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REAL RESULTS

Optimum™ Completion System Installs First Fully Integrated Subsea Completion in Norwegian North Sea

Objectives

- Design, build, and install the subsea completion into 9 5/8-in. main-bore casing strings. An operator in the Norwegian sector of the North Sea required a solution for the subsea installation of two satellite wells at a water depth of approximately 417 ft (127 m) that would provide both the capacity for the required cable and gas-lift systems as well as providing the necessary level of well control.
- Comply with all applicable regulations regarding safety and environmental issues.

Results

- Weatherford personnel performed extensive studies of the reservoir conditions, expected production profiles, and planned operating life of the wells.
- The following fully integrated subsea completion was deployed as a part of the *Optimum* completion system: OptiMax™ tubing-retrievable surface-controlled subsurface safety valve (TRSCSSSV), SBRO-2GR DVX gas-lift mandrels (both unloading and orifice types), SBRO-2GRCl chemical injection mandrel, OptiPkr™ hydrostatic-set removable production packer, TSP5H3 liner packer, WPHR hanger assembly, Morphisis® swellable packer, MaxFlow® standalone screens, and FloReg™ inflow control devices (ICDs).
- The *MaxFlow* screens with the ICDs are designed to regulate flow into the screen and bring on production in a uniform manner. The design also protects the sand from localized erosion on the screen, commonly known as “hot spotting.”
- The *Morphisis* packers swell in the openhole zone and isolate different producing zones of the formation to prevent crossflow between them in the event of a pressure differential.
- The *OptiPkr* module eliminates the need for a plug to be run below the packer, in turn eliminating the need for additional wireline work.
- The preinstalled chemical-injection mandrel delivers production chemicals, such as scale and paraffin inhibitors. Similarly, the gas-lift mandrels are also preinstalled and ready for use, eliminating expensive future workover costs.



The Weatherford *OptiPkr*, one component of the *Optimum* completion system, is a premium high-performance production packer that offers the robustness of a permanent packer with the flexibility/versatility of a retrievable packer.

Location

North Sea, Norway

Well Type

Offshore, oil producer

Main Bore Casing

9 5/8-in, 53.5-lb (24.2-kg)

Products/Services

- *OptiMax* TRSCSSSV
- Gas-lift mandrels (unloading and orifice types)
- Chemical-injection mandrel
- *OptiPkr* packer
- TSP5H3 liner packer
- WPHR hanger assembly
- *Morphisis* swellable packer
- *MaxFlow* screens
- *FloReg* ICDs

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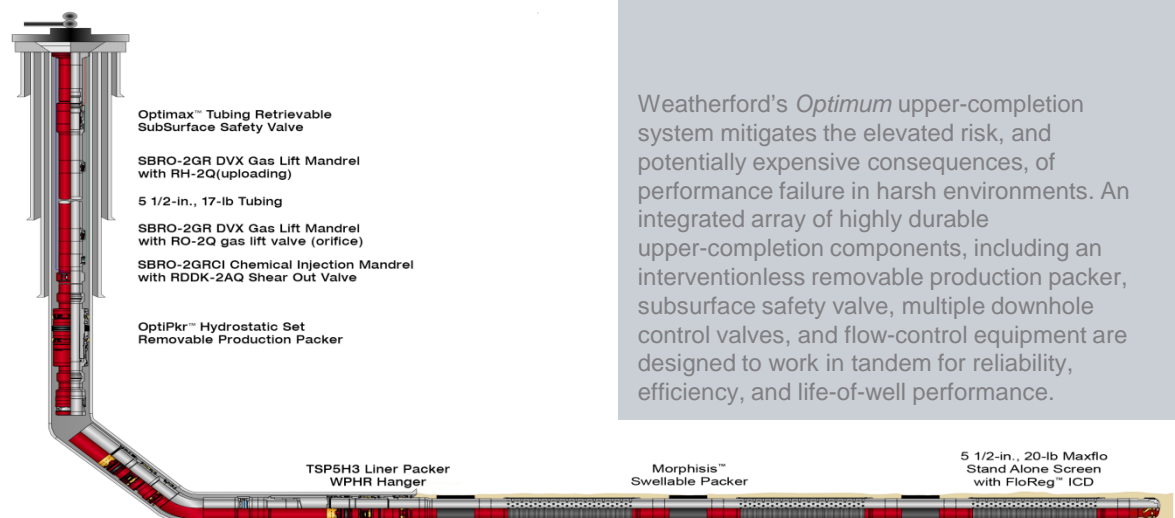
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Results, cont.

- The quality-control plan documented the quality-assurance requirements for the safe manufacture, inspection, and testing of all cased-hole completion components for the wells. To reduce as much risk as possible, Weatherford instituted a “complete well on paper” process, where all parties had a thorough understanding of the installation plan before it was actually implemented.

Value to Client

- Using Weatherford’s *Optimum* completion system enabled the operator to deploy a customized well plan into two wellbores safely and efficiently. The installations were completed 2 days ahead of schedule, saving the operator rig time and associated costs.
- The *MaxFlow* screens and the ICD protected the sand from localized erosion on the screen, commonly known as “hot spotting.”
- By eliminating the need for additional wireline work, the *OptiPkr* packer contributed to a greater costs savings.
- By preinstalling the chemical-injection system, the operator eliminated the need for future intervention work to enhance production, a more cost-effective solution across the life of the well.
- The gas-lift mandrels were installed and ready to be brought online in the future, eliminating expensive future workover operations to maintain production rates.
- The successful installation of these initial subsea completions has prompted the operator to use this collaborative strategy for future wells in the field and in the greater North Sea because of the value brought to overcoming completion challenges.



Weatherford’s *Optimum* upper-completion system mitigates the elevated risk, and potentially expensive consequences, of performance failure in harsh environments. An integrated array of highly durable upper-completion components, including an interventionless removable production packer, subsurface safety valve, multiple downhole control valves, and flow-control equipment are designed to work in tandem for reliability, efficiency, and life-of-well performance.

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