Drilling System Saves 18.5 Rig Days in Eastern Siberia

Integrated BHA increases average ROP and meters drilled on three wells, setting drilling performance records

**CHALLENGE**
Increase directional drilling performance for 8½-in well sections in eastern Siberia.

**SOLUTION**
- Design a BHA that includes an 8½-in SHARC* high-abrasion-resistance PDC drill bit fitted with ONYX II* premium PDC cutters run on PowerDrive X6* rotary steerable system (RSS), PowerDrive vortex* powered RSS, and PowerPak* steerable motors.
- Use ASPHASOL† shale inhibitor to stabilize shale sections.

**RESULT**
- Drilled multiple 8½-in sections, increasing average ROP, meters drilled, and meters drilled per circulating hour.
- Saved 18.5 rig days on three wells.

**Increase ROP and drill farther in Siberian field**
An operator drilling in eastern Siberia wanted to increase ROP and drill more meters per run in a field characterized by
- extended salt intervals prone to excessive washout
- hard dolomites and limestones in which drilling produces severe vibrations
- an unstable argillite shale that often results in stuck drillstrings and less directional control.

The operator’s previous drilling efforts in the field using bits on a positive displacement motor had resulted in low ROP, disappointing run lengths, and poor borehole quality that often prevented running casing efficiently.

**Optimize BHA for greater durability**
Schlumberger used the IDEAS* integrated drillbit design platform to optimize an 8½-in SHARC MDSi716 PDC bit, which was fitted with ONYX II premium cutters for superior resistance to abrasive wear and thermal degradation. The bit design included a row of backup cutters positioned to provide maximum durability in the nose and shoulder areas of the bit’s cutting structure without compromising ROP.

The SHARC bit from Smith Bits, a Schlumberger company, was run on PowerDrive X6 and PowerDrive vortex RSSs for accurate wellbore placement, borehole quality, and additional torque. ASPHASOL shale inhibitor from M-I SWACO, a Schlumberger company, was used to stabilize shale sections and control solids dispersion.

**Increase ROP, save rig time**
The average ROP in the field increased from 6.53 to 21.41 m/h, and meters drilled per circulating hour increased from 4.77 to 12.61.
Directionally drilling 2,644 m in Well 1 marked the longest single run in the field, surpassing the previous record by approximately 300 m and saving 10 rig days.

The extended-reach directional drilling operation in Well 2 resulted in drilling a 3,824-m lateral in a single run, which was a 50% increase in meters drilled that allowed the operator to reach TD 6 days ahead of AFE.

On Well 3, the integrated drilling system achieved an average ROP of 34.1 m/h and 20.5 m drilled per circulating hour. These increases set field records and enabled the operator to reach TD 2.5 days ahead of plan.

ASPHASOL shale inhibitor increased the stability of the shale sections by decreasing drilling torque an average of 10% more than conventional lubricants.