

## Stimulation

# Delta Frac® Service

## Borate Fracturing Fluid System For Bottomhole Temperatures Up To 200°F

- Reduces polymer loading required to obtain necessary viscosity.
- Helps reduce formation damage.
- Provides superior retained conductivity.
- Provides excellent proppant transport.
- Achieves clean, complete breaks.
- Simple to use system enhances quality and helps reduce time on location.

Delta Frac® service is designed for stimulating wells with bottomhole temperatures up to 200°F and is used in conjunction with Halliburton's proven enzyme and oxidizing breakers.

### High Viscosity With Reduced Gel Loading

Halliburton's advanced fluid technology has produced an optimized borate fracturing fluid system that provides high viscosity with low gel concentrations. In fact, Delta Frac service provides about the same viscosity as a conventional borate fracturing fluid, but uses up to 33% less gel. Reduced polymer loading can help reduce formation damage, improve retained conductivity, and reduce the amount of breaker required. This all translates to improved productivity and cost effectiveness.

### High Performance Breaker Systems For Clean, Tailor-Made, Complete Breaks

Halliburton incorporates special enzymes and oxidizers to provide the cleanest, most complete fluid breaks possible. Figure 1 illustrates the versatility provided by Delta Frac fluid. A fluid can be designed with the break profile needed for optimum results in a wide variety of well conditions. A common comment following treatments has been that the Delta Frac fluid broke back to water.

Halliburton's new HPH™ breaker is an enzyme breaker solution that is especially effective in Delta Frac treatments up to about 140°F. It has high pH stability that is very effective and economical at pH 8 and above.

For mid-temperature wells, Delta Frac service capitalizes on the advantages offered by oxidizing breakers. Activated Vicon™ NF breaker solution—a new, proprietary oxidizing breaker—is particularly suited for temperatures above 170°F.



*Halliburton's Delta Frac service represents a real change ( $\Delta$ ) in fracturing fluid capabilities for wells up to 200°F. Thousands of treatments have proved that Delta Frac fluid characteristics can help improve fracturing efficiency and can provide more production for your fracturing dollar.*

### Excellent Shear Stability Throughout Treatment

The borate gel formula of Delta Frac service fluid provides outstanding shear stability. This fluid system heals readily, allowing crosslink time to be varied while maintaining excellent proppant transport and suspension characteristics.

### Proven results: Canada - Glaucinite Formation - Delta Frac service starts production from a horizontal well, saves redrilling

Mobil Oil Canada Ltd. (MOCAN) had a 978 m TVD (3,209 ft) horizontal well that had never produced oil. The wellbore was above the productive interval by about 10 to 15 m (33 to 49 ft). Mobil needed to reach the lower pay zone without redrilling. Halliburton recommended a fracturing treatment using Delta Frac service. The fractures were expected to be transverse to the cased horizontal wellbore. To help insure that, the perforation interval was kept very short. In the treatment, 25 t (55,127 lb) of 16/30 sand was pumped into the formation and tailed in with 5 t (11,025 lb) of 12/20 resin coated sand. Results: The productive interval was intersected. The well cleaned up quickly after the frac and was placed on pump. Production increased from zero to a stable 10 m<sup>3</sup>/d (63 BOPD).

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## New Mexico - Fruitland Coal Formation - Delta Frac service with SandWedge® conductivity enhancer creates value of over \$720,000 per year

Three virtually identical gas wells were producing only about 200 Mcf/D each, even though the wells had already been fractured with slick water and were on artificial lift. Halliburton recommended combining Delta Frac service with the SandWedge conductivity enhancement system\*. The operator opted to use Delta Frac on all three wells and added SandWedge agent on two of the wells. The results: Delta Frac fluid provided outstanding performance in all three wells. Production from the well treated using Delta Frac fluid without SandWedge agent increased by about 45%. Production from each of the other two wells treated with Delta Frac and SandWedge almost quadrupled, creating an additional economic value of over \$720,000 per year for the operator.

\*The SandWedge conductivity enhancement system is specifically designed to enhance fracture conductivity resulting from fracture treatments using water-based fluids. This technology chemically modifies the surface of the proppant grains, resulting in increased porosity and permeability of the proppant pack and enhanced frac fluid cleanup. In addition, SandWedge service helps keep the proppant in the fracture during well flowback and production.

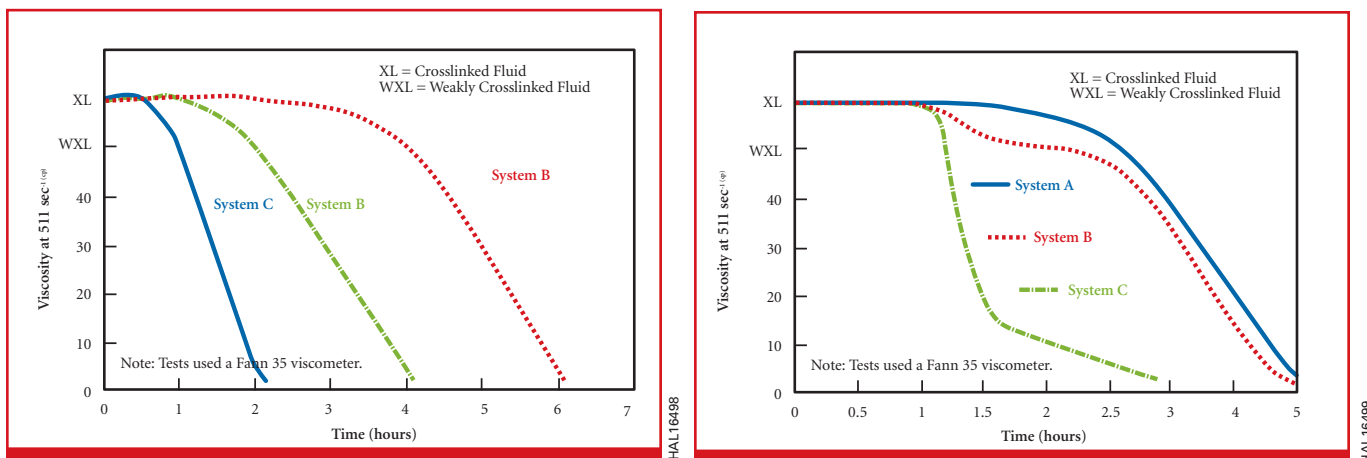


Figure 1 - Halliburton's breaker technology enables fluid performance to be tailored to the well's requirements. Break profiles for Delta Frac fluid designed for low-temperature wells (left) and mid-temperature wells (right) illustrate the versatility of Delta Frac fluid.

For more information about Halliburton's Delta Frac<sup>SM</sup> Service, visit [www.Halliburton.com](http://www.Halliburton.com), contact your local Halliburton representative or e-mail [stimulation@Halliburton.com](mailto:stimulation@Halliburton.com).