FIELD APPLICATIONS™

Storage Tank Level Control Devices

Prevent Tank Overflows and Aid EPA Compliance

Product Developer: *Noverflo, Inc.*

THE PROBLEM

Accidental spillage of petroleum products caused by tanks overflowing can be extremely costly in fines and environmental liabilities. Owners of underground storage tanks soon will be required by the EPA to install automatic shutoff valves on all such tanks. High level sensors can serve as a secondary spill control device by sounding an alarm if the automatic shutoff valve fails.

A variety of automatic shutoff valves is in use. Some valves slow the flow rate early in the filling process, which increases fill time. Others close abruptly, which can damage upstream piping. Many valve designs are expensive because of their complexity.

Many types of high liquid level indicators are available to activate alarms or to signal process control systems. Some sensors rely on sonic signals, conductivity, or a float switch. Such sensors are sensitive to operating environment. Sonic sensors do not work well in tanks with steam or dense vapors. Conductivity probes do not work well in low conductivity liquids such as petroleum products. Float switches rely on a mechanical float which can easily wear and corrode.

THE SOLUTION

Noverflo, Inc. has developed and patented FillGuard™, an automatic shutoff valve that provides a positive, non-abrupt shutoff which meets EPA requirements. Because the valve minimizes flow restriction during fill-up, using the valve does not increase fill-up time. The valve virtually eliminates fluid hammer damage caused by sudden shutoff. FillGuard™ can be installed on existing tanks without welding.

Noverflo has also developed a high liquid level switch called NLLS™ to control fluid levels in petroleum product tanks. The NLLS™ uses a fiberoptic cable to detect high levels and then transmits a signal to a remote controller to close valves or turn off pumps. Unlike conventional optical liquid level sensors, the NLLS™ is immune to environmental effects such as condensation, foam, and icing.

Noverflo and RMOTC tested the FillGuard™ and the NLLS™ at the RMOTC field testing site (Naval Petroleum Reserve No. 3). These field tests showed that both devices are effective in preventing petroleum product spillage caused by tank overflows.

The Noverflo NLLS™ high liquid level switch tested at NPR-3 helps prevent petroleum product spillage caused by tank overflows. The system uses fiberoptics to detect high levels and signals a remote controller to close valves or turn off pumps.

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THE BENEFITS

The FillGuard™ and NLLS™ devices provide owners of underground petroleum storage tanks a reliable, cost-effective way to comply with EPA tank regulations. These devices provide several benefits:

- Low cost.
- Maintenance-free operation.
- Inherently safe operation.
- The FillGuard™ shutoff valve minimizes flow reduction during fill-up.
- The NLLS™ high level alarm operates reliably even when the in-tank sensor is subjected to condensation, foaming, or icing.

These technologies have wide application for petroleum tank level process control, especially in remote locations and harsh environments.

THE FIELD PERFORMANCE

The FillGuard™ automatic shutoff valve was tested on a stationary 6000 gallon diesel tank. The valve consistently shut off when the tank was filled to a pre-set level. FillGuard™ was tested ten times over a 9-month period in a wide range of weather conditions. The valve was easily installed and did not require retrofit of the tank filling port.

The NLLS™ liquid level sensor was also tested over a three-month period on a stationary 6000 gallon diesel storage tank. In this application, the NLLS™ sensor consistently indicated a high tank level when the tank reached the pre-set liquid level while being filled. An alarm was sounded each time the tank level was within 3/4 inch of the pre-set level.

A second application of the NLLS™ was attempted using the diesel fuel tank for a portable well servicing rig. Because of varying tank inclinations during fill-up, it was impractical to rely on only one sensor. Thus, it was concluded that for this type of operation a second sensor should be connected in series and inserted on the other side of the tank.

The RMOTC tests also showed that the NLLS™ electronic circuitry should be appropriately packaged if it is to be used in applications where rough handling and vibration are factors.

The FillGuard™ automatic shutoff valve installed on a RMOTC well. FillGuard™ provides a positive, non-abrupt shutoff which meets EPA requirements. The valve can be installed on existing tanks without welding.

THE NEXT STEP

The FillGuard™ and NLLS™ devices tested at RMOTC were prototype units. Following the RMOTC field tests, both devices were manufactured for commercial applications and are now available.

FillGuard™ valves were installed and have been operating reliably at about 100 beta test sites. FillGuard™ valves are manufactured and distributed exclusively by EarthSafe Corporation of McLean, Virgina.

NLLS™ liquid level sensors were installed and have been operating reliably in several electrical power plants in sump applications for more than a year. NLLS™ sensors are available through Action Sensors, Inc. of Wendell, North Carolina.

RMOTC™
Rocky Mountain Oilfield Testing Center

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For more technical information on this project and to learn how RMOTC can benefit you, visit our Web site at WWW.RMOTC.COM

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