



## Wellbore History

### GENERAL

Well 6306/10-1 was designed to drill the Skalmen prospect, a structural closure located at the northern apex of the Gossa High in block 6306/10. Amplitude anomalies were seen at 280-, 300-, 400-, 1200 to 1300-, and 2200- 2400 ms. The primary objective of the well was to test the hydrocarbon potential of Early Jurassic and Pre-Jurassic sequences, believed to be developed in a sandy facies of deltaic/fluvial origin. Secondary objective was to test potential reservoir developments in the Cretaceous and the Late Jurassic within dip-closure. A third objective was to test the hydrocarbon potential of Paleocene sands. The well should be drilled some 250-300 m into rocks of Pre-Jurassic age and would penetrate the primary objective some 300 m down-dip from the structural culmination.

### OPERATIONS AND RESULTS

Wildcat well 6306/10-1 was spudded with the semi-submersible installation Dyvi Stena on 7 September 1990 and drilled to TD at 3187 m in basement rocks. Shallow gas was not observed. Overcompacted sediments and boulders caused some problems, and the well had to be re-spudded several times. Bad weather caused some delay in the drilling procedure, as the string was temporarily hung off several times. The well was drilled with Bentonite and seawater down to 610 m and with PAC/gypsum mud from 610m to TD.

The well encountered close to 150 m of Paleocene Egga sand at 1138 m. Some sand developments were seen also in an Intra-Kvitnos Unit at 1825 m and in a 7 m thick Lysing Formation at 1992 m. The well penetrated a hiatus from Aptian to Early Callovian at 2692 m. The Middle Jurassic section from 2692 m to 2980 m contained about 60 m net sand with relatively low porosities and poor permeabilities, based on petrophysical log evaluation. The logs also showed that this section was gas bearing. Shows were recorded in the Egga Informal unit from 1142 m to 1180 m, in sandstone stringers in the interval 1992 m to 2470 m in the Lysing and Lange Formation, in the Middle Jurassic Viking and Fangst Groups from 2700 m to 2980 m, and on sidewall cores taken in metamorphic basement. Production testing of the Jurassic interval and the basement produced small volumes of gas at very low rates from the Jurassic, while the basement produced no formation fluid to surface.

Various laboratories conducted extensive organic geochemical analyses in this well. These could confirm migrant hydrocarbons (shows) in the Egga sand and in the Middle Jurassic. The Egga hydrocarbons were severely biodegraded, but appeared to originate from a very early mature source. The Middle Jurassic shows and the DST oil showed variable fingerprints, but a more or less waxy, terrestrial nature was interpreted in many samples. The Middle Jurassic contained silty shales in the upper part (Melke) and more coaly shales and coals in the lower part (Garn). Both constitute excellent source rocks for gas and oil. The well is mature for oil generation (%Ro = 0.5) from ca 2200 m depth to TD.

FMT pressure surveys gave a clear water gradient in Egga sand. No gradient could be established over the Jurassic and basement sections. FMT Fluid sampling in the Jurassic gave only mud filtrate. A total of 5 conventional cores were cut in the well: two in the Egga sand, one in the Melke Formation, one in the Garn Formation, and one in basement rock.

The well was permanently abandoned with shows on 17 December 1990.

### TESTING

Two DST tests were carried out. No 1 perforated from 2995 - to 3187 m in basement. This test did not produce any formation fluid to surface. No 2 perforated from 2716 - to 2827 m in Jurassic rocks. It flowed gas at very low rates of some 1500 Sm<sup>3</sup>/d. Upon abandonment of the test the tubing content was circulated out. This indicated that condensate and some formation water had been produced (some 1 m<sup>3</sup> of condensate and some 4 m<sup>3</sup> of water at 3000 ppm).

## LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6306/10-1