

# Operator Drills UltraHPHT Well to TD Without Incident and with Reduced NPT, North Sea

@balance Speed X2 RCD provides simple and reliable method to control pressure and contain drilling and formation fluids

## CHALLENGE

Drill a deep exploration well in an ultraHPHT environment while managing a high risk of influx with potential catastrophic consequences.

## SOLUTION

Use the @balance Speed X2\* large-ID rotating control device (RCD) to drill the last two sections of the exploration well at high c/min speeds, decrease NPT, and eliminate the need to rig down the RCD or one of its components.

## RESULT

Successfully drilled the well to TD without incidents while reducing NPT by enabling the @balance Speed\* sealed rotating system (SRS) to be stabbed offline.



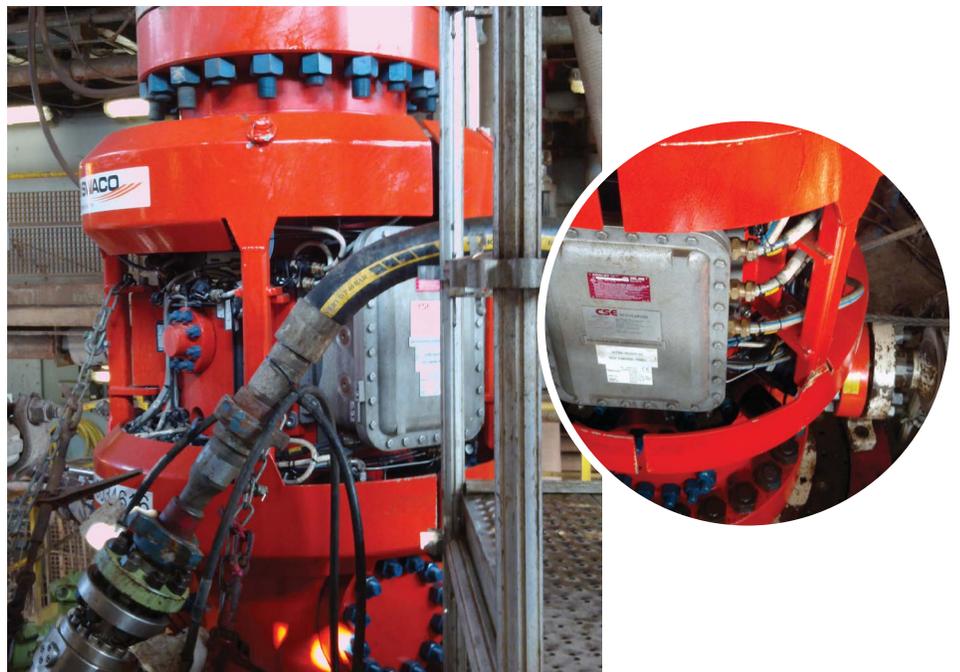
## Drill an offshore exploration well in a high-risk North Sea environment

An operator planned to drill an ultraHPHT exploration well in the North Sea. This well, which promised to be one of the most extreme wells ever drilled in the region, was expected to have a maximum static temperature of 428 degF [220 degC] and a bottomhole pressure around 18,440 psi [127.1 MPa] at the well's planned TVD of 18,022 ft [5,493 m]. Additionally, the operator planned to use a synthetic-base drilling fluid. Under such conditions, the potential risks and their consequences were extreme.

## Deploy the @balance Speed X2 RCD to overcome multiple drilling challenges and meet well objectives

For the first time in the Norwegian Continental Shelf, M-I SWACO recommended the @balance Speed X2 RCD—composed of an @balance Speed SRS inside an X2 large-ID housing—for the project. The RCD was used while drilling the 12.25-in [31.1-cm] section and while running the 10.75-in [27.3-cm] casing. The casing hanger was installed without the need to rig down the RCD or any of its components. To successfully drill this exploration well and meet the objectives, managed pressure drilling (MPD) was used to drill the last two sections. MPD can provide an additional level of safety by sealing the well, providing an early kick-detection capability, applying pressure if encountering an abnormally pressured zone, and helping facilitate the evaluation of wellbore integrity.

In addition, the rig did not have a mouse hole through which to stab the @balance Speed SRS during changeout operations. Recognizing this challenge, the M-I SWACO team custom designed a bench press that the running tool could stab through on the pipe deck.



*The @balance Speed X2 RCD was used to drill the section, run the casing and casing hanger, and eliminate the need to rig down the RCD during the operation.*

### Decreased NPT and set multiple records in successful drilling operation

While drilling, the @balance Speed X2 RCD maintained a near-constant bottomhole pressure, mitigating risks when pumps were off. This operation set multiple NCS records, including drilling the deepest well at 19,491-ft [5,941-m] TVD, running a 20,000-psi [137.9-MPa] BOP for the first time, setting the heaviest vertical casing string, and performing the largest cement job.

The bench press enabled the running tool to stab through the @balance Speed sealed rotating system (SRS) without interrupting drilling operations. Because the X2 housing does not require a protective sleeve when the @balance Speed SRS is not in place, the installation and retrieval operations were completed in under 14 min each, resulting in a decrease in NPT. By deploying the @balance Speed X2 RCD, the operator was able to drill the 12.25-in [31.1-cm] section from 16,457 to 18,245 ft [5,016 to 5,561 m] with a surface rotation exceeding 160 c/min at times.

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#### Well Results (Actual)

Formation temperature	388 degF [198 degC]
Drilling fluid temperature	145 degF [63 degC]
Maximum reservoir pressure	18,149 psi [125.1 MPa] at 19,177 ft [5,845 m]
Well TD (TVD)	19,491 ft [5,941 m]

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