Case study: Permian Basin, North America

Optistriker system reduced fluid by 75%, increased monthly production by 2,400%

A Permian Basin operator needed to find an alternative completion method to economically control frac height growth after its initial operation breached a nearby water zone.

The operator asked Baker Hughes to analyze well conditions and suggest an alternative method. Baker Hughes recommended the **OptiStriker™ straddle packer system**, the first of its kind to use two mechanically resettable packers to isolate individual clusters.

The OptiStriker system's resettable packers were deployed on a workover rig which enabled the operator to stimulate five zones, using 10 stages, in a single trip. After a two-month successful evaluation period, the OptiStriker system was deployed throughout the remainder of the wellbore, precisely delivering controlled treatment volumes, straddling 14 zones, performing proppant-laden hydraulic fracture treatments. Rapid depth correlation was achieved by performing a Baker Hughes mechanical casing-collar locator service, which ensured the packers were set at the correct depths every time. This not only improved operational efficiency, but also delivered greater assurance that the packers were securely in place.

The OptiStriker system is also designed to run pressure and temperature memory gauges throughout the bottomhole assembly. For this specific job, the gauges were placed above, between, and below the packers for monitoring and diagnostic purposes. Post-job data analysis allowed the operator to confirm isolation during the fracturing of each stage, enabling a better understanding of how the formation reacted to the fracturing treatment—paving the way for future applications.

After the treatment, the system was retrieved from the well and no post-frac operations were required. The well was placed on rod lift and began producing immediately, avoiding nonproductive time (NPT) and excess water disposal costs.

The OptiStriker system also delivered the added benefit of requiring less fluid overall, since the well didn't have to be killed after every stage, saving additional dollars in flowback and disposal costs.

Due to the reduced fluid volume needed from surface, the fracture treatment could also be customized on the fly to be more responsive to the formation's feedback, providing increased control. Multiple ports on the OptiStriker system provided circulation around the packers for quick screenout recovery that can sometimes be caused by low fluid volumes.

Challenges

- Control fracture growth to avoid breaching nearby water zone
- Reduce fluid requirements while controlling frac screen outs
- Stimulate underperforming frac zones in an existing vertical well
- Control water disposal, fluid and hydraulic horsepower costs

Results

- Reduced needed fluid volumes by 75% compared to plug-and-perf methods
- Increased oil production from 200 to 5,000 B/M
- Reduced flowback and disposal costs
- Achieved rapid depth correlation and greater packer placement reliability
- Minimized tool trips with the use of Optistriker sytem stimulating 19 zones in a single trip, using resettable packers at an average repositioning time of 40 minutes per stage

Efficiently deploying the system on this workover rig increased well production from 200 B/M to 5,000 B/M—an increase of approximately 2,400%.

Fluid volumes needed to hydraulically fracture the stages were reduced by 75% as compared to a traditional plug-and-perf completion, stimulating 2,917 ft (889 m) of lateral, with an average repositioning time of 40 minutes per stage, reducing NPT and associated costs.

Operational summary	
Total stages	6
Max frac rate	25 bbl/min
Total acid	181 bbl
Total light weight proppant	47,367 lbs
Average bottomhole treating pressure	6,750 psi
Average time between stages	38 min
Max well depth	6,038 ft
Oil production B/M	200 to 5,000 B/M

Monthly oil
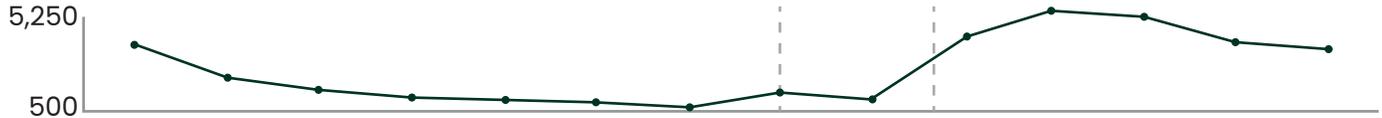
Monthly gas

Monthly water
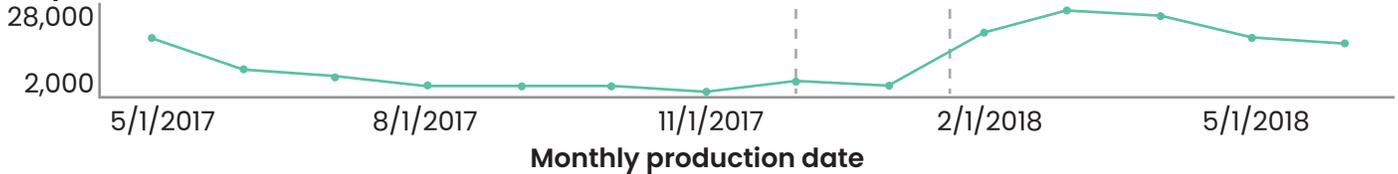
Original well production increased from 200 B/M to 5,000 B/M after the OptiStriker system was deployed on this workover well in the Permian.

Baker Hughes

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