

Micro Motion® Coriolis Meters Team with Two-Phase Testing Technology to Increase Reliability and Reduce Maintenance Cost

BENEFITS

- 80% reduction in preventive maintenance costs
- Increased reliability of well-testing facility
- Lower capital cost solution



PROCESS

Upstream Production: Well Production Management

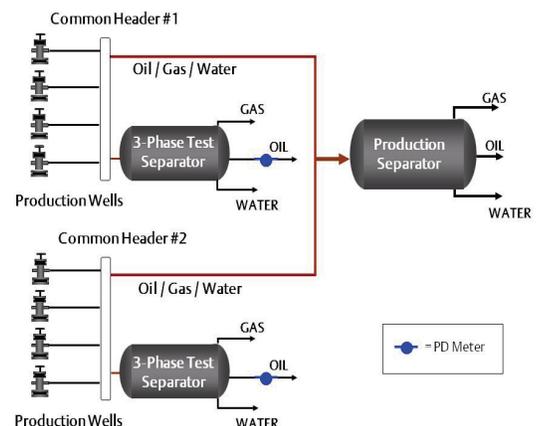
An oil producer used three-phase test separators to measure the total volume of fluids produced by individual wells that were part of a large upstream production field. The company directed a number of the production wells into a common manifold where they periodically diverted the production from individual wells through a three-phase test separator. The produced fluids: oil, water, and natural gas, in each well were separated into individual streams to measure the volume flow of the fluid with a single-phase mechanical flow meter.

Each test cycle consisted of the following:

- Diverting the individual well stream from the larger production stream through the test separator
- Purging the test separator of the previous test's fluids for approximately 1 to 2 hours
- Running a 24-hour test cycle on the volume of fluids produced from the current well.

The oil producer then compared the sum of the individual well test measurements to the overall production measurements recorded at the centralized production facilities. This testing process enabled the oil producer to determine the allocation factors that were used to correct for any uncertainties in the well-testing program.

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Three-phase test separator setup in a large upstream production field



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CHALLENGE

Based on the test results, the oil producer discovered that the three-phase test separators were proving to be unreliable, expensive, and maintenance intensive. The company found that level-controller and valve failures were going unnoticed, which impacted the overall availability of the test facilities and increased the uncertainty of production testing. Colder winter temperatures caused pneumatic valve actuators to freeze, while electric valve actuators were failing because of the summer heat. These failures combined with the need to regularly clean the separator oil and water control floats required a demanding preventive maintenance program.

The oil producer investigated the use of two-phase test separators as an alternative to the three-phase test separators to address the concerns associated with the three-phase equipment. They also investigated the use of Micro Motion® Coriolis meters and density-based Net Oil Computers (NOC) as a solution to potential problems with the following:

- fouling of capacitance water-cut probes
- clogging and repair of turbine meters
- minimizing the need for instrument air
- obtaining accurate water-cut measurements in tight emulsion applications.



Installation of a three-phase test separator

SOLUTION

A compact, cyclonic two-phase test separator manufactured by an oil and gas solutions provider was installed as a replacement to the three-phase technology. Because of the self-leveling control capabilities of the two-phase test separator design, a majority of the pneumatic, electric, and float-related control devices associated with the three-phase technology were eliminated.

The oil producer also installed Micro Motion Coriolis meters on the liquid and gas legs of the individual well streams. These meters produced the following results:

- Increased reliability by minimizing the potential for clogging and need for repair because the meters have no mechanical parts.
- Achieved sustainable volume measurement performance because the sensor technology is not impacted by changing fluid properties, flow regimes, or changes in production characteristics.
- Provided an accurate full stream measurement of the water cut, even in tight emulsion applications, because of the addition of the Micro Motion Net Oil Computer.

The elimination of the control devices associated with the three-phase technology, in combination with the little or no maintenance feature of Micro Motion Coriolis meters, resulted in an 80% reduction in preventive maintenance activities associated with the conventional three-phase test separator. The compact, less complex design of the two-phase test separator and the ability to incorporate volume flow measurement of oil/water and water cut into one device resulted in a lower capital cost solution.