

North Sea Operator Cures Lost Circulation While Cementing in Weak Formation

Losseal treatment and CemNET technology help operator exceed cement bond log and formation integrity test objectives by 50% and 13%, respectively

CHALLENGE

Control lost circulation while cementing water injection wells in a troublesome formation with depleted zones and a narrow operating window between pore and fracture pressure.

SOLUTION

Combine Losseal Microfracture* lost circulation control treatment with CemNET* advanced loss-control fiber technology to mitigate fluid losses and ensure cement integrity.

RESULTS

- Observed full returns once the spacer and cement entered the annulus.
- Successfully tested casing to 26.1 MPa.
- Exceeded cement bond log objective by 50%.
- Exceeded formation integrity test (FIT) objective by 13%.



Cement well in formation with known lost circulation issues

An operator was completing the initial development phase in the North Sea with six horizontal oil wells and eight water injection wells. While drilling and cementing the injector wells, the operator encountered severe lost circulation issues. Only one out of seven cementing jobs in the 12 ¼-in section was executed with full returns.

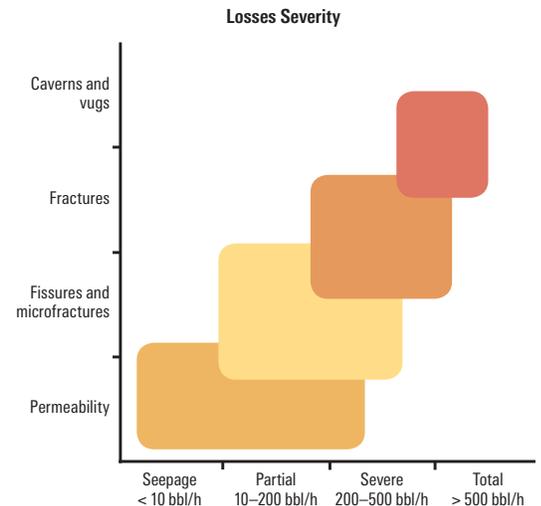
Adding to the challenge, the operator needed to set the casing of an upcoming injector well into depleted sandstone to provide adequate pressure support to the target area. This reduced the fracture gradient considerably. The operator needed to control fluid losses and ensure successful cement placement around the shoe to avoid water injection into the undesired formation.

Use engineered fiber technologies to plug thief zones

Reviewing the data from previous operations in the field revealed that losses were present while running casing, prior to cementing operations. To optimize mud removal and ECD management in the narrow window between the fracture gradient and pore-pressure gradient, Schlumberger ran simulations of different fluids and lost circulation material (LCM) using CEMENTICS* zonal isolation software. The team recommended adding Losseal Microfracture* lost circulation control treatment into the spacer and CemNET advanced loss-control fiber technology into the cement slurry. In collaboration with M-I SWACO, a Schlumberger company, the cementing team also proposed pumping WARP* advanced fluids technology with treated micronized weighting agents to help deliver lower ECD values.

Treatment cured lost circulation, exceeding cementing objectives

Schlumberger executed the cementing operation as planned with no losses once the spacer exited the casing shoe, confirming that Losseal Microfracture treatment and CemNET loss-control fiber technology combined to minimize losses. The casing was successfully pressure tested to 26.1 MPa and the operator confirmed a 45-m circumferential cement barrier above the reservoir—50% higher than the 30-m acceptance criteria. In addition, the engineered LCM treatments helped the operator exceed the formation integrity test objective by 13%, avoiding costly, time-consuming remedial operations compared with offset wells. As a result of this successful application, the operator plans to deploy Losseal Microfracture treatment and CemNET technology to stop lost circulation in future field operations.



For loss severity, there is a standard industry accepted loss rate shown above and the relevant severity category. For severe losses, the rate can be somewhere between 200 and 500 bbl per hour, but this definition can vary between operators and service companies.

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