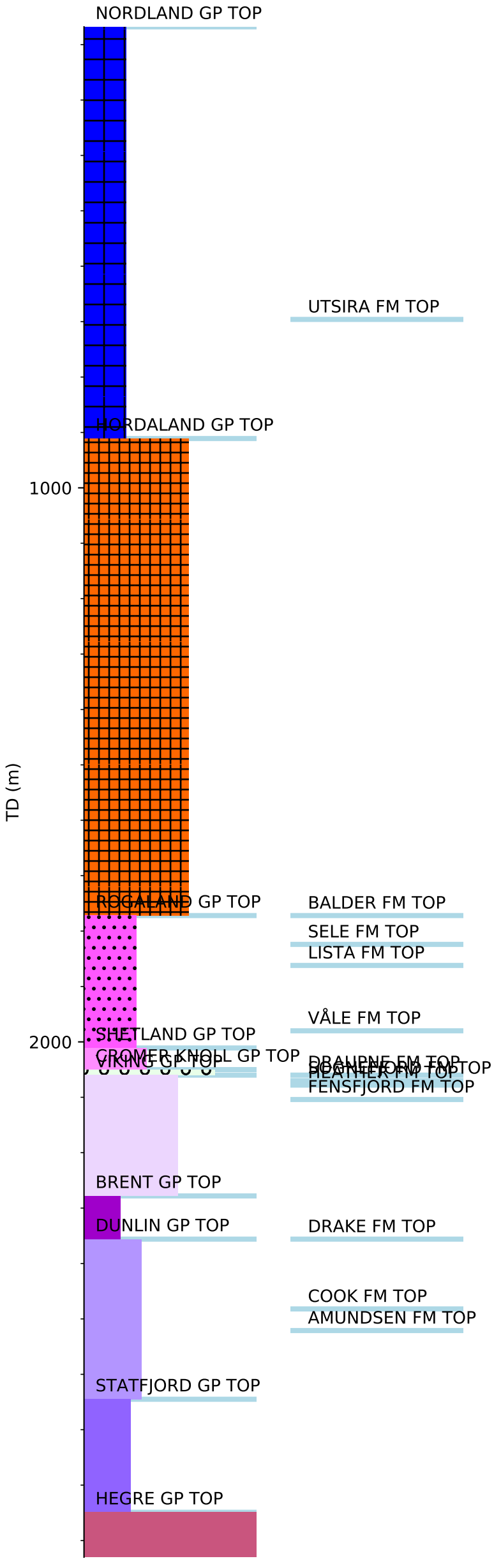
Groups

Formation Tops



Wellbore History

GENERAL

Appraisal well 31/4-5 was drilled on the 31/4-3 Discovery on the Bjørgvin Arch in the northern North Sea. The primary objective was to test "Intra Heather Formation" sands on the "B structure" in a crestal position, up dip from the discovery well 31/4-3. The well was planned to delineate known hydrocarbons in the "Intra Heather Sand I" (Sognefjord Formation) and to test the prospect for additional up dip oil and gas reserves in the "Intra Heather Sand II" (Fensfjord Formation). The well was planned to enter the "Intra Heather Sand I" reservoir approximately 20 m below the OWC in order to provide evidence of the extent of the reservoir. The lower oil bearing zone ("Intra Heather Sand II") was prognosed approximately 20 m higher than in well 31/4-3 and significant amounts of up dip oil were thought to exist. The Brent, Dunlin and Statfjord Groups were secondary objectives, possibly prospective in an up dip position.

OPERATIONS AND RESULTS

Wildcat well 31/4-5 was spudded with the semi-submersible installation Nortrym on 27 May 1981 and drilled to TD at 2930 m in the Triassic Hegre Group. The well was drilled without significant problems. It was drilled with seawater and hi-vis pills down to 926 m, with KCl mud from 926 m to 1966 m, and with a lignosulphonate/XC polymer/Drispac mud from 1966 m to TD.

The well penetrated the Sognefjord Formation at 2070 m and the Fensfjord Formation at 2104 m. The Sognefjord Formation was 8.5 m thick and water bearing, but with good oil shows. The Fensfjord Formation was hydrocarbon bearing with a net sand of 60 m and a net pay of 37 m. The oil/water contact was not possible to define exactly, but RFT pressure gradients and shows on cores placed it at ca 2150 m. Shows on sandstones on cores continued down to 2192 The Brent Group was encountered at 2278 m. Sandstones were penetrated in the Brent, Dunlin and Statfjord Groups, but all were water bearing. Weak oil shows were recorded the Dunlin Group and also above the Jurassic, in the Paleocene Maureen Formation at 1992 - 2002 m.

Nine cores were cut. Cores 1 to 8 were cut in succession from 2063 m to 2191 m in the Draupne, Sognefjord, Heather, and Fensfjord formations. Core 9 was cut in the Brent Group from 2292.4 m to 2309.8 m. RFT samples were taken in the Sognefjord Formation at 2072.5 m (formation water, filtrate and trace hydrocarbons) and in the Fensfjord Formation at 2131.5 m (one litre 34.9 deg API oil and 0.4 Sm3 gas).

The well was permanently abandoned on 29 July 1981 as an oil appraisal

TESTING

Three DST's were performed in the Fensfjord Formation.

DST 1 tested the interval 2152 - 2158 m. After 10 min initial flow and 80 min shut in the well was opened for the main flow. The well ceased flowing after a few minutes.

DST 2 tested the intervals 2130 - 2133 m and 2134.5-2140 m. It flowed 397 Sm3 oil and 33400 Sm3 gas /day through a 32/64" choke. The GOR was 84 Sm3/Sm3 the oil gravity was 36.2 deg API and the gas gravity was 0.73 (air = 1).

DST 3 (also called DST 3A in well reports) was a combination test over the interval of DST 2 plus the interval 2107-2113 m. It flowed 334 Sm3 oil and 27500 Sm3 gas /day through a 32/64" choke. The GOR was 82 Sm3/Sm3, the oil gravity was 36.2 deg API, and the gas gravity was 0.724 (air = 1).

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 31/4-5