



# SPECTRUM<sup>SM</sup> Diagnostic Service Combines Millout with Cluster Efficiency Analysis in a Single Run

**REAL-TIME COILED TUBING PROVIDES INSIGHT AND EFFICIENCIES THAT SAVE OPERATOR BOTH TIME AND MONEY.**

BAKKEN, NORTH DAKOTA

**CHALLENGE**

- » For each well, in a single run that would include a plug millout, provide cluster efficiency data to optimize customer’s future perforation strategy
- » Successfully deploy coiled tubing in difficult, extended-reach environments

**SOLUTION**

- » SPECTRUM<sup>SM</sup> Diagnostic Services, a real-time coiled tubing technology, for combining diagnostics with a plug millout in a single trip
- » Halliburton technical know-how and expertise for extended-reach operations’ design and execution

**RESULT**

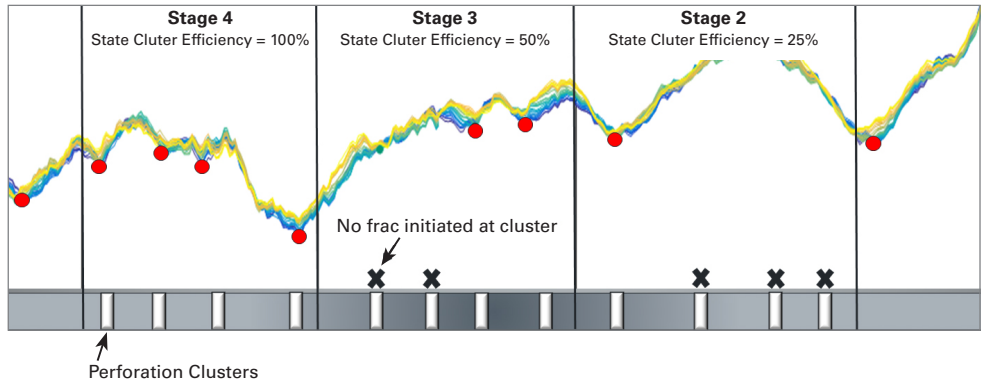
- » SPECTRUM service diagnostic technology enabled flawless execution of millouts and cluster efficiency analyses, thus optimizing time on location, fluids consumption, and data gathering
- » Diagnostics provided customer with better insight into future completion strategies to maximize productivity and well performance

**OVERVIEW**

An operator in the Bakken shale play was seeking a solution for milling out plugs in two challenging extended-reach wells and for immediately conducting a post-stimulation review of the cluster efficiency data to identify which perforations were taking fluid. SPECTRUM<sup>SM</sup> Diagnostic Services was proposed in order to leverage Halliburton’s unique coiled tubing capabilities in extended-reach environments to deliver distributed temperature and acoustic surveys in order to provide comprehensive cluster efficiency data in a single run.

**CHALLENGE**

The client had several key challenges. First, for each well, the need was to efficiently mill out frac plugs in an extended-reach lateral. Second, the customer wanted to gather distributed temperature sensing (DTS) data along the entire length of the lateral to determine the effectiveness of the frac and perforating design. The solution would need to deploy fiber-optics-equipped coiled tubing, without compromising intervention performance, so that both operations could be executed in the same run in the hole.

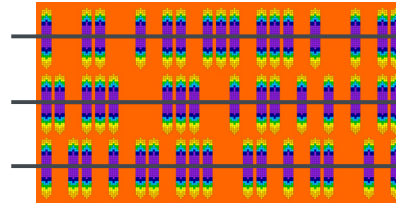


*Production analysis from perforation clusters.*

In addition, to deliver these combined activities, the extended-reach scenario required optimal job design, pipe selection, and field execution in order to guarantee enough weight on bit so that plugs in the toe could be milled. The solution also needed to deliver time savings and operational efficiency.

**SOLUTION**

Halliburton recommended SPECTRUM Diagnostic Services, a proprietary fiber-optics coiled tubing technology, to deliver distributed temperature and acoustic analyses. Unlike other alternatives, such as chemical tracers, wireline “tractored” logging, or permanent fiber-optic installations, SPECTRUM Diagnostic Services is uniquely positioned to deliver rapid execution, combined milling and diagnostic capabilities, and full coverage of extended-reach intervals.



LESS THAN  
**60%**  
CLUSTER  
EFFICIENCY

**RESULT**

Important findings on the effectiveness of specific clusters were available to the customer immediately after completion of the millout and distributed survey stages. An estimated 21-hour time improvement in execution per each well resulted in savings related to operational and surface ancillary activities. Significant savings were achieved by eliminating the tripping in/out times normally required for separate runs; operational risks; pipe fatigue accumulation; and significant fluids consumption, handling, and disposal. For both wells, SPECTRUM Diagnostic Services provided valuable and innovative techniques that enabled the customer to both mill out plugs and analyze cluster efficiency in a single trip.

**DID YOU KNOW**

SPECTRUM Diagnostic Services delivers coiled-tubing-conveyed fiber-optic distributed sensing to provide real-time capabilities to assess reservoir performance, monitor the wellbore, and visualize treatment efficiency. The ability to access downhole insight enables the opportunity to design customized solutions while also implementing onsite decisions to deliver optimal well production and intervention results.

**FEATURES**

- » Fiber-optic-based measurements
- » Distributed temperature sensing (DTS)
- » Distributed acoustic sensing (DAS)
- » Distributed strain sensing (DSS)

**APPLICATIONS**

- » Cluster efficiency
- » Production profiling
- » Injection profiling
- » Leak detection
- » Well interference
- » Fracture mapping
- » Diversion effectiveness
- » Gas lift optimization

[www.halliburton.com](http://www.halliburton.com)

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H012420 3/17 © 2017 Halliburton. All Rights Reserved.