Operator Drills 6” Section in High Temperature Limestone Reservoir with Customized Fluid System

BARAFLC® W-950 IN HPHT WBM MAINTAINS STABLE FLUID PROPERTIES AFTER 183-HOUR STATIC PERIOD AT 300°F DUE TO COVID-19 SHUTDOWN

OFFSHORE ABU DHABI, UNITED ARAB EMIRATES

CHALLENGES

- Drill 6-in. interval through high temperature (HT) reservoir formations
- Run liner to bottom without issues
- Prevent fluid stability issues
- Due to COVID-19, operations were suspended, which required the fluid to remain stable in the wellbore more than 7.5 days

SOLUTIONS

Halliburton Baroid prepared a DOS, with the following engineered fluid solution:

- Customized HT fluid system with BaraFLC W-950® to address well challenges
- A pill treatment with additional BaraFLC W-950® and scavengers to provide extra fluid stability for extended static times

RESULTS

- Provided target fluid properties for the section while drilling, through to liner running operations
- Minimal change in fluid properties after 183 hrs of static time

OVERVIEW

A major operator in the U.A.E planned to drill a high temperature (HT) limestone reservoir section, ranging from 300°F to 320°F bottomhole static temperature (BHST), with a 10.5 ppg water-based fluid. The primary goal was to provide stable drilling fluid properties while conducting flawless drilling, logging, and liner running operations.

CHALLENGE

The biggest challenge in drilling this 6-in. section was the expected high bottomhole temperatures. A fluid with stable rheology and filtration properties would be critical to meet the various operational requirements. Both the operator and Baroid Technical Team understood the necessity for extended stability of the fluid system in the event of a temporary, unforeseen shutdown as a consequence of COVID-19 impact on operations.

SOLUTION

Based on offset well experience, Baroid proposed a customized HT water-based mud (WBM) with BaraFLC® W-950 synthetic filtration control polymer for the application. Extensive fluid qualification testing was performed to validate the HT fluid formulation was suited to the job specifications. Baroid presented the operator with a detailed Design of Service (DOS) document, including the HT WBM formulation and associated engineering guidelines for smooth execution of drilling fluid services.

PROJECT DETAILS

With the HT WBM prepared as per DOS guidelines, the 6-in. hole was successfully drilled to section total depth (TD), with no issues and minimal change to fluid properties, at a confirmed BHST of 300°F. An 80 bbl pill was prepared on surface, supplemented by fluid loss control additives and extenders. The pill was spotted in the open hole before tripping out for logging operations.

Two wireline logging runs were performed, and the fluid was left static for 65 hours during the first run and 72 hours in the second run. A wiper trip was performed after each logging run, and bottoms up properties indicated negligible changes to key fluid properties.

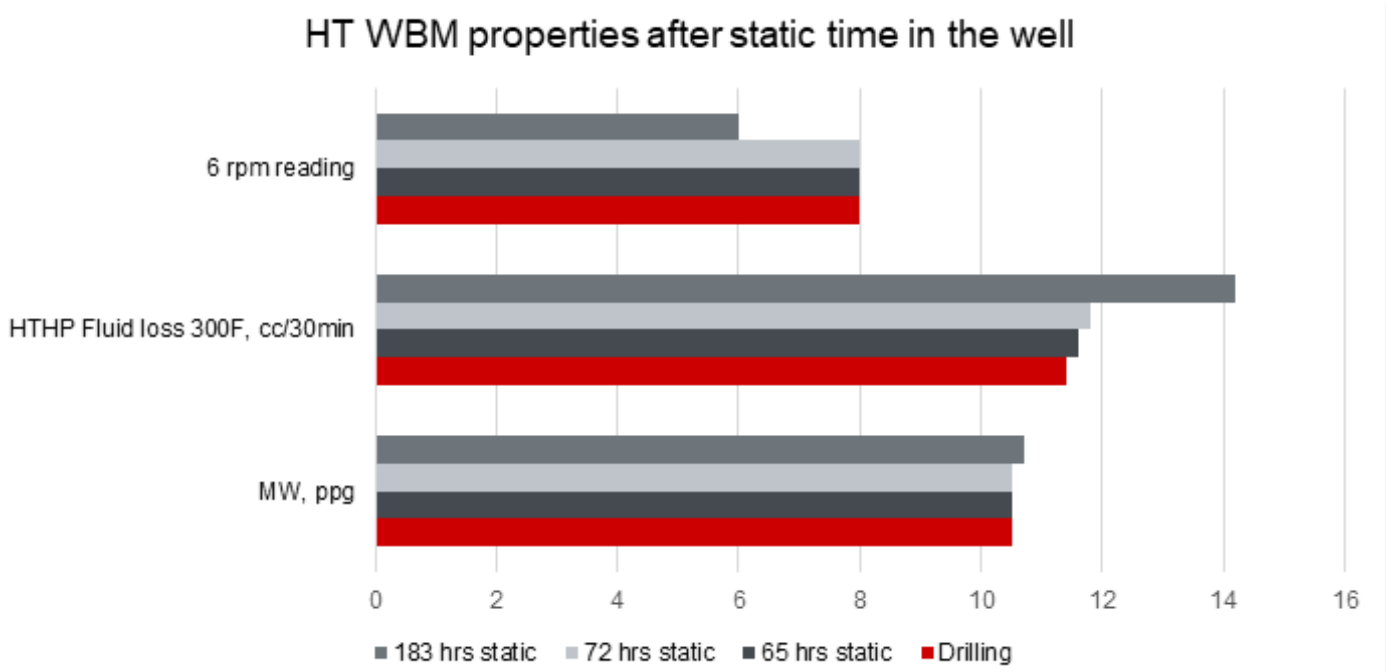
The 4.5-in. liner was run to TD without incident and cemented in place. However, once the liner was cemented, the operations were suspended to protect personnel from suspected COVID-19 exposure. The shutdown lasted approximately 183 hours, during which time the

HT WBM was left static in the liner.

Once operations resumed, a 3.75-in. clean-out assembly was made up and run in hole; and while on bottom, the 4.5-in. liner was circulated. A bottoms up fluid sample was taken from the flow line, which confirmed that the HT WBM properties were stable during the extended static phase.

RESULT

The operator maximized wellbore value with the stability of this customized fluid system, and especially the resilience of BaraFLC® W-950 when exposed to high temperatures for extended static periods. Baroid continues to successfully deploy the HT WBM formulation with BaraFLC® W-950 in this field.



Graph shows stability of HT WBM properties, even after 183 hours of static time in the well during COVID-19 shutdown.

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