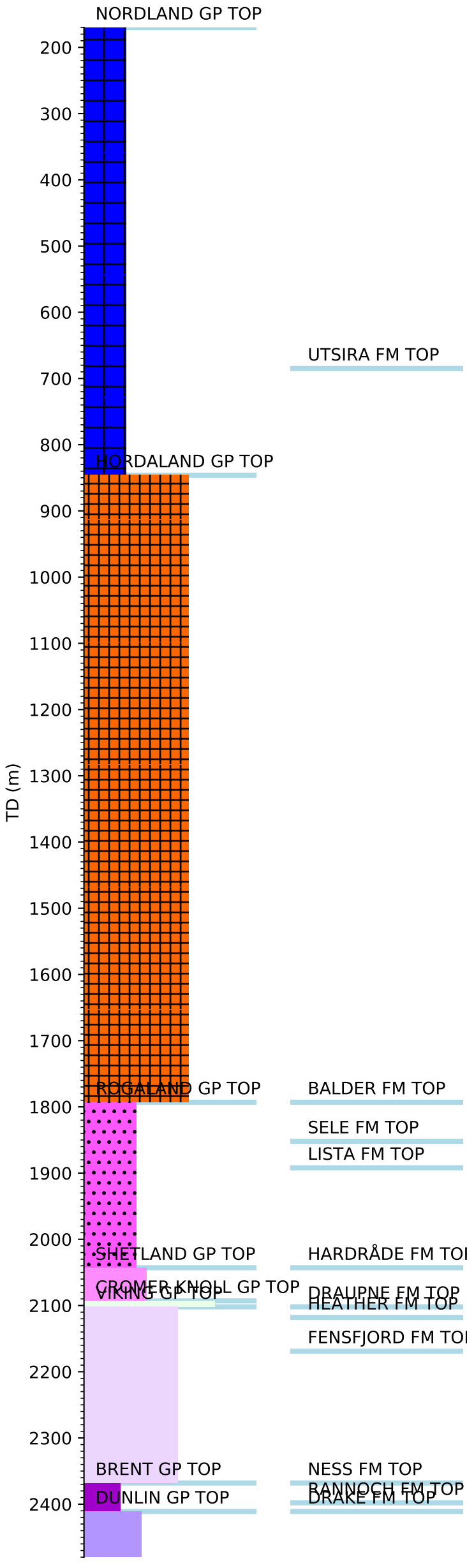
Groups

Formation Tops



Wellbore History

GENERAL

Well 31/4-9 was drilled as an appraisal well on the Brage Field on the Bjørgvin Arch in the North Sea. The main objective was to establish the OWC and confirm reservoir trends, hydrocarbon column and reserve potential in the east flank of the structure. TD was prognosed at 2500 m, 70 m into the Dunlin Group.

OPERATIONS AND RESULTS

Appraisal well 31/4-9 was spudded with the semi-submersible installation Polar Pioneer on 23 January 1987 and drilled to TD at 2480 m in the Early Jurassic Drake Formation. No significant problem was encountered in the operations. The well was drilled with spud mud down to 974 m, with KCl/polymer mud from 974 m to 2027 m, and with NaCl/CaCO3/polymer mud from 2027 m to TD.

The Fensfjord reservoir came in at 2168.5 m and consisted mainly of fine to medium grained sandstones grading into and interbedded with siltstones. The Fensfjord Formation was oil bearing down to the oil-water contact at 2172 m. The Brent sandstone was found to be water bearing. Oil shows were described in the cored sections from 2103.5 m in the Draupne Formation down to 2222 m in the Fensfjord Formation.

An attempt to take two cores in the Tertiary claystones failed. Eight cores were cut with good recovery in the interval 2103 to 2222 m in the Heather and Fensfjord formations. RFT oil samples were taken at 2171.5 m topmost in the Fensfjord Formation

The well was permanently abandoned on 7 March 1987 as an oil appraisal well.

TESTING

Two drill stem tests were performed in the Fensfjord Formation.

DST 1 tested water from the interval 2193.1-2208.1 m through a 50.8 mm choke. The maximum production rate was 577.5 Sm3/day. An injection test was also performed with a maximum injection rate of 576 Sm3/day. Flowing bottom hole temperature was 90.8 deg C.

DST 2 tested oil from the interval 2169.6-2171.6 m through a 12.7 mm choke. The maximum flow rate for the oil was 311.1 Sm3/day and for the gas 23253 Sm3/day. DST 2 also produced 7-8% water and emulsion on average. The GOR was 75 Sm3/Sm3, the oil gravity was 0.875 g/cm3, and the gas gravity was 0.769 (air=l) with 0.5 - 1.0 % CO2. Flowing bottom hole temperature was 88.1 deg C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 31/4-9