

# Cimarex Energy Saves One Day While Drilling Curve Section on Consecutive Wells, Permian Basin

StingBlade bits complete multiple curve sections at desired 12°/100-ft build rate and with high ROP, New Mexico

## CHALLENGE

Drill 8¾-in curve sections in a highly interbedded formation while achieving desired build rates and high ROP.

## SOLUTION

Use the IDEAS\* integrated drillbit design platform to design fit-for-purpose StingBlade\* conical diamond element bits for improved directional response and dogleg capabilities.

## RESULTS

- Completed the curve section to TD in one run, achieving the desired 12°/100-ft build rate at 30.2 ft/h, 23% faster than the best offset well.
- Repeated performance on the next well, achieving a 12°/100-ft build rate at 30.1 ft/h.
- Achieved an Avalon shale play record for the first fixed-cutter bit to complete a curve section in one run.



## Drill tight curve through hard, interbedded formations

When drilling the Avalon shale play of New Mexico, Cimarex Energy wanted to drill high-dogleg-severity (DLS) curve sections with 12°/100-ft build rate while achieving maximum ROP. The play's highly interbedded lithology includes thick sections of limestone. The unpredictable, transitional nature of the formation was unsuccessfully drilled with conventional PDC bits, and roller-cone hybrid bits had low ROPs and potential reliability issues. For this operation, Cimarex wanted to maximize ROP and build rates to kick off the curve section deeper in the lithology column, landing the borehole at the precise location needed to maximize reservoir exposure in the lateral.

## Accomplish drilling objectives using fit-for-purpose StingBlade bit

Using the IDEAS platform to simulate drillstring and wellbore geometry and to understand the rock-cutter interaction, Schlumberger engineers developed a custom-designed StingBlade Z613 bit with Stinger\* conical diamond elements across the bit face. The Stinger elements' unique conical shape enables drilling with significantly less torque than conventional PDC cutters. This reduces reactive torque fluctuations when drilling directionally, allowing StingBlade bits to stay on target with better toolface control and achieving higher build rates with fewer adjustments by the directional driller. Stinger elements also apply a higher concentrated point load on the rock, and the thicker diamond layers enhance impact strength and wear resistance. The result is longer runs at higher ROPs in challenging applications that cause damage to conventional bits.

For cost-effective, high-performance steerable drilling, Schlumberger positive-displacement motors were used. Also included in the drillstring was the SlimPulse\* retrievable MWD service for real-time direction, inclination data, and gamma ray measurements from mud pulse telemetry. This integrated solution was designed and optimized to efficiently achieve Cimarex's directional drilling objectives.

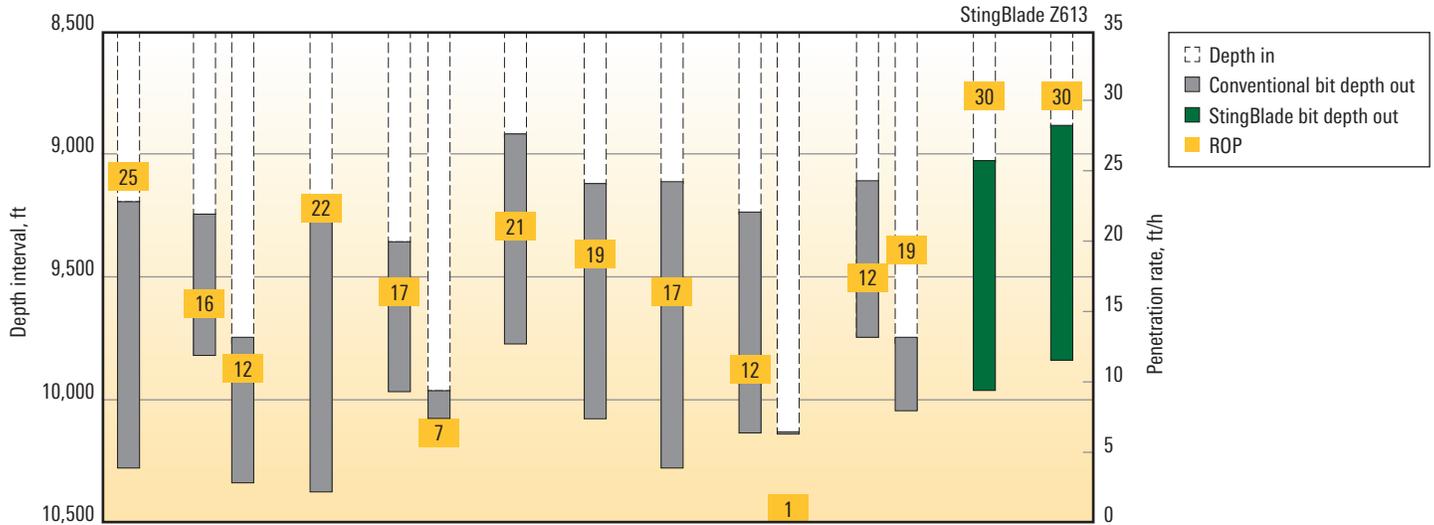


*StingBlade bits have Stinger elements placed across the bit face, enabling operators to drill with less torque compared with conventional PDC cutters.*

**Reached TD in one run, achieved record ROP**

The StingBlade bit drilled the curve section in one run with an overall ROP of 30.2 ft/h, 23% faster than the best offset drilled with a roller-cone hybrid bit. This was the first time a fixed-cutter bit completed a curve in the Avalon shale play in one run, setting a new record. The curve was completed at a build rate of 12°/100 ft, achieving the tight curve geometry needed to land early in the reservoir, with excellent steerability noted by the directional driller. The StingBlade bit also eliminated the risk of lost cone incidents and costly fishing trips.

Based on the initial run, Cimarex chose to use another StingBlade bit on the next well it drilled. The next StingBlade matched performance of the previous well, completing the curve section in one run at 12°/100-ft build rate with a high ROP of 30.1 ft/h. This back-to-back performance proved StingBlade bits can complete curve sections, with one bit, that were previously drilled unsuccessfully with conventional PDC bits.



The StingBlade bits drilled with higher ROP, while providing the toolface control necessary to achieve the 12°/100-ft doglegs with maximized reservoir contact.