PEMEX Implements Nationwide Pipeline Surveillance System Using Avocet Platform

Optimization of midstream operations delivers millions in cost savings and minimizes pipeline upsets, onshore Mexico

**CHALLENGE**
Integrate digital monitoring activities to allow the central operations group to receive and respond to pipeline upset alerts without delay.

**SOLUTION**
- Employ the Avocet* production operations software platform to integrate and expand surveillance across the pipeline network.
- Integrate the PIPESIM* steady-state multiphase flow simulator to identify flow assurance and operation problems and the OLGA* dynamic multiphase flow simulator to forecast flow conditions and optimize performance.
- Implement an online pipeline management system for access to real-time transient data.

**RESULTS**
- Expanded surveillance across the nationwide midstream network.
- Increased operational efficiency and effective use of real-time data for analysis and decision making.
- Coordinated planning of pipeline maintenance activities.
- Improved system safety, reliability, and integrity.
- Saved millions through predictive alerting.

Integrate midstream operations data and establish collaboration between field and central operations

The Mexican state-run petroleum company, PEMEX, launched an online monitoring and optimization project to integrate midstream operations data and establish collaboration between field and central operations. The project aimed to connect more than 9,000 wells and 7,000 km of hydrocarbon pipeline across Mexico.

Working with PEMEX, Schlumberger sought to achieve the following objectives:
- Monitor key midstream parameters and detect system anomalies to improve midstream activity by conducting ongoing monitoring and surveillance, linking SCADA data from across the country into a single, comprehensive system.
- Connect central and remote operational groups in each region through the use of collaborative environments.
- Improve real-time and predictive awareness of the system state by simulating the primary oil and gas trunk lines and pipelines.
- Predict crude oil volume arrivals at the delivery point by type and arrival time to debottleneck gas pipelines and avoid contract penalties.
- Optimize business operational performance by leveraging advances in online monitoring and modeling.

**CASE STUDY**
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“**The online monitoring and optimization project has been a great success. It has produced a very positive impact on PEMEX decisions related to hydrocarbon transport and distribution. This project has been recognized at many levels and has saved USD 1.5 million per day of deferred production.**”

Emilio Sampayo Trujillo
Project Leader
PEMEX

Advanced computing and communication technologies provide ease of cross-domain and cross-discipline collaboration for efficient exchange of knowledge and expertise and rapid response to crises.
Use the Avocet platform for timely, collaborative access by all stakeholders

Working closely with PEMEX, Schlumberger implemented the Avocet production operations software platform to connect data sites throughout Mexico and to create a comprehensive system that collects, stores, and displays all types of production operations information, with access provided to all key stakeholders regardless of location. In the Avocet platform, surveillance and monitoring operations of the project are streamlined through customized dashboards that display a comprehensive view of the entire network using a common portal, enabling alarms, reports, graphs, and facility details to be accessed by teams across the country.

The established cross-domain links to data create a responsive collaborative environment between the remote and central operations for efficient exchange of knowledge and expertise. This assists operational planning and optimization of pipeline performance as well as facilitates timely, informed decision making to avoid crises in the network. To help identify potential problems related to flow assurance (e.g., liquid dropout) and operations (e.g., corrosion), Schlumberger integrated the PIPESIM steady-state multiphase flow simulator into the system.

Use of the OLGA dynamic multiphase flow simulator enabled implementation of an online pipeline management system, which uses online data to simulate flow behavior for real-time awareness of pipeline performance state. This information was used to predictively forecast pipeline conditions to enhance operational planning and transport through the network.

Saved millions of dollars by reducing deferred gas production

PEMEX received immediate value from the expanded, fully linked network surveillance system. System reliability, integrity, and safety were improved through increased project efficiencies, effective use of real-time data for analysis, and coordinated planning of pipeline maintenance. Continuous monitoring of pressure drops across pipeline segments issued alerts and triggered timely pigging operations to clear gasline bottlenecks, allowing production stoppage to be restored quickly.

Predictive alerting has saved PEMEX millions of dollars through reduced deferred gas production. In addition, the tracking of water slugs using online data and prediction of slug arrival at the processing facility allowed operators to anticipate an upset and avoid penalties related to off-specification crude.

Views of the customized dashboards.