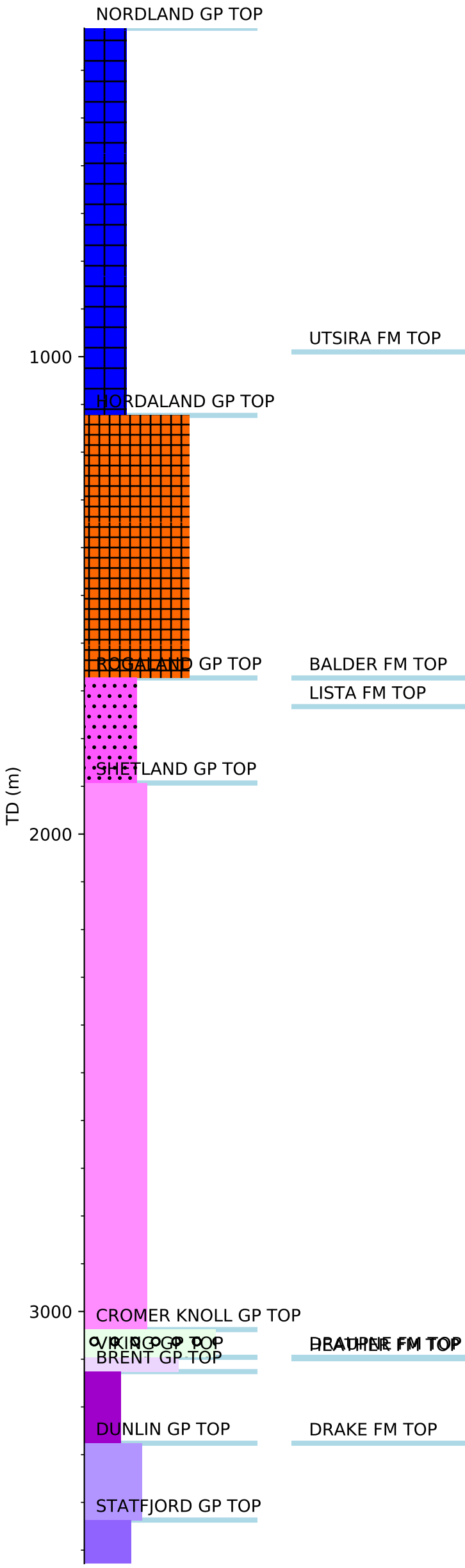
Groups

Formation Tops



Wellbore History

GENERAL

Wildcat well 33/9-11 was drilled to test the 33/9-Epsilon prospect 6 kilometres north of the 33/9-Beta oil discovery and 10 kilometres northeast of the Murchison Field (UK). The Epsilon structure is a northwest tilted fault block and is expressed as a topographic high at the Kimmerian Unconformity surface. The primary objective was to test the hydrocarbon potential in the Middle Jurassic Brent Sand. The Early Jurassic Statfjord Sand was secondary objective.

OPERATIONS AND RESULTS

Exploration well 33/9-11 was spudded with the semi-submersible installation Fernstar on 17 June 1978. The spud location turned out to be in a 25 m diameter crater in the sea floor. Due to problems with tilting of the temporary guide base two unsuccessful spuds were made before the third and successful spud was made with a modified guide base on 24 June 1978. Final position refers to this hole. The well was drilled with seawater and gel down to 820 m, with KCl polymer mud from 820 m to 1870 m, and with a fresh water/lignosulfonate mud from 1870 m to TD. Diesel and Protectomagic was spotted below 820 m, and from this depth the mud is reported to contain between 4 and 12 % oil. The well was drilled to TD at 3528 m, 91 m into the Early Jurassic Statfjord Formation.

Grey clays and claystone dominated the Tertiary except for the sands in the intervals, 989 to 1034m and 1205 to 1225m. In the Paleocene Balder Formation typical tuffaceous grey and red claystone were present and were also observed above and below the Balder. The Late Cretaceous Shetland Group was comprised of grey and brown claystone and siltstones with only minor sands and carbonates. The electric log pick of the top of the Early Cretaceous Cromer Knoll Group was taken at 3037.8 m. The Early Cretaceous was 58 m thick and consisted of 8.6 m of Barremian limestone at the base and claystone with interbedded marls in the overlying section.

The Late Jurassic Viking Group was encountered at 3096.2 m, 28.8 m high to prognosis. Of the 29.8 m thick shale section the upper 2.8 m was the Draupne Formation and the lower 27 m was the Heather Formation.

The primary objective Brent Group came in at 3126 m. It was 149.6 m thick and had 102 m net sand. The sandstone was argillaceous; medium grained and had fair porosity. Both porosity and permeability were better than in the 33/9-10 well. Brent was water bearing and no shows were seen in the ditch samples. One core was cut from 3134 m to 3152 m. Weak shows were observed in the core in the top of the reservoir from 3134 m to 3136 m, but electric logs indicated the Brent Formation to be water wet. The shows were explained by flushing of the core with diesel and Protectomagic mud. No residual oil was measured in the core plugs. Core porosity averaged 22.2 percent and horizontal liquid permeability averaged 370 mD, ranging up to 1874 mD.

Top Dunlin Group was penetrated at 3275.6 m. It consisted of 161 m silty, micaceous claystone belonging to the Drake Formation. The Statfjord Formation came in at 3436.6 m. The Statfjord sand was kaolinitic, coarse and had fair to good porosity but with several tight calcareous-cemented sand streaks. No shows were seen in the samples and electric log analysis confirmed the Statfjord Formation to be water wet.

The well was permanently abandoned as dry on 28 August 1978.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 33/9-11