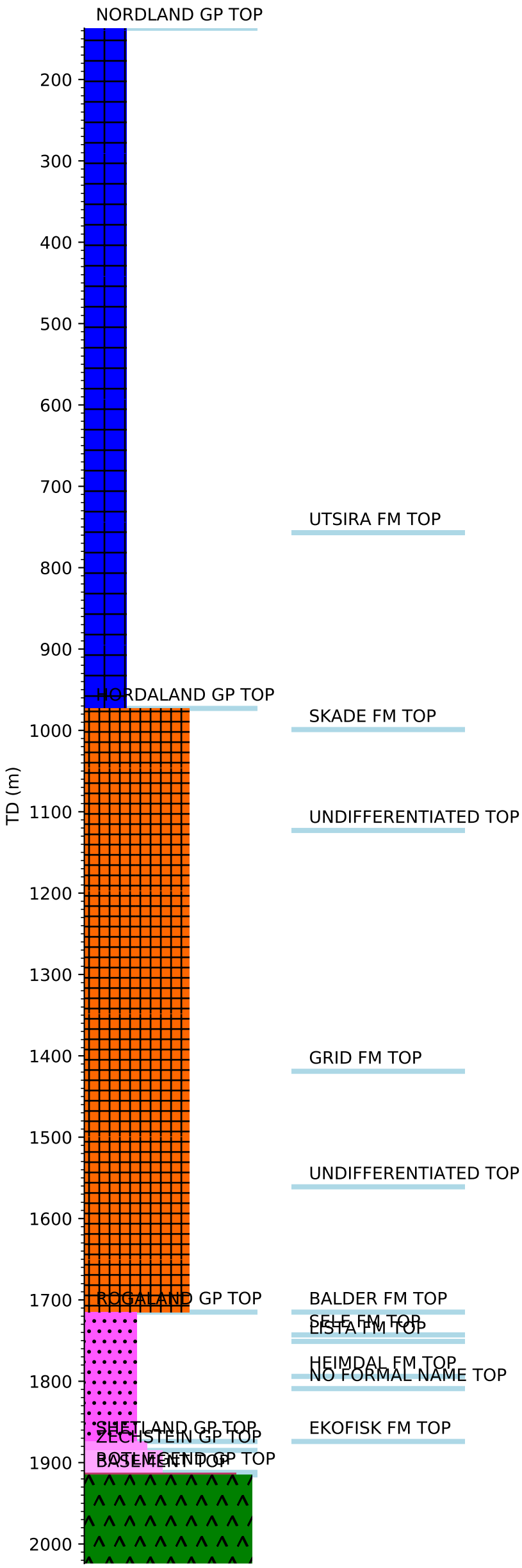
Groups

Formation Tops



Wellbore History

GENERAL

Well 16/1-29 S was drilled to test the Lille Prinsen prospect on the north-western part of the Utsira High in the North Sea. The exploration objective was to test the Lille Prinsen prospect, believed to mainly consist of Triassic sediments, with the possibility of (thin) transgressive Jurassic sands similar to Johan Sverdrup on top. In addition, the well was expected to penetrate Grid and Heimdal sands, which were found to contain oil and gas in the 16/1-6 S Verdandi well.

OPERATIONS AND RESULTS

Wildcat well 16/1-29 S was spudded with the semi-submersible installation Deepsea Bergen on 22 April 2018. During the operation, the well (16/1-29 S) experienced unexpected heavy mud losses when drilling into the reservoir section, eventually leading to well collapse and stuck drill string. Consequently, a technical side-track (16/1-29 ST2) was kicked off at 1225 m and this was successfully drilled through the reservoir section. Continuous mud losses were also experienced in the reservoir section of the technical side-track, but these were controlled by lowering the mud weight. The well was finally drilled to planned TD at 2024 m (2010 m TVD) in Basement rock. The well was drilled with seawater and hi-vis pills down to 550 m, with KCl mud from 550 m to 1210 m, with Enviromul oil-based mud from 1210 m to 1863 m (mainwell and side-track) and with KCl/polymer/GEM mud from 1863 m to final TD.

The Eocene Grid Formation and the Paleocene Heimdal Formation were encountered at 1419 m (1416 m TVD), and 1794 m (1785 m TVD), respectively. They both contained gas over oil. In the Grid formation a gas-oil contact was found at 1462.6 m (1459.9 m TVD) with a free water level at 1498.9 m (1495.8 m TVD). In the Heimdal Formation a gas-oil contact was found at 1808.1 m (1798.4 m TVD) with a thin oil leg down-to 1809.2 m (1799.5 m TVD). The oil-leg was confirmed by PVT analyses, which found the fluid samples taken at 1808.5 m (1798.8 m TVD) to contain both gas-condensate and black oil.

The well did not encounter any of the expected Jurassic/Triassic sands, but instead encountered 26.6 m of oil filled Permian Zechstein Group Dolostone carbonates with top at 1885 m (1874 m TVD), immediately below the Cretaceous Shetland Group. The Permian Carbonates show varying, but good reservoir quality, with an average net/gross of 0.91 and porosity of 23%. The core and thin sections show variations within the carbonate reservoir, with the better zones in the upper parts, which can be associated with vuggy porosity, low content of calcite cement and karst development.

Poor shows were described from drilled cuttings in Grid sand at 1475 m and in Heimdal sand at 1800 m. Shows from drilled cuttings in Zechstein were described as patchy even brown oil stain, even yellow direct fluorescence, weak blooming cut and weak patchy yellow residual. Oil shows (direct and cut fluorescence and spots of oil stain) continued in basement down to TD.

Two cores were cut in the technical side-track from 1888.2 to 1907.5 m in the Permian Zechstein Group. MDT fluid samples were taken at 1474.5 m (oil with 3% mud contamination), 1808.5 m (gas-condensate and oil with <1% mud contamination), 1892.5 m (oil, no mud contamination), and 1985.7 m (formation water and filtrate).

The well was permanently abandoned on 3 June 2018 as an oil discovery.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 16/1-29 S