



Release Detection and Inventory Control for Petroleum Storage Tanks

Methods for underground storage tanks and product piping

This is a general guide to laws and regulations for underground storage tanks and an aid in minimizing potential risks; it does not replace those laws and regulations, which take precedence over any information in this publication.

If your UST system is located in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, or Williamson county, additional requirements related to protecting the Edwards or the Trinity aquifer may apply (Title 30, Texas Administrative Code [30 TAC], Chapters 213 and 214). In addition to the laws and TCEQ rules, local governments and other state and federal agencies may have rules that apply. The owner and operator are responsible for ensuring compliance with all applicable laws and regulations.

What is release detection?

Release detection is a way to determine if your underground storage tank system is leaking. Release detection allows the owner-operator of a UST system, once a month, to ensure that the tanks and piping are not releasing a petroleum substance into the soil or groundwater. All UST systems are required to have an approved monthly release-detection method. You may also hear the phrase *leak detection*—it means the same as ‘release detection.’

Why is it required?

Release detection is necessary to prevent or minimize releases of regulated substances (gasoline, diesel, used oil, etc.) into the environment. It involves periodic monitoring of your tanks and piping for leaks. Such leaks not only can contaminate soil and groundwater, but also incur a cost to you in lost product and remediation expenses in the event of a release. Effective detection allows for a quick response to signs of leaks. Early action on your part protects the environment, while also protecting you from the high costs of cleaning up leaks and responding to liability claims. Often, when releases from UST systems occur, the petroleum substance can affect soil or groundwater over an area much larger than the property on which the tanks are located, affecting other parties, and increasing the cost of cleanup.

Remember that release detection applies to both tanks and product piping. Together, the tanks and piping are referred to as a “UST system.” For the TCEQ, PST rules apply to the UST system underground up to the point where piping exits the ground, leading to the dispenser. Leak detection only affects that part of the UST system that is installed below ground, not dispensers or aboveground equipment.

Many methods are available for monitoring your tanks and piping for leaks, and they may be used in multiple combinations to achieve compliance. Some methods cover tanks only, some cover piping only, and some cover both tank and piping. It’s important that you look at release detection not just as something required of an owner or operator, but also as a tool that will help you to make sure a regulated substance is not leaking from your UST system.

What is inventory control?

Regardless of your chosen release-detection method, all retail facilities (where fuel products are sold to the public) are required to perform inventory control. In addition, all tanks should be checked for water at least once a month. Inventory control is an ongoing accounting system similar to balancing a checkbook. Inventory control compares what is in the tank to what should be in the tank, to reconcile the inputs and outputs of product with the volume remaining in the UST. Each day the tank is used, records of product deliveries, amounts dispensed, and the measured volume of fuel remaining in the tank (inventory) are recorded on a ledger-like form. (Although this form is available in paper format for the manual recording of values, it can also be converted to an electronic spreadsheet for tank owners and operators who wish to have values tracked and calculated by computer.) The fuel inventory is determined by measuring fuel level in the tank with a measuring stick (“sticking the tank”) and then converting that level into a volume using a dedicated calibration chart for the tank. Many automatic tank gauges are also capable of determining the fuel level. Doing proper inventory control on manifolded tanks and blended-fuel systems can be very complicated. This information is very general. For assistance, please call the SBLGA hotline at 800-447-2827.

If your system has tanks that share a common inventory of fuel, those tanks are considered to be *manifolded*. For example, two 1,000-gallon tanks that are connected are considered manifolded tanks. For the purpose of inventory control, you should consider all manifolded tanks as a single system.

Blended-fuel systems are those with no separate tank for a midgrade product. For example, a station sells three grades of gasoline, but only has two tanks. Fuel from each tank is blended to create the midgrade fuel. To complete proper inventory control, the blended fuel product must be accounted for in both of the tanks’ inventory-control records.

At the end of the month, the book inventory and the measured inventory are compared to determine that month’s overage or shortage of product, which is then compared to a threshold value obtained from a mathematical formula. If the overage or shortage exceeds the threshold value for two consecutive months, you

must report a suspected release. (See *Suspected Releases from Petroleum Storage Tanks*, TCEQ publication RG-475h, for more information about reporting suspected releases.)

A monthly water check is also required to quantify the water in the tank. A small amount may be expected, but it is critical to remove water from the tank before it interferes with dispensing operations. Also, a sudden influx of water into the tank may need to be reported to the TCEQ as a suspected release.

For more details and sample forms regarding inventory control, see the U.S. Environmental Protection Agency's publication no. 510-B-93-004, *Doing Inventory Control Right*.

Is inventory control an acceptable method of monthly release detection?

Inventory control is only effective for finding larger leaks and is not considered a stand-alone method of release detection; it must be used in combination with a monthly method that is capable of detecting small leaks.

What are my options for detecting releases from tanks?

In Texas, tanks are required to be monitored for leaks at least once a month.

When properly employed, the following are acceptable methods of monthly release detection.

Automatic tank gauging (ATG) and inventory control use monitors permanently installed in the tank and linked electronically to a nearby control device to report product level and temperature. Often called the "tank monitor," the control device is usually mounted on a wall inside a building and has a keypad and message screen, and a printing device. During a test period, the gauging system automatically calculates the changes in product volume that can indicate a leaking tank. The test will often fail or give an inconclusive result if the product level in the tank is too low or if product is added to or removed from the tank while the test is being run. Test periods require several hours of quiet time, when nothing is put into or taken from the tank. Users of the ATG system must perform a complete test on each tank at least once a month.

In addition to the automatic test, inventory control for each tank must be maintained as outlined in the previous section. Some ATG systems can perform inventory control and store the results in memory or print a copy. If you do not have this type of ATG, inventory-control data must be obtained manually, as outlined above. ATG monitors tanks only; a separate method of release detection is required for the piping system.

Statistical inventory reconciliation (SIR) and inventory control make use of a computer program to determine whether a tank system is leaking by conducting a statistical analysis of inventory, delivery, and dispensing data collected over time. The data are sent by the tank owner or operator to a SIR

vendor, who analyzes the data to determine if there is a loss trend in the UST system.

By the 15th of each month, the SIR vendor supplies to the client (the tank owner-operator) a report that indicates whether the UST system is leaking.

If the analysis indicates a failure (or an inconclusive result that cannot be immediately corrected), the situation is considered a **suspected release** and must be reported to the TCEQ within 24 hours from the time the operator receives the results. **Important: even a single SIR failure requires notification and investigation of a suspected release, even if inventory control indicates there is not a leak in the tanks.** In Texas, SIR is considered a monthly monitoring method of release detection which covers tanks and lines.

Interstitial monitoring is used in double-walled UST systems. Monitoring equipment designed to detect product vapors or liquid is placed in the interstitial space between the inner (primary) and outer (secondary) wall of the system. The probes must monitor the interstitial space at least once every month.

In **groundwater monitoring**, monitoring wells are installed at strategic locations in the ground near the tank system. Groundwater is monitored for the presence of liquid product (gasoline, diesel, used oil) floating on its surface. To discover if leaked product has reached groundwater, these wells are checked periodically (at least once every month) by hand or continuously with permanently installed equipment (electronic sensors). This method is only valid at sites where groundwater is within 20 feet of the surface year round and the subsurface soil or backfill material (or both) consists of gravels, coarse to medium sands, or other similarly permeable materials. The person who installs the wells should state in writing that a release from any part of the UST system will be detected within one month of its occurrence.

Vapor monitoring is the sensing and measurement of product vapor in the soil around the tank system to determine whether a leak is present. This method requires installation of carefully placed monitoring wells in the ground near the tank system. Vapor monitoring can be periodic (at least once every month) using manual devices or continuously using permanently installed equipment (electronic sensors). All subsurface soils and backfill material must be sufficiently porous, e.g., gravel, sand) to allow vapors to diffuse rapidly through the subsurface. For this method of release detection to be acceptable, any preexisting background contamination in the subsurface soils must not interfere with the ability of the vapor-monitoring equipment to detect a new release. The person who installs the wells should state in writing that a release from any part of the UST system will be detected within one month of its occurrence.

Note: For both groundwater monitoring and vapor monitoring, the owner or operator is required to ensure subsurface conditions that enable the monitoring systems to detect a release from any portion of the system that contains product.

Secondary containment barriers are impermeable barriers (i.e., liners, vaults) placed between the UST system and the environment. Leaked product from the UST system is directed toward monitoring points such as observation wells

located between the tank system and the secondary containment barrier. To determine if a leak has occurred, the wells should be checked periodically (at least once every month) by hand or continuously with permanently installed equipment (electronic sensors).

Manual tank gauging is only acceptable for tanks with a capacity of 1,000 gallons or less. It requires a quiet period each week. The length of the quiet period depends on the diameter of the tank. For that reason, very few owners or operators use this method of release detection. If you would like more information on it, contact the TCEQ (see the end of this guide).

Monthly tank gauging is only acceptable for emergency-generator tanks. It requires a monthly quiet period, during which nothing is added to or removed from the tank. The product level is measured at the beginning and end of the quiet period. The difference between measurements should be within certain standards based on the capacity of your tank. If you would like more information on this method, contact the TCEQ, using the information at the end of this guide.

What are my options for detecting releases from product piping?

Pressurized piping. Each pressurized product line (from the USTs to the fuel dispenser) is required to have an automatic line-leak detector (ALLD) designed to detect and prevent a large or catastrophic leak (of at least 3 gallons per hour) in the line. Mechanical ALLDs are required to be performance tested annually. If you have an electronic ALLD (also referred to as an *ELLD*) that can self-test **and** either print out or store the test results, documentation of the self-test at least once a year satisfies your ALLD-testing requirements. Contact your UST-system contractor for more information about ALLD testing.

In addition to an automatic line-leak detector, pressurized piping requires one of the following release-detection methods:

- an annual piping-tightness test
- monthly vapor monitoring
- monthly groundwater monitoring
- monthly interstitial monitoring
- monthly monitoring with a secondary containment barrier
- monthly SIR and inventory control
- monthly electronic leak monitoring

Suction piping requires no leak detection if it meets **all of** the following design requirements:

- The below-grade piping operates at less than atmospheric pressure.
- The below-grade piping is sloped so that the contents of the pipe drain back into the tank when suction is released.

- Only one check valve is included for each suction line and it is located directly below, and as close as possible to, the suction pump.
- The owner-operator is able to verify that these requirements have been met, e.g., via plans provided by the installer, a consultant, or signed documentation by a registered UST contractor.

If your suction piping meets these requirements and you choose not to equip your piping with leak detection, you must have proper documentation.

Suction piping that does not meet these design requirements listed above must use one of the following approved methods to meet the release-detection requirements for piping:

- a piping-tightness test once every three years
- monthly vapor monitoring
- monthly groundwater monitoring
- monthly interstitial monitoring
- monthly monitoring with a secondary containment barrier
- monthly SIR and inventory control

What records do I need to keep?

All testing and monitoring results, including the results of any annual function test of mechanical ALLDs, must be kept for at least five years. Also, certification of financial assurance must be maintained at the facility, in addition to the UST registration certificate and TCEQ fuel-delivery certificate. All equipment used for release detection must have a third-party certification which verifies that the equipment meets EPA standards. Each certification must list the conditions of use and limitations of the equipment. Copies of these certifications must be maintained by the owner-operator while the equipment is in use, and it is important to ensure that the equipment is operated in accordance with the third-party certification. Installation and maintenance records for the UST system must be maintained by the owner operator for the life of the system, and should **not** be discarded after five years. Supplemental record-keeping forms have been attached to the end of this document.

What if there is a release?

If any of the release detection methods above indicate that a leak has occurred, the owner or operator is required to report it within 24 hours as a suspected release to the agency at 512-239-2200 or 800-832-8224. For more information on what to do in the case of suspected releases, please refer to the module *Suspected Releases from Petroleum Storage Tanks* (RG-475h).

Where do I find more information?

The complete requirements for release detection may be found at 30 TAC 334.50, available online at <[info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=334](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=334)>.

The Small Business and Local Government Assistance Program has information designed to assist tank owners and operators online at <www.tceq.texas.gov/goto/pst_resources>.

Search TCEQ publications online at <www.tceq.texas.gov/goto/publications>.

EPA Office of Underground Storage Tanks home page (please note that EPA requirements may be used as a guideline, but differ from Texas requirements): <www.epa.gov/oust/pubs>.

Suspected Releases from Petroleum Storage Tanks (RG-475h), available online at <www.tceq.texas.gov/goto/rg-475>.

For confidential environmental compliance assistance for small businesses and local governments, contact Small Business and Local Government Assistance via its hotline at 800-447-2827 or online at <www.TexasEnviroHelp.org>.



Monthly Record of Vapor-Well Monitoring

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, please contact the Small Business and Local Government Assistance hotline at 1-800-447-2827, or online at <www.TexasEnviroHelp.org>.

Instructions

- Vapor wells must be monitored at least monthly for potential product releases.
 - Monitoring and observation wells must be properly secured to prevent any unauthorized substances being deposited in the well.
 - If there is a suspected release, notify the TCEQ within 24 hours and refer to module RG-475h, *Suspected Releases from Petroleum Storage Tanks*.
 - Keep this form on file for at least five years.

Vapor Reading Instrument and Tank Information

Vapor Recovery Instrument and Tank Information	
Instrument Name and Type:	
Date Last Calibrated:	Depth from Ground Surface to Tank Bottom (in feet):

Vapor Monitoring Well Record



Monthly Record of Groundwater-Well Monitoring

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, please contact the Small Business and Local Government Assistance hotline at 1-800-447-2827, or online at <www.TexasEnviroHelp.org>.

Instructions

- Groundwater wells must be monitored at least monthly for potential product releases.
 - Monitoring wells must be properly secured to prevent any unauthorized substances being deposited in the well.
 - Automatic monitoring devices must be capable of detecting at least 1/8 inch of free product on top of the groundwater.
 - Manual monitoring method must be capable of detecting a visible sheen or other accumulation of regulated substances.
 - If there is a suspected release, notify the TCEQ within 24 hours and refer to module RG-475h, *Suspected Releases from Petroleum Storage Tanks*.
 - Keep this form on file for at least five years.

Groundwater

Depth from Ground Surface (in feet): _____ **Depth to Tank Bottom (in feet):** _____

Groundwater-Monitoring Well



Monthly Record of Interstitial-Sensor Monitoring

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, please contact the Small Business and Local Government Assistance hotline at 1-800-447-2827, or online at <www.TexasEnviroHelp.org>.

Instructions

- Interstitial sensors must be monitored at least monthly for potential product releases.
 - If there is a suspected release, notify the TCEQ within 24 hours and refer to module RG-475h, *Suspected Releases from Petroleum Storage Tanks*.
 - Keep this form on file for at least five years.

Sensor Location (tank or dispenser [T/D])

Sensor -Status Record



Monthly Record of Secondary Containment Well Monitoring

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, please contact the Small Business and Local Government Assistance hotline at 1-800-447-2827, or online at <www.TexasEnviroHelp.org>.

Instructions

- Observation wells must be monitored at least monthly for potential product releases.
 - *Note:* if your system uses observation wells or electronic sensors to determine if there is free product in the secondary containment, record if free product detected.
 - Observation wells must be properly secured to prevent any unauthorized substances being deposited in the well.
 - If there is a suspected release, notify the TCEQ within 24 hours and refer to module RG-475h, *Suspected Releases from Petroleum Storage Tanks*.
 - Keep this form on file for at least five years.

Monitoring Method

Secondary-Containment Release-Detection Method (circle one):

Observation Wells

Electronic Sensors

Observation Well or Sensor-Status Record



Weekly Record of Manual Tank Gauging (Tanks <1,000 gallons)

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, contact the Small Business and Local Government Assistance hotline at 1-800-447-2827, or online at <www.TexasEnviroHelp.org>.

Facility Information

Facility Name:	Facility ID No.:
Street Address:	City, State, Zip:

Instructions

- Manual tank gauging must be performed weekly.
- In the table to the side, circle your tank size, duration, and standard.
- If the weekly or monthly average of the four weekly test results exceed the standard in the table your tank may be leaking.
- If there is a suspected release notify TCEQ within 24 hours and refer to module RG-475h, *Suspected Releases from Petroleum Storage Tanks*.
- If you don't have sufficient quiet time, you must choose a different method of release detection.
- Release detection is a good business practice. Lost product, penalties and fines, and cleanup costs can add up to a significant amount of money.

Tank Size	Minimum Duration of the Test	Weekly Standard (1 test)	Monthly Standard (4-test average)
Up to 500 Gallons	36 hours	10 gallons	5 gallons
551–1000 gallons (when tank diameter is 64")	44 hours	9 gallons	4 gallons
551–1000 gallons (when tank diameter is 48")	58 hours	12 gallons	6 gallons
551–1000 gallons (also requires periodic tank tightness testing)	36 hours	13 gallons	7 gallons

Gauge Record

Start Test (date and time)				
First Initial Stick Reading				
Second Initial Stick Reading				
Average Initial Reading				
Initial Gallons (convert inches to gallons) [a]				
End Test (date and time)				
First End Stick Reading				
Second End Stick Reading				
Average End Reading				
End Gallons (convert inches to gallons) [b]				
Change in Tank Volume (gallons + or -) [a - b]				
Initials				
Tank Passes Test? Y/N				

To calculate monthly average, divide sum of 4 weekly readings by 4 and enter results here ▼