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## Abstract

High-pressure/high-temperature (HP/HT) formations continue to pose challenges for hydraulic fracturing because of extreme pressure and issues with fluid stability at these temperatures. From design to seamless execution, considerable planning during every stage is necessary for operational success. These challenges are detailed in terms of technical and operational planning and execution along with lessons learned from one such well from the KG Basin located in the eastern offshore region of India, where five fracture stages were successfully pumped with high efficiency.

Meticulous design and execution planning led to the completion of five successful stages in 25 days, including wireline perforation, slickline/coiled-tubing unit interventions, and sand-plug settling times. A total of 952,257 lbm of proppant was pumped with 16,133 bbl of fracturing fluid in all stages combined. The total proppant placed into the formation increased 21% while consuming 50% less time than anticipated. All treatments were pumped to completion with good packing as indicated with both surface and downhole gauges. The operational efficiency achieved enabled the operator to evaluate the possibility of treating an additional well ahead of the timeline.

A metal-based crosslinked fluid system was optimized for the anticipated high temperatures to help ensure sufficient stability throughout the duration of pumping. Low-residue carboxymethyl-hydroxypropyl guar at 45-lbm/1000 gal loading was used in the crosslinked fluid system.

For zonal isolation, a sand plug methodology was used, refined by emphasizing pump rate reduction after the sand plug traversed three-fourths of the wellbore volume. With live breaker added during the sand plug stage, complete breaking of fluid was ensured, aiding subsequent smooth runs of slickline/wireline for tagging the top of sand or perforation, respectively.

In a nutshell, even though conventional resources were used (a zirconium-based, high-performance, low-polymer fracturing system and 12,000-HHP fracturing equipment), high efficiency was achieved by extensively planning during design optimization, preparation, and execution. Challenges, such as gas migration, sand plug uncertainty, high process zone stress (PZS), and small entry hole diameter (EHD) were addressed using a measured approach resulting in successful execution.