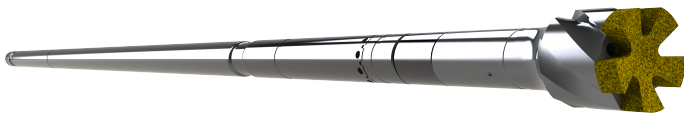


Milling Optimization

Improved Milling Results with F5 Motor



HIGHLIGHTS

- Completed a 10 Well Pad
- F5 Motor Excels in Long Laterals
- Average Milling Time of 35 min/plug
- Increased Flow Rates with Larger OD Tools
- Improved Annular Velocity and Debris Cleaning due to Larger Flow Rates

DETAILS

Location	Northern BC, Canada
Formation	Montney
Casing Size	5 1/2" 20#
Well Orientation	Horizontal
Fluid	Water Based
Lateral Length	11,811 Ft
Conveyance	73MM Coiled Tubing
Operation Depth	20,587 Ft
Operation Type	Milling Composite Bridge Plugs
Tools Used	Slimline Dimple CT Connector 79.4mm OD Dual Back Pressure Valve 79.4mm HydraSet Jar 79.4mm Hydraulic Disconnect 79.4mm Diverting Circulating Sub 79.4mm XRVTM Extended Reach Tool 79.4mm F5 Downhole Motor 95.3mm Ported Rotary Bit Sub 117.5mm JZ Sealed Bearing Bit

OBJECTIVE

The customer had a 10 well pad in Northern British Columbia needing a total of 144 composite bridge plugs milled out.

RESULTS

Utilizing Thru Tubing Solution's Milling Assembly, TTS was able to complete all 10 wells with an average milling time of 35 min per plug. The key to success was the inclusion of TTS' XRVTM Extended Reach Tool which helped overcome the frictional forces in long laterals, which exceeded 3600m (11,811') on these wells. The use of TTS' F5 Downhole Motor in conjunction with the XRVTM, left the milling operation smooth and predictable with only 15 stalls encountered over the entire project. It was assumed that restricted flow around the bit caused hydraulic lifting off the target resulting in decreased milling efficiency. Therefore, inserting a diverting sub below the motor helped to eliminate the negative effects of hydraulic forces at the bit face associated with large flow rates.

VALUE TO CUSTOMER

By optimizing their milling operations with the use of TTS' Milling Assembly, the customer was able to reduce overall costs by decreasing time spent per well.

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