

# Integrated Motor-Bit Modeling Service Drills Reservoir Section in a Single Run, Kvitebjørn Field

i-Power service enables motor-elastomer combination that eliminated 75 h of NPT and beat previous records for field section length by 60% and pumping hours by 67%

**Statoil wanted to reduce NPT caused by motor failures while drilling a 5¾-in reservoir section through an abrasive HPHT environment using through-tubing drilling, MPD techniques, and a positive displacement motor (PDM). Using i-Power\* integrated motor-bit modeling service and PowerPak\* hard rubber motor with DynaPower XR\* extreme-wear-resistant motor elastomer, the operator drilled the entire reservoir section in a single run and eliminated 75 h of NPT caused by motor stalls and failures.**

## Reduce NPT caused by motor failures

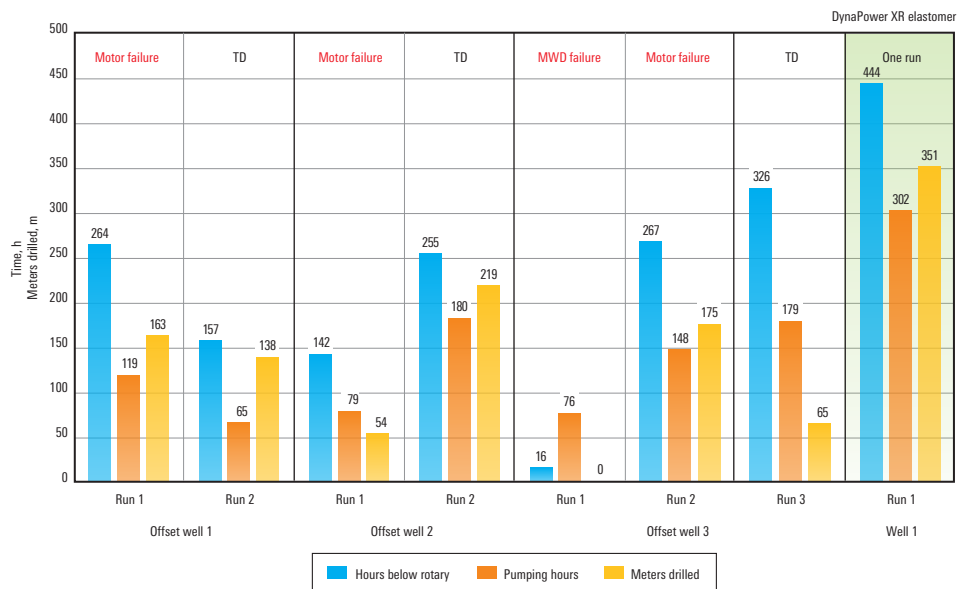
Wells in the Kvitebjørn Field in the North Sea are HPHT wells where operators commonly use highly abrasive muds to drill reservoir sections. In 2006, pressure depletion and a well control incident required unconventional drilling techniques to continue production. Techniques included MPD, through-tubing rotary drilling, wellbore strengthening materials, and rig-assisted snubbing units. In 2011, Statoil planned to drill a reservoir section with a 5¾-in bit, making drilling with a PDM necessary to minimize surface string rotation. Mud motor failures were common due to the mud types used with motor-elastomer combinations deployed in the abrasive and HPHT environment. Consequently, no operator in that field was able to drill a reservoir section in a single run. Such failures caused NPT averaging about 75 h per well.

## Use motor modeling techniques and durable elastomer to drill section in one run

Statoil needed to reduce the NPT it experienced while drilling the section, which meant seeking out a new motor and elastomer combination. The i-Power service provided motor optimization modeling and a simulation strategy used during the prejob planning phase. Statoil’s goal was to drill the 5¾-in section in a single run. i-Power service helped rule out several motor and elastomer combinations that would have failed. But Statoil found one successful combination—the PowerPak motor and the DynaPower XR elastomer. Simulations revealed this pairing would be far more durable than any other option.

## Eliminate motor NPT and set field records while completing section in a single run

The PowerPak motor and the DynaPower XR elastomer selected by the i-Power motor-bit modelling service enabled drilling the entire 5¾-in reservoir section in a single run with no stalls, even through thick cemented sandstone stringers and for the first time since MPD was introduced more than 6 years before. The motor also set field records for the longest run length of 1,152 ft [351 m], the longest below-rotary hours of 444 h, and the field maximum pumping hours of 302 h. These are considered the highest statistics for Schlumberger for the 4¾-in motor size worldwide. Overall, the PowerPak motor with the DynaPower XR elastomer was able to increase section lengths by 60% and pumping hours by 67%, as compared with the previous field records. The technologies also eliminated the 75-h NPT associated with motors on previous drilling campaigns in the area. Unlike previous elastomers, the DynaPower XR elastomer was not damaged from increased temperatures when pumps were inactive.



*Using the DynaPower XR elastomer, the operator was able to avoid motor failures entirely on two consecutive wells. In the offset wells drilled beforehand, motor failures were fairly regular.*

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