High Rate Annular Coiled Tubing Fracturing

Cardium Formation, Western Canadian Sedimentary Basin

CHALLENGE

- Effectively place single-entry fracture into the Cardium Formation
- Avoid pumping nitrogen unnecessarily
- Optimize fracture concentration
- Successfully recover from screenouts quickly
- Reduce water and footprint of location

SOLUTION

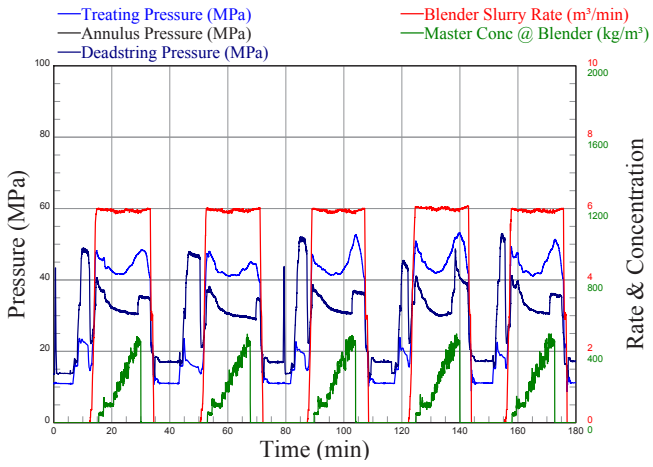
Calfrac has done extensive research and incorporated theoretical and empirical results to extend pumping rates with annular fracturing to 7m³/min in 4.5" casing and to 10m³/min in 5.5" casing.

- Specifically designed spacing for 31 stages CWS-600 Slickwater fracture
- Pinpoint annular fracturing entry at 6.0m³/min in 4.5" casing
- Elimination of nitrogen with ability to circulate screenouts
- Improve sand placement stage to stage with deadstring analysis
- Fracture to optimize rather than to avoid a screenout

RESULTS

- Less water utilized by optimizing sand ramps and concentration placement
- Reduced horsepower and footprint on location
- All 31 stages successfully placed
- Enhanced recovery due to stimulated reservoir volume being maximized
- Screenouts quickly circulated out and avoidance of downtime for an independent coiled tubing cleanout

ILLUSTRATION OF RESULTS



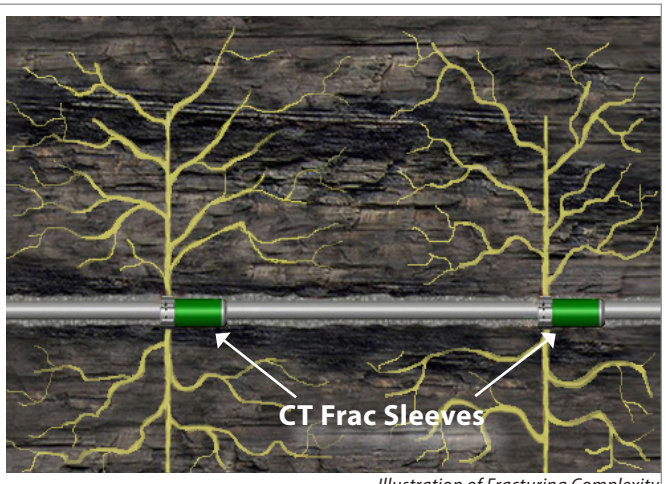


Illustration of Fracturing Complexity