

# Statistical inventory reconciliation for underground storage tank systems

If your underground storage tank (UST)'s 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.

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

## When is SIR allowed?

SIR is an approved form of tank leak detection and periodic line 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.

## How does SIR work?

Data on tank inventory, deliveries, and dispensing 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 four on the following pages show you how to perform SIR correctly.

SIR methods have certain limitations regarding the size, monthly throughput and configuration of the system. For example, some versions of SIR cannot be used on manifolded tank systems. You should contact the SIR vendor to determine which system would fit your needs.

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

## What are the SIR requirements?

The tank owner must use an SIR vendor, method, version and analysis that has been certified by the National Work Group of Leak Detection Evaluations (NWGLDE). A list of NWGLDE approved SIR vendors can be found at [http://nwglde.org/methods/sir\\_quantitative.html](http://nwglde.org/methods/sir_quantitative.html). A list of some common SIR vendors can be found at the end of this fact sheet.

Inventory data must be taken daily and must follow the SIR vendor's instructions, forms, and procedures. Tank contents, deliveries, and sales must be calculated.

SIR results must be obtained within the 30-day monitoring period (see Step 3)

The SIR version must report a quantitative result with a calculated leak rate (indicate pass, fail or inconclusive)

The SIR Version must be capable of detection a leak rate of 0.2 gph or a release of 150 gallons with 30 days.

The SIR version must use a threshold that does not exceed one-half the minimum detectable leak rate.

## 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. All handheld devices used to take fuel or water readings must be checked annually for functionality and that the handheld device is in good condition and can be read properly.

Instead of using a gauge stick, you may use an 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. Electronic monitoring devices (ATG's) and probes must be inspected annually for functionality and calibrated accordingly.

### Pastes for finding water or fuel

You must check for water in the bottom of the tank at least once each month by using water-finding paste and record the water level. The paste changes color when it is exposed to water. Many operators improve their stick readings by using a fuel-finding paste on the stick. Fuel-finding paste changes color when it is exposed to fuel. An electronic tank monitor with a water float may also be used to monitor for water in lieu of water finding paste. Either way the tank water levels must be reported on the SIR vendor forms.

### 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 certified by the National Work Group of Leak Detection Evaluations (NWGLDE)? A list of NWGLDE approved SIR vendors can be found at [http://nwglde.org/methods/sir\\_quantitative.html](http://nwglde.org/methods/sir_quantitative.html).
- 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 or failed results happen because of inadequate training, you will be responsible for expensive tank tightness tests.

## Step 2 – Collecting data 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. Data gathering is the most important task when using SIR as a leak detection method

Collecting data properly 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

Historically, the owner or operator sometimes obtained SIR results three to eight weeks after the 30-day monitoring period ended. This often occurred because of the time it took to fill out manual forms, mailing time and getting the results back from the vendor. This will no longer be acceptable.

Owners and operators using SIR to meet leak detection requirements must determine the leak status (pass or fail) within the 30-day monitoring period. That means the data gathered during the month must be submitted to the SIR vendor by very quickly and results must be obtained within the 30-day monitoring period. Contact your vendor to assure they can meet this requirement.

Most SIR vendors offer an electronic (on-line) data submittal to expedite the process. Owners and operators can enter inventory data daily, weekly, monthly or when it fits their schedule. The SIR vendor will then analyze the data and results can be obtained electronically from the vendor. Often times the SIR vendor will have results available within minutes, but may take up to 48 hours, depending on the vendor. The owner can then save an electronic copy of the results to their computer or print the results for record retention

If electronic submittal of data is not an option for you, contact your SIR vendor to discuss options to assure you get results within the 30-day monitoring period. One option is to send data to the SIR vendor more frequently to get more frequent results. Another option is rolling data collection. For example, if the SIR vendor requires 30 days of data, tank owners and operators could submit data for 15 days and combine this with 15 days of previous inventory data for a combined 30 days of data. The Vendors would then have to send the results in a timely manner. Given the variability of the data requirements by each vendor, it is best to contact your SIR vendor to come up with a solution to meet your needs if electronic submittal of data is not an option.

## Step 4 – Analyzing results and record keeping

Each SIR vendor has a particular way of showing the results of the SIR analysis. Regardless of the form used to show 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.

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 a “pass” result, you need to file the results with your leak detection records.

- c) If the results show a "fail" result, 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. Because SIR includes the tank and the pipe, confirmation of the source of a release is required. A tank tightness test and line tightness test of the tank and pipe would be required to confirm and isolate the release and perform corrective actions as necessary.
- d) If the SIR results show an "inconclusive" result you may continue SIR for one additional month. During The next month, you should make sure your data gathering practices are perfect. If the next month's result is also "inconclusive", it must be reported as a suspected release and treat it as if were a failing test as indicated in (c) above.
- e) Keep the SIR results for at least five years. These records are the only way to prove that you are performing leak detection properly. It can also help in the sale of property by showing that no releases have taken place.

## Sir Vendors

The MPCA has gathered the following information to show common SIR vendors in Minnesota. Please visit [http://nwgldc.org/methods/sir\\_quantitative.html](http://nwgldc.org/methods/sir_quantitative.html) for an updated list and details on each vendor.

Company	Website Address	Telephone	SIR Version
Minnesota Petroleum Marketers Association	<a href="http://www.mpmaonline.com/">http://www.mpmaonline.com/</a>	800-864-3818	USTMAN SIR 95.2
Gilbarco/Veeder Root	<a href="https://www.gilbarco.com/us/">https://www.gilbarco.com/us/</a>	800-253-8054	USTMAN and more
EnviroSIR LLC	<a href="http://www.envirosir.com/pages/index.html">http://www.envirosir.com/pages/index.html</a>	337-935-0205	EnviroSIR V1.0
Leighton O'Brien Technologies	<a href="https://www.leightonobrien.com/">https://www.leightonobrien.com/</a>	888-275-3781	Monitor/Redone
Mostyle Pty. LTD	<a href="http://www.ems-australia.com">www.ems-australia.com</a>		Greenscan 3.0.1.2
National Environmental, LLC	<a href="http://www.tanknetics.com">www.tanknetics.com</a>	800-520-4802	Tanknetics, V. 2.1
Simmons Corporation	<a href="http://www.simmons-corp.com">www.simmons-corp.com</a>	800-848-8378	SIR 5.7
TeleData, Inc.	<a href="http://tankdata.com">http://tankdata.com</a>	772-219-4661	Tankmate
Total SIR	<a href="http://www.totalsir.com">www.totalsir.com</a>	800-533-2481	Version 2.0
Warren Rogers Associates Inc.	<a href="https://warrenrogers.com/">https://warrenrogers.com/</a>	800-972-7472	SIRA 5.2 and 5.1

## Need more information?

Visit the UST Program at <https://www.pca.state.mn.us/waste/underground-storage-tank-systems>. 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.