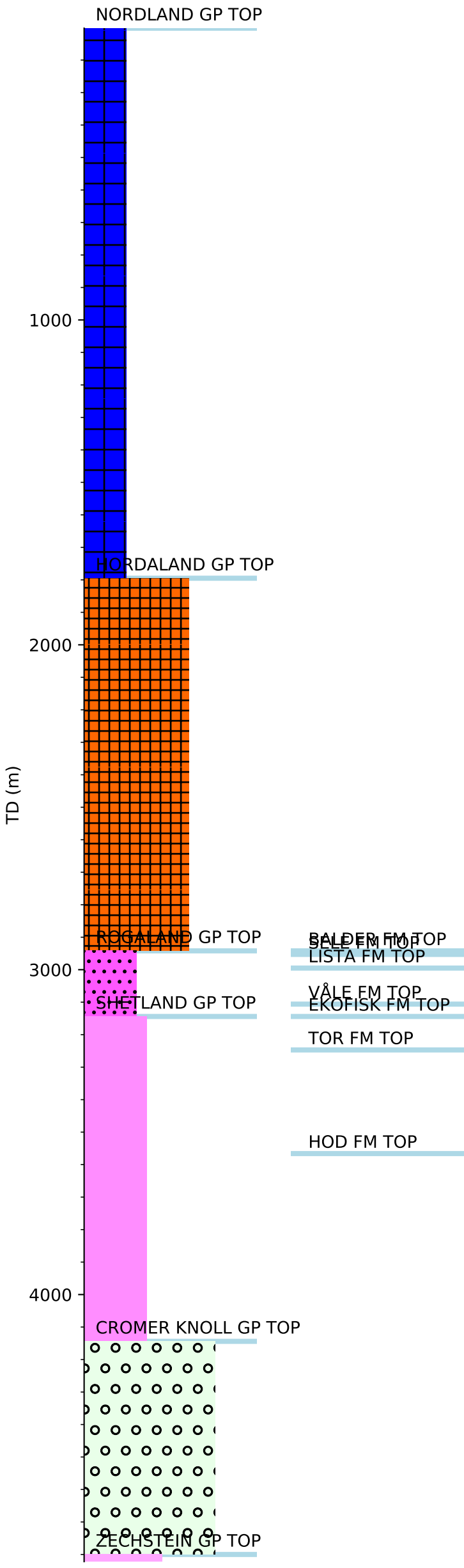
Groups

Formation Tops



Wellbore History

GENERAL

Wildcat well 1/6-1 is located ca 15 km northwest of the Ekofisk Field in the southern Norwegian North Sea. It was drilled in a crestal position on a large chalk structure shared between Norske Shell's block l/6 and Phillips' block 2/4, the Ekofisk block. Phillips participated in drilling this well on a 50/50 basis. The primary objective was to investigate Danian and Maastrichtian chalk prospects. Secondary objective was to evaluate possible sand developments in the Paleocene and the Lower Cretaceous or older units. Planned total depth was 4572 m (1500 ft).

OPERATIONS AND RESULTS

Well 1/6-1 was spudded with the jack-up installation Zapata Nordic on 10 July 1972 and drilled to TD at 4822 m in the Late Permian Zechstein Group. No major technical problems were encountered in the operations and the drilling of this deep well was within the prognosed time schedule. The drill string stuck at 228 m. After working the string and spotting pipe-free/diesel the string came loose. Some highly porous limestone intervals (1 - 8 m thick) resulted in lost circulation problems. The pipe stuck at 3456 m, but was freed after spotting with pipe-free/diesel. The well was drilled with seawater down to 448 m, with seawater/lignosulphonate and a shale inhibitor (shalock) from 448 m to 1586 m, and with seawater/lignosulphonate/ligcon (caustisized lignite) from 1586 m to TD.

Reservoir development was encountered only in the Chalk Formations, with hydrocarbon-bearing intervals being developed in both the Danian and Late Cretaceous. Four hydrocarbon-bearing intervals were encountered and tested within the Chalk, but only one zone in the Maastrichtian (Tor Formation), yielded commercial flows of gas and condensate. Reservoir developments in the Danian (Ekofisk Formation) and earlier Maastrichtian (Hod Formation) were found to be considerably less favourable in l/6-l than in the adjacent Ekofisk and West Ekofisk field. The Early Cretaceous (Valanginian) was found resting directly on Late Permian Zechstein evaporite at 4800 m.

Two cores were cut in the intervals 3177.5 to 3189.7 m and 4604.6 to 4610.7 m. No fluid samples were taken on wire line.

The well was permanently abandoned on 26 November as a gas/condensate discovery.

TESTING

Based on results from logging four zones were perforated and tested.

Zone 1 was perforated from 3821 to 3833 m in the (DST 1, Hod Formation). The test produced only a small quantity of gas and traces of light crude/acid emulsion.

Zone 2 was perforated in the intervals 3653.6 - 3650.6 m, 3646.0 - 3647.5 m, and 3621 - 3632.2 m (DST 2, Hod Formation). The test produced ca 65 Sm3 fluid (50% oil) /day.

Zone 3 was perforated from 3270.5 m to 3279.6 m (DST 3,Tor Formation). The test produced at maximum 451 Sm3 oil and 480400 Sm3 gas /day. The rates decreased during the test and the GOR changed accordingly from 1070 to 1330 Sm3/Sm3. Oil gravity was 46.8 deg API. Maximum down hole temperature was 135 deg C.

Zone 4 was perforated from 3152.9 m to 3158.9 m (DST 4, Ekofisk Formation). After acidization the test produced 24 Sm3 oil, 52000 Sm3 gas, and 29 Sm3 water / day. Oil gravity was 46.3 deg API, gas gravity was 0.745 (air = 1), and GOR was 2180 Sm3/Sm3.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 1/6-1