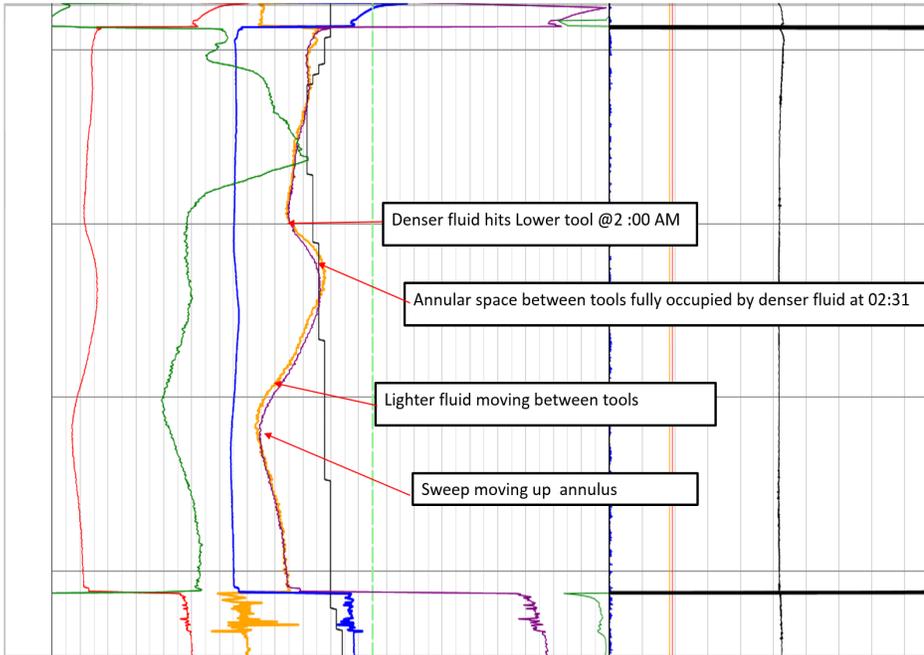


Case study: North Sea

XACT service provided downhole data during MPD drilling, cementing



Distributed bore and annulus pressure measurements and interval equivalent circulating densities in real time enabled full analysis of movement and positions of different density fluids in the wellbore during the cement stinger operation.

A customer with a North Sea well wanted to observe and control pressures downhole in a complex offshore well with tight margins while running a managed pressure drilling (MPD) operation with the potential for losses. In order to safely manage and efficiently drill the well, the following were required:

- Observe downhole pressures in real time while drilling ahead
- Trip in and out of the well in several hole sizes while still receiving downhole pressure data
- Cement operations after losses were encountered with downhole pressure data

This required a telemetry and measurement network with a full through bore that could operate with and without fluid flow or connected to the top drive. The operation also needed to be independent of, and not interfere with, traditional MWD or mud pulse telemetry.

Baker Hughes recommended the **XACT™ downhole acoustic telemetry service**.

The telemetry tool was deployed on seven drilling runs in a complex well requiring MPD. The XACT tool was run in conjunction with a traditional assembly consisting of measurement while drilling (MWD) and logging while drilling (LWD) services, but also provided downhole and along-string pressure measurements to enhance the MPD operations.

Challenges

- Observe and control pressures downhole
- Calibrate MPD operations
- Deliver real time data while drilling, tripping, and cementing

Results

- Provided downhole pressure data with a 98% telemetry uptime in real time during MPD operations
- Acquired data during cement stinger run without drilling BHA

MWD tools traditionally operate only with a string full of fluid and flowing over a certain threshold. In this well, the customer anticipated large sections of the operations where no data would be available from that source.

Data was transmitted in real time back to the surface and was integrated with other surface rig data. In addition, the same data was delivered to the customer's real time operating centers located onshore in two different countries.

The XACT service's ability to transmit downhole data in real time through the steel of the drillstring enabled data to be sent even when the traditional MWD could not, including while tripping in and out of the hole and in low-flow conditions when losses were encountered.

During a cement string run where the drilling bottomhole assembly (BHA) was removed, the bore design of the XACT tool successfully provided real time, downhole pressure. In fact, the XACT service was the only method of transmitting downhole pressures during this operation. The XACT data enabled cementing operations to continue, and the ability to pump lost circulation material safely without blocking downhole tools.

In the anticipated loss sections where downhole pressure data was absolutely critical, the XACT service provided real time downhole pressure data with a telemetry uptime of 98.5%. Since flow rate due to losses were below the threshold of operation of the mud pulse telemetry, the telemetry uptime from the MWD was only 37%. The same telemetry uptime of 98%

delivered real time pressures during a cement stinger run, where the drilling BHA was removed and the XACT service remained the only method of transmitting downhole pressures.

The combination of a full through-bore technology, with along-string measurements and the ability to send real time downhole data independent of fluid, flow, and formation meant the customer had access to downhole pressure, weight, temperature, and torque measurements throughout every phase of these challenging drilling runs.