

BBT Field Development Optimization - The Use of High Performance (Polyamine) Water Base Mud for Optimum Drilling Performance

Amine Boubekri¹, Jamel Beltaief², Hichem Tagougui², and Rim Ghali²

¹Schlumberger, Algeria

²ATOG, Tunis, Tunisia

Abstract

As an operator, the key success of a drilling project resides in 20-30% of the cases in a well-engineered drilling fluid program; the integration of new drilling muds and in particular the “polyamine system” has advantages over conventional water based mud and in some functions are as good as oil based mud, and more cost effective. One of the features to be considered for selecting a drilling fluid is the cost associated with logistical and environmental issues. In the BBT field over 20 wells have been drilled with different drilling fluid systems and the performance recorded either for invert emulsion fluids or water-based fluids. From the early time of BBT field development activities, delivering a well on budget and with minimum reservoir damage were the main targets for the operator. The field has a high level of reservoir complexity and therefore any further development plan needs to take in consideration the predicted reservoir characteristics at each location, as well as the well geometry (both vertical and directional). In this respect, the drilling fluid is one of the primary criteria to meet these challenges. Extended lateral sections, lubricity and wellbore stability, shale swelling and dispersion, hole instability and tight hole conditions due to time-sensitive high reactive clays are the main challenges encountered when planning and drilling new BBT wells. The choice of drilling fluid can help to overcome these issues and deliver optimized cost. Invert emulsion drilling fluids are known to be expensive, therefore finding a water based mud that can provide similar performance to low toxicity, oil based mud ensures that the wells can be drilled cost effectively and with minimal waste. In evaluating mud systems the main requirements were ensuring good rate of penetration (ROP) and lubricity and minimizing fluid loss and shale stability and inhibition. In this case study the HydraGlyde drilling fluid system was selected to overcome the challenges. The formulation was further optimized to minimize environmental impact, reduce cuttings and disposal requirements. The enhanced lubricity is planned to increase the ROP and reduce the total drilling days. In turn this will lead to improved performance, reduced cost and minimize the environmental impact. This paper will discuss the application of high performance “polyamine based” drilling fluid by listing the key performance indicators including: inhibition capacity, ROP, non-productive time related to hole stability and reservoir damage.