

DELTA-TEQ low-pressure-impact drilling fluid improved ROP by 48%

An independent national oil company in Brazil required a synthetic drilling fluid for a challenging deepwater well. Located in the Atlanta field in the Santos basin, the well had a water depth of 5,088 ft (1,551 m), a 14¾-in. (375-mm) section with a maximum anticipated density of 9.3 ppg, and inclination build up from 48 to 88°, landing at the top of the unconsolidated sand/sandstone reservoir. Constant rheology, lower viscosity, and fragile gel strength had to be maintained to promote effective hole cleaning and a successful casing run, while minimizing pressure impacts to protect the formation.

The fluid also needed to withstand high-pressure-high temperature (HPHT) conditions, improve equivalent circulating density (ECD), and manage pressure spikes compared to offset wells drilled with a paraffin-based conventional drilling fluid. The operational drilling window was narrow with pore pressure at approximately 8.8 ppg and formation integrity at 10.1 ppg. Reactive shales and soft formations were expected with risk of lost circulation. An accurate hydraulics analysis had to be performed to aid in eliminating downhole losses and nonproductive time (NPT).

Based on these challenges, Baker Hughes, a GE company (BHGE), recommended the

DELTA-TEQ™ low-pressure-impact drilling fluid. The DELTA-TEQ fluid is a non-aqueous, advanced formulation of specialized clay and polymers that creates a non-progressive gel structure, reducing hydraulic impact with a rapid-set/easy-break profile. This profile maintains fluid integrity if operations are paused, mitigates pressure spikes when circulation resumes, and protects the formation from surge pressures when running casing.

In addition, the DELTA-TEQ fluid has the unique ability to manage hydraulic impact by maintaining the right viscosity in the right areas of the well for optimal hole cleaning and penetration rates without putting excess pressure on the formation. Like a “viscosity clutch,” it engages viscosity at low shear rates and disengages at high shear rates for true optimization.

Excellent performance was immediately observed in the field, enabling smooth directional drilling work with higher efficiency in the **AutoTrak™ rotary steerable system (RSS)** sleeve behavior compared to previous wells.

The DELTA-TEQ low-pressure-impact drilling fluid retained stability throughout a 2,149-ft (655-m) interval and enabled the customer to reach the section's final depth at 9,258 ft (2822-m), making the entry into the reservoir



Challenges

- Deepwater well
- Pressure spikes
- Inclination build up from 48 to 88°
- HPHT conditions
- Reactive shales and soft formations

Results

- Improved ROP 48%
- Increased flow rate 14%
- Maximized drilling efficiency
- Eliminated NPT and downhole losses
- Maintained adequate pressure and temperature controls
- Achieved total depth of 9,258 ft (2,822-m)

with stable borehole conditions with no downhole losses or NPT. The DELTA-TEQ fluid facilitated a reliable and precise steering response with the AutoTrak RSS in order to meet critical wellbore construction requirements for the installation of a submersible pump during completion.

The DELTA-TEQ low-pressure-impact drilling fluid allowed the customer to increase flow rate by 14% and ROP by 48% compared to offset wells without significantly impacting pump pressure, ECD, and torque and drag. Furthermore, the DELTA-TEQ fluid reduced annular pressure variations by 47% compared to offsets, which confirmed the low-impact characteristics of the fluid.

For more information, visit bhge.com/delta-teq.



bhge.com

Copyright 2017 Baker Hughes, a GE company, LLC ("BHGE"). All rights reserved. The information contained in this document is company confidential and proprietary property of BHGE and its affiliates. It is to be used only for the benefit of BHGE and may not be distributed, transmitted, reproduced, altered, or used for any purpose without the express written consent of BHGE.

Baker Hughes reserves the right to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your BHGE representative for the most current information. The Baker Hughes logo, DELTA-TEQ and AutoTrak are trademarks of Baker Hughes, a GE company, LLC. GE and the GE Monogram are trademarks of the General Electric Company.