

CASE HISTORY

OPTIMIZING LATERAL LENGTH WITH ACOUSTIC SENSORS IN ULT TOOL

APPLICATION

Geosteering
 Engineered Completions
 Wellbore Imaging
 Sourceless Porosity Measurement

TECHNOLOGY

- Logging While Drilling (LWD)
- + Unconventional Logging Tool (ULT)
 - + Wave Propagation Resistivity (WPR)
 - + Pressure While Drilling (PWD)
- Measurement While Drilling (MWD)
- + Falcon MP MWD

LOCATION

Permian Basin,
 Texas

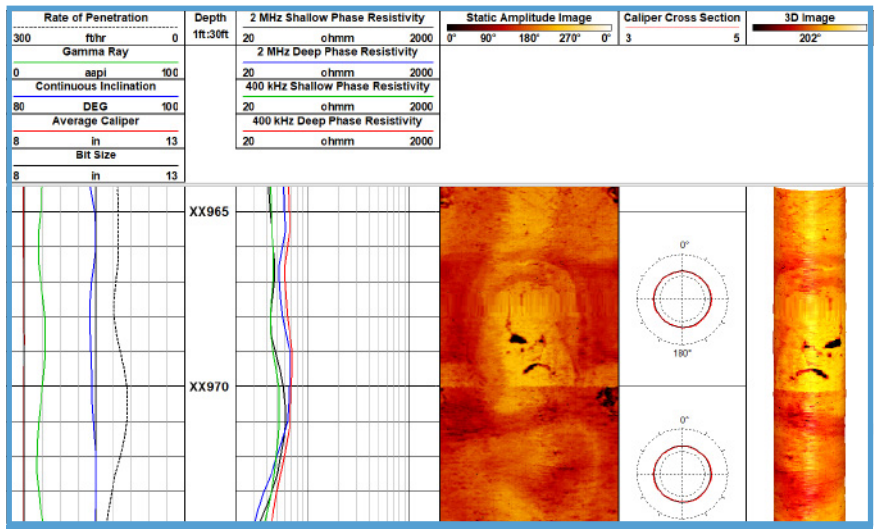
CLIENT CHALLENGE

A major Permian basin operator was set to drill an appraisal well in a newly acquired oil/gas lease. The completion plan for the horizontal section was to have at least 5000' of lateral wellbore placement in the highest porosity zones of the target formation. The natural gamma radiation from the limestone formation was relatively low, so reliable LWD resistivity measurements in real-time would be required to stay in their target zone. Log correlation between LWD porosity and LWD resistivity was also going to be implemented in the lateral length determination.

SCIENTIFIC SOLUTION

For real-time geosteering and wellbore surveying, Scientific Drilling International's (SDI) Falcon Mud Pulse MWD system was deployed for accurate and reliable data transmission. In addition to providing six-axis survey data, the MWD system was equipped with Pressure While Drilling for real-time monitoring of ECDs and mud weight optimization.

Since both Gamma Ray and Resistivity were required for geosteering, SDI's WPR system was interconnected with the Falcon MP MWD system for accurate Deep Phase Resistivity curves in both 2Mhz and 400kHz frequencies. This dual frequency, dual spacing, and fully compensated resistivity collar provided the geosteering team with the formation measurements reading over 6ft away from the wellbore.



High-resolution LWD log from ULT memory which shows Gamma Ray, Resistivity, Ultrasonic imaging, and caliper outputs in the lateral portion of the wellbore.

To image the wellbore in the oil-based mud system and provide sourceless porosity measurements of the reservoir, SDI's ULT tool was also included in the BHA between the MWD and Resistivity collars. This unique LWD tool employs an integrated sensor design for optimal BHA bit-to-sensor distances and lowers the overall cost of running LWD tools. With its capability of logging both ultrasonic images and traditional unipole acoustic waves, this technology was able to reduce the risk of running nuclear sources downhole for porosity measurements and logged high-quality images of the borehole wall for fracture evaluation.

CLIENT VALUE

By running LWD technology for gamma ray, resistivity, ultrasonic imaging, and unipole sonic, the operator was able to steer the well in the high porosity zones while fulfilling the completion requirement of having 5000ft of vertical section in the thin target zones. Since the ULT's unipole sonic was able to measure the porosity of the formation, the operator did not need to run nuclear sources in the drilling BHA, therefore lowering risk and reducing costs.