MATURE FIELDS

CASE STUDY

SentinelCem™ Cement Cures Losses Successfully in Heavily Fractured Carbonate Formation in Southern Oman

HALLIBURTON SOLUTION REPRESENTS PARADIGM SHIFT IN LOST CIRCULATION MANAGEMENT

SOUTHERN OMAN

CHALLENGE

Cure severe to total circulation losses in a heavily fractured carbonate formation

SOLUTION

- SentinelCem™ cement, which is designed to cure losses during drilling

RESULTS

- Cured static losses completely and reduced dynamic losses by 93 percent
- Ran and cemented 9-5/8-inch casing without losses
- Continued drilling the well to its planned total depth
- Avoided estimated losses of USD 700,000

OVERVIEW

AVOIDED LOSSES OF **USD 700K**

Halliburton Project Management (HPM) was tasked to support Medco Arabia Ltd. in the planning and execution of its Block 56 exploration drilling campaign in southern Oman. The objective was to plan and execute engineering and operations at the lowest cost possible.

CHALLENGE

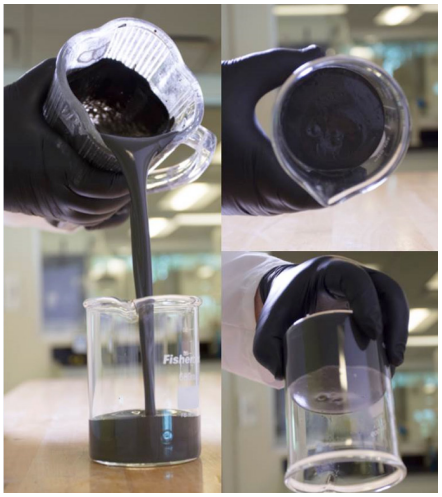
The operator experienced total losses while drilling its exploration well "C" in a heavily fractured carbonate formation. Typically, several unsuccessful attempts to cure the losses with standard lost circulation materials (LCMs) resulted in 62 hours of nonproductive time (NPT) at a total cost of USD 154,000. The operator wanted to avoid the problems that had plagued the drilling of past offset well "B" where the bottomhole assembly (BHA) had been lost due to complete losses at 1,580 meters (5,184 feet) and the well was plugged and abandoned.

SOLUTION

Well "C" was experiencing 200 bbl/hour losses in the 12-1/4-inch open hole at 1,498 meters (4,915 feet). HPM collaborated with the Cementing product service line (PSL) to evaluate the situation and to offer solutions. An innovative solution was then tailored using SentinelCem™ cement, which is designed to cure losses during drilling. A 100-bbl treatment of 10.0-ppg SentinelCem cement was recommended for treating the losses and increasing the chances of successfully achieving top of cement on the 9-5/8-inch production casing.

Advantages of SentinelCem cement:

- Rapid gel strength development once pumping is reduced, thus stopping the losses and helping to achieve early compressive strength to minimize "waiting on cement" time
- The ability to pump SentinelCem cement through the drilling BHA was able to prevent two trip times, compared to doing a conventional cement plug with open-ended pipe



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SentinelCem™ cement's rapid gel strength development is demonstrated in a laboratory.

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The operator overcame the problems that had plagued the drilling of past offset wells and managed to successfully explore the deeper horizons to depths of 2,400 meters (7,874 feet).

RESULTS

With the use of SentinelCem cement, static losses were completely cured and dynamic losses were reduced by 93 percent. The treatment volume will be tailored for future operations to completely cure the dynamic losses.

Additionally, the operator ran and cemented the 9-5/8-inch casing successfully without any losses. The operator overcame the problems that had plagued the drilling of past offset wells and managed to successfully explore the deeper horizons to depths of 2,400 meters (7,874 feet), in line with the objectives set out in the Geological Well Proposal.

The operator also saved an estimated USD 700,000, because it avoided losing the BHA and then needing to sidetrack. The success achieved with SentinelCem cement was recognized by Medco Arabia Ltd., and SentinelCem cement is now considered the preferred solution for curing severe losses in similar formations.

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