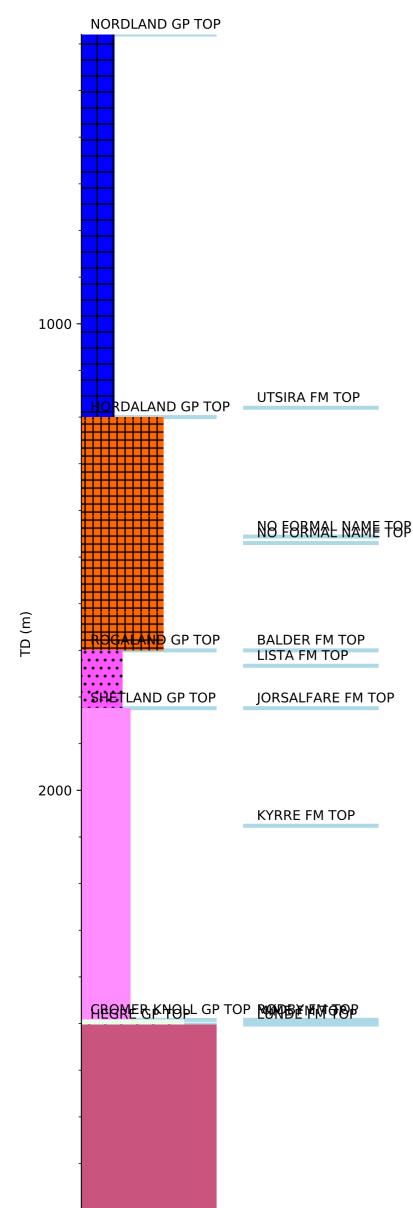
Groups Formation Tops

Wellbore History



GENERAL

Well 34/4-7 was drilled in the north-eastern margin of the Snorre Field. The Late Triassic - Early Jurassic reservoirs of the Snorre Field are made up of a complete series of rotated fault blocks dipping between 5 and 12 degrees towards west and northwest. The primary purpose of the well was to assess the upper part of the Lunde Formation. The well was located to provide data on the reservoir quality of both oil and water bearing parts of upper Lunde, and to investigate potential changes in porosity and permeability across the oil/water contact. Further objectives were to verify a revised velocity model for the 34/4 part of the Snorre Field and reduce structural uncertainty.

OPERATIONS AND RESULTS

Wildcat well 34/4-7 was spudded with the semi-submersible installation Treasure Saga on 17 February 1987 and drilled to TD at 2950 m in the Late Triassic Lunde Formation. Drilling proceeded without significant problems. The 26" section was drilled first as a 17 1/2" pilot hole down to 915 m as a precaution against shallow gas, then opened up to 26" with an underreamer. The well was drilled with seawater and bentonite down to 470 m, with gel mud from 470 m to 915 m, with gypsum/polymer mud from 915 m to 2407 m, and with KCl mud from 2407 m to TD.

Apart from the Pliocene Utsira Formation at 1062 m and some minor sandy intervals in Middle Oligocene to Late Miocene, the upper section down to Triassic consists mainly of claystones. No Jurassic sediments were encountered in the well. The Triassic Lunde Formation was encountered at 2502 m, 35 m deeper than expected and is composed of sandstones with minor siltstones in the upper part. From 2736 m the Lunde Formation consists of interbedded sandstone, claystone and limestone and from about 2872 m to TD the lithology is mainly sandstones with minor claystone and limestone. Hydrocarbons were encountered in the section belonging to the upper member of the Lunde Formation, from 2502 m down to an OWC, defined from FMT pressure gradients and PLT logging during DST, at 2586 m. The cores from the oil bearing part reservoir shows light brown oil stain with good odour, strong bright yellow fluorescence, instant blue white cut and pale yellow residue upon evaporation. Below 2586 m both shows and cut become poorer, and from 2610 m there were no shows.

Apart from in the reservoir as described above traces of shows were seen first at 2080 m in silty/sandy laminas of the Shetland Group. These are described as yellow fluorescence with slowly to very slowly streaming white yellow cut. From 2270 m the shows are slightly decreasing to a dull yellow fluorescence with very slow streaming light yellow cut, occasionally no cut.

Ten cores were cut in the Lunde Formation in the interval 2506 - 2711.5 m with a total recovery of 199.4 m. Segregated FMT samples were taken at 2509 m, 2581.5 m, 2584.4 m, and at 2592.5 m. The sample from 2509 m was sent to the laboratory for PVT analyses. It contained ca 2 l oil and 1.1 l of mud filtrate.

The well was permanently abandoned on 12 May 1987 as an oil appraisal

TESTING

Two production tests were performed in the upper member of the Lunde Formation.

Test No 1 was carried out from the intervals 2579 - 2587 m and 2590 - 2596 m, straddling the oil/water contact. The main flow produced 190 Sm3 oil and 215 m3 water/day through a 7.9 mm choke. The GOR was 105 Sm3/Sm3, the dead oil density was 0.833 g/cm3 and the gas gravity was 0.81 (air = 1). A Production Logging Test (PLT)-flow followed. The PLT flow confirmed the OWC at exactly 2586 m. The temperature recorded by the Production Logging tool was 99.4 deg C, close to the maximum 99.6 deg C measured in the preceding more unstable clean-up flow. After the

LITHOSTRATIGRAPHYL& IMPSTORY FOR WELLED 34/4 in all part of Test No 1.

Test No 2 was carried out from the intervals 2506 - 2512.5 m, 2517 - 2529 m, 2532.5 - 2535.5 m, 2544 - 2550.5, and 2560 - 2566 m in the oil zone. The well produced oil without water continuously for 18 days. During the last 17 days the test produced initially 1550 Sm3/day declining to a fairly constant rate around 1390 Sm3/day through a 14.3 mm choke. The GOR stabilised at 85 Sm3/Sm3 while the temperature stabilized at 96.9 deg C. The dead oil density was 0.835 g/cm3 and the