Tuha oil field in China
When PetroChina was developing the Tuha oil field, the company faced potentially low production because of the limitations of conventional drilling technology. Tuha is considered one of the most difficult environments to drill because of the hard and abrasive formation in the 6-in slim hole of this tight laminated reservoir. Rig limitations and downhole equipment specifications of conventional technology made steering impossible. Shock and vibration caused severe wear on casing and a high rate of downhole equipment failure. Drilling in this environment pushed the limits of the rig and the downhole equipment specifications.

Schlumberger and Smith Bits technologies
PetroChina contacted Schlumberger for a solution to the problems they were encountering. The PowerDrive vorteX 475 RSS was chosen to overcome the drilling challenges. The PowerDrive vorteX integrated power section rapidly rotates the bit and allows slowing of the drillstring section. Stick/slip and other damaging vibration modes common to conventional rotary drilling are reduced, and all available energy is used to drill the hole optimally. Casing wear and drillstring fatigue are reduced, lessening the chance of drillstring or casing failure.

The IDEAS integrated drillbit design platform by Smith Bits, a Schlumberger company, was chosen to design and test bit behavior in a simulated well environment and provide the optimal bit design for the project. Because of virtual simulation, drill bits certified by the IDEAS design process go from concept to field-proven performance much faster than those designed with traditional processes. For this project, the performance of seven bits was simulated through the IDEAS platform, based on the BHA design for a range of different drilling parameters. Along with the hydraulic analysis, two 6-in optimized Smith Bits directional PDC drill bits were certified to run with the BHA: MDi613 and MDi616.

PowerDrive vorteX 475 RSS delivered top performance, drilling 6 times longer than conventional motors and twice as long as an RSS alone.
New world drilling records
The high-performance PowerDrive vorteX 475 RSS drilled 6 times longer than conventional motors and twice as long as an RSS alone. This RSS combined with Smith Bits customized bits resulted in two new field records for the longest 6-in hole interval and the most rotary steerable hours drilled in a single run in the 6-in hole section. This saved PetroChina six round trips compared to the conventional rock bit drilling and achieved the longest reservoir exposure ever drilled in this thin reservoir area.

Contact your local Schlumberger representative to learn more.