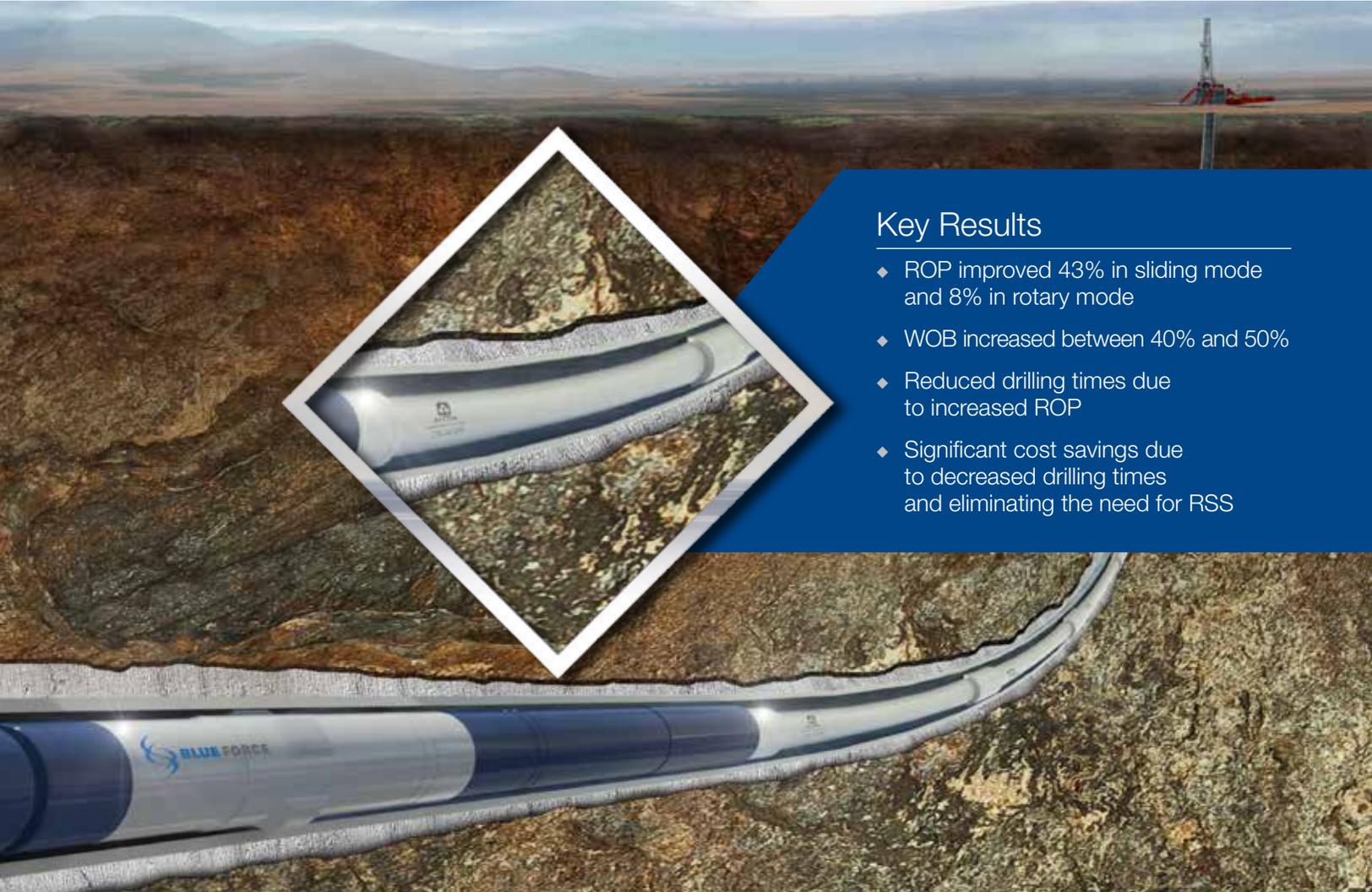


FarReach™ Alloy Drill Pipe and Blue Force™ Steerable Mud Motor Outperforms Steel Drill Pipe and Negates Need for RSS in Eagle Ford Shale



Key Results

- ◆ ROP improved 43% in sliding mode and 8% in rotary mode
- ◆ WOB increased between 40% and 50%
- ◆ Reduced drilling times due to increased ROP
- ◆ Significant cost savings due to decreased drilling times and eliminating the need for RSS

Alcoa Oil & Gas and Ryan Directional Services technologies increase slide mode ROP by 43% negating the need for rotary steerable systems and dramatically reducing costs.

Customer Challenge

Longer lateral sections in the shale plays are forcing operators to choose rotary steerable systems (RSS) over conventional mud motor systems in order to achieve adequate weight on bit and good rates of penetration. However they are much more expensive than conventional mud motors systems and are not typically as reliable. Conventional mud motor systems require “slide drilling” to re-orient which creates excessive friction and can result in very low ROP in extended laterals. An Eagle Ford operator wanted to find a better performing drilling solution that was more cost-effective than a rotary steerable system.

Solution

Ryan Directional Services, a subsidiary of Nabors, recommended using Alcoa FarReach™ lightweight alloy drill pipe with their Blue Force™ steerable mud motor in place of traditional steel pipe because of its superior ROP performance in sliding mode.

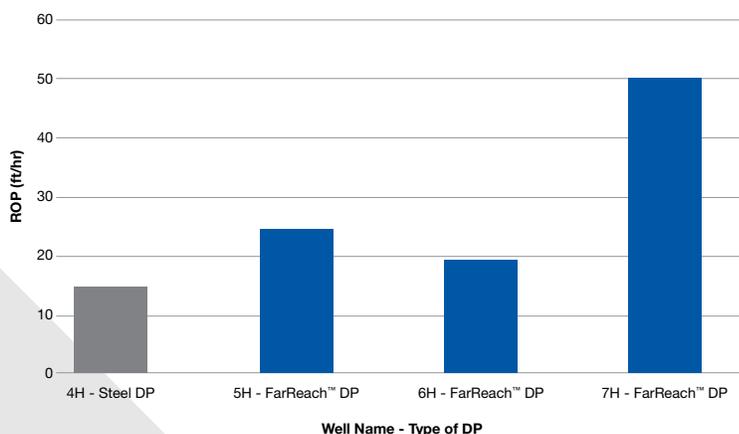
High Performance Results

DrillScan analyzed four wells the operator drilled. On the same pad, three wells were drilled with FarReach™ alloy drill pipe, and one with steel drill pipe (SDP). The FarReach™ alloy and SDP strings used identical bottom hole assemblies (BHA) and bits. Because well profiles, BHA designs and bit types were similar, a meaningful comparison was possible.

The combination of FarReach™ alloy drill string and the Ryan Blue Force™ motors resulted in greater weight on bit (WOB) and improved ROP by 43% in slide mode and 8% in rotating mode. (Well 7H actually gained three times the ROP improvement in slide mode.) Torque and drag simulations show that real WOB was about 40%-50% greater than with SDP in sliding mode. Because the lighter alloy drill string reduced sliding friction, off-bottom torque was reduced by about 25%.

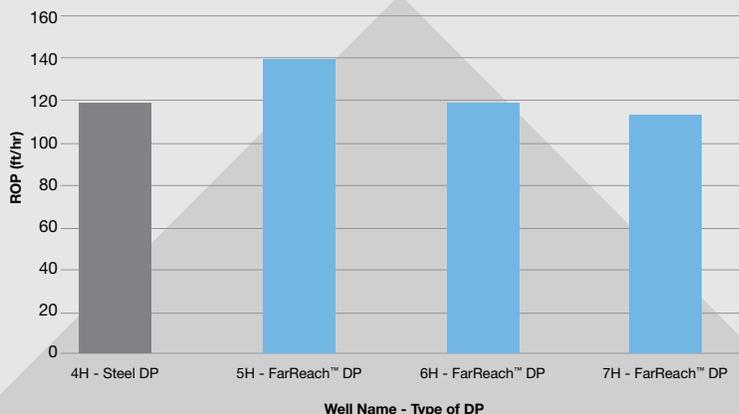
These results demonstrate that Alcoa FarReach™ alloy drill pipe and a steerable mud motor can be a better performing and more cost effective alternative to RSS in shale gas plays.

Slide Mode ROP Comparison



Using similar drilling parameters, a 43% ROP increase in sliding mode was achieved in wells 5H and 6H vs. 4H. Well 7H gained three times ROP with FarReach™ vs. well 4H while applying 20%-100% higher WOB through the curve and lateral sections.

Rotary Mode ROP Comparison

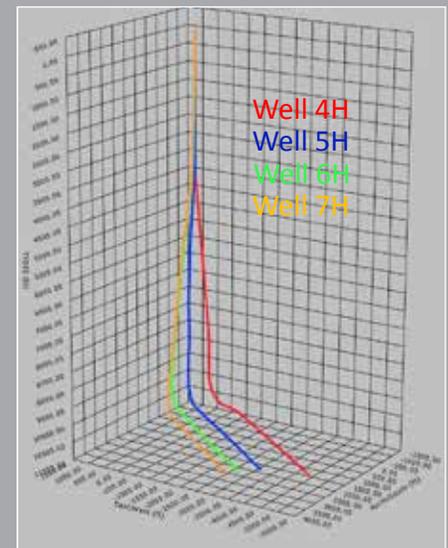


Using similar drilling parameters, an 8% ROP increase in rotary mode with FarReach™ in wells 5H and 6H vs. 4H was achieved.

Blue Force™ is a registered trademark of Ryan Directional Services.

About Alcoa Oil & Gas

Advanced materials technology from Alcoa Oil & Gas enables customized, high-performance solutions to many of the oil and gas industry's most difficult challenges. Proprietary, lightweight, high-strength alloy drill pipe and subsea riser systems, engineered forgings and extrusions, and fabricated products are proven in land and offshore applications worldwide.



Performance data was gathered on four wells in the Eagle Ford Shale, comparing FarReach™ alloy drill pipe against steel drill pipe.



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