



Wellbore History

GENERAL

Well 16/1-10 was drilled on the eastern margin of the South Viking Graben on the south-western part of the Utsira High in the North Sea. It was drilled to confirm the northern extent of the Luno oil discovery in Early Jurassic conglomerates made by well 16/1-8. The oil-water contact at 1965 m TVD RKB should be confirmed and a production test of the clean sand facies and conglomeratic facies should be conducted.

OPERATIONS AND RESULTS

Appraisal well 16/1-10 was spudded with the semi-submersible installation 16/1-10 on 13 November 2008 and drilled to TD at 2151 m in conglomeratic sandstones of Early Jurassic age. As the site survey revealed a number of possible shallow gas zones the well started with a 9 7/8" pilot hole to check for shallow gas down to 400 m, TD of planned 26" section. No gas was seen in this interval. Due to a leak in the 20" casing the casing programme was significantly revised, with 13 3/8" casing set at 589 m, above a potential shallow gas zone at 634 m, and the 12 1/4" hole was drilled down into top Shetland Group. This slimmer-than-planned hole turned out to give easier drilling than in the previous well on the prospect (16/8-1). The amount of down time was however comparatively large, due mainly to wait-on-weather. Additional coring also added to a longer than planned time for this well. The well was drilled with seawater and hi-vis bentonite sweeps down to 411 m, with KCl/glycol enhanced mud from 411 m to 1860 m, and with Performadril water based mud with 5% glycol from 1860 m to TD.

The Utsira, Skade and Grid sandstone formations were penetrated by the well, all water bearing. The top of the Jurassic reservoir sequence was encountered at 1898 m (1872.9 m TVD MSL), 11.4 m TVD deeper than prognosed. The reservoir sequence was composed of oil bearing sandstones and conglomerates with an OWC at 1965 m. No gas cap was observed on the logs or could be inferred from the production testing. The first hydrocarbon shows in well 16/1-10 were observed in the core chips collected in the Shetland Group limestones that overlie the reservoir. Generally good hydrocarbon shows were observed in the reservoir from 1898 m down to 1911 m. From 1911 to 1928 m the hydrocarbon shows became more patchy due to widespread argillaceous infilling of the pore spaces within the sandstone matrix. More consistent shows were present in the interval from 1929 to 1940 m but below this depth only intermittent shows were observed.

A total of 7 cores were cut from 1868 to 1987.5 m. The first two cores were cut entirely within the Shetland Group. The third core penetrated top reservoir at 1898 m. The entire hydrocarbon bearing part of the reservoir interval was cored with the last core penetrating the oil-water contact. Four wire line logging runs were made including one MDT run for samples and pressures. Oil samples were taken at 1899.6 m and 1933.1 m and a water sample was taken at 2024.9 m. Fluid gradients were established for both water and oil zones, indicating an oil-water contact at 1965 m TVD, confirming the contact extrapolated in well 16/1-8.

The well was permanently abandoned on 5 February as an oil appraisal.

TESTING

Two Jurassic intervals were production tested. DST 1A was performed in the interval 1919.92 to 1958.11 m in the conglomeratic sandstone facies.

DST 1B was performed in the interval 1897.00 to 1909.79 m in addition to 1919.92 to 1958.11 .The test rate was 338 Sm3 oil per day and 35500 Sm3 gas per day through a 12,7 mm choke.

Maximum temperature recorded in the tests was 82.1 deg C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 16/1-10