WIRELINE SERVICES

MICROSEISMIC SERVICES

Optimize stimulation decisions in real time

DRILLING & FORMATION EVALUATION
WELL CONSTRUCTION
COMPLETION & STIMULATION
PRODUCTION

Weatherford®

MAKE BETTER, FASTER STIMULATION DECISIONS

OUR MICROSEISMIC SERVICES MAP A MORE EFFICIENT COMPLETION.

Profitability can be lost in the details. Your stimulation spend can drain into subseismic faults and unmapped fractures, leaving you with suboptimal proppant placement, bypassed pay zones, and mounting stimulation costs.

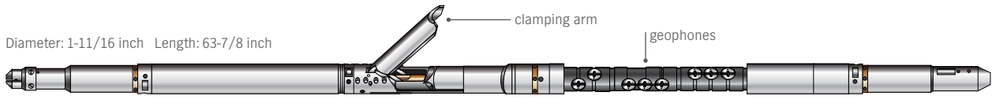
Our microseismic arrays let you track the progress of each stage, so you can refine your hydraulic fracturing plan in real time.

We provide purpose-built borehole microseismic arrays for near-reservoir and in-treatment-well monitoring. Our SlimWave Quadpack array tool has four stacked geophones per directional component, to significantly improve signal quality and sensitivity. And when you need to map the height, length, and azimuth of your hydraulic fractures—but lack an offset well—our Spear tool delivers actionable fracture-propagation imaging.

Our state-of-the-art technologies record, process, and interpret microseismicity from single-stage or multistage hydraulic fracture stimulations in real time. Combining up-to-the-second downhole data with 3D visualization and interpretation software, our specialists provide actionable information to help you improve the productivity of your assets while saving time and expense.

RAPID MOBILIZATION

We match our skill with speed. The Weatherford Express Land Unit is a fully-integrated, self-contained logging unit. Optional on-board satellite capabilities provide fast and efficient field data upload and communications, while a telescoping steel mast enables work to be done in the absence of on-site service or drilling rigs.



SlimWave Quadpack array tool uses four stacked geophones per axial component.

OUR MICROSEISMIC SERVICES HELP YOU:

- Analyze fracture geometries and optimize fracture models in real time
- Evaluate diverter, proppant, and frac fluid placement and performance
- Determine fracture height, growth, half-lengths, and stimulated volume
- Reveal anomalous drainage patterns and conductive fracture networks
- Ascertain the impact of depleted zones or natural fractures and faults
- Track interactions between wells and stages

IMPROVING FRAC EFFICIENCY IN REAL TIME

An operator working in an unconventional reservoir used our microseismic services to evaluate the effectiveness of hydraulic fracture propagation during a stimulation job, and changed the stimulation plan in real time to achieve more efficient stimulation design.

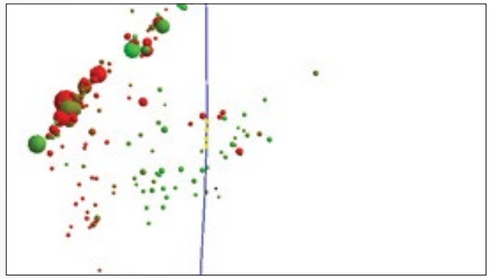


Figure (a) illustrates a screenout of a stage treatment with events sized by moment magnitude and colored by time (green = earlier, red = later). All large events lined up along an unforeseen mini-fault, which caused the screenouts.

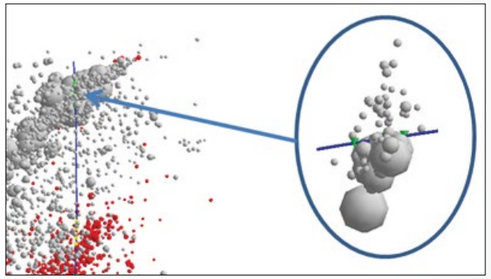


Figure (b) shows large-magnitude events propagating from the target shale formation into a limestone formation below. This prompted the operator to change its frac strategy to develop fractures in a deeper zone.

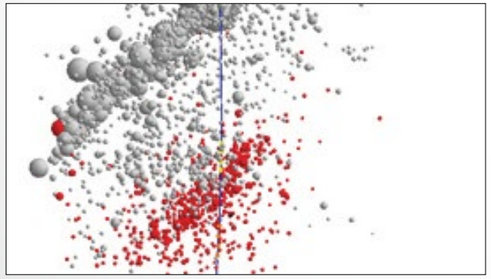


Figure (c) shows red events from the revised plan, which prevented screenouts and opened new fractures in the formation. Events from earlier stages are shown in gray. The operator saw highly effective fracture propagation within the target zone; these newer fractures resulted in increased production.

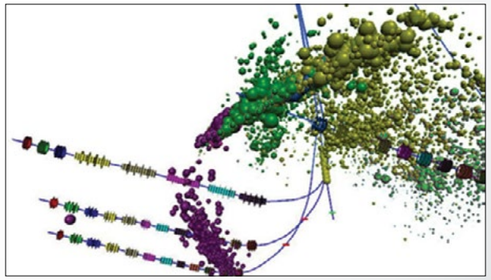


Figure (d) displays results from two frac treatments in a different set of lateral wellbores. Two years after the initial treatment, a subsequent frac job revealed an extension to the earlier observed trend. This later frac job shows that while most of the events cluster along the NW-SE trend, some of the larger events again occur along the initial NE-SW fracture trend.

Weatherford provides integrated microseismic acquisition, processing, and interpretation services. To learn how our services and technologies can work for you, contact your authorized Weatherford representative, or visit us at **weatherford.com**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