# Closure of Underground Petroleum Storage Tanks

API RECOMMENDED PRACTICE 1604
THIRD EDITION, MARCH 1996
REAFFIRMED, NOVEMBER 2001



# API ENVIRONMENTAL, HEALTH AND SAFETY MISSION AND GUIDING PRINCIPLES

The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. We recognize our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to the following principles using sound science to prioritize risks and to implement cost-effective management practices:

- To recognize and to respond to community concerns about our raw materials, products and operations.
- To operate our plants and facilities, and to handle our raw materials and products in a manner that protects the environment, and the safety and health of our employees and the public.
- To make safety, health and environmental considerations a priority in our planning, and our development of new products and processes.
- To advise promptly, appropriate officials, employees, customers and the public of information on significant industry-related safety, health and environmental hazards, and to recommend protective measures.
- To counsel customers, transporters and others in the safe use, transportation and disposal of our raw materials, products and waste materials.
- To economically develop and produce natural resources and to conserve those resources by using energy efficiently.
- To extend knowledge by conducting or supporting research on the safety, health and environmental effects of our raw materials, products, processes and waste materials.
- To commit to reduce overall emissions and waste generation.
- To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.
- To participate with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment.
- To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

# Closure of Underground Petroleum Storage Tanks

**Manufacturing, Distribution and Marketing Department**

API RECOMMENDED PRACTICE 1604
THIRD EDITION, MARCH 1996

American Petroleum Institute

**Helping You Get The Job Done Right.**SM

## 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. 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.

5. 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 FIVE YEARS AFTER ITS PUBLICATION DATE AS AN OPERATIVE API STANDARD OR, WHERE AN EXTENSION HAS BEEN GRANTED, UPON REPUBLICATION. 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.

# FOREWORD

Underground storage tank systems that have held flammable or combustible liquids should be handled with extreme care during closure 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 closure 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.

On September 23, 1988, the United States Environmental Protection Agency (EPA) issued its *Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks Systems (UST).* These standards are Part 280 of Volume 40 of the *Code of Federal Regulations.* Furthermore, legislation and regulations on all aspects of UST management have been developed at state and local levels of government. These levels may have requirements other than those specified in the EPA *Technical Standards,* and the appropriate government agencies should be consulted about regulations that apply in the geographic area of interest before any action suggested by this recommended practice is taken. When used in this document, the term "implementing agency" means EPA or the designated state or local agency responsible for carrying out an approved UST program.

This recommended practice is based upon the experience of knowledgeable members of the petroleum industry. In some respects it may be more stringent than the requirements imposed by the *Technical Standards.* However, this recommended practice does not attempt to cover all of the subjects covered by the EPA *Technical Standards.* Furthermore, while substantial effort has been made to ensure that none of the recommendations contravene the requirements of the *Technical Standards,* API is not undertaking to interpret the *Standards* and cannot guarantee that its recommendations are completely in accord. Nor is any representation made that these recommendations conform with any requirements imposed by state and local agencies. This edition of API Recommended Practice 1604 supersedes the 1987 second edition in its entirety. The EPA *Technical Standards* provide that Recommended Practice 1604 can be used as a guide to compliance with EPA's requirements governing closure of USTs. According to EPA, an owner or operator conforms with this provision of the *Standards* if it uses the 1987 edition, which was in force when the *Standards* became final. However, an owner or operator who uses this amended version will also be meeting the requirement of the 1987 edition, and EPA encourages the use of the most recent version.

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.

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

## CONTENTS

# Closure of Underground Petroleum Storage Tanks

## SECTION 1—GENERAL

### 1.1 Introduction

Underground petroleum storage systems that are no longer needed or suitable for product storage, or are not in compliance with applicable regulations and are not brought into compliance by upgrading or replacing, must be properly closed in place or removed 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 closure 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, and 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 notified and consulted concerning applicable regulatory and permit requirements.

**1.2.2** All applicable permits must be obtained prior to beginning any work. Certified or licensed contractors may be required in some states. Consult the implementing agency for contractor requirements. Contractors, subcontractors, and their employees responsible for tank closure in place or removal should be familiar with:

a. All applicable safety rules and regulations, including OSHA's *Occupational Safety and Health Standards* (29 *Code of Federal Regulations* Part 1910).

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

d. The applicable sections of the publications referenced in 1.4.

**1.2.3** Under applicable federal regulations, including 40 *Code of Federal Regulations* Part 280, an underground storage tank system (UST) consists of the underground storage tank and the connected underground piping, underground ancillary equipment and containment system, if any. The procedures outlined in this recommended practice can be applied to all portions of an underground storage tank system.

**1.2.4** The procedures outlined in this recommended practice can be carried out without entering the tank. Should tank entry be desired, the procedures outlined in API Publications 2015, 2015A, and 2217 and API Recommended Practice 1631 should be followed. See also 29 *Code of Federal Regulations* Part 1910.147 regarding "Permit required confined spaces."

### 1.3 Special Precautions

During 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 FOR PETROLEUM SUBSTANCES

All personnel 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 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 or around 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