

# AxeBlade Bit Helps Improve Drilling Efficiency Through Hard Carbonate Formation in Eastern Siberia

Ridged diamond element bit delivers record-shattering ROP while drilling through high-UCS formation

**CHALLENGE**

- Improve ROP while drilling the 8%-in curve section through a hard carbonate formation with high unconfined compressive strength (UCS), ranging from 13.78 to 172.37 MPa [2,000 to 25,000 psi].

**SOLUTION**

- Drill with an AxeBlade\* ridged diamond element bit to improve ROP and extend bit durability.

**RESULTS**

- Achieved a 106% increase in ROP compared with the average ROP of offset wells.
- Set three daily length drilled records for Yarakinskoe field, drilling up to 637 m/d [2,090 ft/d].
- Established three field ROP records.

**Drill severe dogleg severity (DLS) through formation with a high UCS**

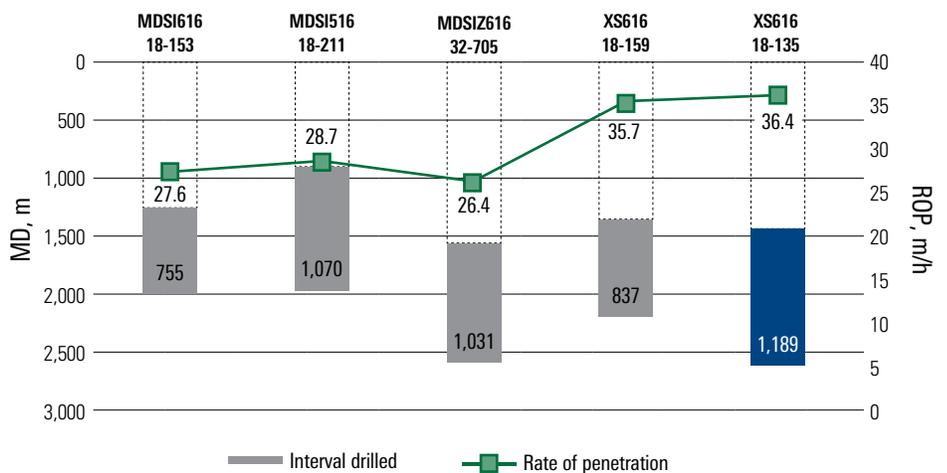
INK-Servis faces a significant challenge while drilling a curve in the 8%-in interval for a well in the Yarakinskoe field, which is located in the Irkutsk region of Eastern Siberia. The depth in and out is within the 1,300- to 2,500-m [4,265- to 8,202-ft] MD range with a length of about 1,000 m [3,280 ft]. The DLS is 15° to 40°. The section mainly consists of hard carbonates, such as dolomites and anhydrites, along with salt deposits with UCS ranging from 13.78 to 172.37 MPa [2,000 to 25,000 psi]. Drilling would start from the shoe of a previously drilled section (11½ in with 9½-in casing) and proceed down to a dolerite intrusion formation where, in offsets, the BHA was typically pulled out of hole for a planned bit change.

**Use bit with unique-geometry cutting elements to improve ROP**

Schlumberger used the IDEAS\* integrated dynamic design and analysis platform and determined that an AxeBlade bit with Axe\* ridged diamond elements would drill more aggressively and with better impact and wear resistance compared with conventional PDC cutters. The proposed bit would facilitate higher ROP; enable a more stable drilling experience; and minimize shock, vibration, and cutter wear to maximize drilling efficiency.

**Shattered field ROP records**

Using the AxeBlade bit, INK-Servis achieved a 106% increase in ROP compared with the average penetration rate of offset wells in 2016. ROP improved by 70% in the second run as compared with average results achieved in the first quarter of 2017. Drilled lengths in both runs reached 562 m/d [1,844 ft/d] and 544 m/d [1,785 ft/d], respectively, and set daily drilling records for Yarakinskoe field. Overall, the AxeBlade bit set six field records (3 ROP and 3 daily length drilled).



AxeBlade bits achieved an ROP record of 36.4 m/h while drilling intervals in the Yarakinskoe field.

\*Mark of Schlumberger  
Other company, product, and service names are the properties of their respective owners.  
Copyright © 2018 Schlumberger. All rights reserved. 18-BDT-367040