

Spill
Prevention
Operations
Technology
Series

SPOTS Memo #2
Tightness Testing Underground
Petroleum Storage Tank Systems

Prepared by:
New York State Department of Environmental Conservation
Division of Spills Management
Bureau of Source Control

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Langdon Marsh
Acting Commissioner

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MEMORANDUM

To: Regional Spill Supervisors, Bureau Directors, Section Chiefs

Subject: Spill Prevention Operations Technology Series (SPOTS) Memo (No. 2)
Tightness Testing Underground Petroleum Storage Tank Systems
(Originator: Paul Sausville/Russ Brauksieck)

I. PURPOSE

This memo is a guide to the DEC regulations for tightness testing of underground petroleum storage tanks and piping. Included in this guidance are the requirements for testing, the criteria which a tightness test must meet to be acceptable to the Department, and the required qualifications for test technicians. A listing of test methods which are acceptable for use in New York State is found in Appendix I. In addition, it lists the conditions under which an internal inspection or other alternative method acceptable to the Department may be substituted for a tightness test. Finally, the relationship of the federal UST requirements to New York State's requirements is discussed in Appendix II.

II. DISCUSSION

The Petroleum Bulk Storage (PBS) regulations are applicable to any facility that stores over 1100 gallons of heating oils, motor fuels or lubricants.

Section 613.5 of the Petroleum Bulk Storage (PBS) regulations lists the requirements and schedules for underground tank tightness testing. It requires **all** underground tanks and connected piping at facilities regulated by the PBS regulations to be tested except the following.

No periodic tightness testing is required:

- (i) on a tank and piping system storing No. 5 or No. 6 fuel oil;
- (ii) on a tank and piping system which has a capacity of eleven-hundred (1,100) gallons or less, unless the Department determines that the tank or piping system could reasonably be expected to leak petroleum to waters of the State;
- (iii) on tanks and piping systems which are corrosion-resistant and have a leak monitoring system;
- (iv) on tanks and piping systems installed in conformance with the standards for new construction set forth in Part 614 of the PBS regulations; or
- (v) where the size of the tank exceeds 50,000 gallons, or where it is technically impossible to perform a meaningful tightness test. In this case, an alternative test or inspection which is acceptable to the Department must be conducted.

Paragraph 613.5(a)(6) describes the criteria for tank tests.

Criteria for tightness test. A tightness test is a test acceptable to the Department, which will determine if a tank and piping system is tight or not tight. The test must be capable of detecting a tank or piping leak as small as five-hundredths (0.05) of a gallon in one (1) hour, accounting for variables such as vapor pockets, thermal expansion of product, temperature stratification, groundwater level, evaporation, pressure, and end deflection.

III. GUIDANCE

Tanks/Piping Systems which Require Testing, and the Test Schedule

Any unprotected underground petroleum storage tank system (tanks and connecting pipelines) which is larger than 1100 gallons, and any corrosion-resistant tank system which is larger than 1100 gallons but does not have a leak monitoring system, are required to be tested.

Manifolded tanks are considered one tank system and if the total capacity is greater than 1,100 gallons, then the system must be tested in accordance with the testing schedule outlined below. In order to properly test a manifolded tank system, access to all tanks may be required if the tank system is to be tested as one unit, or the tanks may have to be isolated and tested separately.

No testing is required for tank and piping systems which store No. 5 or No. 6 fuel oil. An alternative test or inspection which is acceptable to the Department may be used where the size of the tank exceeds 50,000 gallons or where it is technically impossible to perform a meaningful tightness test. Compartmentalized tanks where each compartment is less than 1100 gallons do not require testing.

The State Petroleum Bulk Storage (PBS) regulations require that unprotected steel tanks and piping systems be tested when they are 10 years old and every 5 years thereafter. Corrosion-resistant tanks and piping systems must be tested when they are 15 years old and every 5 years thereafter. Piping systems that are not corrosion-resistant (including, but not limited to, old steel lines and galvanized steel lines) must be tested once every five years. Testing **must** be done even if the line is connected to a corrosion-resistant tank.

In addition to the PBS regulations, tank owners are also responsible for complying with the federal EPA Underground Storage Tank (UST) regulations. For a comparison of the leak detection requirements (including testing) of the two programs, see Appendix II: "Comparison of State and Federal Requirements for Leak Detection".

Tank Testing

A list of tank tightness test methods which meet the requirements of the EPA and NYS DEC, and have been accepted for use in New York State, and a comparison of these test methods is found in Appendix I: "Underground Tightness Test Methods Accepted by DEC for Use in New York State." This list is updated periodically. The Bulk Storage Helpline (1-800-242-4351) may be contacted for the current list of acceptable methods.

Test methods which are acceptable to the Department must be third-party certified as meeting the EPA requirements and must test the entire tank system.

Third Party Certification

To be accepted for use in NYS, a tightness test must meet the EPA accuracy requirements for a tank test, as well as account for variables such as vapor pockets, thermal expansion of product, temperature stratification, groundwater level, evaporation, pressure and end deflection.

According to the federal EPA Underground Storage Tank (UST) regulations, 40 CFR Part 280, a "third-party certification" is required to prove that a method of leak detection meets the performance standards set forth in the UST regulations. This process, set forth in subdivision 280.40 (a), states: "Owners and operators of new and existing UST systems must provide a method of release detection that meets the performance requirements in section 280.43 or 280.44, with any performance claims and their manner of determination described in writing by the equipment manufacturer or installer. In addition, methods used after December 22, 1990... must be capable of detecting the leak rate or quantity specified for that method... with a probability of detection of 0.95 and a probability of false alarm of 0.05." The manner of verifying these performance claims is referred to as "third-party certification."

Leak detection manufacturers, including tank tightness testing firms, obtain these third-party certifications by having their equipment tested by an independent firm such as Midwest Research Institute (MRI), Vista Research, Ken Wilcox Associates or other qualified analyst.

By following the manufacturer's instructions for using the test method, these firms evaluate tightness test methods using the EPA protocol, "Standard Test Procedures for Evaluating Leak Detection Methods: Volumetric Tank Tightness Testing Methods." If a test meets the accuracy requirements, the firm certifies that the tank tightness testing hardware can detect a certain leak rate if operated within the manufacturer's protocol. This certification will specify the size of tank which may be tested by the test method and still meet the probability requirements. This leak rate determination usually is stated in probability of false alarm, or P(FA), and probability of detection, or P(D), at a given leak rate such as gallons per hour (gph), or 0.1 gph for tank tightness testing equipment. The P(D) and P(FA) indicates accuracy. Thus a given tank tightness testing equipment system might have third-party certification/accuracy of 99% P(D) and 2% P(FA) at 0.1 gph.

The gallon per hour (gph) criteria that is used for the certification is different than the gallon per hour criteria that is used as the threshold for declaring a leak. The criteria used for the certification is 0.1 gph, the criteria used for declaring a leak is a maximum of 0.05 gph. Therefore, the 0.1 gph criteria is **only** used during the certification process. The 0.05 gph criteria is the maximum criteria that can be used to declare that a tank has passed the tightness test (see "Threshold for Declaring a Leak").

Third-party certification provides other useful information to underground storage tank owners. For example, the certification report will state the length of time of the test, including waiting time after fill-up and top-off. The certification will also specify a size limitation. This size limitation is only applicable for tanks which are being tested to meet the federal EPA UST requirements. At this time, larger- sized tanks which are only regulated by NYS or tanks which are being tested only to meet the NYS requirements may be tested using a certified method even if the tank is larger than the size allowed on the certification. This is allowable because the PBS regulations require testing of tanks up to 50,000 gallons unless it is technically impossible to test. The size limitation on the certification was generated by the size tank that was used for the certification not on the technical limitations of the test method. While the P(D) will be lower, it is still possible to test the larger tanks.

Tank owners should obtain, read and retain third-party certifications. Owners should determine that the tank tightness testing equipment used is the equipment for which third-party certification has been obtained. For example, if the third-party certification says that certification has been provided to the second-generation equipment, owners should be sure that the test technician is not using the first-generation device.

Full System Testing

Although EPA accepts testing of that portion of the tank which routinely contains product as meeting its requirements for leak detection, New York State requires that the entire tank and product piping system be tested. Any method which does not involve testing the entire tank system (that is, the entire tank and associated product piping) is not acceptable to DEC. When the test method is evaluated by the third party, the test method must be used to test the entire tank system. In other words, a tank test method which is certified in an underfilled mode cannot simply be modified by overfilling the tank to perform a test in New York State. If the only way the entire tank system is tested is by overfilling the tank, the test method must have a third-party certification for overfilled tank testing.

An underfilled tank test is only acceptable when an acceptable third-party certified method is used to test the remaining portion of the tank above the product level. There are several testing systems which include a precision test of the product-filled portion of the tank and a non-volumetric test of the tank above the level of the product in the tank. Product lines must also be tested; therefore, a separate line test must also be used if the lines cannot be tested with the tank, due to the tank system configuration.

At this time, most of the test methods which DEC has accepted for use in New York State are volumetric or precision tests. However, non-volumetric tests such as tracer tests and vacuum tests may be accepted by the Department if they pass the EPA protocol for non-volumetric tests, "Standard Test Procedures for Evaluating Leak Detection Methods: Non-Volumetric Tank Tightness Testing Methods." Although these methods are qualitative, not quantitative, and the results from these methods will be either pass or fail, the EPA has established tests, in its testing protocol, which a non-volumetric method can use to demonstrate that it meets the required quantitative accuracy requirements.

It has not been demonstrated that air pressure testing can meet EPA's accuracy requirements; therefore, it is not accepted by EPA or by NYS for meeting their leak detection or testing requirements.

Pipe Line Testing

A list of pipe line tightness test methods which meet the requirements of the EPA and NYS DEC, and have been accepted for use in New York State, is found in Appendix I: "Underground Tightness Test Methods Accepted by DEC for Use in New York State."

Line tests which are acceptable to the Department are those which have shown that they meet the EPA requirements for line tests by being evaluated in accordance with the EPA's "Standard Test Procedures for Evaluating Leak Detection Methods: Pipeline Leak Detection System."

The product piping is considered part of the storage system and testing is required when tank testing is due. This includes pressurized piping systems and suction piping systems whether the check valve is located directly under the pump or at the tank. It also includes suction and return lines associated with a heating oil tank.

Piping systems may be tested in one of two ways:

1. Using a system test when the product can freely flow from the tank into the piping (ie.; for suction piping with only one check valve located under the pump); or
2. Using a separate line test.

If there is an inconclusive or failing test result with a system test, a separate pipe line test should be done.

If there is an inconclusive test result with a separate line test, then air pressure testing may be considered. It has not been demonstrated that air pressure testing can meet EPA's accuracy requirements; therefore, it is not accepted by EPA as meeting its leak detection requirements. However, DEC has found that there are cases where volumetric testing yields inconclusive results due to vapors trapped in dips and valleys in the piping. In these cases, DEC may accept air pressure testing as meeting its pipe line testing requirements. The local Regional Office should be contacted for approval before this type of testing is conducted.

Another useful test may be the helium test. This test involves pressurizing the pipe line with helium and using a helium detector to try to locate helium coming from the pipe line. A helium test does not meet EPA or NYS requirements for pipe line testing. However, if a pipe line has been determined by a line test to not to be tight, then it may be possible to use a helium test to identify the location of the leak.

Threshold for Declaring a Leak

The threshold for declaring a leak is a loss or gain of 0.05 gallons per hour. This criterion is not an "allowable leak rate". It is the leak rate that a test method must be capable of detecting. If the third-party certification shows that the test method is capable of detecting a leak smaller than 0.05 gph while still meeting the probability requirements of the EPA, then the threshold for declaring a leak will be the smaller criteria. This is particularly applicable to non-volumetric test methods. For example, the Tracer Tight test method is a test which has shown that it can detect a leak of 0.005 gph. Any tank known to leak, regardless of the size of the leak, must: 1) be reported to the spill hotline (1-800-457-7362 or 518-457-7362) within two hours; and 2) be promptly emptied.

If a tank fails a test, an inspection should be performed to ensure that the tank was indeed stable during the test procedures. There are two main variables which could cause problems with volumetric tank tests: temperature fluctuations and trapped vapor pockets. Temperature data should be analyzed for drastic fluctuations, or be monitored for a longer period of time. If the temperature is fluctuating, then a longer waiting period should be used to ensure that the tank temperature is stable before testing. If there is a trapped vapor pocket, the top of the tank may have to be exposed, a hole drilled in the tank to allow vapors to escape and then plugging the hole securely so no leaks will occur.

After the tank is stable, a retest may be done. If the tank fails again, then the tank and piping system should be tested separately to determine where the leak is located. If the leak is in the tank, then the tank will have to be emptied and an investigation performed to determine the extent of the leak. If the leak is in the piping, then the piping may need to be excavated to determine where the leak is located or a helium test may be used to locate the leak.

Tanks may possibly be repaired, lined and returned to service. However, if there is contamination, the tank may have to be removed to allow remediation to occur. Owners/operators should only have a tank repaired or rehabilitated in consultation with the DEC Regional Office. If a section of metal piping is faulty, it will have to be replaced, metal piping cannot be repaired. Fiberglass piping may be repaired in accordance with the manufacturer's specifications. If a union or joint is loose, the union or joint may be tightened without having to be replaced.

If the tank is to be closed, it must be closed in accordance with Part 613.9 of the PBS regulations. If the tank is to be replaced, it must be replaced in accordance with Part 614 of the PBS regulations.

Qualifications for Technicians

The technician who performs the tightness test must be qualified. This means that the technician must be trained and certified by the manufacturer of the test equipment as being capable of performing the test and interpreting the results. At this time there is no state certification of technicians.

Test Report

The test report must be submitted to the local DEC Regional Office within 30 days of the completion of the test, and must include the PBS number and the tank identification number as shown on the registration certificate, the test date, the test method used, the data and the results from the test, a certification statement by the technician that the test was conducted properly, and the signature of the test technician. In addition, the tank owner must keep a copy of the tank test for a minimum of 5 years.

Manufacturer's Instructions

All tests must be conducted using the proper equipment in accordance with the instructions and procedures set forth by the manufacturer of the test equipment. This includes determining the level of the groundwater around the tank, allowing the proper waiting time before commencing the test, and filling or overfilling the tank as required by the manufacturer of the test method. The manufacturer's instructions shall be in accordance with the procedures used for the third-party certification.

Alternative Test or Inspection

Alternative tests or inspections may be allowable by the Department in situations where a meaningful tightness test can not be performed. The use of an alternative test or inspection is allowed by DEC on a case-by-case basis. If a tank owner believes that the tank cannot be tested, then he must contact the local regional bulk storage staff and obtain written approval to perform an alternate test and/or inspection. Contact with the local Regional Office shall be written and include a description of the testing or inspection method to be used.

The conditions under which alternative tests or inspections may be granted include:

- Tanks which have a capacity greater than 50,000 gallons;
- Tanks which are buried with no direct access and retrofitting of this access could cause damage to buildings or other properties. (This situation could include tanks or manifolded tanks which are encased in concrete, tanks which are vaulted with no access, and other similar situations); and
- Tanks which are considered "technically impossible to test".

Alternative tests or inspections which are acceptable to the Department include any of the leak detection options listed in the federal UST regulations. These are: retrofitting with an automatic tank gauge (ATG), the installation of vapor or groundwater monitoring wells, or statistical inventory reconciliation (SIR). Monitoring would be done on a weekly basis if an ATG or monitoring wells are chosen, and monthly or yearly if SIR is chosen. Appendix III: "Federal Leak Detection Options," lists the requirements for the options allowed under the federal UST regulations.

Instead of choosing one of these leak detection options, a tank owner may choose to perform an internal tank inspection. This inspection would need to be done once every 10 years. Large underground storage tanks may need to use a combination of test and inspection methods to provide for adequate leak detection. For example, this could include the use of an internal tank inspection in conjunction with a series of monitoring wells.

Internal Tank Inspection

If an internal tank inspection is chosen as the alternative to tightness testing, it should be recognized that tank entry is an extremely dangerous procedure which should only be performed by properly trained and equipped personnel. Positive ventilation and standby personnel should also be required as additional precautionary measures. Tanks containing gasoline residues are explosive and should have all possible ignition sources controlled. Further information on safety precautions is provided in the American Petroleum Institute (API) and National Fire Protection Association (NFPA) publications listed in the reference section of this memorandum.

Once all safety precautions have been taken, the inspection procedures can begin. Initially, all product and tank bottoms must be removed, and the tank interior must be cleaned to remove loose scale, corrosion and residual product. Local fire regulations or company policies should be checked for any permit requirements and procedures prior to entry. The inspection should be performed only by a qualified inspector. In some locations and for some classes of equipment, an inspector may require licensing or certification by the local fire or health department. The inspection should consist of visual inspection of the tank shell for corrosion, in addition to one or more of the following methods:

- ultrasonic techniques;
- acoustic emission techniques;
- aural inspection (ball-peen hammer test);
- magnetic particle inspection;
- liquid penetrant inspection;
- fluorescent inspection; and/or
- electromagnetic inspection.

Because internal inspection procedures are similar for underground tanks and aboveground tanks, more detailed information on these procedures can be found in SPOTS #5, the DEC's guidance document on the internal inspection of aboveground tanks.

Any part of the storage facility which is determined not to be tight by investigation, must be promptly replaced or repaired in accordance with Part 614 of the PBS Regulations or taken out-of-service in accordance with Section 613.9 of those regulations.

Salvatore Pagano, P.E.
Director, Division of Spills Management

cc: S. Chrimes
Regional Engineers for Environmental Quality

References

1. API Publication 2015, Cleaning Petroleum Storage Tanks, 1982.
2. API Publication 2015A, Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning, July 1982.
3. NFPA 30, Flammable and Combustible Liquids Code, 1984.
4. NFPA 329, Underground Leakage of Flammable and Combustible Liquids, 1987.
5. US EPA, Must for USTs, July 1990.
6. US EPA, 40 CFR Part 280 and 281 Underground Storage Tanks; Technical Requirements and State Program Approval; Final Rules, September 23, 1988.

Appendix I (Superceded by August 1, 2001 Memo Addendum- see last page)

Underground Tightness Test Methods Accepted by DEC for Use in New York State

Appendix II

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Comparison of State and Federal Requirements for Leak Detection

Owners/operators of underground petroleum storage tanks are responsible for complying with both the New York State Petroleum Bulk Storage (PBS) regulations and the federal EPA Underground Storage Tank (UST) regulations. The PBS regulations apply to any facility which stores over 1100 gallons of motor fuels, heating oils, lube oils, and/or waste oil which is being re-used. The federal UST regulations apply to any petroleum-based oil, including crude oil and any fraction thereof, and waste oil, with an exemption for all heating oil, and farm/residential motor fuel tanks less than 1100 gallons. The federal UST regulations apply to USTs which are larger than 110 gallons. The leak detection options in the federal UST regulations include tank testing as well as those listed in Appendix III. This appendix describes the state and federal leak detection requirements. For more information on the federal requirements for leak detection, see the UST regulations (40 CFR Part 280) or the EPA publication, Musts for USTs.

<u>Tank Type</u>	<u>NYS PBS Regulations</u>	<u>Federal UST Regulations</u>
Bare Steel Tanks	Test when 10 years old and every 5 years thereafter. If tank is already past 10 years old, first test was due December 27, 1987.	Tank must have monthly monitoring or be tested annually after the following dates: i) If tank was installed before 1965 or if the installation date is unknown, then initial test was due by December 1989. ii) If tank was installed between 1965 and 1969, then initial test was due by December 1990. iii) If tank was installed between 1970 and 1974, then initial test was due by December 1991. iv) If tank was installed between 1975 and 1979, then initial test is due by December 1992. v) If tank was installed between 1980 and 1986, then initial test is due by December 1993.
Corrosion-Resistant Tanks	Test when 15 years old and every 5 years thereafter.	Tanks must have monthly monitoring or be tested every 5 years after the dates listed above if the tank has spill and overfill prevention devices. If the tank does not have spill or overfill prevention devices, then the tank must have monthly monitoring or be tested annually.
Corrosion-Resistant Tanks with Leak Detection Systems	Weekly monitoring of leak detection systems.	Monthly monitoring of leak detection system.

Appendix III Federal Leak Detection Options

The following leak detection options can be used to satisfy the leak detection requirements of the federal UST regulations. Unless otherwise noted, monitoring is required to be done at a minimum of once per month.

Automatic Tank Gauge

If an automatic tank gauge (ATG) is used for leak detection, then the ATG must be capable of detecting a leak of 0.2 gph with a probability of detection [P(D)] of 95% and a probability of false alarm [P(FA)] of less than 5%. The ATG can demonstrate that it meets this criteria by being evaluated in accordance with the EPA protocol, "Standard Test Procedures for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." This is not acceptable as a leak detection method for piping systems.

Monitoring Wells

If monitoring wells are used for leak detection, then the wells must be installed in accordance with the following requirements:

1. Monitoring wells can only be used where groundwater is never more than 20 feet from the ground surface, and the hydraulic conductivity of the soil(s) between the UST system and the monitoring well is not less than 0.01 cm/sec (i.e., the soil should consist of gravels, coarse to medium sands, coarse silts or other permeable materials.)
2. The site shall be assessed within and immediately below the UST system excavation zone to ensure compliance with the above requirement, and to establish the number and positioning of monitoring wells so that they will detect releases from any portion of the tank system.
3. The slotted portion of the monitoring well casing must be designed to prevent migration of natural soils or the filter pack into the well, and to allow entry of the product on the water table into the well under both high and low groundwater conditions.
4. Monitoring wells shall be sealed from the ground surface to the top of the filter pack.
5. Monitoring wells shall be placed within the excavation zone or as close as technically feasible.
6. The continuous monitoring devices or manual methods used can detect the presence of at least one-eighth of an inch of free product on top of the ground water in the monitoring wells.
7. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

Vapor Wells

If vapor wells are used for leak detection, then the wells must be installed in accordance with the following requirements:

1. The materials used as backfill around the tank are sufficiently porous (e.g., gravel, sand, crushed rock) to readily allow diffusion of vapors from releases into the excavation area;
2. The stored regulated substance, or a tracer compound placed in the tank system, is sufficiently volatile (e.g., gasoline) to allow a vapor level that is detectable by the monitoring devices located in the excavation zone in the event of a release from the tank;
3. The measurement of vapors by the monitoring device is not rendered inoperative by the groundwater, rainfall, or soil moisture or other known interferences so that a release could go undetected for more than 30 days;
4. The level of background contamination in the excavation zone will not interfere with the method used to detect releases from the tank;
5. The vapor monitors are designed and operated to detect any significant increase in concentration above the background levels of the regulated substance, a component or components of that substance stored in the tank system, or a tracer compound placed in the tank system;
6. The site is assessed in the UST excavation zone to ensure compliance with requirements numbers 1, 3 and 4 above, and to establish the number and positioning of monitoring wells which will detect releases within the excavation zone from any portion of the tank which routinely carries product; and
7. Monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

Interstitial Monitoring

If interstitial monitoring is used as the leak detection method (monitoring between the tank and secondary containment), the secondary containment must be designed, constructed and installed to contain any leak from the tank system until it is detected. The interstitial space may be monitored manually or electronically. Secondary containment can be accomplished by using either a double-walled tank; by using a secondary containment barrier under and around the tank; or by using a tank with an internally fitted liner.

Manual Tank Gauging

Manual tank gauging may only be used as leak detection for tanks which are 1000 gallons or smaller. The test procedure is as follows:

1. Tank liquid level measurements are taken at the beginning and ending of a time period during which no liquid can be added to or removed from the tank. For tanks that are 550 gallons or smaller, this time period is 36 hours. For 1000 gallon tanks which are 64 inches in diameter, the time period is 44 hours, and for 1000 gallon tanks which are 48 inches in diameter, the time period is 58 hours.

2. Level measurements are based on an average of two consecutive stick readings at both the beginning and the ending of the time period.

3. The equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch.

4. Testing must be conducted at least once per week, and four weekly results must be averaged to obtain a monthly result. A leak is suspected and subject to investigation if the variation between beginning and ending measurements exceeds the weekly or monthly standard as follows:

<u>Tank Size</u>	<u>Weekly Standard</u>	<u>Monthly Standard</u>
550 gallons or less	10 gallons	5 gallons
1000 gallon (64" diameter)	9 gallons	4 gallons
1000 gallon (48" diameter)	12 gallons	6 gallons

Statistical Inventory Reconciliation (SIR)

If SIR is used as the leak detection method, then it must be capable of detecting a 0.2 gallon per hour leak rate with a probability of detection [P(D)] of 95% and a probability of false alarm [P(FA)] of less than 5%. An SIR method can show that it meets this requirement by being evaluated in accordance with the EPA's "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods" or "Standard Test Procedures for Evaluating Leak Detection Methods: Volumetric Tank Tightness Test Methods." If the SIR method can detect a leak of 0.2 gph, then the tank must be monitored monthly. If the SIR method can meet the EPA requirements for a volumetric tank test (being able to detect a leak of 0.1 gallons per hour with a probability of detection [P(D)] of 95% and a probability of false alarm [P(FA)] of less than 5%), then the tank can be monitored yearly.

Piping Leak Detection - Pressurized Systems

Pressurized piping systems must have an automatic line leak detector, and have either an annual line test or one of the following: vapor or groundwater monitoring wells designed to detect any release from the piping system, interstitial monitoring of secondarily-contained pipe, or use of statistical inventory reconciliation (SIR).

Piping Leak Detection - Suction Systems

Suction systems do not require leak detection under the federal UST regulations if they are installed in accordance with the following:

1. The piping is sloped toward the tank so that the product will drain into the tank if the suction is released.
2. Only one check valve is included in the system and it is located directly below and as close as practical to the suction pump.

If the piping system does not meet the above requirements, then the piping system must either be tested once every 3 years or have one of the following: vapor or groundwater monitoring wells designed to detect any release from the piping system; interstitial monitoring of secondarily-contained pipe, or use of statistical inventory reconciliation (SIR).

Memo Addendum

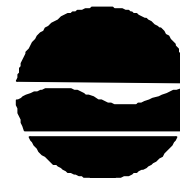
**New York State Department of Environmental Conservation
Division of Environmental Remediation**

Bureau of Spill Prevention and Response, 11th Floor

625 Broadway, Albany, New York 12233-7020

Phone: (518) 402- • **FAX:** (518) 402-9577

Website: www.dec.state.ny.us



Erin M. Crotty
Commissioner

ACCEPTED TANK TESTS AS OF AUGUST 1, 2001¹

The following tests are currently on the National Work Group's List of Leak Detection Evaluations and if performed in accordance with the specification on this list are acceptable to the Department:

Tank Tightness Tests		
Volumetric		Non- Volumetric
Overfill	Underfill plus Ullage	
<ol style="list-style-type: none"> 1. AES System II 2. APT System 3. APTT System 4. Horner EZY-Chek I 5. Horner EZY-Chek II 6. Ibex Precision Test 7. Leak Computer 8. Petro-Tite II 9. Petro-Comp 10. Soiltest Ainlay Tank Tegrity Tester 11. Tank Auditor 12. Tel-A-Leak I 13. VPLT Computerized 	<ol style="list-style-type: none"> 1. Alert Model 1000 with Alert Ullage Test 1050 2. Fast Test plus ullage test 3. Quick Test plus ullage test 4. Sure Test Series IV plus ProEco U2 Ullage Test 5. TEI System 4000 version 1.0 plus ullage test 6. USTest 2000/Por LL plus 2000/U 7. VPLT Computerized plus ullage test 8. VU-5000 or VUP-5000 plus UTA-5000, UTF-5000 or UTFP-5000 ullage test 	<ol style="list-style-type: none"> 1. Horner EZY 3/EZY 3 Locator Plus 2. TEI System 5000 version 1.0 3. Tracer Tight 4. VacuTect

Line Tightness Tests		
Line tests	Volumetric Overfill Tests	Non-volumetric Tests
<ol style="list-style-type: none"> 1. AcuRite 2. EZY-Check Manual Line Test 3. EZY-Chek II Automatic Line Test 4. LTH-5000 or LTP-5000 5. Petro-Tite 6. PLT-100R 7. Proline Test Series III 8. PTK-88 9. TEI Model LT-3 version 1.0 10. TLD-1 	<p>See list under tank tests (a line test may be required based on tank and piping system configuration)</p>	<p>See list under tank tests (a line test may be required based on tank and piping system configuration)</p>

¹For more information on these methods, please refer to the National Work Group's list of leak detection methods. It is available on the EPA website: www.epa.gov/sweeust1/ustsystem/nwgolde.htm