National Engineering Laboratory

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Case Study:

Keeping Costs Down in Marginal Field Developments

Designing a Metering Skid for a Marginal Oil Field

TÜV SÜD National Engineering Laboratory was approached to design an offshore flow metering skid for a marginal field development to provide allocation measurement. However, unforeseen circumstances put the skid in jeopardy prior to its commissioning. To avoid the client having to replace the skid, which would have incurred additional cost, substantial delays and production downtime, TÜV SÜD National Engineering Laboratory devised a bespoke solution to overcome the uncovered measurement issue.

OVERVIEW	
Client name	Confidential
Industry	Oil & Gas

Issue

When developing marginal fields with limited reserves, every effort has to be taken to keep costs down. Achieving the optimum design for marginal fields can be extremely challenging due to space and load restrictions. This can lead to non-ideal meter installations, often with inadequate lengths of straight pipe to stabilise the flow before and after meter transducers. As a result, disturbances in the flow can create swirl and other effects that can significantly degrade meter accuracy.

Approach

TÜV SÜD National Engineering Laboratory undertook a review of the measurement requirements, operating conditions and field installation. This allowed a clear understanding of space and load constraints, and informed the location and required accuracy of the different instrumentation to be mounted on the skid. In addition to flow meters, other instrumentation included pressure and temperature sensors, and a sampling system to monitor the composition of the production fluid. Before commissioning it was discovered that the oil being produced was close to its vapour pressure. This would have significantly compromised the performance and accuracy of the skid designed by TÜV SÜD National Engineering Laboratory.

Solutions

To overcome this issue TÜV SÜD National Engineering Laboratory used correction factors based on three-phase flow. These were based on the characteristics of the meter, and were validated in TÜV SÜD National Engineering Laboratory's multiphase flow test facility. The test configuration used in the laboratory closely represented actual conditions in the field. This allowed the meter's outputs to be compared against reference values. This in turn allowed correction curves to be established.

Benefits

TÜV SÜD National Engineering Laboratory's solution avoided the need for a replacement skid, which would have cost the operator over £0.25m. Furthermore, the added delays, downtime and costs through replacing the skid, would have affected production levels.
With marginal fields already operating to tight budgets, this could have threatened the overall viability of the oil field.

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