

Valve Saves Twelve Hours of Rig Time in First Subsea Operation

UNITED KINGDOM

CHALLENGE

- » Eliminate several interventions and the use of surface pressure control equipment to install, test and equalize, and ultimately retrieve the barrier

SOLUTION

- » eRED® valve was preinstalled in the tubing hanger
- » Equalizing ball mechanism in the valve was in the closed position, allowing full pressure testing
- » Valve provided a fully testable barrier, allowing for the drilling BOP to be moved and the subsea tree to be installed and tested

RESULT

- » Approximately 12 hours of rig time savings, since the preinstalled eRED valve reduced the number of slickline runs from four to one
- » Removed requirement to rig up PCE
- » Reduced exposure to weather-related delays
- » Reduced persons on board (POB) requirements
- » Reduced slickline service costs for both personnel and equipment

OVERVIEW

The Foinaven field, operated by BP, is located 190 km west of the Shetland Islands. In this area, a central water-injection well supports two peripheral producers.

The eRED® ball valve had been previously used successfully in several platform operations for BP in the UK and Norwegian sectors. This particular operation was the first in a subsea application.

Programmable electronics and sensors enable the eRED valve to open and close as per predetermined pressure and time signals. In this situation, it was activated by using applied tubing pressure over a given time sequence, providing a highly flexible downhole barrier.

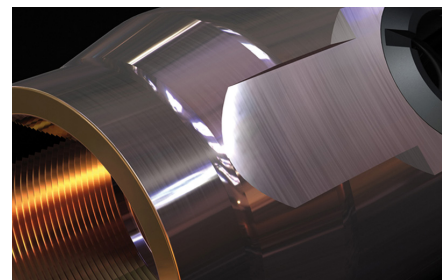
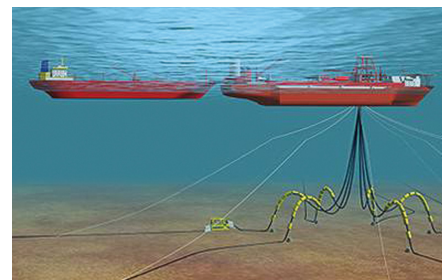
CHALLENGE

Traditionally, when subsea completions are landed, wireline-set plugs and prongs are used as the tubing hanger barrier. This involves several interventions and the use of surface pressure control equipment to install, test and equalize, and ultimately retrieve the barrier. The operator wanted to eliminate interventions and the use of surface pressure control equipment in order to save hours of rig time and lower the cost of the completion.

SOLUTION

The traditional hanger plug was replaced with an eRED valve, primarily for the benefits of improved safety, reduction of risk, and decreased rig time – thus leading to net cost savings. The eRED valve was preinstalled the tubing hanger and fully tested onshore before being shipped to the rig.

The eRED valve was made up below a standard 4.875-in. lock, which was then set into the hanger nipple profile. At this stage, the equalizing ball mechanism in the valve was in the closed position, allowing full pressure testing against the barrier to be carried out from above and below. On successful completion of testing, the hanger sub-assembly was shipped offshore as normal.



Offshore, a laptop was connected to the eRED valve, and diagnostic checks were made to ensure that the valve was operating correctly. The valve was then commanded to move the equalizing ball into the fully open position.

Running in the open position allowed fluid bypass while landing the tubing hanger, but also allowed pressure to access the lower completion for operations such as well control and packer setting.

With the completion at depth, the tubing hanger was landed and locked in place. The production packer was hydraulically set and the tubing string was tested through the open eRED valve. After achieving successful function, pressure and inflow testing of the tubing-retrievable safety valve (TRSV), the eRED valve was commanded to close with a preprogrammed pressure and time signature of 2,500 psi applied to the tubing for 10 minutes. A delay of five minutes was included to allow for bleeding off pressure prior to the ball closing.

The closed eRED valve now provided a fully testable barrier, allowing for the drilling blowout preventer (BOP) to be moved and the subsea tree to be installed and tested. Without any form of intervention, the eRED valve was now opened remotely with a predetermined command trigger of 1,500 psi for 10 minutes. Positive feedback that the valve had opened was observed at surface by a tubing pressure drop. With the valve equalized and well pressure being monitored, the hanger plug and lock were retrieved using wireline, but without the requirement for full surface pressure control equipment (PCE).

RESULT

The eRED valve functioned as designed, enabling BP to remotely close and then perform multiple tests against the barrier. On command, the eRED valve was remotely reopened, equalizing across the plugging assembly before retrieval.

In this operation, eliminating the need for three wireline runs and the rigging up of surface PCE resulted in saving approximately 12 hours of rig time; reducing exposure to possible weather-related delays; and decreasing health, safety, and environmental (HSE) risks.

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