

Tullow Ghana Ltd. Improves Zonal Isolation and Reduces Waiting Time in Long, Deviated Deepwater Wells

CemFIT Shield cement system eliminates mud channeling and dry microannuli in highly permeable sandstone reservoirs

After two years of following best cementing practices and extending the time between cementing and cement evaluation, Tullow Ghana Ltd. improved cement bond logs and zonal isolation with mud-sealing cementing technology.

Poor isolation between zones in deepwater wells

Tullow Ghana Ltd. drilled 10 wells in the deepwater Jubilee, Tweneboa, Enyenra, and Ntomme (TEN) Fields since 2018, and all experienced zonal isolation issues such as poor cement bonding and channeling in the oil-based drilling fluid. Cementing challenges include highly deviated well trajectories, a relatively narrow envelope between pore and fracture pressures, high reservoir permeability, and small distances between reservoir units. Centralization choices are also limited to avoid casing drag and enable reaching total depth.

Cementing best practices and delayed bond logs

To improve zonal isolation over the course of the project, the friction pressure hierarchy was increased, cement designs were modified to increase compressive strength and tolerance to contamination, and a preflush was added ahead of the cement spacer. Finally, the time between cementing and cement evaluation was extended up to 60 days, which did not significantly improve bond logs and detrimentally affected well economics.

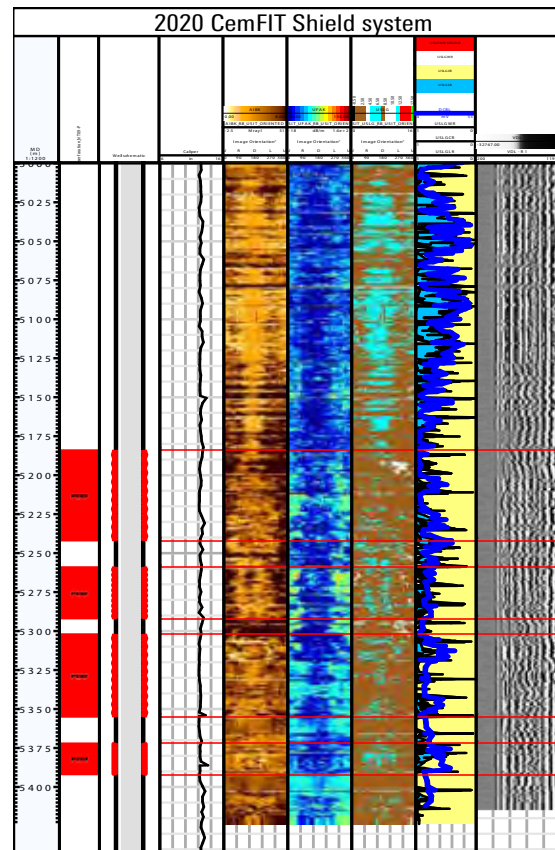
Cement technology that interacts with oil-based mud (OBM)

Schlumberger recommended CemFIT Shield* mud-sealing cement system, which interacts with any OBM that remains after the spacer train. The interaction reduces mud mobility and the likelihood of communication along channels.

Mud-sealing cement improves bond log and isolation

CemFIT Shield system was deployed in Well 11, where target reservoir sands were separated by less than 20 m. The reservoir section was drilled to 5,492-m MD with fresh OBM after heavy losses during prior sections, and the operation was executed as expected.

Two pressure test cycles of 1,500 psi and 1,400 psi were applied to the casing within 10 days after cementing. The cement evaluation log carried out 12 days after cementing showed that the zonal isolation requirements were achieved without significant continuous channels, dry microannuli, or debonding.

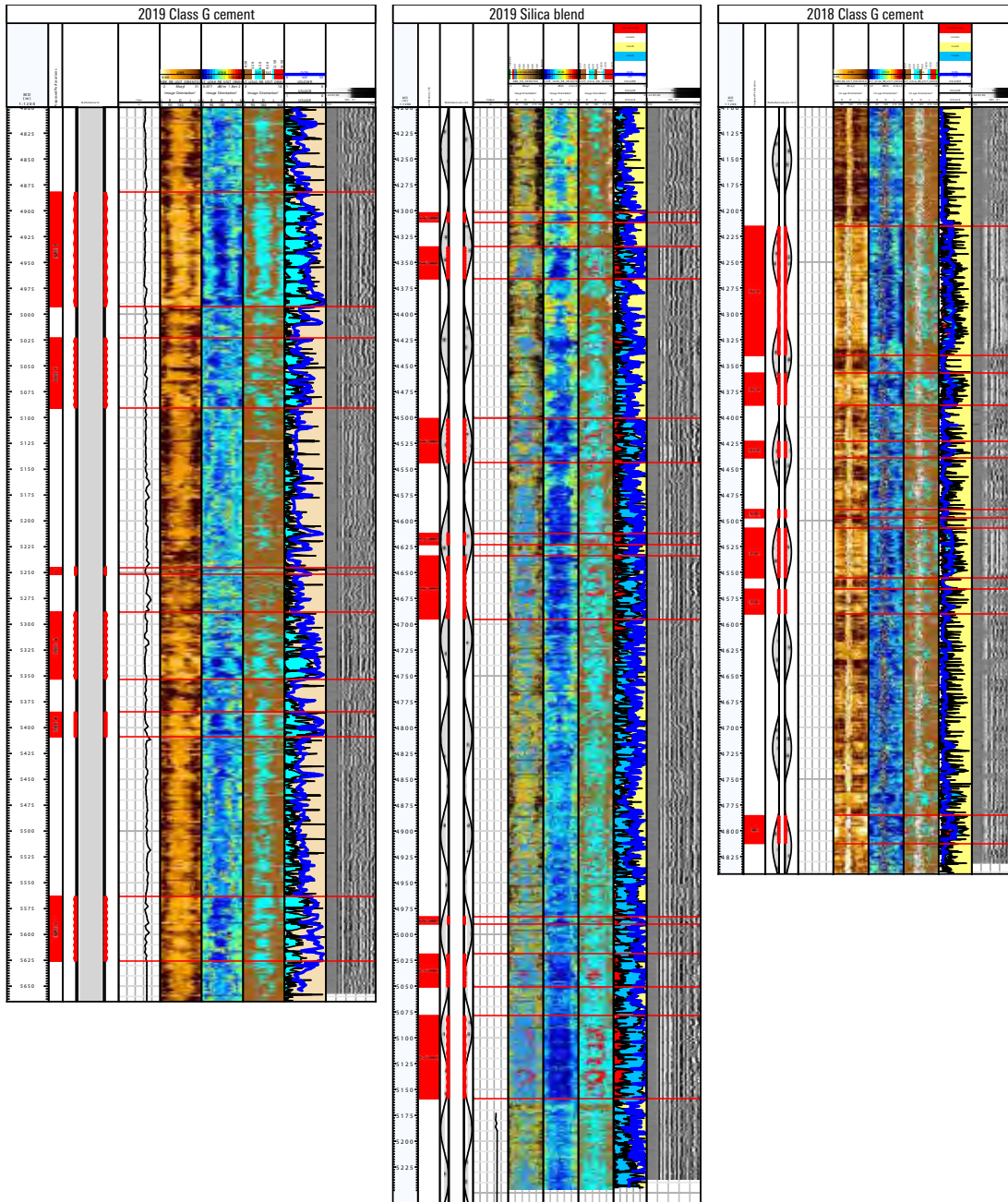


The first project well cemented using CemFIT Shield system was pressure-cycled within 10 days after cementing and then logged after just 12 days to demonstrate the required zonal isolation.

“This was quite possibly one of the easiest logs to evaluate, despite the very short time between cementation and bond logging. I am happy to report that I am satisfied that we have good isolation above the upper, between the upper and middle, between the middle and lower, and below the lower sands.”

Ian Whyte, Group operations petrophysics lead, Tullow Oil

Case study: Tullow Ghana Ltd. improves zonal isolation and reduces waiting time in deepwater wells



Early wells in the Jubilee and TEN Fields experienced poor cement bonding, liquid pockets, and continuous channels, even when logging was delayed by up to 60 days.

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