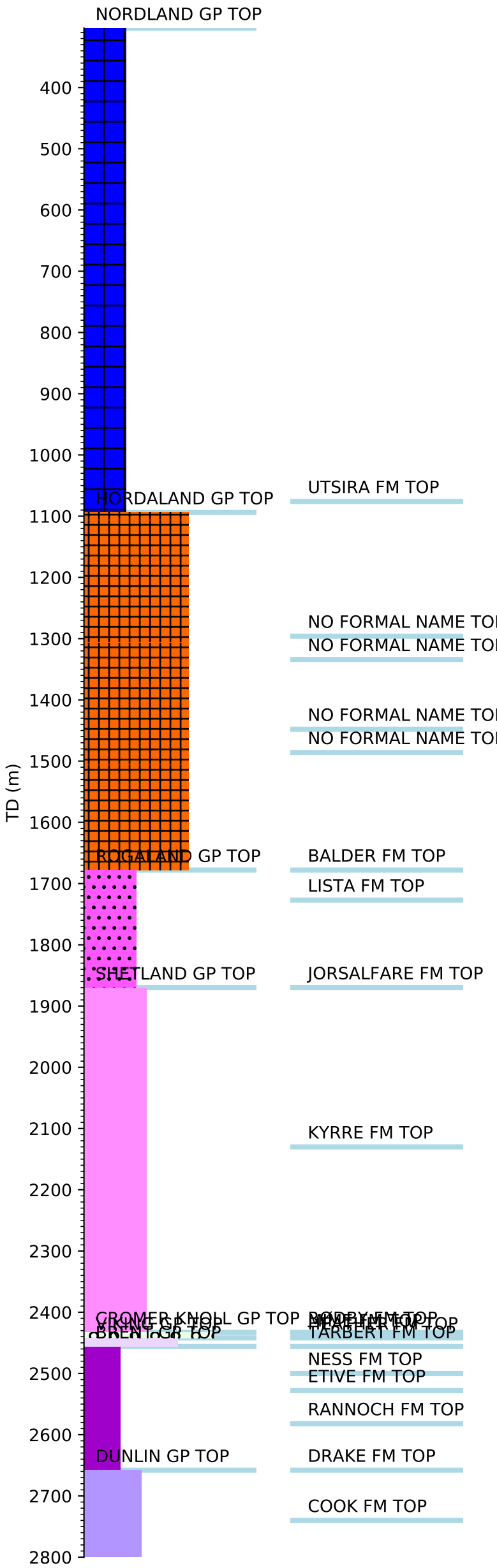
Groups

Formation Tops



Wellbore History

GENERAL

Well 34/7-19 is an appraisal well on the Vigdis Middle structure, south of the Snorre Field on Tampen Spur in the Northern North Sea. The well was drilled approximately 1.5 km north-west of well 34/7-16, on a north-west dipping, rotated fault block. A wedge of partially eroded Viking Group/Heather Formation was interpreted above the reservoir. The primary objectives of the well were to prove the north-western extension of the 34/7-16 reservoir into Segment M1 of the Vigdis Middle and establish an oil water contact for the upper Brent Group. A secondary objective was to test the possible existence of a Late Jurassic Draupne Formation shale wedge. The well was designed to be used in possible future field development. Shallow gas was expected at a depth of 445 m on the well location. This level represents a sand layer at Top Pliocene where gas had been observed in several previous wells in block 34/7. Shallow gas could also be expected in thin sand layers, below seismic resolution down to Top Utsira Formation. A boulder bed could be expected approximately 60 m below sub seabed. Prognosed TD was estimated to 2803 m, and an OWC was assumed at 2418 m (2400 m MSL).

OPERATIONS AND RESULTS

Well 34/7-19 was spudded with the semi-submersible installation West Alpha on 24 September 1991 and drilled to TD at 2800 m in the Early Jurassic Cook Formation. At core point, 2439 m the weather deteriorated. Due to extreme heave the top drive jumped out of hook. The drill pipe bent and the top drive fell down on the drill floor. The shear ram was activated leaving the drill string with core assembly in the hole. Fishing and WOW caused 4.5 days delay before coring could commence. The well was drilled with spud mud down to 1166 m and with KCl mud from 1166 m to TD. Shallow gas was not encountered in this well, but a zone from 526 to 527.5 m was interpreted as potentially gas bearing. One boulder bed was encountered at 363 m.

Down to the Top Jurassic at 2455.5 the well penetrated mainly claystones. An exception to this was the sandy Utsira Formation from 944 to 1065 m. The Jurassic interval comprised the Late Jurassic Heather Formation, the Middle Jurassic Brent Group and the Early Jurassic Dunlin Group.

Well 34/7-19 encountered oil in the Tarbert Formation of the Brent Group. The resistivity logs indicated oil down to 2477 m and water up to 2483 m. The OWC was from the RFT-pressure measurements estimated at 2478 m (2460 mSS). An RFT sample recovered oil at 2465 m. The oil bearing part of the Tarbert Formation (2455.5 - 2478.0 m) had an estimated average log porosity of 0.26, a net to gross ratio of 0.8 and an average water saturation of 39 %. The total Tarbert Formation (2455.5 - 2499.5 m) had an estimated average porosity of 0.25 and a net to gross ratio of 0.67.

Sparse oil shows were observed in sandstone lamina and claystones of the Rogaland Group in parts of the interval 1688 -1750 m. Shows were observed in silty and sandy lithologies in the interval 2180 -2300 in the Kyrre Formation. Over the Brent Group reservoir good oil shows were encountered in cores from 2454 - 2482 m. Below 2482 the amount of shows decreased, and below 2486 hydrocarbon shows were not observed.

Ten cores were cut in the interval 2439 - 2661 m, giving full core coverage of the Brent Group. A total of 16.5 m in the Cromer Knoll Group/Heather Formation, 202.5 m in the Brent Group and 3 m of the Dunlin Group was cored. The total core recovery was 211.8 m (95.4 %). One RFT segregated fluid sample was taken at 2465 m. The 2 3/4 gallon chamber recovered 10.3 l water and filtrate with only small amounts of oil and gas (0.2 l and 7 l, respectively). The content of the 1 gallon chamber had a similar composition.

The well was suspended 27 December 1991 as a possible future development well. It is classified as an oil appraisal.

TESTING

Two drill stem tests were performed in this well.

DST 1 perforated and tested the interval 2542 to 2557 m in the water bearing Etive Formation. The maximum stable production rate during main flow was 466 Sm3 water/day. Initial reservoir pressure and temperature, at sensor depth (2487.7 m), was measured to 369.2 bar and 86 deg C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 34/7-19