DEEP WATER

MATURE FIELDS

UNCONVENTIONALS

Crush & Shear™ Hybrid Bit Technology Improves Drilling Efficiency in the Curve

CRUSH & SHEAR HYBRID BIT IMPROVES DIRECTIONAL STABILITY WITHOUT SACRIFICING PENETRATION RATE IN THE U.S. MIDCONTINENT REGION

STEPHENS COUNTY, OKLAHOMA

CHALLENGE

Drill curve section in one run, while maintaining directional control at a higher ROP than in offset runs

SOLUTION

Crush & Shear™ hybrid bit technology to achieve steerability without sacrificing ROP

RESULTS

- Successfully completed the curve section of the subject well in just one run
- Achieved an ROP of 25 feet/hour (7.6 meters/hour), beating the ROP in the offset sells by over 5 feet/hour (1.5 meters/hour)
- Reduced the cost of the interval, saving the customer over USD 120,000

OVERVIEW

An 8¾-inch curve interval in a field in Stephens County, Oklahoma, consisted of challenging formations with varying rock strengths. These tough transitions could cause cutting structure damage to the drill bit, making it difficult to maintain toolface control. Many operators in this field struggled to consistently complete the curve section in just one run.

The challenge set by one of our customers was to drill the curve section in a single bit run while maintaining the targeted build rate of 14°/100 feet (14°/30.5 meters) and improving on the offset runs' rates of penetration (ROPs).

TECHNOLOGY ADVANTAGES

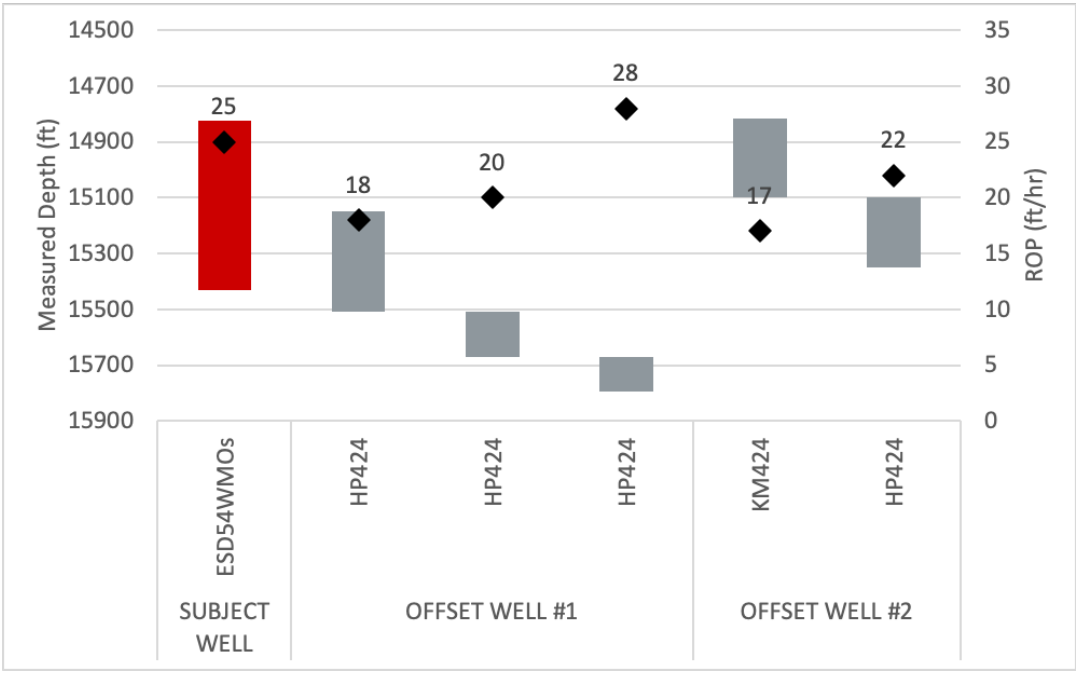
In certain formations or applications, a hybrid drill bit is required to ensure that directional targets are achieved, while also allowing the operator to maintain drilling efficiencies. Hybrid drill bits have been successful in demanding applications where steerability is critical, and/or where durability is required due to formation inconsistencies.

Crush & Shear™ hybrid bit technology is engineered to take advantage of rock failure mechanics while providing lateral stability. It has the ability to withstand high weight on bit (WOB) while reducing torque fluctuations, thus improving toolface control and enabling smoother drilling. The Crush & Shear drill bit reimagines hybrid bit technology by placing the PDC elements in parallel with the rolling elements, instead of in series. By optimizing PDC element placement and positioning rolling cones in the center to crush the rock (where PDC shearing action is inefficient), the Crush & Shear hybrid bit achieves higher ROPs, improves lateral stability, and minimizes torque fluctuations – thus increasing drilling efficiency and extending the life of PDC elements.

RESULTS

For this challenging application, our Crush & Shear technology was utilized to design a bit that could complete a one-bit run curve while still being able to meet the directional and ROP requirements set by the customer.

Utilizing Crush & Shear hybrid bit technology enabled the operator to successfully complete the curve section of the subject well in just one run – achieving an ROP of 25 feet/hour (7.6 meters/hour), beating the ROP in the offset sells by over 5 feet/hour (1.5 meters/hour). Additionally, this solution reduced the cost of the interval, saving the customer over USD 120,000.



Performance Details

Well	Bit Type	Depth In, Ft	Depth Out, Ft	Footage	Hours	ROP
SUBJECT WELL	**ESD54WMOs**	**14825**	**15430**	**605**	**24.50**	**25**
OFFSET WELL #1	HP424	15147	15507	360	19.50	18
	HP424	15507	15669	162	8.00	20
	HP424	15669	15795	126	4.50	28
OFFSET WELL #2	KM424	14815	15100	285	16.50	17

HALLIBURTON