

Intelligent Completion Helps Agip and NPDC Make First-Oil Date

Case study: Commingled production meets Nigerian regulations, doubles expected offshore production

Challenge

Commingled oil production from several reservoirs needed to be allocated to each reservoir individually as required by Nigerian regulation. Agip had to meet the original first-oil target date without drilling more wells than planned.

Solution

Intelligent completion was designed to accommodate available penetrators of single-string subsea wellheads. Remotely actuated multiposition flow control systems controlled zonal flow. QUANTUM* MultiPort* bypass packers enabled zonal isolation and the passage of control lines to lower zones. A WellWatcher* real-time reservoir and production monitoring system delivered bottomhole pressure and temperature data used for optimization of chokes and production allocation.

Results

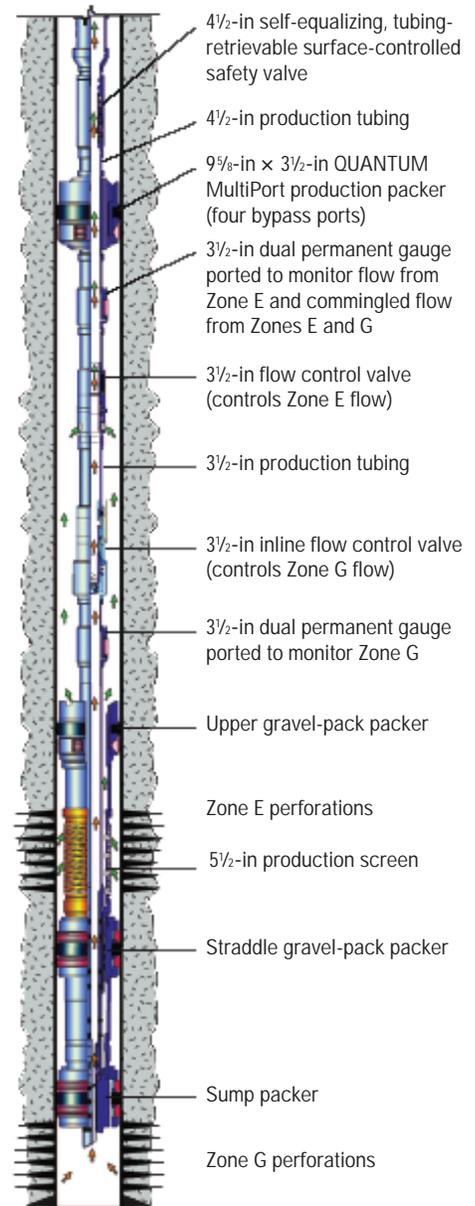
This intelligent completion enabled commingled, allocated production using existing wellheads. The first-oil target date was met within 5 months from commitment to installation without drilling unplanned wells. Production was twice that expected from a standard selective completion.

Allocate commingled production

When the Okono field offshore Nigeria was discovered, only a single reservoir was found. As a result, Agip, operator for the Nigerian Petroleum Development Corporation (NPDC), planned to develop the field with subsea completions and ordered single-string wellheads. Plans changed when subsequent drilling revealed multiple reservoirs.

To meet the first-oil production date without drilling more wells than planned, Agip needed to commingle oil from several reservoirs. However, a Nigerian regulation allowed commingled production only if it could be allocated to the individual reservoirs. The traditional selective completions approach would have required expensive subsea interventions to close one zone and open another, significantly reducing initial production.

A Schlumberger reservoir simulation demonstrated the value of an intelligent completion system for the field. Agip and NPDC decided to use an intelligent completion system based on its reliability, field-proven performance, and ability to accommodate the subsea wellhead penetrators. A Schlumberger reservoir simulation helped model the value of an intelligent completion system for the field as well as later providing key back allocation data.



Intelligent completion in Okono 5 well.

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Bypass lines for the inline flow controller.

Field development facilitated

Two remotely actuated flow control systems and permanent downhole gauges were installed above the sandface completions so that standard gravel-packing techniques could be used. QUANTUM MultiPort bypass packers were used for the passage of control lines and zonal isolation. When the wells were placed on production, the WellWatcher monitoring system delivered the gauge data, retrieved via satellite, which were used to remotely optimize the 11 choke positions on each flow control valve. From commitment to installation, Agip's intelligent completion was finished in 5 months.

Production optimized remotely

Intelligent completions enabled commingled, allocated production using existing wellheads and met the target date. Oil production from the first well was approximately 1,749 m³/d [11,000 bbl/d] from two zones—twice that expected from a standard selective completion.

Contact your local Schlumberger representative to learn more.

Agip and NPDC selected the intelligent completion for its reliability, field-proven performance, and ability to accommodate the subsea wellhead feed-throughs.

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