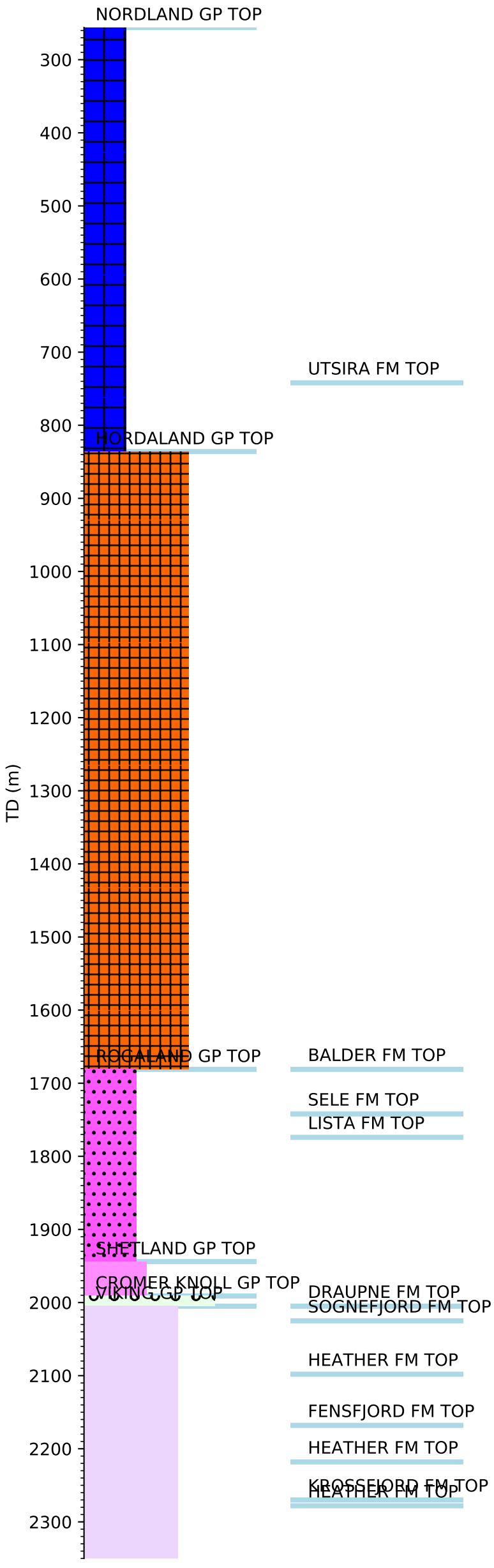
Groups

Formation Tops



Wellbore History

GENERAL

Well 31/4-10 was drilled to appraise the Brage Field on the Bjørgvin Arch in the North Sea. The main objective was to confirm hydrocarbons in the Sognefjord Formation. The secondary objectives were to obtain information about reservoir properties and stratigraphic development of the Fensfjord and Krossfjord Formations.

OPERATIONS AND RESULTS

Appraisal well 31/4-10 was spudded with the semi-submersible installation West Vanguard on 14 November 1995 and drilled to TD at 2342 m in Middle Jurassic sediments in the Heather Formation. The well was drilled and logged without significant problems. It was drilled with spud mud down to 1010 m and with KCl/polymer mud from 1010 m to TD.

A 21 m thick Draupne Formation was penetrated from 2004 m to 2025 m. The Sognefjord Formation was encountered at 2025 m and a total of 4.7 m net pay was calculated in the interval between 2038.0 m and 2044.9 m. The average oil saturation over this interval is estimated to 50.6 %. The average porosity is calculated to 23 %. MDT pressure measurements gave an oil-water contact at 2045 m. Low saturations of residual hydrocarbons are observed in intervals below the oil-water contact down to bottom Sognefjord Formation at 2097.5 m. No gas-oil contact could be determined from pressure measurements or logs because of the low permeability over this interval. However, a gas-oil contact at 2034.5 m was inferred from hydrocarbon shows on the cores. The Fensfjord Formation was encountered at 2167.5 m and a total of 3.2 m net pay was calculated between 2167.5 m and 2171 m. MDT pressure measurements gave an oil-water contact at 2171 m. Low saturations of residual hydrocarbons are observed in intervals below the oil-water contact down to bottom Fensfjord Formation at 2217.5 m. The Krossfjord Formation was penetrated from 2269.5 m to 2277 m and was water bearing without shows.

Eleven cores were cut in the well. Cores 1 to 6 were cut from 2005 in the Draupne Formation, through the Sognefjord Formation and into the Heather Formation at 2114.6 m. One hundred percent recovery was obtained except for core 6, where only 46% recovery was obtained. Cores 7 to 11 were cut from 2171.5 m in the Fensford Formation to 2266 m in the Heather Formation. Good recovery was obtained. The recovery on core 11 included recovery of 3.9m from core 10 during running in hole with core 11. MDT oil samples were taken at 2038.5 m in the Sognefjord Formation and at 2168.7 m in the Fensfjord Formation.

The well was permanently abandoned on 13 December 1995 as an oil appraisal well.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 31/4-10