

Case study: Troll Field, North Sea

# Integrated drilling solution of Talon PDC bit and AutoTrak G3 RSS, longest single run in complex deepwater field

An operator drilling horizontally in Troll Field on the North Sea shelf wanted to complete a lengthy 8½-in. section and planned open-hole sidetrack to total depth (TD) in one run. Previous runs in the Troll Field encountered numerous unpredictable zones of calcite cementation as well as several wellbores in close proximity of each other, so reservoirs in this field present significant directional challenges. Bit steerability, stability, and durability to endure the run are critical factors in reaching total depth.

To optimize the integrated bottomhole assembly (BHA) design, new procedures were developed that enabled drilling to total depth (TD) in one run. In collaboration with the customer, the Baker Hughes DART design application review team and Drilling Services team worked together to develop a solution.

Baker Hughes recommended the **Talon™ high-efficiency polycrystalline diamond compact (PDC) drill bit**

integrated with the **AutoTrak™ G3 rotary steerable system (RSS)**, and **CoPilot™ measurement-while-drilling (MWD) system**. In addition, the Baker Hughes Reservoir Navigation Services provided active geosteering with azimuthal logging while drilling (LWD) data.

The Talon bit's **StaySharp™ cutters** and **EZCurve™ directional technology** maintained steerability and reduced vibrations to mitigate BHA tool failure. The AutoTrak G3 RSS provided precise well control and trajectory. The CoPilot MWD system delivered real-time drilling optimization data to optimize drilling performance. **LUBE-622™ environmentally acceptable lubricant** reduced torque and drag in water-based muds to quickly achieved high rates of penetration.

The operator was able to drill a record distance for Troll Field of 16,598 ft (5 059 m) including an open-hole sidetrack in one single run. ROP averaged 98.8 ft/hr (30.1 m/hr), 27% faster than the planned benchmark of 72.2 ft/hr (22.0 m/hr).

## Challenges

- Complete the long horizontal 8½-in. section and open-hole sidetrack to TD in one run
- Steerability and wellbore collision issues
- Sandstone formation with hard interbedded calcite cemented stringers

## Results

- 16,597 ft (5 059 m) drilled in one run
- ROP of 98.8 ft/hr (30.1 m/hr)
- Collaboration between Baker Hughes Drilling Services, DART drill bits group, and the customer
- Talon high-efficiency PDC bit with StaySharp cutter technology and EZCurve directional technology
- AutoTrak G3 RSS
- LUBE-622 biodegradable lubricant

