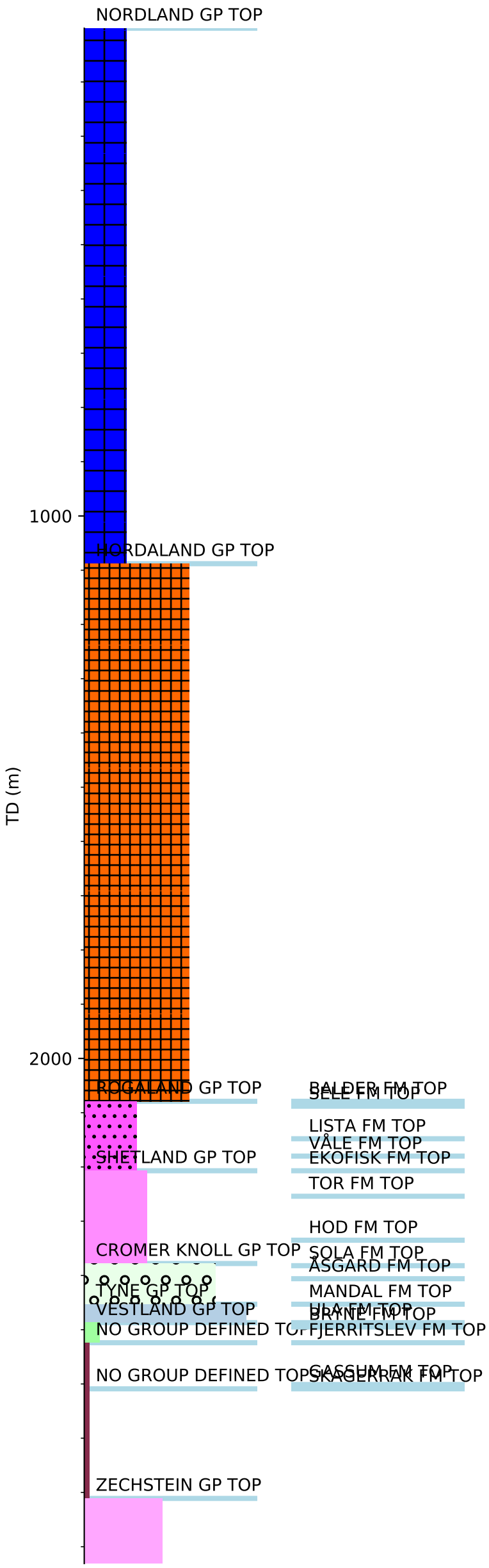
Groups

Formation Tops



Wellbore History

GENERAL

Well 7/9-1 is located on the Reke Fault Zone between the Jæren High and the Sørvestlandet High. The objective of the well was to test for hydrocarbons in Tertiary, Cretaceous, Jurassic, and Triassic reservoirs over a Zechstein salt well which showed 1300 feet of vertical closure over an area of about 65 square km at the base Tertiary level.

The well is Reference Well for the Gassum and Fjerritslev formations.

OPERATIONS AND RESULTS

Wildcat well 7/9-1 was spudded with the jack-up installation Mærsk Explorer on 22 April 1970 and drilled to TD at 2931 m in Zechstein salt. The well was spudded using a high viscosity gel-seawater mud. After drilling out of the 20" casing, which stuck at 242 m, the mud was converted to a lignosulphonate-seawater. The 213 m of 26" rat hole left below the 20" casing gave considerable trouble by acting as a build up area for large balls of gumbo, which collected there as 17 1/2" hole was being made. An attempt to run electric logs at the 13 3/8" casing point failed because of the fill at 442 m. Drilling detergent was used to reduce torque and drag and was successful in the upper part of the hole. The diesel oil content of the mud was maintained between 4% and 7%. A deviation problem arose in the 8 1/2" hole, starting around 2255 m where the angle was 4.5°. It increased steadily and at 2723 m the last survey point was 5.5°. Light bit weight, high rotary speeds, and a bottom hole assembly usually successful in dropping angle had no effect.

The Tertiary Paleocene Sands were not developed over the structure. The other objectives, the Tertiary Danian calceranites, the late Cretaceous Maastrichtian chalk, and the Middle Jurassic to Triassic sandstones, were confirmed, but were water bearing. During the drilling of the Tertiary section to a depth of 1676 m shale gas from the sometimes richly organic shales maintained a high background between 0.5% and 1% methane in the mud with maximum values of 2.5% recorded between 503 m and 594 m. Below 1676 m background readings were generally below 0.1% methane to the base of the Tertiary shale section. The upper Jurassic shales between 2454 m and 2484 m also gave indications up to 0.1% methane. Apart from the shale gas recorded no shows were encountered in any of the porous sections. Organic geochemical analyses showed that the vitrinite in the well was immature to TD (%Ro only up to 0.5), while the maturity based on spore coloration indicated mature kerogen below ca 2000 m. Relatively high TOC was measured in Cretaceous "grey shales", in the Jurassic, and possibly in the Zechstein Group. However, the data appear highly affected by cavings, and from picked lithologies only the Late Jurassic Mandal Formation appeared to be a reliable source rock. It had TOC around 4% and Hydrogen Index around 250 mg HC /g rock.

Two conventional cores were cut in the well and both jammed off. The first retrieved 4.7 m chalky limestone of Danian age (Ekofisk Formation) from the interval 2209.5 m to 2216.8 m. The second core retrieved 3 m of Maastrichtian chalk (Tor Formation) from the interval 2256.4 m to 2260.4 m. No fluid sample was taken.

The well was plugged and abandoned as a dry hole on 29 May 1971.

TESTING

No drill stem test was performed

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 7/9-1