CASE STUDY

HALLIBURTON

Indonesia

Cement system allows operator to mitigate losses and reach planned total depth

SentinelCem Pro™ cement proves successful in limestone formation after multiple ineffective lost-circulation treatments

CHALLENGE

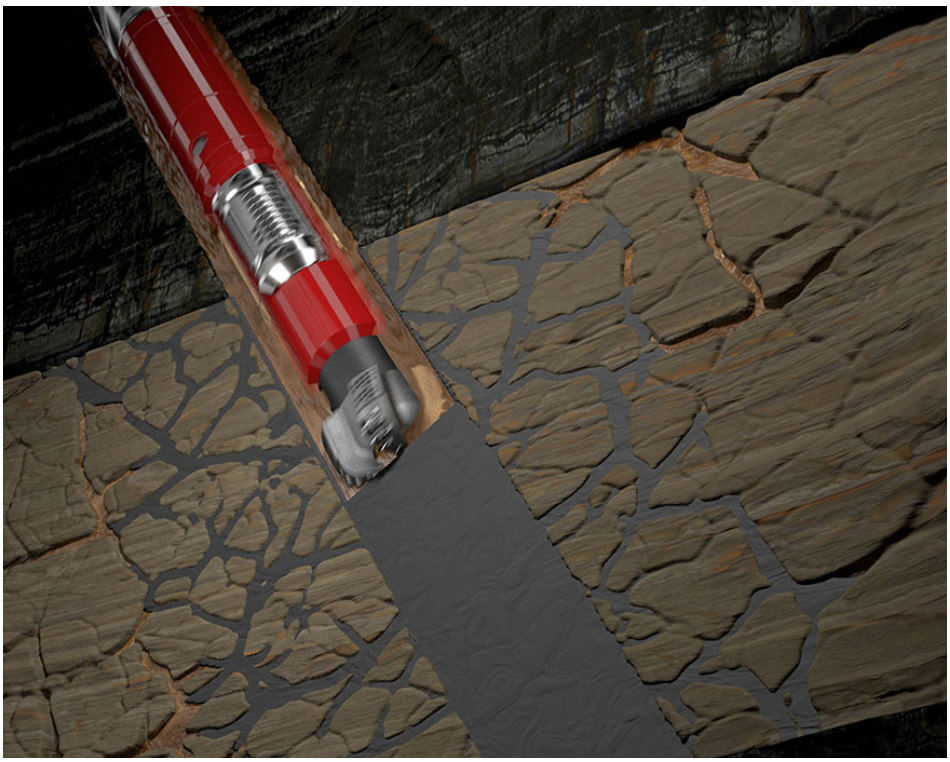
- Severe losses halted drilling
- Unable to cure losses with conventional cement plugs and LCMs

SOLUTION

- Pump two SentinelCem Pro™ cement treatments, one through BHA offshore and one through open-ended pipe, to cure total losses

RESULT

- Eliminated pipe trip time
- Prevented static or dynamic losses
- Saved three days of rig time
- Drilled well to planned TD
- Proved viability of application with the use of seawater



SentinelCem Pro™ cement rapidly gels with the shear rate reduction and then gains early compressive strength. This feature helps cure losses when the slurry enters fractures and vugular zones and it mitigates costly drilling fluid loss to the formation.

Overview

Total lost circulation in highly fractured limestone formations presents a common drilling obstacle in Indonesia. Typical lost-circulation materials (LCMs) often fail because of the large fracture size and the challenge of the use of bridging materials to plug fractures. Conventional thixotropic cement systems also have proven ineffective. Repeated failed treatments can increase nonproductive time (NPT) and well costs.

CASE STUDY

Challenge

An operator in Indonesia encountered severe losses while drilling the 8.5-in. openhole section through a limestone formation with maximum inclination of 68°. Losses began 135 ft below the 9 5/8-in. casing and reached up to 500 bbl/hr. Despite multiple 100-bbl conventional cement treatments with LCMs by a third party, the loss rate of 500 bbl/hr persisted. This halted drilling progress toward the casing point.

Solution

Halliburton proposed SentinelCem Pro™ cement. This solution possesses thixotropic properties that permit it to remain fluid while pumped into lost-circulation zones and develop rapid gel strength once pumping ceases. These properties allow the system to penetrate deep into fractures to cure lost-circulation events.

The crew pumped the first 60-bbl SentinelCem Pro cement treatment through the bottomhole assembly (BHA), which eliminated the need to trip out of hole. They squeezed 40 bbl into the formation and left 20 bbl in the wellbore to drill out. Mixed with seawater, the system demonstrated flexibility and convenience for offshore use by its tolerance to different water types. After eight hours of wait on cement (WOC) time, the rig resumed circulation with a reduced dynamic loss of 320 bbl/hr. LCM was pumped to further reduce the dynamic loss to 210 bbl/hr. After 89 ft of drilling the new formation, the operator recorded a dynamic loss of 330 bbl/hr. The rig pumped another conventional cement plug without success, and the loss rate increased to 500 bbl/hr.

The crew pumped a second 70-bbl SentinelCem Pro cement treatment through an open-end drill pipe to squeeze 15 bbl of the treatment into the formation. After 10 hours of WOC time, the well remained static. The crew tagged the cement 334 ft above the loss zone and drilled out with 1 to 2 kps. They observed no further static or dynamic losses.

Result

SentinelCem Pro cement mitigated total losses. The operator proceeded to drill the 8.5-in. open hole to planned total depth. In addition, the SentinelCem Pro cement treatment saved an estimated three days of offshore rig time.

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