Challenged by an application that consisted of anhydrite and hard interbedded carbonate formations with extended chert inclusions, an operator in Kazakhstan sought a bit solution that would not only provide durability, but also maintain higher speeds than that seen with diamond impregnated bits.

The unconfined compressive strength (UCS) of the formation typically ranged from 10,000 to 20,000 pounds per square inch (PSI), but would spike up to 35,000 PSI when chert was encountered. Typically, PDC bit cutters would experience excessive damage when drilling the chert, so Baker Hughes recommended its heavy-set, eight-bladed 8½-in. Talon™ high-efficiency PDC bit fortified with Baker Hughes Stabilis™ reinforced cutters to tackle the varying formations.

The Talon 8½-in. PDC bit with Stabilis cutter technology, with its stable design, durable profile and efficient cutting structure, provided the strength and speed to outpace competitor impreg bits, hybrid bits, and PDC bits with conical diamond cutters in this difficult chert formation. The Baker Hughes AutoTrak™ V automated rotary steerable drilling system (RSS) ensured the bottomhole assembly would stay on trajectory and drill a vertical hole.

The goal for the first run of the section was to drill 1,870 ft (570 m) until chert content reached 10% with a target rate of penetration (ROP) of 26 ft/hr (8 m/hr). The beginning section of 295 ft (90 m) consisted of hard plastic anhydrite. Following that was a 656 ft (200 m) section through interbedded and hard carbonate formations with chert levels of up to 60%. Total distance drilled...
reached 1,946 ft (593 m), a 4% improvement over the plan. The rate of penetration (ROP) drilled was 32.8 ft/hr (10 m/hr), a 250% increase over previous impregnated drill bit runs, and an increase anywhere from 110% to 200% over competitor PDC type drill bits.

The Talon PDC bit also provided the added benefits of creating larger cuttings than previous impreg bit runs for better lithology identification. The bit also required less weight on bit, reducing torque and mitigating bottomhole assembly damage.

Together, the Talon PDC bit with Stabilis reinforced cutters and the AutoTrak V automated RSS saved the client 5.7 days of rig time that equated to an estimated USD 240,000.