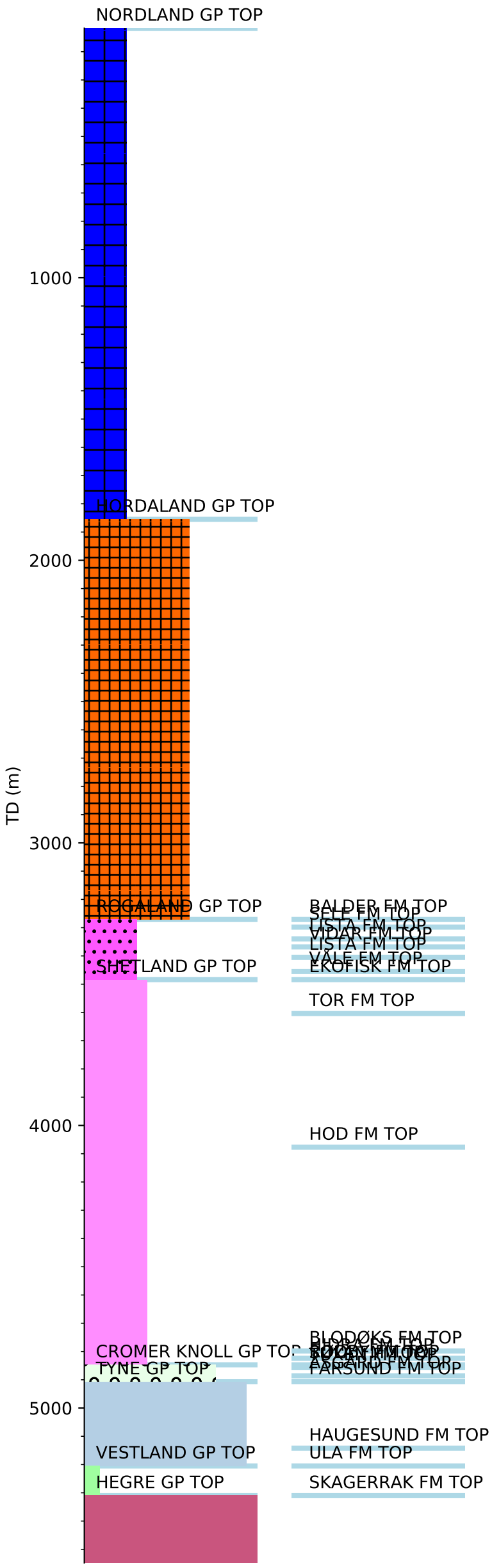
Groups

Formation Tops



Wellbore History

GENERAL

Well 2/4-23 S was drilled to test the Julius prospect about 17 km northeast of the Ekofisk field, near the 2/4-21 (King Lear) discovery in the southern part of the North Sea. The primary objective was to prove petroleum in the Late Jurassic Ula Formation and the Middle Jurassic Bryne Formation. The secondary objective was to delineate the 2/4-21 discovery (King Lear), which was proven in Late Jurassic reservoir rocks within the Farsund Formation) in the summer of 2012. The tertiary exploration target for 2/4-23 S was to prove petroleum in the Late Triassic reservoir Skagerrak Formation.

OPERATIONS AND RESULTS

Wildcat well 2/4-23 S was spudded with the jack-up installation Mærsk Galant on 12 March 2015 and drilled to TD at 5548 m in the Late Triassic Skagerrak Formation. At 5235 m, in the Ula Formation, the well kicked and a 12-m3 influx was taken into the well. A considerable amount of time was needed to regain control of the well, including bullheading operations followed by circulation of remaining gas out of the well. Eventually drilling was resumed with a bottom hole pressure of 2.15 g/cm3. The well was drilled with Seawater and hi-vis pills down to 224 m, with Glydril mud from 224 to 457 m, with Versatec oil based mud from 457 to 4876 m and with WARP oil based mud from 4876 m to TD.

Top of intra-Farsund Formation sandstones, King Lear appraisal target, was encountered at 4994 m (4893 m TVD). A 20-metre thick gas/condensate column was encountered here, in two five metres thick sandstones with moderate/good reservoir quality. The petroleum/water contact was not found. Pressure communication with the 2/4-21 King Lear discovery was confirmed. The Ula Formation was encountered at 5205 m (5105 m TVD) and proved to contain 41 metres of gas/condensate in sandstones of moderate reservoir quality. The petroleum/water contact was not encountered. The well also penetrated 30 gross metres of water-filled sandstone with poor reservoir quality in the Bryne Formation. The Skagerrak formation had poor reservoir quality and was water-filled. Despite the presence of hydrocarbons in the Farsund and Ula formation sandstones, no shows were detected on cutting samples. The use of oil based mud and the suspicion of a deep mud invasion could have masked any signs of live hydrocarbons.

By-pass coring in an open-hole sidetrack was planned in case of discovery in Ula or Skagerrak reservoirs. Despite Ula reservoir being gas filled, no by-pass coring was performed due to too high operational risk. MDT fluid samples were taken at 5012.3 m (gas/condensate), 5211.2 m (gas/condensate) and 5241.4 m (gas/condensate). All fluid samples were contaminated with oil based mud. The contamination ranged from 14.8 to 20.7 % of the STO liquid content in the samples. Cuttings samples from the 8 1/2" section (below 4876 m) are recorded on drillers depth, which is up to 12 m shallower than loggers depth.

88.1 days were spent on plug and abandon, exceeding the budget (22.3 days) by 65.8 days. The main drivers for exceeding the target and budget were:

-Stuck with cement stinger when circulating above cement plug #1

-Failure of annular preventer

-Remedial cementing of 9 7/8" production casing

-3 attempts to set cement plug in section milled interval in 9 7/8" casing

The well was permanently abandoned on 5 October as a gas-condensate discovery.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 2/4-23 S