USPCI, INC.
Remedial Services

A

HEALTH, SAFETY AND WORK PLAN

for

UP/UST

by

U.S. POLLUTION CONTROL, INC.
8250 SOUTH AKRON, SUITE 203
ENGLEWOOD, COLORADO 80112
(303) 799-4142

July 31, 1989

USPCI, Inc.
8250 South Akron, Suite 203
Englewood, Colorado 80112
(303) 799-4142

Table of Contents

1.0 HEALTH AND SAFETY

1.1 INTRODUCTION

The personal health and safety of all employees, USPCI, Union Pacific, any contractors or subcontractors, involved in the Union Pacific tank excavation Project is of particular concern to USPCI management. Therefore, all prudent and reasonable measures will be taken to establish and maintain safe and healthy working conditions.

This Health and Safety Plan identifies the potential hazards associated with the project and the actions which will be taken to minimize or eliminate these hazards (i.e., engineering controls, use of personal protective equipment, training, etc.). However, this plan will be reviewed throughout each stage of the project and modified or added to as necessary. All on-site workers will be trained from this and any modified Health and Safety plans.

Although every effort was made to develop a plan that was as comprehensive and detailed as possible, conditions may change once the project is initiated which warrant modification of this plan. Modification of the plan will be the responsibility of the USPCI Project Manager. Substantial changes will be reviewed and approved by USPCI's Certified Industrial Hygienist.

Although it is hoped that the U.P./U.S.T. Project will not require them, an Accident Prevention Plan and Emergency Response Plan are provided in this document.

1.2 PROJECT DESCRIPTION

This project consists of the removal of petroleum underground storage tanks along the UPRR line in the states of Washington, Oregon, Idaho, Utah, Wyoming, Colorado, Nebraska, and Kansas. The following is a brief description of how a tank removal will proceed.

All liquids will be removed from the tank by UPRR employees. In the event that this is not possible USPCI will sample the tank liquids to assess the suitability of the material for recycling. Liquids will be removed with an air-diaphragm pump or vacuum truck.

Most tanks will be well away from any active tracks. In the event that any tanks are within 20 feet of active tracks UPRR will provide a flagman to maintain safe working conditions around the trac[illegible]

Prior to excavation underground lines and tanks will be located using site maps, utility and generator information, and line locators. Site control zones will be established as described below in section 1.4.1 The top of the tank will be exposed with soil stockpiled at least two feet from the excavation. Throughout the work, the atmosphere in and around the excavation will be monitored for the presence of hydrocarbon vapor using a combustible gas meter, (the safe working level being 10% of the L.E.L.) colorimetric tubes, and photoionization. Once the tank is exposed all tank fixtures and pipes will be removed. Hydrocarbon reacting putty will be used to determine liquid tank contents. Also a Foxboro Gas Chromtograph will be used to monitor air in the tank to help determine the tank contents. If the tank contents cannot be determined then activity at the site will halt. A sample of existing material will be analyzed to determine the contents of the tank. When this is determined activity will resume. All lines will be plugged with concrete or removed as appropriate. Flammable vapors will be temporarily purged from the tank by adding dry ice (See section 1.4.7). The tank will be tested continuously (6 inches from the bottom to the top) with the combustible gas meter and when readings at 10% of the LEL are achieved the tank will be considered safe for removal from the ground. All tanks will be purged regardless of LEL levels. ✓ Or ?

The tank will be lifted out of the excavation with nylon straps with high strength ratings. A 1/8" vent hole will remain open to prevent excess differential pressure. The tank will be lifted with the excavator or a crane. During all lifting personnel shall stay well away from the tank. The tank will be secured on the surface with blocks and clearly labeled as described in section 1.4.8.3. The excavation will be sampled using the excavator bucket. No one will enter the excavation unless absolutely necessary and the proper side slope protection is in place. Once the excavation is clean it will be backfilled using the excavator. If the excavation must remain open and cannot be continuously attended by USPCI employees then a temporary fence will be erected around the excavation. Clean Backfill?

The tank will be transported to a central location where it will be cut up for disposal and scrap. This procedure will be performed by an approved USPCI subcontractor. No hot work is to be allowed by any USPCI employee, hot work includes any activity which may generate heat; welding, cutting, brazing, drilling, using saws, etc. Man. tested as haz waste?

If contaminated soil is found it will be removed and stockpiled separately from clean soil. The photovac PID will be used to monitor the atmosphere in the breathing zone. A consistent reading of 200ppm over a 15 minute period will be the action level at which PPE will be upgraded to Level C. A consistent reading of 1000ppm over a 15 minute period will be

the action level at which PPE will be upgraded to Level B.

1.3 POTENTIAL HAZARDS

The hazards associated with the Union Pacific underground storage tank (UST) excavation include exposure to potentially toxic materials, noise, heavy equipment operation, contact with underground structures, buried high pressure lines, heat stress, excavations, product removal, purging, tank extraction and tank transportation.

1.3.1 Potentially Toxic Materials

Materials that were placed in these UST's are reported to include gasoline (leaded and unleaded) diesel and waste oil, (see MSDS sheets Appendix K) other materials may be present.

1.3.2 Noise

Noise levels created by heavy equipment will likely exceed USPCI's health and safety standard of 85 dBA (the OSHA PEL is 90 dBA). Noise induced hearing loss is a major concern and will be protected against.

1.3.3 Heavy Equipment

Off-road operation of equipment involves special hazards and requires special training and safety measures. Where mobile and heavy equipment is in use, the potential for workers being struck or run over exists. Collisions with structures or other vehicles is also possible and servicing and maintenance can be hazardous. Care will be taken to avoid overhead power lines.

1.3.4 Underground Structures/Materials

Excavations of items or substances of unknown origin is potentially the most dangerous situation. Underground utilities are a real hazard on each side.

1.3.5 Heat Stress

Should temperatures frequently exceed 75 degrees F, during the project, heat stress will be a major concern. All employees in protective clothing, particularly those performing heavy manual labor, will be subject to dehydration, heat rash, cramps, and possibly heat stress and heat stroke.

Heat rash is caused by continuous exposure to heat and humid air and aggravated by chafing clothes. The condition decreases ability to tolerate heat and is very uncomfortable.

Heat cramps are caused by profuse sweating that is not balanced with adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke. The symptoms are acute painful spasms of certain voluntary muscles, particularly the abdomen and extremities.

Heat exhaustion is a state of very definite weakness or exhaustion caused by significant loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated. The symptoms of heat exhaustion include pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

Heat stroke is the most serious health problem that can develop from heat exposure. At this state the body's temperature regulation system has failed and sweating stops completely. There may be little warning that the crisis stage has been reached. Unless recognized and treated promptly victims of heat stroke can suffer permanent brain damage or die.

Heat stroke victims have hot, dry and usually red or spotted skin. Their body temperatures hit 105 F or higher and rising. They often suffer from confusion, convulsions, delirium and finally unconsciousness.

1.3.6 **Excavations**

Excavations greater than four feet in depth pose slide and cave-in hazards. Excavations also create hazards by restricting the work area (enclosed space) and by possibly creating a confined space situation if gaseous conditions (seepage into the excavation from nearby gas lines, sewage lines, etc.) exist. Tripping/falling hazards are also created for employees working above the excavation.

1.3.7 **Product Removal**

Product removal can create hazards through improper grounding and ignition sources located in the vicinity of product removal.

1.3.8 **Purging**

Prior to extracting the UST from the excavation the tank must be purged to where the LEL is below 10%. All tanks will be purged regardless of LEL levels. Improper purging techniques can lead to explosion hazards.

1.3.9 Tank Extractions

Extracting the UST from the excavation can pose hazards through improper strap attachments, insecure hookups and utilizing under powered equipment for extraction.

1.3.10 Tank Transportation

In many cases these UST's will require transportation to a centralized location prior to demolition. Before the tank is removed from the site the tank atmosphere should not exceed 10% LEL. If the tank's atmosphere exceeds 10% LEL explosion hazards may be present.

1.4 ENGINEERING CONTROLS

To eliminate or reduce exposure to potential hazards, the following engineering controls will be implemented:

1.4.1 Work Zones

- Three work zones; an Exclusion Zone, Contaminant Reduction Zone and Support Zone will be established at the work site.
- The Exclusion Zone shall be the area of contamination. Within the Exclusion Zone shall be the excavation areas; potentially the area of greatest contamination.
- The Contaminant Reduction Zone is a transition zone. It is where personnel and equipment decontamination takes place. It shall be restricted access and minimally contaminated, if at all.
- The Support Zone shall be where administrative and support facilities are located. It shall be restricted access but not considered contaminated.
- Employees shall not be permitted to eat, drink or smoke in contaminated areas. All lighters, matches, and cigarettes shall be left in the support zone.

1.4.2 Noise

- Noise sources (compressors, generators, etc.) will be located away from the immediate work area, whenever possible.
- Mobil equipment will have enclosed cabs.

1.4.3 Underground Structures/Materials

- Buried structures and various lines may be encountered. Prior to beginning excavation line locators and metal detectors will be utilized.

1.4.4 Heavy Equipment Operations

- All trucks and heavy equipment will be equipped with backup alarms. Roll-over protection and machine guards will be in place on heavy equipment.
- Mobile equipment will operate at slow speeds and workers will make eye contact with equipment operators prior to entering the equipment's work zone. Hand signals will be used where appropriate.
- Operators shall never vacate equipment with the motor running.

1.4.5 Heat Stress

- To reduce the possibility of heat stress, water will be provided and employees will be instructed to drink copious amounts.
- Frequent breaks or cool-down periods will be mandatory and a shaded area will be constructed near the work area for such breaks.

1.4.6 Excavations

- Excavation hazards will be minimized by maintaining the angle of repose and shoring when necessary (see Appendix B).
- The excavated area will be demarcated by a fence at all times.
- Monitoring will be conducted to determine atmospheric conditions in all excavations (see Monitoring Section).
- If possible, all work will be performed with equipment (track hoe, etc.) from outside the excavation.
- If workers must enter excavations, a sloped entrance will be constructed for personnel entry and exit and a support system (shoring or bracing) will be used.
- Excavated materials will be placed two feet or more from the edge of the excavation if employees are entering the excavation.
- Equipment operating distances from excavations shall depend on ground conditions. If necessary, signalmen shall be provided to direct equipment operators.
- The Project Manager will continuously monitor the stability of the excavation and take into consideration the effects of time on the shoring.

1.4.7 Product Removal

The following criteria have been established to reduce hazards from the product removal operation. Either a vacuum truck or diaphragm pump will be utilized and both have the same criteria.

- The vacuum truck or diaphragm pump will be properly grounded to the tank to reduce the hazard of static electricity build up.
- Proper grounding techniques are to run a highly conductive wire or cable from the metal frame work of the truck or pump and attach it to the tank being worked on.
- A (approximately) 1 1/4" diameter, flat bottom suction tube with NO holes will be used to remove as much product from the tank as possible.
- The vacuum truck or diaphragm pump will park upwind from the tank to keep vapors away from the truck and truck motor.
- The vacuum truck or diaphragm pump will have sufficient hose available to remove the truck from explosive vapors. These vapors will be measured during the operation by a combustible gas detector with built in alarm.
- Only non-sparking tools will be used when working inside or around the tank.
- All source of ignition in the tank or in the vicinity of the tank will be eliminated.
- The hydrocarbon in air concentration will be continuously monitored throughout the residue removal process using a combustible gas detector with a built in alarm system.

1.4.8 **Purging/Cleaning**

Flammable vapors will be temporarily removed from the tank atmosphere by purging with dry ice. All tanks will be purged regardless of LEL levels. All vapors will be vented through the vent line in the tank and additional piping as necessary so that vapors are vented 12 feet above grade and 3 feet above any adjacent roof lines. The work area shall remain free of all ignition sources during purges.

Dry ice will be added to the tank at the rate of 3.0 pounds of dry ice per 100 gallons of tank capacity. The dry ice will be crushed into quarter sized pieces and distributed as evenly as possible over the tank to promote rapid evaporation. Care will be taken to prevent skin contact with the dry ice. Dry ice will be handled with heavy leather gloves at a minimum. If extended handling time is required cotton liners will be added for insulation. Monitoring shall be continuous after one hour of dry ice evaporation and the tank and work area must have a L.E.L. of 10% or below before continuing with the removal.

1.4.8.1 **Dry Ice Criteria**

Dry ice is suitable to purge the following tanks:

- Tanks up to 500 gallons with one central vent pipe.
- Tanks with a manway or minimum of two (2) access pipes spread over the tank.

Tanks not meeting this criteria must be purged with USPCI industrial hygienist approval. The reason for this criteria is to get even distribution of the dry ice across the tank.

1.4.8.2 **Water Criteria**

Water can be used to float sludge or scale in the tank allowing a vacuum truck to clean the tank more efficiently, thus reducing residue in the tank. However water is **NOT** a proper purging technique and must always be followed with dry ice purging.

1.4.9 **Tank Extraction**

Extraction criteria is as follows:

- Nylon straps will be utilized to extract the tanks. The straps change color with excessive wear and will be replaced when the change occurs. Tanks will not be lifted by pipes, lift hooks, manways, domes, etc.
- The straps will be wrapped completely around both ends of tanks and snubbed to prevent slippage.
- A spreader will be hooked to both straps to form one single lifting point. A spreader "bar" will **NOT** be used.
- Straps will be inspected prior to each lift to ensure strength ratings, proper working condition, and utilizing approved working clevices.
- The USPCI supplied 416 backhoe can lift approximately up to a 2000 gallon empty tank. When the lifting limit has been exceeded either a crane or larger hoe will be used.
- A free lift of the tank is preferable. Tanks will be drug out as a last resort. If this occurs a smooth spark free ramp will be built.

1.4.10 **Tank Transportation**

The transportation criteria is as follows:

- Prior to transportation, all tanks will be inerted to L.E.L. levels below 10%. This inerting process will accommodate a four hour haul and the four hours starts upon purging. If hauls greater than four hours are required the tank must be inerted again.
- A 1/8" vent hole will remain open to prevent excess differential pressure.

1.4.11 **Inspections/Notifications**

1.4.11.1 **Nylon Straps**

Nylon straps will be used to extract the tanks. Inspections

will take place before they are used. These inspections will entail checking for frayed straps, broken hooks, and missing hook pins.

1.4.11.2 Regulatory Notification

Prior to the removal of the tank, permits will be obtained from the local fire department. In the event that contaminated soil is encountered the appropriate agencies will be notified within 24 hours. If possible all additional contaminated soil will be excavated, and a site closure report will be submitted to the state. If there is more contamination than can easily and quickly removed and/or there is threat of groundwater contamination the excavation will be lined with visqueen and backfilled. An investigation work plan will be developed and submitted to the state. An initial abatement will also be submitted within 45 days of the initial notification. In the event that no soil contamination is detected a site closure report will be submitted to the state within 30 days of tank removal.

1.4.11.3 Inspections Before Shipping Tanks

Prior to transporting the tank the atmosphere will be checked, and it will not be moved until it is below 10% of the LEL. And all free liquids are removed labels will be applied to the tank. It will state the former contents and current vapor state including removal date. The label will be two inches high and will including the following:

TANK HAS CONTAINED LEADED GASOLINE
LEAD VAPORS MAY BE RELEASED IF HEAT IS APPLIED TO THE SHELL

- OR -

TANK HAS CONTAINED LEADED GASOLINE*
NOT VAPOR FREE
NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS INTENDED FOR HUMAN OR ANIMAL CONSUMPTION
DATE OF REMOVAL: MONTH/DAY/YEAR

*Or other flammable/combustible liquid

1.5 MONITORING

To verify that the engineering controls implemented are adequate, the following types of monitoring will be conducted. All Monitoring devices will be calibrated at the recommended schedule and the records of calibration will be maintained.

The calibration schedule is daily for P.I.D. and weekly for the Gastech. In addition, environmental changes such as altitude or humidity will also require a recalibration. Any dropping or abuse of equipment also requires recalibration.

Testing will be done immediately prior to any work activity, and after any change in working conditions i.e. environmental changes, physical changes. Testing will be performed by personnel thoroughly trained in proper operation of the equipment, and monitoring will be done in the tank atmosphere and not in the fill pipes.

1.5.1 Combustible Gas/Oxygen Monitoring

The monitoring equipment will be a Gastech 1214s meter with built in alarm system.

Throughout all work activity, a combustible gas/oxygen monitor will be used to verify that flammable conditions do not exceed 10 percent hydrocarbon vapor by volume in air. The Gastech is also an oxygen meter and will be used to assess oxygen concentration in the tank and work area. When readings of 10% or less of the lower explosion limit (LEL) exist, the tank will be considered safe for removal from the ground.

O. F. D. Jurisdiction, <10% LEL + O_2

The meter will be calibrated to hexane which will allow a direct one to one correlation with gasoline. To receive proper LEL % readings for diesel, the LEL reading off of the Gastech will be multiplied by two (2.0). One (1) foot increments will be marked on Gastech tubing to determine depth of monitoring in tank. Monitoring will start at 6" from the bottom of tanks and will be done continuously throughout the tank. A non sparking rod will be used to verify that the tank atmosphere, and not a fill pipe, is being monitored.

1.5.2 Colorimetric Tube Monitoring

Also throughout excavation activity and soil sampling, monitoring with colorimetric tubes will be conducted. Tubes used will be those designed to detect the contaminants thought to be present in the highest concentrations and/or are potentially the most toxic; i.e. benzene toluene or xylene.

1.5.3 Photoionization Monitoring

In order to expand capabilities of detecting contaminants, photoionization instruments will be operated almost continuously during excavation activities.

1.5.4 Foxboro Gas Chromatograph

Air monitoring or head space of UST's will be done with the Foxboro Gas Chromatograph to help determine tank contents. Data received will be compared with laboratory data for this analysis. If tank contents cannot be determined additional analysis will be necessary.

1.5.5. Exposure Risks

The photvac tip will be used to determine the exposure risks to employees working around the excavation. A consistent reading of 200ppm or greater for 15 minutes in the breathing zone will be cause for upgrading to level C PPE. A consistent reading of 1000ppm or greater for 15 minutes in the breathing zone will be cause for upgrading to level B PPE.

1.6 PERSONAL PROTECTIVE EQUIPMENT

The following sections detail the respiratory protection, protective clothing, and other personal protective equipment which will be used.

1.6.1 Personal Protection According to Work Activities

During all phases of this project personal protective equipment, at a minimum, will include steel toed boots, safety glasses and hard hats.

1.6.1.1 Locating UST's

Interviewing Union Pacific employees and studying Union Pacific's supplied maps of the areas, in most cases, should allow USPCI employees to locate UST's. If the tanks cannot be located, exploratory trenches will be dug until the tanks are located. Level "D" personal protective equipment will be utilized. This will consist of hard hats, safety glasses, steel toed boots and cotton uniforms. Since maps do not always show all piping or correct locations, extreme care will be used when locating UST's.

1.6.1.2 Sampling UST's

In cases where material is still in the UST's, a sample will be collected to determined if gasoline, diesel, oil or water are present. In the case of oil, chlorinated solvents and PCB's will be analyzed at a laboratory.

A glass sample rod or plastic bailer will be used to collect these samples.

Modified Level "D" personal protective equipment will be utilized. This will consist of saranex or chemrell coveralls, nitrile gloves and rubber-steel toed boots.

1.6.1.3 **Removing Liquids from the UST**

In the event that USPCI employees must remove remaining liquids from the UST, the flashpoint of the liquid will be measured. Also the suitability for recycling will be addressed by offsite analysis. Liquids to be recycled in quantity that justify a vacuum truck will be pumped directly into the truck. Small quantities will be pumped into drums. Liquids with a flashpoint below 140° F will be pumped with an air diaphragm pump.

Modified Level "C" personal protective equipment will be used during liquids removal. This will include MSA half or full face respirator with organic vapor cartridges, saranex coveralls, steel toed rubber boots, and nitrile gloves.

1.6.1.4 **Exposing the UST**

During excavation of the tanks Level "D" personal protective equipment will be utilized. If monitoring indicates the need for upgrading of personal protective equipment, Level "C" will be required. This will include donning MSA half face respirators with organic vapor cartridges, kleen guard coveralls, steel toed rubber boots, and nitrile gloves.

1.6.1.5 **Sludge Removal**

If any UST's unearthed are found to contain sludge, tank decontamination will be required.

Water will be pumped into the tank and vacuumed out to clean the tank.

If analytical results indicate the presence of lead, modified level "B" will be enforced.

This will consist of kleen guard coveralls, with exterior cotton coveralls. Self contained breathing apparatus with welding shield will serve for respiratory protection.

If lead is not present, MSA full face respirators with welding shield and organic vapor cartridges will be substituted for SCBA.

1.6.1.6 **Hearing Protection**

Hearing protection will be required while operating any heavy equipment or when working within twenty-five feet of such equipment while it is operating.

Hearing protection shall also be worn within twenty-five feet of operating generators or compressors.

1.7 **TRAINING/MEDICAL SURVEILLANCE**

All USPCI employees will receive the 40 hour OSHA training and will be an active participant in the USPCI medical surveillance program prior to working on this project.

1.8 **DAILY SAFETY MEETINGS**

USPCI will hold daily safety meetings before work begins each and every day to ensure safe operations.

1.9 ACKNOWLEDGEMENT

I acknowledge that I have read and understand the UP/UST Health and Safety Plan and will comply with the requirements of the Plan.

Date	Name	Social Security #	Signature

1.10 APPENDICES

APPENDIX A - TRENCH SHORING
APPENDIX B - SLOPE
APPENDIX C - RESPIRATOR FIT TEST
APPENDIX D - SAFETY TRAINING MANUAL
APPENDIX E - FIELD TRAINING DOCUMENT
APPENDIX F - TRAINING SESSIONS
APPENDIX G - SUPERVISOR'S REPORT OF ACCIDENT
APPENDIX H - WORKERS' COMPENSATION COURT (FORM #2)
APPENDIX I - WORKERS' COMPENSATION COURT (FORM #3)
APPENDIX J - API RECOMMENDED PRACTICE 1604
APPENDIX K - MSDS SHEETS
APPENDIX L - FOXBORO GAS CHROMATOGRAPH

TABLE C-1.2

TRENCH SHORING - MINIMUM TIMBER REQUIREMENTS FOR SOIL TYPE B (SEE NOTES)

ALL TIMBER SIZES ARE ACTUAL, NOT NOMINAL

DEPTH OF TRENCH (FEET)	SIZE AND SPACING OF MEMBERS													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZONTAL SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERTICAL SPACING (FEET)	SIZE (INCHES)	VERTICAL SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	2	3		
OVER 5 UP TO 10	UP TO 6	4x6	4x6	6x6	6x6	6x6	5	6x8	5			2x6		
	UP TO 8	6x6	6x6	6x6	6x8	6x8	5	8x10	5			2x6		
	UP TO 10	6x6	6x6	6x6	6x8	6x8	5	10x10	5			2x6		
	SEE NOTE 1.													
OVER 10 UP TO 15	UP TO 6	6x6	6x6	6x6	6x8	6x8	5	8x 8	5		2x6			
	UP TO 8	6x8	6x8	6x8	8x8	8x8	5	10x10	5		2x6			
	UP TO 10	8x8	8x8	8x8	8x8	8x10	5	10x12	5		2x6			
	SEE NOTE 1.													
OVER 15 UP TO 20	UP TO 6	6x8	6x8	6x8	8x8	8x 8	5	8x10	5	3x6				
	UP TO 8	8x8	8x8	8x8	8x8	8x10	5	10x12	5	3x6				
	UP TO 10	8x10	8x10	8x10	8x10	10x10	5	12x12	5	3x6				
	SEE NOTE 1.													
OVER 20	SEE NOTE 1.													

TABLE C-2.3

TRENCH SHORING - MINIMUM TIMBER REQUIREMENTS FOR SOIL TYPE C (SEE NOTE 3)

ALL TIMBER SIZES ARE ACTUAL, NOT NOMINAL

DEPTH OF TRENCH (FEET)	SIZE AND SPACING OF MEMBERS													
	CROSS BRACES							WALES		UPRIGHTS				
	HORIZONTAL SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERTICAL SPACING (FEET)	SIZE (INCHES)	VERTICAL SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET) (SEE NOTE 2.)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE				
OVER 5 UP TO 10	UP TO 6	6x8	6x8	6x8	8x8	8x8	5	8x10	5	2x6				
	UP TO 8	8x8	8x8	8x8	8x8	8x10	5	10x12	5	2x6				
	UP TO 10	8x10	8x10	8x10	8x10	10x10	5	12x12	5	2x6				
	SEE NOTE 1.													
OVER 10 UP TO 15	UP TO 6	8x8	8x8	8x8	8x8	8x10	5	10x12	5	2x6				
	UP TO 8	8x10	8x10	8x10	8x10	10x10	5	12x12	5	2x6				
	SEE NOTE 1.													
	SEE NOTE 1.													
OVER 15 UP TO 20	UP TO 6	8x10	8x10	8x10	8x10	10x10	5	12x12	5	3x6				
	SEE NOTE 1.													
	SEE NOTE 1.													
	SEE NOTE 1.													
OVER 20	SEE NOTE 1													

SOIL TYPE A
(SEE NOTES)

ALL TIMBER SIZES ARE ACTUAL, NOT NOMINAL

DEPTH OF TRENCH (FEET)	SIZE AND SPACING OF MEMBERS													
	CROSS BRACES						WALES		UPRIGHTS					
	HORIZONTAL SPACING (FEET)	WIDTH OF TRENCH (FEET)					VERTICAL SPACING (FEET)	SIZE (INCHES)	VERTICAL SPACING (FEET)	MAXIMUM ALLOWABLE HORIZONTAL SPACING (FEET)				
		UP TO 4	UP TO 6	UP TO 9	UP TO 12	UP TO 15				CLOSE	4	5	6	8
OVER 5 UP TO 10	UP TO 6	4x4	4x4	4x6	6x6	6x6	4	NOT REQUIRED	--				2x6	
	UP TO 8	4x4	4x4	4x6	6x6	6x6	4	NOT REQUIRED	--					2x8
	UP TO 10	4x6	4x6	6x6	6x6	6x6	4	8x8	4			2x6		
	UP TO 12	4x6	4x6	6x6	6x6	6x6	4	8x8	4				2x6	
OVER 10 UP TO 15	UP TO 6	4x4	4x4	4x6	6x6	6x6	4	NOT REQUIRED	--				3x8	
	UP TO 8	4x6	4x6	6x6	6x6	6x6	4	8x8	4		2x6			
	UP TO 10	6x6	6x6	6x6	6x8	6x8	4	8x10	4			2x6		
	UP TO 12	6x6	6x6	6x6	6x8	6x8	4	10x10	4				3x8	
OVER 15 UP TO 20	UP TO 8	6x6	6x6	6x6	6x8	6x8	4	8x8	4	3x6				
	UP TO 10	6x6	6x6	6x6	6x8	6x8	4	8x8	4	3x6				
	UP TO 12	8x8	8x8	8x8	8x8	8x10	4	8x10	4	3x6				
	UP TO 10	8x8	8x8	8x8	8x8	8x10	4	10x10	4	3x6				
	UP TO 12	8x8	8x8	8x8	8x8	8x10	4	10x10	4	3x6				
OVER 20	SEE NOTE 1.													

from the face of an excavation and striking or rolling down into the excavation.

(3) "Long term exposure" means a period of time that an excavation is open longer than 72 hours.

(4) "Maximum allowable slope" means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

(5) "Short term exposure" means a period of time less than or equal to 72 hours that an excavation is open.

(c) *Requirements.* (1) *Soil classification.* Soil and rock deposits shall be classified in accordance with Appendix A to Subpart P of Part 1926.

(2) *Maximum allowable slope.* The maximum allowable slope for a soil or rock deposit shall be determined from [illegible] of this Appendix.

(i) *Actual slope.* (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope when there are signs of distress. The slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from adjacent structures, stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved.

(4) *Configurations.* Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1.—MAXIMUM ALLOWABLE SLOPES

Soil or rock type	Maximum allowable slopes (H:V) [1]	
	Short-term exposure	Long-term exposure
Stable Rock	Vertical (90°)	Vertical (90°)
Type A (See footnote (2)).	1/2:1 (53°)	3/4:1 (53°)
Type B	3/4:1 (53°)	1:1 (45°)
Type C	1-1/2:1 (34°)	2:1 (27°)

[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

[2] A short-term maximum allowable slope of 1/2 H:V is allowed in excavations that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4 H:V (53°).

FIGURE B - 1

ALLOWABLE SLOPING AND BENCHING CONFIGURATIONS

FIGURE B - 1.1

SIMPLE SLOPE

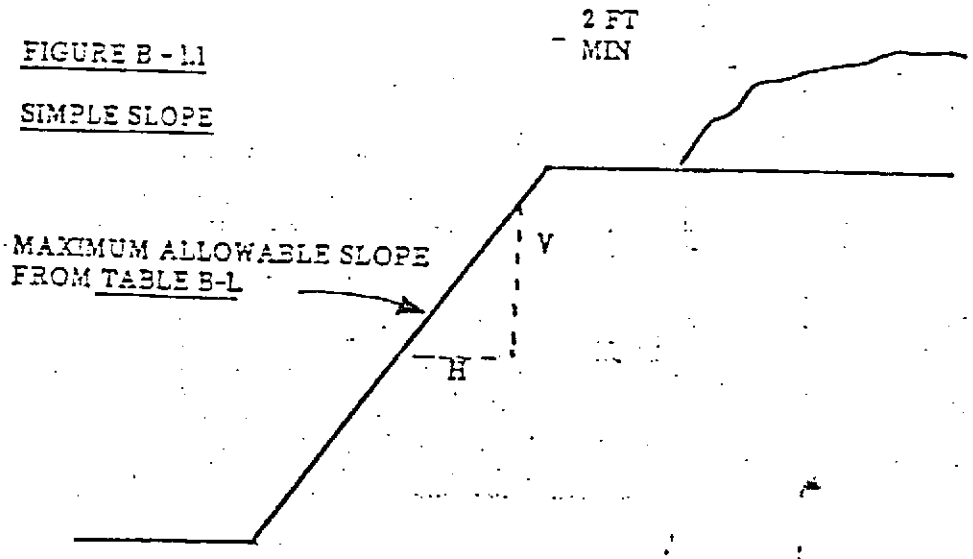


FIGURE B - 1.2

SLOPE AND BENCH

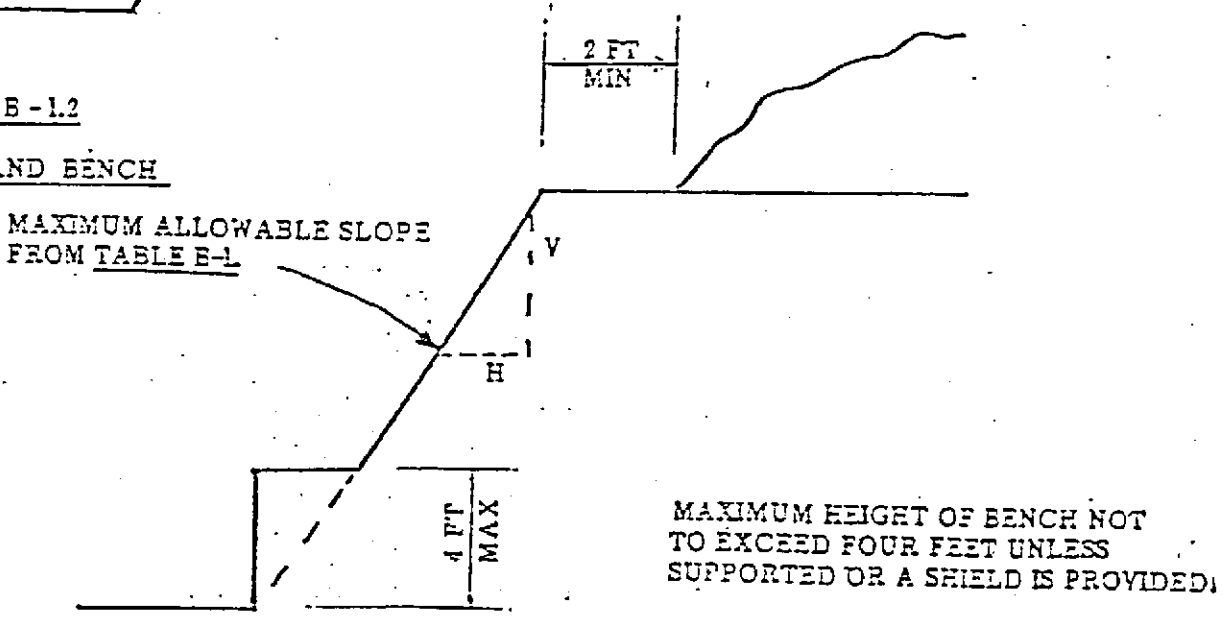
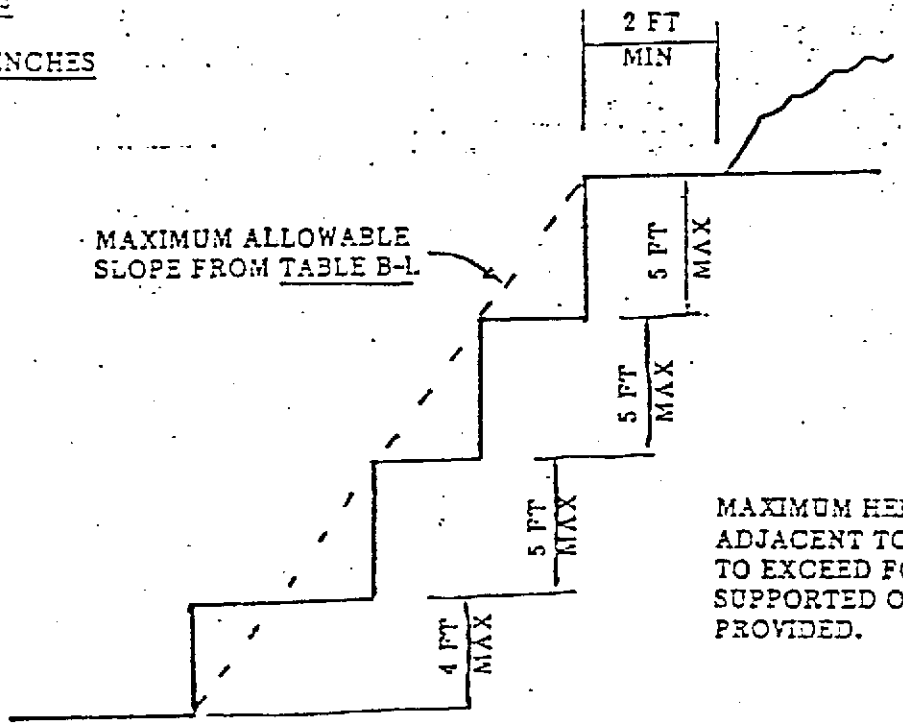


FIGURE B - 1.3

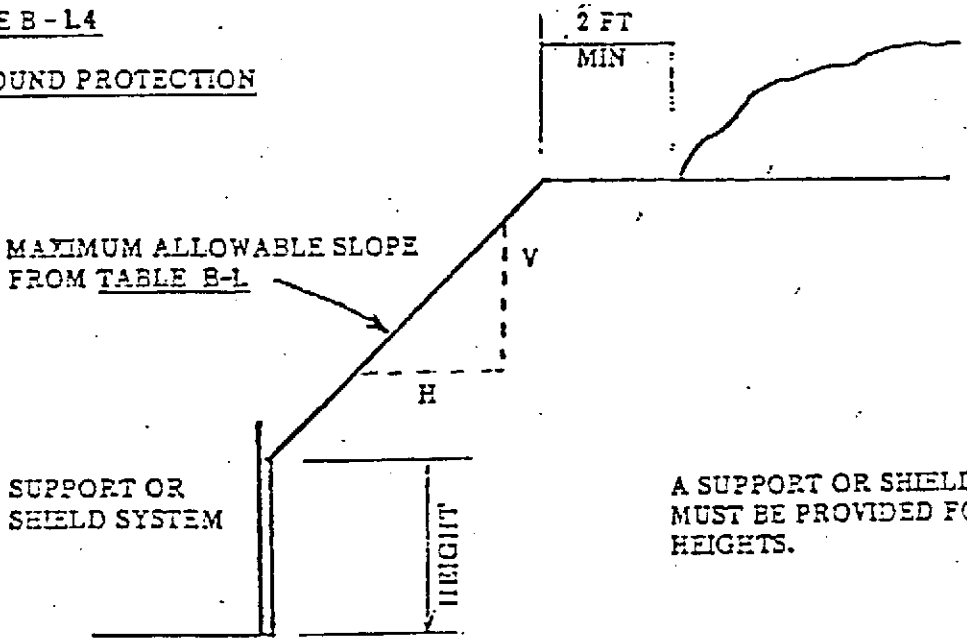
MULTIPLE BENCHES



MAXIMUM HEIGHT OF BENCH ADJACENT TO WORK AREA NOT TO EXCEED FOUR FEET UNLESS SUPPORTED OR A SHIELD IS PROVIDED.

FIGURE B - 1.4

COMPOUND PROTECTION



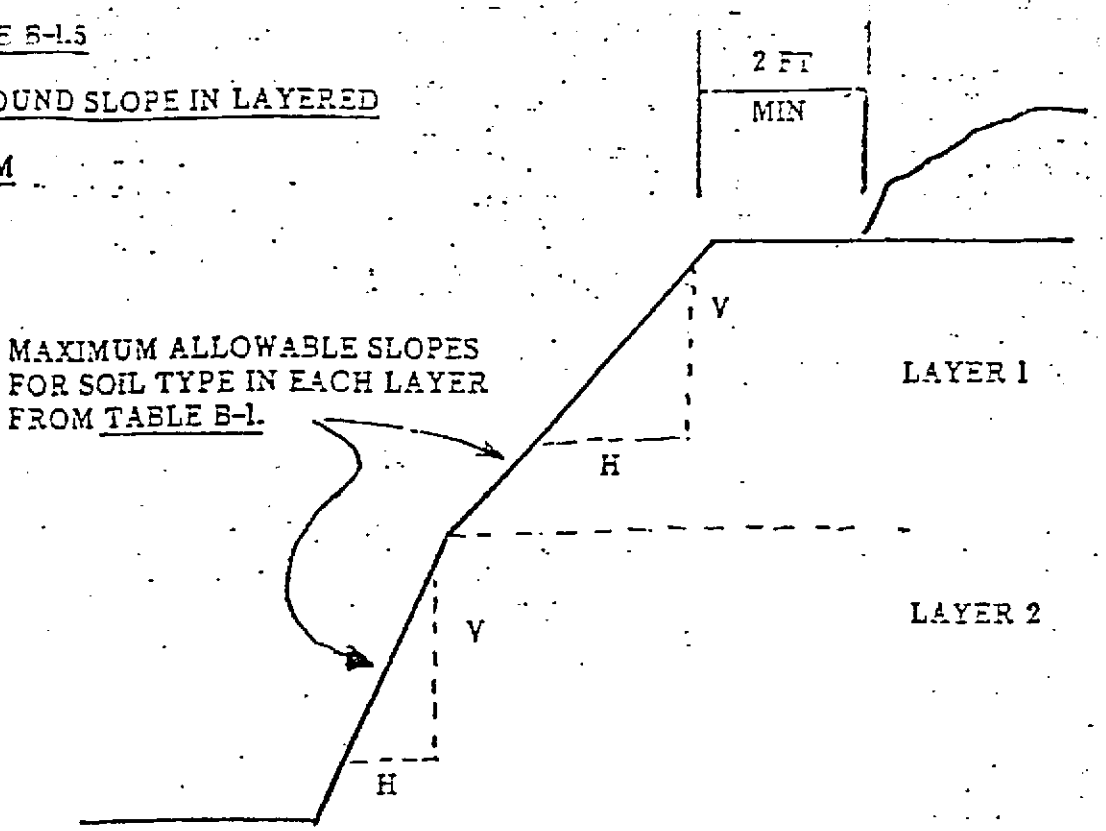
A SUPPORT OR SHIELD SYSTEM MUST BE PROVIDED FOR ALL HEIGHTS.

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., Washington, D.C. 20037

FIGURE B-1.5

COMPOUND SLOPE IN LAYERED

SYSTEM



NOTE: Compound slopes may be used only where the material in the lower layer can stand on a steeper slope than the material in the upper layer.

USPCI SPECIAL SERVICES

RESPIRATOR FIT TEST CERTIFICATE

Employee Name:_____

Social Security No.:_____

Project/Location:_____

Test Performed |__| Irritant Smoke |__| Other_____

1. Respirator Make:_____

   Model: |__| 1/2 Mask |__| Full Face

   Size: |__| Small |__| Medium |__| Large

2. Respirator Make:_____

   Model: |__| 1/2 Mask |__| Full Face

   Size: |__| Small |__| Medium |__| Large

I certify that the above employee has been fit and tested for respirator use.

Tested by:_____

Signature:_____

Date:_____

Employee Signature:_____

Date:_____

Safety Training Manual
Table of Contents

Foot Protection Literature
Chemical Protective Clothing
EPA Decontamination Procedures
Chemical Resistance Chart
Kimberly Clark Literature
Tyvek Literture
Chemical Literature
Trelleborg Literature

MONITORING INSTRUMENTATION
Air Monitoring
GasTech Literture
Sensidyne Literature
Photovac Literature
Revter Stokes Literature
MIE Literature

LAB PACKING
Proper Packaging of Laboratory Chemicals
List of Explosive Materials
Labpack Inventory Sheet

SAMPLING
Site Preparation
Inspection
Drum Opening
Drum Sampling
Field Notes-Chain of Custody
Laboratory

DRUM HANDLING
Drum Handling Guidelines

CONFINED SPACES
Special Service's Procedures
Checklist of Considerations for Working in Confined Spaces
Confined Space Entry Permit
Cleaning Petroleum Storage Tanks
Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning

SPILL CONTROL
Sorbents Literature
Containment of Hazardous Materials

ENGINEERING CONTROLS
Site Control
Noise Reduction
Dust Control
Thermal Stress

HEALTH AND SAFETY PLAN
Special Services Guidelines
Sample Plans

USPCI SPECIAL SERVICES
DOCUMENTATION OF 3 DAY SUPERVISED TRAINING

Employee Name:_____

Social Security Number:_____

Training Location(s):_____

Date(s)_____

Description of Training (list specific tasks)	Hours

Employee Signature:_____

Date:_____

Trained By:_____
(Must be Location Manager, Project Manager or Project Supervisor)

Signature:_____

Date:_____

U.S. POLLUTION CONTROL, INC.
SPECIAL SERVICE'S DIVISION

TRAINING DOCUMENTATION

Project Name: _____

Location: _____

Date: _____

Trainer: _____

Course Content: _____

_____

_____

_____

_____

Attendees:

Name (Print)	Signature	Social Security Number

U.S. POLLUTION CONTROL, INC.
SPECIAL SERVICE'S DIVISION

SUPERVISOR'S REPORT OF ACCIDENT INVESTIGATION
(To be completed immediately after accident)

Project: _____

Location: _____

Name of Injured Person: _____

Occupation When Injured: _____

Description of Accident: _____

_____

Nature and Extent of Injury: _____

_____

Date and Time of Accident: _____

Estimate of Days Lost: _____

Unsafe Condition (refers to mechanical hazards as defective ladders, etc.): _____

Unsafe Act (refers to violation of safe practice rules as failure to wear hard hats): _____

_____

What I have Done to Correct Situation: _____

_____

What I Suggest to Prevent a Similar Accident: _____

_____

Date Form Completed:_____Signature of Supervisor:_____

Comments: _____

_____

_____

FORWARD COMPLETED FORM TO MARY ANN HEANEY

WORKERS' COMPENSATION COURT
1915 NORTH STILES AVENUE
OKLAHOMA CITY, OK 73105

FORM NO. 2

EMPLOYERS' FIRST NOTICE OF INJURY

We have been informed that one of our employees alleges the occurrence of an accidental personal injury or occupational disease arising out of and in the course of employment. The information regarding this alleged injury or occupational disease as reported is as follows:

(Please type or print all information legibly in ink)

EMPLOYEE

Name _____ Social Security # _____
(Last, First, Middle) (Must be filled out)

Address _____
(Number & Street, City, State, Zip code)

Telephone _____ Age ____ Birthdate _____ Sex ____ Length of employment or service _____
(with present employer)

Occupation or job description _____
(Enter regular job title - not the activity the employee was performing when injured)

Average weekly wage $ _____ Was employment agreement made in Oklahoma? _____
See reverse side #1

INJURY

Date of accident (or last hazardous exposure) _____ Time _____ ____ M.
To nearest hour

Place of accident City _____ County _____ State _____

Date employee reported injury to employer _____

Is the employee likely to be absent from employment more than seven (7) calendar days? _____

Last date employee worked _____ Time work shift began _____ ____ M.

Was employee paid full wages for that last day? _____

Was employee paid wages in lieu of compensation benefits? ____ If yes, period of time wages were paid _____

Has employee returned to work? _____ If so, on what date? _____

Did employee die? _____ If so, on what date? _____

Treating physician _____
(Name, Address, City, State)

Nature of injury _____
Example: Burn, cut, sprain or amputation

List parts of body injured _____
Example: Eye, finger, arm or back

How did the accident occur _____
Describe fully the events which resulted in the injury or illness. Tell what happened and how it occurred

_____

Name object or substance which directly injured employee _____
Be specific. Example: Hammer, saw, box, floor or dust

_____

Is validity of accident in doubt? _____ If so, indicate reasons _____

_____

EMPLOYER

Name _____ Telephone _____

Address _____
(Number & Street, City, State, Zip code)

Type of business _____ SIC Number _____
Example: Manufacturing, food service, construction See reverse side #2

Type of ownership: Private _____ State Gov't _____ County Gov't _____ Local Gov't _____

Insurance Carrier (NOT YOUR AGENT) _____
Workers' compensation carrier - not liability carrier

Policy Number _____ Carrier Number _____
See reverse side #3

I hereby declare under penalty of perjury that I have examined this notice, and all statements contained herein, and to the best of my knowledge and belief, they are true, correct and complete.

Signed this _____ day of _____, 19____

Prepared by _____

Title _____

SUBMISSION OF THIS FORM IS NOT AN ADMISSION OF LIABILITY

[illegible] COURT
[illegible] STREET
[illegible] CITY, OKLAHOMA 73105

[illegible] Workers' Compensation Court

Type claim of:

Name of Claimant (Injured Employee)

Name of Employer

Name of Insurance Carrier (To Be Added By Court)

EMPLOYEE'S FIRST NOTICE OF ACCIDENTAL INJURY AND CLAIM FOR COMPENSATION

Court Claim Number _____ (To Be Added by Court)

Claimant's Social Security Number _____ (Must be filled out)

(Please type or print all information legibly in ink)

EMPLOYEE

Name _____ (Last, First, Middle)

Address _____ (Number & Street, City, State, Zip Code)

Telephone _____ Age _____ Sex _____ Birthdate _____

Average weekly wage $_____ Was your employment agreement made in Oklahoma? _____

INJURY

Date of accident _____ Time _____ (To Nearest Hour) _____M.

Place: City _____ County _____ State _____

Last day worked after injury _____ Were you paid full wages that day? _____

Have you returned to work? _____ If so, on what date? _____

Treating physician _____ (Name, Address, City, State)

Nature of injury _____ (Examples: burn, cut, sprain or amputation)

List parts of body injured _____ (Examples: eye, finger, arm or back)

How did the accident occur? _____ (Describe fully the events which resulted in the injury. Tell what happened and how it occurred.)

Name object or substance which directly injured you _____ (Be specific. Examples: Hammer, Saw, Box, Floor or Door)

Names of witnesses to the accident _____

EMPLOYER

Name _____ Telephone _____

Address _____ (Number & Street, City, State, Zip Code)

Were you at the time of this last injury a physically impaired person on account of a pre-existing disability as a result of accident, disease, birth, military or other cause? _____. If the answer is "Yes", you may be entitled to additional benefits from the Special Indemnity Fund. If so, please describe the impairment and give the dates of the injuries and of any court orders. To commence a claim for benefits from the Special Indemnity Fund, a Form 3-F must be completed and filed with the Court and the Special Indemnity Fund.

I declare under penalty of perjury that I have examined this notice and claim, and all statements contained herein, and to the best of my knowledge and belief, they are true, correct and complete.

Signed this _____ day of _____ 19_____

_____
Signature of Claimant

COMPLETE THIS FORM AND THREE (3) COPIES AND MAIL DIRECTLY TO THE COURT. THE COURT WILL SEND A COPY EITHER TO YOUR EMPLOYER OR TO ITS INSURANCE CARRIER.

Name of claimant's attorney if represented:

Name _____ OBA# _____

Address _____ (Number and Street)

_____ (City, State, Zip Code)

Telephone _____

_____
Signature of Attorney for Claimant

NOTICE: IF YOU HAVE NOT ALREADY NOTIFIED YOUR EMPLOYER OF THIS ACCIDENTAL INJURY, DO SO AT ONCE. NOTIFICATION WITHIN 60 DAYS IS REQUIRED BY LAW. FAILURE TO GIVE SUCH NOTICE MAY BAR YOU FROM RECEIVING ANY BENEFITS UNDER THE WORKERS' COMPENSATION ACT.

Removal and Disposal of Used Underground Petroleum Storage Tanks

API RECOMMENDED PRACTICE 1604
SECOND EDITION, DECEMBER 1987

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005

SPECIAL NOTES

1. API PUBLICATIONS NECESSARILY ADDRESS PROBLEMS OF A GENERAL NATURE. WITH RESPECT TO PARTICULAR CIRCUMSTANCES, LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS SHOULD BE REVIEWED.

2. API IS NOT UNDERTAKING TO MEET THE DUTIES OF EMPLOYERS, MANUFACTURERS, OR SUPPLIERS TO WARN AND PROPERLY TRAIN AND EQUIP THEIR EMPLOYEES, AND OTHERS EXPOSED, CONCERNING HEALTH AND SAFETY RISKS AND PRECAUTIONS, NOR UNDERTAKING THEIR OBLIGATIONS UNDER LOCAL, STATE, OR FEDERAL LAWS.

3. INFORMATION CONCERNING SAFETY AND HEALTH RISKS AND PROPER PRECAUTIONS WITH RESPECT TO PARTICULAR MATERIALS AND CONDITIONS SHOULD BE OBTAINED FROM THE EMPLOYER, THE MANUFACTURER OR SUPPLIER OF THAT MATERIAL, OR THE MATERIAL SAFETY DATA SHEET.

4. GENERALLY, API STANDARDS ARE REVIEWED AND REVISED, REAFFIRMED, OR WITHDRAWN AT LEAST EVERY FIVE YEARS. SOMETIMES A ONE-TIME EXTENSION OF UP TO TWO YEARS WILL BE ADDED TO THIS REVIEW CYCLE. THIS PUBLICATION WILL NO LONGER BE IN EFFECT AS AN OPERATIVE API STANDARD FIVE YEARS AFTER ITS PUBLICATION DATE OR, WHERE AN EXTENSION HAS BEEN GRANTED, UPON REPUBLICATION. THE STATUS OF THE PUBLICATION CAN BE ASCERTAINED FROM THE API AUTHORING DEPARTMENT (TELEPHONE 202 682-8000). A CATALOG OF API PUBLICATIONS AND MATERIALS IS PUBLISHED ANNUALLY AND UPDATED QUARTERLY BY API, 1220 L STREET, N.W., WASHINGTON, D.C. 20005.

5. NOTHING CONTAINED IN ANY API PUBLICATION IS TO BE CONSTRUED AS GRANTING ANY RIGHT, BY IMPLICATION OR OTHERWISE, FOR THE MANUFACTURE, SALE, OR USE OF ANY METHOD, APPARATUS, OR PRODUCT COVERED BY LETTERS PATENT. NEITHER SHOULD ANYTHING CONTAINED IN THE PUBLICATION BE CONSTRUED AS INSURING ANYONE AGAINST LIABILITY FOR INFRINGEMENT OF LETTERS PATENT.

6. API PUBLICATIONS MAY BE USED BY ANYONE DESIRING TO DO SO. EVERY EFFORT HAS BEEN MADE BY THE INSTITUTE TO ASSURE THE ACCURACY AND RELIABILITY OF THE DATA CONTAINED IN THEM; HOWEVER, THE INSTITUTE MAKES NO REPRESENTATION, WARRANTY, OR GUARANTEE IN CONNECTION WITH THIS PUBLICATION AND HEREBY EXPRESSLY DISCLAIMS ANY LIABILITY OR RESPONSIBILITY FOR LOSS OR DAMAGE RESULTING FROM ITS USE OR FOR THE VIOLATION OF ANY FEDERAL, STATE, OR MUNICIPAL REGULATION WITH WHICH THIS PUBLICATION MAY CONFLICT.

FOREWORD

Underground storage tank systems that have held flammable or combustible liquids should be handled with extreme care during disposal in place, removal, storage, or disposal off site. This is particularly true of underground storage tanks at motor vehicle refueling facilities which are most frequently used for storage of motor fuel or other petroleum products.

The purpose of this recommended practice is to provide procedures for the disposal in place, removal, storage, and the off-site disposal or sale of used underground tanks that have contained flammable or combustible liquids. Although this guide specifically addresses underground storage tank systems at service station facilities, the principles outlined may be applied to similar systems used at other petroleum facilities.

At the time this recommended practice was written, legislation and regulations related to the operation, maintenance, disposal, and removal of underground petroleum storage systems were under development at the federal, state, and municipal levels. The appropriate government agencies should therefore be consulted about regulations that apply to the geographic area of interest before any action suggested in this recommended practice is taken. API will revise this recommended practice from time to time in an effort to ensure consistency with all applicable federal regulations. This edition of API Recommended Practice 1604 supersedes API Publication 1604, *Recommended Practice for the Abandonment and Removal of Used Underground Service Station Systems* (First Edition, 1981) in its entirety.

Suggested revisions are invited and should be submitted to the Director of the Marketing Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

Removal and Disposal of Used Underground Petroleum Storage Tanks

SECTION 1—GENERAL

1.1 Introduction

Underground petroleum storage systems that are no longer needed or suitable for product storage must be properly disposed in place or removed in order to avoid future safety or environmental hazards. Because of the nature of the flammable or combustible liquids that are stored in these tanks, hazardous conditions may arise in the work area during disposal in place or removal and subsequent handling of tanks. For this reason, all personnel involved in the procedures outlined in this recommended practice should be familiar with the potential hazards, and be knowledgeable in the appropriate health and safety measures needed to ensure a safe working environment.

1.2 Scope and Purpose

1.2.1 This publication recommends procedures for the disposal in place, removal, storage, and off-site disposal of underground storage tank systems that have contained flammable or combustible fluids. In general, it outlines requirements, procedures, and operating conditions to be followed by contractors, engineers, or other individuals who may be involved in these practices. While this recommended practice specifically addresses underground petroleum storage tank systems at service station facilities, the principles outlined may be applied to similar systems used at other petroleum storage facilities. All such work must be accomplished in accordance with federal, state, and local requirements as well as accepted safety standards. Before initiating work, the appropriate government agencies should be consulted concerning applicable regulatory and permit requirements.

1.2.2 All applicable permits must be obtained prior to beginning any work. Where required, contractors must be approved by local authorities. Contractors, subcontractors, and their employees responsible for tank abandonment or removal should be familiar with: (a) all applicable safety rules and regulations, (b) the use of equipment and procedures for testing and vapor-freeing tanks, (c) the handling and disposal of the types of wastes likely to be encountered, and (d) the applicable sections of the publications referenced in 1.4.

1.2.3 The procedures outlined in this recommended practice can be carried out without the need to enter the tank. Should tank entry be desired, the procedures outlined in API Publications 2015, 2015A, and 2217 and Recommended Practice 1631 should be followed.

1.3 Special Precautions

During the course of underground storage tank removal or in place disposal, workers may be exposed to petroleum hydrocarbon liquids, vapors, or wastes. The precautions in 1.3.1 and 1.3.2 should be observed by all individuals engaged in the procedures discussed in this recommended practice.

1.3.1 TOXICITY CONSIDERATIONS: PETROLEUM SUBSTANCES

Users should be aware of appropriate health precautions. When high concentrations of petroleum hydrocarbon vapors are inhaled, symptoms of intoxication may result. These symptoms, ranging from simple dizziness to excitement or unconsciousness, are similar to those produced by alcohol or anesthetic gases. If such effects occur, the individual should be removed to fresh air. For minor effects of exposure, breathing fresh air or oxygen results in rapid recovery. If breathing has stopped, artificial respiration should be applied promptly. Medical attention should be obtained as soon as possible. Paragraphs 1.3.1.1 and 1.3.1.2 contain special toxicity considerations for benzene and tetraethyl lead, which may be present in petroleum products or wastes found in underground storage tanks. Care should be exercised to minimize exposure to these substances when they are present during the handling of used underground petroleum storage tanks.

WARNING: Tests have shown that prolonged or repeated exposure to some petroleum substances, in liquid or vapor form, may cause serious illness, including cancer, in laboratory animals. Although the significance of these test results to human health is not fully understood, exposure to petroleum substances should be minimized. The following health precautions are suggested:

a. Avoid skin contact and inhaling vapors.

b. Keep petroleum liquids away from eyes, skin, and mouth; they can be harmful or fatal if inhaled, absorbed through the skin, or ingested.
c. Use soap and water or waterless hand cleaner to remove any petroleum product that contacts skin. Do not use gasoline or similar solvents to remove oil and grease from skin.
d. Promptly wash petroleum-soaked clothes and avoid using soaked leather goods. Properly dispose of rags.
e. Keep work areas clean and well ventilated.
f. Clean up spills promptly.

1.3.1.1 Benzene

High occupational exposures to benzene have been associated with various human blood disorders, including an increased risk of leukemia. Very high levels have also been known to affect the central nervous system. Benzene administered by mouth has induced cancer in laboratory animals in long-term tests. Benzene is rapidly absorbed through the skin. The American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) for benzene is 1-part-per-million time-weighted average, with a short term exposure limit of 25 parts-per-million (the latter is designated for deletion in 1986 or 1987). The Occupational Safety and Health Administration (OSHA) 8-hour time-weighted average for benzene is 10 parts-per-million with an acceptable ceiling concentration of 25 parts-per-million and an acceptable peak of 50 parts-per-million for 10 minutes (29 CFR 1910.1000, Table Z-2). OSHA conducted a rulemaking in 1986 with the intent to revise this standard. The latest OSHA *Occupational Safety and Health Standards* should be consulted to determine the current TLV.

1.3.1.2 Tetraethyl Lead

This organic form of lead can cause diseases of the central and peripheral nervous system, the kidney and the blood. Skin absorption of this compound is a major route of entry into the body. The ACGIH time-weighted average is 0.1 milligrams per cubic meter for general room air. The TLV in OSHA's *Occupational Safety and Health Standards* (29 CFR 1910.1000, Table Z-1) is 0.075 milligrams per cubic meter.

1.3.2 FLAMMABILITY AND COMBUSTIBILITY CONSIDERATIONS

1.3.2.1 Flammable or combustible vapors are likely to be present in the work area. The concentration of vapors in the tank, the excavation, or the work area may reach the flammable (explosive) range before venting is completed and a safe atmosphere is reached. Therefore, precautions must be taken to: (a) eliminate all potential sources of ignition from the area (for example, smoking materials, nonexplosion-proof electrical and internal combustion equipment), (b) prevent the discharge of static electricity during venting of flammable vapors, and (c) prevent the accumulation of vapors at ground level. Refer to API Publication 2015 and Recommended Practice 2003 for general precautionary measures to follow during the vapor-freeing procedure.

1.3.2.2 A combustible gas indicator (CGI) should be used to check for hazardous vapor concentrations (see 4.3). All open flame and spark-producing equipment within the vapor hazard area should be shut down. Electrical equipment (for example, pumps and portable hand tools) used in the area must be explosion-proof in accordance with NFPA 70B Class I, Division 1, Group D or otherwise approved for use in potentially explosive atmospheres.

1.4 Referenced Publications

Portions of the following documents contain information regarding various engineering and safety procedures that may be applicable to underground storage tank removal or disposal.

API	
Bull 1628	*Underground Spill Cleanup Manual*
RP 1631	*Interior Lining of Underground Storage Tanks*
RP 2003	*Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*
Publ 2015	*Cleaning Petroleum Storage Tanks*
Publ 2015A	*A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning* (Supplement to API Publ 2015)
Publ 2217	*Guidelines for Confined Space Work in the Petroleum Industry*
Publ 2219	*Safe Operating Guidelines for Vacuum Trucks in Petroleum Service*
NFPA[1]	
327	*Standard Procedure for Cleaning or Safeguarding Small Tanks and Containers*
70B	*Electrical Equipment Maintenance*

[1]National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

OSHA[2]

Occupational Safety and Health Standards (29 CFR 1910.1000)

EPA[3]

General Regulations for Hazardous Waste Management (40 CFR 260)

Regulations for Identifying Hazardous Waste (40 CFR 261)

Regulations for Hazardous Waste Generators (40 CFR 262)

Underground Storage Tanks Regulations (40 CFR 280.11, 280.22)

SECTION 2—TEMPORARILY OUT OF SERVICE

2.1 Applicability

Underground petroleum storage tank systems are considered temporarily out of service if they are: (a) idle but will be returned to service within one year, (b) are awaiting abandonment in place, or (c) are awaiting removal.

2.2 Securing Tank Systems

Tanks temporarily out of service must be properly secured for the period they will be out of service. Tanks may be considered properly secured if processed as follows:

a. Observe all special precautions described in 1.3 through 1.3.2.2.

b. Remove stored product from the tank using one of the following methods:

1. Drain all product lines into the tank, then remove all liquids from the tank.
2. Remove all flammable or combustible liquids with the exception of a sufficient quantity (approximately four inches) to assure a saturated vapor space.
3. When high water table or flooding conditions exist, remove all stored liquid and ballast the tank by filling with water.

c. Cap the fill pipe, gauge pipe, tank truck vapor recovery fitting, and vapor return. Secure the tank against tampering.

d. Cap the product lines at the service station island, or elsewhere if the pumps are removed, or leave the pumps connected and locked. Disconnect electric power to the pumps.

e. Leave the vent line open.

f. Consult the appropriate local, state, or federal agencies concerning regulatory notification requirements.

SECTION 3—DISPOSAL IN PLACE

3.1 Criteria for Disposal in Place

3.1.1 This section describes a safe method for the in place disposal of underground tanks. Removal of the tank is preferred (see Section 4). Disposal of the tank in place should be considered in the following circumstances: (a) because of the tank location adjacent equipment or structures may be damaged or weakened if the tank is removed, (b) removal may be physically impossible, or (c) removal may incur excessive costs. A determination of whether to dispose of a tank in place or to remove it will depend upon: (a) local regulations which may prohibit abandonment in place, (b) the location of the facility and tank, (c) the availability of equipment, and (d) cost. Additional considerations include the length of service the equipment has provided and its reuse or salvage value.

3.1.2 The federal *Resource Conservation and Recovery Act* (RCRA) (40 CFR 260-265) places restrictions on disposal of certain residues that may be present in some underground storage tanks. Residues from tanks that have held leaded gasoline should be treated with extreme caution. Lead compounds and other residues in the tank may be classified as hazardous wastes. All liquids and residues removed from the tank should be handled in accordance with appropriate federal, state, and local regulations. Product removed from the tank can usually be reused or recycled.

3.2 Procedures for Disposal in Place

3.2.1 Tanks may be effectively and safely disposed in place by using the procedures in 3.2.2 through 3.2.11.

[2]Occupational Safety and Health Administration, U.S. Department of Labor, Washington, D.C. 20402.

[3]U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

3.2.2 Observe the special precautions described in 1.3 through 1.3.2.2.

3.2.3 *Drain* product piping into the tank, being careful to avoid any spillage to the excavation area. Disconnect product piping from the tank, and cap or remove the piping.

3.2.4 Remove liquids and residues from the tank by using explosion-proof or air-driven pumps. Pump motors and suction hoses must be bonded to the tank or otherwise grounded to prevent electrostatic ignition hazards. It may be necessary to use a hand pump to remove the last few inches of liquid from the bottom of the tank. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck must be vapor-free. The truck should be located upwind from the tank and outside the path of probable vapor travel. The vacuum pump exhaust gases should be discharged through a hose of adequate size and length downwind of the truck and tank area. See API Publication 2219 for vacuum truck operating and safety practices.

3.2.5 Excavate to the top of the tank.

3.2.6 Remove the drop tube, fill pipe, gauge pipe, vapor recovery truck connection, submersible pumps, and other tank fixtures. Cap or remove all non-product lines, such as vapor recovery lines, except for the vent line. The vent line should remain connected until the tank is purged (see 4.2.2 through 4.2.7). Temporarily plug all other tank openings.

3.2.7 Purge the tank of flammable vapors. This may be accomplished using methods outlined in 4.2.2 through 4.2.7. Vent all vapors a minimum of 12 feet above grade and 3 feet above any adjacent roof lines. Monitor the tank for flammable vapor with a combustible gas indicator until the tank atmosphere has been brought to less than 20 percent of the lower flammable limit (see 4.3).

3.2.8 One or more holes may be cut in the tank top if existing tank openings are not adequate for introduction of the inert material to be used to fill the tank.

3.2.9 Proceed to introduce a suitable solid inert material through openings in the top of the tank. It is important to fill the tank as full as possible with the sand or other inert material. The procedures in 3.2.9.1 through 3.2.9.3 are intended to minimize any surface settling subsequent to disposal of the tank in place.

3.2.9.1 Sand will flow readily and is generally available. Any kind of sand is suitable if it is free of rocks, which might limit leveling-out in the tank. The sand may be introduced dry as long as it flows in freely. When the sand cone nears the top of the tank, the sand can be washed into the tank with a nominal amount of water and puddled to cause it to flow to the ends. The use of larger amounts of water should be avoided since the tank might be filled with water before it is filled with sand.

3.2.9.2 Almost complete filling of the tank can be achieved by using a combination of sand and earth. Fill the tank with sand to approximately 80 percent of calculated capacity. Mix soil and water to make a free-flowing mud and pour the mixture into the tank opening. Puddle the mixture until the tank is full and overflows the fill opening.

3.2.9.3 Other types of inert materials, slurries, or expandable materials such as polyurethane-type foams may be used when approved by regulatory officials.

3.2.10 After the tank is filled with an inert material, all tank openings should be plugged or capped unless it was necessary to cut open the tank top (see 3.2.8).

3.2.11 Disconnect and cap or remove the vent line.

3.3 Recordkeeping

3.3.1 When underground tanks are disposed in place, the owner of the tank should keep a permanent record of the tank location, the date of disposal in place, and the method of conditioning the tank for disposal. All local, state, and federal regulatory requirements for tank disposal/closure and notification must be observed.

3.3.2 It is recommended that the tank owner inform a potential buyer of the presence of abandoned underground tanks when properties are sold. A property owner should also be informed at the termination of the property lease. In some areas this may be a regulatory requirement. It may be desirable to obtain an acknowledgement or a release from the property owner.

SECTION 4—REMOVAL OF UNDERGROUND TANKS

4.1 Preparation

4.1.1 Observe the special safety precautions in 1.3 through 1.3.2.2.

4.1.2 Drain product piping into the tank, being careful to avoid any spillage. Cap or remove product piping.

4.1.3 Remove residues and liquids from the tank as described in 3.2.4. Also observe the restrictions in 3.1.2.

4.1.4 Excavate to the top of tank.

4.1.5 Remove the fill pipe, gauge pipe, vapor recovery truck connection, submersible pumps, and other tank fixtures. Remove the drop tube, except when it is planned to vapor-free the tank by using an eductor as in 4.2.5. Cap or remove all non-product lines, such as vapor recovery lines, except the vent line. The vent line should remain connected until the tank is purged. Temporarily plug all other tank openings so that all vapors will exit through the vent line during the vapor-freeing process.

4.2 Purging

4.2.1 Remove flammable vapors by one of the methods described in 4.2.2 through 4.2.7, or as required by local codes. These methods provide a means for temporary vapor-freeing of the tank atmosphere. However, it is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor-freeing procedures described in 4.2.2 through 4.2.7. For this reason, caution must always be exercised when handling or working around tanks that have stored flammable or combustible liquids. Before initiating work in the tank area or on the tank, a combustible gas indicator should be used to assess vapor concentrations in the tank and work area.

4.2.2 Vent all vapors from the tank at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines until the tank is purged of flammable vapors. The work area should be free from sources of ignition (see 1.3.2).

4.2.3 Flammable and combustible vapors may be purged with an inert gas such as carbon dioxide (CO_2) or nitrogen (N_2). This method should not be utilized if the tank is to be entered for any reason, as the tank atmosphere will be oxygen deficient. The inert gas should be introduced through a single tank opening at a point near the bottom of the tank at the end of the tank opposite the vent. When inert gases are used, they should be introduced under low pressure to avoid the generation of static electricity. When using CO_2 or N_2, pressures in the tank should not exceed 5 pounds per square inch gauge.

CAUTION: The process of introducing compressed gases into the tank may create a potential ignition hazard as the result of the development of static electrical charges. The discharging device must therefore be grounded. Explosions have resulted from the discharging of CO_2 fire extinguishers into tanks containing a flammable vapor-air mixture. CO_2 extinguishers should not be used for inerting flammable atmospheres.

4.2.4 If the method described in 4.2.3 is not practical, the vapors in the tank may be displaced by adding solid carbon dioxide (dry ice) to the tank in the amount of at least 1.5 pounds per 100 gallons of tank capacity. The dry ice should be crushed and distributed evenly over the greatest possible area in the tank to promote rapid evaporation. As the dry ice vaporizes, flammable vapors will flow out of the tank and may surround the area. Therefore, where practical, plug all tank openings except the vent after introducing the solid CO_2 and continue to observe all normal safety precautions regarding flammable or combustible vapors. Make sure that all of the dry ice has evaporated before proceeding.

CAUTION: Skin contact with dry ice may produce burns.

4.2.5 Flammable vapors may be exhausted from the tank by one of two methods of tank ventilation listed below:

a. Ventilation using an eductor-type air mover usually driven by compressed air is illustrated in Figure 1. The eductor-type air mover must be properly bonded to prevent the generation and discharge of static electricity. When using this method, the fill (drop) tube should remain in place to ensure ventilation at the bottom of the tank. Tanks equipped with fill (drop) tubes that are not removable should be purged by this method. An eductor extension shall be used to discharge vapors a minimum of 12 feet above grade.

b. Ventilation with a diffused air blower is illustrated in Figure 2. When using this purging method, it is imperative that the air-diffusing pipe is properly bonded to prevent the discharge of a spark. Fill (drop) tubes must be removed to allow proper diffusion of the air in the tank. Air supply should be from a compressor that has been checked to ensure a clean air supply and is free

SECTION 4—REMOVAL OF UNDERGROUND TANKS

4.1 Preparation

4.1.1 Observe the special safety precautions in 1.3 through 1.3.2.2.

4.1.2 Drain product piping into the tank, being careful to avoid any spillage. Cap or remove product piping.

4.1.3 Remove residues and liquids from the tank as described in 3.2.4. Also observe the restrictions in 3.1.2.

4.1.4 Excavate to the top of tank.

4.1.5 Remove the fill pipe, gauge pipe, vapor recovery truck connection, submersible pumps, and other tank fixtures. Remove the drop tube, except when it is planned to vapor-free the tank by using an eductor as in 4.2.5. Cap or remove all non-product lines, such as vapor recovery lines, except the vent line. The vent line should remain connected until the tank is purged. Temporarily plug all other tank openings so that all vapors will exit through the vent line during the vapor-freeing process.

4.2 Purging

4.2.1 Remove flammable vapors by one of the methods described in 4.2.2 through 4.2.7, or as required by local codes. These methods provide a means for temporary vapor-freeing of the tank atmosphere. However, it is important to recognize that the tank may continue to be a source of flammable vapors even after following the vapor-freeing procedures described in 4.2.2 through 4.2.7. For this reason, caution must always be exercised when handling or working around tanks that have stored flammable or combustible liquids. Before initiating work in the tank area or on the tank, a combustible gas indicator should be used to assess vapor concentrations in the tank and work area.

4.2.2 Vent all vapors from the tank at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines until the tank is purged of flammable vapors. The work area should be free from sources of ignition (see 1.3.2).

4.2.3 Flammable and combustible vapors may be purged with an inert gas such as carbon dioxide (CO_2) or nitrogen (N_2). This method should not be utilized if the tank is to be entered for any reason, as the tank atmosphere will be oxygen deficient. The inert gas should be introduced through a single tank opening at a point near the bottom of the tank at the end of the tank opposite the vent. When inert gases are used, they should be introduced under low pressure to avoid the generation of static electricity. When using CO_2 or N_2, pressures in the tank should not exceed 5 pounds per square inch gauge.

CAUTION: The process of introducing compressed gases into the tank may create a potential ignition hazard as the result of the development of static electrical charges. The discharging device must therefore be grounded. Explosions have resulted from the discharging of CO_2 fire extinguishers into tanks containing a flammable vapor-air mixture. CO_2 extinguishers should not be used for inerting flammable atmospheres.

4.2.4 If the method described in 4.2.3 is not practical, the vapors in the tank may be displaced by adding solid carbon dioxide (dry ice) to the tank in the amount of at least 1.5 pounds per 100 gallons of tank capacity. The dry ice should be crushed and distributed evenly over the greatest possible area in the tank to promote rapid evaporation. As the dry ice vaporizes, flammable vapors will flow out of the tank and may surround the area. Therefore, where practical, plug all tank openings except the vent after introducing the solid CO_2 and continue to observe all normal safety precautions regarding flammable or combustible vapors. Make sure that all of the dry ice has evaporated before proceeding.

CAUTION: Skin contact with dry ice may produce burns.

4.2.5 Flammable vapors may be exhausted from the tank by one of two methods of tank ventilation listed below:

a. Ventilation using an eductor-type air mover usually driven by compressed air is illustrated in Figure 1. The eductor-type air mover must be properly bonded to prevent the generation and discharge of static electricity. When using this method, the fill (drop) tube should remain in place to ensure ventilation at the bottom of the tank. Tanks equipped with fill (drop) tubes that are not removable should be purged by this method. An eductor extension shall be used to discharge vapors a minimum of 12 feet above grade.

b. Ventilation with a diffused air blower is illustrated in Figure 2. When using this purging method, it is imperative that the air-diffusing pipe is properly bonded to prevent the discharge of a spark. Fill (drop) tubes must be removed to allow proper diffusion of the air in the tank. Air supply should be from a compressor that has been checked to ensure a clean air supply and is free

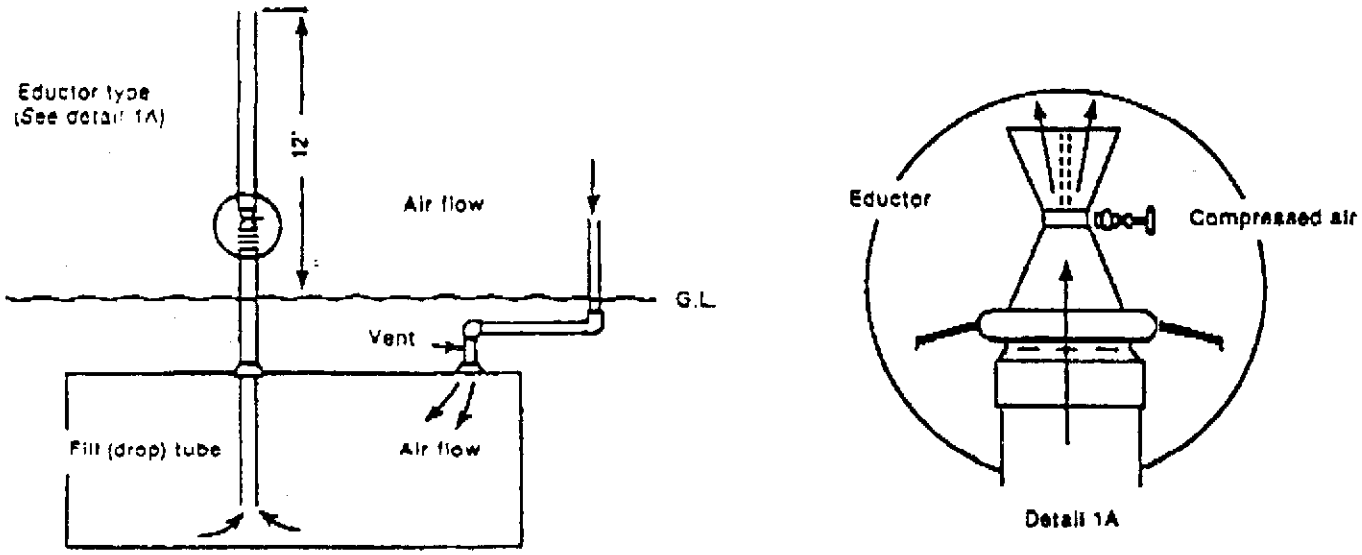
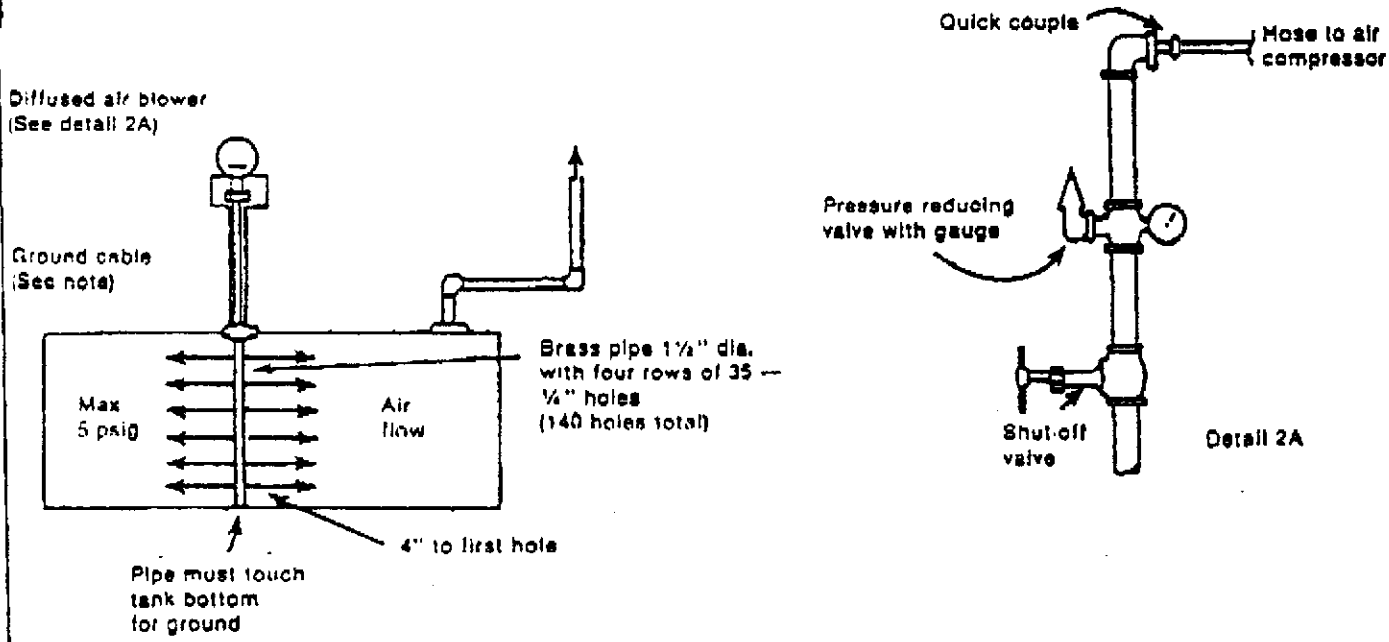


Figure 1—Eductor-Type Air Mover



Note: Ground cable brazed to pipe must be clamped to fill pipe. Use 12 gauge ground wire from fill pipe to water pipe or ground rod.

Figure 2—Diffused Air Blower

from volatile vapors. Air pressure in the tank must not exceed 5 pounds per square inch gauge.

4.2.6 One of the safest and simplest methods for vapor-freeing a tank is to fill the tank with water. However, in certain areas, regulatory requirements for treatment/disposal of water used in the vapor-freeing process may make this method cost-prohibitive. Before employing the method described in 4.2.6.1 through 4.2.6.3, consult local regulations.

4.2.6.1 Fill the tank with water until the floating product nears the fill opening. Remove the floating product and place it in a suitable container for proper disposal. Care should be exercised to ensure that neither product nor water is spilled into the tank excavation.

4.2.6.2 In the process of filling the tank with water, flammable vapors will be expelled through both the vent and fill openings, but primarily at the fill opening. Normal safety precautions should be observed. To minimize this escape of vapor through the fill opening, the opening may be temporarily capped.

4.2.6.3 When the tank is free of vapor, pump out the water and dispose of it in accordance with local regulations.

4.2.7 Steam can be used to clean and vapor-free a tank. However, a large static charge can build up on the nozzle of the steam jet. Insulated objects on which the steam impinges can also become charged. If steam is to be used for either purging or cleaning a tank or other equipment, the steam discharge nozzle and all conductive insulated objects subject to impingement or condensation should be bonded to the tank or be grounded. Steam purging of tanks should be avoided when suitable alternatives are available. Further reference to steam cleaning of tanks is found in NFPA 327.

4.3 Testing

4.3.1 The tank atmosphere and the excavation area should be regularly tested for flammable or combustible vapor concentrations until the tank is removed from both the excavation and the site. Such tests are to be made with a combustible gas indicator which is properly calibrated according to the manufacturer's instructions (typically on pentane or hexane in air), and which is thoroughly checked and maintained in accordance with the manufacturer's instructions. Persons responsible for testing must be completely familiar with the use of the instrument and the interpretation of the instrument's readings.

4.3.2 The tank vapor space is to be tested by placing the combustible gas indicator probe into the fill opening with the drop tube removed. Readings should be taken at the bottom, middle, and upper portions of the tank, and the instrument should be cleared after each reading. If the tank is equipped with a non-removable fill tube, readings should be taken through another opening. Liquid product must not enter the probe. Readings of 20 percent or less of the lower flammable limit must be obtained before the tank is considered safe for removal from the ground.

4.3.3 Combustible gas indicator readings may be misleading where the tank atmosphere contains less than 5 percent by volume oxygen, as in a tank vapor-freed with CO_2, N_2, or another inert gas. In general, readings in oxygen-deficient atmospheres will be on the high, or safe, side. It may be desirable to use an oxygen indicator to assess the oxygen concentration.

4.4 Removal

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

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

4.4.3 When partially or totally removing an existing underground storage system, a small amount of contaminated backfill may be encountered. The contamination can be due to minor spills and drips during previous operation of the facility or from drips and minor spills that may occur during removal. Contaminated backfill may be a potential safety and environmental hazard. Spills or drips should be contained to minimize contamination during removal. If contamination is severe, consult local environmental officials, the fire marshal, or the USEPA for assistance and requirements. See API Bulletin 1628 for further information.

4.4.4 Tanks should be labeled after removal from the ground but prior to removal from the site. Regardless of the condition of the tank, the label should contain a

warning against certain types of reuse. The former contents and present vapor state of each tank, including vapor-freeing treatment and date should also be indicated. The label should be similar to the following in legible letters at least 2 inches high:

TANK HAS CONTAINED LEADED GASOLINE*

NOT VAPOR FREE

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

DATE OF REMOVAL: MONTH/DAY/YEAR

*Or other flammable/combustible liquid. Use the applicable designation, for example, DIESEL.

4.4.5 Tanks that have held leaded motor fuels (or whose service history is unknown) should also be clearly labeled with the following information (see API Publication 2015A for additional guidelines):

TANK HAS CONTAINED LEADED GASOLINE
LEAD VAPORS MAY BE RELEASED IF HEAT IS APPLIED TO THE TANK SHELL

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

4.4.6.1 Before the tank is removed from the site, the tank atmosphere should be checked with a combustible gas indicator as specified in 4.3 to ensure that it does not exceed 20 percent of the lower flammable limit.

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

SECTION 5—STORAGE OF USED TANKS

5.1 Storage Considerations

Even though used tanks that have contained flammable or combustible liquids have been vapor-freed at one time, they cannot be guaranteed to remain vapor-free. Hydrocarbons may be retained in crevices and under scale and may be released when disturbed or over a period of time. It is important, therefore, that appropriate safety precautions be observed at all times.

5.2 Storage Procedures

5.2.1 Tanks should be vapor-freed before being placed in storage (see 4.2). Tanks should also be free of all liquids and residues. All tank openings should be tightly plugged or capped, with one plug having a 1/8-inch vent hole to prevent the tank from being subjected to excessive differential pressure caused by temperature changes. Tanks should be stored with the vented plug at the highest point on the tank. All tanks should be labeled as described in 4.4.4 and 4.4.5.

5.2.2 Used tanks should be stored in secure areas on the premises of persons familiar with any attendant hazards and where the general public will not have access. A fenced yard, apart from other facilities, is desirable.

SECTION 6—SALE FOR REUSE

6.1 Considerations for Reuse

Careful consideration should be given to the reuse of tanks that have been in petroleum storage service. If a tank is sold for reuse, the purchaser should be given a very clear understanding of the former use and present condition of the tank. The seller of a tank to be returned to service in an underground petroleum storage system must inform the purchaser of the tank of the owner's notification requirements under applicable federal regulations (40 CFR 280.11 and 40 CFR 280.22). There may also be similar state or local regulations. Buyers of such tanks should check with the original manufacturer of the tank to determine its suitability for reuse. It is advisable to test the tanks for flammable vapors (see 4.3) before they are transported.

CAUTION: Tanks that previously contained gasoline must not be used for the subsequent storage of food or liquids intended for animal or human consumption.

6.2 Conditions of Sale

A bill of sale should be used to transfer tank ownership. The bill of sale should include the purchaser's acknowledgement that he assumes all liability related to the tank. Bills of sale should indicate the former use of the tank and carry the following warning regardless of the former contents of the tank:

TANK HAS CONTAINED LEADED GASOLINE*

NOT VAPOR FREE

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

*Or other flammable/combustible liquid. Use the applicable designation, for example, DIESEL.

SECTION 7—DISPOSAL

7.1 Disposal Criteria

7.1.1 Tanks should be disposed of when they are no longer fit for the storage of flammable or combustible liquids or any other appropriate use. Whether sold to a scrap dealer or disposed of at an acceptable facility, sufficient holes should be made in the tanks to render them unfit for further use.

7.1.2 Tanks that have been lined internally or coated externally with epoxy-based or similar materials may not be accepted by scrap processors. Prior inquiries should be made as to the requirements of the processor accepting the tank for scrap.

7.2 Disposal Procedures

7.2.1 After a tank has been vapor-freed, it should be rendered unsuitable for future use as a storage tank by puncturing, cutting, or drilling numerous holes in all sections of the tank.

7.2.2 All tanks should be labeled as described in 4.4.4 and 4.4.5.

7.2.3 A bill of sale should be used to transfer tank ownership (see 6.2).

7.2.4 Prior to disposal of used tanks, current federal, state, and local regulations should be checked to determine if special procedures or preparations are required.

APPENDIX "K"

Waste oil may include all chemicals in this section.

TETRAETHYL LEAD : Excessive inhalation. Ingestion, or prolonged skin exposure may cause insomnia, anxiety tremors, hyper reflexia, spastic, brady card, hypotension, hypotherinia, pallor, nausia, anorexia, weight loss, hallucinations, convulsions, coma, eye irratation.

FIRST AID :

Inhalation : Move victim to fresh air at once. If breathing has stopped, perform artificial respiration. Get medical attention.

Eye Irratation : Immediately flush with water, occasionally lifting upper and lower lids. Get medical attention.

Skin Contact : Immediately rinse the contaminated skin with petroleum product (i.e. kerosene) then with soap and water. Immediately remove contaminated clothing. Get medical attention.

Ingestion : Give large amounts of water, if conscious, and induce vomiting. Get medical attention.

IDLH - 40mg/m^3

PEL - .075mg/m^3

APPENDIX "L"

TO: All Foxboro Gas Chromatograph Users

FROM: Bruce Bennett

RE: UST Air Sampling

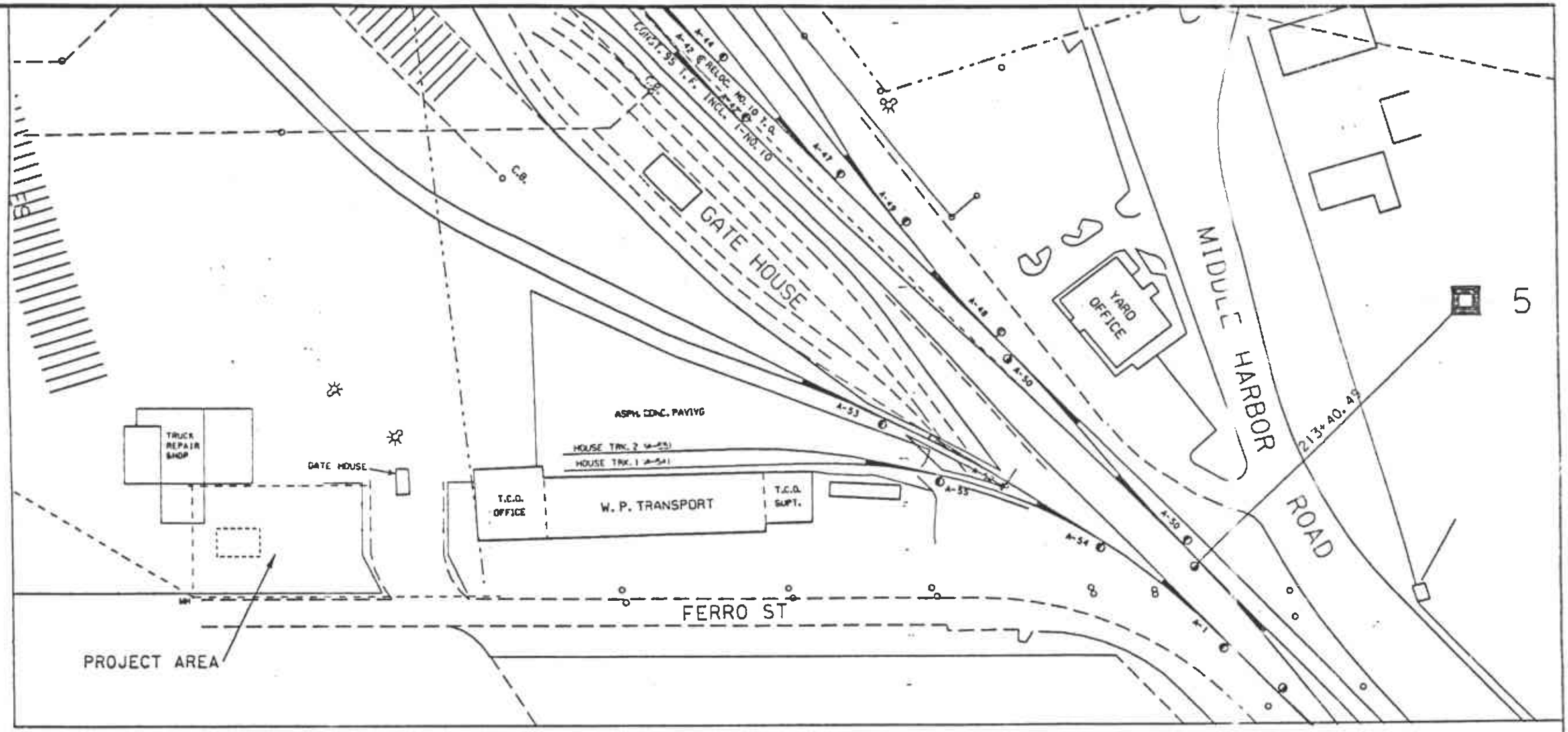
In order to insure consistent sampling for air monitoring of underground storage tanks using the Foxboro Gas Chromatograph (GC), sampling protocol will be as follows.

If the sludge or liquid is less than three feet from the point of entrance to the tank, the GC can read directly from the tank using the extended sampling probe. Hold the opening 3 to 6 inches above the material, in order to get a high concentration. The chromatograph will be the sharpest if you can get a 100 to 300 ppm reading before injecting the sample to the GC column.

If the material is more than three feet from the entrance, a sample should be removed, placed in a jar with aluminum foil or saran wrap over the top. Allow at least 15 minutes to build up a head space vapor, then puncture the cover with the probe and take a head space recording. Again, a concentration of 300 ppm of total organic carbons, (TOC), is ideal.

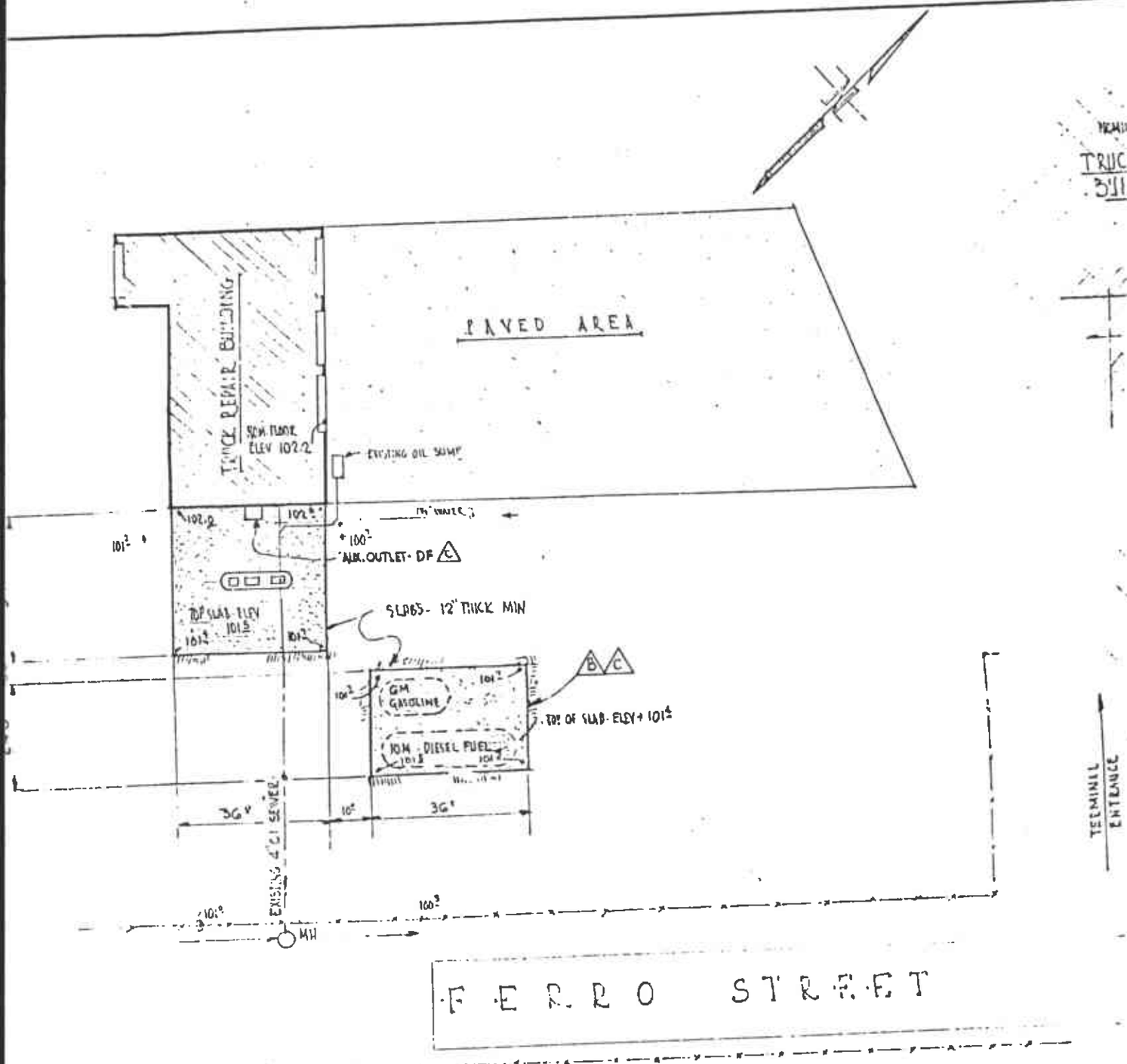
A sample can be removed with either a sampling cup on a pole, a callawasa tube, or pulled out by the vacuum truck and placed in a glass jar.

cc: Mary Ann Heaney

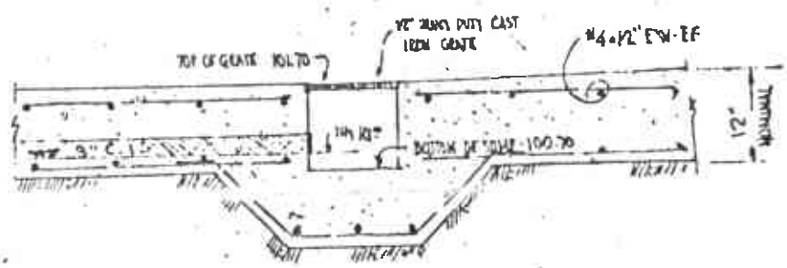


SITE PLAN

SCALE: 1" = 100'



PLOT PLAN SCALE 1"



SECTION THRU SUMP SCALE 3/4" = 1'-0"