

Varel

PDC technology that outperforms insert bits in tough formations

The Travis Peak and Cotton Valley formations in East Texas, notorious in the past for destroying polycrystalline diamond compact (PDC) bits, can now be drilled faster and more economically with PDC bits instead of insert bits. Varel has engineered bits for this challenge using Spot 4D to model bit behavior for

vertical and lateral directions. When offset logs are used in conjunction with Spot 4D, bit behavior can be modeled in various lithologies along the well profile to optimize cutter placement.

Varel's RSC (Residual Stress Control) cutters include Gamma, for high impact applications; Delta, for some impact with

moderately abrasive intervals; and Alpha, for high abrasion resistance. All cutters have increased diamond volume, reduced thermal expansion, reduced residual stress from manufacturing and decreased points of stress concentration.

Varel's Alpha cutter recently set a drilling record in Panola County, Texas. A typical well in this area will have a 12¼-in. interval from surface to 600 ft.

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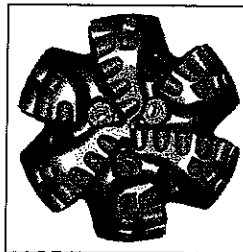
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(183 m). A 7½-in. section follows to total depth 9,650 ft (2,943 m). In this area, the Travis formation begins at about 6,000 ft (1,830 m). Normal practice is to drill into the Travis Peak with the surface bit until dull, then drill with a new bit through the Travis Peak into the Cotton Valley. The final section normally requires a third bit. Four or more bits can be required.

All sections are vertical, with deviation limits. The soft, upper part of the hole can be troublesome. The Varel bit maintained 1½° deviation through this zone.

In one well, a Varel 7½-in. MKS66 was used from the bottom of the 12¼-in. section into the Travis

Peak. The bit drilled from 665 ft to 7,397 ft (202.8 m to 2,256 m) in 75 hours, for a rate of penetration (ROP) of 89.7 ft/hr (27.3 m/hr). The bit was graded 1-1. The best offset drilled 80.8 ft/hr (24.6 m/hr) and was short of Varel's footage by 600 ft. The competitor bit in the same field dull graded 1-2. The Varel bit maintained 1¼° maximum deviation through the interval and finished at ½°.



Varel PDC bit features RSC (Residual Stress Control) cutter technology. (Image courtesy of Varel)

Starting at 7,397 ft (2,256 m), Varel's 7½-in. MKS66DRG drilled 1,498 ft (457 m) in 59 hours, for an ROP of 25.4 ft/hr (7.75 m/hr). The bit was dull graded 1-2. The last directional survey showed ¾° deviation, well within operator requirements. The best offset bit drilled 1,531 ft (467 m) in 80 hours, for an ROP of 19.3 ft/hr (5.9 m/hr), and was dull graded

8-8. Using Varel's bits, this well reached total depth in 8½ days, a county record.

New CR roller bearing series

Challenger CR bits for motor applications in bit sizes 1¼-in. and larger have aggressive cutting structures. Insert row placement and spacing reduce wear; promote efficient drilling and ensure uniform loading. Steel-tooth cutting structures have thicker deposits of high-density premium tungsten carbide hardfacing. Optional diamond features extend life in extreme applications.

Bearings have a proprietary, thermally stable, extreme-pressure lubricant; silver-plated floating elements; and high-aspect ratio seal made with Varel's high-temperature elastomer.

In a recent three-well trial in Mexico, 17½-in. CRIG bits achieved 21% more rotating hours and 32% more footage per bit compared with ETRIG bits used on previous wells.