Abstract

The objective of this study is to optimize the drilling performance in the Tharjath oil field in order to increase the penetrations rate by choosing the optimum weight on bit and optimum rotational speed to decrease the cost and time.

The study began with the collection of the required data and information from the White Nile Petroleum Operation Company (WNPOC), Geological Research Authority of Sudan (GRAS) and from the ministry and energy and mining (MEM).

In this study the Z. Aswad mathematical model was selected. Four scenarios were assumed to obtain to optimum penetrations rate ad weight on bit and to obtain the optimum rotational speed on study area.
In the first scenario the weight on bit was kept constant and the rotational speed was varied using a new drilling bit. The penetration rate was found for drilling fluids of different densities. The second scenario was similar to the first one but the drilling bit was partially deteriorated.

In the third scenario drilling fluids of different densities were used but the rotational speed is kept constant while the weight on bit was varied, and assuming new drilling bit the penetration rate is calculated. The fourth scenario is similar to third one but the bit was assumed to be partially deteriorated, the penetration rate was calculated.

The penetration rates obtained from the above scenarios were drawn graphically and analyzed, and then the results were obtained for the optimum weight on bit and rotational speed.

The obtained result can be applied after doing further studies using data for different wells covering all the study area.