CASE STUDY

HALLIBURTON

Permian Basin

Operator avoids wellbore damage, and significantly reduces proppant costs using real-time data insights

A record 75 cemented DataSphere® Array system quartz gauges + fiber optics provide far-field monitoring for well space out and fracture optimization

CHALLENGES

Deploy a highly instrumented observation well to verify well space out and determine fracture propagation

- Reduce cost and complexity of existing perforating systems
- Overcome limitations of current systems in the market
- Obtain high-resolution reservoir pressure data

SOLUTIONS

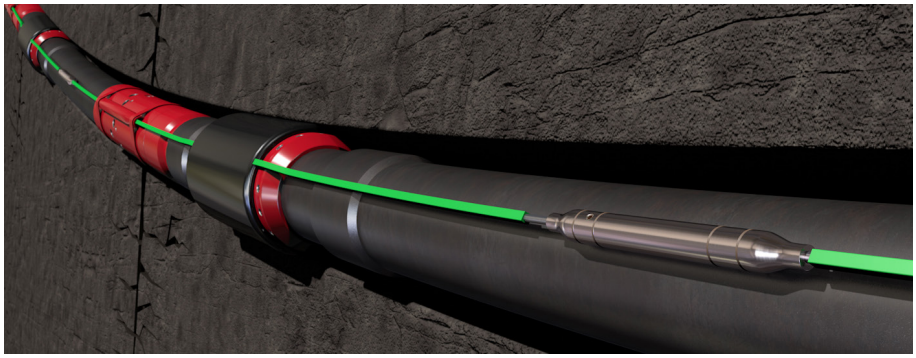
DataSphere® Array permanent monitoring system with 75 sensors and fiber optics

- Cementable, welded DataSphere system sensors
- Simple clamping scheme on casing
- Efficient operations with no cable terminations or associated rig time

RESULTS

Real-time reservoir pressure, temperature, and acoustic monitoring data insights

- Far-field monitoring for effective analysis of fracture propagation
- Per pad savings attributed to reduced fracture proppant volumes



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Overview

A major operator in the Permian Basin wanted to increase overall field production output and significantly reduce frac proppant costs that result from tighter well spacing and overstimulation.

Currently established solutions for formation pressure monitoring use perforating systems, along with conventional permanent monitoring quartz gauges, which can be cumbersome, costly, and slow to deploy. Such perforating systems use multiple connections (potential failure points) and charges that pose health, safety, and environmental (HSE) risks.

Halliburton and the operator collaborated on a downhole monitoring solution that included the DataSphere® Array permanent monitoring system and fiber optics. A highly instrumented observation well, deployed with a record 75 sensing elements cemented on the outside of the casing, provided the high-resolution pressure, temperature, and acoustic data necessary to evaluate the frac design and ultimately improve well production.

Challenges

To better understand well space out and fracture propagation, the operator needed to obtain high-resolution pressure data from multiple pads. Perforating systems allow less than 15 sensors deployed per well, which significantly limited the operator's data acquisition and reservoir-understanding goals.

CASE STUDY

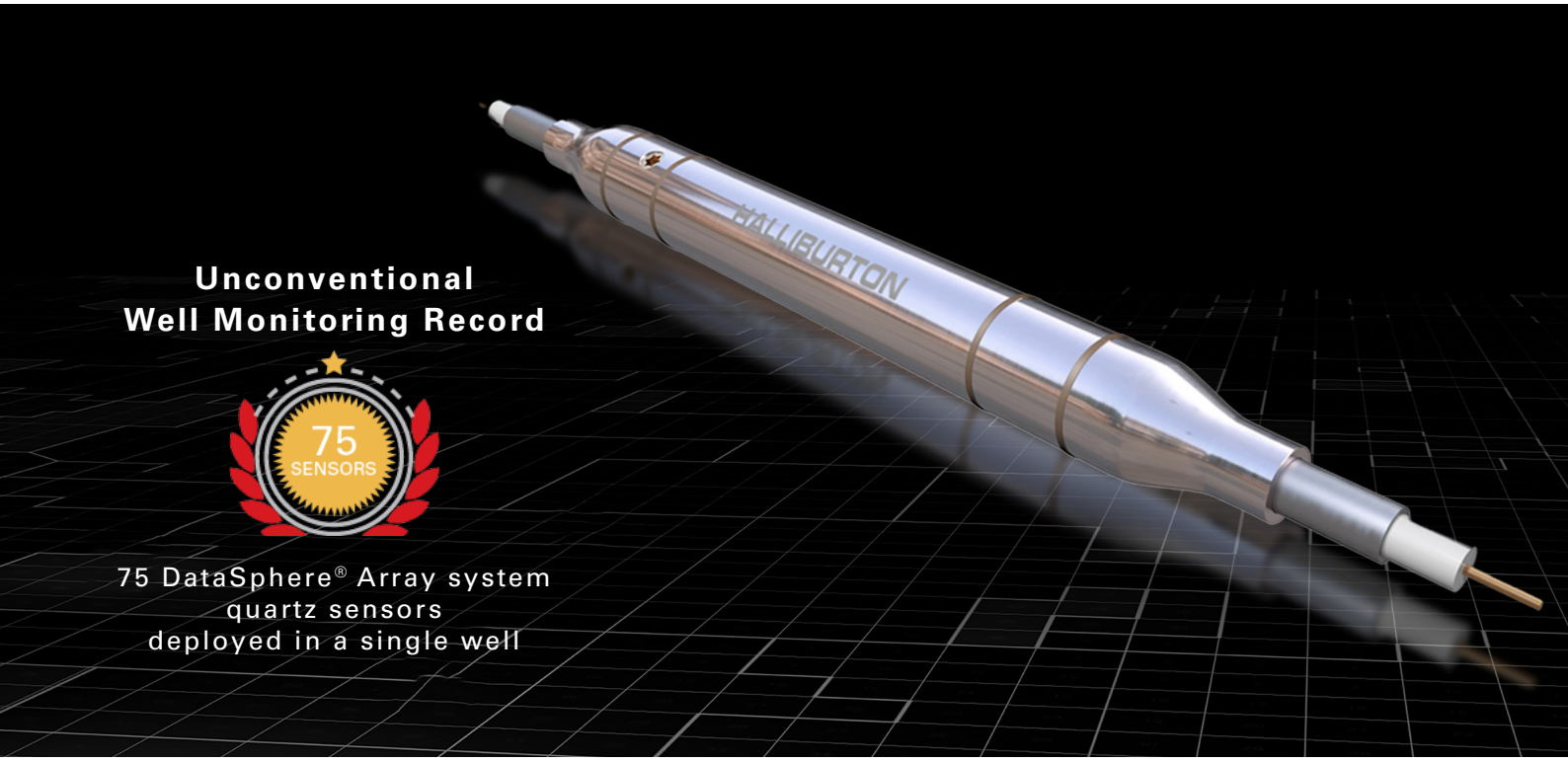
Solutions

Halliburton proposed a cemented, casing-deployed DataSphere® Array permanent monitoring system with 75 pressure and temperature sensing points for well space out and fracture optimization, in addition to long-term production depletion monitoring.

Results

During operations, the DataSphere Array system saved the operator significant rig time versus perforating systems on the market because the Array system has no connections or mandrels and simply clamps to the casing along with the fiber-optic cable. In addition, the system can measure formation pressure and temperature through cement, which eliminates the need for perforating charges- and the associated costs and HSE risks.

The cemented DataSphere Array system provided high-resolution pressure data from multiple formations that, when fractured, produced invaluable data insight regarding well space out and fracture propagation from adjacent wells in the pad. Such data helped the operator determine that multiple wells were drilled closer than originally planned, which would have caused overstimulation of the formation had the fracturing schedule remained the same. The monitoring system helped the operator avoid costly wellbore damage caused by overstimulation and ultimately enabled adjustments to frac proppant volumes, which saved tens of millions of USD and maximized asset value.



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