



Wellbore History

GENERAL

The Frigg Field was discovered by well 25/1-1 in 1971 and set in production in May 1977. Well 25/1-8 S was drilled to monitor changes in gas/fluid contact, uncover permeability barriers and pressure gradients in the Frigg Formation, refine the geological model, and provide ties for seismic interpretations. Before production started the Frigg Field fluid contacts were: OWC = 1955.9 m TVD MSL and GOC = 1948.2 m TVD MSL. Due to the close proximity to the Odin pipeline, the well had to be drilled with a slight deviation. The well was to be entered several times to monitor further changes in the gas/water contact as a response to field production.

OPERATIONS AND RESULTS

Appraisal well 25/1-8 S was spudded with the semi-submersible installation Byford Dolphin on 28 May 1985 and drilled to TD at 2650 m (2572 m TVD / 2547 m TVD MSL) in the Paleocene Lista Formation.

Top Frigg Formation came in at 1930.2 m (1853 m TVD MSL). The formation was gas-bearing with a water saturation of only 6.1% in the gas zone down to the gas/water contact (GWC) at 1901.5 m TVD MSL. A residual gas zone with 74.9% water saturation was found from 1901.5 m TVD MSL down to 1909.3 m TVD MSL. Within this zone, at 1903.5 m TVD MSL was a thin oil layer, which indicated a fingering effect caused by edge water drive. Otherwise the original oil-leg in Frigg had been all swept by water since production start. A three phase zone (oil+gas+water) with 51.5% water saturation was seen below the gas zone from 1909.3 m TVD MSL down to the original GOC at 1948.2 m TVD MSL, and from 1948.2 TVD MSL down to 1981.1 m TVD MSL there was a zone of residual oil and water with 88.2% water saturation. Below 1981.1 m TVD MSL there was only water in the porosity.

A total of 9 cores were cut in the interval between 1939 and 2112 m, covering the whole Frigg gas sand including the fluid contacts. Fifty-six RFT pressure measurements were recorded on three different runs. They proved no pressure barriers throughout the hydrocarbon bearing sands of the Frigg Formation and 10 m into the water zone at 1990 m TVD MSL. The Frigg Formation below this level had 6 pressure barriers based on the RFT data. No wire line fluid samples were taken.

The well was suspended on 25 July 1985 for later re-entry and monitoring of the reservoir parameters. It is classified as a gas appraisal well

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 25/1-8 S