



Wellbore History

GENERAL

Whereas Saga Petroleum operated license 041, BP operated wildcat well 35/3-2 under license 041 by special agreement. The well was the second well drilled on this block, 35/3-1 was abandoned in the Middle Jurassic due to high calculated pore pressures. Well 35/3-2 was drilled on a westerly dipping fault block. The primary target of the well was Early Jurassic sandstone, secondary targets were any other Jurassic sandstones encountered.

OPERATIONS AND RESULTS

Wildcat well 35/3-2 was spudded with the semi-submersible installation Sedco 707 on 19 May 1980 and drilled to TD at 4400 m in ?Caledonian age basement rocks. The well was drilled with seawater and gel down to 902 m, with gypsum/CMC mud from 902 m to 2305 m, with Poly RX/Drispac from 2305 m to 3833m, and with Poly RX/Lignosulfonate mud from 3833 m to TD. The well started to flow while drilling the 24" hole. Heavy mud was pumped down the hole, but there was very little difference between the fracture gradient and the bottom hole pressure and returns were lost several times. A loss/gain situation was maintained until the casing setting depth was reached. When running the 18 5/8" casing the string parted and 22 joints were left in the hole. The string was recovered successfully, and a new string was run and cemented without problems.

The well penetrated strata from Tertiary through Jurassic and Triassic before reaching basement. Hydrocarbon shows were encountered in Lower Cretaceous and Lower Jurassic sands. The primary target Jurassic sandstones were found to be very tight, and no DST was carried out in these. In stead two zones in the Lower Cretaceous Sandstone were tested, producing water and gas/condensate respectively. The lower Cretaceous sands are interpreted as submarine fan deposits. The Lower Jurassic coarsening upward sequences may represent offshore open marine bars cut by tidal channel deposits and capped by a transgressive marine sheet sand. Log evaluation indicated 13.7 meters net pay in the Lower Cretaceous, with an average porosity of 15 % and an average water saturation of 64.3 %. The RFT pressure gradients suggested that a gas-water contact exists at 3585 m. Log interpretation showed moveable hydrocarbons to 3588.5 m and formation water below 3591 m. A possible 8.8 meters of net hydrocarbon bearing thin sand stringers were penetrated in the Lower Jurassic sequence.

Two FIT fluid samples were taken through the 9 5/8" casing. The first FIT was run at 3675.5 m. Total recovery was 1 litre of gas and 22 litres of flocculated mud with trace of oil. The second FIT was run at 3750.5 m. Total recovery was 1 litre of mud filtrate/water and 10 litres of flocculated mud. This sample had no measurable gas volume. Two RFT segregated samples were taken in the Early Cretaceous Agat Formation. A segregated sample was collected in the gas-bearing interval at 3565.5 m, and both chambers were found to contain gas only with no trace of mud filtrate. The second sample collected in the water-bearing interval at 3593 m recovered 7.5 litres of water and 13.1 litres of gas in the 2-3/4 gallon chamber, and 3.8 litres of water with 3.4 litres of gas in the 1-gallon chamber. Analysis of the water samples indicated that mud filtrate had been recovered. RFT sampling in the Early Jurassic at 4073 m, 4024.5 m, and 3939 m was unsuccessful and recovered only mud filtrate and water. Seven cores were cut in the well. Cores 1 to 4 were cut in the Agat Formation from 3593.3 m to 3641 m, core 5 was cut in the Agat Formation from 3690.7 m to 3708.3 m, core 6 was cut in the Lower Jurassic from 3944.5 m to 3960 m, and core 7 was cut in the Lower Jurassic from 3998.2 m to 4010 m.

The well was plugged and abandoned as a gas/condensate discovery (Agat) on October 1980.

TESTING

Two drill stem tests were carried out in the Early Cretaceous Agat Formation. DST1 perforated the interval 3599 m to 3605 m. This test produced water at a rate of 5.5 Sm3/day through a 38/64" choke. The gas dissolved in the water showed no H2S and only traces of C02. DST2 perforated the intervals 3547 m to 3552, 3555.5 m to 3558, and 3562 m to 3566 m. It produced 1082000 Sm3 gas/day through a 38/64" choke. The final flow rate with the choke at 32/64 was 736000 Sm3/day. Because of a failure on the condensate metering system on the separator condensate flow rates were measured by flowtank dipping. A final condensate/gas ratio of approximately 10 bbl/MMSCF (5.6 x 10-5 Sm3/Sm3, corresponding to GOR = 18000 Sm3/Sm3) has been estimated. The gas gravity was 0.62

LITHOSTRATIGRAPHY & HISTORY FOR WELL 35/3-2