

CASE HISTORY

AT-BIT INCLINATION ALLOWS CONSISTENT CURVE DOGLEGS FOR FIBER OPTIC CASING

APPLICATION

Geosteering
 Curve Dogleg Consistency
 Fiber-Optic Production Casing
 Multi Well/Pad Drilling

TECHNOLOGY

Directional Drilling
 + TiTAN22 6.60" 4/5 7.0 Performance Drilling Motor
Logging While Drilling (LWD)
 + Smart Motor Mandrel-Integrated Azimuthal Gamma Ray/Inclination sensor
Measurement While Drilling (MWD)
 + Falcon MP MWD

LOCATION

South Texas,
 Eagleford Shale

CLIENT CHALLENGE

An operator in South Texas was planning to run fiber-optic cables during a production casing operation in order to monitor production. Keeping doglegs consistent was key to ensure the fiber-optic cables were not damaged while production casing was tripped to bottom. Their geosteering program also called for landing low in their target window at the bottom of the reservoir, but not penetrate the formation directly below.

SCIENTIFIC SOLUTION

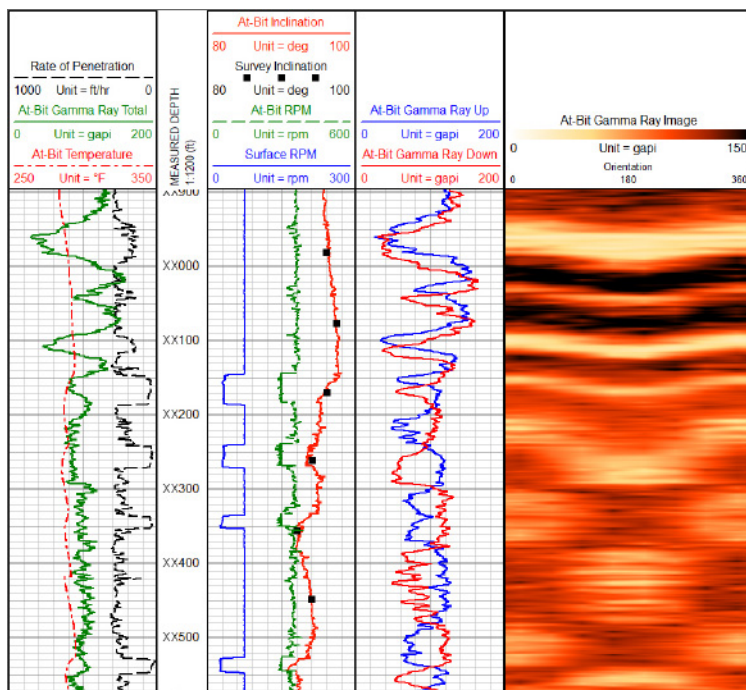
For real-time monitoring of motor dogleg output, Scientific Drilling International (SDI) provided at-bit inclination sensors included in the TiTAN22 Smart Motor package, powered by SDI's BitSub electronics. This new instrumented motor design integrates the at-bit electronics of the BitSub inside the motor mandrel, allowing for higher allowable motor bends.

To drill the planned 7°/100 curve section, a high-speed 4/5 7.0 power section with a 2.12° motor bend was selected. At-bit gamma ray and inclination were pulsed to surface via Scientific Drilling's Falcon MWD system. This system utilizes a proprietary Wi-Sci EM short-hop technology to establish the bi-directional communication between the MWD tool and the at-bit electronics. The proven short-hop technology works in both water and oil-based mud systems and is compatible with many mud motor power sections.

CLIENT VALUE

With its at-bit inclination measurements, Scientific Drilling's Smart Motor provided the operator with the ability to proactively monitor motor yields to ensure they did not get ahead of plan and put large doglegs in the curve section.

Keeping the curve doglegs under 10°/100 allowed smooth casing running operations and prevented damage to the fiber optic cables. Doglegs in the curve averaged 6.79°/100 with a maximum of 8.31°/100. The curve was landed on target and the assembly was drilled to the planned coring point halfway through the lateral. After coring runs were finished, a new instrumented Smart Motor with a 1.50° bend was picked up and utilized until total depth was reached. Real-time azimuthal gamma ray at the bit allowed precise geosteering and well placement, even with bottom-hole temperatures reaching as high as 318° F (159° C)



1" MD At-Bit Gamma Ray Image Log showing cutting up section stratigraphically from XX000 to XX300, then traveling parallel with the structural dip from XX300 to XX550.