



# New Drill Bits Boost Efficiency, Safety

By Colter Cookson

From novel cutter geometries that reduce vibration to advanced cutters for ultratough formations, PDC bit manufacturers continue to demonstrate a knack for coming up with new twists on old ideas. Their efforts have paid off. The latest drill bits are setting penetration rate records in all types of formations, and are completing jobs in single runs that once required three or four bits.

Meanwhile, new hybrids are bringing roller cone-quality steerability and respectable speed to applications traditionally dominated by PDC bits. And thanks to more robust seals and bearings, roller cone bits continue to redefine performance benchmarks in tough, abrasive formations and large-diameter holes.

Although they express pride in their technologies, bit manufacturers say it takes more than a great bit to drill efficiently while staying on target. They say the record-setting performances being achieved are the result of working closely with customers to deliver bits that are a perfect fit for each job.

## Large-Diameter Roller Cone

For large-diameter wells, Varel Oil & Gas Drill Bits has introduced the Everest™ series of roller cone bits. With diameters ranging from 14¾ to 45 inches, Varel says the bits deliver superior performance and reliability when drilling surface and intermediate hole sections.

“In designing the bits, our goal was to combine outstanding efficiency in the upper hole with enhanced durability in deeper, tougher carbonate sections,” says Thomas Gallifet, Varel’s roller cone engineering manager.

According to Gallifet, the Everest series includes three models: Everest Summit, which offers the most advanced features; Everest Base, an economical option for less abrasive wells; and Everest Open, the ideal choice for open-bearing, surface or intermediate applications.

Everest Summit features EdgeGuard®, a shirttail protection system in which tungsten carbide microshields are placed

on critical areas. “These custom-fitted microshields have higher carbide content than welded hard-facing, so they offer enhanced wear characteristics,” says Matt Stroever, a Varel roller cone design engineer.

As proof, he offers a head-to-head drilling test in Virginia. The bit without EdgeGuard experienced two out of three bearing failures caused by cuttings packing into the seal gland, while the EdgeGuard bit experienced significantly less bearing wear over an additional 283 feet of drilling.

Gallifet says Everest’s grease system has been improved as well. “The new canister compensator is designed to extend bit life and maintain grease supply over the bit’s application life,” he details. “It has at least twice the grease capacity of previous models to provide critical and reliable lubrication.”

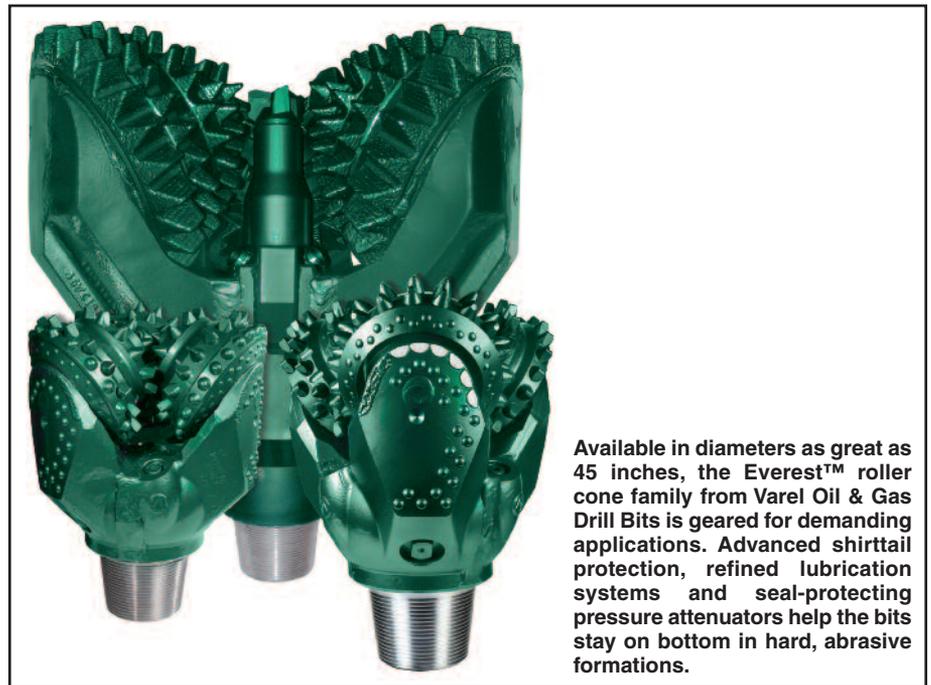
The system was designed to achieve a consistent grease release pressure at various temperatures and downhole pressures, Gallifet mentions. “Extensive field tests in a variety of sizes and applications demonstrate the canister compensator improves bearing reliability by 33 percent,”

he reports.

Stroever adds that all Everest models use a new grease formula. “In lab and field tests, this formula has extended bearing life by reducing internal bearing heat generation,” he says. “Additionally, the grease is stable at temperatures above 350 degrees Fahrenheit and at higher energy levels, so the bits can run in deeper, hotter wells.

“To protect the seal, the bits feature a pressure attenuator,” Stroever continues. “Naturally occurring cone pumps encountered while drilling lead to pressure spikes in the grease system, accelerating seal wear and grease loss. This patented technology has been proven to mitigate these pressure spikes by restricting access to the seal and allowing ample reaction time for the reservoir system to compensate.”

Gallifet says considerable research went into developing the Everest bits’ shirttail protection, lubrication system, and pressure attenuator. “We have done everything we can to make sure the bits will reduce costs and improve performance in large diameter holes,” he assures. □



Available in diameters as great as 45 inches, the Everest™ roller cone family from Varel Oil & Gas Drill Bits is geared for demanding applications. Advanced shirttail protection, refined lubrication systems and seal-protecting pressure attenuators help the bits stay on bottom in hard, abrasive formations.