

Modeling results increase productivity in multiphase fracture flow—Bakken

Field trial shows low-density ceramic proppant delivers higher conductivity and value than alternatives.

Middle Bakken formation, North Central USA

The challenge

Higher conductivity was recognized as essential to improving oil productivity in wells with multiphase flow in narrow transverse fractures. However, in this application the individual economic potential of the various proppant types available was not clearly understood.

The solution

The results of subsequent modeling of the various proppant types suggested a wide variation in fracture conductivity. The analysis revealed realistic conductivity values (md-ft) of 10 for 20/40 sand, 40 for resin-coated sand and 80 for low-density ceramic proppant. Given these results, a field trial was designed to evaluate the economic potential of the available proppant types.

As part of the field trial, 10 Bakken wells were completed and stimulated with the low-density ceramic proppant. The 10 low-density ceramic-treated wells were compared to 12 similar offset wells containing 20/40 sand.

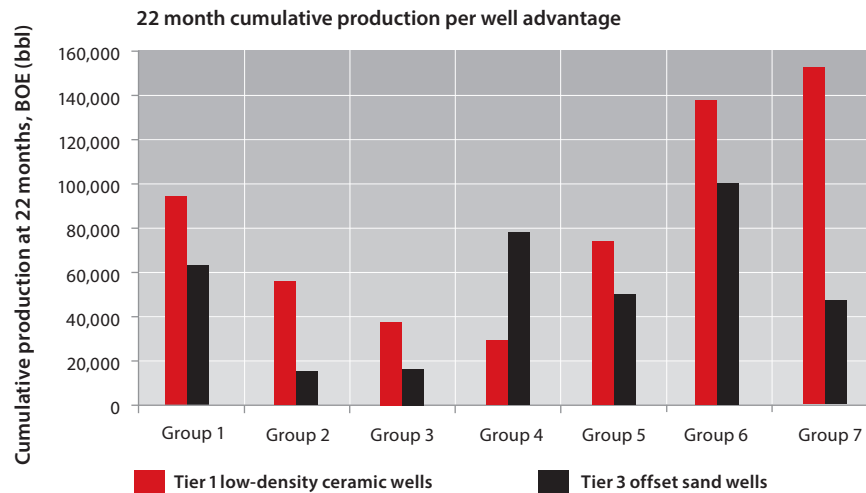
Well Data

Location: Middle Bakken formation, North Central USA

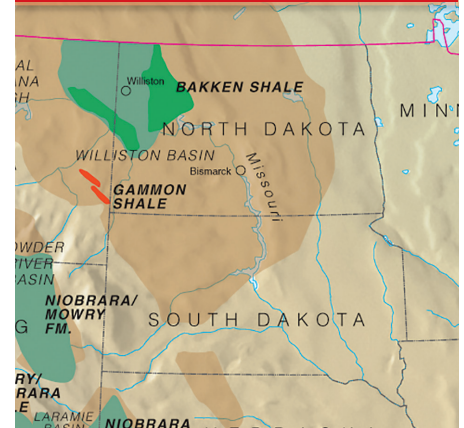
Well Type: Tight oil

Proppant: Low-density ceramic proppant

Well Conditions:
 9,000 - 11,500 ft TVD
 Horizontal wells with multistage transverse fractures
 Average porosity ~5%
 Permeability ~0.04 mD

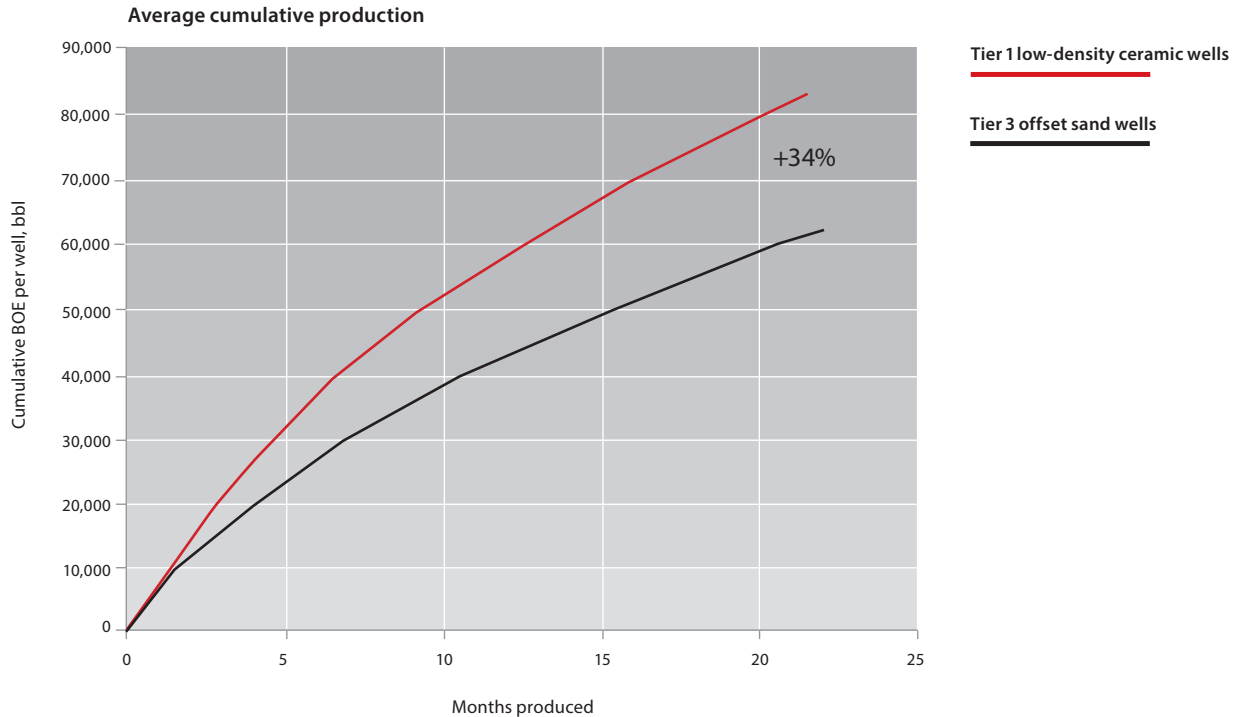


After 22 months of sustained production, low-density ceramic wells produced on average 34% more BOE than offset sand-stimulated wells.



The results

After 22 months, wells stimulated with the Tier 1 low-density ceramic proppant produced an average of 34% more hydrocarbons than the offsets. Assuming \$75/bbl oil and \$3.50/Mcf gas, the production increase over 22 months yielded an incremental \$1.5 million in value per well, thus providing a quick pay-out of upgraded low-density ceramic proppant investment.



The higher conductivity of the low-density ceramic wells generated \$1.5 million in incremental value per well (assuming \$75/bbl oil and \$3.50/Mcf gas) compared to offset sand-fractured wells. Source: SPE 160206

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