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Riserless Light Well Intervention (RLWI)

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Abstract

With the growing number of subsea wells needing some sort of intervention (repair, measurements, plugs, zone isolation, chemical treatment, scale removal etc.) there is an increasing demand for an efficient subsea light well intervention service. Such a service has been in operation on the Norwegian Continental Shelf for the past four years and is systematically being improved from year to year. Currently, a long term commitment has been made by Norwegian Operators to acquire a RLWI service from one provider for a 5 + 3 years period. In conjunction with this long-term commitment new and improved technology is developed to make this service more efficient wrt. HSE, cost and quality.

This paper discusses the RLWI service in general, but focus will be put on some of the new technologies that are under development, technology that may be required to make this service move forward. These new technologies are: composite cable, deployment systems, coiled tubing from light vessels and new well control systems for RLWI.

Background

Currently there are more than 400 subsea wells in operation by Norwegian companies on the Norwegian Continental Shelf, a number that will increase to 500 on existing fields or fields sanctioned for development within the next few years. In addition, we believe that Norwegian companies will be operating subsea fields in deep waters and arctic areas through their international efforts. Currently the goal of Statoil's IOR R&D efforts is to increase recovery from our Subsea fields to 55% of OOIP, an increase corresponding to 200 MSm³ of additional oil. For the RLWI service to substantially contribute to this large volume, the establishment of an efficient subsea well intervention service is crucial.

Historically, some sort of intervention is required every 4th year (or more often) in subsea wells. We see a large gap in well intervention frequency between wells on fixed platforms and subsea wells. This is mainly due to the lack of well intervention capacity and high cost for subsea wells. It has therefore been

important to establish a Riserless Light Well Intervention (RLWI) service, which can operate across asset borders on the Norwegian Continental Shelf (NCS). In our case the service provider comprise a ship-owner, a well control company and a wireline company. It is essential that this service arrangement is long- term such that experience gained through operations is turned into improved technology and work processes.

By moving well intervention work from expensive drilling rigs to light monohull vessels the well intervention cost should be reduced dramatically, thus enabling more intervention work and eventually increased oil recovery. Even with the long term contract there will be a need for considerable improvement in the operations due to the limited capacity.

To create even more efficient operations and move work from expensive rigs to light vessels we have focused our technology development on the following:

- Make stronger, slick WL cables to be able to carry heavier tool strings and reach total depth (TD) of deep wells with complicated well paths;
- Extend the wireline (WL) tool string length to 40-60 m (currently 22 m lubrication length is available);
- New tools/methods for use on light vessels (coiled tubing);
- Improvements in RLWI stack (well control package) to simplify systems, reduce weight, increase flexibility by a modular system, improve running/pulling speed and HSE, as well as facilitate truly integrated operations (IO).

Subsea Increased Oil Recovery (IOR) – Light Well Intervention

Within Statoil's ongoing Subsea IOR project development of technology is taking place, which, if decided to proceed to implementation, has direct implication for the types of operations to be performed from a Riserless Light Well Intervention (RLWI) vessel. The task of establishing a long term RLWI alliance have already been accomplished through long term agreements between service providers and operators. This will enable reasonable cost and improvement in operations based on lessons learned, as well as specific Technology Development Agreements to provide new technology for the service. It is very important that new technology developed through the R&D efforts is applicable on the LWI vessels in use. In order to succeed with such new technology, it is necessary that the technology developed is thoroughly supported by the companies providing the RLWI service as well as the Assets acquiring this service. This is secured by closely involving the Assets in the yearly planning and evaluation process of the different projects. Furthermore, it is essential to give priority to a limited number of activities within the RLWI area in order to succeed. Our prioritized projects are as follows: