



GENERAL

Well 30/11-4 was drilled north-east of the Frigg area in the Fensal Sub-basin in the North Sea. Previous well 30/11-3 was abandoned at top Statfjord Group for technical reasons, due to high pressures, without being production-tested. Well 30/11-4 was then proposed as a virtual re-drill, only some 400 m NE of 30/11-3. The objective of the well was to test the hydrocarbon potential of the Middle Jurassic Vestland Group sandstones and the Early Jurassic Statfjord Group sandstones in a westward tilted horst block

OPERATIONS AND RESULTS

Wildcat well 30/11-4 was spudded with the semi-submersible installation Dyvi Delta on 25 January 1984 and drilled to TD at 5255 m in Late Triassic sediments belonging to the Statfjord Group . At 2179 m the drill string parted, leaving a 24 m fish in the hole. After unsuccessful fishing the well was sidetracked from 1918 m. The well was drilled with bentonite and brack water down to 813 m, with KCl/polymer mud from 813 m to 4205 m, with gel/lignosulphonate/lignite mud from 4205 m to 5059 m, and with gel/polymer lignite mud from 5059 m to TD.

Well 30/11-4 penetrated water bearing reservoir sands in the Tertiary Frigg and Heimdal formations. The Vestland Group was penetrated at 3434 m. This section had oil shows at 3434 m to 3470 m, where some oil emulsion was retrieved by RFT, at 3514 m to 3550 m, and at 3635 m to 3650 m. An anomaly in the reservoir pressure occurred at about 3580 m where a siltstone/claystone interval possibly acts as a seal/pressure barrier. A total of 615 m of sands and shales assigned to the Statfjord Group, between 4640 m and TD in the well. Log interpretation pointed towards the presence of at least 75 metres of sands with porosities up to 20% and water saturations as low as 40%. The Group had gas shows and weak oil/condensate shows on the cores. Subsequent microscopic studies on the cores, taken near to the top of the Group, have revealed that, although rather high porosities are locally preserved, permeability is destroyed by clay mineral authigenesis.

Five cores were cut in the well. One was cut in the Vestland Group from 3514 - 3532 m. The remaining four were cut in the Statfjord Group in the intervals 4632 - 4649 m, 4652 - 4666 m, 4839 - 4839.4 m, and 5011-5011.4 m. The two latter were junk basket cores. A depth shift of ca 10 m downwards has to be applied on the cores in order to match with logger's depth. A segregated RFT fluid sample was taken at 3452 m in the Vestland Group. It contained water, gas, and oil emulsion.

The well was permanently abandoned on 24 July 1984 as a dry well with shows.

TESTING

The Vestland Group was not considered worth testing. Two drill stem tests were performed in the Statfjord Group.

DST 1 tested the interval 5015 to 5029 m. The test flowed only insignificant and non-representative fluids, even after acid stimulation. Extremely tight formation was concluded. Maximum temperature, measured at 5000.6 m, was 167 °C.

DST 2 tested the intervals 4823 - 4837 m and 4854 - 4875 m. The test produced prior to acidization some 5 to 6 m3 formation water and some bubbles of gas over a period of 3 days at a flowing bottom hole pressure declining from 479 to 90 bar. After stimulation with 12 m3 acid the well produced 22 m3 water during 20 hours. The interval was concluded to be very tight. Maximum temperature, measured at 4809 m, was 162 °C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 30/11-4