

FAQs from the NWGLDE

...All you ever wanted to know about leak detection, but were afraid to ask.

Statistical Inventory Reconciliation (SIR)

The Rules, the Listing, the Site Report

The recently updated USEPA underground storage tank (UST) rules included changes for statistical inventory reconciliation (SIR). What does this mean for sites where SIR is used as their leak detection method?

What Are the Rules SIR Must Follow?

The new regulation included SIR as a specific release-detection method for the first time. Under the previous 1988 UST regulations, SIR was regulated under the general “other methods” option at 40 CFR 280.43(h).

The revised federal UST regulation established the following:

- The performance standard of SIR methods must detect a leak rate of at least 0.2 gallon per hour (gph) with a 95 percent probability of detection and no more than a 5 percent probability of false alarm.
- SIR methods are similar to inventory control and those associated rule requirements apply.
- Each SIR method must perform a quantitative analysis. This means that the SIR method must calculate the leak rate for the facility, specifically for the data set, not simply indicate a result of Pass or Fail.
- To meet the performance standard, the SIR method must “use a threshold that does not exceed one-half the minimum detectable leak rate” in determining whether a release has occurred or not. This last requirement is often confusing and is explained as follows.

How Do I Read and Use the NWGLDE Listing for SIR?

In order to meet listing requirements for the National Work Group on Leak Detection Evaluations (NWGLDE), SIR release-detection-method vendors must document that their method meets the required performance standard (i.e., can detect a 0.2 gph leak with a 95 percent probability of detection and no more than a 5 percent probability of false alarm) by having their method or equipment evaluated by a third-party.

NWGLDE maintains a list of the equipment and methods that have been submitted to the workgroup that have verified through a third-party that the equipment or method has met this performance standard. The listing for each method summarizes the third-party evaluation, the method, the threshold, performance parameters, and limiting criteria, as applicable. For many SIR methods, to prove that they meet the federal performance standard of 0.2 gph with the accuracy required in the rule, data must be analyzed at the leak declaration threshold/leak threshold of 0.1 gph.

How Do You Read Your SIR Site Report?

When you look at your site report, you see multiple leak thresholds and rates...did you pass? The report may include the NWGLDE-listed leak threshold (not data specific). But for SIR, the method must also analyze the inventory and related data collected to determine the data set’s minimum detectable leak rate (MDL) for that tank system and that time period. This is accomplished for every period of performance—every 30-days (i.e., monthly monitoring), in accordance with the federal UST regulations. This (MDL) can be affected by the throughput, the accuracy of the data, and the consistency or range of the data, among other factors. The following three sections describe how to read the report.

1) Look at the NWGLDE listing for the method you are using. To meet the regulatory performance standard (0.2 gph), you need to look [here](#) for the third-party-evaluated listed leak threshold.

STATISTICAL INVENTORY RECONCILIATION TEST METHOD (QUANTITATIVE)	
Certification	Leak rate of 0.2 gph with PD > 99.9% and PFA = 0.0%.
	Leak rate of 0.1 gph with PD > 99.0% and PFA < 1.0%.
Leak Threshold	0.1 gph for leak rate of 0.2 gph.
	0.05 gph for leak arate of 0.1 gph.
	A tank system should not be declared tight if the test result indicates a loss or gain that equals or exceeds this threshold.
	Gains (water ingress) are analyzed and evaluated on an individual basis.

2) What is your “pass” threshold?

The **third-party listed leak threshold** may appear on your site report. The **data set leak threshold** **must** be calculated for each specific data set (each month, each tank) and is the maximum leak rate for the data set to be considered passing. It **cannot** exceed half the **minimum detectable leak rate**.

Summary of test results from monthly SIR reports. Complete for all 12 months.

Month / Year	Listing Leak Threshold	Data Set Calculated Leak Threshold	Minimum Detectable Leak	Calculated Leak Rate	Pass, Fail, Inconclusive		
	gph	gph	gph		P	F	I
Oct/ 2015	0.10	.085	0.17	-0.08	*		
Nov 2015	0.10	.095	0.19	-0.09	*		
Dec/ 2015	0.10	.085	0.17	-0.09	*		
Jan/ 2016	0.10	.065	0.13	-0.09	*		
Feb/ 2016	0.10	.065	0.13	-0.09	*		
Mar/ 2016	0.10	.085	0.17	-0.09	*		
Apr/ 2016	0.10	.09	0.18	-0.09	*		
May/ 2016	0.10	.095	0.19	-0.01	*		
Jun/ 2016	0.10	.085	0.17	-0.09	*		
Jul/ 2016	0.10	.01	0.02	0.06	*		
Aug/ 2016	0.10	.09	0.18	-0.08	*		
Sep/ 2016	0.10	.09	0.18	-0.08	*		

The regulation requires the vendor to calculate the data set’s minimum detectable leak rate **and** the leak threshold specifically for the set of data analyzed. The data set’s *calculated leak threshold* cannot exceed half the minimum detectable leak rate NOR can it exceed the NWGLDE-listed threshold.

Data Set Calculated Leak Threshold ≤ half the Minimum Detectable Leak Rate
AND

Data Set Calculated Leak Threshold ≤ Third party evaluated, NWGLDE-listed leak threshold

If the **data set calculated leak threshold** meets these two criteria, it is the maximum leak threshold for a “pass” for this data set.

3) You now know what your maximum passing leak threshold is. SIR provides your tank system’s calculated leak rate. Did your tank system pass?

The **data set calculated leak threshold** established your “pass” maximum for each data set. Compare this maximum value to your tank system’s **calculated leak rate**. If the **calculated leak rate** is lower than the **data set calculated leak threshold**, the tank system passes monthly monitoring!

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Apr/ 2016	0.10	.09	0.18	-0.09	*		
May/ 2016	0.10	.095	0.19	-0.01	*		
Jun/ 2016	0.10	.085	0.17	-0.09		*	
Jul/ 2016	0.10	.01	0.02	0.06		*	
Aug/ 2016	0.10	.09	0.18	-0.08	*		
Sep/ 2016	0.10	.09	0.18	-0.08	*		

In other words: If the **Data Set Calculated Leak Threshold > Calculated Leak Rate**, then it’s a PASS! Remove equal from the equation.

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