**Challenge**

- Improve ROP while drilling the 8¾-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 Yaraktinskoe 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 8¾-in interval for a well in the Yaraktinskoe 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 (115/8 in with 95/8-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 Yaraktinskoe 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 Yaraktinskoe field.