

Abstract



Drilling Optimization Simulation Reduces Drilling Cost

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Drilling simulation and optimization tools in drilling engineering was lacking behind the other three petroleum engineering disciplines until a global drilling engineering optimization simulator was developed in the late 1990s. The drilling simulator simulates the drilling of wells in advance using offset wells drilling operational data, lithology description and bit records.

Based on this information the simulator generates drillability or rock strength log, which is correlated to the formations to be penetrated on the new, planned well. The simulation of the new well is done by trying different bit designs, pull depths, combination of bit operating parameters and drilling hydraulics. The most economical bit selection and corresponding operating parameters are then selected and sent to the field.

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During the drilling of the planned wells constant updates are done and the progress monitored, comparing the field data to the pre-planned as well as updating with daily new calculations of critical parameters like bit wear and rock strength.

The past 10 years this approach has been utilized by major operators in the North Sea and Western Canada. The approach has been applied on more than 200 wells with an average depth of 3000m. The results indicate that the drilling learning curve is sharply reduced and that more consistency in the drilling days per well is seen. The cost reduction in total days has been shown to be 15-25 percent in mature fields where more than 10 wells were previously drilled and as much as 40-50 percent in areas where less than 5 wells were drilled.

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This presentation will give the general information about the development and functionality of the drilling simulator technology and how it has been and currently is applied with sample field cases.

The main idea for the members to take away from this presentation is that the drilling simulation is here to stay with real time applications and that large drilling cost saving are possible today by application of this simulation technology.