Silverback Cashes In Using LateralScience℠ Advanced Analysis

C&J ENERGY SERVICES

Advanced Workflow Takes Engineered Completions to the Next Level

Innovative Workflow Uses Drilling Data to Optimize the Wellbore

Why apply the same fracturing treatment to every stage when you know the stages don't have the same reservoir properties? The LateralScience method interprets drilling data to help guide the placement of stages and perf clusters to mitigate the negative impact of lateral heterogeneity along the wellbore.

LateralScience Advanced Analysis Delivers Precise MSE Evaluation Across the Lateral

Applying advanced analysis to the LateralScience method enables us to model the effects of various drilling conditions. These models are then used to normalize the mechanical-specific-energy (MSE) results across the entire lateral. Because we can now reliably compare results between stages – despite the variations in BHAs and drilling efficiencies that occur during the drilling process – we are able to build stage-specific treatment designs.
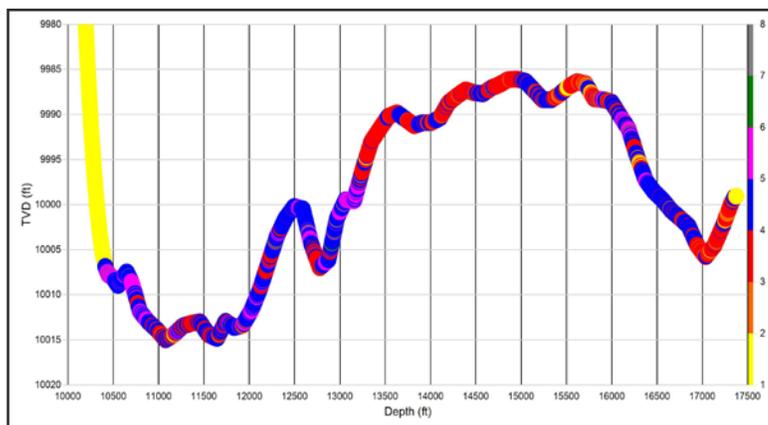

Figure 1: LateralScience TVD Output for Parker 1H

Silverback Builds Asset Value Using LateralScience Advanced Analysis

In Q2 2016, Silverback Exploration held 35,500 acres in Reeves County, Texas, and they had already drilled two Upper Wolfcamp A wells that were optimized using sonic data. Each of these wells had oil IP 30 results that exceeded 600 B/D and were considered successful wells.

Silverback became aware of the LateralScience method prior to completing their third well. Using this option, the well achieved significantly better oil IP 30 results (924 B/D). This success led to three additional wells, with two in the Upper Wolfcamp A. (To provide a like-to-like comparison, analysis going forward is limited to Upper Wolfcamp A.)
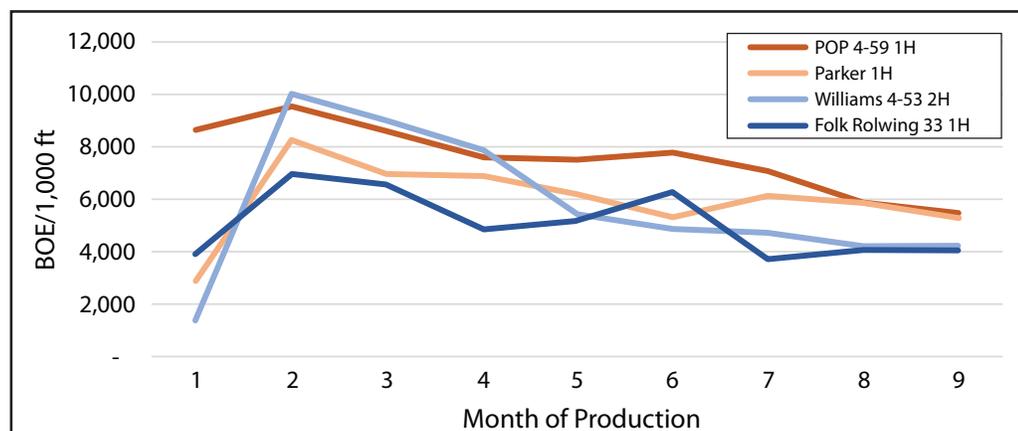

Figure 2: Comparison of Four Wells in Upper Wolfcamp A – Normalized Total Production

LateralScience wells are shown in brown, and those using sonic data are shown in blue.

Long-term production results, controlled for lateral length, demonstrated sustained improvements for the LateralScience-based completions designs. The LateralScience wells outperformed the two sonic wells by an average of 25% in the first nine months, with Oil IP 30 results averaging >1,000 B/D. These results were achieved using 100-ft stage lengths and between 4 to 6 clusters per stage, depending on the MSE hardness index.

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Silverback's Success Pays Off

Silverback's success did not go unnoticed by the industry, and their acreage position was ultimately purchased by Centennial Resources in December 2016 for $855 million. Centennial already owned the acreage that directly offset Silverback's, and while Centennial's acreage had lower GOR, their analysis of the Silverback wells projected EUR values 33% better than the offsetting Centennial wells (283,000 vs. 212,000 BOE/1,000 ft) when normalized for lateral length.

Centennial Subsequent Activity

The analysis motivated Centennial to drill three new Upper Wolfcamp A wells on the acreage they had acquired from Silverback. The initial results were very encouraging, with the best of the new wells being the Big Fundamental 4-52 1H. This well was located directly between the Williams 2H and the Pop 1H wells that Silverback had drilled.

The new Centennial wells (including the Balmorhea State 2H) had been completed using a geometric design with constant stage lengths and they increased the clusters per stage from three to 15.

This provided an excellent opportunity to evaluate the optimized LateralScience five-cluster design vs. the geometric 15-cluster design.

LateralScience Process Demonstrates Value

After a short time, both LateralScience wells significantly outperformed the best 15-cluster geometric and sonic-based designs. This confirms the excellent value delivered by the C&J LateralScience advanced-analysis process.
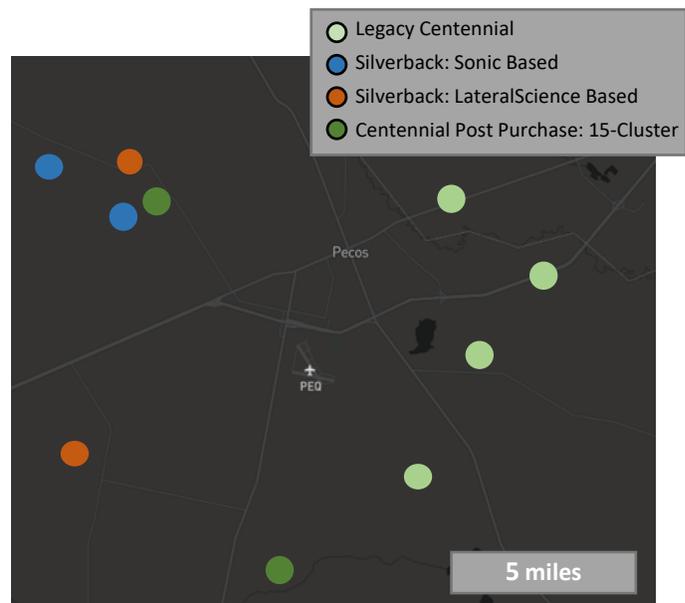

Legend:
- Legacy Centennial
- Silverback: Sonic Based
- Silverback: LateralScience Based
- Centennial Post Purchase: 15-Cluster

Pecos

PEQ

5 miles

Figure 3: Upper Wolfcamp A Near Offsets: Centennial and Silverback

Legend:
- POP 4-59 1H
- Williams 4-53 2H
- Big Fundamental 1H
- Parker 1H
- Folk Rolwing 33 1H
- Balmorhea ST 2H
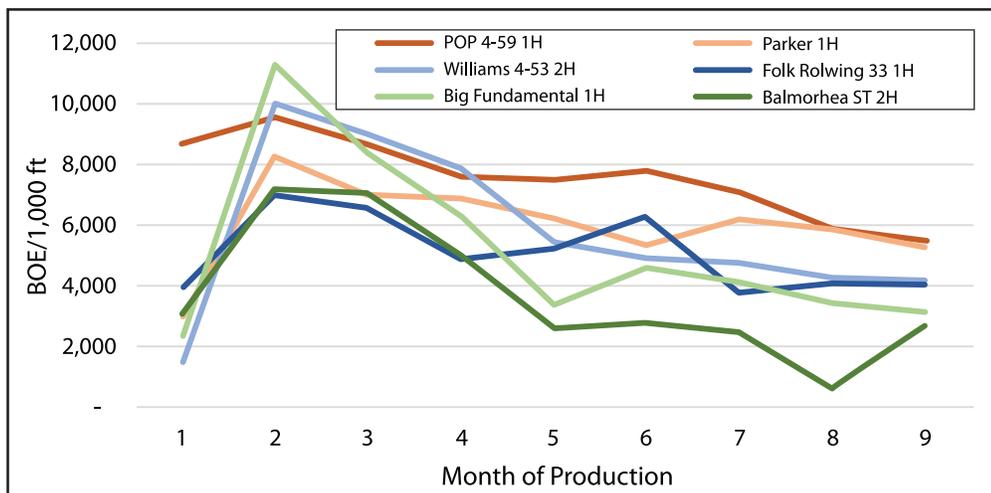
Y-axis: BOE/1,000 ft
X-axis: Month of Production

Figure 4: Production Results for Upper Wolfcamp A Wells – Normalized Total Production

LateralScience wells are shown in brown, those optimized using sonic data are shown in blue, and the new Centennial 15-cluster wells are shown in green.