



BIT OF A GAMBLE

Drilformance, a new PDC drill bit manufacturer in Leduc, takes on the global giants

by Mike Byfield

Photos: Aaron Parker

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— Sean Gillis, Engineering Manager, Drilformance

Drilformance ULC began making polycrystalline diamond compact (PDC) drill bits in 2008, just as rig counts began plunging across North America. Besides timing its launch to the worst upstream market conditions in the past decade, the Alberta-based manufacturer had jumped into an arena dominated by oilfield giants: Schlumberger Limited (Smith Bits), Halliburton Company (Security DBS), National Oilwell Varco, Inc. (ReedHycalog) and Baker Hughes Inc. And there are other players, including Chinese price lowballers.

So how's business?

"We're doing pretty well," says Sean Gillis, engineering manager at Drilformance's plant in Leduc. At age 30, he runs research and manufacturing under company chairman Rusty Petree, a well-known entrepreneur from Houston. "The industry slowdown has benefited us on the supplier side. Steel is instantly available, for example, and everyone bends over backward to help," Gillis says. "On the buy side, customers are attracted by the fact that our bits reduce their drilling costs. Drilformance's technology is the cream of the crop in terms of durability in tough rock and steerability for directional drilling." >

Engineering manager Sean Gillis (left) says his boyhood machine shop experience helps him lead the Drilformance manufacturing team.



Although the new firm's payroll is small—about 30, including sales offices in the United States and overseas—the firm can nonetheless access state-of-the-art manufacturing technology. “We use some of the world's most sophisticated CNC [computerized numerical control] programs and machinery,” Gillis says. “Compared to larger companies, we're more willing to push the design envelope if a customer wants to try out an idea, and our team can move quickly.”

Drillformance PDC bits are milled from a single block of steel. The compact unibody, flat profile and PDC cutter layout are engineered to generate smooth, consistent reactive torque, which enhances directional responsiveness downhole. The company has developed several manufacturing technologies, including:

- Rhino Armour Gauge Protection is a proprietary hard-facing process that reportedly provides maximum protection to critical bit surfaces.

- After the armoured bit cools, PDC diamond cutters are brazed into place. Drillformance is in the process of patenting Cryo Edge, a technology that enhances the thermal stability of its polycrystalline diamond wafers.
 - The company's Shadow Path work sharing system is another patent-pending element, designed to mitigate heat buildup while adding diamond volume to the bit shoulder.
 - The HeliPath stability system (also patent pending) is a radial spiral breakthrough that reportedly increases depth of cut while increasing bit stability.
 - Opti Trac Directional is modelled for good steerability, utilizing optimal custom back rake, side rake and other design elements.
- Drillformance has case studies demonstrating superior rate of penetration in tough geological formations like the Basal Belly

"A downhole drilling system with the potential to create a step-change improvement in drilling performance for both vertical and directional applications."

—Rusty Petree, Chairman, Drillformance



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River, Glauconite and Ellerslie. For instance, in British Columbia's Montney tight gas play, Encana Corp. reportedly drilled two off-setting wells, one using a Drillformance 156 millimetre PDC bit and the other with a competitor's bits. "The drilling crew completed the horizontal portion of our well in 133.5 hours, compared to 201.3 hours for the other well," Gillis says. "That's a 34 per cent improvement under very similar operating conditions."

The professional engineer says that "for me, coming to work each day is like going to the race track. I'm always examining how fast and how far we went, and thinking about how that performance might be improved. Our people on the floor are great to work with. They're experienced hands who truly understand the practical aspects in manufacturing—the precise temperatures and methods for making bits that will perform consistently in the field."

Gillis himself worked in machine shops during summer breaks while still in high school and later when he was studying mechanical engineering at the University of Alberta. "Too often I heard machinists cursing engineers for poor designs. I took those complaints to heart," the engineering manager says. "Theory isn't enough, not even close. I'm grateful that I had the opportunity to 'touch the steel' and learned to respect the manufacturing process."

Drillformance is preparing tools well beyond its current PDC bit lineup. In 2009, Petree said publicly that his company is preparing "a downhole drilling system with the potential to create a step-change improvement in drilling performance for both vertical and directional applications." Gillis won't even hint further at this point about what's in the works: "Let's just say that our guys are always interested in developing new and exciting ways to destroy rock!" ■

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