

## PerforationVA

# MAXIMIZING RE-FRACTURING PERFORMANCE

EV's Optis Infinity camera provides a complete 360° image of the well while substantially reducing operating time and cost

### INEFFICIENT FRAC DESIGNS

Fracture treatments and stage designs for new wells have evolved considerably over the past decade contributing to significant production growth. Older wells completed originally with less efficient techniques can benefit from more up-to-date designs and treatments using re-fracturing methods. These offer the prospect of economically boosting production in appropriately selected wells.

The operator's initial frac design was proven to be inefficient, with production declining much more rapidly than expected for a number of wells. Believing that significant reserves may still be unexploited, these wells were selected for re-fracturing with the aim of restoring their true production potential.

In a bid to maximise re-frac performance, the operator selected EV's PerforationVA service to evaluate the effectiveness of a range of stage designs on a pilot well, in order to apply the optimum configuration across all remaining candidate wells.

### IDENTIFYING OVER AND UNDER TREATED ZONES

EV's Optis Infinity M125 camera was deployed in memory mode on standard Coiled Tubing, to confirm and quantify proppant placement at each and every perforation downhole. With the ability to record 360 degree sideview video across the entire well, Optis Infinity provides a top-to-toe perspective of well performance & integrity, in stunning high definition.

Thanks to its 360-degree field of view and GigaPixel resolution, Optis Infinity captured detailed images of each and every perforation within the well (**Fig.1**).

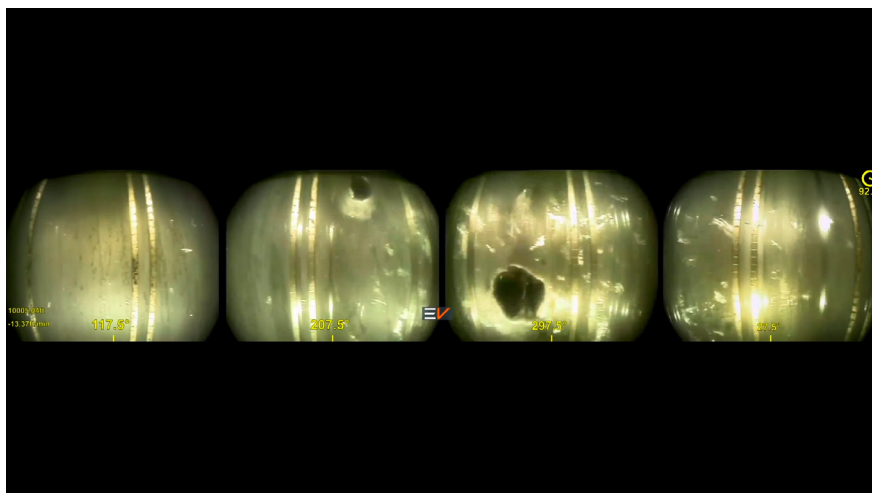


Figure 1: Optis Infinity sideview footage capturing perforations

### ⚠️ THE CHALLENGE

A US operator experienced declining production levels in a number of wells. These wells were identified and selected for re-fracturing, with the aim of restoring their true production potential. In a bid to maximise re-frac performance, EV's PerforationVA service was applied to evaluate the effectiveness of a range of stage designs on a pilot well, in order to apply the optimum configuration across all remaining candidate wells.

### 💡 THE SOLUTION

EV's Optis Infinity M125 camera was deployed in memory mode on standard Coiled Tubing, to evaluate the effectiveness of a range of stage designs on a pilot well in order to apply the optimum configuration across all remaining candidate wells. With the ability to record 360 degree sideview video across the entire well, Optis Infinity provides a top-to-toe perspective of well performance & integrity, in stunning high definition.

### ✅ THE RESULTS

Each and every perforation was analyzed successfully with PerforationVA (**Fig.2**), with results revealing clear indication of heel-toe bias in geometrically designed stages. Engineered stage designs with tapered perforations were proven to be successful, resulting in a more uniform heel-toe ratio (**Fig.3**). The optimized stage design was also identified, giving the operator enhanced control of their proppant placement (**Fig.4**). The success of the pilot well was demonstrated by its production data, with production of oil & gas returning to nearly 90% of it's initial production levels (**Fig.5**).

### QUANTIFYING CLUSTER EFFICIENCY

Using an integrated visualization and dimensioning platform, EV's analysts analyzed each perforation in detail, delivering precise calculations of eroded area in a highly time-efficient process (Fig.2).

Results revealed clear indication of heel-toe bias in geometrically designed stages, with evidence of over and under stimulated clusters. Engineered stage designs with tapered perforations were proven to be successful, resulting in a more uniform heel-toe ratio (Fig.3).

### MAXIMIZING PRODUCTION ECONOMICS

Having provided a complete picture of the fracture treatment, the optimized stage design was identified, giving the operator enhanced control of their proppant placement and enabling effective, full-lateral stimulation (Fig.4).

The success of the pilot well was demonstrated by its production data, with production of oil & gas returning to nearly 90% of its initial production levels (Fig.5).

By applying the optimized stage design to the remaining wells, the operator can ensure similar, or even higher levels of performance, helping to maximise production economics and return on investment.

With unrivalled operations and analytics experience, EV provide a unique advantage in measuring the success of plug and perf hydraulic fracturing operations. Whether new wells or re-fracturing operations, PerforationVA provides the definitive assessment required to enable effective decision-making for hydraulically fractured wells.

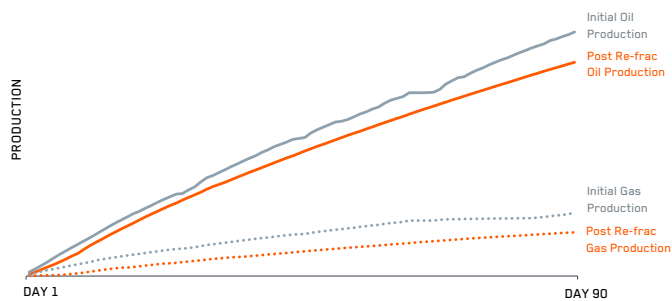


Figure 5: Production levels after re-fracturing returned to nearly 90% of initial production



Figure 2: Dimensioned perforation with eroded area calculations

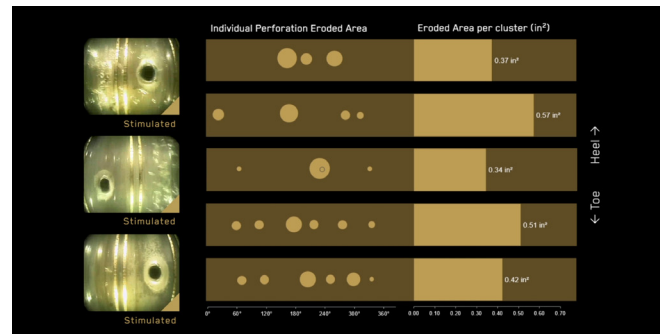


Figure 3: Engineered stage designs revealed a more uniform heel-toe ratio

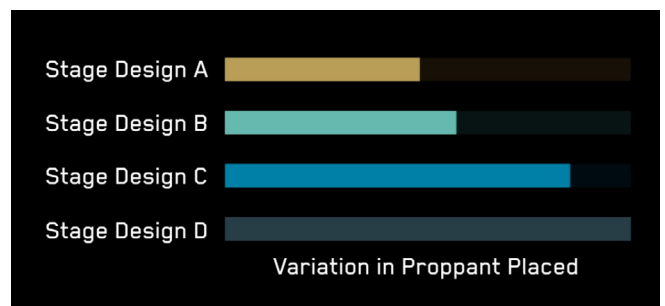


Figure 4: The best performing stage design was identified