

Statistical Inventory Reconciliation for Underground Storage Tank Systems

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Minnesota law requires Underground Storage Tank (UST) systems, including tanks and piping, to have leak detection.

If your USTs do not have leak detection, you can be cited for violations and fined. Leak detection violations can also keep you from getting reimbursement for cleanup costs. Without leak detection, you risk discovering a leak only after it becomes an environmental problem and a major financial burden.

Inspections conducted nationwide indicate that many who are doing leak detection are not performing leak detection in a way that is likely to find leaks or complies with state and federal requirements.

If you use Statistical Inventory Reconciliation (SIR) for leak detection, then this document may help you perform SIR properly.

When is SIR allowed?

The Minnesota Pollution Control Agency (MPCA) has conditionally approved SIR as an alternative method of leak detection for regulated UST systems installed prior to December 22, 2007. UST systems installed after this date are required to have secondary containment with interstitial monitoring.

An owner of a new tank may use inventory control (with a tightness test after five years) as the primary method of leak detection, but only for a period of ten years after installation. If you plan to substitute SIR for inventory control, you must begin data gathering and submittal a couple of

months prior to the ten year anniversary of installation, in order that a valid SIR analysis can be performed by the ten year anniversary.

How does SIR work?

Data on tank inventory, receipts, and withdrawals is recorded by the tank owner on a regular basis. Data is sent to the SIR vendor for statistical analysis to determine if the tank system is leaking.

Important elements of SIR for tank and piping leak detection include:

- Proper selection of SIR vendor.
- Proper collection and analysis of data.
- Proper recordkeeping.

Without these elements, you may fail to meet the leak detection requirements. Steps one through five on the following pages show you how to perform SIR correctly.

SIR methods have certain limitations regarding the size and configuration of the system. You should contact the SIR vendor to determine which system would fit your needs.

There are several important restrictions for SIR. They are listed here.

What are the SIR restrictions?

The tank owner must use an MPCA-approved SIR vendor, method, version and analysis. A list of approved SIR vendors is found at the end of this fact sheet.

Inventory data must be taken daily and must follow the SIR vendor's instructions and the MPCA Inventory Control fact sheet. Tank contents, deliveries, and sales must be calculated.

If a tank system has two consecutive months of inconclusive results, a tightness test must be performed.

SIR may not be used on manifolded tank systems.

Do you have the right equipment?

Gauge stick or other gauges

The gauge stick used to measure the depth of liquid in an underground storage tank must be marked or notched to the 1/8 of an inch (with zero at the bottom end). Check your stick to be sure that the end is not worn or cut off and that the stick is not warped. The stick should be made of non-sparking material such as wood. Wooden sticks should be varnished to minimize the creeping of fuel above the actual fuel level reading on the stick.

Instead of using a gauge stick, you may use a mechanical or electronic tank monitor. Whatever measuring device is used, it must be capable of measuring the entire volume of the tank to the nearest 1/8 of an inch of product. It is important to make sure that the correct gauge chart from the manufacturer is used when converting tank volumes.

Pastes for finding water or fuel

You must check for water in the bottom of the tank at least once each month by smearing a water-finding paste along the bottom of the gauge stick. The paste changes color when it comes in contact with water. Many operators improve their stick readings by smearing a fuel-finding paste on the stick. Fuel-finding paste changes color when it comes in contact with fuel.

Forms

The SIR vendor will have forms that are specific to the needs of their system. These forms will have to be completed according to the instructions of the SIR method. Forms that are not completed properly will result in inconclusive results. This may lead to unnecessary tank tightness testing.

Here are the steps to follow to determine if SIR is the appropriate leak detection option for you.

Step 1 – Selecting an SIR vendor

When selecting an SIR vendor, you should look at many factors like cost, training, system limitations, and customer service. Remember that the SIR vendor is providing a service that will keep you in compliance with leak detection regulations. This service should be a partnership. If either partner fails to meet its obligation, the tank owner will be the one penalized for insufficient leak detection records.

When selecting an SIR vendor, you should analyze the following:

- (a) Is the SIR vendor approved by the MPCA? The companies approved by MPCA are listed at the end of this fact sheet.
- (b) Does the SIR method cover my specific tank situation? You should check with the vendor to make sure you comply with the limitations. Remember, it is the tank owner that is responsible for leak detection, not the SIR vendor.
- (c) Does the SIR vendor provide good training for method requirements? The SIR vendor should provide training on what data to collect and how to collect and record the data properly. You must understand system needs and what the system results mean.
- (d) What is the cost of the SIR system? You should look at the total cost, not just the monthly cost. Customer service and training are important parts of an effective SIR system. If inconclusive results happen because of inadequate training, you will be responsible for expensive tank tightness tests.

Step 2 – Performing inventory control properly

Proper data gathering is the key for effective leak detection using SIR. The SIR vendor will provide you with training, instructions, and forms for this data-gathering task.

Refer to the fact sheet titled "Inventory Control for Underground Storage Tanks," for proper inventory control instructions. Inventory control is an important aspect of SIR.

Inventory control requires the following actions:

- (a) Measure the tank contents every day. This data is usually put on a daily inventory worksheet.

Remember to use the proper tank chart for data conversions.

- (b) Record the amount pumped every day. This is done at the same time that the contents of the tank are measured.
- (c) Record fuel deliveries. Failing to record deliveries properly on the correct day is the largest source of error for SIR analysis. Make sure that proper training on data gathering is incorporated into your SIR program.
- (d) Measure water once a month. This step must also be documented.

Tank owners should train all personnel who will be involved in data gathering in the proper procedures.

Step 3 – Sending data to the SIR vendor

Data gathered during the month must be submitted to the SIR vendor by the tenth day of the next month. SIR vendors have special forms for information gathering and in some cases allow data gathered to be faxed or sent on a computer disk.

The SIR vendor will analyze the inventory data and send you the results within ten working days after receiving the data. Since you might not get the results back until late into the next month, it is critical that the inventory data is gathered correctly. If the first month has bad data gathering (e.g., improper sticking, deliveries written on wrong days) and you do not get those results back until the end of the second month, chances are that the data gathering techniques did not improve. This will lead to a second inconclusive result. Two inconclusive results require you to conduct a tank tightness test at additional cost.

Sending data to the SIR vendors includes:

- (a) Gathering data every day and filling out the required vendor forms. Data gathering is the most important task when using SIR as a leak detection method.
- (b) Sending the data by the tenth day of next month.
- (c) Receiving the results within ten working days from the vendor.

Step 4 – Analyzing results and record keeping

The SIR vendor will send the results of the monthly analysis within ten working days of receiving the data.

Each SIR vendor has a particular way of showing the results of the SIR analysis. Regardless of the form used for the results, you must know how to read the results so that you know if the tank system is tight or leaking.

Many vendors also provide suggestions for improving the quality of the data such as calibrating the equipment or making sure to record deliveries on the correct day. This information can be very useful for your operation if you know what to look for. Again, you should select a vendor because they provide good customer service not because they are inexpensive.

If your tank system shows a failure greater than or equal to 0.2 gallons per hour (gph), the system is considered to be leaking and you must report it as a suspected release and begin an investigation. During the next month, you should make sure that your inventory data gathering practices are perfect.

Generally, SIR is non-specific. SIR will not indicate the specific tank or piping that is leaking. Therefore, confirmation of the source of a release should always be completed before corrective action begins to avoid unnecessary work.

Analysis and record keeping should include the following steps:

- (a) Review the SIR results immediately after receiving them from the vendor.
- (b) If the results show that the tank system is tight, you need to file the results with your leak detection records.
- (c) If the results show a leak greater than 0.2 gph, you must report it to the Minnesota Duty Officer within 24 hours by calling 800-422-0798 or 651-649-5451. The telephones are answered 24 hours a day.
- (d) If the SIR results show a leak rate between 0.1 gph and 0.2 gph, you may continue SIR for an additional month. If the next month's result is also 0.1 gph or greater, it must be reported as a suspected release.
- (e) Keep the SIR results for at least ten years. These records are the only way to prove that you are performing leak detection properly. It can also help in the sale of the property by showing that no releases have taken place.

SIR Vendors Approved by MPCA

The MPCA has conditionally approved SIR as an alternative method of leak detection for UST systems. This list represents MPCA-approved SIR providers in Minnesota.

Company	Address	Telephone	SIR Version
Minnesota Petroleum Marketers Association	2345 Rice Street, Suite 173 St. Paul, MN 55113	651-484-7227	USTMAN SIR 95.2
Simmons Corporation	106 East Main Richardsen, TX 75081	800-848-8378	SIR 5.7
USTMAN Industries, Inc.	12265 West Bayaud Avenue, Suite 110 Lakewood, CO 80228	303-986-8011	USTMAN SIR 95.2
Warren Rogers Associates Inc.	747 Aquideck Middleton, RI 02842	401-846-4747	SIRA 5.2
Total SIR	PO Box 2040 Cornelius, NC 28031	704-892-9941	V 1.0

Need more information?

Visit the UST Program at <http://www.pca.state.mn.us/cleanup/ust.html>. The site has forms, fact sheets, and other information about USTs and UST requirements.

You can also call the MPCA at 651-296-6300 or 1-800-657-3864.

Eight ways to achieve good inventory measurements:

1. Measure each tank every operating day.
2. Measure just before each delivery.
3. Measure through the same drop tube each time.
4. Use gauge sticks that are:
 - Marked to the 1/8 of an inch.
 - Not cut off or worn off at the "0" end.
 - Varnished and not warped.
5. Use good stick practices:
 - Slowly lower the stick.
 - Gently touch the stick on the tank bottom.
 - Quickly pull stick out.
6. Wait an appropriate amount of time after delivery, then measure again. The tank should be given sufficient time after delivery to settle before measuring.
7. Read and record totalizer meters carefully, daily.
8. Check for water at least once a month using water-finding paste.