Prodigi™ Intelligent Fracturing Service Eliminates Poor Proppant Distribution to Clusters While Pumping

INNOVATIVE SERVICE ENABLES MORE EFFICIENT FORMATION BREAKDOWN AND IMPROVES WELL PRODUCTIVITY

DELAWARE BASIN, TEXAS

OVERVIEW
An exploration and production (E&P) company that operates in the Permian Basin approached Halliburton when it was targeting an undeveloped area of the Delaware Basin in Reeves County, Texas. The operator was interested in collaborating with Halliburton to design and execute a stimulation treatment in line with the basin’s operational trends in order to maximize production.

CHALLENGES
Operating in the Delaware Basin can be particularly challenging. High fracture gradients cause elevated treating pressures and unpredictability during stimulation. Geological and operational inconsistencies lead to understimulated perforation clusters. Designed treatment rates are difficult to reach; jobs are frequently not pumped as designed; and it is difficult, if not impossible, to optimize the treatment for maximum stimulated reservoir volume. These challenges result in an inconsistent execution of the designed stimulation treatment.

SOLUTION
To solve these challenges, Halliburton recommended its Prodigi™ intelligent fracturing service to provide a consistent approach to formation breakdown. Specifically tuned to formation properties, Prodigi service is able to adapt to downhole conditions by autonomously and intelligently changing the pump rate during the breakdown phase of the treatment in order to deliver more uniform fluid distribution across multi-cluster intervals and to maximize cluster efficiency. To evaluate the effectiveness of the treatment design, the Halliburton team could also provide real-time subsurface monitoring of the fluid and proppant distribution in each cluster by using its StimWatch® stimulation monitoring service.

RESULTS
The results from utilizing the Halliburton Prodigi service has been impressive for this E&P company in the Permian Basin. Fiber-optic monitoring measured the Uniformity Index, an evaluation of the flow distribution between clusters, for each and every stage along the wellbore. The implementation of Prodigi service yielded a 20 percent more uniform distribution of fluid and proppant, as observed by the StimWatch stimulation monitoring service and depicted in Figure 1. For comparison, these two stages were pumped in the same horizontal well, both executed with the same perforation design and the same maximum rate of treatment. Not only does the Uniformity Index of the Prodigi stage outperform that of the manual stage, but it maintains a consistent level throughout the entirety of the stage while placing proppant. Enabling a more efficient formation breakdown process, Prodigi service created more fracture initiation points along the wellbore, which will lead to improved well productivity as indicated in SPE-194331-MS.
Prodigi™ service eliminated human intervention during the breakdown and rate ramping intervals, thus bringing consistency to the process and results, stage to stage and well to well. The former approach to pressure management during stimulation treatments often resulted in unnecessary pressure spikes on the surface – causing delays, pump kickouts, and incorrect diagnoses of downhole conditions. This variability in the overall stimulation treatment has been reduced, resulting in the Permian Basin operator’s ability to better plan future development and completion activities. As a result of improving cluster efficiency during breakdown, the designed treating rate was achieved earlier than when using traditional breakdown methods. In fact, Prodigi service reduced the overall treatment time, on average, by 30 minutes. All of this has translated into better wells.

**Figure 1** > Fiber optics monitoring reveals a 20 percent improvement of fluid and proppant uniformity across the perforation clusters when Prodigi service is deployed.