



Wellbore History

GENERAL

Appraisal well 6407/9-4 is the fourth well on the Draugen Field. The main objective was the Late Jurassic Rogn Formation. Wells 6407/9-1, 6407/9-2 and 6407/9-3 had previously encountered under-saturated 40 deg API oil in sandstones of the Late Jurassic Rogn Formation. Net oil sand thicknesses in the three previous wells were 39, 12 and 34 m, respectively. Precise definition of the OWC in well 6407/9-1 was precluded by poor quality lithology at the base of sequence. A clearly defined oil-water contact at 1638.5 m MSL was however encountered in well 6407/9-2. The purpose of this fourth well was to evaluate the reservoir quality and sand development on the north-west flank of the accumulation, and to evaluate the oil deliverability and water injection potential of the reservoir sands.

OPERATIONS AND RESULTS

Well 6407/9-4 was spudded with the semi-submersible installation West Venture on 4 July 1985 and drilled to TD at 1820 m in the Early Jurassic Tilje Formation. No significant problems were encountered while drilling the well. The well was drilled with seawater and bentonite down to 820 m, with KCl/polymer mud from 820 m to 1635 m, and with chalk mud from 1635 m to TD.

Light oil with low gas content was discovered in the Garn Formation, as the Rogn Formation proved to be only 2 m thick. The oil/water contact was found at 1672 m (1639 m MSL), the same contact that had been established in previous wells on the Draugen Field. This indicated communication in the Rogn and Garn Formations between the wells drilled so far on Draugen. No oil shows were recorded above the reservoir. Below OWC oil shows continued down to 1681 m, otherwise no further oil shows were observed.

Five cores were cut from 1666 m to 1711.5 m in the Fangst Group. An RFT segregated fluid sample was taken at 1664.5 m in the upper Garn Formation.

The well was permanently abandoned on 10 September 1985 as an oil appraisal well.

TESTING

To Drill Stem Tests were performed. One injection test at 1708 - 1713 m in the water zone, and one production test at 1662 -1667 m in the oil zone. Maximum injection rate in the water test was 2080 m3 /day. The oil test produced at maximum 998 Sm3 oil /day on a 64/64" choke. The GOR was ca 35 Sm3/Sm3, the oil density was 0.82, and the gas gravity was 0.82 (air = 1). Temperature measurements in the test gave a reservoir formation temperature of 71.1 deg C (160 deg F).

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6407/9-4