



LITHOSTRATIGRAPHY & HISTORY FOR WELL: 35/8-1

Wellbore History

GENERAL

Well 35/8-1 is located on the Marflo Spur, ca 30 km west of the Gjøa Field in the northern North Sea. The principal objective of this well was to test the hydrocarbon potential of sandstones within the Jurassic section beneath the Late Cimmerian Unconformity.

OPERATIONS AND RESULTS

Wildcat well 35/8-1 was spudded with the semi-submersible installation Sedco-704 on 27 July 1980 and drilled to TD at 4345 m in Late Triassic sediments of the Statfjord Formation. The well was drilled without significant technical problems, but two well kicks occurred .After penetrating the Jurassic sand reservoir at 3516m a sudden rapid gas increase was noted, but due to mechanical problems could not be measured. This increase was associated with a quantity of reservoir fluids entering the borehole. During controlling of the kick, a large proportion of gas was vented and light low gravity yellowish oil recovered from the mud. A second kick with formation fluids entering the well bore was taken after coring core no 3 at 3549.6 to 3567.1 m. The well was drilled with seawater and viscous slugs down to 890 m, with gypsum/Lignosulphonate mud from 890 m to 2196 m, and with KCl/polymer mud from 2196 m to TD.

The top sections down to Top Rogaland Group, Balder Formation at 1683 m contained a number of sands and sandy intervals. From top Rogaland and throughout the Cretaceous section down to top Draupne Formation at 3186 m the lithology was mainly claystone and limestone. The heather Formation came in at 3200 m with two thin Intra-Heather Formation sandstones at 3219 and 3250 m. Heather Formation shale continued down to the Brent Group at 3516 m. Frequent sandstones were penetrated in the Brent and Dunlin Groups, and in the Statfjord Formation.

No shows or other hydrocarbon indications were recorded in the well above the first Intra Heather Formation sandstone at 3219 m. Indications of hydrocarbons while drilling occurred in Late, Middle and Early Jurassic sandstones. Log analysis indicated a gross hydrocarbon column of 140.5 m in the Brent Group down to a clear hydrocarbon/water contact at 3657 m in the Etive Formation. The gross hydrocarbon sand thickness was 115 m with an apparent net hydrocarbon thickness of 94 m. Average porosity in the net sand was 17% with an average water saturation of 25%. Apparent residual oil was indicated below the gas column in the Brent and in both Early Jurassic sands (Cook and Statfjord Formations). The Intra Heather Formation sandstones at 3219 and 3250 m were also interpreted as hydrocarbons based on shows and the logs.

Thirteen cores, totalling 187 m, were cut in the Brent Sand reservoir from 3522.6 m to 3709.7 m. Coring continued until hydrocarbon shows were no longer encountered. RFT fluid samples were taken at at 3524 m (1.5 Sm3 gas + 2.15 litres 39 deg API oil + trace mud in suspension), 3524.5 m (ca 1.4 Sm3 gas + 1.3 litres 45.5 deg API oil + trace mud), 3637.5 m (2.1 Sm3 gas + 3.1 litres 43 deg API oil + trace mud), 3671 m (mud filtrate + "a grey brown cloudy liquid with sour odour" + trace of dissolved gas), 3576 m (9.8 litres mud filtrate with trace oil and small amount of gas), and at 3576.5 m (0.3 Sm3 gas + 0.35 litres 43 deg API oil + 1.4 litres mud filtrate). In addition to the RFT samples and samples taken during DST, samples with oil were recovered from the mud at 3515 m, 3518 m, and at 3567 m.

The well was permanently abandoned on 24 June 1981 as a gas/condensate discovery

TESTING

Two intervals in the Brent Group sands were tested.

DST's no 1, 2, and 3 tested the interval 3636.3 to 3646.9 m in the Etive Formation. The two first DST's failed for technical reasons. DST3 gave flow rates of 650000 Sm3 gas, with 218 Sm3 condensate per day through a 40/64" choke. The Gas/condensate ratio was 7892 Sm3/Sm3, and the condensate gravity was 44.5 deg API. The H2S content was below detection and the gas stream contained only trace amounts of CO2. The maximum stable temperature recorded in DST3 was 134.4 deg C.

DST4 tested the interval 3565.2 to 3578.0 m in the Tarbert Formation. It flowed 920000 Sm3 gas with 229 Sm3 condensate per day through a 48/64" choke. The Gas/condensate ratio was 4007 Sm3/Sm3, and the condensate gravity was 45.6 deg API. The gas stream contained traces of H2S and 1%