VERSAPAC Pill Helps Control Lost Circulation While Drilling a Highly Deviated North Sea Well

“The VERSAPAC* lost circulation pill proved to be a very effective cure for the losses on this well. After the curing period, circulation was re-established allowing operations to continue.”

Client Drilling Superintendent

Well Information
Location ........................................... U.K. Central North Sea
Well type .................................................. Development
Date .......................................................... July 2006
Maximum deviation ........................................ 65
Bottomhole temperature ..................................... 235°F (113°C)
Well depth .................................................. 11,262 ft (3432 m) Measured Depth (MD)

The Situation
An operator in the U.K. North Sea was drilling a highly deviated development well through difficult formations. The 13⅜-in. casing was set at 7,000 ft (2134 m) and the main 12¼-in. section was then drilled using 13.3-lb/gal VERSACLEAN® low-toxicity, oil-base mud. The hole angle was built to 65°, in order to place the 9⅝-in. casing above the reservoir, casing off the difficult Lark and Balder formations. Up to 10% cavings (mostly mechanical) were seen at the shale shakers while drilling this section and were identified as coming from the upper Lark formation. The mud weight was consequently increased to 13.4 lb/gal at section total depth (TD). However, the hole packed off while pumping out the string and total losses were encountered. Despite efforts to get out of the hole with limited pump strokes, the string became stuck and had to be abandoned.

After raising the mud weight to 13.8 lb/gal to control the shales, the hole was then sidetracked. No problems were encountered while drilling, but up to 5% cavings from the Lark formation were again noted at the shakers. Section TD was at 11,262 ft (3433 m), with final hole angle being 65°. The mud weight was raised to 13.9 lb/gal and the string was pumped out of the hole. While the string was being worked over a sticky section at around 7,500 ft (2286 m), there was a partial packoff and total losses resulted. Static losses were too severe to be measured because it was found to be impossible to keep the annulus full. After losing around 600 bbl of mud and with reserve mud running low, the annular blowout preventer (BOP) was closed to hydraulically “lock” the well while mud stocks were being obtained. The suspected loss zone was an induced fracture in the Balder formation at approximately 500 ft (152 m) below the bit depth.

The Solution
A VERSAPAC pill was made up in a reserve pit using active mud and 50 bbl were displaced across the Balder formation. The pill was then allowed to cure for a period of 6 hr.

The Results
After 6 hr the annular BOP was opened, and the well was found to be static. Circulation was established by bringing the pump strokes up carefully. Full circulation was achieved at 850 gal/min with zero losses.
The Details
This mud was at a temperature of 140°F and was diluted with base oil to cool it down as a precaution against premature activation of the Versapac material. 50 bbl of active mud was treated with 30 bbl base oil, 200 L emulsifier, 6 sacks organophilic clay and barite to raise the weight back up to 13.9 lb/gal. This was then treated with 21 lb/bbl Versapac lost circulation material, 5 lb/bbl fine fiber, and 5 lb/bbl of Ecotrol* RD fluid loss additive.

50 bbl of this pill was pumped into the string and then, with the annular BOP still closed, bullheaded down the drillstring at 600 gal/min with pump pressure of 3,000 psi. Prior to the pill entering the MWD tool in the string, the pump rate was reduced to 300 gal/min in order to de-activate the MWD turbine and maximize the flow area through the tool. Once the pill was at the bit, the pump rate was reduced so that the pump pressure was at a maximum of 400 psi. The pill was displaced across the Balder formation with no increase in pressure noted.

The remaining pill in the slugging pit was diluted back 1:1 with base oil and bled slowly into the active system with no noticeable effect on properties.

Why Versapac material?
The main advantage of Versapac lost circulation material over other water-base pill treatments is that the pill can be mixed quickly from oil-base mud in the active system, without the need to clean mixing pits and lines and without the associated waste generation. The pill is also much less sensitive to contamination from the active mud system and no spacers are required.

How does it work?
The Versapac lost circulation material forms a cross-linked structure with the Ecotrol RT additive. The reaction is affected by temperature and shear.

Questions? We’ll be glad to answer them.
If you’d like to know more about Versapac lost circulation material and how it’s performing for our other customers, please call the M-I SWACO office nearest you.