



Wellbore History

GENERAL

Well 7/4-2 was drilled on the Nemo prospect on the Jæren High in the North Sea. Two wells had previously been drilled for the evaluation of the Nemo structure. The 7/7-2 was drilled by Statoil in 1992 and discovered 19.5 m oil filled Ula Formation. No OWC was detected and no reliable pressure measurements were retrieved in the underlying Triassic Smith Bank Formation. Well 7/7-3 was drilled down flank to the SSW in 1993 and penetrated a 16.5 m Ula Formation which was water bearing with oil shows. The primary objective of the 7/4-2 Nemo well was to appraise the 7/7-2 oil discovery. This objective included determination of the OWC deeper than 3372 m (3371.1 m TVD RKB) oil down to in well 7/7-2; to verify the seismic interpretation and geological model for the Nemo discovery, including facies changes in the Farsund Formation; and finally to obtain fluid samples (oil and formation water). The secondary objective was to test the reservoir potential of the Triassic Smith Bank Formation.

The well was designed as a potential future water injector.

OPERATIONS AND RESULTS

Appraisal well 7/4-2 was spudded with the jack-up installation Mærsk Giant on 15 December 2007 and drilled to TD at 3459 m in the Late Permian Zechstein Group. A 9 7/8" pilot hole was drilled from the 30" conductor shoe at 208 m and down to 236 m when losses were discovered. A passage through the cement from the 30" conductor shoe to seabed allowed the pumped seawater to escape from the circulating system. While monitoring the losses when pumping at 3000 l/min, 42 m3/hr travelled unhindered behind the conductor to the seabed. Due to the severity of the losses a cement stinger was run in to 207 m and 37 m3 cement pumped to seal the passage and cure the losses. The well was drilled with Seawater and hi-vis pills down to 950 m, with Aquadril /KCl (glycol-) mud from 950 m to 1857 m, and with CarboSea oil based mud from 1857 m to TD.

The top of the Jurassic reservoir Ula Formation was encountered at 3382 m, 7 meter deeper than prognosed. The seismic interpretation of a possible thickening of the reservoir, up to 54 m, towards the Triassic pod was not proven. The observed increased sediment thickness belongs to the non-reservoir Triassic Smith Bank Formation. Hence, the Ula Formation thickness of 18 m was penetrated. Pressure points taken from 3389 m to 3345.5 m (Ula Formation) varied from 632.73 bar to 633.69 bar. It gave an oil gradient of 0.076 bar/m equivalent to a density of 0.77 g/cc. The water density in the reservoir was derived from a sample (1.09 g/cc). From evaluation of the wire line logs, pressure points and sample analysis, the OWC was estimated to be found in the interval 3397 m to 3399 m MD RKB / 3396.1 m to 3398.1 m TVD RKB. Down to top Mandal Formation the gas composition was mainly C1 and there were no shows on cuttings. The entire Ula Formation sandstone and 4 m of the Skagerrak Formation had HC shows, from 3381 m to 3404 m. In the underlying Triassic sediments, no shows were seen.

Two conventional cores were taken, from 3378.5 m to 3403.9 m and 3403.9 m to 3421.7 m with 97 % and 98 % recovery, respectively. RCI fluid samples were taken at three levels, 3392.5 m (oil), 3389 m (oil), and 3399.2 m (water).

The well was plugged back and made ready for permanent abandonment on 27 February, abandoning also the plan to use it as a future injector. Gas bubbles were seen from the well crater. Analysis of the gas bubbles concluded that the gas was from shallow formations (biogenic gas), i.e. gas percolating between the 20" surface casing and 30" conductor, not gas from the reservoir. The rig waited on weather for14 days before jacking down, observing that the leak rate did not increase. The well was permanently abandoned on 13 March 2008 still with a small gas leak from the well crater. It is classified as an oil appraisal well

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 7/4-2