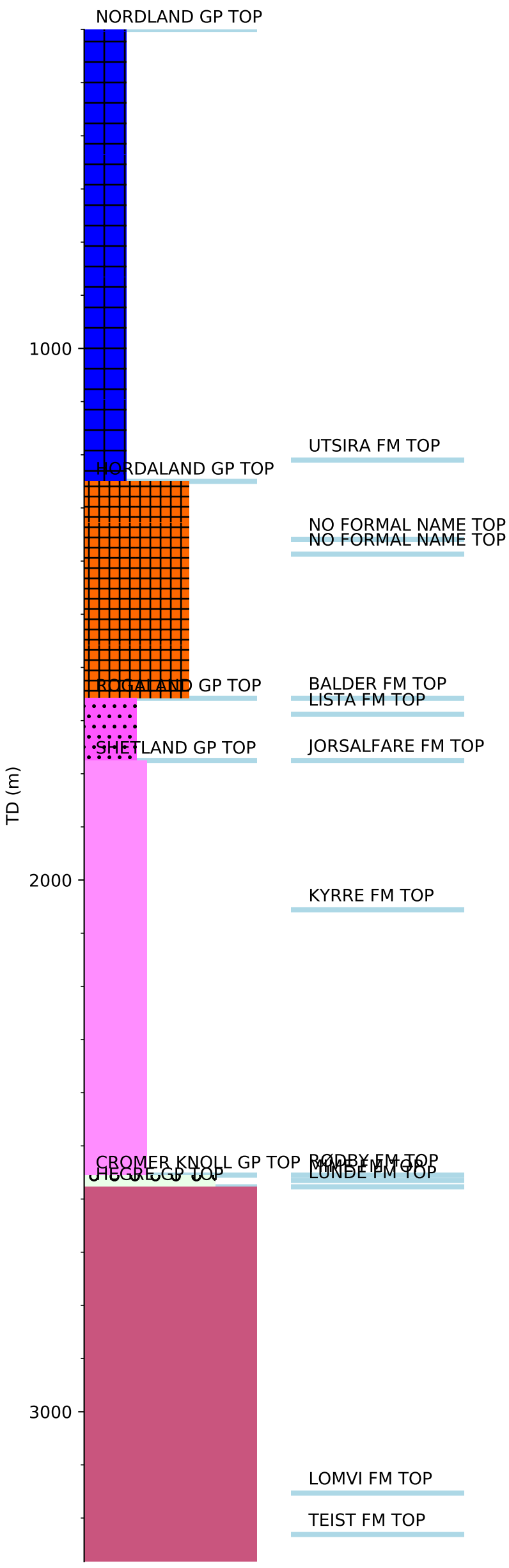


# LITHOSTRATIGRAPHY & HISTORY FOR WELL: 34/4-6

## Wellbore History

GENERAL

Well 34/4-6 was drilled in the northern part of the Snorre Field. The main objectives were to test the northern outline of the field and to confirm the oil/water-contact and reservoir characteristics of the Upper Lunde Formation. The stratigraphy and reservoir characteristics of the Middle and Lower Lunde together with the Lomvi Formations were secondary objectives. Prognosed depth was at 3236 m in Triassic rocks.

OPERATIONS AND RESULTS

Appraisal well 34/4-6 was spudded with the semi-submersible installation Vinni on 31 December 1995 and drilled to TD at 3282 m in the Late Triassic Teist Formation. The 26" section was hampered by bad weather and large parts of the period from the evening of 9 January up to 18 January was spent as WOW. When reaching 740 m the bad weather also made it necessary to disconnect the riser from the well head. Technical problems when attempting to re-latch the pin connector back on to the well head resulted in the remaining section down to TD at 920 m in the 26" section being drilled with no returns to the surface. The well was drilled with spud mud down to 530 m, with gel mud from 530 m to 920 m, with gypsum/polymer mud from 920 m to 2345 m, and with gel mud from 2345 m to TD.

Apart from the sandy Utsira Formation of Late - Middle Miocene to Pliocene age (1127.5 - 1239 m) and a sandstone unit within the Hordaland Group of Early Oligocene age (1358.5 - 1387 m), the upper section down to the Base Cretaceous Unconformity proved mainly claystones. No Jurassic rocks were encountered in the well. The Triassic Hegre Group consists of sandstones with minor shales and siltstones down to TD of the well. The target horizon, the Upper Lunde Formation, was encountered at 2576.5 m, 65 m deeper than prognosed. It had a gross thickness of 68.5 m with 39.7 m net sand. Hydrocarbons were encountered in the uppermost part of this formation with an OWC was at 2587 m, determined from RFT pressure points.

The first appearance of shows was seen in the Shetland Group from ca 2090 m. This was seen in silt lenses where pale yellow fluorescence was accompanied by slow to moderate streaming blue white cut reaction. A slight yellow residue was occasionally observed. Entering the main reservoir at 2576.5 m, the shows were as follows in the interval 2576.5 - 2587 m (OWC): 100% yellow brown oil stain, 100% yellow fluorescence with instant to fast streaming blue white cut, leaving a light yellow brown residue upon evaporation. The odour was good. Below the OWC, shows decreased gradually to become extinct below 2624 m.

Six cores were cut totalling 84.5 m. One core was cut in the Shetland Group crossing the border zone into Cromer Knoll Group. The other cores were taken in the Late Lunde Group where hydrocarbons were encountered in the uppermost section. The RFT chambers from this well gave no pressurized fluid samples. An atmospheric RFT sample from 2580 m contained ca 1.6 l oil and ca 2 l water/mud filtrate.

The well was permanently abandoned on 27 March 1986 as an oil appraisal.

TESTING

One DST test was performed in the well. This was a combined production/interference test in the Upper Lunde Formation. The well produced from the interval 2577 - 2585 m, with the interval 2592 - 2595 m as an observation interval. The test included three flow periods; 1) Clean-up flow of the lower zone; 2) initial flow of the upper zone; 3) main flow of the upper zone. The two first flows produced only cushion water. The last flow produced 1206 Sm2 oil /day with a wellhead pressure of 153.6 bar. The flowing bottom hole pressure was 359.6 bar at 2546.9 m. The gas-oil ratio was measured to 91.3 Sm3 /Sm3 after a four stage separation. The corresponding dead oil density was 824.5 kg/Sm3. Maximum temperature in the test was 99.7 deg C. During flow 3) wellhead samples and samples for recombination from the separator were taken. These samples include the "DST3" samples in the geochemical download report from IKU found further down on this fact page.