# SITE HEALTH AND SAFETY PLAN

[redacted] UNDERGROUND STORAGE TANK REMOVAL
PARKS RESERVE FORCES TRAINING AREA
BUILDING 888
CAMP PARKS
DUBLIN, CALIFORNIA

Prepared for

HAZWRAP
Lockheed Martin Energy Systems, Inc.
900 Tri-County Blvd
Oliver Springs, TN 37830

June 1996

Woodward-Clyde

Woodward-Clyde Federal Services
500 12th Street, Suite 100
Oakland, California 94607

FORM HS-507
SITE SAFETY PLAN
FIELD INVESTIGATION OF UNDERGROUND FUEL SPILLS


ADMINISTRATIVE INFORMATION

Project Number ORHZ00S
Project Name Camp Parks RFTA Bldg 888
Project Manager Mike Sartor
Operating Unit Oakland
Site Safety Officer Bill Loskutoff
Health & Safety Officer Jeff Mohu
Date of Issue June 25, 1996
Effective Dates 6/25/96 - 6/25/97

SITE INFORMATION (attach map of site)

Location: Northeast corner of Munroe Ave & 4th streets within Camp Parks Reserve Forces Training Area.

Pertinent History: Camp Parks is a multi-use installation that hosts a variety of tenants both military & civilian. Building 888 was the facilities service station for fueling transport vehicles. The tanks were installed in 1951. The service station has been inoperable since 1984.

Material(s) Spilled: TPH-diesel, leaded gasoline, waste oil

FIELD ACTIVITIES

Underground Storage Tank removal activities including subcontractor supervision, soil and groundwater sampling, health and safety monitoring of air quality in worker breathing zones.

EMERGENCY TELEPHONE NUMBERS

| | |
|---|---|
| Fire Department | 911 |
| Ambulance | 911 |
| Hospital | (510) 847-3000 |
| Project Manager | (510) 874-3173 |
| Health & Safety Officer | (510) 874-3146 |
| Hospital (Emergency Room) | (510) 447-7000 |

FORM HS-507
SITE SAFETY PLAN
FIELD INVESTIGATION OF UNDERGROUND FUEL SPILLS


HOSPITAL INFORMATION

Name: Valley Care Medical Center

Address: 5555 W. Las Positas Blvd., Pleasanton, CA.

Route: From site take Arnold Rd. South to Dublin Blvd., turn left (east) on Dublin Blvd. to Hacienda Dr. Go south over Interstate 580 to Owens Drive. Turn left (east) on Owens Dr to W. Las Positas Blvd. Turn left on W. Las Positas Blvd., hospital is on left side at 5555 W. Las Positas Blvd

AUTHORIZED FIELD PERSONNEL

| | |
|---|---|
| Mike Sartor | |
| Bill Loskutoff | |
| | |

NAME OF SUBCONTRACTORS (field work)

Name: IT Corporation Telephone Number: (510) 372-9100

Address: 4585 Pacheco Blvd, Martinez, CA 94553-2233

Authorized Representatives: Jamie Hargrave

Name: _____ Telephone Number: _____

Address: _____

Authorized Representative: _____

APPROVALS

Jm Sexton — Project Manager — 6/25/96 Date

_____ Health & Safety Officer — _____ Date

A. Baptiste — Corporate Health & Safety Officer* — 6-25-96 Date

* Signature required only for modified plans.

# 507.0 PROCEDURES FOR FIELD INVESTIGATIONS OF UNDERGROUND SPILLS OF GASOLINE AND OTHER PETROLEUM DISTILLATE FUELS

## 507.1 PURPOSE

The purpose of this procedure is to establish sound and uniform health and safety procedures and guidelines for field operations associated with investigations of leakage of petroleum hydrocarbon fuels from underground storage tanks and pipes. When this procedure is used, Form HS-507 must be completed and approved and attached to the front of this procedure. Together the procedure and completed form shall comprise a site-specific safety plan.

## 507.2 SCOPE

This procedure identifies the types of fuels and field activities to which it applies, assesses the hazards of fuels, and describes risk control measures.

## 507.3 APPLICABILITY

This procedure applies to: collection of samples of surface and subsurface soil; construction, completion, testing, and abandonment of groundwater monitoring wells; collection of water samples from new and existing wells; and observing removal of underground fuel pipes and storage tanks at facilities that currently dispense or store:

(1) leaded gasoline,
(2) unleaded gasoline,
(3) gasohol,
(4) Numbers 1, 1D (diesel), 2, 2D (diesel), 4, 5, or 6 fuel oils,
(5) jet A, jet A-1, jet B, JP-1, JP-3, JP-4, and JP-5 fuels,
(6) crankcase oil,
(7) methanol (when used as a motor fuel), and/or

(8) stoddard solvent.

This procedure shall not be used for confined space entry or for installing or operating pilot and full-scale fuel recovery systems. This plan may be used for the installation of vapor extraction systems only by appropriate modification and proper health and safety approvals. It is also not applicable to field work performed at refineries, sites where spills of chemicals other than the substances listed above have occurred, sites of unusual hazard, and any other site or activity for which the use of this plan is identified as inappropriate by the Operating Unit Health and Safety Officer (HSO).

This plan is applicable to work involving the removal of underground fuel pipes and storage tanks only when used with and attached to the American Petroleum Institute (API) Recommended Practice 1604, Second Ed. 1987 as revised March 6, 1989, Removal and Disposal of Used Underground Petroleum Storage Tanks (attached).

This plan is applicable to work involving borings with power equipment only when used with and attached to Woodward-Clyde Operating Procedure HS-203, Safety Guidelines For Drilling.

This plan is applicable to work involving entry into excavations by Woodward-Clyde (W-C) or Woodward-Clyde subcontractor personnel only when used with and attached to Woodward-Clyde Operating Procedure HS-204, Safety Procedures for Trenching/Excavation.

## 507.4 RESPONSIBILITY AND AUTHORITY

A completed Form HS-507 shall be approved by the Project Manager and HSO prior to beginning work.

The Project Manager (PM) has overall responsibility for safe conduct of all field work, including ensuring full implementation of this procedure by the site manager, project staff and subcontractors assisting with field work. The PM shall assign (with the concurrence of the Operating Unit HSO or Health and Safety Coordinator (HSC)) a Site Safety Officer (SSO) to attend to day-to-day health and safety matters in the field. The

PM may elect, if qualified, to serve as SSO. The SSO must be on-site whenever work by employees of W-C or its subcontractors is being performed at the site.

Both the PM and SSO are authorized to suspend work when working conditions become unacceptable and are authorized to remove from the site any W-C and subcontractor employee whose conduct endangers the health and safety of the employee or of others.

## 507.5 HAZARD EVALUATION

Petroleum distillate fuels are mixtures of aliphatic and aromatic hydrocarbons, the constituent concentrations of which can vary significantly dependent upon the crude feedstock, refining process, and seasonal variations. The predominant types of compounds in fuels are paraffins (e.g., pentane, hexane), naphthenes (e.g., cyclohexane) and aromatics (e.g., benzene, toluene, polynuclear aromatics). Gasoline contains about 80 percent paraffins, 6 percent naphthenes, and 14 percent aromatics. JP-1 and 4 contain up to 48 percent paraffin, 38 percent naphthenes, and 20 percent aromatics. Fuel oils and certain jet fuels (JP-3 and 5) contain about 10 percent paraffin, up to 23 percent naphthenes, and up to 78 percent non-volatile aromatic hydrocarbons. Gasohol is gasoline containing 10 to 40 percent ethyl alcohol. Methanol as it is used as a motor fuel typically contains up to 20% gasoline to improve cold starting characteristics as a safety factor to provide a visible flame. To improve their burning properties, compounds such as tetraethyl-lead, methyl tertbutyl ether (MTBE) and ethylene dibromide (EDB) are often added to automotive and aviation fuels.

Petroleum distillate fuels exhibit relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm gasoline vapor have been reported to cause eye, nose, and throat irritation in people after several hours of exposure. Levels of 500 to 900 ppm have been reported to cause irritation and dizziness in one hour and 2,000 ppm has been reported to cause mild anesthesia in 30 minutes. Gasoline, kerosene, and some jet fuels will cause severe eye irritation on contact with the eye and low to moderate skin irritation on contact with the skin. Methanol can be toxic by either skin or inhalation exposure, and is unique in that it attacks the optic nerve. Methanol blindness can be irreversible.

Ingestion of 10 to 15 grams (2 to 3 teaspoons) of gasoline has caused death in children. In adults, ingestion of 20 to 50 grams may produce severe symptoms of poisoning. The most dangerous aspect of ingestion of these motor fuels is the development of chemical pneumonia from the aspiration of gasoline or other fuels aspirating into the lungs. Aspiration of very small quantities of these motor fuels into the lungs is often fatal. Some gasoline additives, such as ethylene dichloride, ethylene dibromide, and tetraethyl- and tetramethyl-lead are highly toxic materials; however, their concentrations in gasoline are so low that their contribution to the overall toxicity of gasoline is negligible in most instances.

Benzene is a minor component of petroleum distillate fuels with concentrations ranging from non-detectable to 5%, with gasoline typically at 1%. Benzene has been classified a known human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH) based on the increased incidence of leukemia in certain oil refinery workers.

Petroleum distillate fuels are flammable. Under certain conditions, this property presents a greater risk than toxicity. Six of the fuels covered by this procedure are classified by the Federal Department of Transportation as flammable liquids as all six typically have flash points of 100 degrees F or less. These fuels are gasoline, gasohol, Jet B, JP-1, JP-4, and No. 1 fuel oil. Lower explosive limits of the fuels range from 0.6 to 1.4 percent (6,000 to 14,000 ppm).

## 507.6 HEALTH AND SAFETY CLEARANCE

W-C employees as well as subcontractor employees assigned to perform field activities covered by this procedure must be currently approved for hazardous waste field work, including:

- Current medical clearance to conduct hazardous waste field work and to wear a respirator;

- Successful completion of a respirator fit test within the last 12 months for the make and model of the respirator assigned to that individual for use

at that site;

- Completion of training as required by Title 29 Code of Federal Regulations (CFR) 1910.120(e), including either:

  - 40 hours of hazardous waste worker basic instruction within the last 12 months, or,

  - 8 hours of hazardous waste worker refresher training within the last 12 months, subsequent to completion of 40 hours of basic hazardous waste worker training.

## 507.7 HEALTH AND SAFETY BRIEFING

Before field work begins, all field personnel, including subcontractor employees, must be briefed on their work assignments and the provisions of this procedure, and each person briefed must be given a copy of this document and each must acknowledge receipt and willingness to comply by submitting a signed safety compliance agreement to the W-C Project Manager. Individuals refusing to sign the agreement will be prohibited from working at the site.

## 507.8 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equipment listed below must be available on-site in appropriate sizes for use when needed.

1. National Institute for Occupational Safety and Health (NIOSH) approved full- or half-face respirator with organic vapor cartridges. Respirators must be worn when airborne hydrocarbon action levels are reached or exceeded.

2. Saranex or polyethylene coated Tyvek coveralls. Coated coveralls must be worn when product quantities of fuel are encountered and when fuel-saturated soil is handled.

3. Safety goggles or glasses. Must be worn when working within 10 feet of operating heavy equipment (e.g., drill rig, backhoe). Must be splash-proof when handling concentrated fuel product.

4. Nitrile or neoprene gloves for all fuels except methanol. Workers handling methanol must wear butyl gloves. Gloves must be worn when handling contaminated soil or water, or when drilling or digging into contaminated soil. Confirm with your HSO the applicability of model and brand of gloves!

5. Neoprene or butyl rubber safety boots, calf-length. Must be worn when walking on obviously contaminated soil and when working within 10 feet of operating heavy equipment.

6. Hard hat. Must be worn when working within 10 feet of operating heavy equipment.

## 507.9 ORGANIC VAPOR MONITORING

### 507.9.1 Monitoring Instruments

Two instruments are required for this work:

1) Combustible Gas/Oxygen indicator (CGI/$O_2$) with readout in % Lower Explosive Limit (LEL) and $\%O_2$.

2) Photoionization (PID) field survey instrument (HNU, ThermoEnvironmental 580A, Photovac Microtip, or equivalent)*, or, Flame ionization (FID) field survey instrument (Foxboro OVA or equivalent).

*PID instruments cannot readily detect methanol, and therefore may NOT be used on sites where methanol is or may be encountered.

### 507.9.2 Toxicity Action Levels

The toxicity action levels given below are set to comply with Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels and ACGIH Threshold Limit Values (TLV). Gasoline averages approximately 1% benzene. Therefore, for fuels which may contain benzene, the action levels specified below are also set to comply with the proposed TLV of 0.1 ppm. These action levels are also adjusted for the relative response of common PID or FID instruments to motor fuel vapors.

Respirators must be worn when meter readings averaged over 10 minutes equal or exceed the action level for upgrade to Level C PPE. Workers must be evacuated from the area when organic vapor concentrations exceeding respiratory protective equipment protection factors are encountered.

#### 507.9.2.1 Toxicity Action Levels for Gasoline and Jet B

**TOXICITY ACTION LEVELS**
**GASOLINE AND JET B**
**(in PPM)**

| Instrument | Calibration Gas | Action Upgrade to Level C | Evacuate |
|---|---|---|---|
| Photoionization meter# (10.0 to 10.2 eV lamp) | HNU calibration gas* or Benzene | 4 | 40**<br>200*** |
| Photoionization meter# (10.0 to 10.2 eV lamp) | Isobutylene | 6 | 60**<br>300*** |
| Flame ionization meter (OVA-128) | Methane | 10 | 100**<br>500*** |

# Photoionization instruments do not work and shall not be used for work in high (>90%) humidity or rainy weather, or sites where methanol is or may be present.

* Although the calibration gas purchased for the HNU is isobutylene, the concentration identified on the cylinder for calibration of a HNU with 10.2 eV lamps is a benzene equivalent.

** for workers wearing half-face respirators.

*** for workers wearing full-face respirators.

507.9.2.2 Toxicity Action Levels for Fuels other than Gasoline and Jet B

TOXICITY ACTION LEVELS
FUELS OTHER THAN GASOLINE, METHANOL AND JET B
(in PPM)

| Instrument | Calibration Gas | Action Upgrade to Level C | Evacuate |
|---|---|---|---|
| Photoionization meter# (10.0 to 10.2 eV lamp) | HNU calibration gas* or Benzene | 20 | 100** 600*** |
| Photoionization meter# (10.0 to 10.2 eV lamp) | Isobutylene | 35 | 200** 600*** |
| Flame ionization meter (OVA-128) | Methane | 100 | 300** 600*** |

# Photoionization instruments do not work and shall not be used for work in high (>90%) humidity or rainy weather.

* Although the calibration gas purchased for the HNU is isobutylene, the concentration identified on the cylinder for calibration of HNU's with 10.2 eV lamps is a benzene equivalent.

** for workers wearing half-face respirators.

*** for workers wearing full-face respirators.

All instruments shall be calibrated both immediately prior to commencing the day's field work and after work ceases for the day. Calibration and monitoring records shall be kept in the project file and provided to the operating unit HSO. Records shall include:

- Worker's name,
- Date,
- Time,
- Location,
- Temperature and humidity, and
- Calibration gas identity and concentration.
- Exposure data (time, location, and concentration)

### 507.9.3 Explosion Hazard Action Levels

The explosivity action levels below are set to prevent the creation of flammable or explosive atmospheres. Measurements should be taken at all locations where personnel are present or power/hand tools are in use. API procedures shall be followed for measurements in tanks or piping.

**EXPLOSIVITY ACTION LEVELS**
**(% of the LEL)**

| Instrument | Action Level (Evacuate) |
|---|---|
| Combustible Gas Indicator | 20% |

The Combustible Gas Indicator (CGI) alarm must be set to sound at the action level. For this work it is highly recommended that hexane or methane to a pentane standard

be used for calibration.

When measurements with a CGI indicate the presence of combustible gas levels equal to or exceeding the explosivity action level in the work area, the following action must be taken:

1. Extinguish all possible ignition sources in the work area and shut down all powered equipment.

2. Move personnel at least 100 feet away from work area.

3. Contact the Health and Safety Officer.

4. At the instruction of the HSO and after waiting 15 minutes for organic vapors to dissipate, the SSO or PM may use the CGI to, cautiously and with prudence, approach the worksite to determine the extent and concentration of organic emissions. The SSO or PM shall not enter any area where CGI readings exceed the explosivity action level, nor shall the SSO or PM make any approach if there is possibility of fire or explosion.

5. Personnel may reenter the work area only by clearance of the HSO after the cause of the emission has been determined and the source abated.

6. Prepare incident report and submit to the HSO.

### 507.9.4 Monitoring Guidelines

Personnel exposure monitoring should be performed as often as necessary and wherever necessary to protect field personnel from hazardous concentrations of organic vapors. Monitoring must be performed by individuals trained in the calibration, use and care of the required instruments.

Toxicity action levels are considerably lower then explosivity action levels. Therefore, initial and periodic monitoring should be conducted with the PID or FID. Monitoring

shall be conducted in the worker's breathing zone, which is a 1 foot diameter sphere surrounding the worker's head. The alarm on this instrument should be set to sound at the action level. If vapors are measured continuously and the instrument must be unattended, the detector inlet should be located as close to the worker's breathing zone as possible. Decisions regarding respirator use should be based on breathing zone vapor concentrations of personnel expected to have the greatest exposures. Particular effort should be made to monitor personnel exposures while trenching, boring or tank inerting progresses.

Explosivity monitoring should be continuous, with the detector set at a location near and downwind of the source of emission. Additional monitoring with the CGI should be performed when organic vapor concentrations exceed the ppm range of the PID or FID instrument. If the alarm sounds while continuously monitoring with a CGI, initiate shut-down and evacuation procedures immediately.

**507.10 AREA CONTROL**

Access to hazardous and potentially hazardous areas of spill sites must be controlled to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors, and the public. A hazardous or potentially hazardous area includes any area where (1) field personnel are required to wear respirators, (2) borings are being drilled with powered augers, or (3) excavating operations with heavy equipment are being performed.

The boundaries of hazardous and potentially hazardous areas must be identified by cordons, barricades, or emergency traffic cones or posts, depending on conditions. If such areas are left unattended, signs warning of the danger and forbidding entry must be placed around the perimeter if the areas are accessible to the public. Trenches and other large holes must be guarded with wooden or metal barricades spaced no further than 20 feet apart and connected with yellow or yellow and black nylon tape not less than 3/4-inches wide. The barricades must be placed no less than two feet from the edge of the excavation or hole.

Entry to hazardous areas shall be limited to individuals who must work in those areas.

Unofficial visitors must not be permitted to enter hazardous areas while work in those areas is in progress. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter only if they agree to abide by the provisions of this document, follow orders issued by the site safety officer, and are informed of the potential dangers that could be encountered in the areas.

## 507.11 DECONTAMINATION

Field decontamination of personnel and equipment is not required except when contamination is obvious (visually or by odor). Recommended decontamination procedures follow.

### 507.11.1 Personnel Decontamination

Gasoline, kerosene, jet fuel, and gasohol should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid dishwashing detergent is more effective than hand soap.

### 507.11.2 Equipment Decontamination

Gloves, respirators, hard hats, boots and goggles should be cleaned as described under Section 507.11.1; however, if boots do not become clean after washing with detergent and water, wash them with a strong solution of trisodium phosphate and hot water.

Sampling equipment, augers, vehicle undercarriages, and tires should be steam or high pressure washer cleaned. The steam cleaner is a convenient source of hot water for personnel and protective equipment cleaning.

## 507.12 SMOKING

Smoking and open flames are strictly prohibited at sites under investigation.

## 507.13 INERTING OF TANKS

Whenever W-C personnel must be present during removal or transport of fuel storage tanks, the SSO or designee must determine whether or not the procedures to be used by the firm responsible for tank removal/transport agree with API Recommended Practice 1604, Second Ed. 1987 as revised March 6, 1989, Removal and Disposal of Used Underground Petroleum Storage Tanks. If the firm's procedures, especially those addressing removal/inactivation of flammable vapors, disagree substantially with API's procedures, the PM and HSO must be notified immediately (by telephone, if possible). In turn, the PM shall inform the client that W-C personnel will not report to the site during tank/removal operations unless proper procedures are used. If the firm responsible for tank removal/transport is under subcontract to W-C, the W-C project manager shall require the subcontractor to follow API procedures.

## 507.14 EXCAVATIONS

Tank or pipe removal may involve trenching/excavation operations. W-C employees or contractors shall use remote sampling such as poles or backhoe buckets to avoid excavation entry. If the excavations must be entered, the hazards of trench collapse and accumulated vapors must be considered. W-C Operating Procedures for Confined Space Entry (HS-205) and Safety Guidelines for Trenching/Excavations (HS-204) must be followed.

# 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.

amended version will also be meeting the requirements of the 1987 edition, and EPA encourages the use of the most recent version.

Table of Contents

Change SECTIONS 3 and 4 to read as follows:

SECTION 3 - PERMANENT CLOSURE AND CHANGE OF SERVICE
3.1 General Requirements
3.2 Disposal in Place
3.3 Removal of Underground Tanks
3.4 Change of Service

Renumber SECTIONS 5, 6, and 7 to SECTIONS 4, 5, and 6.

Page 2

In subsection 1.3.1.1 Benzene, delete all material starting with the fourth sentence in the paragraph ("The American Conference . . . ") to the end of the paragraph and substitute the following:

The Occupational Safety and Health Administration (OSHA) imposes limits on occupational exposure. See 29 C.F.R. 1910.1000, Table Z-2, and 1910.1028.

Page 3

Delete the material under Section 2.1 Applicability and substitute the following:

An UST is considered temporarily out of service if it is:
a. Idle but will be returned to service;
b. Awaiting abandonment in place; or
c. Awaiting removal.
An UST that meets EPA's standards for new tanks or that has been upgraded in accord with EPA requirements can remain in the status of "temporarily out of service" indefinitely. An UST that does not meet EPA standards must be permanently removed from service after 12 months unless the implementing agency grants an extension. A site assessment must be completed before an extension can be applied for.

Add the following sentence to Section 2.2 Securing Tank Systems, subsection b.2.:

(If more than 2.5 centimeters (1 inch) of residue or more than 0.3 percent of the capacity of the system remain in

the tank, then release detection measures must be continued.)

Add a new major title SECTION 3 -- PERMANENT CLOSURE AND CHANGE OF SERVICE, and insert the following sections:

3.1 General Requirements

3.1.1 Applicability

Permanent closure of an UST can take place through abandonment in place or removal from the ground. A change of service (that is, conversion of the UST to storage of a non-regulated substance) should also be subject to many of the safeguards that apply to permanent closure.

3.1.2 Notification

The implementing agency must be notified at least 30 days before permanent closure or change of service is begun.

3.1.3 Site Assessment

Following notification, but before closure or change of service is completed, a site assessment must measure for the presence of a release at those places where contamination is most likely to be found. If the UST has been subject to release detection in the form of vapor monitoring, ground water monitoring, interstitial monitoring (in the form of monitoring between the walls of double wall tanks or observation wells), and if no release is indicated, then further site assessment is not necessary.

3.1.4 Corrective Action

If the site assessment indicates that a release(s) has occurred, then appropriate further evaluation and corrective action must be undertaken. See API Publication 1628.

3.1.5 Recordkeeping

Records demonstrating compliance with closure requirements must be maintained. The results of any site assessment of the excavation must be maintained for at least three years. These records can be kept by the owners and operators who took the tank out of service, by the current owners of the site, or by mailing the records to the implementing agency.

Change "SECTION 3 -- DISPOSAL IN PLACE" to "Section 3.2 Disposal in Place," and renumber the subsections accordingly.

Page 4

Insert the following material after the first sentence of present subsection 3.2.4 [renumbered to be 3.2.2.4]:

> During removal of liquids or residues from a tank it is likely that air will enter the tank, and may bring the tank atmosphere into the flammable range. Extra care should be taken during removal operations. For a complete description of safety precautions, refer to API Publication 2015.

Page 5

Change "SECTION 4 -- REMOVAL OF UNDERGROUND TANKS" to "Section 3.3 Removal of Underground Tanks," and renumber the subsections accordingly.

Page 7

Delete the present section 4.4.3 [renumbered to be 3.3.4.3] and substitute the following:

> Present 4.4.3 [Renumbered to be 3.3.4.3] When an existing USTS is partially or totally removed, a small amount of contaminated backfill may be encountered. Backfill can be contaminated by minor spills and drips during previous operation of the facility or by minor spills and drips during removal of equipment, despite efforts to drain and pump product from the equipment before removal. If severe contamination has occurred, local environmental officials and/or fire officials should be notified. Local officials may require isolation and special handling and/or disposal of contaminated backfill materials (see API Publication 1628). The implementing agency should be consulted about any requirements concerning notification, site assessment, or corrective action.

Page 8

Insert a new "Section 3.4 Change of Service" and add the following material:

> 3.4.1 Before a change of service, the UST must be emptied and cleaned.

3.4.2 Any new service should be compatible with the former service. The precautions described in sections [old numbers] 4.4.4 and 4.4.5, above, should be observed.

Pages 8-9

Renumber SECTIONS 5, 6, and 7 as SECTIONS 4, 5, and 6, and renumber subsections accordingly.

# Removal and Disposal of Used Underground Petroleum Storage Tanks

**Marketing Department**

API RECOMMENDED PRACTICE 1604
SECOND EDITION, DECEMBER 1987

American
Petroleum
Institute

## 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.

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# 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.

# CONTENTS

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 I, 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

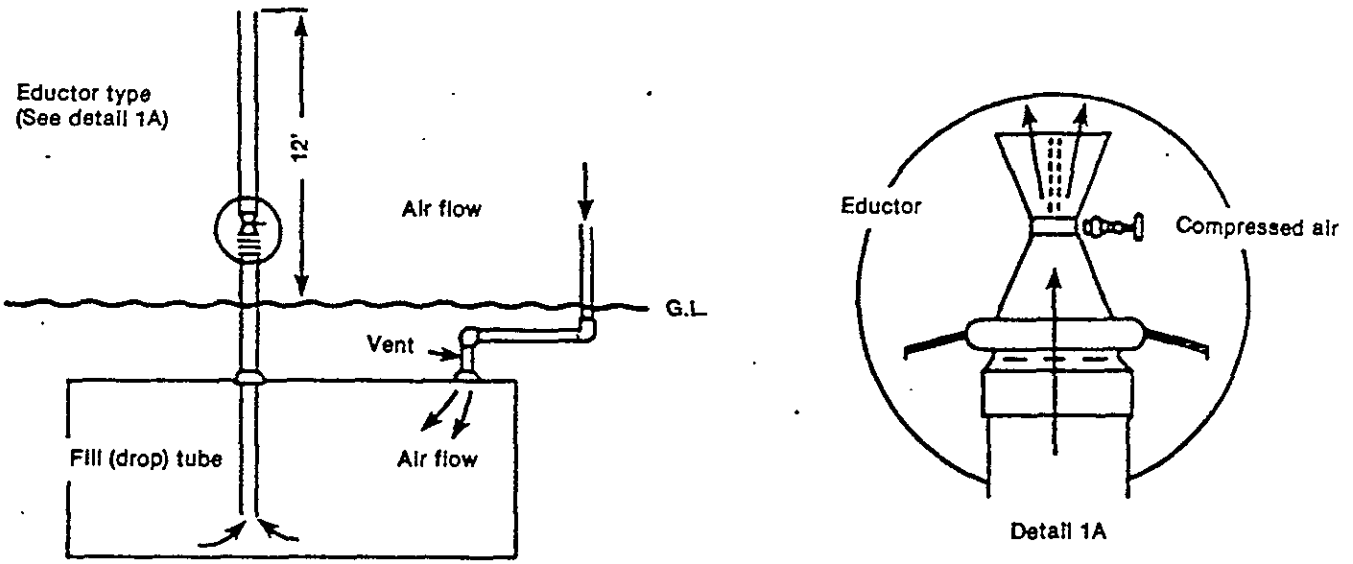
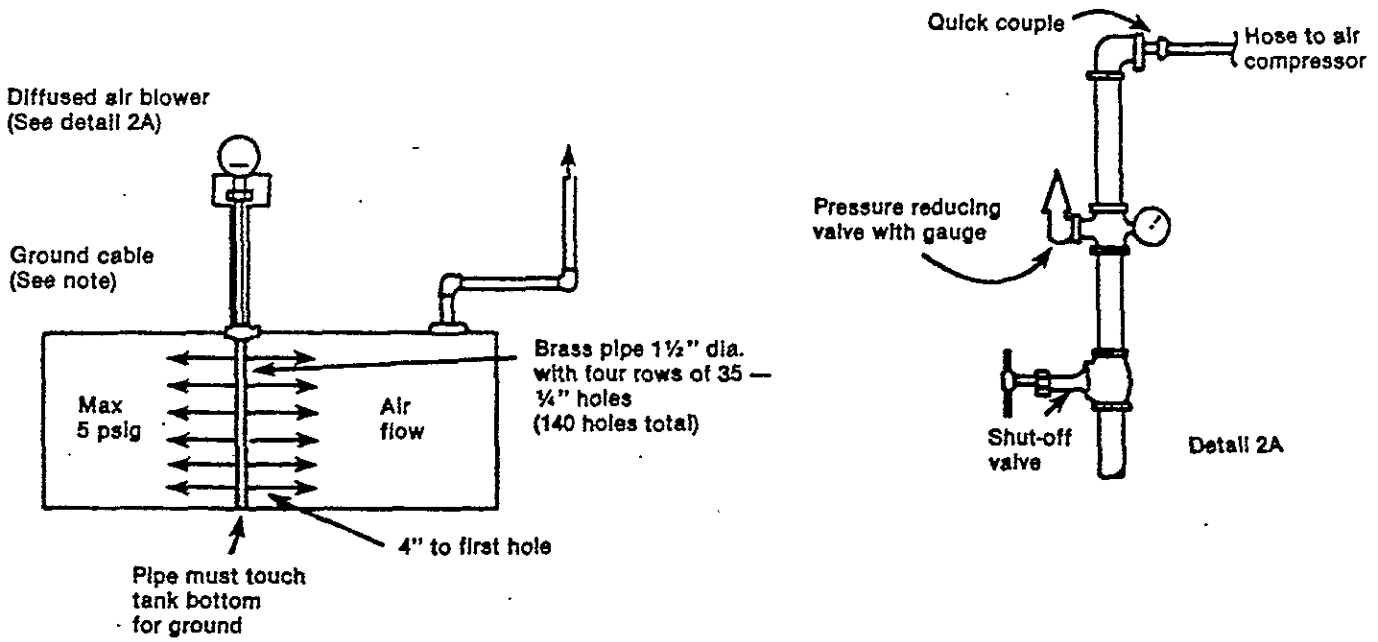



Figure 1—Eductor-Type Air Mover




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.

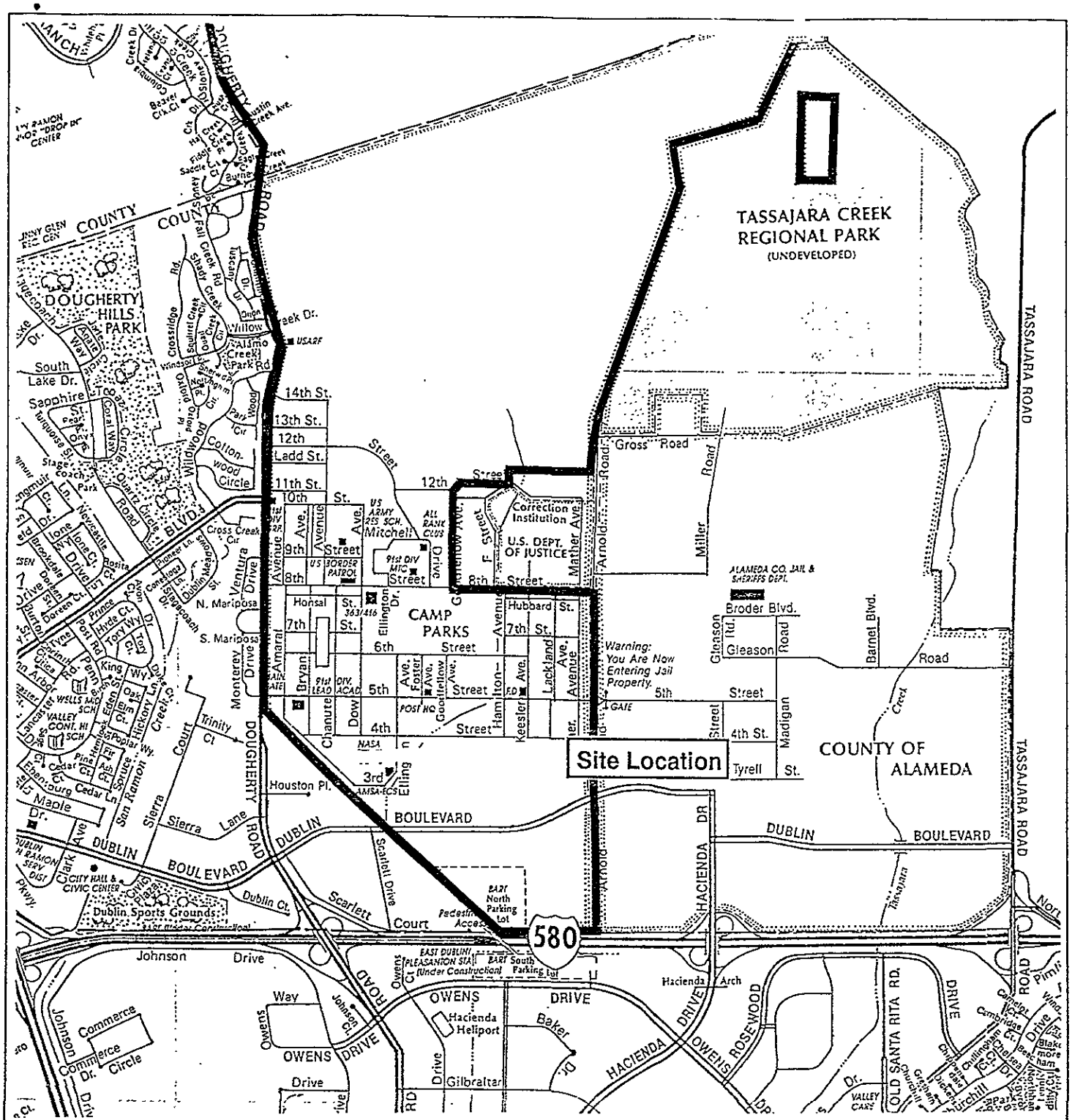
## 7.2 Disposal Procedures

**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.

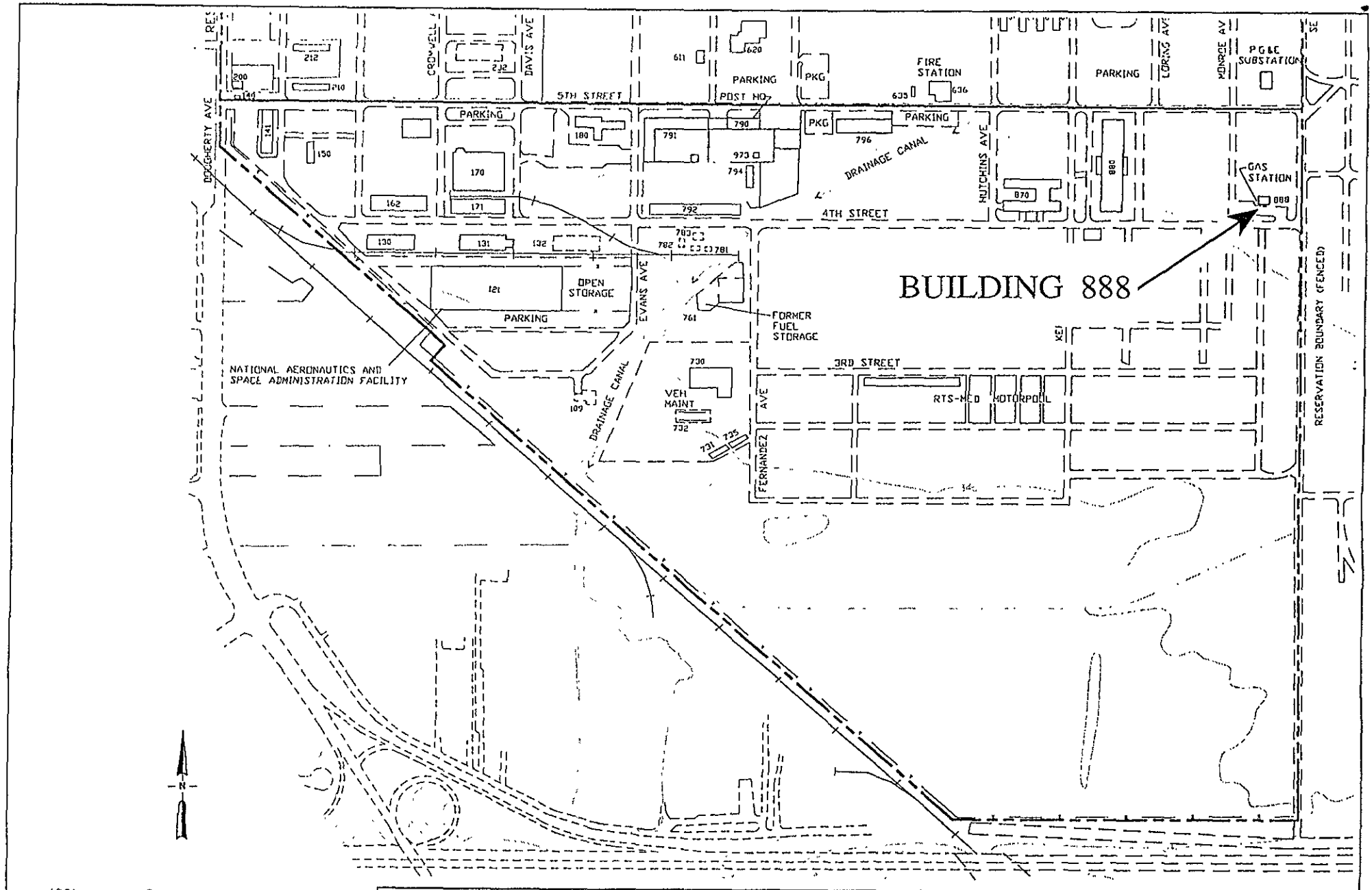
**7.2.2** All tanks should be labeled as described in 4.4.4 and 4.4.5.

**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.




| Project No. 7112 | Parks Reserve Forces Training Area | SITE LOCATION MAP | Figure 1 |
|---|---|---|---|
| Woodward-Clyde | | | |




| Project No. ORHZ005 | CAMP PARKS | SITE MAP | Figure 2 |
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| Woodward-Clyde | | | |


| Project No. 7112 | Parks Reserve Forces Training Area |
|---|---|
| Woodward-Clyde | |

# Route to Hospital

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