DRILL 2 FRAC

**CASE STUDY**

# Designing Effective Diverter Strategies in the Eagle Ford Shale

## Objective

Many operators in South Texas have found that well productivity is being driven by maximizing hydraulic fracture density and complexity. This typically requires shorter stage lengths which can result in increased completion time and costs.

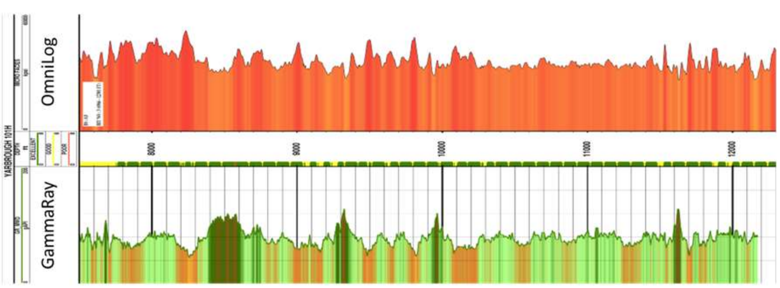
Some operators are incorporating the use of diverters into their completion designs in an attempt to save money through longer stage lengths and improve production through increased cluster density and efficiency. However diversion effectiveness is often suspect.

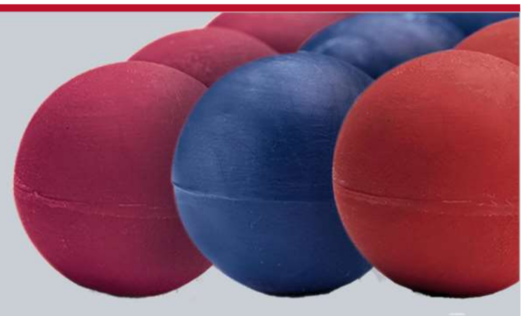
An Eagle Ford operator challenged Drill2Frac to improve diverter effectiveness through designing the completion around lateral heterogeneity obtained from available drilling data.

## Results

By using Drill2Frac's (D2F) OmniLog™ lateral profile, combined with flow simulations performed with the PerfAct™ engine, a new diversion design was engineered incorporating a reduction in the number of diverter drops from three to two, while keeping all other completion parameters consistent including stage length, number of clusters per stage and pump schedule.

Implementation of this design resulted in clear indication of positive diversion response combined with a significant operational improvement in terms of stages being pumped to completion.



Diverters are described as a chemical agent or mechanical device used in injection treatments, such as matrix stimulation, to ensure a uniform distribution of treatment fluid across the treatment interval.

The diverting agents are drawn towards perforation clusters that are actively taking fluid, inhibiting flow to those clusters, and re-distributing the fluid to clusters which may be under-stimulated.

Drill2Frac's Engineered Diversion Strategy is the only commercial service that analyzes a well's lateral heterogeneity with completion design to help guide exactly where and when diversion occurs. As a result, clusters are stimulated in a controlled, predictable manner resulting in maximum productivity while minimizing screen outs.

*OmniLog plot shows moderate heterogeneity along the lateral which in turn was used to design diverter strategy*

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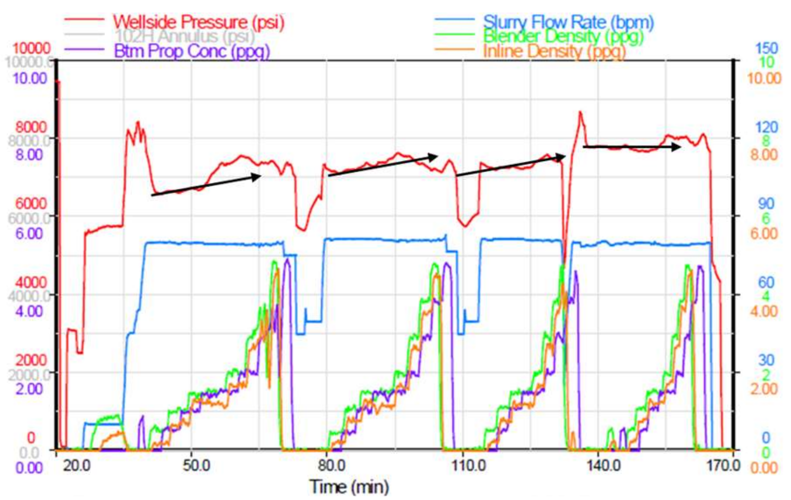
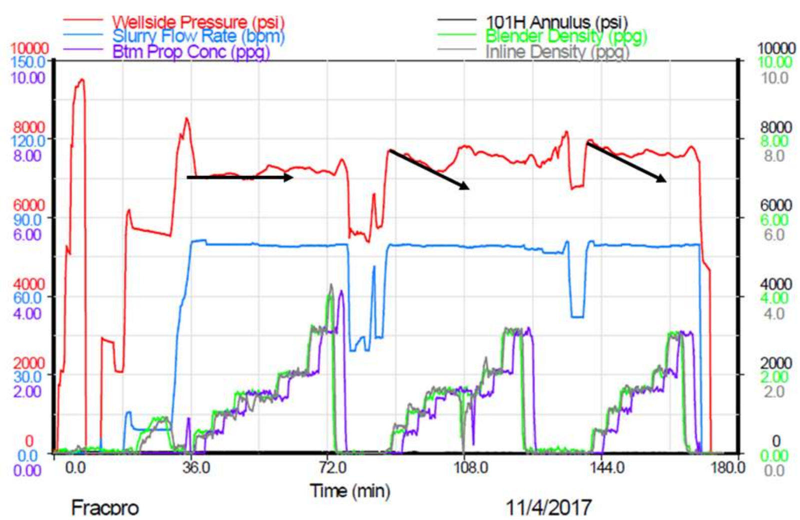
# Validation of Technique

The Drill2Frac technique was validated by completing one well with an engineered diversion technique and simultaneously treating two offset wells drilled on the same pad and completed with a conventional diversion approach.

Upon review of the post job fracture treatment reports, it was seen that 88% of pressure responses from the D2F diversion designs showed effective diversion into virgin rock. In contrast, the conventional approach resulted in only 64% effectiveness. In addition, the D2F stages reduced screen outs by 66% versus the direct offsets.




## Comparison of Engineered Diversion vs Classic Diversion Techniques

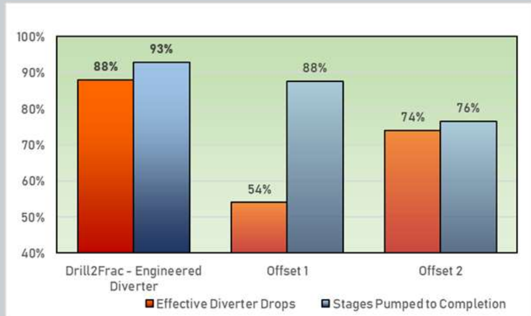



*Chart comparing the D2F technique to two direct offset wells drilled on the same pad, to the same target and completed at the same time with a classic diversion technique.*

*Pressure response showed that diversion drops were on average 37.5% more effective when designed around lateral heterogeneity and resulted in 66% fewer stages being terminated early due to excessive diversion pressures.*

*Left Top: Classic diverter application where diverter provides a pressure response when on formation, but pressure trend does not change, indicating ineffective diversion.*

*Left Bottom: Engineered diversion response shows a deviation in pressure response indicating new rock is being stimulated after diversion.*