

Gladius® Shaped Cutter Technology Improves Lateral Drilling Performance in the Haynesville

INCREASED EFFICIENCY AND HIGHER ROP ACHIEVED WITH LESS WOB/DIFFERENTIAL PRESSURE THAN COMPETITORS

LOUISIANA / HAYNESVILLE

CHALLENGE

- » Drill 6-3/4 in. lateral at a high ROP in the Haynesville where it is difficult to maintain ROP near the end of the lateral
- » Reduce rig costs

SOLUTION

- » Replace traditional cutter with the Gladius® shaped cutter, demonstrating proven aggressiveness in laterals and improved cutting efficiency versus cutters of standard face geometry

RESULT

- » Run completed with improved performance and efficiency
- » Increased ROP and required less WOB/differential pressure than competitors
- » Reached TD in a shorter time than offset competitors in the field
- » Reduced rig costs

OVERVIEW

During drilling operations in a 6-3/4 in. lateral, an operator aimed to reach total depth (TD) while maintaining a high ROP to achieve its financial objectives. Thus, Halliburton suggested transitioning from a traditional cylinder cutter to Geometrix® 4D-shaped cutters.

CHALLENGE

It is common in the Haynesville to experience reduced ROP the further a lateral is drilled. However, to help reduce rig costs, the operator needed to maintain a high ROP.

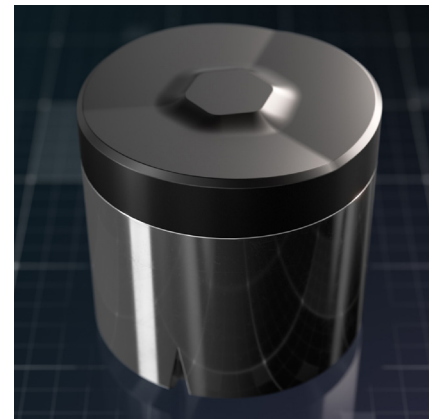
SOLUTION

To meet this objective, Halliburton Drill Bits and Services application design evaluation (ADE™) specialist recommended the Geometrix® 4D-shaped line of PDC cutters. These cutters offer unique geometries to traditional cylinder cutters to produce more efficient drilling. The various shapes in this offering are customized to different applications to better solve for chip flow, friction, and thermal degradation.

Upon reviewing laboratory data, the Gladius® shaped cutter was selected for this application because of the aggressiveness it exhibits in laterals with a 15% improvement in cutting efficiency versus a standard face geometry. The Gladius shaped cutter is equipped with a sharper edge for more efficient shearing, a relieved face to reduce friction, and a centralized chip-breaker to deflect cuttings across the diamond face.

RESULT

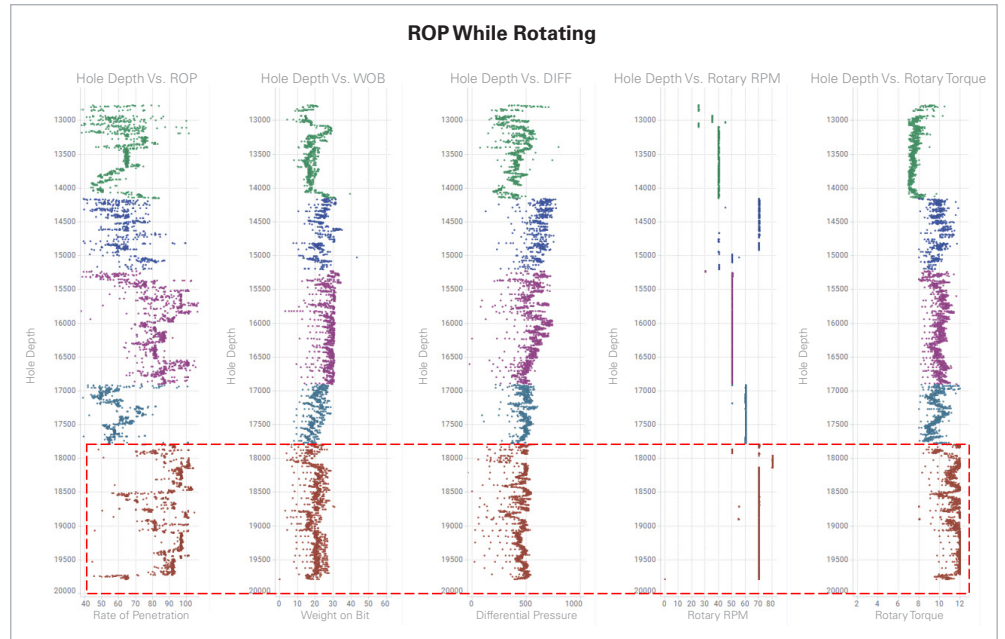
The Gladius cutter exhibited improved efficiency and superior performance during this run drilling a 1,999 ft. lateral section at an increased ROP and with less WOB/differential pressure than competitors. At a rate of 50.6 ft./hr., the operator reached TD in a shorter time than offset competitors in the field (39.5 drilling hours). Halliburton is currently working with the operator to run the Gladius cutter during additional operations to continue delivering superior performance with a reliable and trustworthy drill bit that has proven to reduce drilling hours.



Gladius shaped cutters are equipped with a sharper edge for more efficient shearing, a relieved face to reduce friction, and a centralized chip-breaker to deflect cuttings across the diamond face.

CASE STUDY

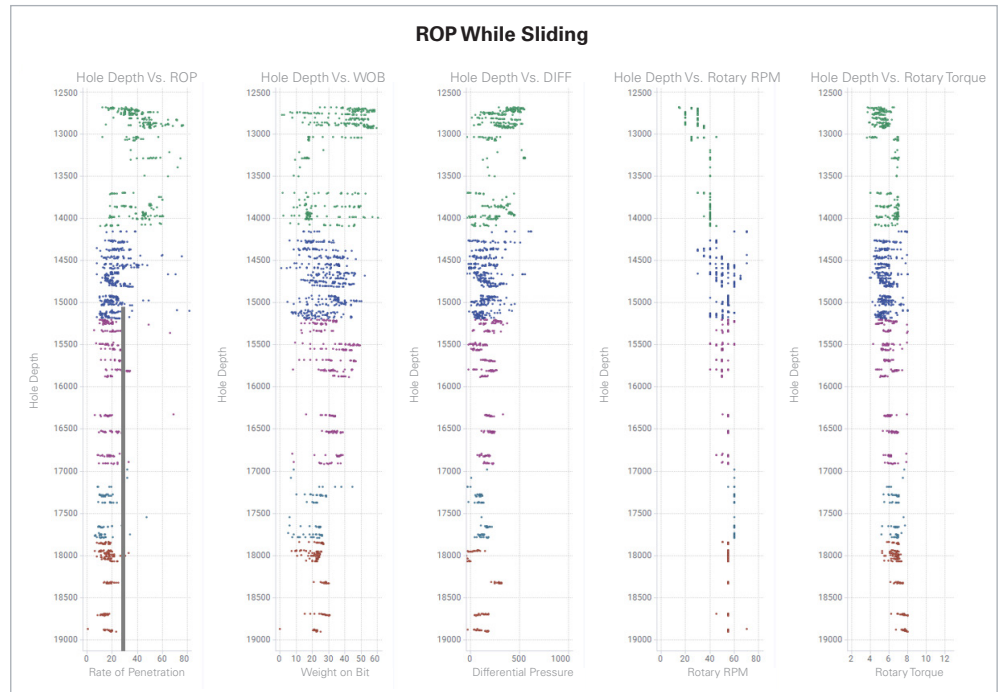
- Comp – Run 2 (61 fph)
- HBDS – Run 3 (63 fph) - Std. Cutter
- Comp – Run 4 (83 fph)
- Comp – Run 5 (59 fph)
- HBDS – Run 6 (88 fph) - Gladius Cutter



- » HBDS - Run 6 with Gladius cutter showed increased efficiency in lateral.
- » HBDS - Run 6 shows decreased WOB/differential with an increased ROP.

- Comp – Run 2 (26 fph)
- HBDS – Run 3 (22 fph) - Std. Cutter
- Comp – Run 4 (19 fph)
- Comp – Run 5 (14 fph)
- HBDS – Run 6 (16 fph) - Gladius Cutter

Run #	Slide (% / .ft)	Rotate (% / .ft)
Comp 2	25 / 365	75 / 1,108
HBDS 3	43 / 452	57 / 595
Comp 4	15 / 256	85 / 1,450
Comp 5	10 / 88	90 / 790
HBDS 6	8 / 172	92 / 1,827



- » Trend dropping in ROP while increasing in lateral due to increased DP in lateral.
- » 15K' to TD slide ROP stayed consistent.
- » HBDS Run 3 vs. 6; Run 3 utilized typical round cutters vs. Run 6 which utilized Gladius cutters.

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