Configuring Leak Detection

Use the following procedures to configure Leak Detection settings.

Prerequisites: You must belong to a FuelsManager user group with appropriate security access rights to view and modify. Some pages may not be available for entry or edit depending on your user security rights.

The Leak Detection license must be installed for Leak Detection to function correctly.

The FuelsManager Leak Detection feature's primary objective is to detect a leak at rates as low as 0.1 gallons per hour. The ability to detect leaks at these rates depends upon the physical characteristics of the tank (size, shape, above/below ground, materials used in construction, etc.), the types of instruments available to measure the properties of the product in the tank, the resolution and stability of the instruments, and how the tank is used.

The basic functions of Leak Detection include:

- Monitoring level, temperature, water level, and density from field instruments or operator entry.
- Performing analysis of sensor data and looking for conditions that might indicate a leak.
- Comparing instrument readings and calculations against alarm limits.
- Annunciating, processing, and logging alarms.
- Providing reports.

Leak Detection reads data directly from historical data and applies filtering algorithms, calculates various statistics, and applies qualifying logic. Alarm processes running within the systems database can monitor the calculation results, which include data manually entered, data calculated in real-time, and data received through communication interfaces.

Leak Analysis is performed through Operate in FuelsManager. For more information on running a Leak Analysis and previewing and/or printing a Leak Test Report, refer to **QRG526 Performing a Leak Analysis in Operate**.

The algorithm for Leak Detection in FM12.x remains the same as the legacy version (FM7.x); however, the data assembly from the archive is different. The legacy version guaranteed data samples archived on a fixed interval. Fixed interval archiving became optional on later versions of legacy. For FM12, data is only sampled on change, and the different types of data (primarily temperature and level) are sampled at different times. This requires that the other values be interpolated to fill in the gaps. The interpolation is performed by carrying forward the earlier data value unchanged, not by calculating a time-weighted average of the earlier and later data values.

❶ Configure Leak Detection Report Settings

Follow the steps below to configure Leak Detection settings at your Site:

1) Open **FuelsManager**.
2) From the menu, select **Administration > Sites > Sites**. The Sites Configuration page displays.
3) Click the **Edit** icon next to the Site record you want to modify. A multi-tab page displays.

4) Select the **Leak Detection** tab.
5) Enter the name of the **Leak Detection Report**.
   Typically, this is set to FM_LeakTestReportStatic to print a Static Leak Analysis.
6) Select the **Leak Test Report Printer** from the list.
   If the printer is not listed, you may need to configure it through Windows.
7) Click **OK** to save your changes or **Cancel** to disregard changes and return to the Sites Configuration list page.

The following fields are currently <u>not</u> in use:

- Minimum Number Quiet Time Samples
- Minimum Total Quiet Time
- Quiet Time Factor
- Use Minimum Issue Wait

❷ Leak Analysis Methods

Leak Detection integrates with third party leak detection systems and instrumentation to detect and calculate leaks. There are two types.

Volumetric Analysis Methods

This analysis method requires measuring the level and temperature, calculating the net volume, and analyzing the tank data during periods of inactivity and searching for losses.

An accurate gauge with high resolution yields the best results for static measurement. The accuracy of the tank strapping table will also affect the accuracy of the volume calculation. Errors in the strapping table could appear as leaks. Leak Detection detects leak rates as low as 0.1 gallons per hour for tanks up to 75,000 gallons.

Mass Analysis Method

This analysis method is based on measuring the pressure of the product and applying the conservation of mass principle. In bulk storage tanks, the Volume Gross Observed will fluctuate with changes in the temperature of the product. The mass of the product in the tank is constant, so changes in the temperature of the product have no effect on the total mass in the tank.

For more information on Leak Analysis Methods, refer to the Point Editor Settings Tab help page on FuelsManager.

❸ Leak Analysis Types

The Leak Analysis Type determines the method used to search for a leak.

This release version supports Static Analysis only.

Static Analysis Type

This analysis type requires the tank to be *Inactive* and stable for the time period or amount of time required by the gauge type certification. Depending on certification of a gauge type, minimum quite time of 24, 48, or 72 hours is needed to perform a relevant Static Tank analysis. After analyzing valid historical data over the minimum required quite time period, the system can report valid leak rates.

A tank typically requires four hours to become stable for adequate Static analysis.

❹ Configure Leak Detection Settings for a Point

The Leak Detection Settings for a Point allow you to set the Leak Analysis Method, Leak Analysis Type, and Gauge Type. By default, Tests are performed automatically at 12:00 am daily (midnight) and at the time defined for automatic printing of a *Leak Test Report*.

The Leak Detection Settings only display on the *General Settings* section of the Point Editor *Settings* tab if a **Standard Tank** or a copy of the Standard Tank point template was used to derive the Point, or if the Leak Detection Module was associated to the custom Point Template used to derive the Point.

Follow the steps below to configure Leak Detection Settings for a Point:

1) From the menu, select **Configuration > Inventory Management > Points**. The Points Configuration page displays.

2) Click the **Edit** icon next to the Point you want to modify. The Point Editor multi-tab page displays.
3) Verify that you are on the **Settings** tab.
4) In the *General Settings* section, click **Open Editor** next to Leak Detection Settings. The Leak Detection Editor displays.

CM_Tank_01 - Leak Detection Settings
Leak Detection Editor

Leak Analysis Method: Net Volume

Leak Analysis Type: Static

Gauge Type: Generic

Minimum Fill Percentage:

Real Time Auto Print: ○ YES   ● NO

Print Time: 12:00:00 am

Print Days Before End of Month: 0

Save   Close

5) Select the *Leak Analysis Method* to use for this Point:

- **Net Volume** - the archived net volume values from the tank point are used to execute the leak test.
- **Unrounded Net** - uses the Volume Net Standard Unrounded, which is calculated similar to the Volume Net Standard.

  The difference is that the *Density Product Standard* is not rounded after being calculated, then that unrounded *Density Product Standard* is used to calculate the *Volume Correction Factor Unrounded* before being used to calculate *Volume Net Standard*.

- **Hydrostatic (Barton)** - used for tanks that use hydrostatic pressure gauges.

  With this method, the *Volume Gross Observed* is used for the Leak Test. This is because the gauge indirectly measures the mass of product above it (it measures the pressure, from which one derives the weight of the column of product above the gauge, from which one further derives the mass). The mass in the column and the pressure on the gauge does not vary with temperature, which results in the derived height, strap table, and gross volumes not varying.

6) Select the *Leak Analysis Type* from the list:

- **Static** - requires the tank to be shut down (out-of-service) and stable for the time period or amount of time required for the analysis.

  Depending on certification of a gauge type, minimum quite time of 24, 48, or 72 hours is needed to perform a relevant Static Tank analysis. After analyzing valid historical data over the minimum required quite time period, the system can report valid leak rates.

  Only **Static** Leak Analysis Type is supported for this release.

- **Continuous** - allows you to keep the tank in use while performing an analysis.

  For future release.

- **Real Time** - allows for an automatic on-going analysis of tanks.

  For future release.

7) Select the **Gauge Type** from the list.

8) Enter the **Minimum Fill Percentage** value.

9) If **Real Time** is selected as the *Leak Analysis Type*, set the Real Time Auto Print:

- **Yes** - indicates auto-printing is enabled.
- **No** - indicates auto-printing is disabled.

  The *Real Time Auto Print*, *Print Time*, and *Print Days Before End of Month* fields are not available (grayed out) if **Real Time** is not selected as the Leak Analysis Type.

10) Enter the **Print Time** or click the calendar icon to select the time when auto-printing starts.

11) In the *Print Days Before End of Month* field, select the **number of days** before the last day of the month in which you want to print the *Leak Test Report* and trigger a *Leak Test* to be performed.

12) When finished, click **Save** to save the Leak Detection Settings for the Point or **Cancel** to disregard changes and close the editor.

  See the Configure Leak Detection Report Settings above to ensure that the Leak Test Report and your printer are configured.