

# Inhibitive Seawater-Based Fluid Saves US\$130,000 on Offshore Well

## 36 HOURS SAVED IN RIG TIME

OFFSHORE TABASCO, MEXICO

### CHALLENGE

Offset data showed reactive clays, high torque and drag, stuck pipe, and lost circulation on wells drilled with KCl-based fluid.

### SOLUTION

Baroid designed a seawater-based fluid that provided powerful inhibition of clays, effective bridging of fractures, and a low-cost base fluid that was readily available.

### RESULT

The interval was drilled, cased, and cemented with zero incidents of stuck pipe or lost circulation, saving PEMEX 36 hours and US\$130,000.

### OVERVIEW

When planning the Tsimin 34 well, PEMEX wanted to optimize multiple aspects of the operation to help ensure a fast rate of penetration (ROP), no lost circulation incidents, and improved logistics related to mud mixing. The upper hole interval contained reactive clays, as well as clay matrix sections where the lost circulation risk was high while drilling and cementing. The initial mud density was 1.08 g/cc (9.0 ppg) and the maximum expected density was 1.14 g/cc (9.5 ppg) at 800 m true vertical depth (TVD).

### CHALLENGE

Offset wells drilled with basic potassium chloride (KCl) fluids had encountered lost circulation, backreaming, stuck pipe, and torque and drag issues causing slow drill rates. The lost circulation incidents required large amounts of additional water for rebuilding the lost mud volumes; for the construction of mud, support vessels were needed to supply water and mixing assistance. PEMEX wanted to overcome these issues on the Tsimin 34 well by using a drilling fluid customized for these specific conditions.

### SOLUTION

The Baroid team conducted extensive lab testing to develop an inhibitive fluid that could deliver reliable polymer performance at relatively elevated temperatures. Since water additions had become a problem in prior wells, the new fluid was seawater-based to ensure that an ample and economical supply of water was available. The inhibitive properties of the proposed fluid were tested by using formation samples to confirm the fluid's ability to stabilize reactive clays.

Two additives were selected to help ensure that the seawater-based fluid would deliver the same or better inhibitive properties as the KCl fluid.

- » **EZ-MUD®** shale stabilizer is a synthetic polymer, dispersed in a liquid carrier, that absorbs onto cuttings and clays on the borehole wall, which helps to prevent dispersion. It is readily soluble in fresh, brackish, or monovalent salt waters, and remains effective up to 300°F (149°C).



HAL41978

*Extensive lab testing resulted in a highly inhibitive seawater-based alternative to conventional KCl fluid.*

The crews were able to prepare 40 m<sup>3</sup> of fluid in 20–30 minutes, due to the easy availability of the seawater and trouble-free blending of liquid additives.

» **CLAYSEAL® PLUS** shale stabilizer is effective in seawater and high-salinity brines, and is suitable for use up to 400°F (204°C). It helps reduce the potential for bit balling and clay accretion on the drillstring, and also facilitates solids removal.

**RESULT**

When the engineered seawater-based fluid was implemented, the drilling performance exceeded expectations with no excessive torque and drag incidents or stuck pipe. Tripping and backreaming time were significantly reduced. The ROP was consistently higher when compared to offset wells. The system exhibited excellent hole-cleaning effectiveness, and no lost circulation events occurred.

Before the casing was run and cemented, bridging agents were added to the fluid to help seal off the fractures that might cause lost circulation. This treatment, based on engineered particle size distribution, was a success. There were zero losses during the casing and cementing operations.

Logistically, the use of seawater as the base fluid created many efficiencies and cost savings. Approximately 80 percent of the additives used to create the fluid system are in liquid form, which simplified mixing operations. The crews were able to prepare 40 m<sup>3</sup> of fluid in 20–30 minutes, due to the easy availability of the seawater and trouble-free blending of liquid additives. This approach also eliminated the need for support vessels to provide fresh water and mixing assistance.

All these optimization efforts combined to reduce rig time by 36 hours, for a savings of US\$130,000.

The infographic features two circular icons with dashed red borders. The left icon contains the text 'NO LOST CIRCULATION' and is surrounded by a circular arrow. The right icon contains the text 'NO STUCK PIPE'. Below these icons is a dark grey banner with a scalloped top edge containing the text 'SEAWATER-BASED FLUID US\$130,000 IN COST SAVINGS'.

[www.halliburton.com](http://www.halliburton.com)

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H012158 3/16 © 2016 Halliburton. All Rights Reserved.