UNCONVENTIONALS

CASE STUDY

Combo Services Provide Single-Trip Assessment of Multiple Completion Designs for Two Wells

COMBINATION OF THREE SPECTRUM® SERVICES DELIVERS COMPLETION DESIGN EVALUATION ALONG 10,000-FOOT LATERALS

UNITED STATES

CHALLENGES

- Analyze erosion and cluster efficiency in two wells with 10,000 feet (3048 meters) of lateral
- Diagnose placement of fractures via tracer presence identification
- Measure impact of Prodigi™ and XLE services, and variable cluster designs at high frac rate

SOLUTIONS

- SPECTRUM® Diagnostics service – to perform distributed temperature sensing (DTS) for warm-back analysis
- SPECTRUM 360 multi-side-view, flow-through camera – for downhole visualization and circulation of fluids to reach total depth and improve image quality
- SPECTRUM FUSION bottomhole assembly – with GR sensor to identify tracer locations

RESULTS

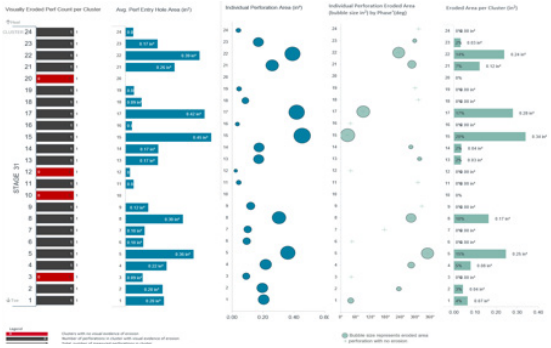
- Provided cluster efficiency profile of the 10,000-foot (3048-meter) lateral of each well
- Created a photographic log of the treatment interval and analyzed dimensioning and erosion area of each perforation, and how each cluster design broke down and performed
- Identified the actual depth at which each tracer was located

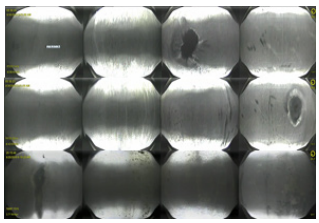
OVERVIEW

Two unconventional U.S. wells with very long laterals (10,000 feet/3048 meters) were the subject of a completion design evaluation. The objectives were to perform an eroson analysis and cluster efficiency analysis, diagnose fracture placement by identifying tracer presence pumped in some stages, and evaluate the impact of Prodigi™ and XLE services, and variable cluster designs at a high rate of fracturing. Well conditions were first reviewed and simulated by Halliburton Production Solutions to validate whether SPECTRUM® real-time coiled tubing services were capable of producing the desired results in a single run.

HALLIBURTON USES SPECTRUM® SERVICES TO EVALUATE COMPLETION DESIGNS

A combination of three SPECTRUM services was needed to accomplish this job. The use of SPECTRUM Diagnostics services enabled the project team to perform distributed temperature sensing (DTS) and warm-back analysis to infer where fluids had entered the reservoir (the depths where injection into the reservoir occurred will exhibit more cooling and, therefore, will take longer to warm back to background temperatures after injection ceases). The SPECTRUM 360 camera provided visualization of well intervention services, aiding the diagnostic efforts with high-resolution images. And, finally, a SPECTRUM FUSION bottomhole assembly (BHA) loaded with gamma ray (GR) sensing capability helped identify the location of tracers – another important diagnostic tool in identifying key reservoir and completion variables that have a direct impact on well performance.





Sample of SPECTRUM® Diagnostics erosion and perforation data (left) and SPECTRUM 360 photographic log images (right).

In a single run, Halliburton Production Solutions was able to provide the customer with a complete assessment of multiple completion designs used in two wells. This data will also benefit the design of future completion projects.

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