

RCX with XE Probe Collected Data in Extreme Tight Formation

After drilling an exploration well in the Cygnus Field of the UK North Sea, a major operator began investigating an extension of the main accumulation into a new fault block. The primary reservoir target was the Lower Leman sandstone consisting of aeolian sands with mobility between 0.1 and 100 mD/cP. One of the operator's main objectives with this well was to examine pressure communication within the main Cygnus Field and the possibility of a common free water level (FWL)—in low-mobility reservoirs it can be extremely difficult to acquire useable pressure data and capture single-phase samples with low contamination levels.

Baker Hughes, a GE Company (BHGE), deployed **the Reservoir Characterization eXplorer™ (RCX™) service** with an extra-elongated (XE) probe designed to optimize testing and sampling in low-mobility formations. The XE probe's larger surface area was able to withstand the high differential pressure and provided an effective probe-based solution for the low-mobility environment. This was the first time the XE probe was run in the UK.

In a single run, pressures tests and samples were collected with mobility measuring as low as 0.4 mD/cP. The FWL was very difficult to determine due to tight test zones around the contact. Three stations were sampled, enabling the formation fluid to be identified and the FWL to be established. One of the sampling stations was conducted in the tight test zone with the XE probe. The increased surface area of the XE probe and the arm device delivery system of the RCX service quickly delivered the results and mitigated the increased risk of getting differentially stuck.

Pressure measurements and samples collected with the XE probe allowed the identification of a clear FWL and pressure gradients. Because the Cygnus field is the largest offshore gas field to be discovered in the Southern North Sea in the last 25 years and it is expected to contribute 5% to UK gas production in 2016, the gathered information provided by the RCX service with the XE probe was essential for the operator's ongoing investigations of connectivity to the main Cygnus field and further development of this area.

Challenges

- Pressure testing and sampling in low-permeability environment
- Determine if pressure communication was present with the main field
- Determine FWL in low-mobility zone

Results

- Collected pressure data and single-phase samples with low contamination levels.
- Acquired mobility measurements as low as 0.4 mD/cP
- Clearly identified FWL through accurate pressure gradients
- Obtained low-permeability pressure measurements in aeolian sands of the lower Leman formation

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