



Wellbore History

GENERAL

The Exploration well 2/4-17 was drilled on the NW Tor prospect situated in the Production License 018. The objective was to test the Late Jurassic and Early Permian sections in a rotated fault block on a terrace NW of the Tor Field. The block is situated in the Central Trough, which is part of the failed Mesozoic North Sea, rift system. The Central Trough comprises a complex series of narrow discontinuous highs and lows with a NW-SE trend. The most important basins are the Feda Graben, the Breiflab Basin and the Søgne Basin. From the Feda Graben/Breiflab Basin up to the Sørvestlandet High several rotated fault blocks form platforms and small highs, named the Cod Terrace, the Hitra High and the Steinbit Terrace. The NW Tor Prospect is situated on a Terrace between the Hitra High and the Feda Graben.

OPERATIONS AND RESULTS

Wildcat well was spudded with the 3-leg jack up installation on 29 February 1992 and drilled to TD at 5258 m in the Early Permian Rotliegendes Group. Drilling went without problems to 2081m where the well was sidetracked because the string became stuck while taking a survey. While pulling out of the hole, following the cutting core to a depth of 4357.1 m, an influx of gas occurred and the well was shut in. Following a 22 hours well kill operation, the well was brought back under control. A second technical sidetrack was taken at 4724 m due to a twist-off of the bottom hole assembly. The well was drilled with seawater/gel down to 466 m, with KCl mud from 466 m to 2146 m, with Soltex from 2146 m to 2582 m, with Soltex/Drispac from 2582 m to 4151 m, with HTHP mud from 4151 m to 4724 m, and with High Temp mud from 4724 m to TD

Thin hydrocarbon-bearing intervals were present in the Hod Formation. At 4340 m a major hydrocarbon bearing sand of the Late Jurassic Ula Formation was encountered. At 4520 to 5027 m an excellent quality aeolian dune sand of Early Permian age (Rotliegendes Group) was penetrated. The overall RFT pressure gradient in the sand showed water, but results in some intervals (e.g. 4600 m to 4650 m) suggested a different fluid (light hydrocarbons) from that shown by the logs (water). Post well organic geochemical analyses of a siltstone cuttings extract from 5029 m at the base of this unit indicated shows of hydrocarbons different from those of the Ula Formation. Further geochemical analyses of samples from this interval (5006 m to 5118 m) indicated source potential with TOC up to 2.9% and Hydrogen Index up to 190. The maturity level at this depth was measured as %Ro = 1.1 to 1.3, corresponding to the wet gas window. Because the 7" liner shoe was set at 5021 most of these samples must be seen as representative for the formation. The unit from 5027 m to TD was described generally as a "Rotliegendes mixed volcanic unit".

One 60" core was cut in the lower Ula Formation, which consisted of major shallow marine sandstone, with marine silty sandstone in the base grading into thin lagoonal sand/silt/mudstone at the top. RFT pressures were taken during the logging of the 8 1/2 inch hole section. A segregated hydrocarbon sample at 4355 m was successful. However, measurement of the opening pressures revealed that the chambers hardly contained any gas, such that the samples were not representative of the reservoir fluid. Water samples were obtained at 4421 m and 4609 m.

The well was completed on 29 February 1992 as a gas/condensate discovery.

TESTING

To DST tests were performed to investigate the to separate sand units. DST 1 in the Permian sandstone-unit (4523 - 4638 m) produced 860 Sm³ water/day. Samples taken from this test had a thin oil film on top of the water. DST 2 in the Upper Jurassic Lower Ula Formation (4341.0 - 4387.5 m) produced 774 Sm³ oil/day and 849510 Sm³ gas/day on a 15.875mm choke with a GOR of 1097 Sm³/ Sm³

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 2/4-17