

Grande-Seal Particulates Eliminate Need to Run Deepwater Expandable Liner

Mud losses during formation sampling cut by two-thirds

CHALLENGE

- Eliminate seepage and partial mud losses in depleted sandstone formations, strengthen the depleted pay zone, and seal potential natural and drilling-related fractures in a deepwater development well.

SOLUTION

- Design a comprehensive slurry comprising Grande-Seal* granular, shear-resistant particulates and traditional lost circulation material (LCM).
- Determine the optimal blend for wellbore strengthening by applying OPTI-STRESS* wellbore stability software.

RESULTS

- Successfully controlled mud losses and strengthened the formation to drill to TD and sample while eliminating the need to run a 9 $\frac{5}{8}$ -in expandable liner.



Curing seepage and partial mud losses

A deepwater operator planned to drill to select targets and sample the reservoir before running a 7 $\frac{1}{2}$ -in production liner. However, a geological analysis showed the presence of localized weak interfaces along bedding planes that were most likely exacerbated by depletion and mud losses. The fracture widths were estimated to range from 1,500 to 3,000 μ m.

Designing appropriate slurry

Making use of the proprietary OPTI-STRESS software packages and the LCM slurry calculator plus offset formation data, various LCM slurries to cover the expected fracture width range were designed and validated in the laboratory with the advanced slot tester. The modeled blends containing Grande-Seal particulates showed a successful and quick initial bridging efficiency and stable sealing capacity up to 4,000 psi [276 bar] in the expected fracture range. Upon review of the results with the operator, the material was shipped out to the rig and the LCM plan was put in place.

Successfully sampling sandstones

When drilling the 10 $\frac{3}{4}$ -in section, mud losses estimated at 50 bbl/h [7.85 m³/h] were encountered and the Grande-Seal particulates were deployed; a 50-bbl [7.85-m³] pill, at 15 lbm/bbl [42.75 kg/m³] of Grande-Seal particulates plus traditional LCM material, was pumped to control the downhole loss rate. As soon as the pill exited the bit, 100% returns were regained. Subsequent Grande-Seal particulates pills, with concentration varying from 15 to 30 lbm/bbl [42.75 to 85.5 kg/m³], were efficaciously circulated as new formation sections were drilled to control seepage losses. At 19,670 ft [5,995 m], severe mud losses were encountered; an LCM pill containing Grande-Seal particulates was prepared in a 50-bbl [7.85-m³] batch and squeezed into the formation.

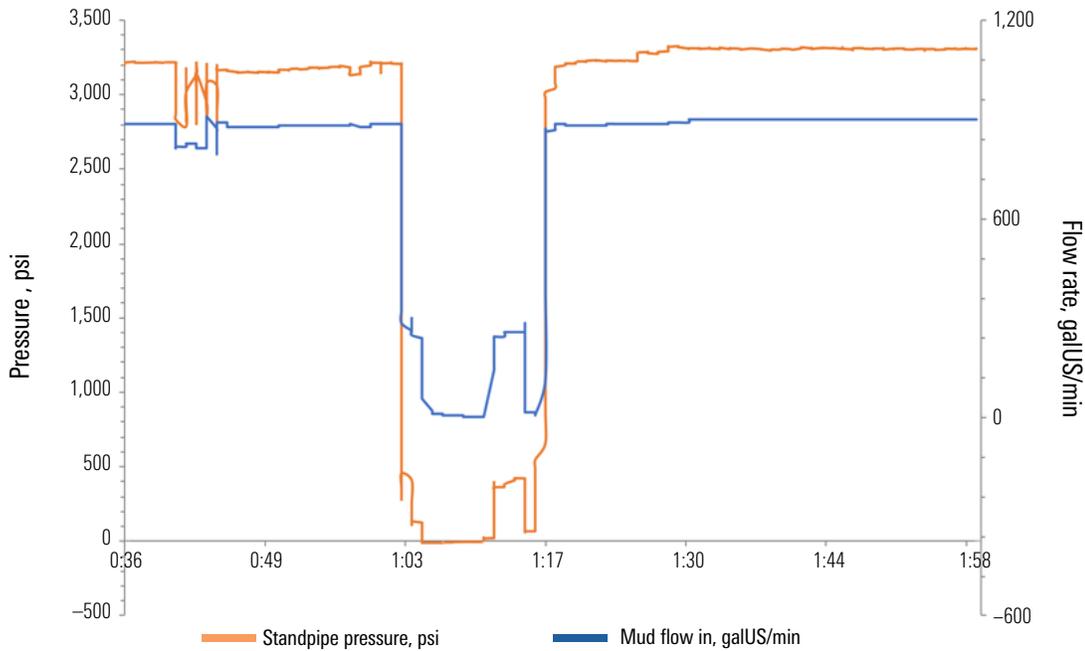


Comprehensive slurry design included Grande-Seal granular, shear-resistant particulates.

CASE STUDY: Grande-Seal particulates eliminate need to run deepwater expandable liner, Gulf of Mexico

Losses were reduced from 160 to 50 bbl/h [25.44 to 7.85 m³/h]. Pumping further Grande-Seal particulates pills in combination with standard LCM proved to be effective in controlling losses.

The operator was able to drill the well to TD, eliminating the need to run a 9⁵/₈-in expandable liner, and the sandstones in the 10¹/₄-in interval were sampled as planned. The 7⁵/₈-in production liner was run and cemented in place.



Grande-Seal particulates and LCM pill pumped through directional tools.

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