

Single-Trip Multizone Cased-Hole Frac Packs and Intelligent Completions Improve Recovery in Subsea Gas Field

ADVANCED COMPLETION SOLUTION ENABLES WELLS TO REMAIN FULLY FUNCTIONAL AFTER FIVE YEARS OF PRODUCTION

OFFSHORE INDONESIA

CHALLENGES

Complex subsea development

- » Weakly consolidated sands
- » Six target zones
- » Potential for early water breakthrough

SOLUTION

Advanced Completion solution comprising

- » ESTMZ system optimizes operations and controls sand production
- » ROC gauges and HS-ICVs monitor and control each zone

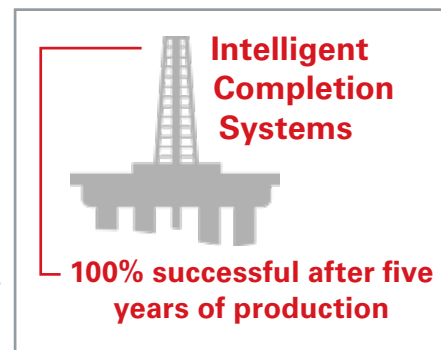
RESULTS

100 percent successful after five years of production

- » Successfully deployed ESTMZ system, saving operator 65 days for these nine wells
- » Exceeded expectations for gas flow rates
- » Significantly improved recovery by shutting in zones that were producing excessive water
- » Ultimately, enabled these wells to continue operating successfully for the next five years

OVERVIEW

A nine-well subsea development project was completed with Halliburton cased-hole frac packs for sand control and multizone intelligent completion technology to improve recovery from a series of shallow, low-pressure gas reservoirs offshore Indonesia for a major operator. The system was installed efficiently and has been operating flawlessly for five years. Combining successful sand control and intelligent completions has significantly improved gas recovery without requiring rig intervention.



CHALLENGE

The operator needed to improve operational efficiencies for this complex subsea field of shallow, low-pressure, and weakly consolidated gas reservoirs. The field required a method of dealing with unconsolidated sands, along with the ability to monitor and control each of the six potential layers as the economics of the project required a single wellbore to access multiple reservoirs. Early water breakthrough was also a concern, with the potential impact of loading the production string with heavy water and curtailing ultimate recovery.

SOLUTION

The Halliburton Enhanced Single-Trip Multizone (ESTMZ™) completion system was chosen for its ability to significantly improve operational efficiency. The system allows the sand control service tools and frac pack to be run in a single trip, and enables the intelligent completion system to be run inside the ESTMZ sand control system to monitor and control each reservoir. The Halliburton HS-ICVs (interval control valves) and ROC™ pressure and temperature gauges provided the operator the advantage of multi-rate testing and cleaning up each zone individually. The HS-ICVs were also used to permanently shut in several zones that were producing excessive water that would have jeopardized recovery from offset zones.

RESULTS

The ESTMZ frac-pack completion system was successfully deployed, saving the operator 65 operational days over the nine subsea wells versus using a conventional frac-pack system. The intelligent completion string was successfully drifted and set inside the ESTMZ system in each of the nine wells, which allowed zonal control of 34 different gas zones. The first well was a six-zone intelligent completion that was drifted and set through the lower completion frac pack, which was an industry first and a true union of intelligent completions with sand control systems. Four of the 34 HS-ICVs have been shut in to prevent water flow into the production string, which could lessen ultimate recovery of the entire field. After five years on production, the field gas flow rates are exceeding expectations, with no known sand control failures and with each of the 34 HS-ICVs still fully operational.

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