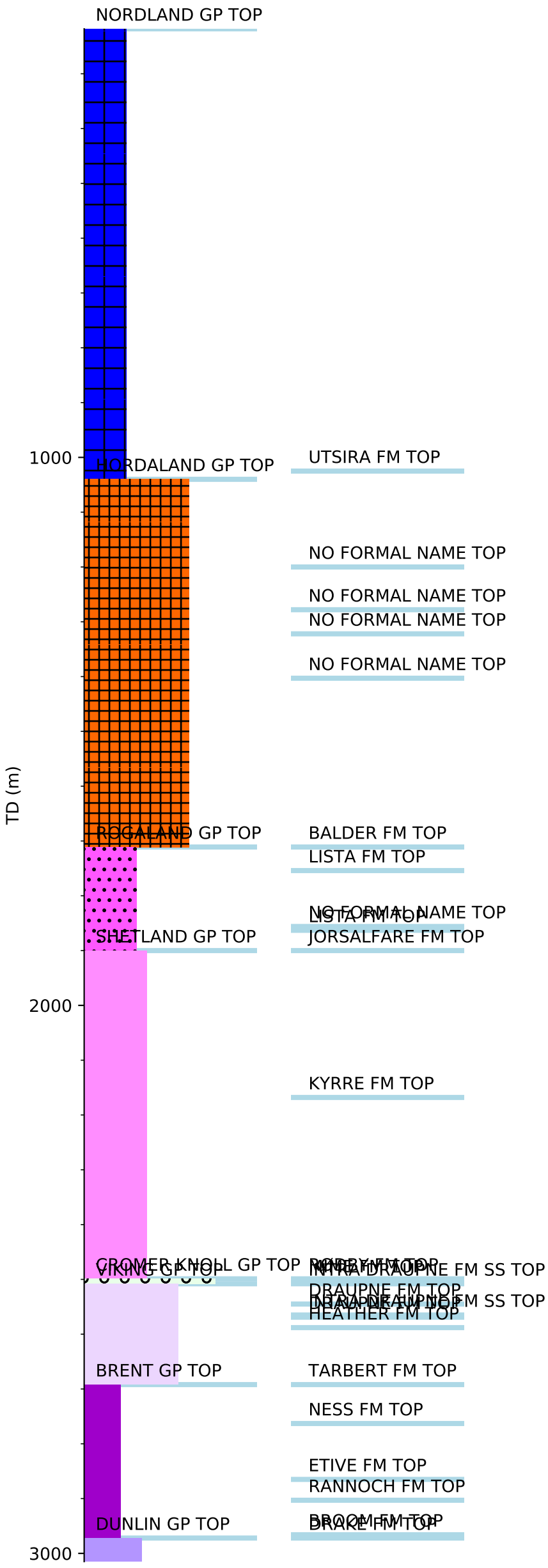
Groups

Formation Tops



Wellbore History

GENERAL

Exploration well 34/7-21 was drilled the south-western part of block 34/7 on Tampen Spur, on the H-prospect northwest of the Tordis Field. The main objective was to test the hydrocarbon prospectivity within the Late Jurassic (Viking Group) interval. The target was a Late Jurassic sand wedge, truncated in the up-dip direction towards the east by the Base Cretaceous Unconformity. Sufficient amounts of reservoir sand were conditioned by erosion and re-sedimentation from the underlying Middle Jurassic Brent Group, which is progressively truncated up-dip in the same direction. The secondary objective was to test the Paleocene in which an oil discovery had been made in well 34/7-18.

OPERATIONS AND RESULTS

Well 34/7-21 was spudded with the semi-submersible installation Treasure Saga on 19 October 1992 and drilled to TD at 3015 m in the Early Jurassic Drake Formation. Tight and sticky formation was reported in the 12 1/4" section, but no significant technical problems occurred in the operations. Based on the site survey, possible shallow gas was predicted at 298, 548 and 612 m. The MWD confirmed a gas bearing sand at 541 m - 548 m. A flow check proved negative. The well was drilled with spud mud down to 1113 m and with KCl polymer mud from 1113 m to TD.

In the Nordland, Hordaland, and Upper Rogaland Groups, the well penetrated mainly clay/claystone with minor sand, except for the sandy Utsira Formation between 929-1040 m. At the base of the Rogaland Group, the Lista Formation sandstone was encountered and proven dry, but with shows. In the Shetland and the condensed Cromer Knoll Group, claystone with limestone beds and massive marls/limestones were penetrated, respectively. A hydrocarbon-bearing interval was proven in a sand in the Cromer Knoll at 2498-2501 m. The top of the Late Jurassic reservoir was reached at 2508 m, which was 29 m shallower than prognosed. Within the Draupne Formation, two separate oil bearing sandstone intervals were proven between 2508-2545 m and between 2565.5-2569 m. The latter contained high concentrations of H2S. All three hydrocarbon bearing intervals had separate formation pressure regimes, and did not communicate. No OWC was identified at any level. The overall ODT was 2569 m (2543 m MSL).

Apart from the three hydrocarbon bearing reservoirs shows were reported in several intervals. In the base of the Rogaland Group, traces of good oil shows were detected in argillaceous sandstones (intra Lista Formation) at 1850-1858 m. In the Shetland Group, good oil shows occurred in thin sandstone horizons from about 2270 m. The shows in this interval decreased progressively from below 2425 m. In the top of the Heather Formation, traces of weak oil shows was identified in a siltstone bed at 2587.5-2588.5 m. No shows were reported below this depth.

A total of 5 cores were cut in well 34/7-21. Core 1 was cut in the interval 1858 to 1885.7 m in the Sele/Lista Formations. Cores 2-5 were cut in the Draupne Formation and down into the top of the Heather Formation, at 2515 to 2594 m.

FMT fluid samples were taken at 2498.5 m (oil), 2529.7 m (oil), and at 2567.5 m (two samples in different runs, both with oil).

After testing the well was plugged back and prepared for sidetracking to explore the extension of the Late Jurassic reservoirs. The plugged back hole was permanently abandoned on 11 December 1992 and the well was classified as an oil discovery.

TESTING

The interval 2510.5-2537.5 m, covering the main part of the upper Intra-Draupne Sand, was perforated and tested. The oil rate at the end of the second main flow was measured to 884 Sm3/day through a 12.7 mm choke. The corresponding wellhead pressure was 146 bar and the GOR was 95 Sm3/Sm3. Wellhead oil density was 0.85 g/cm3 and the gas gravity was 0.89 (air = 1). The reported bottom hole temperature/reservoir temperature from the test was 91 deg C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 34/7-21