



Remotely Operated Technology Achieves Global Milestone with 1,000 eRED® Valve Installations

eRED® BALL VALVE HELPS ELIMINATE APPROXIMATELY 2,400 INTERVENTIONS AND REDUCES CO₂ EQUIVALENT BY AN ESTIMATED 67 METRIC TONS[†] ON AVERAGE PER JOB

GLOBAL

CHALLENGES

- » Multiple interventions associated with conventional plug methods
- » Reduce slickline rig up/rig down operations to perform interventions
- » Surging due to close-ended string
- » Packer and liner ball-drop setting difficulties due to highly deviated and horizontal completions leading to costly rig time
- » Needed a means to test lower completion integrity prior to reaching setting depth

SOLUTIONS

eRED® electronic remote equalizing device

- » Reliable multi-cycle valve tested in accordance with ISO 14310 barrier standards
- » Deployed open or closed
- » Ability to bleed back activation pressure to observe equalization and confirm valve opens
- » Prepared onshore or offshore either as a preinstall or run in hole during intervention
- » Ability to close using various activation methods, such as pressure and/or time
- » Flexible programming performed at the base or wellsite
- » Multiple applications
- » Flexible deployment options on slickline, wireline or coiled tubing, or preinstalled within tubing
- » Two built-in transducers provide pressure and temperature data

OVERVIEW

The first eRED® electronic remote equalizing device deployed in 2008 introduced a novel technology that reduced well interventions and simplified operations. Since then, the proven reliable eRED valve has achieved 1,000 installations globally — making it the first electronic remotely operated, multi-cycle valve within Halliburton to reach this record milestone.

During its installation history, the eRED valve has achieved an impressive activation success rate of 98%, measured by requested ball functions vs. actual functions. The eRED valve's flexibility has allowed deployment in a large variety of applications as a barrier, packer setting and flow control device during completion installment, workover and abandonment operations.

CHALLENGES

Operators typically performed well plugging operations using conventional plug and prong equipment, which required intervention methods to deploy and set. In complex well applications, additional interventions led to increased costs and risks. Available alternatives, such as single-shot plug devices, provided closed-to-open functionality but applications were limited by the one-time use, particularly if conditions changed during the operation. This often necessitated pulling the plug to surface and running a backup unused valve, significantly increasing time and risks.



SOLUTIONS

Remote open close technology (ROCT) provided a means to reduce intervention operations and costs through the first-of-its-kind eRED® valve, which remotely functions using a preprogrammed trigger setup that allows the valve to open and close multiple times, as and when required, without intervention.

Before deployment, the valve can be preinstalled onshore inside the completion tubing and programmed using flexible triggering methods, such as time and pressure, to initiate ball valve movements. For example, upon reaching the desired depth, hydrostatic pressure triggers the eRED valve to “wake up” before closing hours later using a time delay to initiate a barrier within the well. This delay timer allows time to reach setting depth, circulate, and displace fluid before landing the hanger and completing a changeout of the blowout preventer/tree.

RESULTS

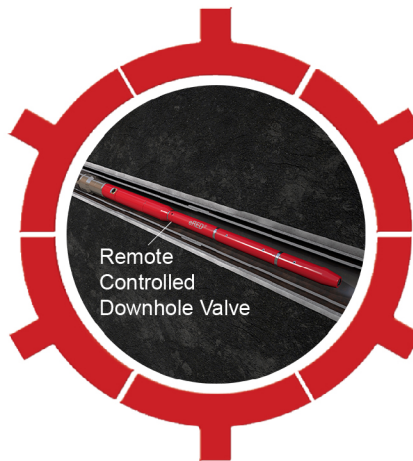
- » Achieved 1,000 installations in more than 23 countries
- » Helped eliminate approximately 2,400 interventions
- » Reduced carbon footprint by an estimated 67 metric tons[†] of CO₂ equivalent per job on average
- » Achieved 98% remote activation success rate
- » Enhanced operations by providing multiple open/close actuations
- » Minimized the number of interventions and personnel on board, thus saving time, cost, and reducing risk of HSE exposure

Applications

Packer Setting, Barrier Device, Acid Stimulation Zonal Isolation, Well Test Shut in Tool, Replace Ball Drop in Setting Tools

Deepest Installations **21,739 ft**
 Max Temperature **135°C /275°F**
 Longest Life **2+ years**

Global Run History
1000 Installations



98% Remote Activation Success

Most Remote Activations Downhole **20**

2358 Interventions Eliminated

RESULTS

Since the first eRED valve deployment in 2008, the Halliburton ROCT team has achieved a record milestone, with more than 1,000 installations completed for more than 60 operators globally. To date, the eRED valve has eliminated approximately 2,400 interventions and effectively reduced rig time, costs and the associated operational and health, safety and environment (HSE) risks. The environmental impact gain was calculated as a CO₂ equivalent reduction of 67 metric tons[†] on average during each job.

[†]The information contained herein is for demonstrative purposes only as provided by Halliburton. It is based on estimations of input data from estimated operating hours based on type of work and emissions factors as provided by the IPCC's Climate Change Synthesis Report (AR5). It does not necessarily represent actual measured emissions.

This sustainability data is not intended for and should not be used by the customer or any other party for any other purpose.

This sustainability data is based on Halliburton's reasonable estimate(s) and assumption(s). Where appropriate, Halliburton's internal work methods and models were used to provide estimates.

Underlying assumptions and information concerning the calculation method will be made available upon request subject to confidentiality requirements and limitations on the ability to release third-party confidential data.

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