Rapidly Detect Pipeline Leaks with Cloud-based Solution that Offers Accurate Alarming

Background

A leak detection system is a subset of the overall asset integrity management program for most oil and gas operators. Since pipelines are often in remote areas, a leak can go unrecognized for days. Leaks or spills can require costly remediation, often including removal and treatment of affected dirt. The potential for regulatory fines and lost production is significant.

While a leak detection system cannot eliminate leaks, it is an essential component of a pipeline asset management program and helps reduce the impact of such events through expedited detection and remedial action.

What's Your Challenge?

Conventional remote monitoring methods include monitoring inflow and outflow volumes, pressure, flow, and pump status with alarms triggered when certain patterns exhibit behaviors outside of preset thresholds.

Traditional leak detection methods involve regular intervals of inspection using tactics such as pigging, sniffer dogs, and visual inspection. These are sometimes enhanced by continuous monitoring methods based on external systems such as fiber optic and acoustic monitoring. Continuous monitoring can also be accomplished through internal, computational-based methods such as rate-transient or mass-balance analysis. While these conventional methods are common, they tend to be more complex and require constant maintenance. Buildup of sediment and other particulates at the turbine meter can also cause erroneous readings.

But not every anomaly indicates a leak, or even an actionable situation. "Alarm fatigue" (excessive alarming) can lead to field personnel being unable to distinguish real situations from false alarms, leading to delays in identifying leaks.

Pipeline operators need an intelligent system that separates alarm-worthy incidents from non-emergency anomalies.

What if you could...

- Detect small leaks, as small as <1% of total flow within 30 minutes?
- Rely on a solution with fewer false alarms, allowing quick dispatch of repair teams?
- Distill pipeline monitoring data into useful, easy-to-read charts and dashboards?

EMERSON

What's Your Opportunity?

Emerson's Zedi Pipeline Leak Detection Solution utilizes pipeline pressures, flow rates, and pump status to analyze flow patterns and determine if an issue is present. It is based on statistical approaches, such as Sequential Probability Ratio Testing (SPRT), that are widely considered among the most reliable in the industry. Our approach characterizes and distinguishes between the "normal" and "abnormal" operation of the asset, including transient behaviors. This approach avoids many of the problems that are present with other computational-based methods and offers a more robust, timely, and hands-off process as compared to external systems and visual monitoring. Instead of modeling the pipeline in mathematical terms, which can be complicated, our approach is to observe the overall behavior of the pipeline and characterize it from the statistical perspective to determine the data patterns that are normal and abnormal.

Optimized for single phase, incompressible fluids, the system uses data from existing sensors to learn the normal operating parameters and diagnose when a potential incident is occurring, including system anomalies and other maintenance issues. Using historical and live data, the system can improve accuracy as the software tracks pump outages, meter reliability metrics, and changes in pressure and flow.

As part of a leak detection program, our software does not and cannot eliminate leaks. Early detection and intervention, however, can potentially reduce the impact of leaks.

Emerson's cloud-based Zedi Pipeline Leak Detection Solution reduces risk to ensure a high-performing asset integrity management program.

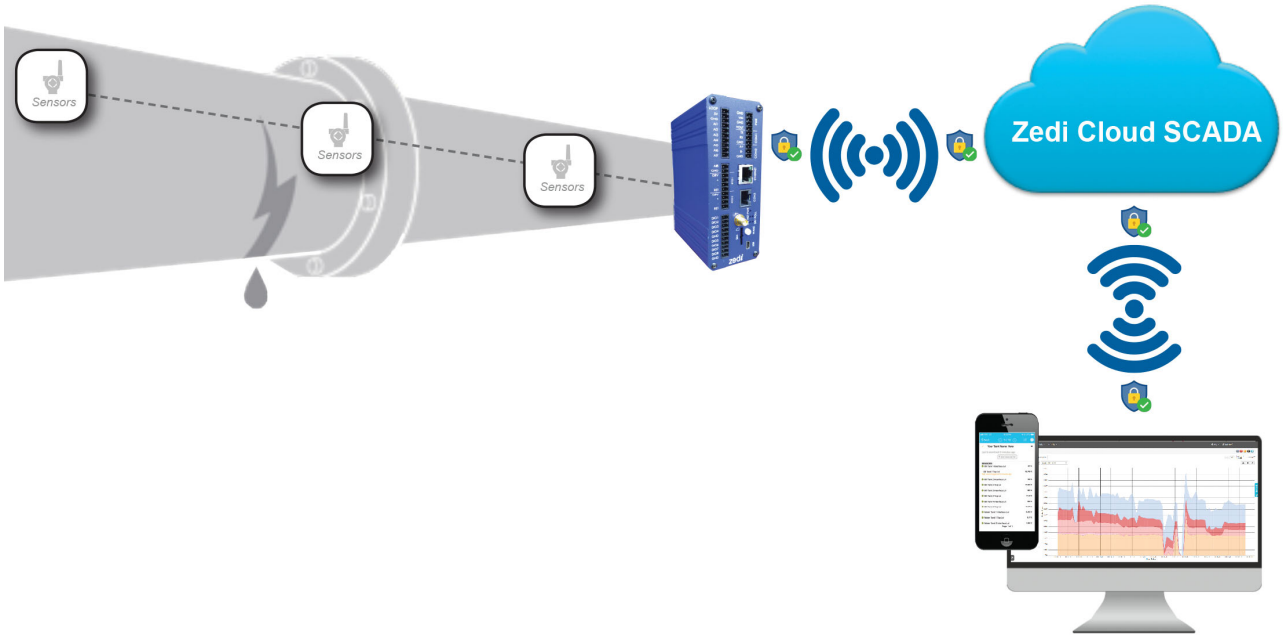

Figure 1. Cloud-based data access allows for remote control and optimization of oil and gas operations.

Zedi Pipeline Leak Detection Solution

Suitable for well sites, mains without redundancy, critical feeder mains, mains with a history of rupture or leaks, and some industrial supply lines, the system detects a wide range of anomalies, including leaks. It is applicable for pipeline fluids that are single-phase and incompressible, including water or oil. Our solution provides a range of benefits, including:

- Detection of small leaks; as low as <1% of total flow for certain pipeline configurations
- Expedited detection time; within 20 to 30 minutes in most cases
- Reduction of response time can be as much as 2 hours on average, when combined with a SCADA system
- Resilience to erroneous readings due to turbine meter buildup
- Detection of anomalies beyond just leaks, such as flow meter buildup, compressor issues, inlet separator water level problems, meter errors, and plant shutdowns

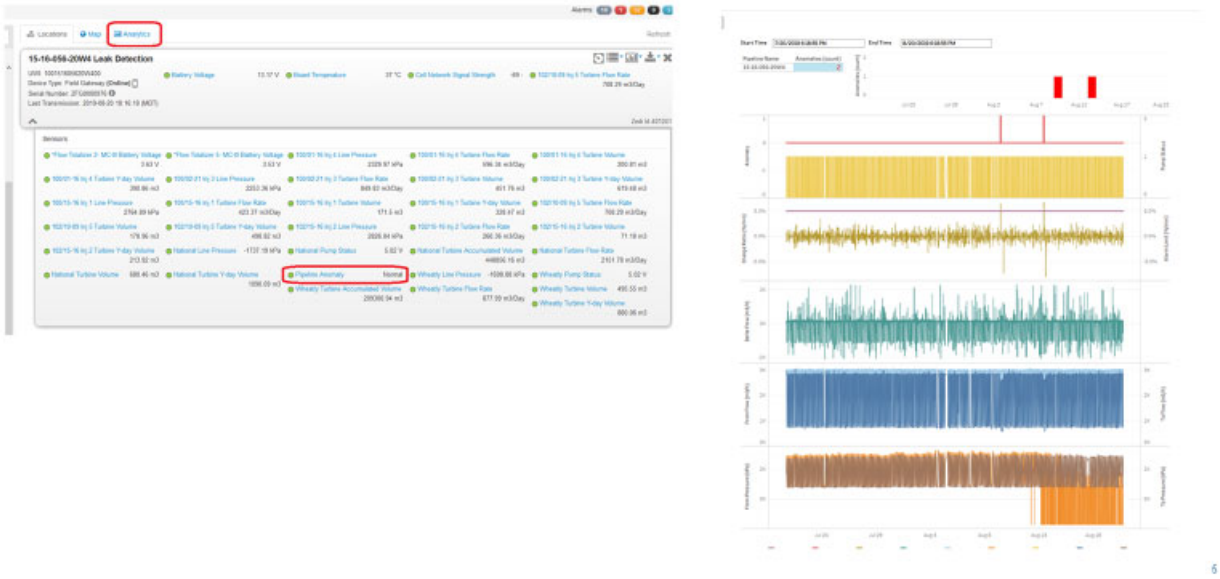

Figure 2. Dashboard views of the anomaly detection engine on Zedi Access.

Advantages of Emerson's Solution

Flexibility

- Easily customize our Zedi Pipeline Leak Detection Solution to your oil and gas operation
- Compliments any existing SCADA system
- Enables all permissioned users to instantly input and update current data from anywhere, anytime using our Zedi Go Mobile App

Data Visibility

- Complete leak detection solutions with vivid analytics, automated workflows, continuous polling and communications, data trending, and custom reporting

Performance Opportunities	How Your Operation Will Benefit
Intelligent Alarming	Expedite analysis and response time to anomalous operating conditions. Reduce false alarms and wasted trips to field sites.
Trending and Reporting	Data trending, default and custom reports to seamlessly provide clear analytics for regulatory and environmental reporting.
Easy-to-Understand Dashboards	Clear, easy-to-understand data for the reports you choose. System displays operational status, flow, and pressure rates.
Remote Data Access	Live production data, anywhere anytime using the Zedi Go Mobile App.
Secure, Cloud-based Platform	No internal IT involvement required. The platform includes evergreen updates, historian management, and full 24/7 support and all-inclusive training.

Global Headquarters
North America and Latin America
Emerson Automation Solutions
Remote Automation Solutions
6005 Rogerdale Road
Houston, TX, USA 77072
T +1 281 879 2699
F +1 281 988 4445

Europe
Emerson Automation Solutions
Remote Automation Solutions
Unit 1, Waterfront Business Park
Dudley Road, Brierley Hill
Dudley, UK DY5 1LX
T +44 1384 487200
F +44 1384 487258

Middle East and Africa
Emerson Automation Solutions
Remote Automation Solutions
Emerson FZE
PO Box 17033
Jebel Ali Free Zone - South 2
Dubai, UAE
T +971 4 8118100
F +971 4 8865465

Asia Pacific
Emerson Automation Solutions
Remote Automation Solutions
3A International Business Park
#11-10/18, Icon@IBP, Tower B
Singapore 609935
T +65 6777 8211
F +65 6777 0947

www.Emerson.com/ZediCloudSCADA

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