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Standard Guide for Environmental Management of Underground Storage Tank Systems Storing Hazardous Substances or Petroleum[1]

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INTRODUCTION

This guide provides an overview of environmental practices for design, installation, operation and maintenance, and corrective action for underground tank systems used for storage of hazardous substances and petroleum products. The training and application of these practices should serve to prevent accidental releases of petroleum or hazardous substances from underground storage tank systems and to facilitate effective detection and response when and if such releases do occur. The guide is intended for use by tank system owners and operators and other persons concerned with practices for prevention and control of environmental releases and remediation of affected environmental media. The guide provides an overview of environmentally sound management practices, identifying key management considerations and referring the user to other related ASTM standards and industry guidelines for more detailed information. All personal safety considerations are not addressed in this guide, and it is the responsibility of the user to identify relevant safety and health protection practices and regulations related to tank system management. Caution is warranted due to the flammable or combustible property of some materials stored in underground storage tanks. Fire codes should be followed.

1. Scope

1.1 The framework discussed in this guide is limited to facilities with underground storage tanks (USTs) storing hazardous substances or petroleum at ambient temperature and atmospheric pressure. This guide is not intended to provide detailed technical specifications for implementation of the approaches described in this document, nor to be used as an enforcement tool, but rather to identify the important information used for environmental management of underground tank systems. The term "must" is used where United States federal requirements apply. References to ASTM standards and other industry guidelines have been provided to address implementation of the approaches discussed in this guide. Many states and some local agencies have adopted UST rules that place additional responsibilities on the owners/operators of UST systems. Refer to state and local regulations that may contain additional requirements. It is not possible to identify all considerations or combinations of conditions pertinent to a unique underground storage tank system.

1.2 This guide addresses principal considerations related to the prevention and response for environmental releases from tank systems and is organized in the sections listed below:

Section 1:	Scope
Section 2:	Lists relevant ASTM Standards and other industry or regulatory guidance documents
Section 3:	Defines the key terminology used in this guide
Section 4:	Describes the significance and use of this guide
Section 5:	Tank System Design and Installation
Section 6:	Preventive Maintenance and Inspection Plan
Section 7:	Fueling Procedure
Section 8:	Corrective Action for Affected Environmental Media
Section 9:	Tank System Closure
Section 10:	Tank Management Practice Education and Training
Appendix X1:	Recurring Release Detection and Cathodic Protection Requirements (Quick Glance) is intended to be a quick reference guide for monitoring information
Related Material:	Documents related to environmental management of underground storage tanks

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1.3 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Some specific hazards statements are given in Section 7 on Hazards.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D5745 Guide for Developing and Implementing Short-Term Measures or Early Actions for Site Remediation

E1739 Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites

E1912 Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases

E1990 Guide for Performing Evaluations of Underground Storage Tank Systems for Operational Conformance with 40 CFR, Part 280 Regulations

E2081 Guide for Risk-Based Corrective Action

E2616 Guide for Remedy Selection Integrating Risk-Based Corrective Action and Non-Risk Considerations

2.2 *American Petroleum Institute (API) Standards:*[3]

API RP 1007 Loading and Unloading of MC-306 and DOT-406 Cargo Tank Motor Vehicles

API RP 1604 Closure of Used Underground Petroleum Storage Tanks

API RP 1615 Installation of Underground Petroleum Storage Systems

API RP 1621 Bulk Liquid Stock Control at Retail Outlets

API RP 1626 Storage and Handling of Ethanol and Gasoline-Ethanol Blends at Distribution Terminals and Filling Stations

API Publication 1628 Guide to the Assessment and Remediation of Underground Petroleum Releases

API Publication 1629 Guide for Assessing and Remediating Petroleum Hydrocarbons in Soils

API RP 1632 Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems

API Publication 4509 Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities

2.3 *Underwriters Laboratory (UL) Standards*[4]

UL 58 Standard for Steel Underground Tanks for Flammable and Combustible Liquids

UL 87A Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 - E85)

UL 971 Standard for Nonmetallic Underground Piping for Flammable Liquids

UL 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures

UL 1746 Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks

2.4 *National Association of Corrosion Engineers (NACE) Standards*[5]

NACE RP0285 Control of External Corrosion on Underground or Submerged Metallic Piping Systems

NACE Corrosion Data Survey Metals and Nonmetals Sections. Hamner, N.E. (ed.), 1975

2.5 *National Fire Protection Association (NFPA) Standards:*[6]

NFPA 30 Flammable and Combustibles Liquids Code

NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair Garages

NFPA 326 Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair

NFPA 385 Standard for Tank Vehicles for Flammable and Combustible Liquids

2.6 *Petroleum Equipment Institute (PEI) Standards:*[7]

PEI RP100 Recommended Practice for Installation of Underground Liquid Storage Systems

PEI RP900 Recommended Practices for the Inspection and Maintenance of UST Systems

2.7 *Steel Tank Institute (STI) Standards:*[8]

STI-P3 System for External Corrosion Protection of Underground Steel Storage Tanks

STI F841-01 Standard for Dual Wall Underground Steel Storage Tanks

STI ACT-100 External Corrosion Protection of FRP Composite Steel Underground Storage Tanks

STI ACT-100-U External Corrosion Protection of Composite Steel Underground Storage Tanks

STI Document "Keeping Water Out of Your Storage System"

STI F922 PERMATANK (trademarked) Double Wall Steel-Fiberglass Underground Storage Tank

2.8 *United States Environmental Protection Agency (US EPA) Standards:*[9]

EPA/510-B-93-005 USEPA Manual Tank Gauging for Small Underground Storage Tanks

EPA 510-B-05-002 USEPA Operating and Maintaining Underground Storage Tank Systems—Practical Help and Checklists

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, http://www.api.org.

[4] Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, http://www.ul.com.

[5] Available from NACE International (NACE), 1440 South Creek Dr., Houston, TX 77084-4906, http://www.nace.org.

[6] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.

[7] Available from Petroleum Equipment Institute (PEI), P.O. Box 2380, Tulsa, OK 74101–2380, http://www.pei.org.

[8] Available from Steel Tank Institute (STI), 944 Donata Ct., Lake Zurich, IL 60047, http://www.steeltank.com.

[9] Available from United States Environmental Protection Agency (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20004, http://www.epa.gov.

EPA/510-R-05-001 USEPA UST Systems: Inspecting and Maintaining Sumps and Spill Buckets—Practical Help and Checklist

Title 40 CFR 280 Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)

3. Terminology

3.1 *Definitions:*

3.1.1 *ancillary equipment*—any devices that are used to distribute, meter, or control the flow of petroleum substances or hazardous substances into or out of an UST, including, but not limited to, piping, fittings, flanges, valves, and pumps.

3.1.2 *cathodic protection tester*—a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems as applied to buried or submerged metal piping and tank systems; at a minimum, such persons must have education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of buried metal piping and tank systems.

3.1.3 *corrective action*—the sequence of actions performed in response to a release that include site assessment and investigation, response actions, interim remedial action, remedial action, operation and maintenance of remediation equipment, monitoring of progress, and termination of the remedial action.

3.1.4 *gasoline dispensing facilities*—also known as a filling station and service station, means any stationary facility which dispenses gasoline into the fuel tank of a motor vehicle.

3.1.5 *hazardous substance*—any substance defined or listed in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14), (42 U.S.C. §9601(14), and which is not regulated as a hazardous waste under the Solid Waste Disposal Act, Subtitle C, (42 U.S.C. §6921, et seq.).

3.1.5.1 *Discussion*—A hazardous substance does not include petroleum product or crude oil. This definition is modeled on 40 CFR §280.12.

3.1.6 *hazardous substance UST system*—an UST system that contains a hazardous substance defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), §101(14), (42 U.S.C. §9601(14) (but not including any substance regulated as a hazardous waste under the Solid Waste Disposal Act, Subtitle C, (42 U.S.C. §6921 et seq.)) or any mixture of such substances and petroleum, and which is not a petroleum UST system.

3.1.7 *maintenance*—the normal operational upkeep to prevent an UST system from releasing product.

3.1.8 *motor fuels*—petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, No. 1 or No. 2 diesel fuel, or any grade of gasohol and is typically used in the operation of a motor engine.

3.1.8.1 *Discussion*—This definition applies to blended petroleum motor fuels such as biodiesel and ethanol blends that contain more than a de minimis amount of petroleum or petroleum-based substance.

3.1.9 *operator*—any person in control of, or having responsibility for, the daily operation of the UST system. The Underground Storage Tank Compliance Act of 2005 further characterizes three operator classes, A, B, and C.

3.1.9.1 *operator, Class A*—an individual whose primary responsibility is to operate and maintain the underground storage tank system.

3.1.9.1 *Discussion*—This could include managing resources and personnel—such as establishing work assignments—to achieve and maintain compliance with regulatory requirements.

3.1.9.2 *operator, Class B*—implements the day-to-day aspects of operating, maintaining, and record keeping for underground storage tanks at one or more facilities.

3.1.9.3 *operator, Class C*—an employee who, generally, is the first line of response to events indicating emergency conditions.

3.1.9.1 *Discussion*—This individual is responsible for responding to alarms or other indications of emergencies caused by spills or releases from underground storage tank systems. This individual notifies the Class B or Class A operator and appropriate emergency responders when necessary. Not all employees of the facility are necessarily Class C operators.

3.1.10 *overfill*—a release that occurs when an UST system is filled beyond its capacity, thereby resulting in a discharge of a regulated substance to the surface or subsurface environment.

3.1.11 *owner*—means any person who owns an UST system used for storage, use, or dispensing of regulated substances.

3.1.12 *petroleum substance*—includes crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure. The term includes petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, and finishing, (for example, motor fuels, aviation gasoline, gas-turbine fuel oils, illuminating oils, distillate fuel oils, residual fuel oils, jet fuels, lubricants, petroleum solvents, used oils).

3.1.13 *petroleum UST system*—an underground storage tank system that contains a petroleum substance or a mixture of petroleum substances with de minimis quantities of other regulated substances.

3.1.13.1 *Discussion*—Such systems include those containing motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

3.1.14 *piping*—all underground pipes in an UST system, including valves, elbows, joints, flanges, flexible connectors, and other fittings attached to a tank system through which regulated substances flow, or in which regulated substances are contained or stored.

3.1.15 *pressurized piping*—product or delivery piping in a UST system that typically operates at greater than atmospheric pressure.

3.1.16 *regulated substance*—a hazardous substance as defined in 3.1.5, a petroleum substance as defined in 3.1.12, and any mixture of two or more hazardous substances and/or