Delta Foam℠ Service

Delta Foam Service Combines the Advantages of Delta Frac® Service Fluid Systems and Foam Fracturing Methods.

- Reduced fluid requirements
- Increased fluid loss control
- More complete well cleanup
- Enhanced fracture conductivity
- Reduced formation damage
- Improved proppant transport

Halliburton’s Delta Foam℠ service has been specially formulated for low pressure and water sensitive reservoirs where operators have often encountered difficulty in effectively employing production enhancement methods.

Even with low residue frac fluids that provide clean, complete breaks after fracturing, much of the placement fluid may be left in the fractures if the formation pressure is too low to force the fluid back out of the well. If not removed, this fluid can obstruct the flow of hydrocarbons to the wellbore.

Conventional, water-based frac fluids can cause enough damage in water-sensitive formations that porosity and permeability are greatly reduced and hydrocarbon flow to the wellbore is seriously inhibited. Such formations may also allow high fluid leakoff into the rock matrix and the buildup of formation damaging filter cake.

**Delta Foam Service Benefits**

For such challenging conditions, Delta Foam service provides substantial benefits over foamed conventional fluids. Delta Foam fluid is a high-viscosity foam, that allows placement of high sand concentrations with an ultra low gel loaded system.

Delta Foam service provides viscosities equivalent to conventional linear and crosslinked foam systems, but requires up to two-thirds less polymer. Although conventional foam systems use 20 to 40-lb gels, the gel loading in Delta Foam fluid can be as low as 10 lb/Mgal, with normal applications ranging from 10 to 20 lb.
**In Water-Sensitive Reservoirs**

The liquid content of Delta Foams fluids can be varied to match the water sensitivity of the reservoir. Wells that have high shale or clay content are typically good candidates for Delta Foam fracturing service. For such water sensitive formations, Delta Foam fluid systems can minimize the following:

- The liquid volume needed.
- The amount of time the fluid is in contact with the formation.
- The amount of fluid lost into the rock matrix.
- The amount of filter cake damage to the formation.

**In Low Pressure Reservoirs**

As an energized fluid, Delta Foam fluid is especially beneficial in low pressure reservoirs for more complete fluid return to the surface. You get the improved cleanup, low residue, and high retained conductivity inherent in Delta Frac service fluids along with high energy assistance from the compressed gas used to make the foam. In addition to higher fluid return volume, Delta Foam service also enables you to put your well on production faster for quicker payout and early profitability.

**Delta Foam Service Plus SandWedge® Conductivity Enhancer**

As an added feature, Delta Foam service is also compatible with Halliburton’s SandWedge conductivity enhancement system. SandWedge agent can enhance the conductivity of the proppant pack even more when used in conjunction with Delta Foam service.

**Delta Foam System Helps Add Production and Reduces Rig Time**

Western Oklahoma – This operator needed to increase production from a sandstone formation just below 8,000 ft. At the same time, he was also concerned about achieving good well cleanup. Halliburton recommended a nitrogen-based 25-lb Delta Foam service treatment in place of a standard 35-lb CO₂ foamed gel treatment. The foamed Delta Frac fluid succeeded in placing 16/30 sand at up to 6 lb/gal without any problems, running at a rate of 28 bbl/min at 2,300 psi with no appreciable pressure increase.

Because of the increased cleanup rate, the operator was able to save three days in running the production tubing and putting the well on production. He also achieved 13% to 14% more water recovery than was expected, along with about a 50 Mcf/D increase in production. The other gelled fluid had previously been able to place 6-lb/gal sand in only one of 12 wells in the field. The rig time savings plus the unanticipated production increase made the treatment very profitable for the operator.

For more information about how Delta Foam™ service can help make your water sensitive and low pressure reservoirs more profitable, contact your local Halliburton representative or email stimulation@halliburton.com.

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H01137  3/08
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