Advanced Testing and Completion Fluid Development
Improve Operational Safety and Well Performance

In-depth design and testing of a customized completion fluid and unique perforation strategy enable Statoil to optimize well productivity in the North Sea

**CHALLENGE**
Improve the safety and efficiency of perforating operations in long horizontal North Sea wells while maintaining high well performance.

**SOLUTION**
Design dynamic underbalanced perforating plan and customized completion fluid to optimize perforation performance and productivity.

**RESULTS**
Improved productivity in several operator wells.

“Testing conducted in the PERF laboratory helped achieve high well productivity after overbalanced perforating.”

**Optimize perforation performance in overbalance environments**
To perforate long horizontal North Sea wells, Statoil sought a safer, more efficient technique that would not compromise well performance in the process. An overbalanced shoot-and-pull technique using conventional completion fluids would have resulted in unclean perforations, leaving the operator with low productivity. However, with a completion fluid customized to meet specific reservoir needs, Statoil could continue using the shoot-and-pull technique while obtaining optimal productivity.

**Design field-specific technique and fluid**
To address Statoil’s specific needs in this North Sea scenario, a custom completion fluid was designed with the operator’s reservoir characteristics in mind. Additionally, a proposed perforating system and dynamic underbalance technique were designed and tested to further optimize production. Both the fluid and the technique were evaluated at the Schlumberger Performance Enhancement Research Facility (PERF) near Houston using the same perforating gun technology and dynamic underbalance as was used in the field. Prior to deployment, studies from the PERF lab demonstrated that the combination of a customized perforating strategy and fluid system could deliver superior well performance in challenging conditions.

**Enhance productivity through efficiency**
After safely and efficiently perforating several wells in its program with the proven, optimized technique developed at the PERF lab, Statoil recorded excellent productivity in the field. According to the operator, the development of a unique perforating fluid designed specifically for long horizontal wells played an important role in the overall perforating strategy. In addition to improving the productivity of Statoil’s completions program, the customized fluid and dynamic underbalanced perforating technique contributed to the cost-effective operation.

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Statoil was able to enhance production in long horizontal North Sea wells with a customized completion fluid and dynamic underbalance technique that were proven through laboratory testing prior to field deployment.

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