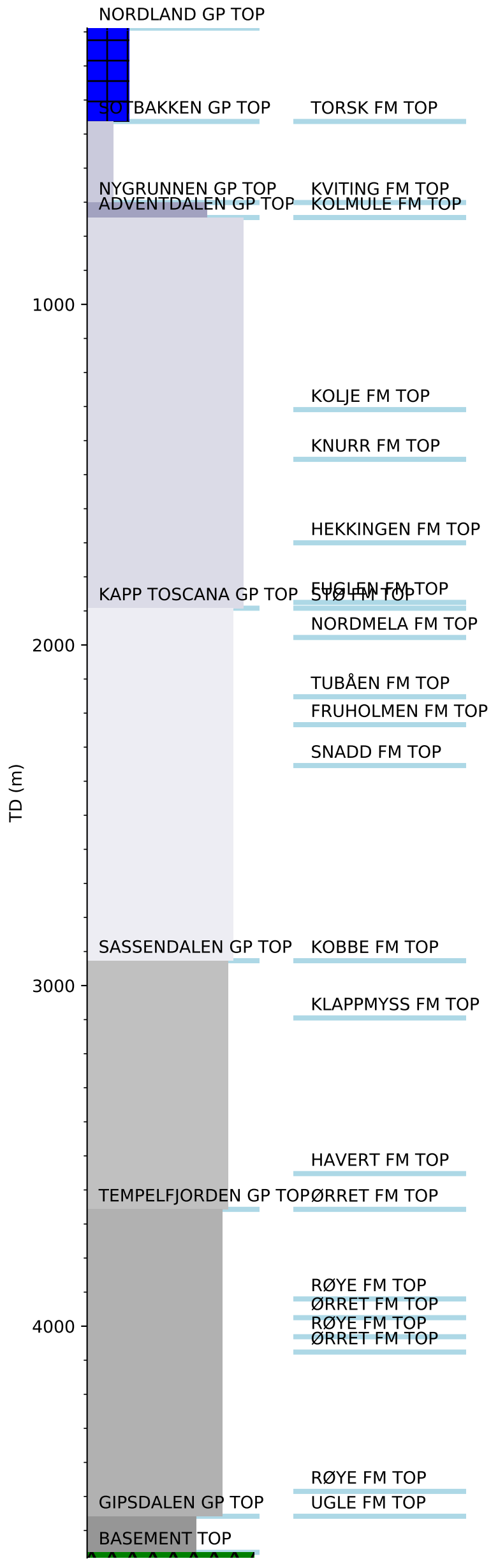

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 7120/12-2

Wellbore History

GENERAL

The primary objectives of well 7120/12-2 were to test sandstone reservoirs of Middle to Early Jurassic age in the central compartment of the Alke structure, and a deep seismic marker interpreted to represent top of a possible carbonate reservoir of Permian age. A secondary objective was to test sandstones of Early Triassic age. The well was planned to be drilled to 5000 m or into basement rocks to serve as the deep commitment well on the licence.

OPERATIONS AND RESULTS

Well 7120/12-2 was spudded with the semi-submersible installation Treasure Seeker on 15 April 1981 and drilled to TD at 4680 m in basement rocks. After setting the 20" casing the kill line outlet flange was accidentally damaged and 5 days were spent repairing the BOP. The well was drilled with bentonite/seawater mud down to 515 m and with lignosulphonate (Spersene / XP-20) mud from 515 m to TD. Severe problems were encountered with gumbo type clays during the interval from about 800 m to 1400 m.

A major fault was penetrated at 2410 m in the well, faulting out approximately 400 m of the Triassic section. This is evident from comparing the Triassic sequences penetrated in the well 7120/12-1 and 7120/12-2. Rocks of Permian age were encountered from 3657 m while metamorphic basement was encountered at 4664 m. Hydrocarbon bearing sandstones were encountered in the Middle to Late Jurassic and in the Middle to Late Triassic.

The "Alke Formation" from 1892 m to 2314 m (Stø, Nordmela, Tubåen , and most of the Fruholmen Formation) was found hydrocarbon bearing from 1888 m to the gas/water contact at 1981.5 m. This interval consisted of relatively clean, fine to occasionally coarse grained, homogeneous sandstones separated by thin silty and argillaceous beds. Towards the base, the sandstones were predominantly very fine to fine grained, becoming increasingly argillaceous and micaceous. The net pay was, from wire line logs, calculated to 76 m, with 20% average porosity and an average water saturation of 19%. RFT pressure recordings and sampling were successfully performed over the interval. This gave a clear gas gradient of 0.088 psi/ft with an underlying water gradient of 0.458 psi/ft.

The Middle to Late Triassic hydrocarbon-bearing interval from 2547 m to 2574 m (Snadd Formation) consisted of fine to very fine-grained sandstone beds with stringers and thin beds of limestone and calcareous cemented sandstone. The net pay was calculated to 14 m, with 23% average porosity and an average water saturation of 30 %. Due to hole conditions, no RFT sampling was performed in this sequence. RFT pressure readings were, however, run through the interval and gave a gas gradient of 0.076 psi/ft. Gas shows were also reported in the Late Triassic (2513 m to 2547 m, Snadd Formation), Early Triassic (2935 m to 3075 m, Kobbe Formation) and in Permian sandstones (3657 m to 3800 m, Ørret Formation). The water saturation in these intervals ranged from 50 - 100% and based on log interpretation, the hydrocarbons were assumed to be non-moveable. Very poor permeabilities were indicated in the Early Triassic and Permian intervals from RFT pressure readings.

Organic geochemical analyses showed rich potential for gas/condensate generation in the Late Jurassic Hekkingen Formation (1630 m to 1859 m), Below this level Early Jurassic to Middle Triassic sequences contained carbonaceous sequences and coal beds with potential for gas and possibly oil. All sediments down to 2500 m to 3000 m are immature. Migrant hydrocarbons were frequently detected all through the well. This could indicate contamination from oil in the mud, although the mud used should be water based.

Six conventional cores were cut in the Middle Jurassic Fuglen, Stø, and Nordmela Formations from 1888 m to 2050 m, and two were cut from 3671 m to 3689 m and 4117 m to 4128 m in Permian sandstones. A final core was cut at TD from 4675 m to 4680.5 m and recovered 5.5 m of gneiss. Two RFT samples at 1978 m and 1943.5 m recovered gas and small volumes of condensate.

The well was permanently abandoned on 11 September as a gas/condensate discovery.

TESTING