



Wellbore History

GENERAL

Well 6407/9-6 was drilled on the Draugen Field in the Haltenbanken area off shore Mid Norway. The target was the Rogn Sandstone Formation of the Late Jurassic. The objectives were to identify the western edge of the Rogn

Formation, to establish the reservoir properties and development of the basal shale, to evaluate the water injection potential in oil-bearing sand, and to calibrate the seismic velocity.

OPERATIONS AND RESULTS

Appraisal well 6407/9-6 was spudded with the semi-submersible installation Borgny Dolphin 2 January 1986 and drilled to TD at 1800 m in the Early Jurassic Ror Formation. Drilling proceeded without significant problems. The well was drilled with seawater and bentonite down to 807 m, with KCl/polymer mud from 807 m to 1603 m, and with chalk mud from 1603 m to TD.

The Rogn Formation was encountered oil-bearing from the top at 1642.5 m (1617.5 m SS) down to the base at 1660 m (1633.5 m SS). Average reservoir quality over this 17.5 m interval was very good, with calculated hydrocarbon saturation of 79 % and an average porosity of 31 %. Core permeabilities in the oil-bearing interval typically ranged between 1 and 10 Darcy. The underlying Fangst Group was interpreted as fully water bearing below 1671 m (1646 m SS), however low hydrocarbon saturations were calculated in the interval 1662 m to 1671 m (1637 - 1646 m SS). These were confirmed by the observed fluorescence in the cores over this interval and by Dean-Stark fluid saturation measurements.

Four cores were cut in the interval 1646 - 1690.2 m. An FMT survey gave the same reservoir oil and water gradients as in the other wells on Draugen, and it was found that the Rogn Formation and the Fangst Group belong to the same pressure regime. One FMT fluid sample was taken at 1652.5 m in the Rogn Formation. After the well was plugged an intermittent stream of gas bubbles was observed leaking from the wellhead. Analysis of a sample of the gas showed that it consisted of methane only. The rig abandoned the location and a programme for regular monitoring of the wellhead and gas leak activity was initiated.

The well was suspended as an oil appraisal and possible water injection well on 13 March 1986.

TESTING

One DST test was performed in the Rogn Formation in the interval 1643 -1656 m. The test produced 1018 Sm³/day (6400 Stb/day) on a 56/64" choke. The GOR at separator was 18.4 Sm³/Sm³ (103 scf/stb), oil gravity was 40 deg API (0.825 g/cm³), gas gravity was 0.810 (air = 1), and CO₂ content was 0.6%. Water injection in the same interval was tested with a maximum injection of 2385 Sm³/day (15000 bbl/day).

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6407/9-6