Remote Operating Centers Successfully Optimize Geosteering Efforts to Maximize Exposure in Extremely Thin Clastic Reservoir

Location: Middle East

OPERATOR’S CHALLENGE – An operator drilling through complex shale and sand formations required accurate real-time information to navigate to a sandstone target zone of a mere three feet (one meter) true vertical depth, sandwiched between two shale zones.

HALLIBURTON’S SOLUTION – Sperry Drilling services implemented the ADT® applied drilling technology drilling optimization service to guide performance of a Geo-Pilot® rotary steerable system and triple combo logging-while-drilling (LWD) suite with an InSite ADR® azimuthal deep resistivity sensor, using StrataSteer® 3D geosteering service, planning and executing operations through a remote operating center (ROC).

ECONOMIC VALUE CREATED – Following the process of “model, measure, and optimize,” Sperry Drilling’s experienced StrataSteer service specialists helped the customer achieve very high reservoir contact in the thin clastic formation, placing the wellbore within the narrow target with maximum 100 percent reservoir contact.

EXTREMELY THIN RESERVOIR PRESENTS CHALLENGING GEOSTEERING TARGET – In a Middle East field, a light oil producer well in a clastic formation required geosteering to a narrow three-foot (one-meter) deep sandstone target sandwiched between two shale zones. The extremely thin reservoir also has a modulating dip that can change dramatically within a short vertical section, and commonly thins out in this area of the field.

With such a difficult target zone, the need for accurate, high-quality real-time data is critical to successfully navigate the wellbore to target depth and remain within the narrow zone to maximize reservoir exposure.

Coordinating efforts through the ADT service from a ROC, Sperry Drilling provided an LWD triple combo suite with the Geo-Pilot system, using the ADR sensor to identify changes in thickness vertically and laterally for more precise wellbore placement within the target zone.

COORDINATED TEAMWORK OPTIMIZES PERFORMANCE, START TO FINISH – With the ADT service, Sperry Drilling was able to create a team focused on the customer objectives, integrating real-time LWD monitoring and engineering support combined with geosteering and petrophysical support.

The ADT service provided pre-well, real-time, and post-well support from two separate locations. The directional drilling engineering team provided all pre-well BHA design and modeling, torque and drag analysis, and hydraulics analysis.
prior to mobilization to ensure BHA performance was available when geosteering decisions were made, while maintaining acceptable ROP. High vibration levels likely to damage the toolstring also required constant monitoring and mitigation.

Real-time geosteering specialists were located at the customer’s location, and real-time monitoring and intervention for LWD and ADT optimization services were conducted from the ROC. This arrangement enabled the Sperry Drilling geosteering specialists to maintain constant communication, and effectively linked the Sperry geologists with customer geologists.

‘MODEL-MEASURE-OPTIMIZE’ PROCESS – Following the process of “model-measure-optimize”, Sperry Drilling geosteering specialists used geosignals from the InSite ADR sensor to identify changes in reservoir thickness vertically and laterally, continuously refining the wellbore trajectory.

Through real-time operations, the customer had continuous, uninterrupted access to and support of geosteering geologists, who also served as geosteering advisors at times, which further assisted in execution of the well.

By continuously delivering the right decision at the appropriate time to the directional drillers, the geosteering team was able to eliminate any unnecessary time to build or drop angle, enabling precise geosteering for optimum wellbore positioning within the reservoir “sweet spot.”

As a result, Sperry Drilling increased the reservoir exposure of the very thin reservoir, outperforming all competitors by achieving 100 percent net reservoir contact in the extremely thin reservoir.

With this success, application of the ADR azimuthal deep resistivity sensor has now become a requirement in this field.