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| Please fill in your manuscript title. | An Integrated Well Monitoring and Placement Approach in Emerging Unconventional Plays: When Geoscience Meets Technology | |
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Abstract

Objectives/Scope:

The primary objective of Geosteering is to place the well in the target window which is defined as a combination of drilling performance and production potential. Using examples of successful unconventional plays in Saudi Arabia, this paper discusses an integrated approach to well execution from spud to total depth that has been implemented through the past few years resulting in drilling more wells that are cost effective with increasing Estimated Ultimate Recovery (EUR). These wells are being executed in less than a month from spud to TD and the laterals are delivered significantly faster.

Methods, Procedures, Process:

Drilling the horizontal wells with Gamma Ray (GR) only is a cost effective solution to horizontal wells geosteering, however in some events it is insufficient for making appropriate decisions. As a result, the absence of the other essential logs have been compensated for by the substantial real-time integration of all available data (structural model, seismic data, mud-logs & drilling parameters) through a cloud-based environment and WITSML real-time data transmission protocols.

An application was introduced for horizontal geosteering that allows interpreting and visualizing the spatial position of the lateral in the True Stratigraphic Thickness (TST) domain using a representative type log assuring the well's placement within the target window. These real-time interpretations across the lateral are being incorporated into a dynamic framework that honors all data from nearby horizontal wells. The combination of the dynamic framework with real-time data produce scientific-based anticipations of the structural and stratigraphic influence on the target window across the lateral allowing for proactive geosteering. Such anticipation is represented by a target line for the directional driller to follow which leads to maintaining the well in the desired zone with higher Rate of Penetration (ROP) and minimized well tortuosity that meets the stimulation requirements.

Results, Observations, Conclusions:

In conclusion; the above approach where data, interpretations and decisions are being integrated with all stakeholders, on the fly, through a cloud-based environment along with real-time data transmission has reduced the time from data being acquired through the execution phase. In addition, this approach of incorporating all available data in a dynamic framework resulted in higher level of quality work with cost-effective manners.