

AxeBlade Diamond Element Bit Design Delivers 92% Higher ROP, Drills 6-in Section in One Run

Innovative bit with 13-mm Axe elements saves approximately 40 hours of rig time in Yarakinskoe field

CHALLENGE

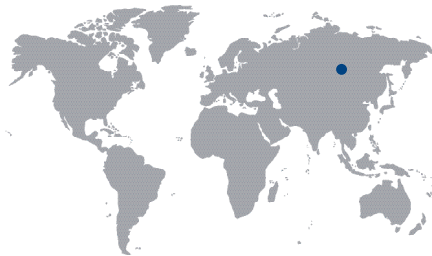
Increase average ROP and maintain bit durability while drilling the horizontal interval in a challenging East Siberian field.

SOLUTION

Implement a modified AxeBlade* ridged diamond element bit design with 13-mm Axe* ridged diamond elements.

RESULTS

- Drilled from shoe to TD in one run using a positive-displacement motor (PDM).
- Increased ROP by 92% compared with offset runs using conventional PDC bits.
- Saved approximately 40 hours of rig time.



Improve ROP and reduce trips in high-UCS formation

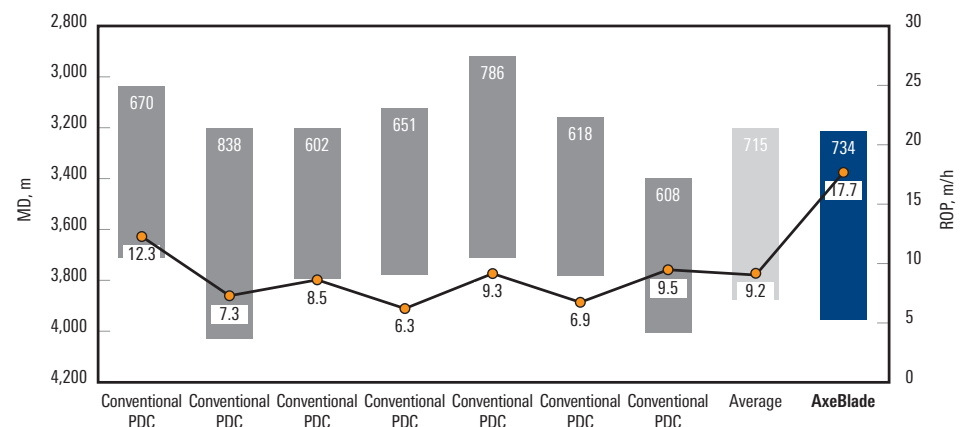
Irkutsk Oil Company (INK-Service) needed to improve penetration rates while drilling the horizontal interval of the 6-in production section in the Yarakinskoe field. Comprised of sandstone interbedded with claystone, the formation has high unconfined compressive strength (UCS), ranging from 68.95 to 172.37 MPa [10,000 to 25,000 psi]. Typical measured depth in and out ranges from 3,000 to 4,000 m [9,843 to 13,123 ft] and inclination ranges from 88° to 90°. Hydraulic horsepower per square inch averages just 0.7 to 1.0 hhp/in²—leading to bit balling, shorter bit life, and poor ROP. In previous drilling campaigns, abrasive wear of the PDC cutters was concentrated in the shoulder area. This led to low penetration rates, dogleg severity issues, and an additional round trip for a bit and BHA change.

Use AxeBlade bit to increase impact resistance and cutting efficiency

Schlumberger used the IDEAS* integrated dynamic design and analysis platform to simulate alternative bit designs and identify optimal drilling technologies. After an extensive study of offset well data, Schlumberger recommended the AxeBlade ridged diamond element bit for improved durability and cutting efficiency. In addition, Schlumberger proposed using new-generation, 13-mm Axe elements—a first for the Yarakinskoe field and one of the first implementations worldwide.

Set record ROP, saved 40 hours of rig time

Using the AxeBlade bit with 13-mm Axe elements, INK-Service successfully drilled 734 m [2,408 ft] from shoe to TD in just one run—eliminating multiple trips and saving 40 hours of rig time. INK-Service achieved an average ROP of 17.7 m/h [58.07 ft/h], nearly doubling the average field ROP of 9.2 m/h [30.2 ft/h]. Additionally, the bit was pulled out of hole in repairable shape with only minor wear in the shoulder area, enabling INK-Service to prolong the life of the tool and mitigate drilling costs.



Using 13-mm AxeBlade diamond element bits instead of conventional PDC bits, INK-Service increased average ROP from 9.2 m/h to 17.7 m/h—an improvement of 92%.

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