

# Frac Sleeve DUC Well Completed 410 Days After Installation Shatters Local Record

## NEW LEVEL OF BALL-DROP EFFICIENCY ACHIEVED IN BAKKEN SHALE PLAY

WILLISTON BASIN, NORTH DAKOTA

### CHALLENGES

Williston Basin DUC wells that have ball-drop fracturing sleeves increase risk when trying to operate them after a long period of time.

- » Customer confidence can be eroded when DUC well completion operations experience issues with ball-drops and achieving positive zonal isolation

### SOLUTIONS

RapidStage® sleeves with Swellpacker® isolation systems proved their efficiency and reliability, even after being left in the well for long periods of time in harsh conditions.

- » Ball drops with high accuracy reduced proppant over-displacement during completion
- » Helped to eliminate the need for wellbore cleanouts, saving time, reducing risk and fluid exposure
- » Sleeves open reliably without excessive over-pressure or pumping operations

### OVERVIEW

An operator in the Williston Basin needed to improve efficiencies and costs on its drilled but uncompleted (DUC) wells. These DUC wells were originally drilled as far back as late 2015 and had openhole ball-drop frac sleeve systems installed. The company challenged Halliburton to provide a completion solution that addresses the concerns of these aging wells, while delivering peak fracturing efficiency capabilities with these systems.

In January, Halliburton successfully completed a DUC well on this pad, performing the fracturing operation 410 days after installation of the completion system – and shattering the record for the longest amount of time a frac sleeve has spent downhole in a DUC well for the area, while still performing as designed.

The latter two wells, both drilled in early 2016, each consisted of a VersaFlex® expandable liner hanger system, Swellpacker® isolation systems, and 49 RapidStage® frac sleeves. The successful fracs, with 99% ball landing efficiency through the use of dissolving RapidBall™ DM self-removing balls, were conducted 329 days and 342 days, respectively, after the installation of the completion systems. In addition, the Halliburton Production Enhancement team successfully completed the two adjacent wellbores with a peak treatment efficiency of 16 stages completed in a 12-hour period.

### CHALLENGE

Starting in 2014, operators in the Williston Basin began transitioning to plug-and-perforate operations as the predominant completion method instead of openhole frac sleeve completions. This transition was largely due to observed production improvements and satisfactory operational efficiencies achieved through simultaneous wireline and pumping operations on multi-well sites, along with an increase in available pumping horsepower. Even with these simultaneous operations, plug-and-perforate completions have not resulted in the peak completion efficiencies and low service intensity that can be achieved by dropping frac balls and pumping continuously.

Pad drilling with multiple wells per location has enabled efficient drilling, which, in busy periods, outpaces the completion capabilities of the local market. That, coupled with the 2014–2016 drilling downturn, created hundreds of DUC wells in the Williston Basin. Many of these older wells were completed with ball-drop frac sleeve systems. This can be a concern because as time passes there is an increased risk of challenges when trying to operate frac sleeves that have been installed for several months or more.

## RESULTS

Completion program on two DUC wells resulted in record-breaking efficiencies with reliable ball-drop operations and positive zonal isolation.

- » Fracturing operation completed 342 days and 329 days after installation, achieved a peak efficiency of 16 stages in 12-hour period
- » Another well on the pad was successfully completed 410 days after installation
- » 99% ball landing accuracy and zero sleeve opening issues during continuous pumping operations

## SOLUTIONS

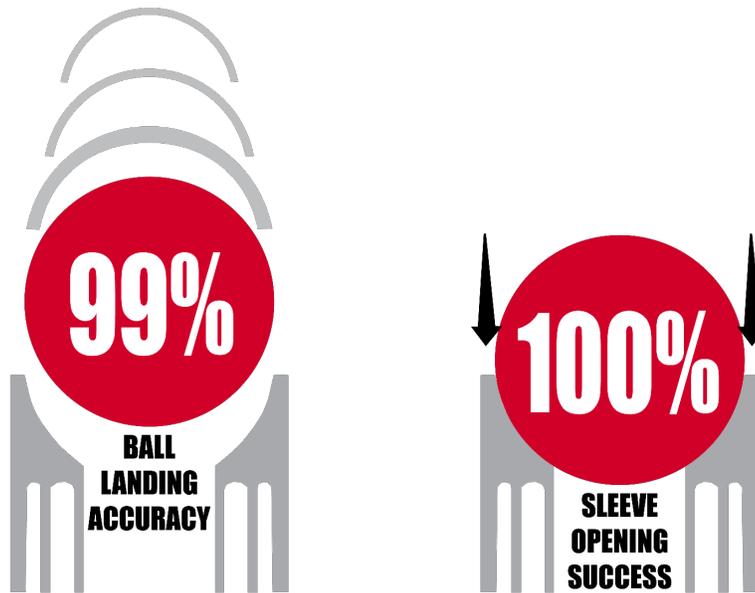
RapidStage frac sleeves with Swellpacker isolation systems have consistently proven their long-term reliability and completion efficiencies throughout their long track record. In the Williston Basin alone, these technologies have enabled hundreds of wells, most with 49 or 50 stages, to be successfully completed with reliable zonal isolation most often within a few months of installation. Up until these fracs, the longest recorded duration for completing a DUC well was around 300 days. Anytime an extended delay is anticipated it is recommended to the operator to add corrosion inhibitors to the displacement fluid that will remain in the lateral.

These systems not only achieve peak completion efficiencies with reliable, continuous pumping ball-drop operations and zonal isolation, but they also deliver intervention-free completion and pre-production phases with no wellbore cleanout required to put the well on production. This eliminates many of the proppant over-displacement concerns and overall fluid exposure on the proppant pack and reservoir during both phases.

## RESULTS

After a single well on the pad was completed 410 days after installation, setting a Williston Basin record in mid-January, a two-well program was successfully completed in February. These latter two wells were completed 342 days and 329 days after installation, respectively, and achieved 99% ball landing accuracy along with several other wells on the same pad.

With consistent sleeve opening performance, the fracturing operation achieved a peak efficiency of 16 stages in a 12-hour period, enabling the operator to successfully complete two 49-stage DUC wells with greater reliability and efficiency while decreasing risk and reducing overall completion costs.



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