



MATURE FIELDS



UNCONVENTIONALS

AccessFrac® Stimulation Service Improves Cluster Efficiency Without Quantifying Stresses

INCREASES INITIAL PRODUCTION RATES BY UP TO 3.2 TIMES

OKLAHOMA

CHALLENGE

- » Operators had not acquired the open hole logging data needed to quantify in-situ and induced stress differentials for effective limited entry design

SOLUTION

- » AccessFrac® service was recommended to effectively stimulate multiple clusters

RESULT

- » Wells utilizing AccessFrac service showed initial production rates 2.7 to 3.2 times higher initial production than comparable offsets

OVERVIEW

The limited availability of diagnostic data for multiple wells in Oklahoma hindered the operators’ ability to effectively design a limited-entry perforating scheme, along with stimulation treatments. AccessFrac® stimulation service was deployed in an attempt to improve cluster efficiency and ultimate recovery from the wells. Wells utilizing AccessFrac service showed initial production rates 2.7 to 3.2 times higher than comparable offsets.

CHALLENGE

In an operating environment of low commodity prices, operators are spending little money on well diagnostics, including the collection of openhole logging data. Data collected from openhole logging can be used to calculate the stress profile and understand the existing heterogeneity along the wellbore. Without this essential data, quantifying stress differentials between clusters and understanding the induced stress interference between clusters are virtually impossible, thus restricting the ability to design effective limited entry. This was the case recently when operators asked Halliburton to help on two of their respective wells in central and southern Oklahoma. Without this valuable data, determining the appropriate perforation setup and stimulation treatment to obtain limited entry and effective treatment design was likely to limit each well’s potential. Fortunately, AccessFrac stimulation service can overcome such unknowns and still achieve high cluster efficiency.

SOLUTION

AccessFrac stimulation service was utilized on the wells, negating the need for a limited-entry design. Both wells achieved excellent diversion pressures during the treatments. Although located in the same field, the wells had very different responses from both a well-to-well and stage-to-stage comparison. These pressure differences are evidence of heterogeneity, which is present in all wells, and must be overcome for any limited-entry design to be effective. The positive diversion pressure responses observed during the treatments and illustrated in Figure 1 and Figure 2 represent the increase in pressure that is needed to open these higher-stress (non-dominant) clusters. This higher stress can be due to differences in mineralogy along the wellbore (heterogeneity) or can be induced by the dilation of the fractures at the lower-stress (dominant) clusters. The key is to overcome these stresses in order to achieve effective stimulation.

RESULT

Effectively stimulating all clusters in a well has the potential to result in higher initial production rates, more uniform reservoir drawdown, and higher ultimate recoveries. In this case, both wells treated with AccessFrac service showed 2.7 to 3.2 times higher initial production rates than comparable offsets within a 10-mile radius. Because of the results seen on these wells, both operators have chosen to deploy AccessFrac stimulation service on future wells.

Diversion Pressure Summary Well #1

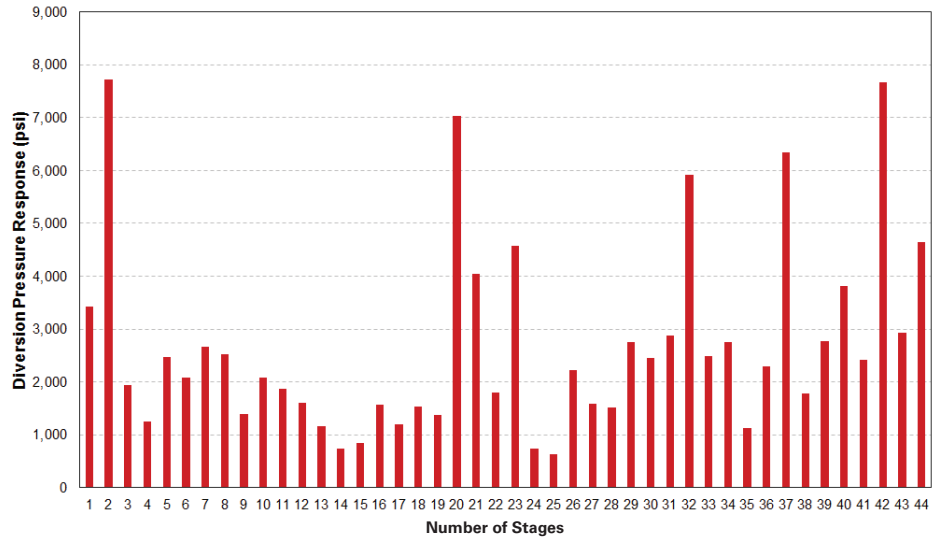


Figure 1. Varying diversion response indicative of heterogeneity in rock type and stress.

Diversion Pressure Summary Well #2

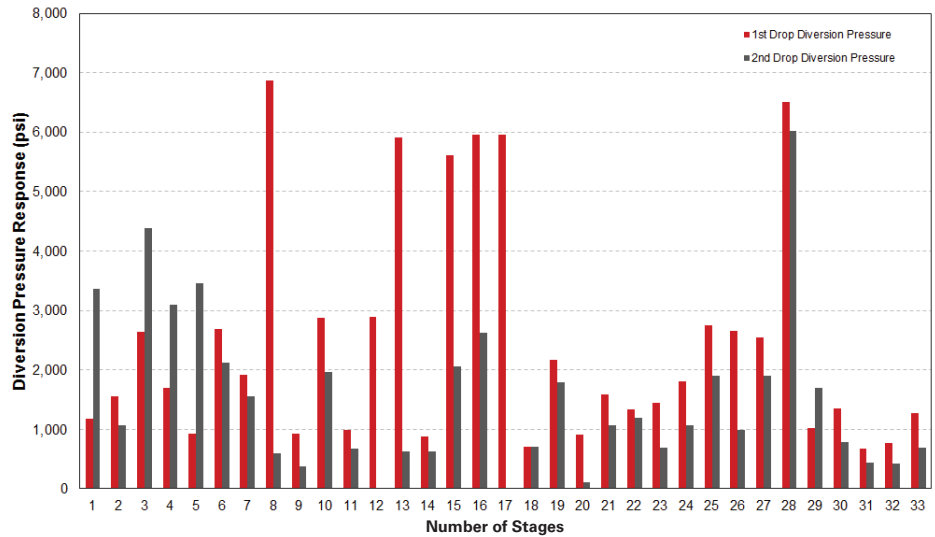


Figure 2. Well with longer perforated intervals showing consistent signs of diversion on both first and second cycles.

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