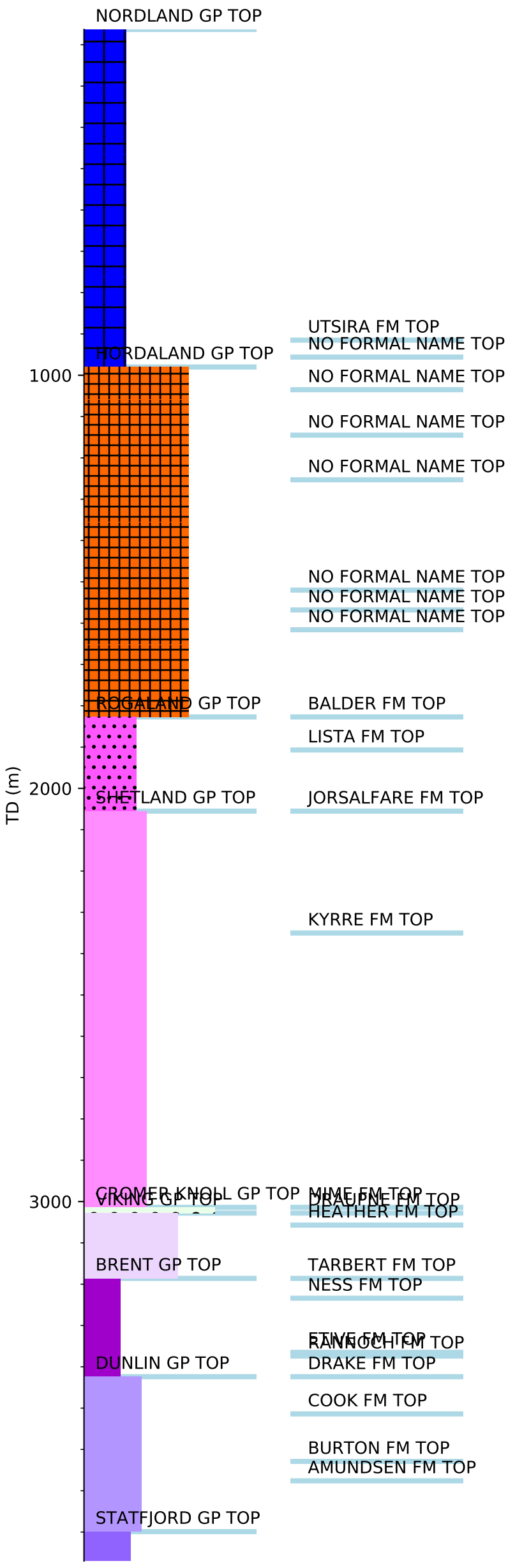

Wellbore History

GENERAL

Well 34/10-33 was the sixth well drilled to reservoir level on the Gullfaks South structure. The main objective of the well was to appraise the oil and gas reserves in the Brent Group on the northern part of the structure. The gas/oil and oil/water contacts were to be confirmed at 3324 m and 3395 m MSL respectively. Secondary objective was to penetrate 50 m of the Statfjord Formation to obtain data to better understand the structural development in the area, and also update the geological model for the upper part of the formation. A positive result would lead to the drilling of a horizontal testing well as a sidetrack from this well.

OPERATIONS AND RESULTS

Well was spudded with the semi-submersible installation West Delta on 25 September 1988 and drilled to TD at 3870 m in the Early Jurassic Statfjord Formation. There was some shallow gas at 477 - 478 m. Due to this the 20" casing was set at 450 m. There was a problem with a leakage in the BOP. The drill string got stuck when setting the 13 3/8" casing and the MWD and drill bit had to be changed. The well was close to vertical down to ca 2500 m. From there the well built inclination gradually up to 20 deg at TD. At TD true vertical depth is estimated to be ca 20 m less than measured depth. The well was drilled with spud mud down to 483 m, with gypsum/polymer mud from 483 m to 3161 m, and with gel/lignosulphonate/lignite mud from 3161 m to TD.

Top Brent Group, Tarbert Formation came in at 3186 m with gas and oil. FMT data showed a gas/oil contact at 3268 m, 85 m higher than prognosed. Approximately 150 m of oil was found vertically down to top Dunlin Group at 3424 m, much more than expected. No oil/water contact was seen. There was a pressure shift of 1.5 - 2 bar at around 3350 m, indicating two separate compartments in the oil zone. This had not been observed in the previous wells on Gullfaks South. Due to the large amount of oil in the Brent Group, the oil in place estimate was adjusted to 50 - 60 million Sm3.

Eighteen cores were cut in the well. One core was cut from 3152 to 3161.5 m, 14 cores in the interval 3188 to 3435 m and 3 cores from 3799 to 3840 m. The core depth was found to be from 1.00 to 3.75 m less than loggers' depth. Segregated fluid samples were obtained at 3314 m in the Ness Formation and at 3368 m in the thin Etive Formation. Sampling was attempted also at 3406 and 3406.2 m in the Rannoch Formation, but due to very low permeability no formation fluid was obtained.

The well was plugged back and classified as an oil and gas appraisal well. West Delta started the sidetrack 34/10-33A 15.12.88 at 18.30 hrs.

TESTING

Four DST tests were performed in this well.

DST 1.1 tested the interval 3378 - 3394 m in the Rannoch Formation and produced 289 Sm3 oil and 51000 Sm3 gas /day through a 12.7 mm choke in the main flow. The GOR was 176, the oil density was 0.859 g/cm3, and the gas gravity was 0.680 (air = 1).

DST 1.2 tested the combined intervals 3378 - 3394 m in the Rannoch Formation plus 3359 - 3374 m in the Ness/Etive Formations and produced 1318 Sm3 oil and 211900 Sm3 gas /day through a 28.6 mm choke in the final flow. The GOR was 161, the oil density was 0.856 g/cm3, and the gas gravity was 0.685 (air = 1). The reservoir temperature measured in the test was ca 123 deg C at reference depth 3373 m.

DST 2.1 tested the interval 3279 - 3307 m in the Ness Formation and produced 850 Sm3 oil and 376700 Sm3 gas /day through a 19.1 mm choke in the main flow. The GOR was 443, the oil density was 0.850 g/cm3, and the gas gravity was 0.665 (air = 1).

DST 2.2 tested the combined intervals 3279 - 3307 m and 3311.5 - 3329 m, both within the Ness Formation, and produced 1433 Sm3 oil and 302100 Sm3 gas /day through a 19.1 mm choke in the main flow. The GOR was 215, the oil density was 0.851 g/cm3, and the gas gravity was 0.660 (air = 1). The reservoir temperature measured in the test was ca 122 deg C at reference depth 3301.5 m.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 34/10-33