

Innovative Elect[®] Frac Sleeve System Proves Successful for Demanding Well Conditions

'FIRST OF A KIND' SLEEVE SYSTEM ENABLES COMPLEX COMPLETIONS AND MINIMIZES RISK

COTTON VALLEY FORMATION, EAST TEXAS

CHALLENGES

- » Successfully run in hole, cement, pressure test, and open an electronic toe sleeve
- » Minimize risk with operational pressures
- » Enable future operations by lowering required opening pressures

SOLUTION

- » Electronic Elect[®] monobore frac sleeve system, with an electro-hydraulic lock, rather than shear pins, to resist operating pressures
- » RapidStart[®] Initiator CT toe sleeve, which allows for a casing pressure test for an extended period of time before the sleeve opens

RESULTS

- » Both the Elect and RapidStart Initiator CT sleeve systems were successfully run in hole, and cemented
- » Performed pressure test before timer expired with no issues
- » Applied desired pressure after timer expired and successfully opened Elect toe sleeve

OVERVIEW

In an East Texas Cotton Valley horizontal well, Rockcliff Energy set out to validate the newly released Halliburton electronic Elect[®] monobore toe sleeve system. The Elect system is the only electronic frac sleeve on the market that can be reliably cemented in a well. Rockcliff Energy wanted to evaluate this innovative technology to see if it would be a viable solution for significantly reducing time and risk on future applications.

CHALLENGES

Rockcliff Energy was interested in a frac sleeve system without operational pressure limitations to allow for higher circulating and cementing rates, and to help eliminate the risk associated with wellbore packoff and the inadvertent shearing of pins.

A further limitation with conventional toe valves is determining an ideal pinning configuration that resists operating pressures from running in hole, cementing, performing casing pressure tests, and running another completion tool such as a liner hanger. Halliburton worked with Rockcliff Energy to create a plan for running a new technology that would create this value without introducing risk into the completion.

SOLUTION

The Elect monobore frac sleeve system is a platform of electronically powered equipment that actuate to turn simple casing into smart completion tools. The Elect toe sleeve system does not utilize shear pins to resist operating pressure in the wellbore. Instead, it uses an electro-hydraulic lock that unlocks after a predetermined, programmed amount of time. This allows the use of operating pressures that approach the limitations of the casing prior to unlocking. Further, the fullbore drift provides the ability to run high-efficiency wiper plugs and pass tools through the sleeve without risk of becoming stuck.

The Elect toe sleeve system was run in hole, along with the Halliburton RapidStart[®] Initiator CT (Casing Test) toe sleeve, which is a reliable, field-proven toe sleeve that allows for a casing pressure test for an extended period of time before the sleeve opens. This minimized the risk of the field trial, as it allowed for the Elect frac sleeve to be actuated and given a chance for validation before having the RapidStart Initiator CT toe sleeve act as a contingent solution.

ROCKCLIFF ENERGY IS EXCITED ABOUT THE POTENTIAL APPLICATIONS OF THE **ELECT[®] FRAC SLEEVE TECHNOLOGY** IN HIGHER-PRESSURE WELLS, AND AS A METHOD TO **REDUCE THE COST, TIME, AND RISK ASSOCIATED WITH A TOE SLEEVE OPENING EARLIER THAN PLANNED.**

RESULTS

The Elect toe sleeve system was programmed with an actuation time of 197 hours and pinned for an opening surface pressure well below that of the RapidStart Initiator CT toe sleeve. Both tools were successfully run in hole and cemented, thus validating the ability of the electro-hydraulic lock to withstand standard operating pressures.

Approximately 18 hours before the Elect toe sleeve system was programmed to actuate, a successful casing pressure test was performed at 9,000 psi, 5,000 psi above the pinned pressure of the Elect frac sleeve. This validated that the electro-hydraulic lock could withstand the pressures associated with casing pressure tests.

Approximately two hours after the Elect toe sleeve system was programmed to actuate, pressure was applied to open the Elect frac sleeve. It successfully opened within the desired range. Due to the large variance between the Elect toe sleeve and the RapidStart Initiator CT toe sleeve pinning pressure, establishing injection at the lower pressure validated that the Elect sleeve was the one that opened.



WHY ELECT® SLEEVES?

A revolutionary step in unconventional completions is the successful test of an electronic frac sleeve without operational pressure restrictions from running in hole, cementing, and performing casing pressure tests during a programmed time window, followed by successfully opening the tool after the timer had elapsed.

Not having to rely on mechanical measures to hold back operating pressures significantly reduces the risk and time involved with field personnel and engineers planning how a frac sleeve is dressed and run in hole. The Elect frac sleeve also allows for more complex completions in the future, where operational pressures may be higher than available pinning pressures or where high pressures may be encountered unexpectedly due to wellbore conditions.

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