CASE HISTORY
Permanent Plug Back

Setting a Plug through the BHA saves $1.5 Million (USD)

**CHALLENGE** – Offshore the eastern coast of New Zealand, an operator had drilled a pilot hole to gather petrophysical data and further assess the geological model and formation pressures of a deepwater field. Although logging technology had charted the course to this zone, a high degree of accuracy in determining the water saturation and the oil/water contact was needed. This data would enable the placement of the horizontal section for optimized production.

Once the data gathering was completed, the pilot section needed to be permanently plugged to block any cross flow between the pilot hole and the production string through the horizontal wellbore. However, the operator wanted to gain operational efficiencies and place the permanent plug without pulling out the bottomhole assembly (BHA). This BHA was approximately 240.26 feet long and included sensors and trajectory tools to help pilot the bit for an optimized placement horizontally through the hydrocarbon-bearing zone.

**SOLUTION** – Conventional plug back solutions require tripping the BHA out of the hole then running in with a stinger to place a cement plug. In these conventional plug-back operations, once the plug is placed and set and tested, the BHA can be run back in for drilling to resume. In optimal conditions, this can require up to three days of rig time, resulting in plug-setting representing a costly operation in offshore drilling.

Halliburton offered WellLock® resin as an alternative to a cement plug. This resin system has an extremely low yield point making it conducive to being placed through a BHA.

At the same time, this resin system can withstand impurities in the wellbore significantly better than conventional cement solutions. Contamination of cement can cause it to become very weak and in some cases unable to set hard. In laboratory tests, WellLock resin withstands contamination by up to 30 percent.

Thus, even when displacing an aqueous- or hydrocarbon-based fluid, covalent bonding allows the entire volume of resin to remain in cohesive association, forming a competent plug with optimum shear-bond values and high compressive strength.

The operation involved placing two 9.3 ppg WellLock resin plugs in the pilot section. The first would be placed 135 meters off bottom and above a high-viscosity pill and the second would be 57 meters above the first, the two separated by another high-viscosity pill. Each plug was >28 meters in height.

Throughout the plug setting operations, the geology team was identifying the well trajectory. Once they determined the best kick-off depth, the section above the top resin plug and the kick-off point was spotted with a high-viscosity pill.

**RESULT** – Without any waiting-on-resin time, drilling resumed on the new trajectory. Spotting the plugs through the BHA and resuming drilling immediately allowed the operator to avoid $1.5 million (USD) in rig costs for the long trips in and out of hole. The dynamic tools on the BHA were unaffected by the resin and drilling continued without incident. When the BHA was pulled out and examined, there was no evidence of the resin anywhere on the BHA string.

For more information on WellLock® Resin system, please call your local Halliburton representative or email us at cementing@halliburton.com.

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