OIL AND GAS INDUSTRY

MIDSTREAM SERVICE PROVIDER ACHIEVES EFFECTIVE PIPELINE LEAK DETECTION IN AN ENVIRONMENTALLY SENSITIVE LOCATION

RESULTS

Only one leak detection false alarm in two years with the root cause easily identified by the meter process diagnostics

Significant savings in slop processing costs with precision batch interface detection and control

Reliable leak detection in a location where no in-situ proving is possible

CAPEX savings over ultrasonic meter alternative

Application

A leading Midstream Oil and Gas company is taking delivery of gasoline and diesel fuel from a liquid products pipeline in Washington State. A 10-inch pipeline that connects the main trunkline to the terminal runs alongside and under portions of the Colombia River at depths of up to 160 feet. To adequately protect this environmentally sensitive area, the connecting pipeline needs an effective leak detection system that complies with strict State and Federal Department of Transportation (DOT) regulatory requirements and that also meets the company's own operational, safety and environmental standards.

Challenge

The company was faced with the challenge of selecting and installing meters that would meet the tight accuracy requirements necessary for leak detection, yet stay within their budgetary constraints. The meters will need to have stable performance when product batches are changed from gasoline to diesel in order to avoid false alarms from the leak detection system. False alarms are very costly, causing additional analysis and reporting to state regulators, as well as interruptions of the delivery of the gas and diesel products. To make matters worse, the locations of the meters do not have any suitable options for bringing in a portable prover. Therefore, the leak detection system must depend on the accuracy and stability of the meter calibrations provided from the factory.

Solution

The customer considered clamp-on, liquid, ultrasonic flow meters (USFMs), pipeline custody transfer quality liquid USFMs, and Micro Motion® Coriolis meters. The clamp-on USFMs were not considered reliable enough. The pipeline custody transfer quality USFMs were too expensive and did not provide the best multivariable measurements or the best diagnostics.

AN-002070

The customer selected two Micro Motion CMFHC3 ELITE® sensors with 2700 transmitters to do the job. These meters provide vital flow information to the Pipeline Manager leak detection system from Energy Solutions International (ESI). There is very low risk of false alarms due to the stability of the meter factor under changing process conditions, so the company can avoid the common headache of having to continually file reports with the state regulators over frequent false alarms.

In over two years of operation the customer only received one false alarm. The false alarm was triggered when the line had stopped flowing and pulled slack. When the meter became partially full, the drive gain diagnostic measurement of 100% immediately revealed the true cause of the alarm (that the line and the meter were no longer full of liquid). A valve was opened to repack the line and the alarm went away.

Emerson's Micro Motion solution had a lower installed cost because a single meter could be used at each location to cover the full range of operating conditions. The operating costs are also lower because the meter can be trusted without the worry of having to prove it under multiple changing operating conditions.

The installation and operation were made simple because the customer is able to bring flow and density for corrected volume calculations to their flow computer. This provides a more accurate system balance than is possible with uncorrected volume flow measurement.

With Micro Motion meters, the customer can operate using a single meter factor with no additional calibration or manual intervention. With a Liquid USFM they would need to adjust the meter factor constantly for flow rate and product changes.

The density measurements from the Micro Motion meters give the customer the added benefit of precision interface detection, enabling them to make improvements to product cuts that reduce the amount of slop that needs to be reprocessed. Reducing the amount of on spec product that was unnecessarily sent to the slop tanks so as to avoid contamination of the on spec product in storage resulted in a significant cost savings in handling and reprocessing slop.

The Micro Motion meters enabled the customer to have:

- Efficient and steady compliance in a tough regulatory environment with no false alarms
- Lower cost of slop handling and processing with higher confidence in product quality due to superior batch interface detection
- Simple and consistent operation with just a single meter factor, even during product changes
- Lower capital investment compared with liquid USFMs
- Simple installation and start up relying on the Micro Motion factory calibration

AN-002070