# High Density Cement Completion

***Utica Formation, Belmont County, Ohio***

## OVERVIEW

Due to high formation pressure experienced while drilling the lateral section of a Utica well, the customer's drilling operations required a drilling fluid density increase to 18.5 pounds per gallon (ppg). Calfrac's experienced personnel were called upon to customize the cement blend, manage the logistics of obtaining materials required to increase density, ensure mud/spacer/cement compatibility, and safely complete the operation while working in extreme winter conditions.

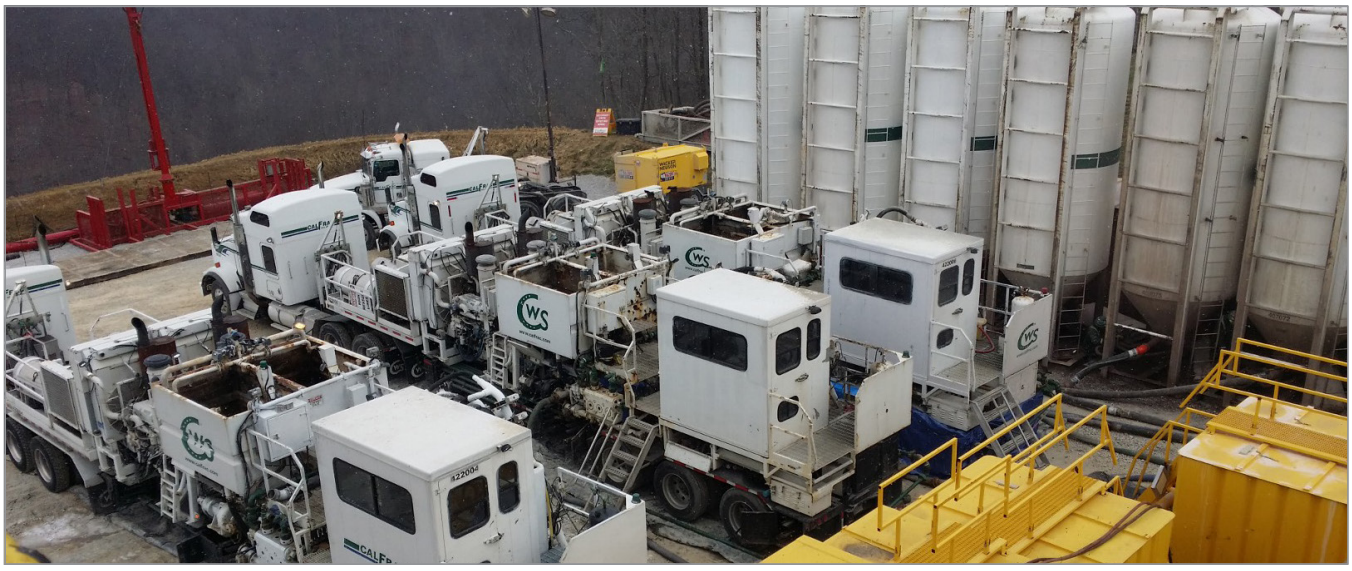
## CHALLENGE

- Multiple density increases in drilling fluid required quick adaptation of cementing solutions
- Formation integrity would need to be maintained while successfully mixing and displacing 19.7 ppg cement
- Cement coverage would need to isolate 19,208 feet
- Mixture had to meet final wellbore conditions of: 18.5 ppg mud weight/20,208' MD/210°F
- The team would need to navigate limited location space while subjected to harsh winter conditions

## SOLUTION

Calfrac specifically designed a high density cement blend capable of being pumped at 19.5 - 20.0 ppg.

- Laboratory quality control ensured proper additive loadings for wellbore performance and mixability in the field
- Around-the-clock lab support was provided to ensure customer needs and program changes were met
- Pre-job rig-up ensured no major issues with bulk delivery of heavy weight cement
- Standard for preventative equipment maintenance laid the foundation for successful operations
- Experienced crew executed the job design safely

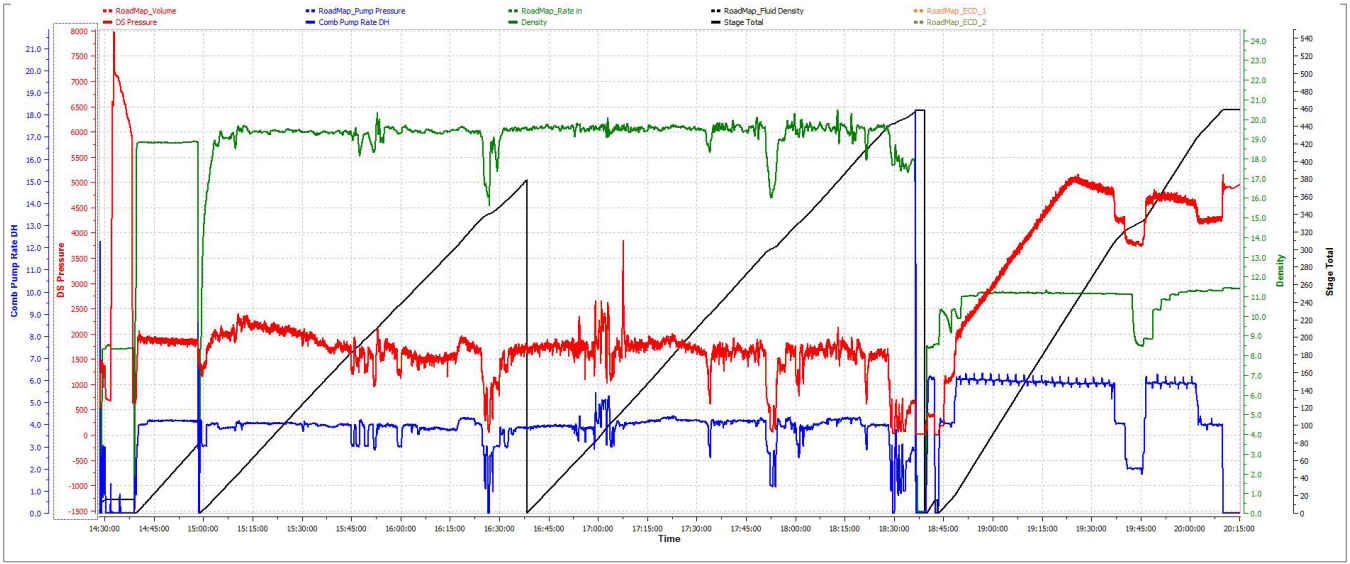


## RESULTS

Highest density cement completion job in Calfrac's history.

- Rig was able to run casing to bottom and circulate for two hours to condition the wellbore prior to cementing
- 834 bbls of 19.7 ppg cement was mixed and pumped at ~4 bpm with one twin cementing unit
- Displaced wellbore at ~6 bpm utilizing 11.3 ppg brine to lower differential pressures
- Bumped plug at 4 bpm at ~4,300 psi
- Successfully placed large volume of high density cement to 1,000 feet below surface while staying below fracture pressures and maintained returns to surface

## ILLUSTRATION OF RESULTS




*Cement test*