Polymer-Free Fracturing Fluid Successful in Tight Gas Sands

Case study: Longer effective fracture half-length with ClearFRAC CO₂ treatment improves production by 164%

Challenge
An operator wanted to improve production from an aging field in the Texas Panhandle. The problem was achieving an effective fracture half-length with CO₂ that would maximize financial returns.

Solution
Low-friction ClearFRAC* CO₂ treatment was successfully performed down 23.8-in tubing, which both reduced rig time and improved cleanup. Operations were further simplified because the ClearFRAC CO₂ system used only 1 liquid additive and an encapsulated breaker mixed on the fly, whereas the polymer fluid required 7 additives.

Results
ClearFRAC CO₂ treatment increased fracture half-lengths by 41% and conductivity by 197%. As a result, production was increased by 29% in comparison with polymer treatment of the same formation in a nearby well. Normalized by net foot of pay, the production increase was 164%.

Longer effective fracture half-length
An operator wanted to improve production from an aging field in the Texas Panhandle. The reservoir depth and pressure depletion made CO₂-base fracturing fluids the system of choice for the field. The problem was achieving an effective fracture half-length with CO₂ that would maximize financial returns.

Normal treatments were polymer-base CO₂ systems pumped down 41.2-in casing. High friction pressure would not allow pumping this system down smaller diameter tubing. Conventional polymer-base fluids used in CO₂ foam fracturing operations do not clean up well in tight gas sands. If sufficient fluid is not recovered, the polymer left behind shortens the effective fracture half-length. Flowing the well back up tubing increases the flowback velocity, which aids cleanup by increasing the liquid-carrying capacity.

Production improved by 164%
To improve cleanup by stimulating downtubing and not introducing polymers that could damage the proppant pack, the operator used robust ClearFRAC CO₂ fracturing fluid. Low-friction ClearFRAC CO₂ treatment was successfully performed down 23.8-in tubing, which both reduced rig time and improved cleanup. Operations were further simplified because the ClearFRAC CO₂ system used only 1 liquid additive and an encapsulated breaker mixed on the fly, whereas the polymer fluid required 7 additives.

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ClearFRAC CO₂ polymer-free fracturing fluid eliminates polymer damage to create longer effective half-lengths that maximize productivity.
Case study: Longer effective fracture half-length with ClearFRAC CO$_2$ treatment improves production by 164%

Significant reductions in the cost of operations were realized by using the ClearFRAC CO$_2$ system over conventional polymer treatments. The treatment fluid volume was 18% less and the flush volume was 25% less. Tubing installation costs were reduced because snubbing operations, packer lubrication, and killing the fractured zone were no longer necessary.

The operator is planning more ClearFRAC CO$_2$ treatments in the field to improve production in additional wells.

Robust fracturing fluids with high-pressured supercritical CO$_2$

The innovative ClearFRAC CO$_2$ system is specifically formulated to address the unique problems associated with creating robust fracturing fluids with high-pressured supercritical CO$_2$. The result is an entirely new approach that can be used in all low-pressure, low-permeability, and brownfield applications, including dry gas reservoirs.

With a recommended foam quality of 60% or higher, ClearFRAC CO$_2$ fluids perform better than conventional polymers, are not time-dependent at normal fracturing conditions, and also reduce the load to be recovered.