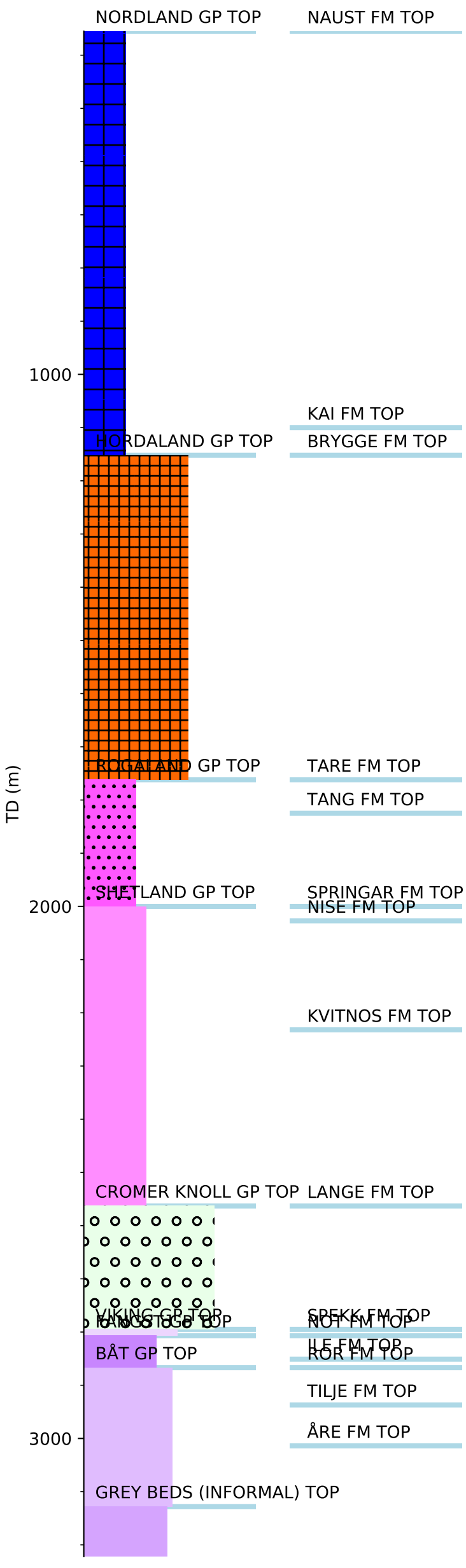

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6407/7-3

Wellbore History

GENERAL

Well 6407/7-3 was drilled on the northern part of the A structure of the Njord Field. The main objectives of the well were to test the hydrocarbon potential of the Ile Formation, to test the hydrocarbon potential of the Tilje Formation above the oil down to level in the Tilje Formation in well 6407/7-1, and to obtain formation pressure data to indicate the relationship between the A-north and the A-east/A-central compartments.

OPERATIONS AND RESULTS

Well 6407/7-3 was spudded with the semi-submersible installation Polar Pioneer on 3 March 1988 and drilled to TD at 3222 m in the Triassic Grey Beds. At 891 m, after setting of 30" casing, gas started to stream out of the casing. It was assumed that the gas came from the bottom of the hole, since there were no previous peaks on the MWD log. Three cement plugs were set in the interval 780 - 891 m, but the gas continued to stream. A plug was then set in the interval 510 - 570 m, and the gas stream decreased. The hole was drilled up again to 525 m, where 20" casing was set, originally not a part of the program. Two zones had shallow gas, 553 - 570 m and 652 - 685 m, which was in agreement with what was assumed in the site survey. Further drilling proceeded without any significant problems. The well was drilled with spud mud down to 536 m, with gel and seawater from 536 m to 1098 m, with Newdrill/KCl/PAC from 1098 m to 3048 m, and with Newdrill/PAC.

Top Jurassic was encountered at 2795 with a 12 m thick Spekk Formation overlying the Middle Jurassic Not Formation. Top of the reservoir sections was encountered at 2851 m. Light oil was encountered in two differently pressured reservoir zones. The upper reservoir was the Ile Formation from 2851 to 2867 m with a net pay of 10.8 m. The lower reservoir was the Tilje Formation and into the Åre Formation. The oil bearing interval was from 2936.5 m and down to siltstones at 3068 m with a total net pay of 50.4 m. The Åre Formation (below 3014 m) was composed of siltstones, sandstones of low porosity and stringers of claystones. It constituted a minor part of the net pay.

Shows were recorded in sandstones in the Nise, Kvitnos, and Lange Formations in the intervals 2062 - 2325 m and 2487 - 2872 m. Weak shows were recorded also below the oil bearing reservoirs down to 3205 m.

Fourteen cores were cut in the well. Two were cut in the interval 2852 - 2893 m and the remaining from 2937 to 3103 m. While cutting the fourth core, there was an invasion of formation fluid into the hole due to a sudden increase in pore pressure. Heavy mud was circulated into the hole, and the well was brought under control. RFT pressures were recorded and a segregated sample was taken at 2855 m. It recovered ten litres of water, a small amount of gas, and no oil.

The well was permanently abandoned on 18 May 1988 as an oil appraisal.

TESTING

Three DST tests were performed in the well. DST 1 tested the interval 3046.8 - 3067.8 m and produced 16 Sm3 oil /day through a 25.4 mm choke. The oil density was 0.831 g/cm3. The down hole temperature in the test, measured at 3003.3 m, was 116 deg C.

Two tests were planned from the interval 2990 - 3014 m. DST 2A produced 527 sm3 oil and 119389 Sm3 gas /day through a 50.8 mm choke. The GOR was 227 Sm3/Sm3, the oil density was 0.809 g/cm3, the gas gravity was 0.737 (air = 1) with 1% CO2 and less than 1 ppm H2S. The down hole temperature in the test, measured at 2889.1 m, was 113.7 deg C. DST 2B was not performed because the bottom hole pressure tool was lost during test 2A and the hole had to be killed.

DST 3 tested the interval 2852.1 - 2867.9 m and produced 950 Sm3 oil and 396150 Sm3 gas /day through a 25.4 mm choke. The GOR was 417 Sm3/Sm3, the oil density was 0.806 g/cm3, the gas gravity was 0.745 (air = 1) with 2% CO2 and less than 1 ppm H2S. The down hole temperature in the test, measured at 2795.5 m, was 111.9 deg C.