Micro Motion® Coriolis Meters Increase Accuracy of Well Production Test Data and Reduce Life Cycle Costs

BENEFITS

- Increased reliability and accuracy of well production test data used to establish optimal production rates and for early problem detection
- Reduced cost of annual maintenance and parts inventory by $100,000 per year

PROCESS

Upstream Production: Well Production Management

An oil producer used approximately 100 three-phase test separators to determine fluid rates of its production wells in a large upstream production field. The test separators separated the combined stream from the wells into the individual components of oil, water, and natural gas. Each fluid stream was measured to determine the volume of the fluid and to determine the production rates for each well. The oil producer installed low cost, mechanical positive displacement (PD) meters to measure the volume of the oil and water streams. The sum of the individual component measurements was compared to the overall production measurements at the centralized production facilities to establish allocation factors and to correct for any uncertainties in the well testing program.

CHALLENGE

Sand being produced with the heavy oil was impacting the overall performance and reliability of the mechanical meters used to measure the oil stream. This condition caused mechanical wear in the meters, which over time affected the meters' measurement performance and ultimately resulted in meter failures on average once a year. To determine the as found accuracy and confirm the meters were functioning within the ±5 % desired accuracy range, the oil producer pulled a large sample of the PD meters from the production field to test for accuracy. The test results of the meter sample indicated the percentage that were within the desired accuracy range, the percentage out of specification, and the range of error encountered.

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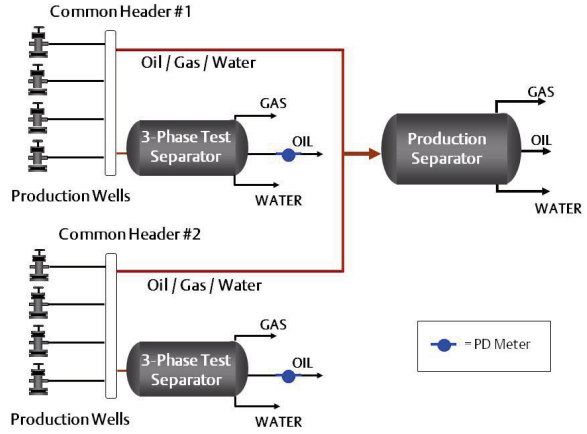

Positive displacement (PD) meter setup in large upstream production field

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www.EmersonProcess.com/solutions/oilgas
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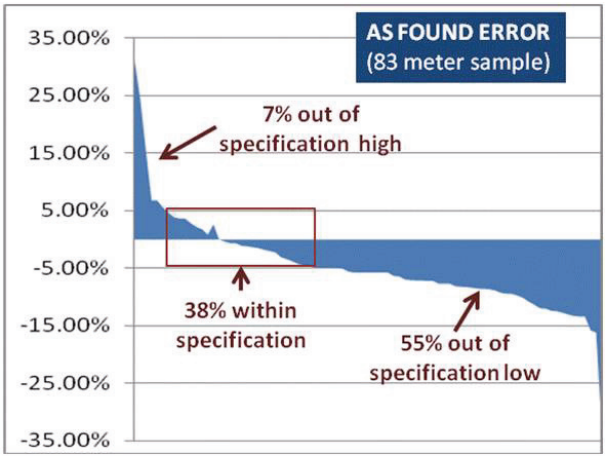
Because of the desire to measure real-time production data and gather the data at a central location, the oil producer was interested in installing more reliable meters with an electronic output on the water stream of the test separators as well.

SOLUTION

The oil producer installed over 200 Micro Motion Coriolis meters on both the oil and water streams of the test separators. The meters sent real-time flow data for each stream to a central location. Because of the ±0.15 % of rate volume flow accuracy and wide turndown associated with the Coriolis meters, the oil producer was able to size the meters to operate at flow rates that prevent sand erosion, thereby increasing meter reliability. Because the Coriolis meters have no mechanical parts, the long term measurement stability was significantly improved and eliminated the need for frequent routine maintenance and calibrations of the meters — thereby reducing the costs of ownership by $100, 000 per year for the oil producer. As found accuracy tests on a sample of installed Coriolis meters confirmed the average meter accuracy improved to be slightly less than the ±0.15 % specification for the meters. The increased accuracy and reliability of the well production test data allowed the oil producer to establish optimal production rates and to detect problems sooner.



Test results for as found accuracy of PD meter sample

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