

## CASE STUDY

## UNPRECEDENTED EFFICIENCY

Scorpion™ Composite Plug  
performs flawlessly in Haynesville

**Scenario:** In Q2 2020, Nine Energy Service designed a Scorpion Composite Plug with a 3.65" OD and built-in, 90 durometer, pump-down ring to meet the extreme operational conditions of the Haynesville.

**Results:** With the enhanced plugs run throughout two wells, pump-down rates reduced from 14 BBL/min. to 9 BBL/min. — a significant improvement to pump-down efficiency.

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## DESIGNING A LARGER OUTER DIAMETER

Due to high downhole pressures and static bottom-hole temperatures surpassing 300°F, the Haynesville is a uniquely demanding play. For operators running 5" 23.2# or 4.5" 13.5# casing, it can be challenging to avoid exceeding the recommended bypass rate of the tool with a standard 3.57" or 3.60" OD.

One particular operator came to Nine Energy Service looking to improve the pump-down efficiency of their existing 3.57" plug. Nine Energy Service quickly engineered a Scorpion Composite Plug with a 3.65" OD. Widened components included both cones, load ring and mule shoe, while maintaining a narrower 3.60" OD of the slips to ensure they were protected while running downhole. Next, built-on, Pump Down Rings (PDR) made of 90 durometer rubber were added to the tool. These PDRs are near full drift of the casing but extremely flexible to ensure no hang-ups and no problem POOH (pulling out of hole) if needed.

These slight modifications made a world of difference. The newly designed composite plugs were successfully deployed across two wells with measured depths of 22,103 ft. and 22,076 ft.





## DELIVERING A HUGE ADVANTAGE

With the re-engineered Scorpion Composite Plug, pump-down rates dropped from 14 BBL/minute to 9 BBL/minute, significantly reducing the amount of water needed to reach set depth, which currently costs the operator \$.46 per barrel. Plus, the increased diameter reduced the bi-directional pressure across the plug to ensure it could not prematurely set in these conditions.

Even with a decreased pump-down rate, the operator maintained pump-down speeds up to 450 ft/min., thus realizing improved efficiencies and reducing costs associated with NPT (non-productive time).

All plugs successfully ran downhole, set and held during frac. Drillout was also fast and effective, with no drillout issues. All told, the operator was impressed with the results of the Scorpion Composite Plug and is ordering more for their next pad.

Backed by decades of expertise in tool development, Nine Energy Service was able to engineer a customized composite plug to meet the unique challenges of the Hayneville operator — delivering unmatched pump-down rates, greater efficiencies and reduced NPT.

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14  
BBL/MIN



9  
BBL/MIN

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