



Wellbore History

GENERAL

Block 15/6 is situated on the eastern flank of the southern part of the South Viking Graben, lying in a transition zone on a system of faulted terraces between the main Viking Graben to the west and the Utsira High to the east. The primary objective of the 15/6-8 S well was to test the hydrocarbon potential of the Middle Jurassic Hugin Formation within a seismically defined structural trap. A secondary objective was the Heimdal Formation sandstone ("C-Prospect") which was prognosed to be penetrated in a down dip flank location, but within structural spill.

The sidetrack 15/6-8 A was designed to test the "C-prospect" in a more optimal crestal location, some 1000 m to the west of the well position.

Other potential reservoir horizons existed in the Early Tertiary Skade and Grid Formations. These were not within mapped structural closure in any of the well trajectories. The well programmes were designed to maximise the evaluation of these sections.

OPERATIONS AND RESULTS

Exploration well 15/6-8S was spudded with the semi-submersible installation "Byford Dolphin" on 18 February 1997 and drilled as a vertical hole to a depth of 1538 m, before kicking off in a NNW direction towards the Middle Jurassic primary objective. The final TD was reached at 3225 m MD (3122.5 m TVD SS) in the Triassic Skagerrak Formation. The well was drilled with Seawater and bentonite down to 512 m, with KCl / polymer mud from 512 to 1650 m, and with KCl / polymer / glycol from 1650 m to TD.

The Quaternary and Tertiary sequence of 2550 m thickness (2493 m True Vertical Thickness, TVT) was represented by the Nordland, Hordaland and Rogaland Groups. Mudstone lithologies dominated, but significant thick sandstone development was present in the Utsira, Skade, Grid, and Heimdal Formations.

The Shetland Group comprised the Early Palaeocene Ekofisk and the Late Cretaceous, Tor, Hod, Blod°ks and Svarte Formations. This 408 m sequence (389 m TVT) was dominated by carbonate lithologies. There were no intervals of reservoir potential. The Early Cretaceous was primarily recognised from well site micropalaeontological analysis of ditch cuttings as a very thin but condensed lithological sequence (4.5 m). It is interpreted as the Åsgard Formation. The Draupne Formation was penetrated at 3089.5 m (2988.6 m TVD SS), and the Heather Formation at 3117.5 m (3016.2 m TVD SS). The primary objective Hugin Formation was penetrated at 3164.5 m, (3062.6 m TVD SS). It consisted of 9 m of sandstone with some minor claystone intercalations, passing into the Triassic Skagerrak Formation at 3173.5 m (3071.4 m TVD SS). Sandstone lithology continued to 3191 m, below which claystone with thin sandstone interbeds became the dominant lithology.

No hydrocarbon shows were recorded or noted within any of the potential reservoir sections in the well. FMT and petrophysical evaluation confirmed all zones to be water bearing with a complete absence of hydrocarbons.

A total of four log runs, were successfully completed at well TD, the first 2 on wire line, the second 2 were pipe conveyed. A 5th run (walk away VSP) was abandoned after 2 1/2 x 6 km lines due to loss of air pressure at the offset source. On rigging up the wire line logging tools the logging contractor Western Atlas was unable to detect marks on the cable and unable to determine the fault. The cable was changed out, but the second cable was again found to be faulty. As a result of the problems, depth matching between log runs had an error factor of at least +/-2m. The first log in the hole, DLL/MLL/DAC/GR/CHT run 1/1, was therefore used as the reference log giving a consistent error for all further runs. Depth mismatching was further exacerbated by the need to run wire line pipe conveyed, and open hole sticking with accelerometer correction required in certain instances. No fluid sample was taken in the well. The well was drilled in the Hugin and Skagerrak Formations in the interval 3172 m to 3181.5 m (8.85m recovered).

Well 15/6-8 S was permanently plugged back to the 9 5/8" casing shoe and abandoned as a dry well on 5 April 1997. Well 15/6-8 A was kicked off from below the 9 5/8" casing at 1525 m and drilled to TD at 2480 m (2397 m TVD SS) in the Heimdal Formation, below the mapped structural spill point. The sidetrack was drilled with KCl / Polymer / Glycol mud from kick-off to TD.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 15/6-8 A