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Losseal Natural Fracture Treatment Saves USD 220,000 on Cementing and Mud Recovery, Southern Pakistan

CEMENTICS software also optimizes spacer train and cement designs for liner segment's narrow pore-to-fracture pressure window

CHALLENGE

Cement 7-in liner across weak formation after unsuccessful attempts to cure severe mud losses.

SOLUTION

- Deliver Losseal Natural Fracture* lost circulation control treatment as part of the spacer train.
- Optimize the cementing operation with CEMENTICS* zonal isolation software to manage the narrow pore-to-fracture pressure window.

RESULTS

- Cured losses with a single pill of lost circulation material (LCM), restoring returns to surface and enabling recovery of approximately USD 23,000 in water-based mud.
- Cemented the liner with top of cement (TOC) at designed depth and good cement bond logs across all formations, saving approximately USD 197,000 by eliminating the need for remedial cementing.

High losses challenge liner cement job

An operator was drilling the 8½-in section of a new well in Pakistan with mud weight of 1.07 g/cm^3 [8.9 lbm/galUS] and encountered a weak formation. Attempts to cure losses with conventional LCMs (sawdust and cotton seed) were minimally effective, resulting in 1,130 m^3 [7,100 bbl] of mud being lost in 10 days. Despite the losses, the hole was drilled to approximately 3,700 m [12,100 ft] and the 7-in liner run into the hole.

The liner limited the operator's options to stop the losses because any significant circulation would increase the risk of destabilizing the open hole, which would jeopardize the cementing operation. Cementing without controlling the losses would likely result in losses of cement to the formation. Both of these cases would require expensive remedial cementing to achieve zonal isolation objectives.

The operator asked Schlumberger for a competent solution to control the losses while cementing.

Expert software optimizes LCM-while-cementing strategy

Based on prior experience in the field, the engineers were prepared for a Losseal Natural Fracture treatment with a composite blend of fibers and solids that create a strong impermeable grid, stopping mud or cement from flowing into naturally fractured zones. The engineers input well fluid information, loss rates, and other well data into the Lost Circulation Control Advisor software, an expert decision-tree application used to analyze and solve lost circulation problems, to generate a fit-for-purpose treatment design that would cure the losses with a single pill as part of the spacer train.

Well and pill data were also input into the CEMENTICS software, which was used to design the complete spacer train and cement slurry within the limited pore-to-fracture pressure window.

Pill cures losses, enabling successful cementing

The cementing crew delivered the pumping operation as designed. When the Losseal Natural Fracture treatment reached the loss zone, the surface pressure and mud pit volume began to increase, indicating the pill had cured the losses and restored returns to surface. As a result, the operator recovered about USD 23,000 in WBM.

After the operation, a cement bond log confirmed the TOC and consistent cement bond across the interval, saving the operator USD 197,000 by eliminating the need for remedial cementing.

An engineered Losseal Natural Fracture treatment saved an operator in Southern Pakistan approximately USD 220,000 by stopping losses, enabling mud returns to surface, and eliminating the need for remedial cementing.

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