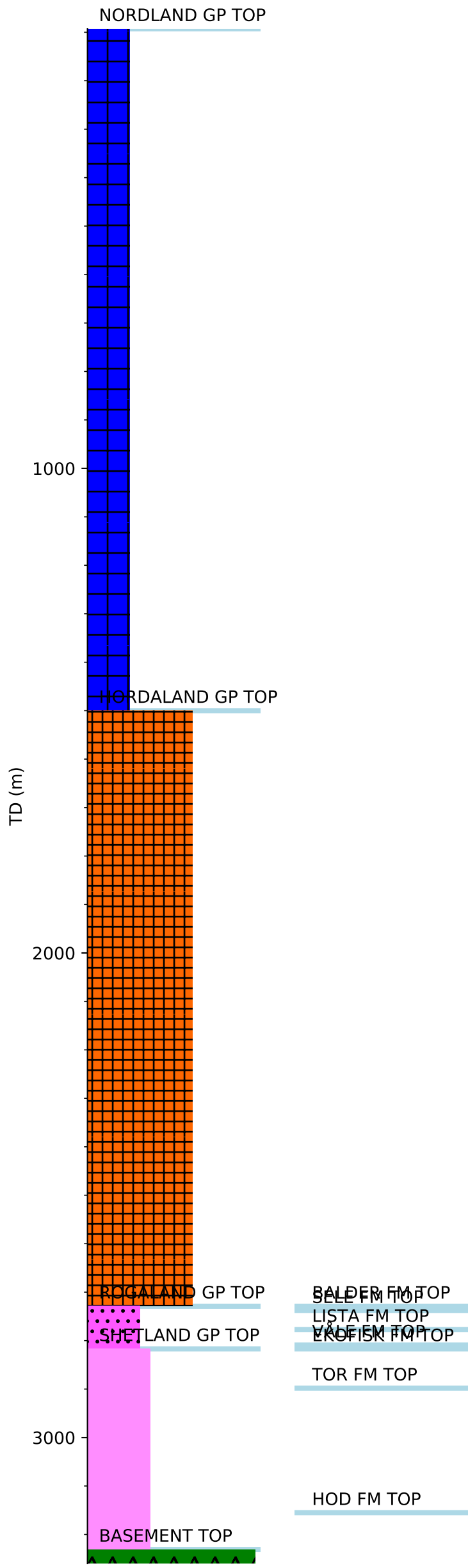
Groups

Formation Tops



Wellbore History

GENERAL

Block 2/6 is structurally located on the eastern margin of the Norwegian part of the Feda Graben. The block partly covers the Piggvar Terrace, the metamorphic Mandal high and the northwestern part of the Søgne basin.

Well 2/6-5 is located in the central western part of the block, high on a structural closure defined on Top Shetland Group

The main objective of well 2/6-5 was to test the presence of hydrocarbons and reservoir properties within the primary target intervals of the Shetland Group, located within a structural closure above the northern part of the Mandal High. It was prognosed approximately 40 m below the distinct Late Cretaceous Top Ekofisk Formation reflector.

Reservoir units were expected in several intervals, some in pressure communication and some not. A possible secondary target of sediment fill in the interval between the Shetland Group and the basement topography would be penetrated before reaching TD in metamorphic rocks. However, this possible wedge was defined on a poor seismic response and could represent intra basement reflectivity. The well was planned as a possible future producer.

OPERATIONS AND RESULTS

Exploration well 2/6-5 was spudded by the semi-submersible installation "Deepsea Bergen" 17 November 1996 and drilled to TD at 3260 m in metamorphic rocks. The well was drilled with a sea water/bentonite mud system down through the 12 1/2" hole section to 2515 m. The deeper part of the well was drilled with a KCL polymer glycol mud system.

Above the Shetland Group the formation tops and lithologies were drilled within the uncertainty limits of the prognosis. The Tertiary succession (including Quaternary) was found to be 2872 m thick. The Nordland Group was 1404.7 m thick and consisted of clay/claystones and sands. Top of the Hordaland Group was encountered at 1499.5 m and the Group was found to be 1229.4 m thick, generally consisting of reactive clays. Top Rogaland Group was drilled at 2729 m Top. The Rogaland succession contained Balder, Sele/Lista, and Våle Formations and was 88 m thick. Top of the Shetland Group was drilled at 2817 m. Top Tor Formation was drilled at 2897.5 m.

The Shetland Group interval velocity was experienced to be much higher than the prognosis based on stacking velocities indicated. The explanation to the observed discrepancy in seismic velocities contra the experienced well velocities is explained as azimuthal anisotropy combined with the seismic sampling configuration. The result is a reasonable seismic tie in two-way travel time to the well, but a significant mismatch in depth prognosis for the Top Hod and deeper strata.

Top Hod Formation was prognosed at 3015 +/- 75 m and was drilled at 3155 m. The Base Cretaceous Unconformity was prognosed at 3103 +/- 125 m and was drilled at 3230.5 m (+125.5m). The secondary target, defined as a possible wedge resting on basement turned out not to be present and the seismic image had to be considered as intra basement reflectivity. Logs and core data both conclude that a rather tight chalk lithology is present in the well. Only few intervals of allochthonous chalk were observed. Immediately below the chalk interval, only separated by thin clay unit (altered basement rocks), fractured metamorphic basement consisting of chists were penetrated. A short core was cut, confirming oil shows in fractures within the basement rocks.

Weak oil shows were reported from the Ekofisk Formation (2817-2897.5 m), and one core was cut. Six more cores were cut in the Tor Formation (2897.5- 3155 m). The cores had variable recovery, especially in core # 6 with only 7.5 % recovery. In addition to the weak shows reported from the Ekofisk Formation, shows were observed in fractures both in the Tor Formation and in the Basement. Matrix staining was only seen within the Tor Formation, in zones of less than 30 cm thickness in the interval from 2929 to 2935 m. A Modular Formation Dynamics Tester (MDT) with a RPQS gauge was used to obtain formation pressure measurements and fluid samples. Due to very tight formation, the pressure measurements were of questionable quality. Two segregated samples were taken at respectively 2929.5 m and 2951.5 m. Two multi samples chambers and one 1 gal chamber were taken at 3026.3 m. Unfortunately, the obtained MDT fluid samples

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 2/6-5