

BroadBand Sequence Service Reduces Completion Time by 46% for Plug-and-Perf Operations, Eagle Ford

Fracturing service significantly enhances operational efficiency and reduces the number of bridge plugs required by 68%

CHALLENGE

Improve operational efficiency and reduce well completion costs without compromising oil production and recovery in the Eagle Ford.

SOLUTION

Apply the BroadBand Sequence* fracturing service, which uses a composite fluid comprising a proprietary, fully degradable blend of particles and fibers to enable stimulation of longer intervals.

RESULTS

Reduced total completion time by 46% and the number of plugs by 68% compared with conventional techniques, while maintaining well productivity.



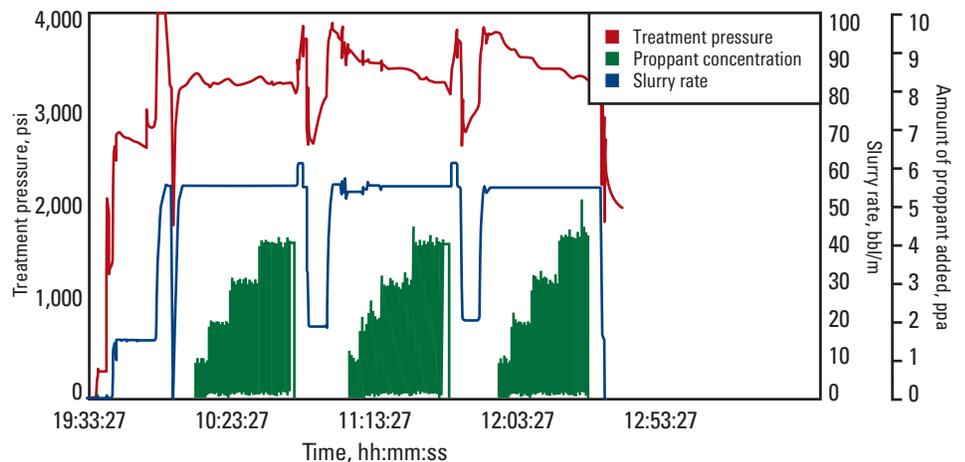
Multiple trips during stimulation operations challenged completion efficiency

An independent operator in the Eagle Ford focuses on the optimization of field development operations with the goal of finding the most effective and efficient methods to complete the wells to generate economic production rates and recoveries. The operator typically uses the plug-and-perf technique, with the following parameters per stimulation stage: an interval length of 200 ft and four perforation clusters.

The interval length dictates the required number of plug-setting operations along the wellbore, and therefore completion times, as well as operational costs. Extending the interval length without altering the spacing between perforation clusters would provide a solution to reduce time and cost. However, limitations on treating rate and fracture gradient anisotropy could lead to ineffective fracturing-fluid distribution among the increased number of clusters within the interval, potentially compromising well productivity and estimated ultimate recovery (EUR). An effective stimulation technique that would optimize fluid and proppant allocation was required.

Broadband Sequence fracturing service provided better stimulation

The BroadBand Sequence fracturing service was used in a new well to evaluate the ability to stimulate more of the reservoir with fewer fracturing intervals. For the candidate well, the interval length was tripled to 600 ft [183 m], greatly reducing the total number of bridge plugs required. The number of perforation clusters per interval was also tripled (to 12) by keeping the spacing between clusters unchanged. For a fair test, the amount of proppant per unit length of lateral and the pumping rate were also kept the same as for a conventional completion. Three stimulation stages were used per interval, separated by two pills of composite fluid.



Using the BroadBand Sequence fracturing service for each 600-ft [183-m] interval between two plugs, proppant was pumped in three stages separated by two pills of composite fluid. The last interval was 400 ft [122 m] long and required only two stages of proppant separated by one pill of composite fluid.

CASE STUDY: BroadBand Sequence fracturing service reduces completion time and costs, Eagle Ford

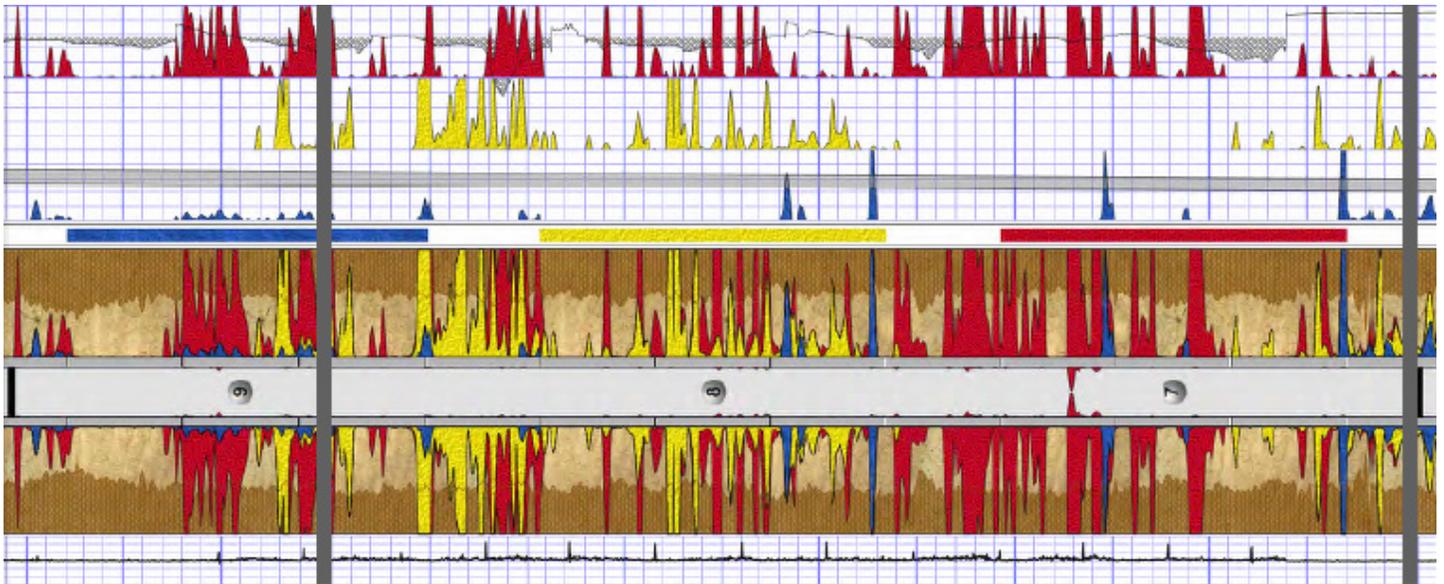
BroadBand Sequence service saved time and costs without lowering productivity

Eight intervals were stimulated, separated by seven bridge plugs. The eighth interval was 400 ft [122 m] long and therefore needed only two stages of proppant (separated by one pill of the BroadBand Sequence service composite fluid), resulting in 23 stages in all. The total operating time for stimulation, milling out the plugs via CT, and subsequent cleanout was 56 hours. An equivalent 23-stage operation using the conventional completion technique would have required 22 bridge plugs and 104 hours.

The effectiveness of the BroadBand Sequence service was confirmed through surface pressure responses and tracer logs. Based on 60 days of oil-, water-, and gas-rate measurements, production from the candidate well was on par with a comparable offset well completed conventionally. The BroadBand Sequence service provided 46% savings in completion time and 68% savings in plug costs, helping the operator achieve a higher rate of return.

		Hours	
		0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96 100 104	
Standard completion treatment	23 stages	76 hours	
	Coiled tubing for 22 bridge plugs		28 hours
BroadBand Sequence fracturing service	23 stages of proppant and 15 pills of diversion material	40 hours	
	Coiled tubing for 7 bridge plugs		16 hours

Operating time for stimulation, milling out bridge plugs via CT, and cleanout was 46% less with the BroadBand Sequence service compared with the conventional plug-and-perf method.



A different tracer (shown red, yellow, and blue) was pumped with each stage of proppant within an interval. The lateral shift in the distribution of the tracers demonstrates that different parts of the wellbore were being stimulated during each stage, testifying to the effectiveness of the BroadBand Sequence service.

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