

# Award-Winning Halliburton Technologies Combine to Provide Enhanced Wellbore Insight

## UNIQUE PACKER AND SLEEVE SOLUTION ENABLES RECORD-SETTING SUCCESS

BAKKEN SHALE PLAY, NORTH DAKOTA

### CHALLENGE

Help an operator in the Bakken shale play to gain a better understanding of its reservoir and stimulation effectiveness by:

- » Collecting data while stimulating and isolating individual zones
- » Reducing installation time over traditional methods
- » Optimizing field performance

### SOLUTIONS

Halliburton proposed an unconventional completion solution with:

- » RapidStage® Cable-Protector sleeves with DTS fiber-optic cable
- » Swellpacker® Cable systems
- » Halliburton fiber-optic solutions

### RESULTS

In addition to flawless installation of the completion system and the ability for real-time monitoring of well information, this solution:

- » Saved 5 days of rig time
- » Achieved continuous pumping in multiple stages
- » Provided insight into frac and isolation effectiveness

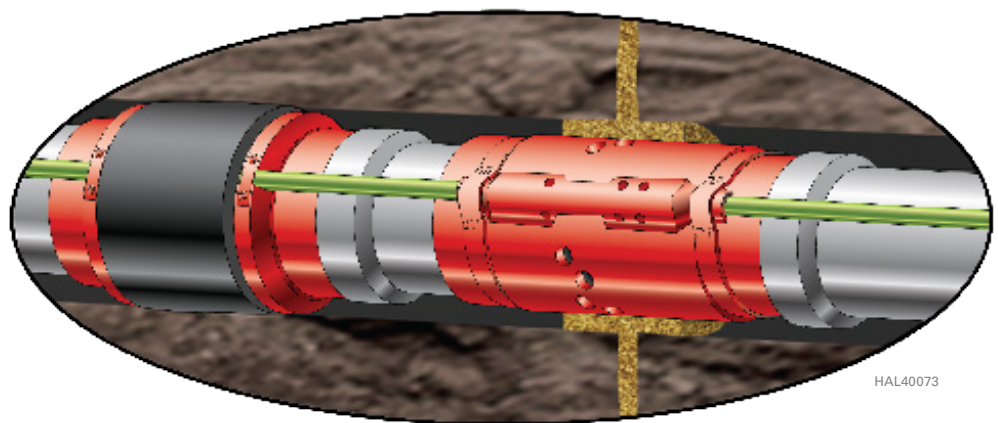
### OVERVIEW

To optimize well performance for its Bakken operations, a major operator turned to Halliburton to design a completion solution that would allow for active monitoring of a wellbore before, during, and after performing a frac. Halliburton proposed a completion system comprising of multistage frac sleeves, fiber-optic cables, and swellable packers. The installation was successful and helped the operator gather valuable insight about its fracturing effectiveness and wellbore production in order to continuously improve their performance.

### CHALLENGES

This major operator in North Dakota's Bakken shale play wanted to enhance its standard completion design by installing fiber-optic cables for wellbore monitoring in order to gain a better understanding of the reservoir and its stimulation effectiveness. Fiber-optic cables enable the use of distributed temperature sensing (DTS) technology, which helps provide valuable information about which zones are producing, as well as the effectiveness of isolation during stimulation. The data obtained also provides additional value when designing future completions, because it helps to optimize stimulation treatment and placement for additional wells in the same field. By doing so, there can be a ripple effect of increased economic value on each successive well in the field, enabling more BOEs to be produced at a lower cost.

To successfully implement this technology, multistage frac sleeves and a robust, feed-through isolation solution were required.



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A record-setting 31 Swellpacker® Cable systems were successfully installed, and the reliability and efficiency of this installation helped to further demonstrate the value that Halliburton could provide for monitoring complex wells.

### SOLUTION

Halliburton proposed the interventionless ball-drop RapidStage® CP (Cable Protector) sleeves, featuring an innovative shroud designed to protect the DTS fiber during stimulation. The RapidStage CP sleeve enables highly accurate placement of fractures, while allowing operators to individually access many separate intervals in a single wellbore.

To isolate each zone, Halliburton proposed the Swellpacker® Cable system. With its award-winning cable feed-through feature, the Swellpacker Cable system enables the passage of control lines and/or flat packs through the elastomer for downhole monitoring operations without the need for splicing or stripping cables and cutting control lines. This solution can save 4–8 hours of rig time for each packer, adding up to substantial cost savings even for a single well. In addition, potential weak points in the fiber are eliminated, since no splicing is required.

### RESULTS

A record-setting 31 Swellpacker Cable systems were successfully installed, including 29 systems with one ¼-in. feed-through to accommodate the DTS, and two other systems with two ¼-inch feed-throughs to accommodate an additional line for permanent gauges. This innovative installation system worked flawlessly, allowing the operator to install each cable through the packer in less than 10 minutes on average. In addition, the RapidStage CP sleeves further improved efficiency by enabling continuous pumping of multiple stages for stimulation treatment.

The reliability and efficiency of this installation helped to further demonstrate the value that Halliburton could provide with industry-leading completion solutions or technologies for monitoring complex wells. Additionally, the data that the operator was able gather and analyze enabled it to optimize the completion design of future wellbores. Using the data, Swellpacker Cable systems and RapidStage CP sleeves could be placed in the best location along the lateral section to enhance production results.

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