

# Case Study: Intervention free completion installed with Shallow and Deep Set Inter Remote Bypass Valve (IRBV)

Date: May 2023

Region: Norwegian Continental Shelf



## Key Achievements

- Temporary barrier and packer setting device with no need for intervention
- No well intervention time.
- No personnel exposure due to associated intervention operations.

## Challenge

A major operator in NCS have a subsea field with an improvement program focused on increased standardisation and efficiency. We were challenged to come up with a solution for a temporary barrier and packer setting device that didn't require intervention. Fluid communication through the plugs during installation was required for autofilling and pressure testing of the tubing hanger/production packer from below, prior to closing the shallow set barrier and removing the Blow Out Preventer (BOP).

## Solution

We proposed the installation of a shallow and deep set Inter Remote Bypass Valve (IRBV) as part of the upper completion. Implementing the IRBV deep below the production packer enabled fluid bypass during installation and testing of the tubing hanger from below. After successfully testing the tubing hanger, the bypass ports in the deep IRBV were closed (Figure 1.). The IRBV was then used as a packer setting device to set the hydraulically activated production packer. Once the packer was successfully set, the deep IRBV was remotely shattered open (Figure 2.), making it possible to perform a pressure test of the production packer from below.

When tests of the pressure production packer and inflow of the TRSV were completed the shallow IRBV was closed (Figure 3). It was then successfully tested as a barrier for nipping down the BOP and installation of the x-mas tree.

Deep IRBV closed and then open after production packer was set:

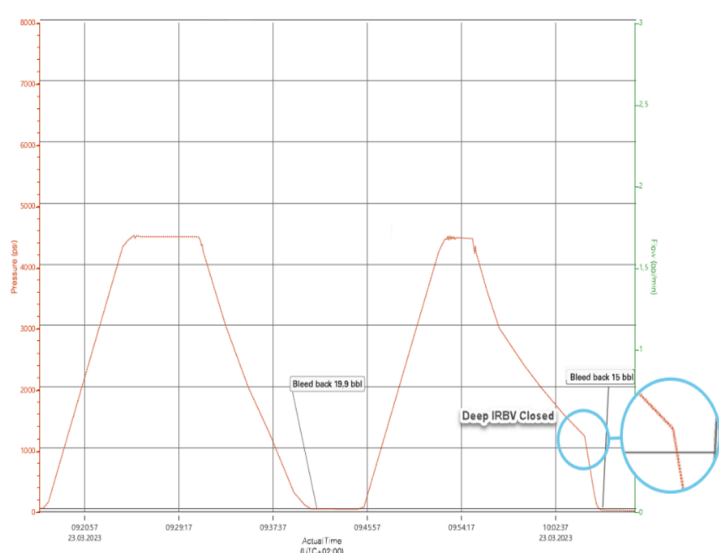


Figure 1. Deep IRBV closed.

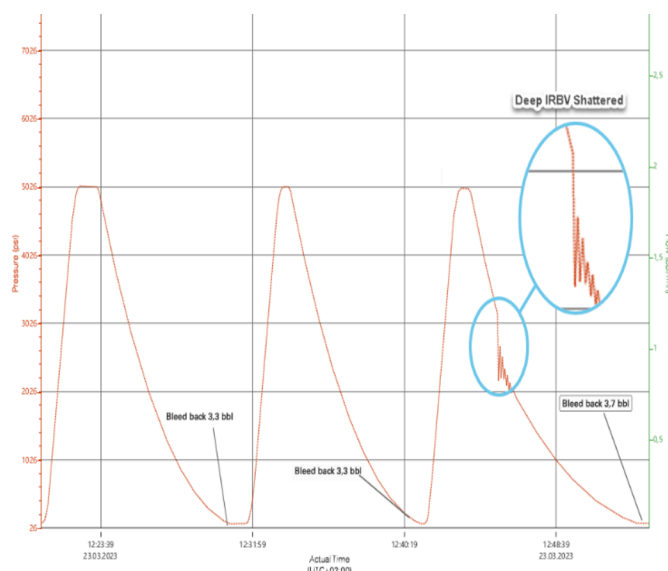


Figure 2. Deep IRBV open.

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## Product Capabilities

- Allows standard completion operations such as circulating, pressure testing, packer setting, etc.) to be completed in the first phase, then closes through pre-determined pressure cycling to become an ISO14310 Vo rated barrier.
- Leaves a full-bore ID after being permanently opened - which can help to maximise production and simplify future intervention.
- Designed to withstand extreme bidirectional pressure loads and temperatures up to 10 200 psi and 170°C.
- Debris tolerant pressure cycling mechanism.

Shallow IRBV Closed as a Bi-directional barrier and suspended until X-mas tree was installed with IMR.

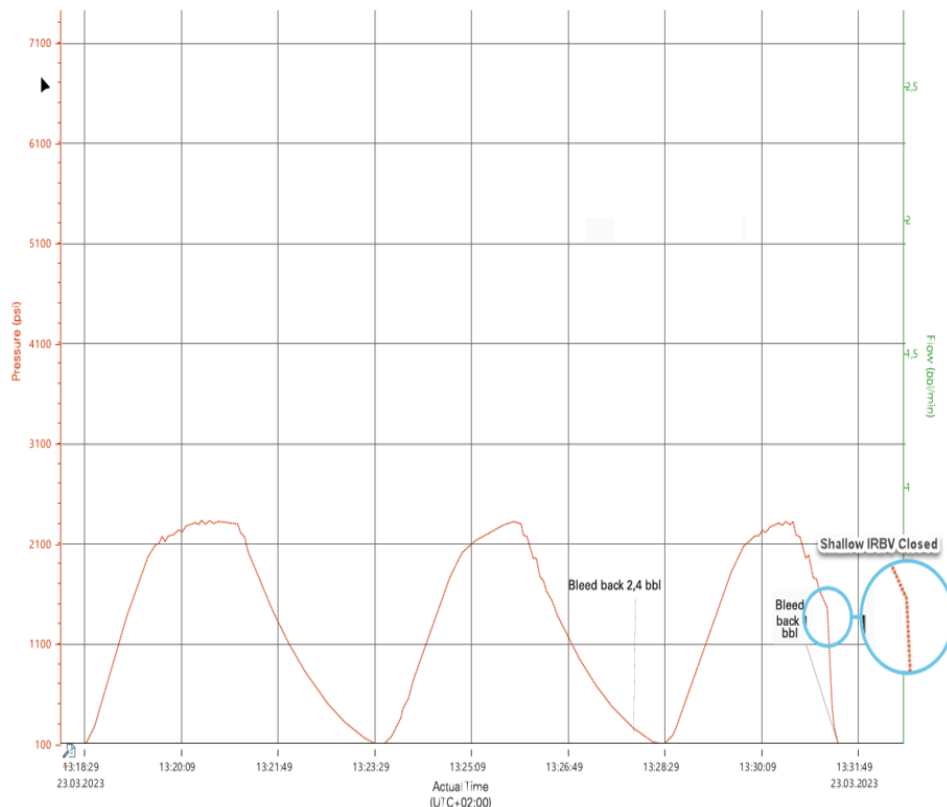


Figure 3. Shallow IRBV closed.

## Value Created

Both the deep and shallow set IRBVs were successfully installed and remotely operated as intended.

The use of the IRBVs successfully achieved the goal of leaving the well with a bi-directional barrier ready to be cycled open with an IMR vessel after the x-mas tree was installed.

Removing the need for intervention throughout the pre-production phase increased operational efficiency and provided a significant cost saving.