Case History

Integrated CleanDrill™ Reservoir Drill-in Fluid and ORCA™ Breaker Treatment Minimizes Formation Damage and Reduces Costs, Delivering Higher than Expected Production, Offshore Romania

An engineered solution was designed to comply with governmental and environmental regulations to successfully complete a challenging offshore well

CHALLENGE	SOLUTION	RESULT
• Integrated fluid solution non-damaging to the reservoir • Only environmentally-friendly products accepted • Achieve a fluid loss lower than 3 ml	• CleanDrill™ minimally damaging brine-based reservoir drill-in fluid (RDF) • ORCA Breaker Fluid by Cleansorb™, a Newpark Company • ClearBridge™ lost circulation modeling software • TrueCarb™ bridging agents	• Reduced rig days and costs to complete well by eliminating the need for additional acidizing jobs • OHGP completion performed • Higher than expected production achieved

OVERVIEW

Newpark was selected by an offshore operator in Romania to engineer an integrated fluid system combining a reservoir drill-in fluid (RDF) with a compatible and effective breaker fluid treatment to remove the drilling fluid filter cake with minimal damage to the reservoir formation.

The operator's goals included protecting the reservoir integrity to allow an open-hole gravel pack (OHGP) completion.

CHALLENGE

The drilling parameters that needed to be achieved included obtaining a fluid loss lower than 3ml using a PPT (500 PSI differential) at 38 °C as BHST and with 10 microns aloxite discs.

The customer demanded only the use of formulations non-damaging to the reservoir, with a minimum quantity of products in the recipe to reduce the volumes of chemicals on the offshore rig.

An additional challenge came from government regulators who were required to approve all products to mitigate the potential for environmental impact as only CEFAS / PLONOR registered chemicals were only allowed to be used.

This project was therefore unique in that Newpark had to ensure a synergy between a minimally damaging RDF and compatible breaker treatment, while complying with the environmental regulations, and creating a bridging strategy that would be effective in sealing any fractures.

Moreover, the entire fluid volume used for the reservoir section had to be prepared in 24 hours within the exact specified parameters. For this reason, the experience and expertise of the Newpark fluids specialists was paramount during the planning phase as there would be no time to adjust the properties while drilling.

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SOLUTION

Following extensive laboratory testing, Newpark fluid specialists selected the CleanDrill™ minimally damaging monovalent brine-based reservoir drill-in fluid together with the ORCA™ breaker fluid from Cleansorb™, a Newpark company.

Compatibility and performance of the RDF and breaker formulations were rigorously tested together to achieve optimum drilling performance and the highest return permeability.

Results of the testing are shown below:

Test results after static aging (at 40ºC / 350 PSI for three days) of the mud cake obtained after 2 hours of HP/HT filtration (2mm mud cake)

TEST TIME	Weight (grams)	Mud cake remaining %	Mud cake decomposed %
Ceramic Disk before filtrate	46.51	-	-
Ceramic Disk with Mud Cake	50.65	100.00% (4.14 gr)	-
3 days	46.87	8.69% (0.36 gr)	91.31%

After the three days, the mud cake was checked visually (as seen in the photos below). The mud cake is completely removed (dissolved).

The breaker pill, after being removed from the cell, has a pH of 4.80.

Mud cake 2 hours – 2 mm height before aging	Ceramic disk after 3 days of breaker treatment
	

Utilizing our proprietary ClearBridge™ lost circulation modeling software, Newpark developed a bridging strategy incorporating the TrueCarb™ family of high-performance, acid-soluble, ground marble bridging agents. These materials provide an efficient, cost-effective solution to mitigate downhole losses in the reservoir and are non-damaging to formations while managing the risks associated with lost circulation events.

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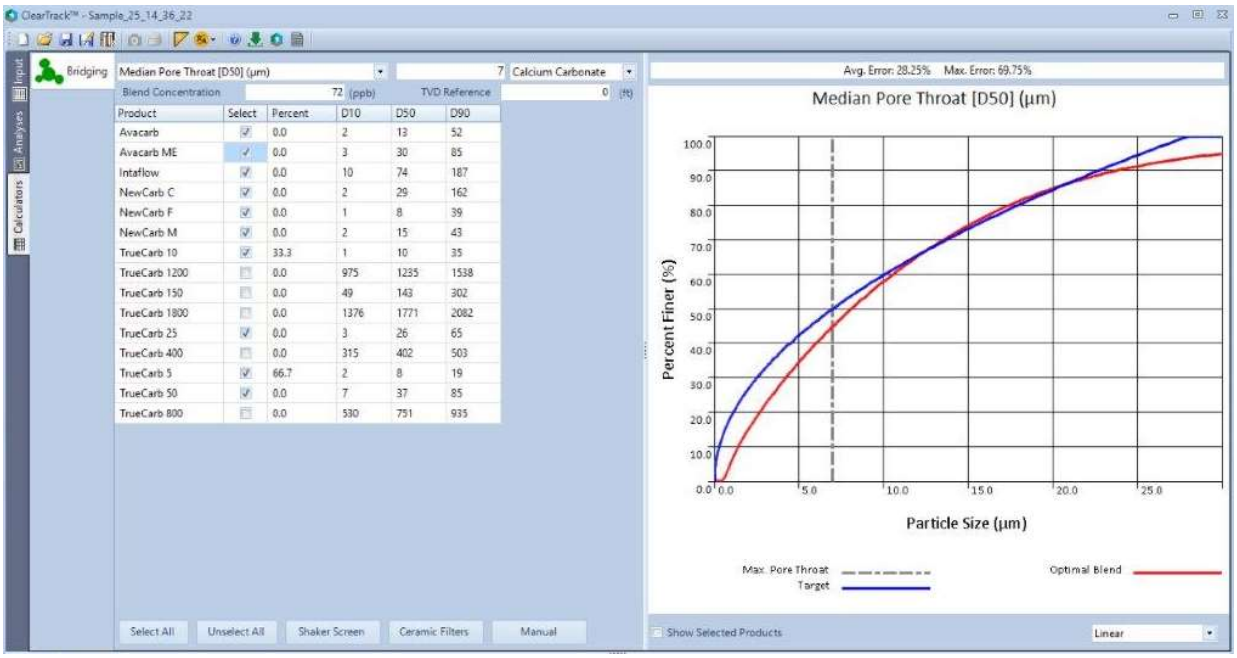

In addition to providing the complete suite of products required for this project, the Newpark scope also included comprehensive laboratory testing support, fully stocked warehouse and a liquid mud plant (LMP) facility.

RESULTS

The reservoir section was drilled in accordance with plan, with zero issues or downtime. The OHGP completion was successfully performed and, as a result of the successful ORCA breaker treatment, no solids were identified during well testing operations.

The integrated fluids solution utilizing non-damaging products eliminated the need for any additional cleanup runs or acid treatment jobs.

In addition to this considerable cost saving, the thorough filter cake removal and successful completion allowed the well to deliver higher than expected production.

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