

HORSESHOES, HAND GRENADES AND MICROSEISMIC

RICHARD MASON
CHIEF TECHNICAL
DIRECTOR

THURSDAY,
MARCH 1, 2018
7:00AM

Close counts in horseshoes, hand grenades—and for “good enough” in oil and gas. But, “close” doesn’t move the technology needle, resulting in a gap between the best performing E&Ps and the larger pool of firms that comprise the eminently modest average.

Out on the leading edge of performance, technically astute managements, often private-equity backed privately held teams, or a select group of technically proficient publicly held firms, consistently deliver headline results.

A recent microseismic program in Cochran County, Texas, illustrates the theme. Midland-based Element Petroleum III LLC acquired 42,000 acres along the southern edge of Levelland Slaughter Field in Cochran County in 2015. Element has drilled 11 wells, completed nine and will resume drilling in second-quarter 2018.

The E&P initially employed downhole microseismic using a single vertical well to monitor stimulation performance, then contracted with Houston-based MicroSeismic Inc. in 2017 to do an 11-arm star-shaped surface array to gauge stimulation program effectiveness and, incorporating petrophysics from a vertical test coring program, is building a detailed reservoir model to develop greenfield acreage.

The effort is part of an unfolding San Andres horizontal play on the Central Basin Platform where a dozen E&Ps are adapting unconventional completion techniques to conventional carbonate oil targets along the edges of legacy megafields.

The Element story reflects evolution in the Permian where technical teams developed expertise fracturing individual zones in Wolfberry vertical wells pre-2011, translating those learnings into today’s horizontal effort. Element, currently backed by ArcLight Capital Partners LLC, was instrumental in Midland Basin development in Howard County, Texas, eventually selling Howard County properties to Athlon Energy Inc., Linn Energy Inc., Breitburn Energy Partners Inc., Blue-Whale Energy North America and Callon Petroleum Co. before prospecting in Cochran County.

Microseismic is one arrow in the company’s technological quiver. In an era where Big Data is a requisite part of the E&P narrative, microseismic remains underutilized and is present on roughly one in 20 horizontal wells. When incorporated with reservoir simulation models, microseismic becomes a real-time in situ laboratory in which to observe the reservoir response to stimulation. E&Ps are able to move beyond a completion recipe generated via numerical modeling into a

dynamic program that can adjust stimulation in real time to match changing reservoir properties.

In Element’s case, microseismic determined the reach of each stimulation and whether the fracture stayed in zone. More importantly, microseismic was instrumental in determining well spacing for greater density development, increasing the property’s value. Element eventually plans to sell its Cochran County acreage.

“This will give a company acquiring this asset the foundation to go to full development of the property,” said Jamie Small, a geologist and Element vice president.

Enter MicroSeismic Inc. CEO Peter Duncan, who outlined for *Oil and Gas Investor* how microseismic data morphed from its roots tracking individual seismic events during stimulation over a decade ago into a comprehensive reservoir evaluation process that enables E&Ps to effectively develop acreage.

Duncan recapped how efforts to determine where proppant was actually placed led to the development of proprietary reservoir modeling that ties together permeability of stimulated rock, stimulation inputs, and matrix contributions to generate accurate projections of drainage volume. Replicating findings across acreage allows E&Ps to craft the right stimulation recipe and the proper number of wells per drilling unit to maximize harvest.

“You’re doing a real-time lab experiment in what really happens in your rocks with the way you pump. If you can interpret that correctly, you can then say: ‘Now, assuming that rock is the same 500 feet away, this is how I should be pumping the well,’” Duncan said. “If you monitor the next well in real time and you see it changing, then you can turn the knob and cook it just right.”

Today’s microseismic enables E&Ps to improve “on the fly” rather than sticking with a model until something doesn’t work, then isolating which variable changed. Duncan said the methodology improves capital efficiency and accelerates net present value by determining when it makes economic sense to add—or eliminate—a lateral.

Joe Rhone, Element business development manager, said: “Spending money on microseismic or cores, it’s ‘pay me now or pay me later.’ We have to understand the rock. It’s money well spent to figure out how to size the fracks. We only want what we need, otherwise costs get out of hand.”

Close adds points in horseshoes, but nothing tops a ringer in oil and gas.

Oil and Gas
Investor

Copyright© Hart Energy
Publishing LLP
1616 S. Voss Rd.
Suite 1000
Houston, TX 77057
(713) 260-6400