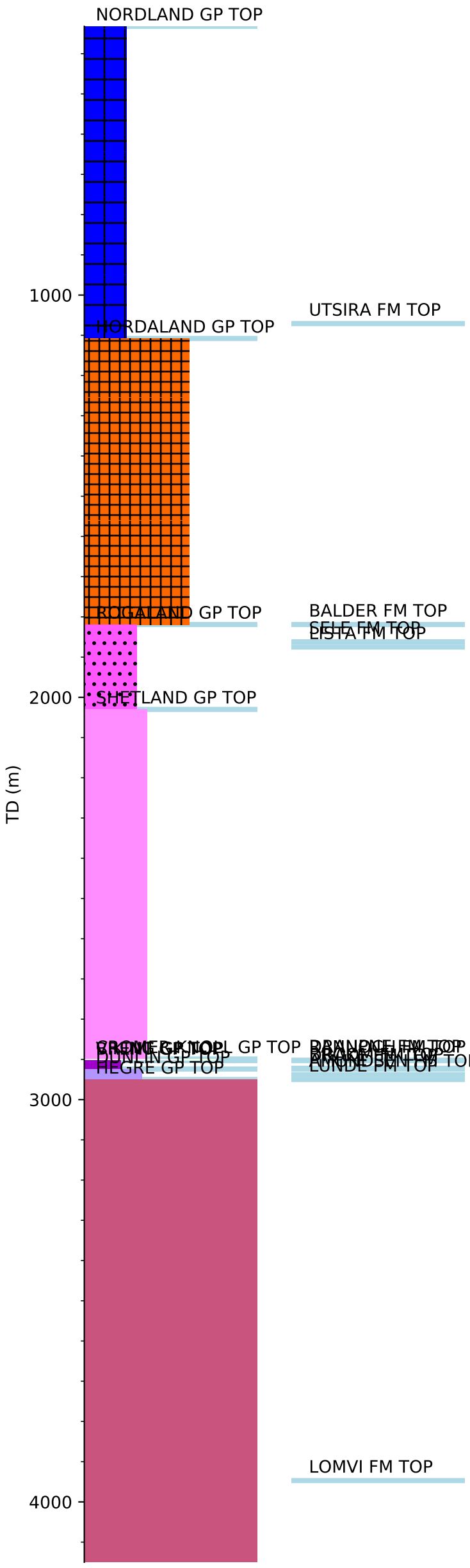
Groups

Formation Tops



LITHOSTRATIGRAPHY & HISTORY FOR WELL: 34/8-4 S

Wellbore History

GENERAL

Well 34/8-4 S is located on the Visund Field, A structure where previous wells 3/8-1, 3/8-3, and 3/8-3 A had proved hydrocarbons in the Brent Group. The main target in 34/8-4 S was the hydrocarbon potential in the Lomvi Formation on the A-structure. Secondary targets were the hydrocarbon potentials of the Statfjord and Lunde B/C formations on the A south compartment. Pressure measurement should be acquired from the Lunde- and Lomvi Formations in order to evaluate the sealing potential of the Middle to Late Triassic sequence. The well was designed for temporary abandonment and re-entry as a subsea producer. The well was planned as a deviated hole to penetrate top Statfjord, Lunde B/C and the Lomvi Formations within structural closure, leaving more than 10 mill Sm3 oil untested up-dip. Boulders could be encountered between 350 m and 395 m. Two intervals with possibility for shallow gas were identified at 446 m and 477 m.

OPERATIONS AND RESULTS

Wildcat well 34/8-4 S was spudded with the semi-submersible installation Maersk Jutlander on 6 Desember 1991 and drilled to TD at 4150 m in rocks of Triassic age. Drilling started with an 8 1/2" pilot hole checking for shallow gas. No boulders or shallow gas was encountered. Significant technical problems were encountered during drilling of this well and one third of the total rig time was counted as down time. The longest period of down time occurred after TD in the 17 1/2" hole where 31.6 days were spent repairing the BOP and wellhead. The planned TD at 4478 m was not reached due to operational problems. The pipe was backed off at 3936 m and the borehole was logged from this depth and up to the 9 5/8" casing shoe. The well was drilled vertical down to ca 2310 m where it started to build angle up to 30 ° at ca 2680 m. From here to TD the deviation varied between 30 ° and 50 °. The well was drilled with spud mud and seawater down to 1165 m, with KCl / polymer mud from 1165 m to 3781 m, and with a dispersed high-temperature tolerant mud system from 3781 m to TD.

Hydrocarbons were encountered in the Brent Group, Rannoch sandstones, and in thickly developed Triassic sandstones of the Hegre Group's Lunde Formation. No fluid contacts were observed in either Groups. The Lomvi Formation proved to be water bearing. Oil shows on sandstones started at Top Brent Group, 2903 m, and ended at 3697 m in Late Triassic, Lunde Formation. One of the secondary targets, the Statfjord Formation, was not encountered in the well. A total of seventeen cores were cut: sixteen in the Lunde Formation and one in the Lomvi Formation. RFT formation pressures were obtained in five runs, three of which were cased hole RFT runs. A gas gradient was defined from pressures obtained in the Brent Group and a common hydrocarbon gradient of 0.045 bar/m (0.46 g/cc) could be inferred throughout the Lunde Formation. A total of 60 sidewall cores were requested in two runs and 37 were recovered. The well was suspended on 9 June 1992 a gas and condensate discovery in the Lunde Formation.

TESTING

Five production tests were performed, four gas/condensate tests in the Lunde Formation and one gas test in the Rannoch Formation. Production test data quoted refer to maximum rates at the specified choke sizes.

Test 1 was performed in the interval 3219.0 - 3241.0 in Lunde D. It flowed at a condensate rate of 441 Sm3/d and a gas rate of 410280 Sm3/d on a 15.87 mm choke. The GOR was 930 Sm3/Sm3. The condensate gravity was 0.782 g/cc and the gas gravity was 0.728 (air = l). The test produced 2.0 % CO2 and no H2S.

Test 2 was aborted due to tool failure shortly after running the test string.

Test 2A was performed in the interval 3133.0 - 3143.0 m in Lunde B/C. It flowed at a condensate rate of 754 Sm3/d and a gas rate of 605090 Sm3/d on a 17.46 mm choke. The GOR was 803 Sm3/Sm3. The condensate gravity was 0.788 g/cc and the gas gravity 0.734 (air = 1). The test produced 0.7 % CO2 and no H2S.

With the test string still in position after Test 2A, Test 2B1 was initiated by perforating three additional intervals. However, it was aborted due to problems with the subsea test tree and lubricator valves.

Test 2B2 perforated the four intervals 3132.5 - 3142.5 m, 3112.5 -