Tailor-Made for Performance

Case Study

Solution for Deep Water Offshore Flowlines

THE CHALLENGE

Two oil field flowlines located in west Africa 120 km offshore, in water depths of 1100 m, needed to be inspected for corrosion. The customer requested an inspection for two 8 km flowlines, which have 10/12" dual diameters and wall thicknesses from 12.7 mm to 31.6 mm.

Under ideal circumstances, the customer could have inspected the complete 16 km pipeline system in one run. The tool would be launched into the first flowline, sent through a pigging loop at the Pipeline End Manifold (PLEM) into the second flowline, and received back on the deck of the Floating Production Storage and Offloading vessel (FPSO). However, ROSEN engineers were informed by the pipeline operator of the possibility that a defective valve on the PLEM wouldn't open completely, meaning that an inspection tool might not be able to pass through the PLEM. The uncertainty on the valve's functionality, along with the deep-water offshore environment, the heavy pipe wall thicknesses, and the continuous operation demands, presented a challenging situation that required a unique solution.

OUR SOLUTION

The uncertainty of the valve's position was a critical issue for the pipeline operator and it was absolutely essential to complete the full inspection in one shutdown. Therefore, ROSEN proposed an inspection solution that consisted of bidirectional cleaning and gauging tools, as well as a bidirectional UT solution.

If the results of the cleaning and gauging process showed no damage to the tools, then the inspection would be performed in a unidirectional run. However, if the gauge plate returned with damage, indicating a partially closed valve or reduced diameter, the pipeline would be inspected bidirec-

tionally by sending the tool through the first flowline to the PLEM, and then reversing the flow to pump the tool back to the FPSO. This process would be repeated for the second flowline, but only one shutdown would be required for the entire operation.

A tailor-made 12" bidirectional (BiDi) UT tool that met the passage and corrosion inspection requirements was developed. The unique design of the BiDi tool ensures that the data quality is equal to that of ROSEN's standard UT tools, thus providing the high-resolution data quality required to ensure the pipeline's integrity. The tool was subjected to pump testing through a simulated pipeline configured to have similar diameters, wall thicknesses, and bend radii as these flowlines.

The inspection campaign began by sending the cleaning and gauging tools through the pipeline to determine whether they could pass the valve. After launching the gauge tool into the pipeline and receiving it again, the gauge plates confirmed that the valve was fully open at the time of inspection. Therefore, the BiDi UT tool was launched into the pipeline and completed the full inspection through the pigging loop in one unidirectional run. A detailed analysis of the recorded data was performed by ROSEN engineers and the final results were delivered to the pipeline operator to the satisfaction of all parties.

YOUR BENEFITS

Maximized Uptime

The solution provided flexibility in allowing both a unidirectional or bidirectional inspection, whatever the situation required. This operational flexibility kept the downtime, and any production losses for the client, to an absolute minimum.

Compliance

Complete data sets allowed for a full understanding of the pipeline condition and the ability to take measures for its integrity management. This ensures compliance with safety standards and regulations.

Minimized Risk Exposure

ROSEN's bidirectional approach assures the tool can be removed from the pipeline at any time, hereby minimizing the operational risk and effectively guaranteeing operational safety.

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