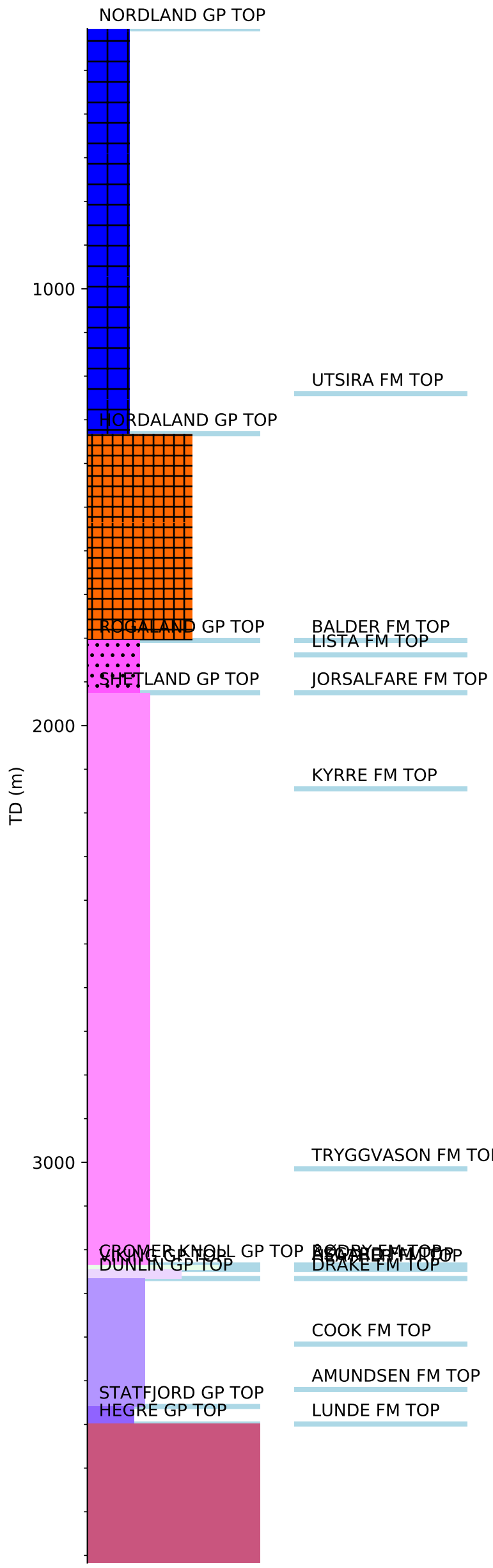
Groups

Formation Tops



Wellbore History

GENERAL

Wildcat well 34/4-5 was drilled on the Mort Horst in the Northeastern part of the block. The purpose of the well was to test the Zeta structure for hydrocarbons and to test the stratigraphy below the Base Cretaceous Unconformity. The well encountered hydrocarbons in the Cook Formation and in the Statfjord Formation.

OPERATIONS AND RESULTS

The well was spudded with the semi-submersible installation Treasure Saga on November 13 1983 and drilled to TD at 3917 m in Early - Middle Triassic sediments of the Lunde Formation. The well was drilled with seawater and bentonite down to 533 m, with bentonite/gypsum mud from 533 m to 1113 m, with gypsum/polymer mud from 1113 m to 2025 m, with gypsum/lignosulfonate (Unical) mud from 2025 m to 3200 m, and with lignosulfonate from 3200 m to TD.

Due to severe boulder problems in the 26" hole section, the well had to be re-spudded three times before the 20" casing could be run and cemented. The 20" casing had to be worked and washed down to the planned depth. This action most likely buckled or partly collapsed the 20" casing. It took approximately 5 days to drill/mill out the bottom section of the 20" casing. Circulation was lost at 2026 m when drilling the 17 1/2" hole. Due to the lost circulation, the 13 3/8" casing had to be set at 2011 m. The 12 1/4" section had to be plugged back from 3106 m to 3005 m due to severe hole deviation problems. The maximum hole angle was 8.75°. Re-drilling this hole section and deepening it down to 3200 m the hole angle varied between 3° and 4°. The 9 5/8" casing was set at 3195 m. The 8 1/2" hole section was drilled down to 3424 m, where the first core was cut. The core recovered shale, and it was decided to drill ahead. The hole was drilled down to 3470 m, where a new drill break occurred. While circulating bottoms up for samples a kick was taken. A total of 43 bbls were gained before closing in the well. Six cores were cut down to 3538 m. Analysis of the formation indicated that the potential reservoir section had not been reached. The hole was this time drilled down to 3561 m, where a new drill break occurred. This time 10 cores were cut down to 3648,6 m. A 7" liner was run in the 8 1/2" hole with the liner shoe set at 3757 m.

The well proved a stratigraphic section ranging in age from possibly Early Triassic to Pleistocene. Minor sand development was penetrated in Miocene and Oligocene. The Cretaceous section was composed of claystones. In the Jurassic two sandstone horizons were encountered, the Cook Formation (3416 m to 3520 m) and the Statfjord Formation (3558.5 m to 3599 m). The Triassic rocks were inter-bedded sandstones, siltstones and claystones. Several unconformities were observed in the well, four in Tertiary, two in Cretaceous, a major unconformity at 3245 m between Callovian and Valanginian, one in Middle Jurassic and a fault cut out in Early Jurassic. Gas peaks up to 7.5 % with shows in limestone stringers were observed in the interval 2137 m to 2600 m in the Late Cretaceous Shetland Group. Weak shows was observed on the core from 3424 m to 3438 m. Good shows with up to 39 % gas was observed in the Cook Formation from 3454 m to 3483 m, from 3483 m shows gradually decreased in intensity. From 3564 good shows appeared in sandstones, and from 3571 m to 3586 m good shows were observed in massive sandstone of the Statfjord Formation. Below 3586 m shows gradually disappeared. No shows were observed below 3603 m. Testing of the two sandstones proved movable oil present in the Cook Formation and immoveable oil in the Statfjord Formation. Both sandstones were tightly cemented, with poor reservoir qualities. A total of 17 cores were cut as described above. The overall recovery was 95%. Logging operations were hampered by tool sticking, causing considerable discrepancies between drillers and loggers depth. This did not affect the Cook and Statfjord Formation Sands. No fluid samples were taken on wire line. The well was permanently abandoned on 6 April 1983 as a non-commercial oil discovery.

TESTING

Two drill stem tests were carried out, one in the Statfjord sand and one in the Intra Cook sand. The Statfjord drill stem test, 3589.0 m to 3598.5 m produced water with traces of oil. A rate of 27 Sm3 water/day was obtained through an 8/64 inch choke with a wellhead pressure of 2.51 MPa.

The Cook drill stem test, 3462.7 m to 3480.7 m, produced oil with 19 per cent water. A rate of 48 Sm3 liquid/day was obtained through a 10/64 inch choke and a wellhead pressure of 13.65 MPa. The GOR was measured to

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