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Standard Guide for Environmental Management of Underground Storage Tank Systems Storing Regulated Substances¹

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INTRODUCTION

This guide provides an overview of environmental practices for design, installation, operation, maintenance including scheduled inspections and periodic equipment testing, and when necessary, and corrective action for underground tank systems used for storage of regulated substances. The training for, and application of these practices should serve to prevent accidental releases of petroleum or regulated 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. Regulatory requirements related to underground storage tank systems may vary by regulatory jurisdiction. This guide provides recommendations to comply with the requirements of 40 CFR Part 280. The user must review the regulations of the implementing agency to determine if it has more stringent regulatory requirements. 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 regulated substances 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 rules that place additional responsibilities on the owners/operators of UST systems. Refer to state and local regulations that may contain additional require-

ments. 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 of, and response to 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:	Dispensing Activities
Section 9:	Release Response Plan
Section 10:	Corrective Action for Affected Environmental Media
Section 11:	Tank System Closure
Section 12:	UST Management Practice and Operator 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

¹ This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.01 on 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. Some specific hazards statements are given in Section 7 on Hazards.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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
- 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 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>.

2.3 Underwriters Laboratory (UL) Standards⁴

- 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) Standards⁵

- 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

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>.

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-K-16-001 USEPA Operating and Maintaining Underground Storage Tank Systems—Practical Help and Checklists](#)

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

3.1.2 *cathodic protection tester, n*—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, v*—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, n*—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, n*—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, n*—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.

3.1.6.1 *Discussion*—This guide is not applicable to USTs subject to regulation under the Atomic Energy Act.

3.1.7 *implementing agency, n*—Environmental Protection Agency (EPA), or, in the case of a State with program approval (or pursuant to a memorandum of agreement with EPA), the designated State or Local agency responsible for carrying out the UST program.

3.1.7.1 *Discussion*—The EPA is the implementing agency on tribal land.

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

3.1.9 *motor fuels, n*—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.

3.1.9.1 *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.

3.1.10 *operator, n*—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.

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

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

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

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

3.1.10.4 *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.

3.1.11 *overflow, n*—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.

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

3.1.13 *petroleum substance*—includes crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure.

3.1.13.1 *Discussion*—The term includes petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through processes of separation,

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