



Wellbore History

GENERAL

Well 15/9-5 was drilled in the Sleipner Vest area in the Central Graben of the North Sea. The objective was to test hydrocarbons in Middle Jurassic sandstones in the Beta structure of Sleipner Vest. The well is Reference Well for the Heimdal and Våle formations.

OPERATIONS AND RESULTS

Appraisal well 15/9-5 was spudded with the semi-submersible installation Norskald on 19 November 1979 and drilled to TD at 3946 m in the Triassic Skagerrak Formation. Operations met with many problems, but the well objectives were fulfilled in the end. Excessive drag when pulling core barrel out of reservoir was a severe problem, and consequently frequent reaming and circulating trips was needed. Having finished logging in the 8 1/2" section, and just started testing the BOP stack, one of the riser tension sheaves broke and fell down. Also several problems with the hydraulic BOP control system and the ball joint made nearly 12 days rig repair necessary. After this delay the hole required extensive reaming before the 7" liner could be ran and the final 6" section could be drilled. Testing operations were hampered and delayed by bad weather and test equipment breakdown. The well was drilled with spud mud down to 426 m and with seawater/lignosulphonate mud from 426 m to TD.

The well proved gas in sandstones of Middle Jurassic age from top Hugin Formation at 3526 m down to a true gas/water contact at 3662 m, based on logs and RFT samples. The Sleipner Formation was encountered at 3693 m. Logs and RFT pressure gradient proved Sleipner water filled, and ca 3 bar overpressured compared to the Hugin Formation. Shows were described on cores all through the hydrocarbon bearing reservoir. Abundant spots of fluorescence described on cuttings below ca 2000 m are described as "no shows". According to other comments in the cuttings descriptions the fluorescence may be related to diesel addition to the mud.

Nine cores were cut in the interval 3525 to 3663.6 m. A total of 133 m core (96.8%) was recovered. A FIT fluid sample at 3536 m recovered gas, condensate and mud. An RFT fluid sample was taken at 3540 m.

The well was permanently abandoned on 11 April 1980 as a gas/condensate appraisal well.

TESTING

Three Drill Stem Tests were conducted.

DST1 tested the interval 3642 m to 3646.6 m. The final flow was controlled by using two variable chokes mounted in parallel. On the smallest choke size, 2x25/64", the well produced 583000 Sm3 gas and 181 Sm3 condensate /day. The GOR was ca 3200 Sm3/Sm3, the oil density was 45.3 °API, and the gas gravity was 0.774 (air = 1).

DST2 tested the interval 3605 to 3610 m plus 3613 to 3618 m. The final flow was controlled by using two variable chokes mounted in parallel. On the smallest choke size, 2x28.75/64", the well produced 699400 Sm3 gas and 189 Sm3 condensate /day. The GOR was ca 3700 Sm3/Sm3, the oil density was 45.4 °API, and the gas gravity was 0.773 (air = 1). The CO2 content was 9.2%. Maximum temperature during this test was 122.8 °C.

DST3 tested the interval 3536 to 3546 m. The final flow was controlled by using two variable chokes mounted in parallel. The choke size was kept at 2x45.5/64" throughout the whole flow. The well produced 815500 Sm3 gas and 212 Sm3 condensate /day. The GOR was ca 3850 Sm3/Sm3, the oil density was 40 °API, and the gas gravity was 0.771 (air = 1). The CO2 content was 7.7 %. Maximum temperature during this test was 117.8 °C.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 15/9-5