

Wellbore History

GENERAL

Well 18/10-1 is located in the Egersund Basin in the North Sea, ca 16 km southeast of the 17/12-1R Bream Discovery. It was designed to test a seismic structure on the same trend as the Bream discovery. The primary target was to test possible hydrocarbon accumulation in Jurassic sandstones on. Planned TD is about 150 to 200 m below Jurassic sandstone in a shaly-sandy sequence of Early Jurassic or top of Triassic.

OPERATIONS AND RESULTS

Well 18/10-1 was spudded with the semi-submersible installation Dyvi Alpha on 19 October 1979 and drilled to TD at 2800 m in the Triassic Skagerrak Formation.

A thick Late Jurassic shale sequence with limestone stringers was penetrated before reaching the target Middle Jurassic sands. The sands (Sandnes and Bryne Formations) were encountered at 2405 m, close to prognosis. The reservoir consisted of two zones separated by a thin shale barrier between 2427 and 2433 m. Based on FMT and DST pressure measurements the upper zone appeared slightly overpressured relative to the lower, suggesting a compartmentalized reservoir. The reservoirs were found hydrocarbon bearing and an OWC was found at 2437 m in the lower zone. The lithology below the target reservoir section, from 2483 m to TD, was predominantly sandstone, fine in the upper part, becoming medium to coarse downwards. Frequent thin interbeds of shale and marl, occasionally also thin stringers of limestone were encountered. The sequence was entirely water bearing. Weak direct fluorescence and cut appears at 2420 m, becoming very good in the intervals 2423 m to 2430 m and 2433 m to 2440 m, then the shows get weaker and disappear below 2444 m.

Organic geochemical analyses showed an immature well all through (%Ro = 0.5 at TD). TOC in the Late Jurassic shale increased gradually from ca 0.8% at top Jurassic to ca 1% at 2200 m. A peak TOC is reached in the Tau Formation with 4.5% TOC in cuttings and 6.9% in a sidewall core. The hydrogen index in the Tau Formation was up to 273 mg HC/g TOC in cuttings and up to 415 mg HC/g TOC in the sidewall core. TOC in the underlying Egersund Formation is also high, from 2-4%, but the hydrogen index is lower, in the range 120 to 270 mg HC/g TOC. Next potential source rock is represented by the Bryne coals with HI up to 300 mg HC/g TOC.

Three conventional cores were cut in the Bryne Formation reservoir section from 2421 m to 2469 m. A total of 39 sidewall cores were recovered between 1080 m to 2791 m. Three FMT runs over the reservoir section gave 10 valid pressure readings and one fluid sample. The fluid sample, at 2434 m, contained only mud filtrate.

The well was permanently abandoned on 1 January 1980 as an oil discovery.

TESTING

One Drill Stem Test was performed in the interval 2414.5 m to 2427.0 m. It flowed 295 m3/day of oil and 2850 Sm3/day of gas on a 2" choke. The gas-to-oil ratio was 9.7 m3/m3, oil gravity was 36.4 $^{\circ}$ API (0.843 g/cm3), and gas gravity was 0.724 (air = 1) with 1.4% CO2 and no detectable H2S. Reservoir temperature (at shut-in) was 80 $^{\circ}$ C.