



Wellbore History

GENERAL

Wildcat well 6507/11-1 is located in the Haltenbanken area and was the third well to be drilled off shore Mid Norway. The purpose of drilling the well was to test the whole stratigraphic sequence between seabed and 500 metres below the Near-Base Jurassic reflector or into the Triassic, whichever came first.

The specific targets, represented by vertical closures, were Middle Jurassic sandstone, below the Base Cretaceous Unconformity, and Early Jurassic sandstone below the Middle Jurassic Unconformity. A possible flatspot was identified at this level. In addition, any horizon below these reflectors will, according to Saga's interpretation, be closed, and represent a possible reservoir.

The well is Type Well for the Tilje Formation.

OPERATIONS AND RESULTS

Well 6507/11-1 was spudded with the semi-submersible installation West Venture on 13 September 1981 and drilled to TD at 3139 m in the Late Triassic Grey Beds. Two gas kicks occurred in the 12 1/4" section at 2125 m and 2128 m with up to 600 000 ppm gas readings observed at surface. The blow out was killed by circulating increasing mud weight in steps from 11.0 ppg to 13.2 ppg. The well was drilled with spud mud down to 460 m, with gypsum mud from 460 m to 815 m, with gypsum/polymer mud from 815 m to 1615 m, and with a lignosulphonate/causticized-lignite mud through the 12 1/4" section from 1615 m to 2300 m. In this section a number of mud additives were used in the kill well operations. The section from 2300 m to TD was drilled with a lignosulphonate mud.

The well proved the existence of a lithological sequence ranging in age from Late Triassic (Early Rhaetian) to Quaternary. The Cenozoic succession was 1794 m thick. The dominant lithology of the Nordland and Hordaland Group was clay stone, but the former was less consolidated and contained more poorly sorted sand and rock fragments. An argillaceous sandstone of Oligocene/Miocene age was encountered at 1634 m. A possible fault zone penetrated the Rogaland Group in the interval 2097 m to 2120 m, just above the Base Tertiary Unconformity. High gas readings were recorded in this fault zone. At 2351 m a 5 m interval of the Melke Formation was encountered. At 2356 m a 54 m thick Ile Formation sandstone section was penetrated followed by the Ror Formation at 2410 m and a second sandstone section, the Tilje Formation at 2498 m. The zone from 2508 m to 2523 reach core porosities well above 30% and permeabilities in the several Darcies range is typical. Both the Ile and the Tilje Formations were gas/condensate-bearing with a gas/water contact at 2526 m. RFT pressure gradients indicated a common pressure system for the two reservoir sandstone sections. A 374 m thick coal unit (the Åre Formation) consisting of interbedded sand-, silt- and clay stone and coal/carbonaceous clay stone was found overlying the Triassic Grey Beds, which extend down to TD.

Five conventional cores were cut in the interval 2502.1 m to 2544.0 m in the Tilje Formation. A number of reservoir fluid samples were taken by means of the RFT tool. Only the samples from the depths 2401.5 m and 2526.0 m were found nearly representative. They contained gas and condensate at a GCR of ca 17000 Sm³/Sm³ and 15000 Sm³/Sm³ respectively. The sample at 2532 m, which was taken just below the estimated GWC, consisted of water with only traces of gas as expected.

The well was permanently abandoned on 10 December 1981 as a gas/condensate discovery.

TESTING

Perforation of the lower part of the Middle Jurassic Sandstone, 2396 - 2402 m, yielded 764.000 m³ gas and 138 m³ of condensate per day through a 51/64 inch choke. The testing equipment limited the production rate.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 6507/11-1