**CASE STUDY**

VERSAPAC Pill Controls Lost Circulation and Allows Successful Drilling to TD in North Sea Well

“The VERSAPAC* lost circulation pill controlled losses in the fault zone to acceptable levels and allowed a difficult well to be completed with minimum non-productive time.”

Michael Hodder, M-I SWACO U.K. Technical Services Manager

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An operator in the U.K. North Sea was drilling a highly deviated development well in the Central North Sea with an 11.5-lb/gal dolomite-weighted VERSACLEAN® LTOBM (low-toxicity oil-base mud) system. The 93/8-in. casing was set at 2285 m (7498 ft) and 81/2-in. hole drilled through the reservoir with a rotary steerable assembly, building angle from 72 to 90°. At 2485 m (8154 ft) MD a fault was penetrated with total loss of returns. The bit was pulled off bottom and the well observed on the trip tank: static losses were 300 bbl/hr. The riser was displaced to base oil, reducing static losses to 30 bbl/hr. Within the first couple of hours after penetrating the fault, 660 bbl of mud had been lost downhole leaving insufficient reserve volume to continue drilling.

The Solution

A VERSAPAC LCM pill was prepared in the slugging pit using 37 bbl of active mud. 30 bbl was spotted on bottom as a balancing plug, providing 130 m (427 ft) of pill in the open hole, extending across and above the fault. There were zero returns while displacing the pill. The bit was pulled to 2213 m (7260 ft), 142 m (467 ft) above the theoretical top of the pill and the pill was allowed to cure for a period of 6 hr.

The Results

As soon as the pill was spotted, static losses went from 30 bbl/hr to 0, increasing to 2 bbl/hr after 6 hr. After 6 hr, the riser was re-displaced to mud and circulation recommenced above the VERSAPAC plug, with 450 gal/min and up to 50% returns. The well was monitored on the trip tank with 10-15 bbl/hr static losses. The well was subsequently displaced from 11.5 to 11.1 lb/gal mud, with 50% returns.

With tolerable dynamic and static losses and a large volume of reserve mud now on-board, drilling ahead was considered a safe and calculated risk. Drilling was resumed and the hole successfully drilled to well total depth at 2604 m (8545 ft) MD. A total of 1838 bbl of mud was lost to the fault. The expandable sand screens (ESS) were run and expanded without problems and the well successfully completed and tested.

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**Well Information**

Location: U.K. Central North Sea

Well type: Development

Date: July 2006

Maximum deviation: 90°

Bottomhole temperature: 89°C (193°F)

Well depth: 2485 m (8154 ft) measured depth (MD)
The Details

After transfer to the slugging pit, the mud temperature was 29.4°C (85°F). The pill was prepared by mixing (in the following order): 5 lb/bbl ECO-CONTROL® RD fluid-loss-control additive, 5 lb/bbl fine fiber and 21 lb/bbl VERSAPAC additive. While the pill was curing, the reserve volume was replenished with 2896 bbl of dolomite-weighted VERSACLEAN LTOBM which had been on a supply vessel in the field.

There were no issues or problems mixing the VERSAPAC pill. After mixing, the residue volume was vacuumed from the bottom of the pit into a skip for disposal and the surface lines were flushed with active mud. When circulation was re-established, there was no apparent contamination of the circulating system with the pill and no problems with surface lines.

Due to the severity of the static losses it was not possible to squeeze the pill. Generally it is recommended, where applicable, to pull above the pill, close the annular blowout preventer and squeeze down the drill pipe, holding 30-45 psi pressure to ensure that the pill has entered the loss zone.

The VERSAPAC pill sets up as soft gel, as illustrated above, with typical gel strength 200-1000 lb/100 sq ft.

Questions? We'll be glad to answer them.

If you’d like to know more about the VERSAPAC lost circulation material and how it’s performing for our other customers, please call the M-I SWACO office nearest you.