CASE STUDY

HALLIBURTON

Australia

Effective remedial operation with thixotropic cement system helps restore well

SentinelCem Pro™ cement system successfully cures losses of 60 bbl/hr during squeeze operation

CHALLENGE

- Regain well integrity in severe loss situation
- Set circulation restriction, ECP set above the zone to be abandoned
- Accommodate equipment with limited space onsite

SOLUTION

- Perform hesitation squeeze under retainer with SentinelCem Pro™ cement system
- Mix SentinelCem Pro™ cement on-the-fly

RESULT

- Successfully cured losses with no static or dynamic losses post-treatment
- Isolated annular space below ECP
- Confirmed zonal isolation via CBL

Overview

Cement operations in coal formations pose major challenges due to their unpredictable behavior and severe lost circulation. This can contribute to nonproductive time (NPT) and threaten wellbore integrity. To help prevent complications, operators must stop losses quickly and effectively. Typical lost circulation materials (LCMs) and conventional cement slurries can fail in these conditions. Instead, operators should use slurries with thixotropic characteristics, which become more fluid (less viscous) under shear but thicken into a gel-like material when the slurry is static.



Challenge

To meet local requirements in Australia, an operator had to isolate all aquifers and permeable hydrocarbon zones. While drilling the 8 1/2-in. production section of an onshore well, severe losses and poor bonding during primary cement operations compromised well integrity. In response, the operator performed a two-stage primary cement operation, but only recovered 10 bbl of returns during the first stage and 15 bbl during the second. A cement bond log (CBL) confirmed a lower than planned top of cement (TOC), which jeopardized the required zonal isolation. With an external casing packer (ECP) in place and losses that exceeded 60 bbl/hr, a circulation squeeze did not represent a viable option to restore integrity.

Solution

An injectivity test using freshwater from the surface into the 7-in. × 8 1/2-in. annulus showed an injection rate of 4 bbl/min at 60 to 100 psi. This data confirmed severe losses to the formation behind the casing. To restore integrity, Halliburton recommended a hesitation squeeze with SentinelCem Pro™ cement, a thixotropic cement that remains fluid during pumping and rapidly gels when static. Its capability to withstand multiple hesitation cycles made it ideal for this application.

Because of space constraints on location that prohibited the use of a batch mixer, the team designed the slurry for on-the-fly mixing and pumping. Halliburton recommended a solution to place a cement retainer 5 m above the top of the perforations and then pump 20 bbl of Flo-Chek® reactive spacer, 15 bbl of water spacer, and 100 bbl of SentinelCem Pro cement squeezed in five hesitation cycles.

Result

The SentinelCem Pro cement solution addressed the challenges of severe losses and restored wellbore integrity. Its thixotropic properties kept it fluid during pumping and allowed it to rapidly gel and provide a secure seal once in place. The use of a pre-blended slurry eliminated the requirement for a batch mixer, which streamlined operations in the space-constrained location.

Post-operation CBL evaluation confirmed good bonding to the pipe and formation, which indicated good zonal isolation and compliance with regulations. This solution addressed the immediate challenges and facilitated a cost-effective, efficient well abandonment process.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H015124 9/25 © 2025 Halliburton. All Rights Reserved.