CASE STUDY

HALLIBURTON

Indonesia

Cement system allows operator to cure persistent losses and improve CBL results

SentinelCem Pro™ cement successful in limestone formation after four unsuccessful conventional squeeze operations

CHALLENGE

- An operator was unable to achieve an adequate CBL to continue the completion program after multiple remedial treatments with conventional slurries failed to seal a limestone loss zone behind the liner

SOLUTION

- Pump the SentinelCem Pro™ cement system down open-ended drillpipe and through perforations above the loss zone

RESULT

- SentinelCem™ Pro cement system tagged 104 m above the loss zone
- No static or dynamic losses after cement was drilled out and pressure tested up to 1,000 psi
- Improved CBL results after treatment with the system
- Using the SentinelCem Pro cement system before the four unsuccessful conventional cement squeeze applications would have saved the operator more than USD 160K and three days of rig time

Overview

Lost circulation in highly fractured limestone formations is difficult to overcome with typical lost-circulation materials (LCMs) because of the large fracture size and difficulty to plug the fractures with bridging materials. In such cases, a reactive, thixotropic solution is necessary.

Challenge

An operator experienced persistent losses that ranged from partial to total losses in the 8.5-in and 6-in. sections in a limestone formation. Remedial operations were necessary to improve the cement bond log (CBL) results behind the 4 1/2-in. liner to meet regulations and advance to the completion phase. Four previous squeeze applications using conventional cement slurries through perforations failed to seal the lost circulation zone behind the perforated casing interval. Persistent static losses of 0.7 bbl/min and dynamic losses of 1 to 1.8 bbl/min at minimum flow rates of up to 3 bbl/min continued.

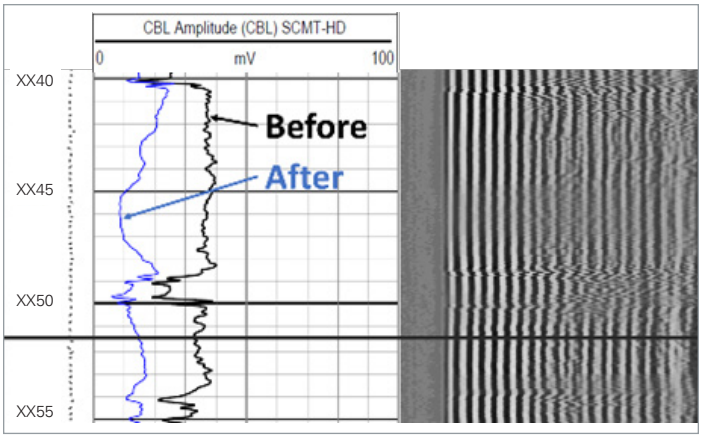
Solution

Halliburton proposed pumping 40 bbl of SentinelCem Pro™ cement to cure the losses. The thixotropic nature of the cement system enables it to remain fluid while pumped into lost-circulation zones and develop rapid gel strength once pumping ceases. This allows the system to penetrate deep into fractures to cure lost-circulation events. The system was pumped down the open-ended drillpipe with the annulus closed from above the loss zone and 10 bbl of SentinelCem Pro cement was squeezed into the formation. The remaining 30 bbl was left inside the casing and later hesitated to pump 15 bbl more behind the perforated interval. The remaining 15 bbls were left inside the casing for later drill out.

Result

After eight hours of wait on cement (WOC) time, the well remained static and cement was tagged 104 m above the perforation zone. Cement was drilled out and no further static or dynamic losses were observed, even after a pressure test up to 1,000 psi. A new CBL indicated improved zonal isolation, which allowed the operator to advance to the completion program.

Using the SentinelCem Pro™ cement system before the four unsuccessful conventional cement squeeze applications would have saved the operator more than USD 160K and three days of rig time.



CBL shows improved bonding after treatment with SentinelCem Pro™ cement system.

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