Applied Fluids Optimization (AFO) service helps to avoid costly NPT in deviated GOM deepwater well

Location: Gulf of Mexico

OPERATOR’S CHALLENGE – The principal challenges on this well were to maintain equivalent circulating density (ECD) below Leak-Off Test (LOT) value and to avoid Non-Productive Time (NPT). The wellbore contains a 56-degree hole angle, typically more difficult to clean, and had reached a depth of 12,969 ft in Gulf of Mexico (GOM) shale. Pack-off and lost returns had been problems in the past in this area, so the company was especially keen to avoid them happening again. The surface fluid density at the time of the event was 12.65 lb/gal. Bottom-hole circulating temperature was 127°F at a pressure of 8,400 psi.

HALLIBURTON’S SOLUTION – Applying real time wellbore assurance solutions used in Halliburton’s Lafayette Remote Operations Center (ROC) enabled the Baroid team to recommend a course of action. Baroid’s Applied Fluids Optimization (AFO) services allows AFO specialists to use Drilling Fluids Graphics – Real Time (DFG RT™) software to interpret the situation in real time, enabling the operators to respond quickly and appropriately.

The AFO Monitoring Service provides around-the-clock monitoring and analysis of drilling operations, with solutions from pre-defined workflows, resulting in real-time detection of events and, therefore, real time avoidance of hazards.
AFO specialists observed that the rate of penetration (ROP) increase from +/-100 ft/hr to +/-140 ft/hr with a steady flow rate of 890 gal/min could lead to a cuttings load increase from 3.08% to 8.23% and a corresponding ECD increase of almost 0.3 lb/gal. The LOT at the last casing show was 13.37 lb/gal.

Since DFG RT™ simulations had predicted significant increases to the cuttings load and ECD, the AFO specialist declared a level yellow intervention* (indicating a potential threat to well operations) and sent notifications as per the job communication plan. Prior to action being taken, the pressure-while drilling ECD had been increasing, and the cuttings load had increased to nearly three times the maximum recommended by Baroid. This validated the accuracy of the DFG RT simulations. The rig operators reduced the ROP to +/-100 ft/hr, and the threat was avoided.

**ECONOMIC VALUE CREATED** – By reducing the ROP, the operators reduced the cuttings load in the wellbore, helping to avoid a potential pack-off, stuck pipe, and/or lost returns. Such events could have resulted in problems ranging from a few hours of lost drilling time to the loss of the well interval and having to sidetrack the well.

The company representative on the rig saw the documentation of the incident and wants to see more of the DFG RT™ software results. The AFO Monitoring service could become a regular service on this rig, continuing to aid in keeping its operations running smoothly.

* A “Green” level intervention is the lowest level intervention and indicates an “information only” communication.
* A “Yellow” level intervention is an intermediate level intervention and indicates a “warning” communication.
* A “Red” level intervention is a top level intervention and indicates an “immediate action needed” communication.