or underpinning shall be provided to ensure the stability of such structures for the protection of associates.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to associates shall not be permitted except when:

- A registered professional engineer (civil) has approved the determination that such excavation work will not pose a hazard to associates; or
- A support system, such as underpinning, designed by a registered professional engineer (civil) is provided to ensure the safety of associates and the stability of the structure; or
- The excavation is in stable rock; or
- A registered professional engineer (civil) has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity.
- If a support system has been put in place to stabilize an adjacent structure, it must be inspected for movement and structural integrity daily by the competent person.
- Sidewalks, pavements, and other structures shall not be undermined unless a support system or another method of protection is provided to protect associates from the possible collapse of such structures.

#### **7.12 Protection from Loose Rock or Soil**

Adequate protection shall be provided to protect associates from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the excavation face to stop and contain falling material; or other means that provide equivalent protection.

Associates shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

#### **7.13 Inspections**

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could

result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work each day and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are required when associate exposure can be reasonably anticipated. An Excavation/Trenching Permit must be completed by the competent person to document the inspections. Canceled Excavation/Trenching Permits should be placed in the project file upon completion of the project.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed associates shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

#### **7.14 Fall Protection**

Where associates or equipment are required or permitted to cross over excavations; walkways or bridges with standard guardrails shall be provided.

Since open excavations are often an attractive nuisance to the public, adequate barrier for physical protection shall be provided at all excavations. Remotely located excavations may require special protection including, but not limited to, highly visible snow fence, concrete "jersey" barriers, chain link fence and flashing warning light. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be covered or backfilled.

### **8.0 EXCAVATION PERMITS**

An Excavation/Trenching Permit must be completed by the competent person each day that an excavation is open and poses safety hazards to personnel who work around or may have to enter excavations.

If a project site has several excavations open and active, each excavation must have its own permit completed. Conversely, a project site which has an open excavation that is not active does not require a daily Excavation/Trenching Permit if the competent person determines that the excavation is NOT posing hazards to site personnel or the public, and is adequately guarded. The competent person must determine what type of inspections and documentation will be required.

The Excavation/Trenching Permit should be retained in the project file and will serve as a record of daily excavation inspection.

## **9.0 TRAINING**

Associates shall not be assigned, or permitted, to design, supervise, or work in or about excavations until they have completed formal training to include:

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

This training can be conducted by the Project Manager or Project Supervisor.

Associates shall not be assigned, or permitted, to act as an excavation competent person until they have completed the TolTest Excavation and Trenching Safety Program presented by the Corporate Health and Safety Department. In the event that it is not feasible to attend this training course, another course may be allowed at the discretion of the Manager, Corporate Health and Safety.

Tailgate Safety Meetings detailing the specific hazards of the work to be performed and safety precautions and procedures specific for the job shall be conducted by the Project Supervisor or designee at the beginning of each shift for each job. These shall be conducted according to the requirements of IPP150: Health and Safety Meetings.

## **10.0 EXCEPTION PROVISIONS**

Variations to this procedure shall be requested in accordance with established variance procedures.

## **11.0 ATTACHMENTS**

1. Excavation/Trenching Permit
2. Selection of Protective Systems for Excavations 20 Feet or Less in Depth
3. Sloping Options
4. Shoring or Shielding Options
5. Utility Location Services

**Attachment 1**

**Excavation/Trenching Permit**

Project Name:	
Project Location:	Project Number:
Name of Competent Person:	Permit Good on This Date Only:
Excavation Length, Depth and Width:	

**EMPLOYEE TRAINING AND PRE-EXCAVATION BRIEFING**

1. Does this job require special training: YES \_\_\_\_\_ NO \_\_\_\_\_  
 2. Mandatory pre-excavation briefing conducted on: \_\_\_\_\_ DATE

**SOIL CLASSIFICATION and PROTECTIVE SYSTEM DETERMINATION**

1. Will the competent person classify the soil based on its properties and site conditions? YES \_\_\_\_\_ NO \_\_\_\_\_  
 If No, the soil is Type C, move to 9 of this section

**VISUAL TEST**

2. Based on visual observation, which best describes the soil in this excavation?  
 Stable Rock       Cemented Soil       Cohesive Soil       Granular Soil  
 Granular Cohesionless       Layered System      Describe Layering: \_\_\_\_\_
3. Based on visual observation, which best describes the moisture condition of the soil? (check all that apply)  
 Dry Soil       Moist Soil       Wet Soil       Saturated Soil  
 Seeping Water       Surface Water Present       Submerged
4. Is the excavation subject to vibration? YES \_\_\_\_\_ NO \_\_\_\_\_  
 5. Is the excavation in previously disturbed soil? YES \_\_\_\_\_ NO \_\_\_\_\_  
 6. Are fissures observed in the excavation walls or on the surface? YES \_\_\_\_\_ NO \_\_\_\_\_

**MANUAL TEST (Must Perform At Least One of the Following)**

**THUMB PENETRATION TEST**

7. Test Performed? YES \_\_\_\_\_ NO \_\_\_\_\_  
 Soil indented with great effort (e.g. to 1/2 of the thumb nail) Type A  
 Soil indented with some effort (e.g. to first thumb knuckle) Type B  
 Soil easily penetrated several inches by thumb with little or no effort. Note: If soil is submerged seeping water, subjected to surface water, runoff, exposed to wetting. Type C

**PENETROMETER OR SHEARVANE TEST**

8. Test Performed? YES \_\_\_\_\_ NO \_\_\_\_\_  
 Device Used/Serial Number: \_\_\_\_\_ Ave. TSF: \_\_\_\_\_

- Soil with unconfined compressive strength of 1.5 TSF or greater Type A
- Soil with unconfined compressive strength of greater than 0.5 TSF and less than 1.5 TSF. Type B
- Soil with unconfined compressive strength of 0.5 TSF or less. Note: If soil is submerged seeping water, subjected to surface water, runoff, exposed to wetting. Type C

9. Soil Classification  
 Stable Rock       Type A       Type B       Type C  
 No soil is Type A if fissured, subject to vibration, previously disturbed, or layered dipping into excavation on a slope of 4H:1V or greater.

10. Which best describes the layering system of the excavation/trench?  
 No Layering       Horizontal Layering       Less than 4H:1V       4H:1V or greater  
 If the layering system is Horizontal Layering, complete 11 of this section, otherwise skip to 12

11. Horizontal Layering  
 Type A over Type B       Type A over Type C       Type B over Type A  
 Type B over Type C       Type C over Type A       Type C over Type B

PROTECTIVE SYSTEM

12. What Type of Protective System Will Be Used?  
 None Required       Sloping       Simple Bench       Multiple Bench  
 Timber Shoring       Trench Shield       Hydraulic Shoring  
 Note: All Protective Systems must have tabulated data, developed by a registered professional engineer, available.

ELECTRICAL SAFETY

1. Are all electrical devices grounded and/or GFCI protected?      YES \_\_\_ NO \_\_\_ N/A \_\_\_

SURFACE ENCUMBRANCES

1. Have all surface encumbrances that are located so as to create a hazard to associates been removed or supported, as necessary, to safeguard associates?      YES \_\_\_ NO \_\_\_ N/A \_\_\_

UNDERGROUND INSTALLATIONS

1. Have the estimated locations of all underground installations been determined prior to excavation?      YES \_\_\_ NO \_\_\_ N/A \_\_\_
2. Have utility companies been contacted and advised of proposed work?      YES \_\_\_ NO \_\_\_ N/A \_\_\_
3. If underground installations are exposed, are they protected, supported or removed while the excavation is open?      YES \_\_\_ NO \_\_\_ N/A \_\_\_

**ACCESS AND EGRESS**

1. Are stairways, ladders, or ramps provided every 25 feet? YES \_\_\_ NO \_\_\_ N/A \_\_\_
2. Are structural ramps that are used for access and egress of equipment and/or personnel designed by a competent person qualified in structural design and constructed in accordance with the design? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**EXPOSURE TO VEHICULAR TRAFFIC**

1. Are personnel exposed to public of project vehicular traffic wearing reflectorized or high visibility vests? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**EXPOSURE TO FALLING LOADS**

1. Are associates prohibited from standing underneath loads handled by lifting or diffing equipment? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**WARNING SYSTEMS FOR MOBILE EQUIPMENT**

1. Are warning systems utilized when mobile equipment is operated adjacent to or the edge of an excavation? YES \_\_\_ NO \_\_\_ N/A \_\_\_

If yes, which type is being used?

- Hand Signal  Stop Logs  Earthen Berm  Other \_\_\_\_\_

**TESTING FOR HAZARDOUS ATMOSPHERES**

1. Are the atmospheric hazards that can be reasonably expected to exist in excavations greater than 4 feet deep tested and controlled? YES \_\_\_ NO \_\_\_ N/A \_\_\_
2. Is testing conducted as often as necessary to ensure safety of personnel? YES \_\_\_ NO \_\_\_ N/A \_\_\_

TIMES & READINGS:	Time: _____				
	LEL: _____ %				
	Oxygen: _____ %				
	Toxic: _____ ppm of _____				

SPECIAL PRECAUTIONS:

**EMERGENCY RESCUE EQUIPMENT**

1. Is emergency rescue equipment such as SCBA, safety harness and lifeline, or basket stretcher available and attended when hazardous atmospheric conditions exist? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 3.

**PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION**

- 1. Is water being controlled or prevented from accumulating in excavation by the use of water removal equipment? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 2. Is water control equipment operation being monitored by a competent person? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**STABILITY OF ADJACENT STRUCTURES**

- 1. Are support systems such as shoring, bracing, or underpinning provided to ensure stability of adjoining structures (i.e. buildings, walls) endangered by excavation activities? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 2. Has the support system been designed by a registered professional engineer (civil)? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**PROTECTION OF ASSOCIATES FROM LOOSE ROCK OR SOIL**

- 1. Are associates protected from excavated or other material and equipment by placing spoils a minimum of two (2) feet from the edge of excavations or by the use of retaining devices? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**INSPECTIONS**

- 1. Are daily inspections of excavations where associate exposure can be reasonably anticipated being done by the competent person? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 2. Are inspections being performed by a competent person after every rainstorm or other hazard increasing occurrence? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 3. Are associates removed from the excavation if the competent person finds evidence at any time of a situation that could result in a possible cave-in, protective system failure, hazardous atmosphere, or other hazardous condition? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**FALL PROTECTION**

- 1. Are standard guardrails provided on walkways and bridges that cross over excavations? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 2. Are all remotely located excavations adequately barricaded or covered? YES \_\_\_ NO \_\_\_ N/A \_\_\_

**SHORING AND OTHER PROTECTIVE SYSTEM**

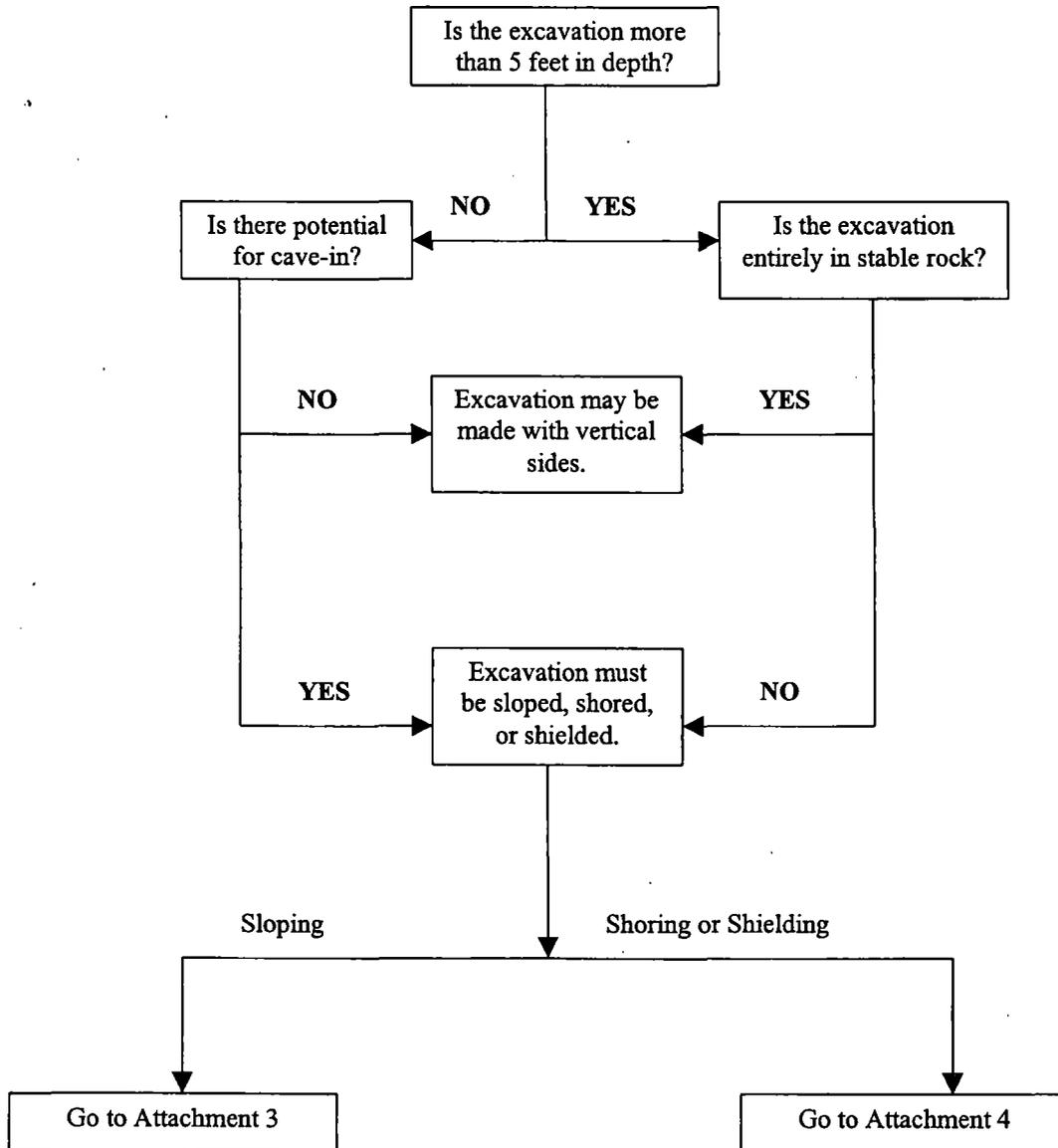
- 1. Have all shoring and/or protective systems been designed by a registered professional engineer (civil) or is it accompanied by tabulated data from the manufacturer? YES \_\_\_ NO \_\_\_ N/A \_\_\_
- 2. Are shoring and other protective systems checked/measured each day to detect movement and possible failure? YES \_\_\_ NO \_\_\_ N/A \_\_\_

(Signature of Competent Person)

(Date)

**ATTACHMENT 2**

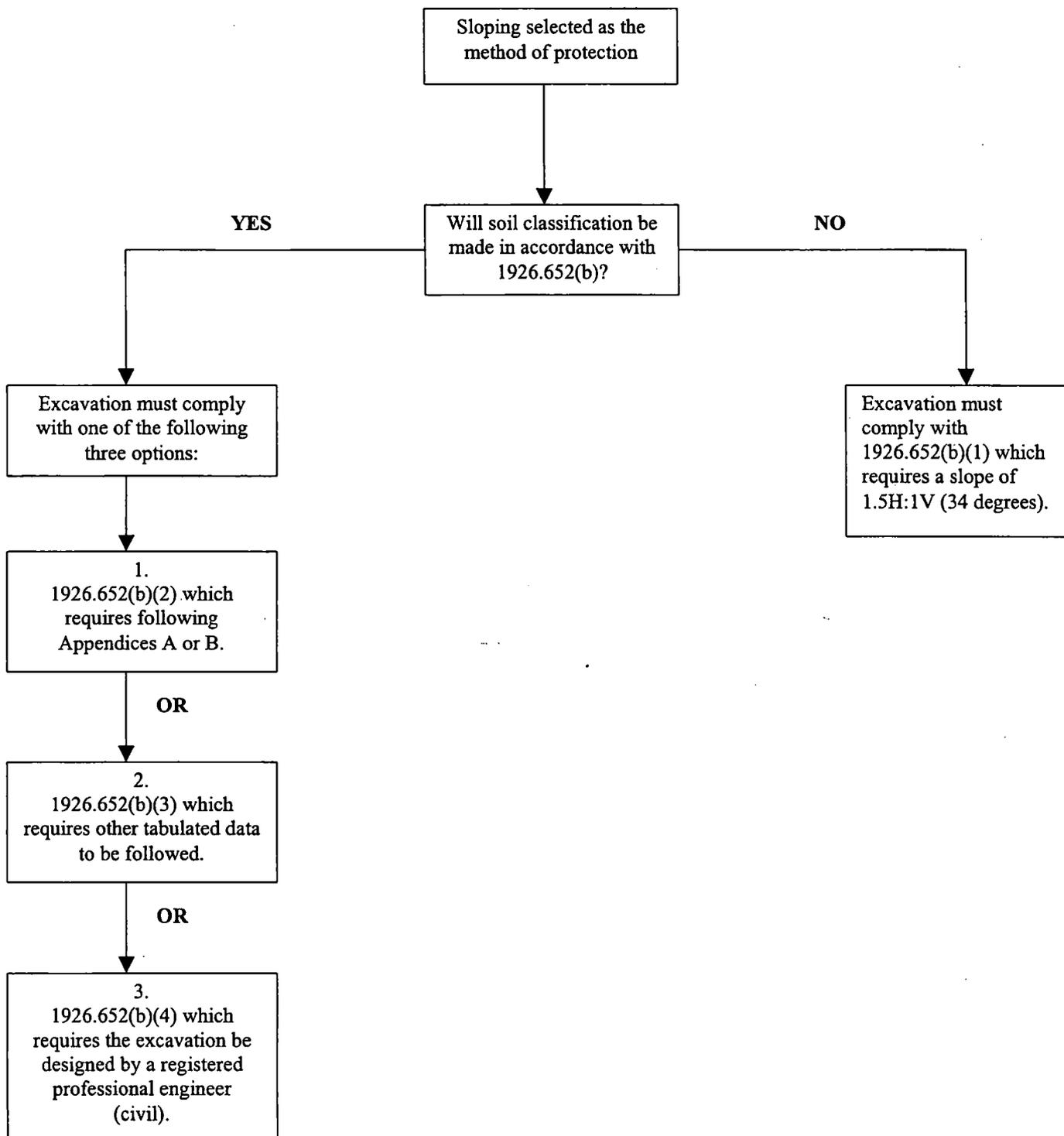
**SELECTION OF PROTECTIVE SYSTEMS FOR EXCAVATIONS  
20 FEET OR LESS IN DEPTH**



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

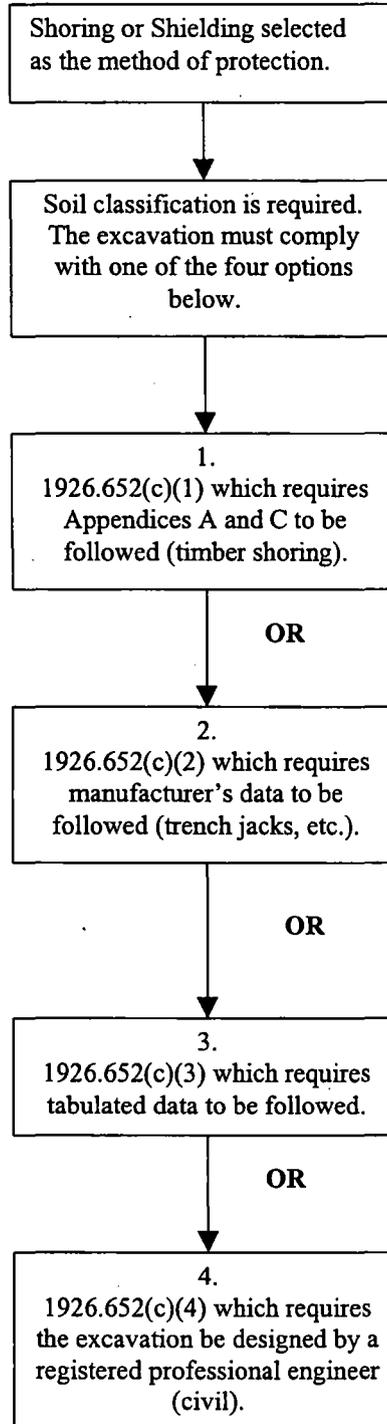
**ATTACHMENT 3**

**SLOPING OPTIONS**



**ATTACHMENT 4**

**SHORING OR SHIELDING OPTIONS**



**ATTACHMENT 5****UTILITY LOCATION SERVICES**

<b>ALABAMA</b>	Alabama One Call	1-800-292-8525
<b>ALASKA</b>	Locate Call Center of Alaska, Inc.	1-907-278-3121
<b>ARIZONA</b>	Arizona Blue Stake, Inc.	1-602-263-1100
<b>ARKANSAS</b>	Arkansas One Call System, Inc.	1-800-482-8998
<b>CALIFORNIA</b>	Underground Service Alert North	1-800-422-4133
	Underground Service Alert South	1-800-422-4133
<b>COLORADO</b>	Utility Notification Center of Colorado	1-800-922-1987
<b>CONNECTICUT</b>	Call Before You Dig	1-800-922-4455
<b>DELAWARE</b>	Miss Utility of Delmarva	1-800-282-8555
<b>FLORIDA</b>	Sunshine State One Call of Florida, Inc.	1-800-432-4770
<b>GEORGIA</b>	Utilities Protection Center, Inc.	1-800-282-7411
<b>HAWAII</b>	Hawaii One-Call	1-800-227-2600
<b>IDAHO</b>	Dig Line	1-800-342-1585
	Palouse Empire Undrgrnd Crd. Cncl.	1-800-822-1974
	Kootenai County Utility Coord. Cncl.	1-800-428-4950
	Utilities Underground Location Center	1-800-424-5555
	One Call Concepts – Idaho	1-800-626-4950
	Shoshone county One Call	1-800-398-3285
<b>ILLINOIS</b>	Julie, Inc.	1-800-892-0123
	Chicago: Digger	1-312-744-7000
<b>INDIANA</b>	Indiana Underground Plant Prototection Service. Inc.	1-800-382-5544
<b>IOWA</b>	Underground Plant Loc. Service, Inc.	1-800-292-8989
<b>KANSAS</b>	Kansas One Call Center	1-800-DIG-SAFE

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<b>KENTUCKY</b>	Kentucky Underground Protec., Inc.	1-800-752-6007
<b>LOUISIANA</b>	Louisiana One Call	1-800-272-3020
<b>MAINE</b>	Dig Safe - Maine	1-888-344-7233
<b>MARYLAND</b>	Miss Utility of Delmarva Miss Utility	1-800-282-8555 1-800-257-7777
<b>MASSACHUSETTS</b>	Dig Safe - Massachusetts	1-888-344-7233
<b>MICHIGAN</b>	MISS DIG System Inc	1-800-482-7171
<b>MINNESOTA</b>	Gopher State One Call	1-800-252-1166
<b>MISSISSIPPI</b>	Mississippi One Call System, Inc.	1-800-227-6477
<b>MISSOURI</b>	Missouri One Call System, Inc.	1-800-344-7483
<b>MONTANA</b>	Utilities Underground Loc. Center Montana One Call	1-800-424-5555 1-800-551-8344
<b>NEBRASKA</b>	Diggers Hotline of Nebraska	1-800-331-5666
<b>NEVADA</b>	Underground Service Alert of NV	1-800-227-2600
<b>NEW HAMPSHIRE</b>	Dig Safe - New Hampshire	1-888-344-7233
<b>NEW JERSEY</b>	Garden State Undrgrnd. Plnt. Loc. Ser.	1-800-272-1000
<b>NEW MEXICO</b>	New Mexico One Call system, Inc.	1-800-321-ALERT
<b>NEW YORK</b>	Dig Safely New York New York City - Long Island One Call Center	1-800-962-7962 1-800-272-4480
<b>NORTH CAROLINA</b>	North Carolina One-Call Center	1-800-632-4949
<b>NORTH DAKOTA</b>	Utilities Underground Location Center	1-800-795-0555
<b>OHIO</b>	Ohio Utilities Protection Service	1-800-362-2764
<b>OKLAHOMA</b>	Call Okie	1-800-522-6543

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<b>OREGON</b>	Utility's Underground Location Center	1-800-424-5555	
	Douglas Utility's Coordinating Council	1-503-673-6676	
	Josephine Utility's Coord Council	1-503-476-6676	
	Utility's Notification Center	1-800-332-2344	
	Rogue Basin Utility Coord Council	1-503-779-6676	
<b>PENNSYLVANIA</b>	Pennsylvania One Call System, Inc.	1-800-242-1776	
<b>RHODE ISLAND</b>	Dig Safe - Rhode Island	1-888-344-7233	
<b>SOUTH CAROLINA</b>	Palmetto Utility Protection Srvc Inc.	1-800-922-0983	
<b>SOUTH DAKOTA</b>	South Dakota One Call	1-800-781-7474	
<b>TENNESSEE</b>	Tennessee One Call System	1-800-351-1111	
<b>TEXAS</b>	Lone Star Notification Center	1-800-669-8344	
	Texas Excavation Safety System	1-800-344-8377	
	Texas One Call system	1-800-245-4545	
<b>UTAH</b>	Blue Stakes of Utah Utility Notification	1-800-662-4111	
<b>VERMONT</b>	Dig Safe - Vermont	1-888-344-7233	
<b>VIRGINIA</b>	Miss Utility of Virginia	1-800-552-7001	
	Miss Utility of Northern Virginia	1-800-257-7777	
<b>WASHINGTON</b>	Utilities Notification Center	1-800-332-2344	
	Grays Harbor & Pacific County Utility Coordinating Council	1-206-532-3550	
	Utilities Underground Location Center	1-800-424-5555	
	Chelan-Douglas Utility Coord Council	1-509-663-6111	
	Upper Yakima County Underground Utilities Council	1-800-553-4344	
	Inland Empire Utility Coord. Council	1-509-456-8000	
	Utilities Council of Cowlitz County	1-360-425-2506	
	Palouse Empire Utility Cord. Council	1-800-822-1974	
	<b>WASHINGTON, DISTRICT OF COLUMBIA</b>	Miss Utility	1-800-257-7777

<b>WEST VIRGINIA</b>	Miss Utility of West Virginia, Inc.	1-800-245-4848
<b>WISCONSIN</b>	Diggers Hotline, Inc.	1-800-242-8511
<b>WYOMING</b>	Wyoming One-Call Call Before You Dig Of Wyoming	1-800-348-1030 1-800-849-2476
<b>CANADA</b>	Alberta: Alberta One-Call Location Corp. British Columbia: BC One Call Ontario: Ontario One Call Ltd Quebec:Info-Excavation	1-800-242-3447 1-800-474-6886 1-800-400-2255 or 905-709-1717 1-800-663-9228
<b>AUSTRALIA</b>	Dial Before You Dig 1100	1100

Note: Many of the above utility location services can be accessed via their website by following the appropriate links at [www.underspace.com/refs/ocdir.htm](http://www.underspace.com/refs/ocdir.htm).

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

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**TOLTEST, INC.**



**APPENDIX F**  
**ACTIVITY HAZARD ANALYSES**

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### ACTIVITY HAZARD ANALYSIS

ACTIVITY Site Preparation/Layout ANALYZED BY/DATE K. Mander 04/03 REVIEWED BY/DATE R. Barcum 04/03

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Site walk through  Identification of work zones for construction activities	<ol style="list-style-type: none"><li>1. Exposure to irritant and toxic plants such as poison ivy and sticker bushes may cause allergic reactions.</li><li>2. Surfaces covered with heavy vegetation and undergrowth create a tripping hazard.</li><li>3. Back strain due to carrying instruments.</li><li>4. Native wildlife such as rodents, ticks, and snakes present the possibility of insect bites and associated diseases such as Lyme disease.</li><li>5. Driving vehicles on uneven or unsafe surfaces can result in incidents such as overturned vehicles or flat tires.</li><li>6. Electrical hazard due to fallen lines.</li><li>7. Thermal stress due to hot/cold temperature extremes.</li></ol>	<ol style="list-style-type: none"><li>1. Wear long sleeved clothing and slacks to minimize contact with irritant and toxic plants and to protect against insect bites. Appropriate first aid for personnel's known allergic reactions.</li><li>2. Be alert and observe terrain while walking to minimize slips and falls. Steel-toed boots provide additional support and stability.</li><li>3. Use proper lifting techniques to prevent back strain.</li><li>4. Avoid wildlife when possible. In case of an animal bite, perform first aid and capture the animal, if possible, for rabies testing. Perform a tick check after leaving a wooded or vegetated area.</li><li>5. Ensure all maintenance is performed on vehicles before going to the field. Site surveillance on foot might be required to choose clear driving paths.</li><li>6. Ensure fallen power lines are not energized.</li><li>7. Implement thermal stress management techniques such as shifting work hours, fluid intake, and monitoring employees, especially high risk</li></ol>
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
		<ol style="list-style-type: none"><li>1. Review hazard analysis with personnel performing the site walk through prior to start</li></ol>



**ACTIVITY HAZARD ANALYSIS**

ACTIVITY Soil Excavation ANALYZED BY/DATE K. Mander 04/03 REVIEWED BY/DATE J. Tinney 04/03

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavation	1. Exposure to airborne contaminants released during intrusive activities. 2. Sides of excavation can cave in. Possible burying or crushing of workers due to 1) absence of shoring, 2) misjudgment of stability, 3) defective shoring, and/or 4) undercut sides. 3. Falling during access/egress or while monitoring or dismounting equipment, or stumbling into excavation. 4. Congested work area due to too many workers in a small area. 5. Existing utilities.	1. Monitor for airborne contaminants, wear PPE as appropriate. 2. Regularly inspect trenches for conditions. 3. Provide adequate shoring or sloping of sides of the excavation ** See Appendix H. 4. Provide an adequate barrier around open pits. Material from pit must be placed away from edge to prevent cave ins and instability of pit. 5. To prevent overexertion, limit manual lifting and emphasize mechanical means where practical. 6. Maintain ample workroom between workers. 7. Find and mark utilities before excavating utilizing the Joint Utility Locating Information for Excavators (JULIE) service 72 hours prior to excavation activities. Use care while excavating, shore existing utilities crossing excavation area. Watch for overhead lines. 8. Check the performance of JULIE locate prior to digging.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
1. Backhoe	Daily, prior to use per manufacturer's recommendations, Fill our Safety Inspection Checklist	OSHA 1910.120 40-hr. training, 3 day OJT, 8 hr. Supervisory, 8 hr. refresher, OSHA Hazard Communication, Respirator and operator training
2. Rolloff Boxes	Use of assistive climbing equipment when covering or placing tarp on box	
3. PPE	Use of particulate filter/VOC breathing PPE as needed.	Lead Hazard Awareness, OSHA 1910.120 40-hr. training, 3 day OJT, 8 hr. Supervisory, 8 hr. refresher, OSHA Hazard Communication, Respirator and operator training



**ACTIVITY HAZARD ANALYSIS**

ACTIVITY Backfill & Site Restoration ANALYZED BY/DATE K. Mander 04/03 REVIEWED BY/DATE R. Barcum 04/03

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>Backfill excavation</p> <p>Compact backfill, subgrade base</p> <p>Asphalt</p>	<ol style="list-style-type: none"> <li>1. Noise levels exceeding the OSHA PEL of 85 dBs are both a hazard and a hindrance to communication.</li> <li>2. Carbon monoxide from the heavy equipment.</li> <li>3. Overhead utility wires, i.e., electrical and telephone, can be hazardous when the dump truck bed is in the upright position.</li> <li>4. Falling backfill material from dump truck may cause injury.</li> <li>5. Moving the equipment over uneven terrain may cause the vehicle to roll over or get stuck in a rut or mud. Be aware of hazards associated with moving heavy machinery and other associated injury.</li> <li>6. High-pressure hydraulic lines and airlines used on heavy equipment are hazardous when they are in ill repair or incorrectly assembled.</li> <li>7. Heat/contact hazards for asphalt and asphalt placement equipment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ear muffs or earplugs effectively reduce noise levels.</li> <li>2. Review the contaminants suspected to be on-site and perform air monitoring as required. Shut down equipment and/or divert exhaust fumes.</li> <li>3. All chains, lines, cables shall be inspected daily for weak spots.</li> <li>4. Hard hats shall be worn at all times when working around heavy equipment.</li> <li>5. Secure loose clothing.</li> <li>6. To avoid contact with any overhead lines, the truck bed shall be lowered prior to moving the truck. Overhead utilities shall be considered "live" until determined otherwise.</li> <li>7. The truck bed should not be erected within 10 feet of an overhead electrical line until the line is de-energized, grounded, or shielded and an electrician has certified that arcing cannot occur.</li> <li>8. All high-pressure lines shall be checked prior to and during use.</li> <li>9. Maintain a safe distance from moving equipment.</li> <li>10. Maintain a safe distance from hot asphalt placement equipment. Wear appropriate clothing and boots if working with hot asphalt.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>INSPECTION REQUIREMENTS</b>	<b>TRAINING REQUIREMENTS</b>
1. Backhoe	Daily, prior to use per manufacturer's recommendations, Fill our Safety Inspection Checklist	OSHA 1910.120 40-hr. training, 3 day OJT, 8 hr. Supervisory, 8 hr. refresher, OSHA Hazard Communication, Respirator and operator training
2. Compactor / Roller	Daily, prior to use per manufacturer's recommendations, Fill our Safety Inspection Checklist	OSHA 1910.120 40-hr. training, 3 day OJT, 8 hr. Supervisory, 8 hr. refresher, OSHA Hazard Communication, Respirator and operator training
3. Dump truck	Upon arrival at site, check for proper operation.	Subcontractor activity.
4. Asphalt Equipment	Upon arrival at site, check for proper operation. Only trained personnel shall conduct asphalt work.	Subcontractor activity.



**ACTIVITY HAZARD ANALYSIS**

ACTIVITY Equipment Decontamination ANALYZED BY/DATE K. Mander 04/03 REVIEWED BY/DATE R. Barcum 04/03

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>Decontaminate Heavy Equipment Using High Pressure Wash or Hand Scrubbing</p> <p>Decontaminate Sampling Equipment by Hand Washing</p>	<ol style="list-style-type: none"> <li>1. Contact with contaminated material, inhalation of airborne aerosols, contact with high-pressure wash stream, unexpected movement of material to be decontaminated.</li> <li>2. Contact with decon solution.</li> </ol>	<ol style="list-style-type: none"> <li>1. Decontamination area to provide isolation and controlled access.</li> <li>2. Level D PPE with face shield. Secure items to be decontaminated. Visually inspect integrity of containment liners and containers used for wastewater. CRZ provided for worker decontamination.</li> <li>3. MSDSs obtained and reviewed for all cleaning solution chemicals.</li> </ol>
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<p>Soap solution, deionized water rinse, scrub brushes.</p>	<p>Use general safety rules and procedures listed in HASP, review manufacturer's recommendation and guidance on inspection of equipment. Complete on daily basis.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory, 8 hour Refresher, HASP, OSHA Hazard Communication and Respirator training.</p>

Soil Remediation Work Plan & Health and Safety Plan  
Petroleum-Contaminated Soil Remediation  
Naval Air Station Detroit, Detroit, Michigan  
EJOC No. N689500-00-D-0200, DO 0078  
TolTest Project No. 73736.01  
April 2004

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**TOLTEST**, INC.



**APPENDIX G**  
**HOSPITAL DIRECTIONS**

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Business Details

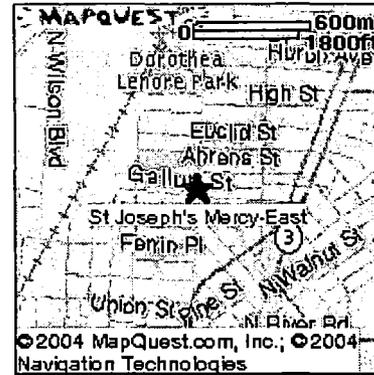
Close Window

**St Joseph's Mercy-East**

Average Rating: Not Rated

215 North Ave  
Mt Clemens, MI 48043

Main Phone: 586-466-9300  
Fax: 586-263-2614



**Additional Information**

**This Listing Appears in These Categories:**

- Hospitals
- (All) Clinics
- Doctors-Emergency Service
- Clinics-Emergency
- Hospitals-General Medical/Surgical

**Ratings & Reviews**

Average Rating: Not Rated (based on 0 ratings)

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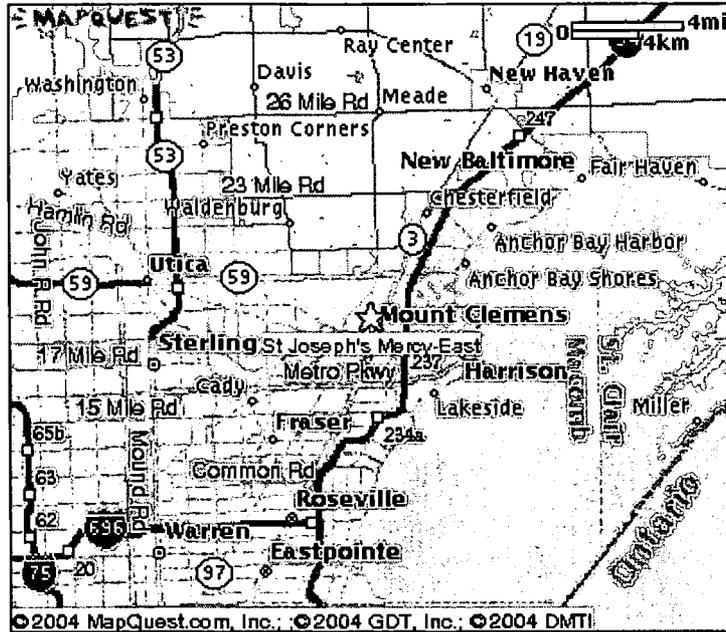
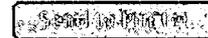




Map Details

Close Window

**St Joseph's Mercy-East**  
215 North Ave  
Mt Clemens, MI 48043  
586-466-9300



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