

Valve Mitigates HSE Exposure During Completion Deployment

NORTHERN NORTH SEA

CHALLENGE

- » Limit intervention
- » Reduce time and risk involved with the rig-up of surface pressure-control equipment to install, test, and retrieve each barrier

SOLUTION

- » Standard tubing hangers and production packer plugs were replaced with an eRED® valve and three wireline runs

RESULTS

- » At least 18 hours of rig time saved
- » Both eRED valves were pre-installed onshore, saving one wireline rig-up and rig-down
- » Less exposure to potential waiting-on-weather time
- » Well was circulated to completion fluid without the need for any additional intervention
- » Cost-neutral reduction in operational risk

OVERVIEW

The Ninian field, operated by CNR International, is located in the northern North Sea approximately 140 miles northeast of Aberdeen, Scotland. CNR had previously run an a Halliburton eRED® electronic remote equalization device on another well on the Ninian Central platform as a well barrier for intervention purposes. The eRED valve was run successfully and was recovered upon the completion of all testing.

CHALLENGE

In a standard platform completion deployment operation, wireline plugs and prongs are used as isolation devices below the production packer and tubing hanger. These operations require several interventions together with the associated time and risk involved with the rig-up of surface pressure-control equipment (PCE) to install, test, and retrieve each barrier.

SOLUTION

In this injector well operation, standard tubing hangers and production packer plugs were replaced with eRED valve, removing the need for wireline, and helping to reduce risk and overall cost of the operation. Each eRED valve was set to the closed position and installed onshore prior to deployment. The first installation was the deep-set eRED valve, made up to a 4½-in. bridge plug, then set and pressure-tested from above and below in the pup joint below the 7-in. production packer.

The second eRED valve was made up to a 4.700-in. lock and set in the tubing hanger nipple profile. The lock was then pressure-tested. Upon completion of all testing, each valve was programmed to open. The assemblies were shipped offshore, with the valves switched to their running mode looking for the next trigger.

With both eRED valves pre-installed in the open position, the tubing could self-fill as the completion was run to depth. The deep-set eRED valve was programmed with a pressure/time activation and was set to activate at approximately 7,500 ft (4,750 psi). Once this trigger was initiated, the valve was programmed to close after 12 hours.



This allowed the completion to be on-depth, the tubing hanger to be made up and landed, the well to be circulated to inhibit seawater, and the production packer to be tested to 4,900 psi after eRED valve closure.

The shallow-set eRED valve was programmed to close, using a pressure activation of 2,250 psi (with a target window of 2,000–2,500 psi) applied pressure for 20 minutes. Since both valves were now closed, the well had two fully tested barriers in place without the need for any intervention. The blowout preventers (BOPs) were removed, and the christmas tree was installed and tested against the shallow-set barrier.

After a successful christmas tree installation, the tubing hanger eRED valve was remotely opened, using a positive pressure activation of 3,250 psi (3,000–3,500 psi) applied pressure for 15 minutes. A positive pressure drop was observed at surface as the tool opened. Once equalized, the eRED valve was recovered using wireline.

The deep-set eRED valve was remotely opened with its programmed activation of 1,250 psi (1,000–1,500 psi) for 20 minutes and a pressure drop was observed as the tool opened. Subsequent to the deep-set valve opening, the well pressure was monitored for a period after which the tool was recovered using wireline.

Upon recovering the 4.700-in. lock and 4½-in. bridge plug complete with eRED valves, a 5½-in. Halliburton High-Lift Injection Valve was set on a 5½-in. packer in the blast joint at 7,450 ft prior to handing the well back to production.

RESULTS

Both the eRED valves functioned as designed, allowing CNR International to remotely close and open the valves, and to perform various pressure tests against the valves without intervention. The reduction in wireline rig-ups and runs for this operation reduced the overall cost and planned timing of the completion. In addition, the success of this operation saved rig time and thus reduced exposure to weather-related delays and to other risks typically associated with wireline operations.

The cost of deploying the eRED valves was essentially offset by the operational savings created by using them.

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