

Casing Set Successfully at Planned Depth After Engineered LCM Pills Cure Total Losses

WESTERN DESERT, EGYPT

CHALLENGE

Severe to total lost circulation in the 12-1/4-inch interval made it impossible to drill ahead to the planned interval depth. Without a solution, the operator would have to run an extra string of casing to cover the loss zone in this exploration well.

SOLUTION

A pumpable LCM blend of three types of material would provide effective sealing of natural and induced fractures and vugular fissures.

RESULT

After spotting two pills, losses dropped 88 percent from an average of 80 bbl/hr to 10 bbl/hr, allowing the operator to reach the planned interval depth and to successfully run and cement 9-5/8-inch casing.

OVERVIEW

While drilling the first exploration well in the area, the customer experienced total losses in the Kharita formation in the 12-1/4-inch interval. A higher mud weight would be required to drill the Abu-Roash pressurized shale below the Kharita formation, so the operator needed to run and cement 9-5/8-inch casing at 9,350 feet (2,850 meters).

The competitor drilling fluid company servicing the well mixed and pumped several lost circulation material (LCM) pills with no success. The operator also pumped two cement plugs.

Reaching the planned interval depth was essential. However, any proposed LCM treatment had to meet the requirements of being able to be prepared at the rigsite and also pumped through the bottomhole assembly (BHA).

BLEND OF LOST CIRCULATION MATERIALS DELIVERS MULTIPLE SEALING EFFECTS

Based on a similar case history in North America, the Baroid team recommended spotting a pill formulated with DIAMOND SEAL® and STOPPIT® LCMs, plus BAROLIFT® additive to enhance suspension capacity and aid in sealing vugs and large fractures. DIAMOND SEAL LCM remains pumpable until placed downhole, where it swells rapidly to seal off loss zones. The STOPPIT composite LCM helps create a strong, competent plug. As formulated, the pill could be pumped through the BHA and spotted accurately in the wellbore before activating.

Per Baroid recommendations, the rig crew mixed 55 bbl of fresh mud diluted with fresh water, and then loaded it with BAROLIFT suspension material (1 ppb) and DIAMOND SEAL (2 ppb) and STOPPIT (100 ppb) LCMs. The pill was spotted at 8,950 ft. Five hours after spotting this pill, the pipe rams were closed and a gentle squeeze pressure was applied to ensure that the pill had plugged the loss zone. When the drillstring was run to bottom and circulation resumed, the loss rate reached 4 bbl/hr at a 200-gpm flow rate and 30 bbl/hr at 550 gpm. A second identical pill was spotted on bottom, and it reduced the loss rate to 10 bbl/hr, 88 percent lower than the average original rate.

**SAVED US\$500,000
IN FLUID COSTS**

HAL42239

CASING SET AND CEMENTED AT PLANNED DEPTH

The effective sealing of induced fractures allowed the operator to safely continue drilling to the planned interval depth and to set the 9-5/8-inch casing successfully.

The engineered LCM pills provided several clear benefits for the operator:

- » Prevented the need to run a liner or casing string through the loss zone
- » Halted severe and total losses
- » Eliminated the need to continuously build replacement mud
- » Minimized the risk of differential sticking

The average downhole loss rate before the Baroid pills were spotted was 80 bbl/hr. After the treatments, the rate dropped to a manageable 10 bbl/hr. This difference saved an estimated US\$500,000 in drilling fluid alone, based on a mud cost of \$40/bbl over the three-day period required to reach the interval's total depth.

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