



## GENERAL

Well 31/2-1 is the Troll West gas and oil Discovery well. The purpose of the well was to establish the basic stratigraphy in the area, and to evaluate the prospectivity of the Jurassic sequence. The structure is formed by a tilted Jurassic fault block on the Sogn Spur High between the North Viking Graben and the Horda Basin. A migration path from the Viking Graben kitchen area is provided by monoclinal fault blocks. The most dominant characteristic of the structure was the presence of a "flatspot", which was believed to be associated with a present hydrocarbon/water contact. Sealing of the potential Jurassic reservoir is provided by Cretaceous and Paleocene Claystones, overlying the reservoir sandstones.

The well is Type Well for the Johansen, Krossfjord, Fensfjord, and the Sognefjord Formations, and Reference Well for the Amundsen, Cook, and Drake Formations.

## OPERATIONS AND RESULTS

Wildcat well 31/2-1 was spudded with the semi-submersible installation Borgny Dolphin on 17 July 1979 and drilled to TD at 2433 m in the Late Triassic Hegre Group. Severe problems with setting the 30" casing led to abandoning of the first hole and re-spudding on 24 July, 50 m to the south of the original spud position. The well was drilled with gel polymer down to 793 m, and with gypsum/lignosulphonate mud from 793 m to TD.

The well 31/2-1 proved the existence of a Late - Middle Jurassic gas bearing reservoir sequence in the Flathead A structure (block 31/2). A gross commercial gas column of 134.5 metres with top at 1439.5 m was encountered in good-moderate quality coastal - shallow marine sands. Good oil shows with oil bleeding from cores were encountered from 1567 m to 1597 m, below the gas. It is possible that both a gas-oil contact and an oil-water contact occur in this zone, however, data available suggested tight formation. From the pressure data the plausible interpretation is that a gas-water contact effectively exists at the intersection of the extrapolated gas and water pressure gradients at 1574 m (1550 m SS), which would imply that the oil observed in cores is actually residual. Indications of oil occurred down to 1622 m. The well results showed that the marked seismic flatspot seen on seismic lines across the structure at 1685 msec was closely related to the base of the gas column. For a detailed evaluation of the reservoir it was decided to take diamond bit cores over the whole hydrocarbon bearing Jurassic interval. A total of 18 cores were cut in the interval from 1450 to 1668 m, with a recovery length of 182 m (86%). The cored interval extends from just below the top reservoir to below the hydrocarbon/water contact. Extensive RFT pressure measurements showed the accumulation to be under hydrostatic conditions. Good RFT gas samples were recovered from 1442 m, 1468 m, 1482 m, 1515 m, 1547.5 m, 1573 m, and 1574 m. They showed a consistent dry gas composition with 93% methane, 0.5% CO<sub>2</sub>, and 1.5% N<sub>2</sub>. Only trace C<sub>4</sub>+ and no H<sub>2</sub>S was recorded. A number of RFT water samples were found to be heavily contaminated by the mud and not representative for the Formation.

The well was suspended on 9 November for re-entry and possible testing at a later stage.

## TESTING

After RFT testing preparations were made for drill stem testing of the interval where oil had been observed bleeding from cores (1565 to 1622 m). Due to severe weather and technical problems the test was aborted.

# LITHOSTRATIGRAPHY & HISTORY FOR WELL: 31/2-1