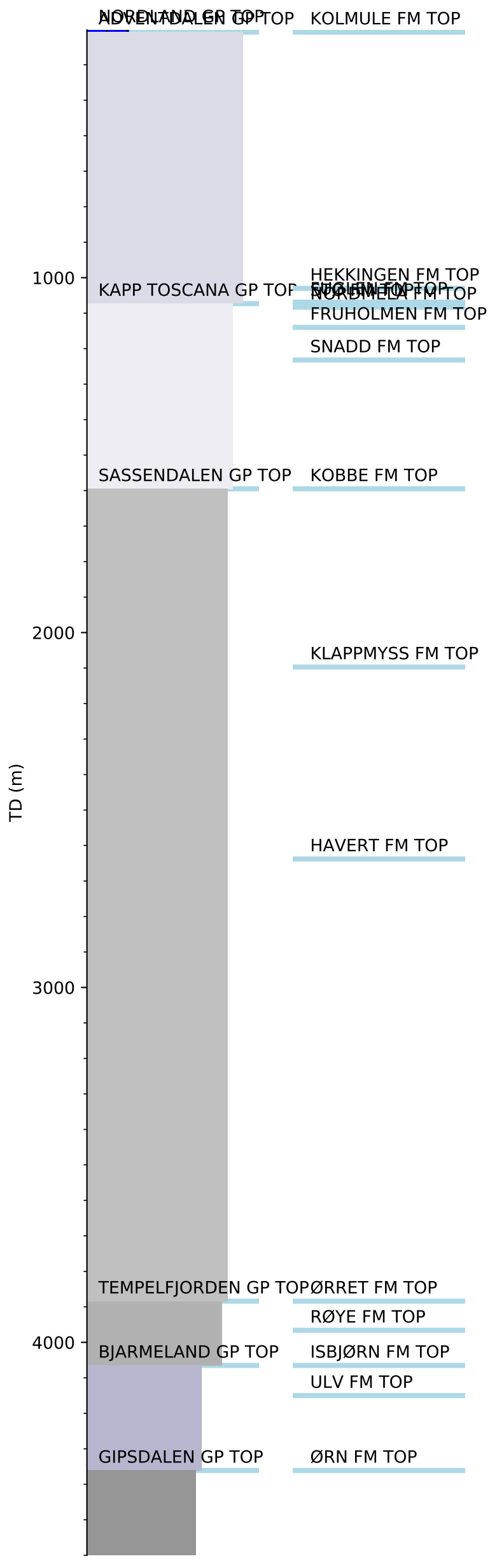

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 7228/9-1 S

Wellbore History

GENERAL

Wildcat well 7228/9-1 S is located on the western margin of the Finnmark Platform in the Nordkapp Basin South. The objective of the well was to test the Jurassic and Triassic prospects above the salt with the Early Triassic Klappmyss Formation as the primary target. Further objectives of this wildcat well was to obtain stratigraphic information from the Palaeozoic for future exploration in the area and to gather as much geological information as possible regarding reservoir, source and cap rock intervals. The well position was chosen to leave a minimum of untested potential up-dip from the well location and to avoid faults that could disturb a good seismic tie. Total depth was planned to 300 m below the base Sakmarian reflector, but not deeper than 4960 m. If massive evaporites were encountered below the Base Sakmarian reflector, drilling would terminate within 50 m. The well would be deviated from approximately 2300 m in direction 270 deg to avoid major faults and to test potential reserves up-dip. No shallow gas was expected in the well.

The well is Type Well for the Ulv Formation and Reference Well for the Røye and Ørret formations.

OPERATIONS AND RESULTS

Wildcat well 7228/9-1 S was spudded with the semi-submersible rig Ross Rig 22 December 1989. Due to severe difficulties with tight hole in the top-hole section, the well was re-spudded twice. The primary reason for the problems was the extremely reactive swelling clay. Exposed to water, the clay swelled without space to expand and thereby raise the formation pressure. The well was drilled to TD at 4576 m in Early Permian evaporites. No shallow gas was observed in the well. The well was drilled with seawater and CMC hi-vis pills down to 958 m, and with KCl/polymer mud from 958 m to TD.

The secondary Late Triassic to Middle Jurassic target (the uppermost part of the Snadd Formation, the Reke Member of the Fruholmen Formation, and the Nordmela and Stø Formations) was penetrated from 1072.5 m to 1295 m. This interval contained a net 93.6 m of predominantly of fine to coarse, poor to well sorted sandstones with 22.8 % average porosity. Good oil shows were recorded on conventional cores, sidewall cores and cuttings in the sandstones from 1069 m to 1160 m.

A CPI was run over the Middle Triassic interval from 1594.5 m to 1685 m (Top Kobbe Formation). A total of 9.5 m net sand with 17.7 % average porosity was estimated in this interval. Gas peaks with higher hydrocarbons (C2 ? C4) were recorded in the mud gas in thin sandstone beds at 1601 m to 1643 m. The lowermost of these sandstones from 1635 m to 1643 m also had patchy oil shows (direct and cut fluorescence) recorded on two sidewall cores.

The primary target reservoir interval in the Early Triassic Klappmyss Formation was penetrated from 2097 m to 2637.5 m. One to ten m thick sandy layers were found throughout this section but no shows were recorded and low levels of mud gas contained only methane.

Seven cores were cut in the well, one in shales of the Hekkingen Formation, three in sandstones of the Lower Jurassic/Upper Triassic section, one in sandstones/siltstones of the Havert Formation, one in Permian muddy carbonates and finally one in the Permian evaporite sequence. Two planned cores in the Klappmyss Formation and the Griesbachian part of the Havert Formation were not cut due to absence of reservoir sandstones and hydrocarbon indicators. A total of 510 sidewall cores were attempted throughout the well and 387 were recovered. Segregated RFT samples were taken at 1091.5 m in the Nordmela Formation and at 1607 m in the Kobbe Formation. The 6 Gallon chamber in the sample from 1091.5 m contained 10 ml gas together with mud filtrate and water with a smell of rotten eggs. A thin oil film was seen, but was described as a possible contamination. The sample from 1607 m contained gas and mud filtrate.

The well was permanently abandoned on 7 May 1990 as a dry hole with shows.

TESTING

No drill stem test was performed