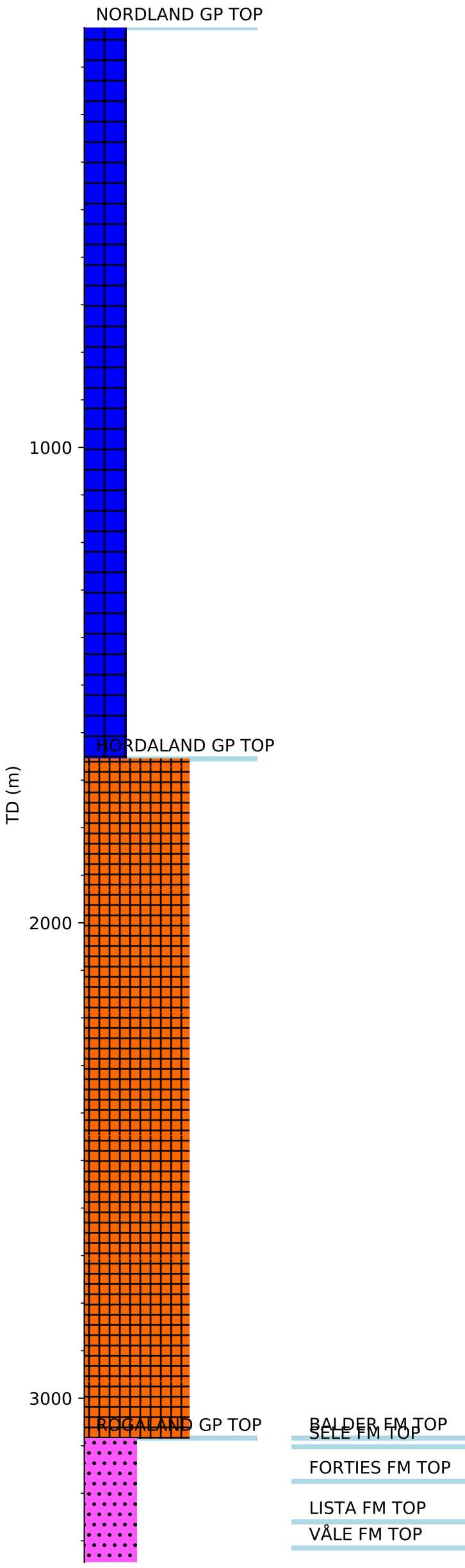
Groups

Formation Tops



Wellbore History

GENERAL

Well 1/3-7 is located on the Hidra High in the North Sea. It was drilled to appraise the 1/3-6 Oselvar condensate discovery made in Paleocene Forties Formation sandstones. The well was placed down-flanks on the structure relative to the discovery well in order to penetrate the hydrocarbon-water contact and further appraise reservoir properties and production rates.

OPERATIONS AND RESULTS

Appraisal well 1/3-7 was spudded with the 3 leg jack-up installation West Epsilon on 13 February 1995 and drilled to TD at 3345 m in the Paleocene Våle Formation. A gas kick was taken at 1740 m in the top of the Hordaland Group, later it was found that the gas probably originated from a limestone less than one meter thick. The hole packed off, the string had to be cut off at 1564 m, and the hole was plugged back. A technical sidetrack (1/3-7 T2) was made from 1204 m. This sidetrack failed as the bit fell back into the original hole during a wiper trip.
A new and successful technical sidetrack (1/3-7 T3) was made from 1202 m. A second gas kick occurred in the T3 sidetrack when reaching 1741 m. This kick was controlled by the driller's method without significant problems or extra rig time. The extra activity caused by the first kick prolonged the rig time with 23 days. Due to poor hole conditions no open hole logging was performed in the 12 1/4" section. As the West Epsilon was available only up to 28 May open hole logging at final TD was also abandoned in order to secure time for the well test. The reservoir was logged through casing. The well was drilled with sea water down to 207 m and with gelled mud from 207 m to 1204 m. From 3103 m to TD it was drilled with a salt polymer.

Top Forties Formation was encountered at 3175 m. The Forties reservoir sandstones was encountered at 3183.5 m and proved to be oil bearing down to an oil-water contact at 3225 m. The logs indicated hydrocarbons down to 3229.4 m (3182.3 m MSL) and oil shows (direct and cut fluorescence) were reported down to 3232 m. This lower zone was considered to be only a residual oil zone, which was indicated also by the change in geochemical composition. No oil shows were reported above the Forties reservoir or below 3232 m, only background gas. The up-flanks 1/3-6 reservoir contains condensate. Hence, the 1/3-7 well suggests a ca 490 m hydrocarbon column with a gas/oil contact somewhere between the two wells. However, the depth of a GOC could not be determined, nor could it be deduced with any certainty that there is pressure communication between the reservoir sections penetrated in the two wells.

A total of 74.5 m core was cut and retrieved in 4 cores in the interval from 3164 to 3251 m. No wire line fluid samples were taken.

The well was permanently abandoned on 25 May 1995 as an oil appraisal well.

TESTING

Two tests were performed on the reservoir.

DST 1A tested the interval 3183.5 to 3215.5 m. It produced 49 Sm3 oil and 16783 Sm3 gas /day through a 1/2" choke. The GOR was 333 with a well head flowing pressure (WHFP) of 15.4 bara. The density of the oil was 0.797 g/cm3.

DST 1B tested the intervals 3183.5 to 3215.5 m and 3220 to 3224.5 m. It produced 136.8 Sm3 oil and 37762 Sm3 gas /day through a 1/2" choke. The GOR was 280.9 Sm3/Sm3, with a well head flowing pressure of 35 bara. The formation temperature was measured in the tests to be 131.6 deg C. The formation temperature was taken as the highest flowing temperature just after opening the well for DST 1A. This is due to the temperature reducing with time because of the thermal expansion effect of gas (BHFP << Bubble point pressure).

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 1/3-7