CHAPTER 30 – UNDERGROUND STORAGE TANK MANAGEMENT PROGRAM

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A. INTRODUCTION

1. The Smithsonian Institution (SI) owns and operates nineteen (19) regulated Underground Storage Tank (UST) systems located on eleven (11) facilities in four (4) different states. Each of these tanks contain a regulated petroleum product such as gasoline or diesel fuel for automotive use, #2 fuel oil for use by emergency generators or as back-up fuel for boilers, heating oil or used oil.
2. U.S. Environmental Protection Agency (EPA), defines a UST system as any tank, including all piping associated with the tank system that has at least ten percent (10%) of its volume underground.
3. It is the policy of the SI to operate and maintain all SI owned UST systems in accordance with EPA, state and local regulations and to prevent the release of regulated substances from those systems. It is very important to note that state and local regulatory programs may establish regulations that are more stringent than the Federal requirements specified in 40 CFR 280.
4. This Chapter focuses on Federal regulations that address the notification, operation and maintenance of existing UST systems that are owned by the SI. Federal UST regulations that address the design, construction, and installation of UST systems, will be addressed during the SD 410 review process.
5. However, where state and local regulations, based on Federal regulations are more stringent they must be followed.
6. State and local regulations are not addressed in this Chapter. Operators of SI owned and operated UST systems must be familiar with and comply with the state regulations that affect their location. Internet links to state UST regulations are provided at the end of this Chapter.

B. DEFINITIONS (according to EPA (40 CFR 280.12))

1. Underground Storage Tank (UST) system – an underground storage tank, connected piping, underground ancillary equipment, and containment system, if any.
2. Owner – Any person who owns a UST system used for storage, use, or dispensing of regulated substances.
3. Operator – Any person in control of, or having responsibility for, the daily operation of the UST system.

4. Person – an individual, trust, firm, joint stock company, Federal agency, corporation, state, municipality, commission, political subdivision of a state, an interstate body, a consortium, a joint venture, a commercial entity and the United States Government.
5. Release – any spilling, leaking emitting, discharging, escaping, leaching, or disposing from a UST into ground water, surface water or subsurface soils.
6. Spill bucket – contained sumps installed at the fill and or vapor recovery connection points of a UST system to contain drips and spills of fuel that can occur during delivery of fuel.
7. Sump – a subsurface area or pit designed to provide access to equipment located below ground and, when contained, to prevent liquids from releasing to the environment.

C. CHAPTER-SPECIFIC ROLES AND RESPONSIBILITIES

1. Office of Facilities Engineering and Operations (OFEO), Office of Facilities Maintenance and Reliability (OFMR) or resident Building Manager (for facilities without OFMR assigned staff) shall:
    a. Designate responsible persons as the Operators of each tank system, per the requirements of the Underground Storage Tank Compliance Act established by the Energy Policy Act of 2005. Three Classes of Operators are required:
        1. Class A: Person having primary responsibility for on-site operation and maintenance of the underground storage tank systems.
        2. Class B: Persons having daily on-site responsibility for the operation and maintenance of underground storage tank systems.
        3. Class C: Daily, on-site employees having primary responsibility for addressing emergencies presented by a spill or release from an underground storage tank system.

    b. Ensure that an adequate budget is provided for personnel, equipment, materials, training, and monitoring required to comply with UST operating requirements.
    c. Ensure that all designated UST Operators are trained as required by Federal and state UST regulations.
    d. Ensure that Office of Safety, Health and Environmental Management (OSHEM) is notified at the design phase of new UST

systems. OSHEM will provide guidance based on regulations established by the EPA and State and local authorities.

2. Operators shall:
   a. Comply with the requirements of this Chapter, the federal regulations and state and local regulations pertaining to the operation and maintenance of UST systems.
   b. Act as the person in control of the UST system(s).
   c. Be responsible for the daily operation of the UST system(s).
   d. Ensure that Federal, state and local permits required for installation and/or operating UST systems are applied for and obtained.
   e. Ensure that notification forms for UST systems are completed and forwarded to the appropriate federal or state agency as required.
   f. Ensure that an accurate inventory of UST systems on each facility is maintained and a copy forwarded to OSHEM.
   g. Ensure that data elements in the inventories are updated to reflect significant changes in the UST condition, especially at critical points during the useful life of each UST (e.g., when upgraded or repaired, if a release occurs, at closure, etc.).
   h. Ensure that only qualified personnel conduct inspection and maintenance activities.
   i. Ensure each regulated UST system is monitored at least every 30 days for release detection.
   j. Ensure that documentation of each UST system release detection monitoring is maintained for one (1) year and is readily available for review by regulators.
   k. Ensure that each UST system is routinely calibrated, operated and maintained in accordance with the manufacturer's instructions.
   l. Ensure that calibration and routine maintenance is conducted by a certified or licensed UST contractor.
   m. Ensure that documentation of all calibrations and maintenance of UST systems are maintained for one (1) year and is readily available for review by regulators.
   n. Ensure that documentation of product inventory requirements are met as required by Federal, State and local UST regulations.
   o. Ensure that transfer (filling) operations are monitored to ensure that spilling or overfilling does not occur.
   p. Ensure that Spill Prevention Control and Countermeasures (SPCC) plans are prepared where required.

q. Ensure that OSHEM is notified immediately for any of the following conditions:

(1) Discovery of a release of a regulated substance at the UST site or in the surrounding area

(2) When unusual operating conditions or observed (e.g., erratic behavior of product dispensing equipment, the sudden loss of product from the UST system, or an unexplained presence of water in the UST)

(3) When monitoring results from a release detection method indicates that a release may have occurred.

r. Ensure that agencies having jurisdiction are notified within 24 hours for any of the above-mentioned conditions.

s. Maintain all records and reporting requirements, specified in this Chapter, for the UST system(s) assigned to them.

t. Maintain records of initial and recurrent Operator training as required by Federal and state regulations.

3. Office of Safety, Health and Environmental Management (OSHEM) shall:

a. Provide technical assistance, for compliance issues, to the Operators of the SI UST systems.

b. Accompany operators of SI UST systems during compliance inspections by agencies having jurisdiction.

D. TRAINING

1. Three classes of operators have been established by EPA and identified as Class A, Class B, and Class C. Each underground storage tank system or group of underground storage tank systems at a facility must have a Class A, Class B, and Class C operator designated. All individuals designated as a Class A, B, or C operator must, at a minimum, be trained according state specific guidelines. Separate individuals may be designated for each class of operator or an individual may be designated to more than one of the above operator classes. An individual who is designated to more than one operator class must be trained in each operator class for which he or she is designated. Because an individual may be designated for more than one operator class, states may allow a training approach that encompasses training for more than one operator class.

a. A **Class A** operator has primary responsibility to operate and maintain the underground storage tank system. The Class A operator's responsibilities include managing resources and

personnel, such as establishing work assignments, to achieve and maintain compliance with regulatory requirements. In general, this individual focuses on the broader aspects of the statutory and regulatory requirements and standards necessary to operate and maintain the underground storage tank system (i.e., 40 CFR 280 or requirements of a state underground storage tank program approved by EPA under SWDA Section 9004). For example, this individual typically ensures that appropriate individual(s):

1. Properly operate and maintain the underground storage tank system.
2. Maintain appropriate records.
3. Are trained to operate and maintain the underground storage tank system and keep records.
4. Properly respond to emergencies caused by releases or spills from underground storage tank systems at the facility.
5. Make financial responsibility documents available to the underground storage tank implementing agency as required.

At a minimum, the **Class A** operator must be trained in the following:

A general knowledge of underground storage tank system requirements so he or she can make informed decisions regarding compliance and ensure appropriate individuals are fulfilling operation, maintenance, and recordkeeping requirements and standards of 40 CFR 280 or requirements and standards of a state underground storage tank program approved by EPA under SWDA Section 9004 regarding:

a. Spill prevention
b. Overfill prevention
c. Release detection
d. Corrosion protection
e. Emergency response
f. Product compatibility
g. Financial responsibility documentation requirements
h. Notification requirements
i. Release and suspected release reporting
j. Temporary and permanent closure requirements
k. Operator training requirements.

b. A **Class B** operator implements applicable underground storage tank regulatory requirements and standards (i.e., 40 CFR 280 or requirements of a state underground storage tank program

approved by EPA under SWDA Section 9004) in the field. This individual implements day-to-day aspects of operating, maintaining, and recordkeeping for underground storage tanks at one or more facilities. For example, this individual typically monitors, maintains, and ensures:

1. Release detection method, recordkeeping, and reporting requirements are met.
2. Release prevention equipment, recordkeeping, and reporting requirements are met.
3. All relevant equipment complies with performance standards.
4. Appropriate individuals are trained to properly respond to emergencies caused by releases or spills from underground storage tank systems at the facility.

Training for the **Class B** operator, as compare to the Class A operator, will provide a more in-depth understanding of operation and maintenance aspects, but may cover a more narrow breadth of applicable regulatory requirements. States may require either site-specific operator training, which is focused only on equipment used at the underground storage tank facility, or broader training regarding regulatory requirements that, at a minimum, encompass the following:

1. Components of underground storage tank systems.
2. Materials of underground storage tank system components.
3. Methods of release detection and release prevention applied to underground storage tank components.
4. Operation and maintenance requirements of 40 CFR 280 or requirements of a state underground storage tank program approved by EPA under SWDA Section 9004 that apply to underground storage tank systems and include:
    a. Spill prevention
    b. Overfill prevention
    c. Release detection
    d. Corrosion protection
    e. Emergency response
    f. Product compatibility
    g. Reporting and recordkeeping requirements.
    h. Class C operator training requirements.

c. A **Class C** operator is an employee and is, generally, the first line of response to events indicating emergency conditions. 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. This individual typically:

1. Controls or monitors the dispensing or sale of regulated substances, or
2. Is responsible for initial response to alarms or releases.

At a minimum, the Class C operator must be trained to take action in response to emergencies (such as, situations posing an immediate danger or threat to the public or to the environment and that require immediate action) or alarms caused by spills or releases from an underground storage tank system.

2. States must ensure that Class A, Class B, and Class C operators are trained according to state-specific training requirements by August 8, 2012, which is three years after the date states are required to develop state-specific training requirements. A state may want to establish a schedule for phasing in the training over this time.

3. After August 8, 2012, states must require operators be trained as follows:
   a. Class A and Class B operators must be trained within 30 days or another reasonable period specified by the state, after assuming operation and maintenance responsibilities at the underground storage tank system.
   b. Class C operators must be trained before assuming responsibility for responding to emergencies.

4. If a state determines an underground storage tank system is out of compliance, appropriate operator(s) must be retrained. States may determine whether both Class A and Class B operators are retrained, or if only one class of operator (either Class A or Class B) is retrained. At a minimum, an underground storage tank system is out of compliance if the system:
   a. Does not meet EPA's Significant Operational Compliance requirements for release prevention and release detection measures identified at: http://www.epa.gov/oust/cmplastc/soc.htm ; or
   b. Is not in significant compliance with other requirements, such as financial responsibility, as determined by the state.

5. Operators must be retrained within a reasonable time frame established by the state. At a minimum, retraining must include training of the areas determined not in significant compliance. States requiring at least annual operator training that covers all operator class requirements would meet retraining requirements.

D. PERFORMANCE STANDARDS FOR UST SYSTEMS.

Owners and Operators of UST systems must meet, as a minimum, the Federal design, construction, installation and notification requirements established by EPA and found in 40 CFR 280.20, for as long as the UST system is used to store regulated substances. This requirement is in place in order to prevent releases due to structural failure, corrosion, or spills and overfills. State and local regulatory programs may have other requirements that are more stringent, and must be considered. All projects that include new UST systems that may be designed, constructed and installed on an SI facility, shall be reviewed by OSHEM for compliance with federal, state and local performance standards and regulations through the SD 410 review process.

E. GENERAL OPERATING REQUIREMENTS

1. Identification of UST Systems and Inventory of associated UST system equipment - An inventory of UST systems and associated equipment shall be developed and maintained at each facility. The inventory shall include information concerning:
   a. The location, size, and the composition of the tank.
   b. The material stored in the tank.
   c. The type of piping used (pressurized or suction) and material composition of the pipes.
   d. The method of release detection used.
   e. Whether the UST system has corrosion protection, spill and overfill protection; and any other pertinent information regarding the UST system.
   f. EPA has provided a checklist for Operators of UST systems to use as a tool to develop the UST inventory. It is included in the Operation and Maintenance of UST System-Practical Help and Checklists document found in Attachment 1.
2. Notification of Installation of Tank Systems -- Federal notification requirements specified in (40 CFR 280.22) require that UST system owners submit a notification form to the state or local agency or department designated to receive such notice when a UST system is installed or modified. This form provides information about the UST

system, including certification of correct installation. The notification form is periodically updated and only the most recent version of the form should be used. The current notification form is EPA Form 7530-1 (Rev. 9-98) Copies of the notification forms are to be maintained as part of the recordkeeping requirements for the UST system.

3. Spill and Overfill Protection - Proper maintenance of the UST system spill and overfill protection equipment will prevent contamination of soil and ground water.

   a. USTs are required to have spill catchment basins, also called spill buckets, at the fill pipe, to contain the drips and spills of fuel that occur when the delivery hose is disconnected from the fill pipe after fuel delivery. Spill buckets shall be:

      (1) Kept clean and dry (empty of liquids).

      (2) Periodically inspected to remove any debris and to ensure that the spill bucket is still liquid tight.

   b. EPA has provided a checklist for Operators of UST systems to use when inspecting and maintaining spill buckets and other sumps associated with the UST systems. It is included in the UST Systems: Inspecting and Maintaining Sumps and Spill Buckets – Practical Help and Checklist document found in Attachment 2.

   c. Overfill protection equipment installed on the UST is designed to stop or restrict the flow of product, or alert the delivery person during filling operations before the tank becomes full and begins to release petroleum into the environment. Types of overfill protection include: Automatic shutoff devices, overfill alarms, and ball float valves.

   d. Filling operations are to be monitored:

      (1) Before,

      (2) During, and

      (3) After the fuel delivery

      EPA has provided a checklist on correct filling practices for the Operator of the UST system to use as a tool when tanks are being filled. It is included in the Operation and Maintenance of UST System-Practical Help and Checklists document found in Attachment 1.

4. Corrosion Protection (CP) UST systems (tank and piping) must meet EPA requirements for corrosion protection (40 CFR 280.31). All parts of the UST system that are underground and routinely contain product are to be protected from corrosion.

a. Tanks that are made of fiberglass reinforced plastic (FRP), a non-corrodible material, and pipes that are made of or are completely enclosed by FRP, do not require additional corrosion protection.

b. Tanks and piping made of steel must meet requirements for corrosion protection by adding cathodic protection to the UST system. UST systems that require cathodic protection shall be inspected within 6 months of installation and every three years thereafter, or as specified by state and local regulations.

5. Release Detection

   a. Release detection, also referred to as leak detection or monthly monitoring, shall be provided for all UST systems containing petroleum products/regulated substances. The release detection method(s) must occur at least every 30 days and must meet three basic requirements:

      (1) Must be able to detect a leak from any portion of the tank and its piping that routinely contains petroleum;

      (2) Must be installed, calibrated, operated, and maintained in accordance with the manufacturer's instructions; and

      (3) Must meet the performance requirements specified in 40 CFR 280.43 and 280.44

   b. Tanks - There are several approved methods that meet the federal release detection requirements for tanks specified in 40 CFR 280.43. All of the regulated UST systems owned by the SI, use Automatic Tank Gauging systems that automatically monitor product level and inventory control in the USTs.

   c. Piping - Underground piping that routinely contains regulated substances must be monitored for releases in a manner that meets one of the following requirements:

      (1) Pressurized piping must:

         (a) Be equipped with an automatic line leak detector that meets requirements in 40 CFR 280.44; AND

         (b) Have an annual line tightness test (specified in 40 CFR 280.44(b)) or have monthly monitoring (specified in 40 CFR 280.44(c))

      (2) Suction Piping must

         (a) Have a line tightness test conducted at least every 3 years (specified in 40 CFR 280.44(b)) OR

         (b) Use a monthly monitoring method specified in 40 CFR 280.44(c))

d. If a leak is suspected, OSHEM and the regulatory agency having jurisdiction shall be notified. The entire UST system shall then be tightness tested and the site checked for additional information on the presence and source of contamination. The regulatory agency having jurisdiction will provide guidance for further investigation and any follow-up actions that are required.

6. Repairs. Any work on a UST system must be done by a certified UST contractor. The repairs must meet requirements specified in 40 CFR 280.33.

   a. If the tank has been repaired, the integrity of the tank must be ensured by being inspected internally or by tightness testing according to industry standards within 30 days of the repair. If the tank has cathodic protection, the cathodic protection must be tested within 6 months of the repair.

   b. Damaged metal piping cannot be repaired and must be replaced.

   c. Piping made of FRP can be repaired in accordance with the manufacturers' instructions or national codes of practice. The repaired or replaced piping must be tightness tested with 30 day of the work.

7. Compatibility. Each UST system is to be made of or lined with materials that are compatible with the substance stored in the UST system.

F. RECORDS AND REPORTS

1. The Owner/Operator (O/O) of UST systems must cooperate fully with inspections, monitoring and testing conducted by the agency having jurisdiction as well as requests for document submission, testing and monitoring by the O/O as specified in 40 CFR 280.34.

2. Reporting. The following information must be submitted to the agency having jurisdiction:

   a. Notification for all UST systems, which includes certification of installation for new UST systems (40 CFR 280.22).

   b. Reports of all releases, including:

      (1) Suspected releases (40 CFR 280.50);

      (2) Spills and overfills (40 CFR 280.53);

      (3) Confirmed releases (40 CFR 280.61)

   c. Notification of corrective actions planned or taken as a result of a release (40 CFR 280.62); and

d. Notification before permanent closure or change-in-service (40 CFR 280.74).

3. Recordkeeping. The following information must be maintained for each UST system:

   a. A corrosion expert's analysis of site corrosion potential, if corrosion equipment is not used. (40 CFR 280.20(a)(4) and (b)(3))

   b. Documentation of inspections and testing of corrosion protection equipment, if applicable. (40 CFR 280.31)

      (1) The results of the last three inspections are to be maintained.

      (2) The results of testing from the last two inspections are to be maintained.

      (3) Documentation of each repair to the UST system shall be maintained for the remaining operating life of the UST system demonstrating compliance with the requirements of 40 CFR 280.33

      (4) Recent compliance with release detection requirements (40 CFR 280.45):

         (a) Copies of performance claims and schedules of required calibration and maintenance provided by leak detection manufacturers must be maintained for 5 years.

         (b) Results of any sampling, testing, or monitoring must be maintained for at least 1 year.

         (c) Results of the most recent tightness test are to be maintained until the next tightness test occurs.

         (d) Documentation of recent maintenance, repairs and calibrations of on-site leak detection equipment, is to be maintained for at least 1 year after work is complete.

      (5) Results of the site investigation conducted at the permanent closure of a tank must be maintained for three (3) years (40 CFR 280.74).

      (6) Documentation of Operator training as required by Federal and state regulations.

      (6) All records must be maintained at the UST site and be immediately available for inspection by the agency having jurisdiction; or be readily available at an alternative site and be provided on request. In the case of permanent closure records, the closure records may be mailed to the agency having jurisdiction if they cannot be kept at the site or at an alternative site.

G. RELEASE REPORTING, INVESTIGATION, AND CONFIRMATION (40 CFR 280 Subpart E (280.50-280.53))

1. OSHEM is to be notified immediately of any release or suspected release of a regulated substance from a UST system.
2. Regulating agencies are to be notified within 24 hours if any of the following conditions occur:
   a. Discovery of a release of a regulated substance at the UST site or in the surrounding area.
   b. When unusual operating conditions are observed (e.g., erratic behavior of product dispensing equipment, the sudden loss of product from the UST system, or an unexplained presence of water in the UST) unless the system equipment is found to be defective but not leaking and is immediately repaired or replaced.
   c. When monitoring results from a release detection method indicates that a release may have occurred, unless release detection equipment is found to be defective and is immediately repaired or replaced.
3. Investigations, required by the agency having jurisdiction, to determine if the UST system is the source of off-site impacts must follow procedures detailed in 40 CFR 280.52.
4. Spills and overfills (40 CFR 280.53) must be:
   a. Contained;
   b. Immediately cleaned up;
   c. Reported to OSHEM; and
   d. Reported to the agency having jurisdiction within 24 hours if the spill or overfill that results in a release to the environment:
      (1) Is a petroleum product that:
         (a) exceeds 25 gallons; or
         (b) causes a sheen on nearby surface water.
      (2) Is a hazardous substance that equals or exceeds its reportable quantity under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended (40 CFR 302).

H. RELEASE RESPONSE AND CORRECTIVE ACTIONS FOR UST SYSTEMS CONTAINING PETROLEUM OR HAZARDOUS SUBSTANCES.

In response to a release, the Owner/ Operator of petroleum or hazardous substance UST systems must comply with the requirements of 40 CFR Subpart F (280.60-280.67).

I. OUT-OF-SERVICE UST SYSTEMS AND CLOSURE

1. When UST systems are temporarily closed, the following must occur:
   a. Operation and maintenance of corrosion protection must continue.
   b. Any release detection must continue if a release is suspected or confirmed unless the tank is empty (40 CFR 280.70).
   c. If the UST system is closed for 3 months or more:
      (1) Vent lines must be left open and functioning.
      (2) All other lines, pumps, manways and ancillary equipment must be capped and secured.
   d. If the UST system is closed for more than 12 months, it must be permanently closed (40 CFR 280.70(c)).
2. When UST systems are permanently closed or a change-in–service occurs the agency having jurisdiction must be notified of the intent to close or make a change in service at least 30 days **before** closure or a change in service, unless such action is in response to a corrective action.
   a. In the event of permanent closure, the tank must be emptied and cleaned, and either removed from the ground or filled with an inert solid material.
   b. In the event of a change in service, the tank must be emptied and cleaned and a site assessment must be conducted as specified in 40 CFR 280.72.
      (1) The UST site must be assessed for the presence of a release.
      (2) If contaminated soil or ground water or if free product as a liquid or vapor is discovered, corrective action must begin.

J. FINANCIAL RESPONSIBILITY.

The Smithsonian Institution is exempt from Federal debt and liability responsibilities as outlined 40 CFR 280.90(c).

K. REFERENCES

1. Operation and Maintenance of UST Systems – Practical Help and Checklists, EPA 510-B-05-002, September 2005
2. UST Systems: Inspecting and Maintaining Sumps and Spill Buckets, Practical Help and Checklist, EPA-R-05-001. May 2005
3. Grant Guidelines to States for Implementing the Operator Training Provision of the Energy Policy Act of 2005. EPA-510-R-07-005. August 2007
4. Internet Links to State UST Regulations:
   a. Arizona – A.R.S. Title18 Chapter 12
   b. District of Columbia – UST Program and DCRA Title 20 Chapters 55 - 70
   c. Maryland – Oil Control Program and COMAR Tile 26, Subtitle 10, Chapter 02
   d. Virginia – VAC Title 6, Subtitle 25, Chapter 580
5. UST Operator training requirements by State (Comply by August 2012)
   a. Arizona-
   b. District of Columbia- DDOE Title 20 Chapter 65 (Revised August 2009)
   c. Maryland-
   d. Virginia-
6. USEPA Title 40 CFR 280 – Technical Standards and Corrective Actions Requirements for Owners and Operators of Underground Storage Tanks (UST)

Attachments

1. Operation and Maintenance of UST Systems – Practical Help and Checklists, EPA 510-B-05-002, September 2005
2. UST Systems: Inspecting and Maintaining Sumps and Spill Buckets, Practical Help and Checklist, EPA-R-05-001. May 2005

Operating And Maintaining Underground Storage Tank Systems

Practical Help And Checklists

Printed on Recycled Paper

Contents

DISCLAIMER

This document provides information on operating and maintaining underground storage tank (UST) systems. The document is not a substitute for U.S. Environmental Protection Agency regulations nor is it a regulation itself — it does not impose legally binding requirements.

For regulatory requirements regarding UST systems, refer to the federal regulations governing UST systems (40 CFR Part 280).

How To Use This Booklet

Who Should Read This Booklet?

This booklet is for owners and operators of underground storage tank systems (USTs).

You are responsible for making sure your USTs do not leak. This booklet can help you meet your UST responsibilities.

Key Terms Used In This Booklet

An **UST** is an **underground storage tank and underground piping connected to the tank** that has at least 10 percent of its combined volume underground. The federal regulations apply only to USTs storing petroleum or certain hazardous substances.

O&M stands for **operation and maintenance procedures** that must be followed to keep USTs from causing leaks and creating costly cleanups.

What Can This Booklet Help You Do?

- Identify and understand the operation and maintenance (O&M) procedures you need to follow routinely to make sure your USTs don't have leaks that damage the environment or endanger human health.
- Identify good O&M procedures you can use to avoid cleanup costs and liability concerns.
- Maintain useful records of your O&M.

Your UST System Is New Or Upgraded — Is That Enough?

Being new or upgraded is not enough. New and upgraded USTs are made of a complex collection of mechanical and electronic devices that can fail under certain conditions. These failures can be prevented or quickly detected by following routine O&M procedures. Having a new or upgraded UST system is a good start, but the system must be properly operated and continuously maintained to ensure that leaks are avoided or quickly detected.

What Should You Do With Each Section Of This Booklet?

Read through each section carefully and use the checklists to help you establish clear O&M procedures.

By identifying and understanding the O&M tasks you need to perform routinely, you will ensure timely repair or replacement of components when problems are identified.

How Can You Use The Following Checklists Effectively?

This booklet's pages are 3-hole punched and unbound so you can put all the materials in a handy 3-ring binder. You can easily remove any of the following checklists from the binder, reproduce them, and then fill them out.

You can select the specific mix of checklists that matches your UST facility. Once you have your select group of checklists together, make several copies that you can fill out periodically over time.

In this way you can keep track of your O&M activities and know that you've done what was necessary to keep your UST site safe and clean, avoiding any threats to the environment or nearby people as a result of costly and dangerous UST releases.

Use This Booklet Often — Effective O&M Requires Constant Vigilance.

Note: This booklet describes quality O&M practices put together by a work group of state and federal environmental regulators. This booklet is not a federal regulation nor legally binding, but it does provide useful information on effective O&M procedures. You should check with your state UST program for information on any additional or different O&M practices that may be required in your state.
See Section 7 for contact information.

Section 1 — Identifying The Equipment At Your UST Facility

Determine what UST equipment you have at your facility by completing the checklist below. Note that each part of the checklist below refers you to the appropriate section of this O&M booklet for relevant information. After you have identified your equipment, proceed to the following sections to identify the O&M actions necessary for your specific UST system.

General Facility Information (optional)

Facility Name

Facility ID #

Release Detection (See Section 2 for information on release detection)

A. Release Detection for Tanks

Check at least one for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Automatic Tank Gauging System				
Interstitial Monitoring (with secondary containment)				
Groundwater Monitoring				
Vapor Monitoring				
Inventory Control and Tank Tightness Testing (TTT)*				
Manual Tank Gauging Only **				
Manual Tank Gauging and Tank Tightness Testing (TTT)***				
Other Release Detection Method, such as SIR (please specify)				

* Allowed only for 10 years after upgrading or installing tank with corrosion protection. TTT required every 5 years.
** Allowed only for tanks of 1,000 gallon capacity or less.
*** Allowed only for tanks of 2,000 gallon capacity or less and only for 10 years after upgrading or installing tank with corrosion protection. TTT required every 5 years.

B. Release Detection for Pressurized Piping

Check at least one from A & B for each tank's piping:		Tank #1	Tank #2	Tank #3	Tank #4
A (Automatic Line Leak Detectors)	Automatic Flow Restrictor				
	Automatic Shutoff Device				
	Continuous Alarm				
B	Annual Line Tightness Test				
	Monthly Monitoring*				

* Monthly Monitoring for piping includes Interstitial Monitoring, Vapor Monitoring, Groundwater Monitoring, and other accepted methods (such as SIR and Electronic Line Leak Detectors)

C. Release Detection for Suction Piping

Check at least one for each tank's piping:	Tank #1	Tank #2	Tank #3	Tank #4
Line Tightness Testing Every Three Years				
Monthly Monitoring*				
No Release Detection Required For Safe Suction **				

* Monthly Monitoring for piping includes Interstitial Monitoring, Vapor Monitoring, Groundwater Monitoring, and SIR
** No release detection required only if it can be verified that you have a safe suction piping system with the following characteristics:

1) Only one check valve per line located directly below the dispenser;
2) Piping sloping back to the tank; and
3) System must operate under atmospheric pressure.

Spill and Overfill Protection (See Section 4 for more information)

Check for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Spill Catchment Basin/ Spill Bucket				
Check at least one overfill device for each tank:				
Automatic Shutoff Device				
Overfill Alarm				
Ball Float Valve				

Corrosion Protection (See Section 5 for more information)

A. Corrosion Protection for Tanks

Check at least one for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Coated and Cathodically Protected Steel				
Noncorrodible Material (such as Fiberglass Reinforced Plastic)				
Steel Jacketed or Clad with Noncorrodible Material				
Cathodically Protected Noncoated Steel*				
Internally Lined Tank*				
Cathodically Protected Noncoated Steel and Internally Lined Tank*				
Other Method Used to Achieve Corrosion Protection (please specify):				

*** These options may be used only for tanks installed before December 22, 1988.**

B. Corrosion Protection for Piping

Check at least one for each:	Tank #1	Tank #2	Tank #3	Tank #4
Coated and Cathodically Protected Steel				
Noncorrodible Material (such as Fiberglass Reinforced Plastic or Flexible Plastic)				
Cathodically Protected Noncoated Metal*				
Other Method Used to Achieve Corrosion Protection (please specify):				

*** This option may be used only for piping installed before December 22, 1988.**

Any Problems Filling Out This Checklist?

If you have trouble filling out this checklist or any following checklist, remember these sources of assistance you can contact:

- Your UST contractor, the vendor of your equipment, and the manufacturer of your UST equipment should be ready to help you. Look through your records for contact information. You may also want to use some of the industry contacts and other contact information provided in Section 7.

- Your state regulatory agency may be able to help you identify equipment or sources of information about your UST equipment. You should, in any event, make yourself aware of any ways in which your state may have additional or different O&M procedures than those presented in this booklet. See Section 7 for state agency contact information.

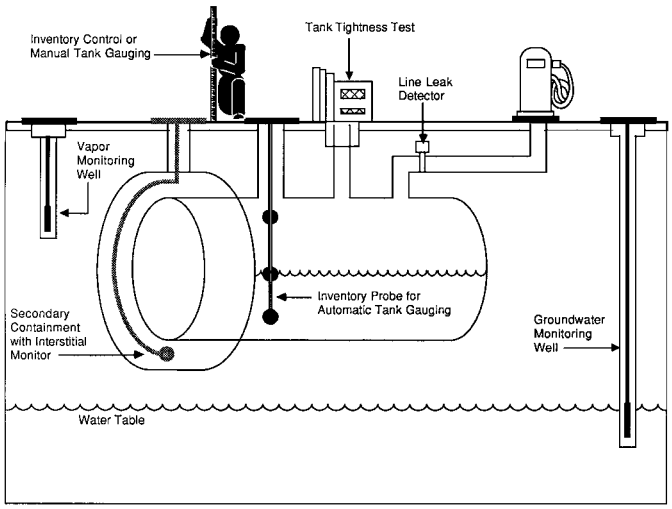
Section 2 — Release Detection

What Is Release Detection?

You must be able to determine at least every 30 days whether or not your tank and piping are leaking by using proper release detection methods.

Your release detection method must be able to detect a release from any portion of the tank and connected underground piping that routinely contains product.

Release detection must be installed, calibrated, operated, and maintained according to the manufacturer's instructions.



Do You Know If Your Release Detection Is Certified To Work At Your UST Site?

Release detection must meet specific performance requirements. You should have documentation from the manufacturer, vendor, or installer of your release detection equipment showing certification that it can meet performance requirements.

Some vendors or manufacturers supply their own certification, but more often an impartial "third party" is paid to test the release detection equipment and certify that performance requirements are met. An independent workgroup of release detection experts periodically evaluates all third-party certifications, thus providing a free and reliable list of evaluations of third-party certifications for various release detection equipment. Frequently updated, this list is available on the Internet at **http://www.nwglde.org/** (the publication's title is ***List Of Leak Detection Evaluations For Underground Storage Tank Systems***). If you can't find the certification anywhere, contact your state regulatory agency (see Section 7 for contact information).

By checking the certification, you may discover the method you use has not been approved for use with the type of tank or piping you have or the type of product being stored. For example, you may learn from the certification that your method won't work with manifolded tanks, certain products, high throughput, or with certain tank sizes.

That's why you need to make sure your release detection method has clear certification that it will work effectively at your site with its specific characteristics.

How Can You Make Sure Your Leak Detection Method Is Working At Your UST Site?

If you don't understand your O&M responsibilities and don't know what O&M tasks you must routinely perform, you may allow your UST site to become contaminated — then you will face cleanup costs and associated problems.

To avoid these problems use the checklists on the following pages that describe each type of leak detection method, discuss actions necessary for proper O&M, and note the records you should keep.

Locate the methods of release detection you are using at your facility, review these pages, and periodically complete the checklist. You might want to copy a page first and periodically fill out copies later.

If you have questions about your release detection system, review your owner's manual or call the vendor of your system. Your state or local regulatory agency may be able to provide assistance as well.

You will find leak detection recordkeeping forms in the following pages of this Section. Keeping these records increases the likelihood that you are conducting good O&M and providing effective release detection at your UST site. For example, see page 20 for a 30-Day Release Detection Monitoring Record.

If you ever suspect or confirm a leak, refer to Section 3. **Never ignore leak detection alarms or failed leak detection tests. Treat them as potential leaks**!

Automatic Tank Gauging (ATG) Systems (for tanks only)	
Description Of Release Detection	**An automatic tank gauging (ATG) system consists of a probe permanently installed in a tank and wired to a monitor to provide information on product level and temperature. ATG systems automatically calculate the changes in product volume that can indicate a leaking tank.**
Have Certification For Your Release Detection Method	❑ **Make sure your ATG system is certified for the types of tanks and stored contents on which the ATG system is used.** Most manufacturers have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the manufacturer provide them to you.
Perform These O&M Actions	❑ **Use your ATG system to test for leaks at least every 30 days.** Most systems are already programmed by the installer to run a leak test periodically. If your system is not programmed to automatically conduct the leak test, refer to your ATG system manual to identify which buttons to push to conduct the leak test. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Make sure that the amount of product in your tank is sufficient to run the ATG leak test.** The tank must contain a minimum amount of product to perform a valid leak detection test. One source for determining that minimum amount is the certification for your leak detection equipment (as discussed above). ❑ **Frequently test your ATG system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your release detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your ATG system is set up and working properly. Most ATG systems have a test or self-diagnosis mode that can easily and routinely run these checks. ❑ **If your ATG ever fails a test or indicates a release, see Section 3 of this booklet for information on what to do next.** ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Check your ATG system owner's manual often to answer questions and to make sure you know the ATG's operation and maintenance procedures.** Call the ATG manufacturer or vendor for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your ATG system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

Secondary Containment With Interstitial Monitoring (for tanks & piping)	
Description Of Release Detection	**Secondary containment is a barrier between the portion of an UST system that contains product and the outside environment. Examples of secondary containment include an outer tank or piping wall, an excavation liner, and a bladder inside an UST. The area between the inner and outer barriers — called the interstitial space — is monitored manually or automatically for evidence of a leak.**
Have Certification For Your Release Detection Method	❑ **Make sure your interstitial monitoring equipment and any probes are certified for the types of tanks, piping, and stored contents on which the release detection system is used.** Most manufacturers have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the manufacturer provide them to you.
Perform These O&M Actions	❑ **Use your release detection system to test for leaks at least every 30 days.** Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Frequently test your release detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your release detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your system is set up and working properly. Some interstitial monitoring systems have a test or self-diagnosis mode that can easily and routinely run these checks. ❑ **If your interstitial monitoring ever fails a test or indicates a release, see Section 3 of this booklet for information on what to do next.** ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep interstitial monitoring access ports clearly marked and secured.** ❑ **Check your interstitial monitoring system owner's manual often to answer questions and to make sure you know the system's O&M procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your release detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

Statistical Inventory Reconciliation (SIR) (for tanks & piping)	
Description Of Release Detection	**SIR is typically a method in which a trained professional uses sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data. You must supply the professional with data every month. There are also computer programs that enable an owner/operator to perform SIR. In either case, the result of the analysis may be pass, inconclusive, or fail.**
Have Certification For Your Release Detection Method	❑ **Make sure your SIR vendor's methodology is certified for the types of tanks, piping, and product on which you use SIR.** Most vendors have their leak detection methodology tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the vendor provide them to you**.**
Perform These O&M Actions	❑ **Supply daily inventory data to your SIR vendor (as required) at least every 30 days.** The vendor will provide you with your leak detection results after the statistical analysis is completed. Otherwise, use your computer software at least every 30 days to test your tank for leaks. ❑ **See Section 3 of this manual if your UST system fails a leak test.** ❑ **If you receive an inconclusive result, you must work with your SIR vendor to correct the problem and document the results of the investigation.** An inconclusive result means that you have not performed leak detection for that month. If you cannot resolve the problem, treat the inconclusive result as a suspected release and refer to Section 3. ❑ **If you use an ATG system to gather data for the SIR vendor or your software, periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. Do this according to manufacturer's instructions. See the checklist for ATG systems on page 7. ❑ **If you stick your tank to gather data for the SIR vendor or your software, make sure your stick can measure to one-eighth of an inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your SIR tests for at least 1 year.** Unless you are keeping records of the 30-day release detection results and maintaining those records for at least 1 year, you are not doing leak detection right. ❑ **Keep all vendor performance claims for at least 5 years.** This includes the certification of the SIR method discussed above. ❑ **If you use an ATG system, keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep the records of investigations conducted as a result of any monthly monitoring conclusion of inconclusive or fail for at least 1 year.** This may include the results of a tightness test performed during the investigation or a re-evaluation based on corrected delivery or dispenser data.

Vapor Monitoring (for tanks & piping)	
Description Of Release Detection	**Vapor monitoring measures product vapors in the soil at the UST site to check for a leak. A site assessment must determine the number and placement of monitoring wells that make sure a release is detected. NOTE: vapor monitors will not work well with substances that do not easily vaporize (such as diesel fuel).**
Have Certification For Your Release Detection Method	❑ **Make sure your vapor monitoring equipment is certified for the types of stored contents on which the release detection system is used.** Most manufacturers have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the manufacturer provide them to you.
Perform These O&M Actions	❑ **Use your release detection system to test for leaks at least every 30 days.** Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. **Be sure you check all of your vapor monitoring wells.** ❑ **See Section 3 of this manual if your UST system fails a leak test.** ❑ **Frequently test your release detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your release detection system is working and never needs checking. Some electronic vapor monitoring systems have a test or self-diagnosis mode. If you have components (such as monitoring equipment, probes or sensors) for your vapor monitoring system, read your manual and test your equipment to see if it is working properly. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions.** Probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep your vapor monitoring wells clearly marked and secured.** ❑ **Check your vapor monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your release detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

Groundwater Monitoring (for tanks & piping)	
Description Of Release Detection	**Groundwater monitoring looks for the presence of liquid product floating on the groundwater at the UST site. A site assessment must determine the number and placement of monitoring wells that make sure a release is detected. NOTE: this method cannot be used at sites where groundwater is more than 20 feet below the surface.**
Have Certification For Your Release Detection Method	❑ **Make sure any automated groundwater monitoring equipment is certified for the types of stored contents on which the release detection system is used.** Most manufacturers have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the manufacturer provide them to you. (Manual devices such as bailers are not generally certified.)
Perform These O&M Actions	❑ **Use your release detection system to test for leaks at least every 30 days.** Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. **Be sure you check all of your groundwater monitoring wells.** ❑ **See Section 3 of this manual if your UST system fails a leak test.** ❑ **Frequently test your automated release detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your release detection system is working and never needs checking. Some electronic groundwater monitoring systems have a test or self-diagnosis mode. If you have components (such as monitoring equipment, probes or sensors) for your groundwater monitoring system, read your manual and test your equipment to see if it is working properly. Manual devices should be periodically checked to make sure they are working properly. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions.** Probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep your groundwater monitoring wells clearly marked and secured.** ❑ **Check your groundwater monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your release detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

Inventory Control And Tank Tightness Testing (for tanks only)	
Description Of Release Detection	**This temporary method combines monthly inventory control with periodic tank tightness testing. Inventory control involves taking measurements of tank contents and recording the amount of product pumped each operating day, measuring and recording tank deliveries, and reconciling all this data at least once a month. This combined method also includes tightness testing, a sophisticated test performed by trained professionals.** ***NOTE: This combination method can only be used temporarily for up to 10 years after installing a new UST or for up to 10 years after your tank meets the corrosion protection requirements.***
Have Certification For Your Release Detection Method	❑ **Make sure your tank tightness testing method is certified for the types of tanks and stored contents on which the tightness test is used.** Most tightness test methods are certified by a third party to verify that they meet specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the tightness tester provide them to you.
Perform These O&M Actions	❑ **Take inventory readings and record the numbers at least each day that product is added to or taken out of the tank.** You may want to use the Daily Inventory Worksheet provided for you on the next page. ❑ **Reconcile the fuel deliveries with delivery receipts by taking inventory readings before and after each delivery.** Record these readings on a Daily Inventory Worksheet (see next page). ❑ **Reconcile all your data at least every 30 days.** Use a Monthly Inventory Record (see page 14 for an example). ❑ **Have a tank tightness test conducted at least every 5 years. This testing needs to be conducted by a professional trained in performing tank tightness testing.** ❑ **See Section 3 of this manual if your tank fails a tightness test or if fails two consecutive months of inventory control.** ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Ensure that your product dispenser is calibrated according to local standards or to an accuracy of 6 cubic inches for every 5 gallons of product withdrawn.** ❑ **Measure the water in your tank to the nearest one-eighth inch at least once a month and record the results on the reconciliation sheet.** You can use a paste that changes color when it comes into contact with water. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your release detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep the results of your most recent tightness test.** ❑ **Keep all certification and performance claims for tank tightness test performed at your UST site for at least 5 years.**

Daily Inventory Worksheet

Facility Name: _____

Your Name: _____

Date: _____

Tank Identification					
Type Of Fuel					
Tank Size In Gallons					
End Stick Inches					
Amount Pumped	↓	↓	↓	↓	↓
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Today's Sum Of Totalizers					
Previous Day's Sum Of Totalizers					
Amount Pumped Today					
Delivery Record	↓	↓	↓	↓	↓
Inches of Fuel Before Delivery					
Gallons of Fuel Before Delivery (from tank chart)					
Inches of Fuel After Delivery					
Gallons of Fuel After Delivery (from tank chart)					
Gallons Delivered (Stick) [Gallons After – Gallons Before]					
Gross Gallons Delivered (Receipt)					

Monthly Inventory Record

Month/Year :_____/_____ Tank Identification & Type Of Fuel:_____

Facility Name:_____

Date Of Water Check: _____ Level Of Water (Inches):_____

Date	Start Stick Inventory (Gallons)	Gallons Delivered	Gallons Pumped	Book Inventory (Gallons)	End Stick Inventory (Inches)	End Stick Inventory (Gallons)	Daily Over (+) Or Short (–) [End – Book]	Initials
1	(+)	(-)	(=)					
2	(+)	(-)	(=)					
3	(+)	(-)	(=)					
4	(+)	(-)	(=)					
5	(+)	(-)	(=)					
6	(+)	(-)	(=)					
7	(+)	(-)	(=)					
8	(+)	(-)	(=)					
9	(+)	(-)	(=)					
7	(+)	(-)	(=)					
8	(+)	(-)	(=)					
9	(+)	(-)	(=)					
10	(+)	(-)	(=)					
11	(+)	(-)	(=)					
12	(+)	(-)	(=)					
13	(+)	(-)	(=)					
14	(+)	(-)	(=)					
15	(+)	(-)	(=)					
16	(+)	(-)	(=)					
17	(+)	(-)	(=)					
18	(+)	(-)	(=)					
19	(+)	(-)	(=)					
20	(+)	(-)	(=)					
21	(+)	(-)	(=)					
22	(+)	(-)	(=)					
23	(+)	(-)	(=)					
24	(+)	(-)	(=)					
25	(+)	(-)	(=)					
26	(+)	(-)	(=)					
27	(+)	(-)	(=)					
28	(+)	(-)	(=)					
29	(+)	(-)	(=)					
30	(+)	(-)	(=)					
31	(+)	(-)	(=)					

Total Gallons Pumped > _____ **Total Gallons Over Or Short >** _____

Leak Check:
Drop the last two digits
from the **Total Gallons Pumped** number and enter here: _____ + 130 =

Compare these numbers

_____ gallons

Is the total gallons over or short **larger** than leak check result? **Yes** **No** (circle one)

If your answer is Yes for 2 months in a row, **notify the regulatory agency** as soon as possible.

Keep This Piece Of Paper On File For At Least 1 Year

Manual Tank Gauging (for tanks 1,000 gallons or less only)	
Description Of Release Detection	**<u>This method may be used only for tanks of 1,000 gallons or less capacity</u> meeting certain requirements. These requirements (tank size, tank dimension, and test time) are found in the manual tank gauging record on the next page. Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which time the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight.**
Have Certification For Your Release Detection Method	**None required.**
Perform These O&M Actions	❑ **Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified in the Manual Tank Gauging Record on the next page, and record two inventory readings at the end of the test (use any form comparable to the one on the following page).** ❑ **Reconcile the numbers weekly and record them on a Manual Tank Gauging Record (see the next page).** ❑ **See Section 3 of this manual if your tank fails the weekly standard.** ❑ **At the end of 4 weeks, reconcile your records for the monthly standard and record the result on a Manual Tank Gauging Record (see the next page).** ❑ **See Section 3 of this manual if your tank fails the monthly standard.** ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your manual tank gauging records for at least 1 year.** Unless you are recording actual release detection results weekly and at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.

Manual Tank Gauging Record

Month _____ Year _____
Tank Identification: _____
Person Completing Form:_____
Facility Name:_____

Circle your tank size, test duration, and weekly/monthly standards in the table below:

Tank Size	Minimum Duration Of Test	Weekly Standard (1 test)	Monthly Standard (4-test average)
up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,000 gallons (when tank diameter is 64")	44 hours	9 gallons	4 gallons
551-1,000 gallons (when tank diameter is 48")	58 hours	12 gallons	6 gallons
551-1,000 gallons (also requires periodic tank tightness testing)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires periodic tank tightness testing)	36 hours	26 gallons	13 gallons

Compare your weekly readings and the monthly average of the 4 weekly readings with the standards shown in the table on the left.

If the calculated change exceeds the weekly standard, the UST may be leaking. Also, the monthly average of the 4 weekly test results must be compared to the monthly standard in the same way.

If either the weekly or monthly standards have been exceeded, the UST may be leaking. As soon as possible, call your implementing agency to report the suspected leak and get further instructions.

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Start Test (month, day, and time)	First Initial Stick Reading	Second Initial Stick Reading	Average Initial Reading	Initial Gallons (convert inches to gallons) [a]	End Test (month, day, and time)	First End Stick Reading	Second End Stick Reading	Average End Reading	End Gallons (convert inches to gallons) [b]	Change In Tank Volume In Gallons + or (—) [a—b]	Tank Passes Test (circle Yes or No)
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
								To see how close you are to the monthly standard, divide the sum of the 4 weekly readings by 4 and enter result here >			Y N

Keep This Piece Of Paper On File For At Least 1 Year

Manual Tank Gauging And Tank Tightness Testing (for tanks 2,000 gallons or less only)	
Description Of Release Detection	**This temporary method combines manual tank gauging with periodic tank tightness testing. <u>It may be used only for tanks of 2,000 gallons or less capacity.</u> Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight. This combined method also includes tightness testing, a sophisticated test performed by trained professionals.** ***NOTE: This combination method can only be used temporarily for up to ten years after installing a new UST or for up to 10 years after your tank meets the corrosion protection requirements.***
Have Certification For Your Release Detection Method	❑ **Make sure your tank tightness testing is certified for the types of tanks and stored contents on which the tightness test is used.** Most tightness test methods are certified by a third party to verify that they meet specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the tightness tester provide them to you.
Perform These O&M Actions	❑ **Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified in the Manual Tank Gauging Record on page 16, and record two inventory readings at the end of the test (use any form comparable to the one on page 16).** ❑ **Reconcile the numbers weekly and record them on a Manual Tank Gauging Record (see page 16).** ❑ **See Section 3 of this manual if your tank fails the weekly standard.** ❑ **At the end of 4 weeks, reconcile your records for the monthly standard and record the result on a Manual Tank Gauging Record (see page 16).** ❑ **See Section 3 of this manual if your tank fails the monthly standard.** ❑ **Conduct a tank tightness test at least every 5 years.** This testing needs to be conducted by a professional trained in performing tank tightness testing. ❑ **See Section 3 of this manual if your tank fails the tightness test.** ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your manual tank gauging records for at least 1 year.** Unless you are recording actual release detection results at least weekly and every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep the results of your most recent tightness test.** ❑ **Keep all certification and performance claims for tank tightness test performed at your UST site for at least 5 years.**

Automatic Line Leak Detection (for pressurized piping only)	
Description Of Release Detection	**Automatic line leak detectors (LLDs) are designed to detect a catastrophic release from pressurized piping. Automatic LLDs must be designed to detect a leak at least as small as 3 gallons per hour at a line pressure of 10 psi within 1 hour. When a leak is detected, automatic LLDs must shut off the product flow, restrict the product flow, or trigger an audible or visual alarm. NOTE: Mechanical automatic LLDs need to be installed and operated as close as possible to the tank (LLDs are designed to detect a leak, restrict flow, etc. only between the detector and the dispenser).**
Have Certification For Your Release Detection Method	❑ **Make sure your release detection equipment is certified for the types of piping and stored contents on which the release detection system is used.** Most manufacturers have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the manufacturer provide them to you.
Perform These O&M Actions	❑ **Frequently test your automatic LLDs according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your release detection system is working and never needs checking. Some monitoring systems have a test or self-diagnosis mode. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturers' service instructions.** Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **See Section 3 of this manual if your LLD detects a leak.** ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **For at least a year, keep the annual test that demonstrates that the LLD is functioning properly.** ❑ **If used for monthly monitoring, keep results of your release detection system tests for at least 1 year.** Your monitoring equipment system may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **Keep all records of calibration, maintenance, and repair of your release detection equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

Line Tightness Testing (for piping only)	
Description Of Release Detection	**This method uses a periodic line tightness test to determine if your piping is leaking. Tightness testing can be performed by either a trained professional or by using a permanently installed electronic system (sometimes connected to an automatic tank gauging system).**
Have Certification For Your Release Detection Method	❑ **Make sure your line tightness testing or permanently installed electronic system is certified for the types of piping and stored contents on which the release detection system is used.** Most tightness test methods and release detection equipment have been tested and certified by a third party to verify that the equipment or services meet specific performance requirements set by regulatory agencies. If you don't have certified performance claims, have the tightness tester or equipment manufacturer provide them to you.
Perform These O&M Actions	❑ **If line tightness testing is used for pressurized piping, the test must be conducted at least annually.** ❑ **If line tightness testing is used for suction piping, the test must be conducted at least every three years.** Safe suction piping as described at the bottom of page 3 may not need release detection testing. ❑ **This tightness testing must be conducted by a professional trained in performing line tightness testing or by using a permanently installed electronic system.** ❑ **See Section 3 of this manual if your piping fails the tightness test or if the electronic system indicates a leak.** ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturers' service instructions.** Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your release detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right. ❑ **If you use a permanently installed electronic system, keep all records of calibration, maintenance, and repair of your equipment for at least 1 year.** ❑ **Keep all performance claims supplied by the installer, vendor, or manufacturer for at least 5 years.** These records include the certification of your leak detection equipment described above.

30-Day Release Detection Monitoring Record

(May be used for monitoring wells, interstitial monitoring, and automatic tank gauging)

Release Detection Method:_____

Facility Name:_____

Date	Your Name	UST System (Tank & Piping) (Enter N for No Release Detected or Y for a Suspected Or Confirmed Release)			
		UST #	UST #	UST #	UST #

Keep This Piece Of Paper And Any Associated Printouts On File For At Least 1 Year From The Date Of The Last Entry

Section 3 — Suspected Or Confirmed Releases

You need to be fully prepared to respond to releases **before** they may occur. You need to know what to do when release detection methods indicate a suspected or confirmed release. Be ready to take the following steps, as appropriate.

Stop The Release

- Take immediate action to prevent the release of more product.
- Turn off the power to the dispenser and bag the nozzle.
- Make sure you know where your emergency shutoff switch is located.
- Empty the tank, if necessary, without further contaminating the site. You may need the assistance of your supplier or distributor.

Contain The Release

Contain, absorb, and clean up any surface spills or overfills. You should keep enough absorbent material at your facility to contain a spill or overfill of petroleum products until emergency response personnel can respond to the incident. The suggested supplies include, but are not limited to, the following:

- Containment devices, such as containment booms, dikes, and pillows.
- Absorbent material, such as kitty litter, chopped corn cob, sand, and sawdust. (Be sure you properly dispose of used absorbent materials.)
- Mats or other material capable of keeping spill or overfill out of nearby storm drains.
- Spark-free flash light.
- Spark-free shovel.
- Buckets.
- Reels of caution tape, traffic cones, and warning signs.
- Personal protective gear.

Also, identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.

Call For Help

Contact your local fire or emergency response authority. Make sure you have these crucial telephone numbers prominently posted where you and your employees can easily see them. See the next page for a form you can copy and post.

Report To Authorities

If you observe any of the following, contact your state's underground storage tank regulatory authority to report a suspected or confirmed release as soon as possible (within 24 hours):

- Any spill or overfill of petroleum that exceeds 25 gallons or that causes a sheen on nearby surface water. (Spills and overfills under 25 gallons that are contained and immediately cleaned up do not have to be reported. If they can't be quickly cleaned up they must be reported to your regulatory agency.)

- Any released regulated substances at the UST site or in the surrounding area — such as the presence of liquid petroleum; soil contamination; surface water or groundwater contamination; or petroleum vapors in sewer, basement, or utility lines.

- Any unusual operating conditions you observe — such as erratic behavior of the dispenser, a sudden loss of product, or an unexplained presence of water in the tank. However, you are not required to report if:

    - The system equipment is found to be defective, but not leaking, and is immediately repaired or replaced.

- Results from your release detection system indicate a suspected release. However, you are not required to report if:

    - The monitoring device is found to be defective and is immediately repaired, recalibrated, or replaced and further monitoring does not confirm the initial suspected release, or

    - In the case of inventory control, a second month of data does not confirm the initial result.

The next page contains a blank list for names and phone numbers of important contacts. Fill out this information for your facility so that you will know who to call in case of an emergency. Remove this page from the manual, copy it, fill it out, and post it in a prominent place at your facility.

Copy the next page and update it often. Make sure everyone at your UST facility is familiar with this list of contacts.

Release Response
Important Contact Information

	Contact Name	Phone #
State UST Agency:		
Local UST Agency:		
Fire Department:		
Ambulance:		
Police Department:		
Repair Contractor:		
Other Contacts:		

✔ Release Response Checklist

- ❑ **Stop the release:** Take immediate action to prevent the release of more product. Turn off the power to the dispenser and bag the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, without further contaminating the site.
- ❑ **Contain the release:** Contain, absorb, and clean up any surface releases. Identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.
- ❑ **Call for help and to report suspected or confirmed releases:** Contact your local fire or emergency response authority. Contact your state's underground storage tank regulatory authority within 24 hours.

Section 4 — Spill And Overfill Protection

The purpose of spill and overfill protection equipment is to eliminate the potential for a release during fuel deliveries. The equipment must be in working order and used properly to provide adequate protection from spills and overfills.

Even the best spill and overfill protection equipment can become faulty over time if not properly operated and maintained.

Only one gallon of fuel leaking each week from a poorly maintained spill bucket can result in up to 195 tons of contaminated soil in a year.

Improper maintenance of the spill bucket at the UST site pictured below contributed to significant contamination of soil and groundwater.

What's The Difference?

Spill Protection:
A spill bucket is installed at the fill pipe to contain the drips and spills of fuel that can occur when the delivery hose is uncoupled from the fill pipe after delivery.

Overfill Protection:
Equipment is installed on the UST that is designed to stop product flow, reduce product flow, or alert the delivery person during delivery **before** the tank becomes full and begins releasing petroleum into the environment.

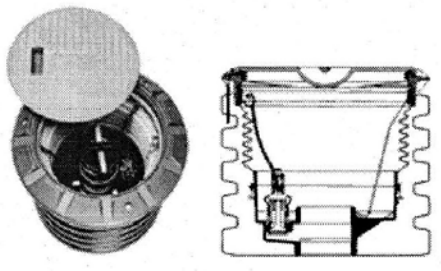
The following pages in this section focus on how you can routinely make sure your spill and overfill equipment is operating effectively.

What Are The Basics Of Spill Protection?

Your USTs must have catchment basins — also called spill buckets — installed at the fill pipe to contain spills that may occur as a result of fuel deliveries.

- The spill bucket is designed to temporarily contain product spills that might occur during fuel delivery. To contain a spill, the spill bucket must be liquid tight.
- **The spill bucket is not designed to contain fuel for long periods of time.** After each delivery, empty and dispose of contents properly.
- Spill buckets need to be large enough to contain any fuel that may spill when the delivery hose is uncoupled from the fill pipe. Spill buckets typically range in size from 5 gallons to 25 gallons.
- If you use a checklist for correct delivery practices (see page 33), spills should be eliminated or reduced to very small volumes that your spill bucket can easily handle.

If your UST ***never*** receives deliveries of more than 25 gallons at a time, the UST does not need to meet the spill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have spill protection, you should consider using spill protection as part of good UST system management.



Examples Of Spill Buckets

How Do You Maintain Your Spill Bucket?

The checklist below provides information on properly maintaining your spill bucket.

✔ Spill Bucket O&M Checklist

- ❑ **Keep your spill bucket empty of liquids.**
  Some spill buckets are equipped with a valve that allows you to drain accumulated fuel into your UST. Others may be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a basin is not equipped with drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.
- ❑ **Periodically check your spill bucket to remove any debris.**
  Debris could include soil, stones, or trash.
- ❑ **Periodically check to see if your spill bucket is still liquid tight.**
  Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.

What Are The Basics Of Overfill Protection?

Your USTs must have overfill protection installed to help prevent the overfilling of tanks.

Three types of overfill protection devices are commonly used:

- Automatic shutoff devices
- Overfill alarms
- Ball float valves

Each of these forms of overfill protection is discussed in detail on the following pages.

If your UST ***never*** receives deliveries of more than 25 gallons at a time, the UST does not need to meet the overfill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have overfill protection, you should consider using overfill protection as part of good UST system management.

How Can You Help The Delivery Person Avoid Overfills?

To protect your business, you must make every effort to help the delivery person avoid overfilling your UST.

Use A Checklist On Correct Filling Practices

If correct filling practices are used, you will not exceed the UST's capacity — see page 33 for a checklist on correct filling procedures. Overfills are caused when the delivery person makes a mistake, such as ignoring an overfill alarm.

Use Signs, Alert Your Delivery Person

The delivery person should know what type of overfill device is present on each tank at your facility and what action will occur if the overfill device is triggered — such as a visual and/or audible alarm or that the product flow into the tank will stop or slow significantly.

Educate and alert your delivery person by placing a clear sign near your fill pipes, in plain view of the delivery person. An example of such a sign follows on the next page.

Delivery Person — Avoid Overfills

- An **overfill alarm** is used for overfill protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90% full, the overfill alarm whistles and a red light flashes.
- **If you hear the alarm whistle or see the red light flashing,**

Stop The Delivery Immediately!

Make Sure You Order The Right Amount Of Product

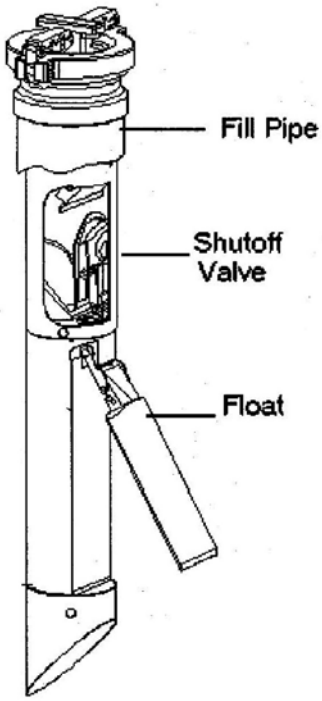
Also, you need to **make sure you've ordered the right amount of product for delivery**. Order only the quantity of fuel that will fit into 90% of the tank. For example, if you have a 10,000 gallon tank with 2,000 gallons already in the tank, you would order at the most a 7,000 gallon delivery (90% of 10,000 is 9,000 gallons; subtracting the 2,000 gallons already in the tank leaves a maximum delivery of 7,000 gallons). Use the checklist formula on page 33. Do your homework right and you reduce the chance of overfills.

What Should You Do To Operate And Maintain Your Automatic Shutoff Device?

The automatic shutoff device is a mechanical device installed in line with the drop tube within the fill pipe riser. It slows down and then stops the delivery when the product has reached a certain level in the tank. It should be positioned so that the float arm is not obstructed and can move through its full range of motion.

When installed and maintained properly, the shutoff valve will shut off the flow of fuel to the UST at 95% of the tank's capacity or before the fittings at the top of the tank are exposed to fuel.

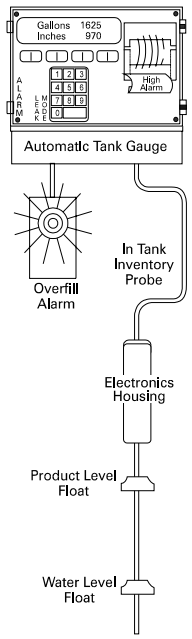
You should not use an automatic shutoff device for overfill protection if your UST receives pressurized deliveries.



✔ Basic O&M Checklist For Automatic Shutoff Devices

- ❑ A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel:
  - Make sure the float operates properly.
  - Make sure there are no obstructions in the fill pipe that would keep the floating mechanism from working.
- ❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

What Should You Do To Operate And Maintain Your Electronic Overfill Alarm?



This type of overfill device activates an audible and/or visual warning to delivery personnel when the tank is either 90% full or is within one minute of being overfilled. **The alarm *must* be located so it can be seen and/or heard from the UST delivery location.** Once the electronic overfill alarm sounds, the delivery person has approximately one minute to stop the flow of fuel to the tank.

Electronic overfill alarm devices have no mechanism to shut off or restrict flow. Therefore, the fuel remaining in the delivery hose after the delivery has been stopped will flow into the tank as long as the tank is not yet full.

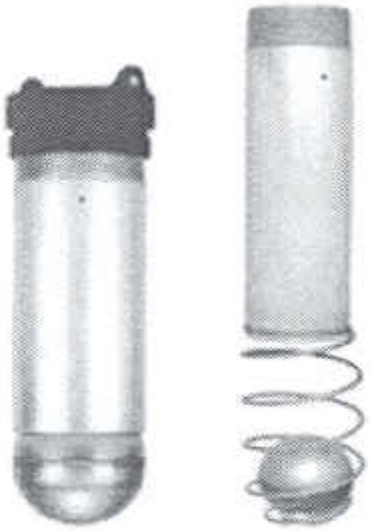
✔ Basic O&M Checklist For Overfill Alarms

❑ A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled:

- Ensure that the alarm can be heard and/or seen from where the tank is fueled.
- Make sure that the electronic device and probe are operating properly.

❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

What Should You Do To Operate And Maintain Your Ball Float Valve?



The ball float valve — also called a float vent valve — is installed at the vent pipe in the tank and restricts vapor flow in an UST as the tank gets close to being full. The ball float valve should be set at a depth which will restrict vapor flow out of the vent line during delivery at 90% of the UST's capacity or 30 minutes prior to overfilling.

As the tank fills, the ball in the valve rises, restricting the flow of vapors out of the UST during delivery. The flow rate of the delivery will decrease noticeably and should alert the delivery person to stop the delivery.

For ball float valves to work properly, the top of the tank must be air tight so that vapors cannot escape from the tank. Everything from fittings to drain mechanisms on spill buckets must be tight and be able to hold the pressure created when the ball float valve engages.

You should not use a ball float valve for overfill protection if any of the following apply:

- **Your UST receives pressurized deliveries.**
- **Your UST system has suction piping.**
- **Your UST system has single point (coaxial) stage 1 vapor recovery.**

✔ Basic O&M Checklist For Ball Float Valves

❑ A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling:

- Ensure that the air hole is not plugged.
- Make sure the ball cage is still intact.
- Ensure the ball still moves freely in the cage.
- Make sure the ball still seals tightly on the pipe.

❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

✔ Spill And Overfill O&M Checklist	
Spill Bucket	❑ **Keep your spill bucket empty of liquids.** Some spill buckets are equipped with a drainage valve which allows you to drain accumulated fuel into your UST. Others can be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a spill bucket is not equipped with a drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly. ❑ **Periodically check your spill bucket to remove any debris.** Debris could include soil, stones, or trash. ❑ **Periodically check to see if your spill bucket is still liquid tight.** Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.
Automatic Shutoff Devices	❑ A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel: • Make sure the float operates properly. • Make sure that there are no obstructions in the fill pipe that would keep the floating mechanism from working. ❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.
Overfill Alarms	❑ A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled: • Ensure that the alarm can be heard and/or seen from where the tank is fueled. • Make sure that the electronic device and probe are operating properly. ❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.
Ball Float Valves	❑ A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling: • Ensure that the air hole is not plugged. • Make sure the ball cage is still intact. • Ensure the ball still moves freely in the cage. • Make sure the ball still seals tightly on the pipe. ❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

What Are Your Responsibilities For Correct Filling Practices?

As an owner or operator you are responsible for ensuring that releases due to spilling or overfilling do not occur during fuel delivery.

As part of this responsibility, you must:

- Ensure the amount of product to be delivered will fit into the available empty space in the tank; and

- Ensure the transfer operation is monitored constantly to prevent overfilling and spilling.

One way help ensure the above requirements are met is to follow the checklist on the next page. The checklist describes activities to perform before, during, and after a fuel delivery.

✔ Correct Filling Checklist

What To Do Before Your USTs Are Filled	❑ Post clear signs that alert delivery persons to the overfill devices and alarms in use at your facility. ❑ Make and record accurate readings for product and water in the tank before fuel delivery. ❑ Order only the quantity of fuel that will fit into 90% of the tank. **Remember, the formula for determining the maximum amount of gasoline to order is:** (Tank capacity in gallons X 90%) — Product currently in tank = Maximum amount of fuel to order **Example:** (10,000 gal X 0.9) — 2,000 gal = 7,000 gal maximum amount to order ❑ Ensure fuel delivery personnel know the type of overfill device present at the tank and what actions to perform if it activates. For example, use sample sign on page 27 of this chapter. ❑ Review and understand the spill response procedures. ❑ Verify that your spill bucket is empty, clean, and will contain spills.
What To Do While Your USTs Are Being Filled	❑ Keep fill ports locked until the fuel delivery person requests access. ❑ Have an accurate tank capacity chart available for the fuel delivery person. ❑ The fuel delivery person makes all hook-ups. The person responsible for monitoring the delivery should remain attentive and observe the entire fuel delivery, be prepared to stop the flow of fuel from the truck to the UST at any time, and respond to any unusual condition, leak, or spill which may occur during delivery. ❑ Have response supplies readily available for use in case a spill or overfill occurs (see Section 3). ❑ Provide safety barriers around the fueling zone. ❑ Make sure there is adequate lighting around the fueling zone.
What To Do After Your USTs Are Filled	❑ Following complete delivery, the fuel delivery person is responsible for disconnecting all hook-ups. ❑ Return spill response kit and safety barriers to proper storage locations. ❑ Make and record accurate readings for product and water in the tank after fuel delivery. ❑ Verify the amount of fuel received. ❑ Make sure fill ports are properly secured. ❑ Ensure the spill bucket is free of product and clean up any small spills.

Section 5 — Corrosion Protection

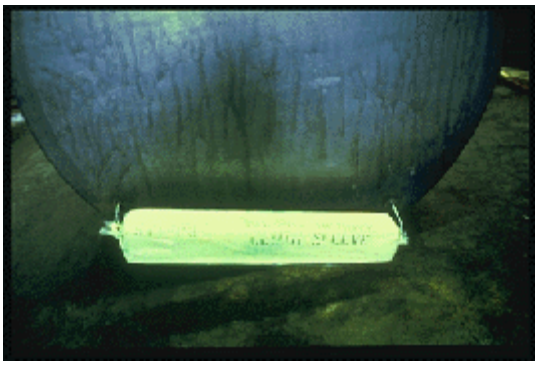
To prevent leaks, all parts of your UST system that are underground and routinely contain product need to be protected from corrosion. The UST system includes the tank, piping, and ancillary equipment, such as flexible connectors, fittings, and pumps. Unprotected metal UST components can deteriorate and leak when underground electrical currents act upon them.

One way to protect UST components from corrosion is to **make them with nonmetallic, noncorrodible materials**, such as USTs made of (or clad or jacketed with) fiberglass reinforced plastic (FRP) or other noncorrodible materials — as illustrated by the FRP tank on the right. Noncorrodible USTs like these do not require O&M for corrosion protection.

UST components made from metal, however, that routinely contain product and are in direct contact with the ground need corrosion protection provided by cathodic protection or (in some cases) lining the interior of the tank, as described below. These options require O&M.

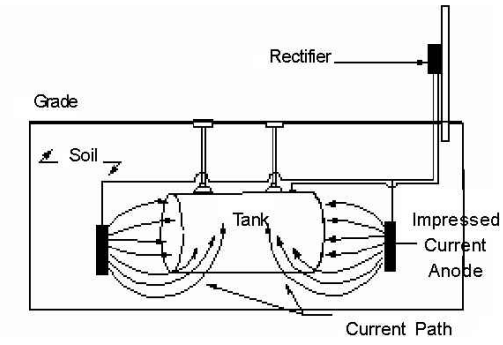
Note: Metal tanks or piping installed after December 22, 1988 must have a dielectric coating (a coating that does not conduct electricity) in addition to the cathodic protection described below.

Cathodic Protection Using Sacrificial Anode Systems



Sacrificial anodes are buried and attached to UST components for corrosion protection — as illustrated on the right by an anode attached to a tank. Anodes are pieces of metal that are more electrically active than steel, and thus they suffer the destructive effects of corrosion rather than the steel they are attached to.

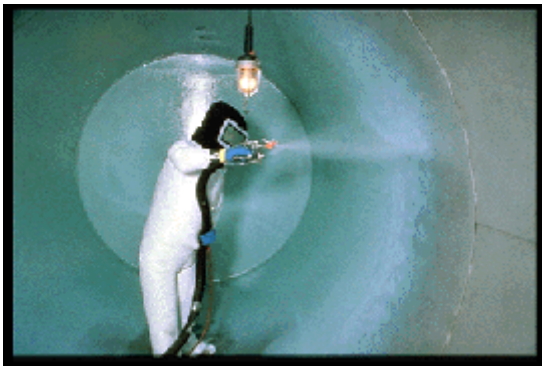
Cathodic Protection Using Impressed Current Systems



An impressed current system — as shown on the right — uses a rectifier to provide direct current through anodes to the tank or piping to achieve corrosion protection. The steel is protected because the current going to the steel overcomes the corrosion-causing current flowing away from it. **The cathodic protection rectifier must always be on and operating to protect your UST system from corrosion.**

Corrosion Protection Using Internal Lining Of The Tank

This corrosion protection option applies only to tanks installed before December 22, 1988. These older tanks can be internally lined by trained professionals to meet the corrosion protection requirements — as shown on the right, in which a professional follows industry codes to safely and effectively line a tank's interior.



It may help you to see your corrosion protection options displayed in the following table.

Corrosion Protection Choices	
Option	**Description**
Noncorrodible Material	The tank or piping is constructed of noncorrodible material.
Steel Tank Clad Or Jacketed With A Noncorrodible Material	Examples of cladding or jacket material include fiberglass and urethane. Does not apply to piping.
Coated And Cathodically Protected Steel Tanks Or Piping	Steel tank and piping is well-coated with a dielectric material and cathodically protected.
Cathodically Protected Noncoated Steel Tanks Or Piping	*This option is only for steel tanks and piping installed before December 22, 1988.* Cathodic protection is usually provided by an impressed current system.
Internal Lining Of Tanks	*This option is only for steel tanks installed before December 22, 1988.* A lining is applied to the inside of the tank. Does not apply to piping.
Combination Of Cathodically Protected Steel And Internal Lining Of Tanks	*This option is only for steel tanks installed before December 22, 1988.* Cathodic protection is usually provided by an impressed current system. Does not apply to piping.
Other Methods Used To Achieve Corrosion Protection	If you have tanks or piping that do not meet any of the descriptions above, check with your state UST agency to see if your UST system meets the requirements for corrosion protection. You also will need to ask about the operation, maintenance, and record keeping requirements applicable to this type of UST system.

Note: In addition to tanks and piping, all other metal components in direct contact with the ground that routinely hold product — such as flexible connectors, swing joints, fittings, and pumps — must also be cathodically protected.

Use the O&M checklist on the next page. Following the checklist look for record keeping forms and discussions of special corrosion protection situations.

✔ Basic O&M Checklist For Corrosion Protection	
Sacrificial Anode Cathodic Protection Systems	**You need to have a periodic test conducted by a qualified corrosion tester to make sure your cathodic protection system is adequately protecting your UST system. This test needs to be conducted:** ❑ Within 6 months of installation. ❑ At least every 3 years after the previous test. ❑ Within 6 months after any repairs to your UST system. • Make sure the professional tester is qualified to perform the test and follows a standard code of practice to determine that test criteria are adequate. • If any test indicates your tanks are not adequately protected, you need to have a corrosion expert examine and fix your system. • Testing more frequently can catch problems before they become big problems. ❑ **You need to keep the results of at least the last two tests on file.** See the next page for a cathodic protection test record keeping form.
Impressed Current Cathodic Protection Systems	**You need to have a periodic test conducted by a qualified corrosion tester to make sure your cathodic protection system is adequately protecting your UST system. This test needs to be conducted:** ❑ Within 6 months of installation. ❑ At least every 3 years after the previous test. ❑ Within 6 months after any repairs to your UST system. • Make sure the professional tester is qualified to perform the test and follows a standard code of practice to determine that test criteria are adequate. • If any test indicates your tanks are not adequately protected, you need to have a corrosion expert examine and fix your system. • Testing more frequently can catch problems before they become big problems. ❑ **You need to keep the results of at least the last two tests on file.** See next page for a cathodic protection test record keeping form. ❑ **You need to inspect your rectifier at least every 60 days to make sure that it is operating within normal limits.** • This inspection involves reading and recording the voltage and amperage readouts on the rectifier. You or your employees can perform this periodic inspection. • Make sure your cathodic protection professional provides you with the rectifier's acceptable operating levels so you can compare the readings you take with an acceptable operating level. If your readings are not within acceptable levels, you must contact a cathodic protection professional to address the problem. ❑ **You need to keep records of at least the last 3 rectifier readings.** See page 39 for a 60-Day Inspection Results record keeping form. ❑ **You should have a trained professional periodically service your impressed current system.** ❑ **Never turn off your rectifier!**
Internally Lined Tanks	❑ Within 10 years after lining and at least every 5 years thereafter, the lined tank must be inspected by a trained professional and found to be structurally sound with the lining still performing according to original design specifications. Make sure the professional performing the inspection follows a standard code of practice. ❑ **Keep records of the inspection (as specified in industry standards for lining inspections).**

Record For Periodic Testing Of Cathodic Protection Systems

(for use by a qualified cathodic protection tester)

Test Date:____/____/____ Facility Name/ID:_____

Note: Provide site sketch as directed on the back of this page.

Cathodic Protection (CP) Tester Information:

Name: _____ Phone Number:_____

Address: _____

Testing must be conducted by a qualified CP tester. Indicate your qualifications as a CP tester:

Identify which of the following testing situations applies:

- ❑ Test required within 6 months of installation of CP system (installation date was __/__/__)
- ❑ Test required at least every 3 years after installation test noted above
- ❑ Test required within 6 months of any repair activity – note repair activity and date below:

Indicate which industry standard you used to determine that the cathodic protection test criteria are adequate: _____

Cathodic Protection Test Method Used (check one)	
	100 mV Cathodic Polarization Test
	-850 mV Test (Circle 1 or 2 below) 1) Polarized Potential (instant off) 2) Potential with CP Applied, IR Drop Considered **Note: All readings taken must meet the -850 mV criteria to pass**
	Other Accepted Method (please describe):

Is the cathodic protection system working properly? Yes No (circle one)

If answer is no, go to the directions at the bottom on the back of this page.

My signature below affirms that I have sufficient education and experience to be a cathodic protection tester; I am competent to perform the tests indicated above; and that the results on this form are a complete and truthful record of all testing at this location on the date shown.

CP Tester Signature**:** _____ Date:_____

Keep This Paper On File For At Least Six Years

Site Sketch: Provide a rough sketch of the tanks and piping, the location of each CP test, and each voltage value obtained (use space below or attach separate drawing). Voltage readings through concrete or asphalt do not provide accurate readings and are not acceptable. Perform sufficient testing to evaluate the entire UST system.

If CP system fails test, you must have a corrosion expert fix the system.

If the answer was no, indicating that your CP system is not working, you must have a ***corrosion expert*** investigate and fix the problem. A corrosion expert has additional training, skills, and certification beyond the corrosion tester who filled out the bulk of this form. A corrosion expert must be:

- Accredited/certified by NACE International (The Corrosion Society) as a corrosion specialist or cathodic protection specialist, or
- Be a registered professional engineer with certification or licensing in corrosion control.

As long as you have the UST, be sure you keep a record that clearly documents what the corrosion expert did to fix your CP system.

Keep This Paper On File For At Least Six Years

60-Day Inspection Results For Impressed Current Cathodic Protection Systems

Facility Name:_____

Amp Range Recommended:_____

Voltage Range Recommended:_____

Date	Your Name	Voltage Reading	Amp Reading	Is Your System Running Properly? (Yes/No)

- **If the rectifier voltage and/or amperage output(s) are outside the recommended operating levels, contact a cathodic protection expert to address the problem.**
- **Never turn off your rectifier.**
- **Keep this record for at least 6 months after the date of the last reading.**

Some Special Corrosion Protection Situations

What If You Have An STI-P3 Tank With A PP4 Test Station?

If you have a PP4 test station installed with an STI-P3 tank, you may perform the periodic testing of your cathodic protection system by using the meter provided to you with the PP4 test station.

- Don't forget to record the result of the reading and keep at least the last two results.
- If your test readings do not pass, you must take action to correct the problem. Call your installer and ask that the corrosion expert who designed the system examine it and correct the problem.

What If You Combine Internal Lining And Cathodic Protection?

If you chose the combination of internal lining and cathodic protection for meeting corrosion protection requirements on your UST, you may not have to meet the periodic inspection requirement for the lined tank. However, you must always meet the requirements for checking and testing your cathodic protection system as described in the basic O&M checklist for corrosion protection on page 36. The 10-year and subsequent 5-year inspections of the lined tank are not required if the integrity of the tank was ensured when cathodic protection was added. You should be able to show an inspector documentation of the passed integrity assessment.

Example 1:
If you have cathodic protection and internal lining applied to your tank at the same time, periodic inspections of the lined tank **are not** required because an integrity assessment of the tank is required prior to adding the cathodic protection and internal lining.

Example 2:
If you had cathodic protection added to a tank in 1997 that was internally lined in 1994 and the contractor did not perform an integrity assessment of the tank at the time cathodic protection was added (or you cannot show an inspector documentation of the passed integrity assessment), then periodic inspections of the lined tank **are** required because you cannot prove that the tank was structurally sound and free of corrosion holes when the cathodic protection was added. The lined tank needs to be periodically inspected because the lining may be the only barrier between your gasoline and the surrounding environment.

What If You Have A Double Walled Steel UST With Interstitial Monitoring And Cathodic Protection?

If you have a cathodically protected double walled steel tank and you use interstitial monitoring capable of detecting a breach in both the inner and outer wall or ingress of product and water as your method of leak detection, then you should monitor your cathodic protection system within six months of installation and following any activity that could affect the CP system.

If you are using impressed current cathodic protection, you still need to perform the 60-day checks of your rectifier to make sure it is operating within normal limits.

- Testing the cathodic protection system more frequently may help catch problems quicker.

- If your test readings do not pass, you must take action to correct the problem. Call your installer and ask that the corrosion expert who designed the system examine it and correct the problem.

- Don't forget to keep at least the last two results of your cathodic protection testing.

Do All UST Sites Need Corrosion Protection?

A corrosion expert may be able to determine the soil at an UST site is not conducive to corrosion and will not cause the tank or piping to have a release during its operating life. If so, you must keep a record of that corrosion expert's analysis for the life of the tank or piping to demonstrate why your UST has no corrosion protection.

Section 6 — Frequent Walk-Through Inspections

You should conduct basic walk-through inspections of your facility **at least monthly** to make sure your essential equipment is working properly and you have release response supplies on hand.

These inspections would not be as thorough as following the O&M checklists presented earlier in this booklet, but they can provide a quick overview you can do more often than the longer checklists. You might think of this level of inspection as similar to automobile dashboard indicators that provide us with status warnings like low battery.

When you perform your walk-through inspection you should quickly check at least the following:

- **Release Detection System:** Is your release detection equipment working properly? For example, did you run a quick self-test of the ATG to verify it's working properly? Or did you check your manual dip stick to make sure it's not warped or worn?
- **Spill Buckets:** Are spill buckets clean, empty, and in good condition?
- **Overfill Alarm (if you have one):** Is your overfill alarm working and easily seen or heard?
- **Impressed Current Cathodic Protection System (if you have one):** Is your cathodic protection system turned on? Are you checking your rectifier at least every 60 days?
- **Fill And Monitoring Ports:** Are covers and caps tightly sealed and locked?
- **Spill And Overfill Response Supplies:** Do you have the appropriate supplies for cleaning up a spill or overfill?

In addition, good UST site management should also include the following quick visual checks:

- **Dispenser Hoses, Nozzles, And Breakaways:** Are they in good condition and working properly?
- **Dispenser And Dispenser Sumps:** Any signs of leaking? Are the sumps clean and empty?
- **Piping Sumps:** Any signs of leaking? Are the sumps clean and empty?

If you find any problems during the inspection, you or your UST contractor need to take action quickly to resolve these problems and avoid serious releases.

A frequent walk-through checklist is provided for your use on the next page.

✔ Frequent Walk-Through Inspection Checklist						
Date Of Inspection						
Release Detection System: Inspect for proper operation.						
Spill Buckets: Ensure spill buckets are clean and empty.						
Overfill Alarm: Inspect for proper operation. Can a delivery person hear or see the alarm when it alarms?						
Impressed Current System: Inspect for proper operation.						
Fill And Monitoring Ports: Inspect all fill/monitoring ports and other access points to make sure that the covers and caps are tightly sealed and locked.						
Spill And Overfill Response Supplies: Inventory and inspect the emergency spill response supplies. If the supplies are low, restock the supplies. Inspect supplies for deterioration and improper functioning.						
Dispenser Hoses, Nozzles, And Breakaways: Inspect for loose fittings, deterioration, obvious signs of leakage, and improper functioning.						
Dispenser And Dispenser Sumps: Open each dispenser and inspect all visible piping, fittings, and couplings for any signs of leakage. If any water or product is present, remove it and dispose of it properly. Remove any debris from the sump.						
Piping Sumps: Inspect all visible piping, fittings, and couplings for any signs of leakage. If any water or product is present, remove it and dispose of it properly. Remove any debris from the sump.						

Your initials in each box below the date of the inspection indicate the device/system was inspected and OK on that date.

Section 7 — For More Information

This section identifies UST program contacts and other resources to help answer your questions and provide you with information about good UST management.

Internet Resources

Government Links

- Directory of State UST Program Contacts: http://www.epa.gov/oust/states/statcon1.htm
- Directory of State UST Program Internet Sites: http://www.epa.gov/oust/states/stateurl.htm
- U.S. Environmental Protection Agency's Office of Underground Storage Tanks Home Page: http://www.epa.gov/oust. To go directly to the compliance assistance section of the Home page go to: http://www.epa.gov/swerust1/cmplastc/index.htm
- Tanks Subcommittee of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO): http://www.astswmo.org/tanks.htm
- New England Interstate Water Pollution Control Commission (NEIWPCC): http://www.neiwpcc.org

Professional And Trade Association Links

- American Petroleum Institute (API): http://www.api.org
- American Society of Testing and Materials (ASTM): http://www.astm.org
- Fiberglass Tank and Pipe Institute (FTPI): http://www.fiberglasstankandpipe.com
- NACE International - The Corrosion Society: http://www.nace.org
- National Fire Protection Association (NFPA) : http://www.nfpa.org
- Petroleum Equipment Institute (PEI): http://www.pei.org
- Steel Tank Institute (STI): http://www.steeltank.com
- Underwriters Laboratories (UL): http://www.ul.com

Free Informative Publications Available

The publications listed below are free and available from the U.S. Environmental Protection Agency (EPA). You can access these publications in the following ways.

- Go to EPA's web site at http://www.epa.gov/oust/pubs/index.htm to order, read, or download documents online.
- Write and ask for **free** publications by addressing your request to EPA's publication distributor: National Service Center for Environmental Publications (NSCEP), Box 42419, Cincinnati, OH 45242.
- For **free** copies, call EPA's publication distributor's **toll-free** number at (800) 490-9198 or fax (513) 489-8695.

Catalog Of EPA Materials On USTs
An annotated list of UST materials, including ordering information. Most of the leaflets, booklets, videos, and software items listed provide UST owners and operators with information to help them comply with federal UST requirements (32 pages).

Musts For USTs: A Summary Of Federal Regulations For Underground Storage Tank Systems
Plain language summary of federal UST requirements for installation, release detection, spill, overfill, and corrosion protection, corrective action, closure, reporting and recordkeeping. Updated & revised 1995 (36 pages).

Model Underground Storage Tank Environmental Results Program Workbook
Workbook, which states can modify to reflect their laws, helps improve owner and operator compliance with UST regulations. Contains general information about ERP; instructions on how to use the workbook; regulatory requirements, best management practices, and compliance checklists for USTs; and draft forms and worksheets in the appendices (164 pages). (Available on web only)

UST Systems: Inspecting And Maintaining Sumps And Spill Buckets – Practical Help And Checklist
Manual presents recommended inspection guidelines and best management practices for UST system sumps and spill buckets. Includes safety considerations; a general introduction to the kinds of sumps; basic maintenance procedures for sumps and spill buckets; and a sump and spill bucket inspection checklist (16 pages).

Straight Talk On Tanks: Leak Detection Methods For Petroleum Underground Storage Tanks
Explains federal regulatory requirements for leak detection and briefly describes allowable leak detection methods. Updated & revised 2005 (28 pages).

Getting The Most Out Of Your Automatic Tank Gauging System
Trifold leaflet provides UST owners and operators with a basic checklist they can use to make sure their automatic tank gauging systems work effectively and provide compliance with federal leak detection requirements.

Doing Inventory Control Right: For Underground Storage Tanks
Booklet describes how owners and operators of USTs can use inventory control and periodic tightness testing to temporarily meet federal leak detection requirements. Contains recordkeeping forms (16 pages).

Manual Tank Gauging: For Small Underground Storage Tanks
Booklet provides simple, step-by-step directions for conducting manual tank gauging for tanks 2,000 gallons or smaller. Contains recordkeeping forms (12 pages).

List Of Leak Detection Evaluations For UST Systems
A summary of specifications, based on third-party certifications, for over 275 systems that detect leaks from USTs and their piping. Each summary provides information on such items as certified detectable leak rate/threshold, test period duration, product applicability, calibration requirements, restrictions on the use of the device, and so on. (Available on web only)

List Of Integrity Assessment Evaluations For USTs
A list of integrity assessment procedures that have been successfully evaluated and certified by a qualified independent third party to meet specified performance criteria. (Available on web only)

Introduction To Statistical Inventory Reconciliation: For Underground Storage Tanks
Booklet describes how Statistical Inventory Reconciliation (SIR) can meet federal leak detection requirements (12 pages).

Closing Underground Storage Tanks: Brief Facts
Trifold leaflet presents “brief facts” on properly closing USTs in order to comply with federal closure requirements.

Underground Storage Tanks: Requirements And Options
Trifold leaflet alerts UST owners and operators who are “nonmarketers” (who do not sell stored petroleum) that they need either to find alternatives to managing their USTs or to make decisions about UST compliance.

Dollars And Sense: Financial Responsibility Requirements For Underground Storage Tanks
Booklet summarizes the "financial responsibility" required of UST owners and operators (16 pages).

List Of Known Insurance Providers For Underground Storage Tanks
Provides UST owners and operators with a list of insurance providers who may be able to help them comply with financial responsibility requirements by providing suitable insurance mechanisms (12 pages). (Available on web only)

Financing Underground Storage Tank Work: Federal And State Assistance Programs
Booklet identifies potential sources of financial assistance to cover the costs of upgrading, replacing, or closing an UST, or of cleaning up an UST release. Updated and revised March 1999 (23 pages).

State Regulatory Agency Contacts

See EPA's web site at http://www.epa.gov/oust/states/statcon1.htm for state underground storage tank program contact information.

United States
Environmental Protection
Agency

Solid Waste And
Emergency Response
5401G

EPA 510-B-05-002
September 2005
www.epa.gov

UST Systems: Inspecting And Maintaining Sumps And Spill Buckets

Practical Help And Checklist

Printed on recycled paper

Contents

This document provides information on inspecting and maintaining sumps and spill buckets. The information provided in this manual is not intended to replace or contradict your specific manufacturer's instructions for maintaining your sumps. Nothing in this manual is intended to endorse or criticize any specific type of equipment or any manufacturer. Photographs of common sump problems are provided for instructional purposes only. This document does not replace existing federal or state regulations, nor is it a regulation itself - it does not impose legally binding requirements. For regulatory requirements regarding UST systems, refer to the federal regulations governing underground storage tank systems (40 CFR Part 280) or corresponding state regulations.

Additional copies of this manual are available at no cost by calling EPA's toll-free distribution center at 800-490-9198. Or you can download a color copy by going to OUST's World Wide Web Home Page at http://www.epa/gov/oust/pubs

Introduction

Who Should Read This Manual?

This manual is intended for owners and operators of underground storage tank (UST) systems; specifically, anyone who oversees the operation and maintenance of UST systems that contain and dispense petroleum products. UST owners/operators should ensure that only qualified personnel conduct inspection and maintenance activities.

After reading this manual, you should be able to identify the different types of sumps associated with your UST system and be familiar with how to identify some common sump-related problems.

How Will This Manual Help You?

This manual covers recommended inspection guidelines and best management practices for sumps associated with your UST system. This manual will:

- Help you identify and inspect the sumps associated with your UST system, including the equipment in your sumps.
- Explain some simple steps you can take to maintain your sumps and the equipment in your sumps, as well as identify potential problems.
- Provide you with tips for fixing common problems before they cause a release to the environment.

For more complete guidance on how to operate and maintain your UST system, refer to the U.S. Environmental Protection Agency (EPA) document, *Operating And Maintaining Underground Storage Tank Systems, Practical Help And Checklists (EPA 510-B-05-002, May 2005)*.

The average cleanup cost for a leaking UST is about $100,000. The cost can be more than $1,000,000 if groundwater is affected.

Why Should You Care About Sump Maintenance?

Despite advances that have greatly reduced the threat of petroleum releases from UST systems into the environment, some UST systems continue to experience releases. Inadequate operation and maintenance is one reason these systems continue to experience releases.

Sumps, including the sumps beneath dispensers, sumps around the submersible pump (turbine) head[1], transition/intermediate sumps, and spill buckets are common sources of releases. Releases of even small volumes of product can seep into the ground and contaminate soil and groundwater. Inspecting and maintaining your sumps is generally simple and can prevent or minimize such releases.

While this manual addresses a number of issues related to sump maintenance, it may not cover some details specific to your particular sumps. Keep in mind the information provided in this manual is not intended to replace or contradict your specific manufacturer's instructions for maintaining your sumps and the equipment in your sumps.

This manual presents practical help and a checklist for inspecting and maintaining sumps. State and local agencies may require these or other activities. Please check with your state or local agency to determine their specific requirements.

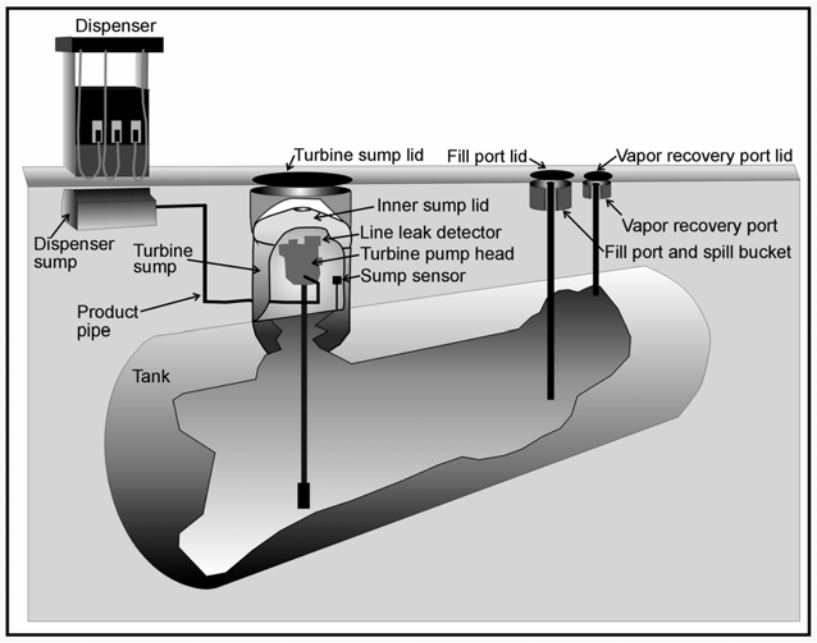


Diagram of an UST system

[1] Submersible turbine pumps are often known by their acronym STP.

Safety Considerations

If you perform sump inspection and maintenance activities, you should be experienced and aware of hazards and safety issues. Chances are you will be working in a high-traffic area, such as a gas station. You should properly mark off your work area and take appropriate steps to protect yourself. You should have the following items:

Person wearing safety gear while inspecting a sump

- Safety barriers, such as traffic cones or yellow plastic tape to mark off your work area
- Orange safety vest
- Hard hat (for construction sites)
- Steel-toed boots
- First-aid kit
- Chemical resistant gloves

You should consider these additional safety precautions:

Person removing a sump lid within a marked inspection area

- Sump lids may be large and very heavy and may require more than one person to lift. Use caution when lifting large steel lids.

- Be aware of the possibility of explosive or harmful vapors when inspecting and maintaining sumps. Avoid breathing in petroleum vapors.

- Please note that OSHA designates some sumps as confined spaces. See OSHA's standard on confined spaces in Title 29 of the *Code of Federal Regulations,* Part 1910.146. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9797

Getting To Know Your Sumps

What Is A Sump?

A sump is a subsurface area (pit) designed to provide access to equipment located below ground and, when contained, to prevent liquids from releasing into the environment.


Uncontained turbine sump

Sumps may or may not be contained. Contained sumps have sides and a bottom, are designed to be liquid tight, and may have a special cover designed to keep out water. Uncontained sumps generally do not have a bottom and are not designed to prevent liquid from entering or exiting the sump. These sumps may use wooden or metal sheeting to restrict the slumping of soil or crushed rock onto the equipment and to prevent the surface pavement from buckling or caving.

What Kinds Of Sumps Are Associated With My UST System And Where Are They Located?

The types of sumps likely to be associated with your UST system are:

Turbine Sumps – Turbine sumps are designed to provide access to the turbine area above the tank. The turbine area may house the submersible turbine pump head, piping, line leak detectors, interstitial monitoring devices, wiring, and other equipment. You generally will find turbine sumps directly above your USTs. Turbine sump lids generally range from 3 to 4 feet in diameter and can be round, oval, square, or rectangular in shape.


Contained turbine sump

Dispenser Sumps – Dispenser sumps are designed to provide access to piping, flex connectors, shear valves, and other equipment located beneath the dispenser. Dispenser sumps are found directly under your dispensers.


Contained dispenser sump

Transition/Intermediate Sumps – Transition/intermediate sumps are less common than other sumps, but can be found along the piping runs that connect the tanks to the dispensers, and are designed to provide access to the piping. Transition sumps are used to transition from above-ground piping to below-ground piping or, in some cases, to transition between different types of piping. Intermediate sumps are located at key points in the piping system (e.g., low spots, branches, tees). Transition/intermediate sump lids generally range from 3 to 4 feet in diameter and can be round, oval, square, or rectangular in shape.

Transition/intermediate sump

Spill Buckets – Spill buckets are contained sumps installed at the fill and/or vapor recovery connection points to contain drips and spills of fuel that can occur during delivery. Spill buckets are located where the delivery driver connects the product and/or vapor recovery hoses to your tank. Spill buckets can be found directly above your UST, at a location that is away from your UST (remote), or both. They typically range in size from 5 to 25 gallons, and lids range from 1 to 2 feet in diameter. Spill buckets may also be installed within a larger sump, similar in construction to a turbine sump, for secondary containment. In this case, you will only need to open your smaller lids to access your spill buckets.

Spill bucket

Fill and vapor recovery lids installed within a larger sump lid

View of sump lids

Did You Know?
Most UST systems must have spill buckets at each fill pipe where fuel is delivered into the UST. Some facilities also may have a second spill bucket around the Stage I vapor recovery line.

How Do You Access Your Sumps And Spill Buckets?

Circular steel sump lid pulled back to show the inner lid covering the turbine sump

You may need tools such as a large screwdriver, pry bar, wrench, or hammer to open your sump lids. Composite lids may require a specialized tool that you probably have on site. Have someone help you in lifting large lids, as they may be very heavy. Use caution when opening the lids and be aware of the following:

Square steel sump lid pulled up to show the inside of an uncontained turbine sump

- Square, rectangular, or oval sump lids can fall through the opening and damage the piping, submersible pump, or tank.
- Round lids, while not typically capable of falling into the sump, may swing down and damage the turbine head or line leak detector.
- If applicable, follow your equipment manufacturer's recommendations if special instructions are necessary to open the sump lids.
- You may need a key to remove the dispenser cover in order to access the dispenser sumps.

Circular spill bucket lid pulled back to show the fill port with a spill bucket

Generally, sumps will have a traffic load rated lid, beneath which may be either direct access to the equipment or, if contained, an inner lid covering the contained area.

Dispenser cover pulled off to show the dispenser piping and equipment

Basic Maintenance Procedures For Sumps And Spill Buckets

What Can You Do To Ensure Your Sumps and Spill Buckets Are In Good Condition?

Maintaining your sumps and spill buckets will involve gaining access to them, inspecting them on a regular basis, assessing whether any problems exist, and ensuring any problems are addressed. For serious problems (e.g., obvious leaks occurring on the piping and equipment, cracked spill buckets or sidewalls, cracked or missing seal around the lid), it's best to contact your UST contractor or the manufacturer of your UST equipment to have the problem fixed. Appendix A contains a sample checklist you may want to use to guide your sump inspections.

Note: To avoid accumulation of surface water, you should check the seals of your sumps' lids more frequently if they are located at a low point on the property or in the path of surface water runoff.

If you identify or suspect a release of fuel to the environment, report this to your implementing agency. For a list of state UST websites, go to: http://www.epa.gov/oust/states/stateurl.htm

What Should You Look For When You Inspect Your Turbine, Dispenser, And Transition/Intermediate Sumps?

Are The Lids Tight And Sealed Correctly? Check to ensure the lids to the turbine, transition, and intermediate sumps create a tight seal when closed and are securely fastened. The seals of the sump lids often dry out, crack, and require replacement; so you need to ensure they are in good condition. Water in your sumps may be an indication of a bad seal.

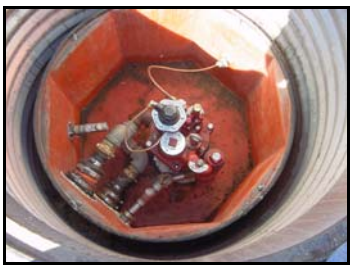
Are The Sump Walls Intact? Check to ensure the walls of your sump are intact and are not slumping or warping. If your sump is not contained, check the sidewalls to ensure there is no caving.

Contained turbine sump full of liquid

UST Systems: Inspecting And Maintaining Sumps And Spill Buckets

Is The Sump Free Of Debris, Liquid, Or Ice? Debris, liquid, and ice can damage equipment, reduce capacity (if contained), and interfere with your equipment's ability to operate correctly. For example, water in your sump will reduce capacity and may cause metal equipment in your sump to corrode. Fuel in your sump will also reduce capacity and may damage some plastic sumps and other components not designed for long term contact with petroleum. Similarly, used dispenser filters may contain small amounts of petroleum, so they should not be left inside your sump. You should carefully remove and properly dispose of any debris, liquid, or ice in your sumps.

Did You Know?
Some sensors may alarm only when in contact with petroleum. If covered completely with water, they will not alarm, even in the event of a petroleum leak.



Dry, debris-free contained turbine sump

Contained sump with liquid and debris

Is The Sump Free Of Cracks Or Holes? Examine your contained sumps for signs of damage (e.g., cracks or holes). Check to ensure no cracks are present around the areas where components, such as wiring conduit and piping, enter your sumps. Cracks and holes mean your sump will no longer contain product or prevent releases to the environment.

Are Sump Components Leak-Free? Check to ensure the piping, fittings, and connections in your sump are not leaking or dripping fuel.

Is The Sump Free Of Staining/New Staining? Check to ensure no new stains are present since your last inspection. New staining indicates a drip or spill has occurred.

Staining

Are The Sensors Positioned Correctly?[2] If you have sensors, check to ensure they are positioned properly in the lowest part of your sump and below the piping entry. Sensors should not be raised as the result of false alarms or for any other reason. Raised or disabled sensors will take longer or fail to detect a leak and could violate regulatory requirements.

Sump sensor

Sump sensor in contained turbine sump

Float sump sensor

Liquid sump sensor

Did You Know?
A crack or hole in your sump below the sump sensor will not allow liquid to accumulate in the sump to a level necessary to activate the sensor. As a result, liquid may be released undetected. Such cracks or holes need to be repaired immediately.

Are All Penetrations Into The Sump In Good Condition?[2]
Check to ensure all areas where electrical wires, conduits, and piping enter the sump are sealed. Cracked or loose seals around the penetrations can allow liquids to enter the sump and can allow fuel to be released into the surrounding soils if a release occurs inside the sump.

Sump penetration seals in poor condition

Sump penetration seals in good condition

Did You Know?
Some plastic flexible piping is installed within a larger pipe (or chase). There may be a seal between the primary pipe and the chase. Check with the piping maker to determine the proper position of the seal.

[2] Only for contained sumps

Are The Test Boots Positioned Correctly And In Good Condition?[3] A test boot is found on secondarily-contained piping and is a flexible sleeve usually made of rubber with a valve located either at the entry to the sump or on the piping in the sump. It is used to test the space between the inner and outer piping walls for tightness. Check to ensure the test boots are in good condition, not cracked or torn, and positioned correctly in the sump.

To ensure a leak can be detected by your leak detection equipment, test boots should be positioned so they allow product to enter your sump if a leak from the primary piping occurs. There are a variety of different configurations for test boots. If you are unsure of the appropriate configuration, check with your contractor.

Test boot located in a sump

Test boots positioned at sump wall, right test boot is torn

Is The Piping And Other Equipment In Good Condition? Sumps may contain various types of piping and equipment such as leak detection equipment, turbine motors, line leak detectors, sensors, conduits, and flex connectors.

Contained turbine sumps and equipment in good condition

Did You Know?
If your metal piping, including metal flex connectors, is in contact with the ground, it must be protected from corrosion.

[3] Typically only for contained sumps

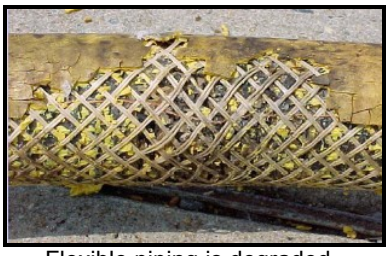
UST Systems: Inspecting And Maintaining Sumps And Spill Buckets

When inspecting the piping and equipment in your sumps, you should watch for the following conditions:

- For metal piping, check to ensure the piping is not severely corroded, in contact with the ground if it does not have corrosion protection, or otherwise degraded.
- For fiberglass piping, check to ensure the piping is not cracked, delaminated, or otherwise degraded.
- For flexible piping, check to ensure the piping does not have abnormal bends, breaks, cracks, or kinks; is not bulging, swelling, or growing; has not become soft, spongy, or discolored; and is not otherwise distorted or degraded.
- Check to ensure the fittings and flexible connectors are not twisted or misaligned and the flexible connectors are not cracked, kinked, etc.
- Check to ensure other pieces of equipment, including pump head, line leak detector, and sensors, are not visibly damaged, severely corroded, etc.

Equipment and metal piping covered with dirt in uncontained sump

Fiberglass piping is cracked



Flexible piping is degraded due to microbial growth

Flexible piping is cracked

Flexible piping is kinked

Metal flexible connector is twisted due to growth of flexible plastic piping

Flexible piping is bulging

What Should You Look For When You Inspect Your Spill Buckets?

Are The Lids To Your Spill Buckets In Good Condition? Check to ensure the lids to your spill buckets are in good condition so they will keep water out when the lid is closed. Ensure that when the lids to your spill buckets are in the closed position, they create a good seal and are secured tightly. Some spill buckets contain a rubber gasket inside the cover; check to ensure the rubber gasket is in good condition and creates a proper seal when the lid is closed.

A missing or damaged spill bucket lid may be a safety hazard. Replace it as soon as possible. Until the lid is replaced, cover and barricade the area to prevent potential accidents.

Cracked spill bucket lid

Spill bucket lid gasket

Check to ensure the lid is not touching the fill cap. This situation should be repaired because it could potentially damage the fill pipe and the tank if it is in an area where vehicles drive over the lid.

Is The Spill Bucket Free Of Debris, Liquid, Or Ice? Examine your spill buckets to determine whether they contain debris, liquid, or ice. For example, water in your spill bucket will reduce capacity and may cause metal equipment in your sump to corrode. Fuel in your spill bucket will also reduce capacity and may damage some plastic spill buckets not designed for long term contact with petroleum. You should carefully remove and properly dispose of any debris, liquid, or ice found in your spill buckets during your inspections. You should also check for and remove any liquid and debris present in your spill buckets before and after every delivery.

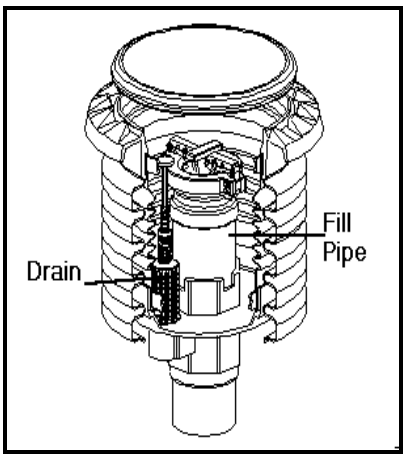
Spill bucket that contains liquid

UST Systems: Inspecting And Maintaining Sumps And Spill Buckets

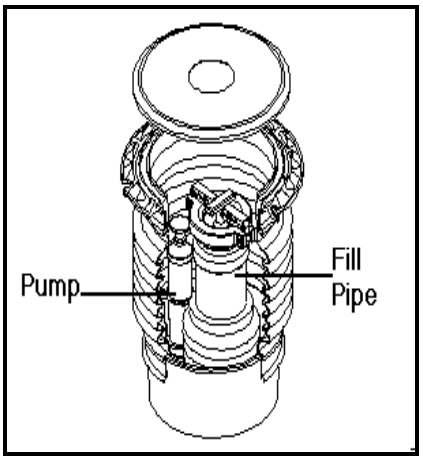
Some spill buckets are equipped with a valve that allows you to drain accumulated liquid into your UST. Others may be equipped with a manual pump so fuel can be transferred to your UST system by pumping it through the fill pipe or removing the fuel and disposing of it properly. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris present also will enter the UST. This could lead to internal corrosion, dispensing problems, and the need to remove contaminated water from the tank. If your spill bucket is not equipped with a drain valve or pump, you can still remove the liquid and debris and dispose of them appropriately. Liquid can be removed with a portable pump, such as the one on the right.

Portable pump

If your spill bucket is always dry, this may be an indication that it is not able to contain product. You may need to test to ensure it is liquid tight.

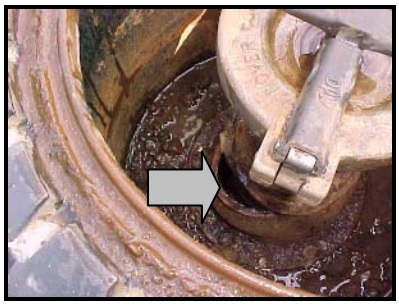


Spill bucket with a drain valve



Spill bucket with a manual pump

Is The Spill Bucket Free Of Cracks Or Holes? Examine the spill buckets for evidence of cracks or holes. If you have a metal bucket, check for corrosion and rust. Also check for deformations in the spill buckets or separation of the spill bucket from the fill pipe.



Spill bucket in poor condition – note the gap between the spill bucket and the fill pipe

Are The Drain Valves Operational? Some spill buckets have drain valves. Check to ensure the drain valve is free of debris and operational (e.g., it can close tightly and be opened to drain fuel in the spill bucket). If the drain valve is left open:

- It will act as a vent
  - Possibly affecting the ability of your overfill device to function properly;
  - Allowing potentially dangerous vapors to build up in the spill bucket or to be released to the soil or groundwater;
  - Possibly affecting the operation of the Stage II vapor recovery system.
- It can allow water and debris to enter your tank.

Spill bucket drain valve

***Never* pump fuel from your spill buckets into storm or sewer drains as a method of disposal. Improper disposal can contaminate surface and groundwater, result in vapor/explosion hazards, damage sewage treatment plants, and may be in violation of state or federal law.**

Where Can You Get More Information On This Topic?

Federal Agencies

U.S. EPA
Office of Underground Storage Tanks
http://www.epa.gov/oust

U.S. Department of Labor
Occupational Safety and Health Administration
http://www.osha.gov
1-800-321-OSHA (6742)

Organizations

API - American Petroleum Institute
www.api.org
(202) 682-8000

FTPI - Fiberglass Tank and Pipe Institute
www.fiberglasstankandpipe.com
(281) 568-4100

NACE International - Formerly National Association of Corrosion Engineers
www.nace.org
(281) 228-6200

NFPA - National Fire Protection Association
www.nfpa.org
(617) 770-3000

PEI - Petroleum Equipment Institute
www.pei.org
(918) 494-9696

STI - Steel Tank Institute
www.steeltank.com
(847) 438-8265

Publications

The publications listed below are free and available from the U.S. EPA. You can access these publications via EPA's website or you can call, write to, or fax EPA.

- You can download, read, or order documents from http://www.epa.gov/swerust1/pubs/index.htm
- To order free copies or ask questions, call EPA's publication distribution toll-free number at 800-490-9198 or fax 513-489-8695. You can also write and ask for free publications by addressing your request to EPA's publication distributor: National Service Center for Environmental Publications (NSCEP), Box 42419, Cincinnati, OH 45242.

Operating and Maintaining Underground Storage Tank Systems: Practical Help and Checklists, U.S. EPA, Office of Underground Storage Tanks, Washington DC, EPA 510-B-05-002, May 2005.

Musts for USTs: A Summary of the New Regulations for Underground Storage Tank Systems, U.S. EPA, Solid Waste and Emergency Response, Washington DC, EPA-510-K-95-002, July 1995.

Model Underground Storage Tank Environmental Results Program Workbook, U.S. EPA, Solid Waste and Emergency Response, Washington DC, EPA R-04-003, June 2004.

Other Sources

For additional information on UST system operation and maintenance, go to U.S. EPA Office of Underground Storage Tanks, List of Operation and Maintenance Tools
http://www.epa.gov/swerust1/ustsystm/o&m tools.html

For links to state UST websites go to
http://www.epa.gov/oust/states/stateurl.htm

Note: Federal UST regulations do not require you to report your maintenance activities, use this form, or keep any specific records of your sump inspection and maintenance practices.

Sample Underground Storage Tank Sump And Spill Bucket Inspection Checklist

Name: _____ Date/Time Of Inspection: _____

Comments/Follow-Up Needed:_____
_____
_____
_____
_____
_____

Choose yes or no for each question that applies.
Choosing no on any item indicates a problem that should be corrected.
When you have corrected the problem, check the fixed box.

Turbine/Transition/Intermediate Sumps	Sump No.: _____			Sump No.: _____			Sump No.: _____			Sump No.: _____		
	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?
Are The Lids Tight And Sealed Correctly?			□			□			□			□
Are The Sump Walls Intact?			□			□			□			□
Is The Sump Free Of Debris, Liquid, Or Ice?			□			□			□			□
Is The Sump Free Of Cracks Or Holes?*			□			□			□			□
Are Sump Components Leak-Free (No Leak Or Drips)?			□			□			□			□
Is The Sump Free Of Staining/New Staining?			□			□			□			□
Are The Sensors Positioned Correctly?*			□			□			□			□
Are All Penetrations Into The Sump In Good Condition?*			□			□			□			□
Are The Test Boots Positioned Correctly And In Good Condition?*			□			□			□			□
Is The Piping And Other Equipment In Good Condition?			□			□			□			□
Dispenser Sumps	Dispenser No.: ___			Dispenser No.: ___			Dispense No.: ___			Dispenser No.:___		
	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?
Is The Sump Free Of Debris, Liquid, Or Ice In The Sump?			□			□			□			□
Is The Sump Free Of Cracks Or Holes?			□			□			□			□
Are Sump Components Leak-Free (No Leak Or Drips)?			□			□			□			□
Is The Sump Free Of Staining/New Staining?			□			□			□			□
Are The Sensors Positioned Correctly?			□			□			□			□
Are All Penetrations Into The Sump In Good Condition?			□			□			□			□
Are The Test Boots Positioned Correctly And In Good Condition?			□			□			□			□
Is The Piping And Other Equipment In Good Condition?			□			□			□			□
Spill Buckets	Bucket No.: _____			Bucket No.: _____			Bucket No.: _____			Bucket No.: _____		
	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?	Yes	No	Fixed?
Are The Lids To Your Spill Buckets In Good Condition?			□			□			□			□
Is The Spill Bucket Free Of Debris, Liquid, Or Ice?			□			□			□			□
Is The Spill Bucket Free Of Cracks Or Holes?			□			□			□			□
Are The Drain Valves Operational?			□			□			□			□

*Only for contained sumps

United States
Environmental Protection
Agency

Solid Waste And
Emergency Response
5401G

EPA 510-R-05-001
May 2005
www.epa.gov/oust/pubs