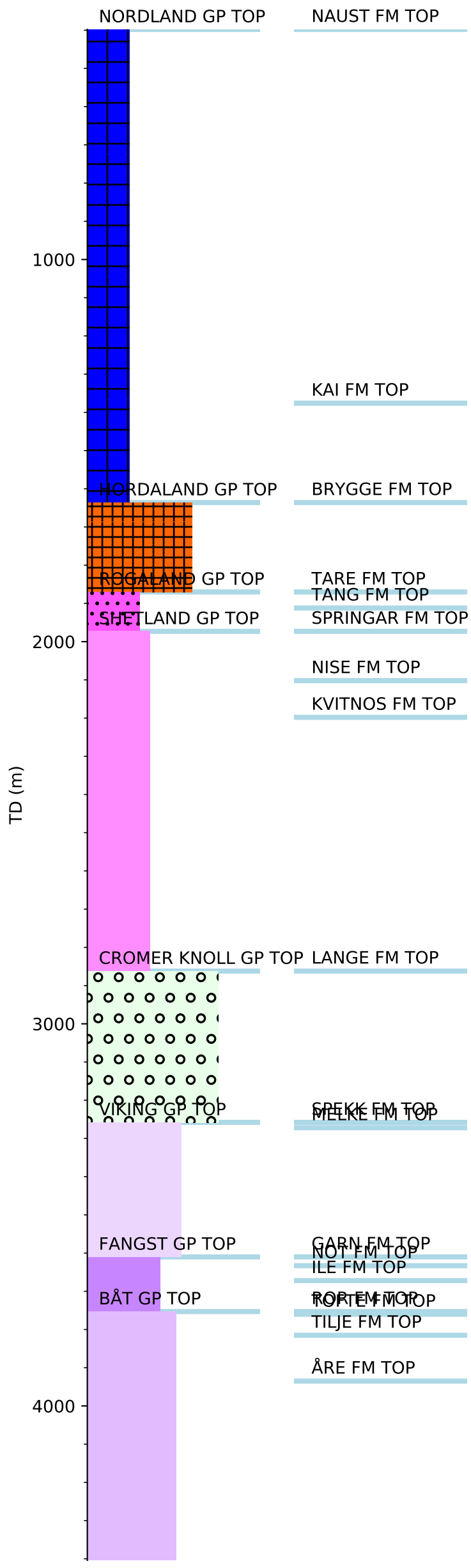

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6607/12-2 S

Wellbore History

GENERAL

Well 6607/12-2 S was drilled on the Alve North structure about eight kilometres west of the Norne field. The primary exploration target for the well was to prove petroleum in Middle and Lower Jurassic reservoir rocks (Fangst and Båt group). The secondary exploration target was to prove petroleum in Cretaceous reservoir rocks (Cromer Knoll group). The Åre Formation should also be evaluated, but the probability of hydrocarbons here was considered low due to a dry Åre Formation in 6507/3-1. The well was designed to be suspended as a possible producer in the event of a discovery. For this reason it was placed as high as possible and in the centre of the structure, deviated and kept parallel to the main fault for keeping a safe distance from potential associated fractures and at the same time access the fluids as efficiently as possible.

OPERATIONS AND RESULTS

Well 6607/12-2 S was spudded with the semi-submersible installation Songa Delta on 22 July and drilled to TD at 4404 m (4274 m TVD) in the Early Jurassic Åre Formation. The well was drilled as high as possible on the NW part of the structure, down to a kick off point above BCU at 3500 m, and then deviated at 30 deg angle in order to stay parallel to the main bounding fault. Drilling the well went without significant problems. A total of 30 days (8 days for Cretaceous and 22 days for Jurassic) was necessary to perform the wire line logging on this well. Three different logging sequences were needed: Cretaceous, Jurassic and Åre deepening to TD. Close to eight days was counted as lost time due to logging problems. The well was drilled with sea water and bentonite hi-vis pills down to 1355 m, with water based mud from 1355 m to 1981 m, and with oil based mud from 1981 m to TD.

The Cretaceous Lange Formation was encountered at 2862 m. Lange Sandstones were found hydrocarbon bearing in two units near the base. The Upper unit contained gas from 2994 m down to 3016 m and light oil from 3033 m down to 3057 m. The reservoir was a few meters net of thin sandstones interbedded in claystone. The Lower unit had 15 bar higher pressure than the gradient in the upper unit. It contained gas from 3094 to a GOC at 3137 and oil from there to an OWC at 3148.5 m. This reservoir was in thick medium to coarse grain sandstones with thin interbeds of claystone.

The Garn Formation was encountered at 3610 m (3587.5 m TVD), 15m deeper than expected. Except for a thin interval in the uppermost Garn, all reservoirs of the Fangst Group, Tofte Formation, and Tilje Formation had relatively poor reservoir properties. These reservoirs had gas from top Garn to a GOC at 3726 and oil down to an ODT at 3753 m. A second column with light oil was penetrated from 3760 to and ODT at 3780 m. The Tilje Formation contained condensate and light oil, but no contacts were established due to tight formation. The Åre Formation was encountered at 3935 m and contrary to expectation proved to contain hydrocarbons in thin or metric sandstones, with gas in the upper section and condensate/light oil in deeper sections. The hydrocarbon bearing sandstones did not have a common pressure gradient. Condensate and light oil were sampled in the thickest reservoir, a 50m stack of medium to coarse sandstones. No oil shows above the oil based mud were recorded.

A 53 m core was cut from 3613 m to 3667 m in Garn/Not with 98% recovery. Wire line (MDT and RCI) fluid samples were taken in the Lange Formation at 3006.5 m (gas), 3055 m (light oil), 3071 m (water), 3122 m (gas), 3140.5 m (oil), 3146.0 m (oil), 3149.5 m (water and trace oil), 3157 m (water and trace oil). In the Jurassic wire line fluid samples were taken at 3614.3 m (dry gas/condensate), 3622.6 m (dry gas/condensate), 3702.9 m (dry gas/condensate), 3738.0 m (light oil), 3761.3 m (light oil), 3775 m (light oil), 3815 m (condensate/light oil), 3872.5 m (light oil), 3926.4 m (light oil), 3944 m (condensate/light oil), 4132 m (condensate/light oil), and 4248.5 m (condensate/light oil).

Due to the schedule the logging operations were stopped on 2 October at 4404 m in the Åre Formation in an oil down to situation. After logging and 11 days WOW the well was suspended on 25 October 2011 as an oil and gas discovery.

TESTING

No drill stem test was performed.