Integrated Rotary Steerable BHA Saves 9 Drilling Days in West Africa

Slimhole PowerDrive Archer RSS with SHARC bit drills well in one trip to save approximately USD 1.4 million

**CHALLENGE**

Drill 6-in hole section, with a 7°/30-m curve and lateral section to TD, through unconsolidated sands while minimizing the number of trips.

**SOLUTION**

Design integrated BHA with a 4 3/4-in PowerDrive Archer* high build rate rotary steerable system (RSS) and 6-in SHARC* high-abrasion-resistance PDC drill bit by Smith Bits, a Schlumberger company, to ensure desired curve and reliable control.

**RESULTS**

- Landed the well horizontally by delivering 7.3°/30-m curve.
- Avoided three trips, compared with previous efforts.
- Saved 9 days of drilling time, approximately USD 1.4 million.

**Slimhole well needed in unconsolidated sand formation**

Attempting to drill 6-in horizontals through an unconsolidated formation with a conventional RSS, an operator encountered a number of challenges in West Africa. The RSS system in use produced an insufficient build rate, resulting in the need to use a motor BHA to land the well. The use of a motor entailed an additional trip to replace the motor BHA with a rotary steerable BHA to drill the lateral section. This method meant another trip was often required with a positive displacement motor (PDM) to correct trajectory in the lateral because of the conventional RSS’s inability to hold inclination in the loose formation.

Drilling these sections generally required four trips and 15 days. The operator wanted a reliable RSS assembly with precise directional control that could drill the curve to land the lateral at TD while reducing trips and minimizing hole washouts.

**Hybrid rotary steerable BHA designed for the project**

Schlumberger proposed an integrated drilling system beginning with the PowerDrive Archer RSS as the drive system. This hybrid RSS has push- and point-the-bit technology and a high turning radius that could ensure the delivery of a moderate dogleg in the unconsolidated formation.

The adnVISION* azimuthal neutron density service was included to provide geological information and formation dip with real-time LWD to keep the lateral wellbore’s trajectory in the reservoir target. The IDEAS* integrated drillbit design platform specially designed a 6-in SHARC MDSi613 PDC drill bit for use with the PowerDrive Archer RSS. SHARC bits are designed to increase directional performance and BHA stability. i-DRILL* engineered drilling system design was used to map the BHA’s behavior in expected shale and sand formations to mitigate potential vibration. In addition, modeling based on finite element analysis was used to designate the proper drilling parameters to minimize shock and maximize ROP.
CASE STUDY: PowerDrive Archer RSS with SHARC bit reduces drilling time by 9 days, saves USD 1.4 million

Drilling time reduced by 9 days, saving USD 1.4 million
The 4¾-in PowerDrive Archer BHA successfully drilled out the shoe, landed the well by drilling the 100-m curve at 7.3°/30 m, and drilled through the lateral to TD in one trip. For this well, compared with previous wells drilled using motors for the curve and rotary steerables for the lateral, the number of trips was reduced by three and drilling time reduced by 9 days, saving the operator approximately USD 1.4 million.

Contact your local Schlumberger representative to learn more.

PowerDrive Archer 475 RSS is run with custom-designed PDC drill bits to ensure top performance and durability in long runs.