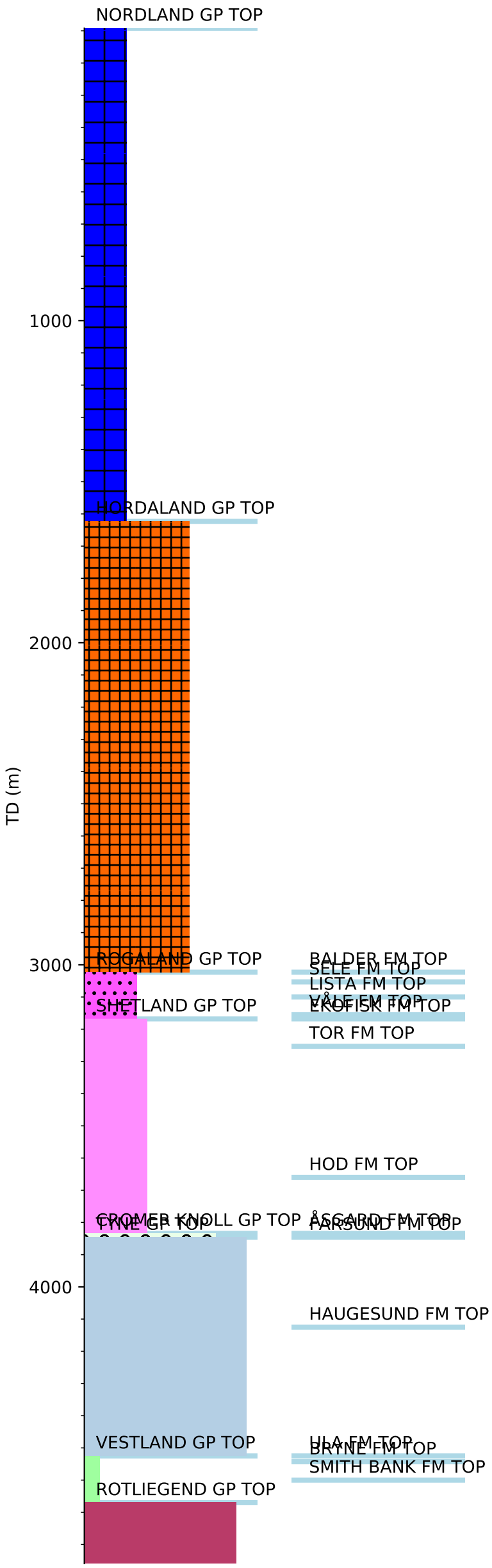
Groups

Formation Tops



Wellbore History

GENERAL

Well 2/9-3 was drilled on the Piggvar Terrace, between the Central Graben to the west and the Mandal High and the Søgne Basin to the east. The primary objective was to test for hydrocarbons, reservoir quality, and source rock potential and maturation in Late and Middle Jurassic formations. Secondary objectives were to determine the Permian stratigraphy in this portion of the Piggvar Terrace, and the reservoir quality and possible hydrocarbon accumulation in Early Permian Rotliegendes sands.

OPERATIONS AND RESULTS

Wildcat well 2/9-3 was spudded with the semi-submersible installation Dyvi Stena on13 September 1989. After drilling to 378 m the hole packed off, and the well had to be re-spudded. The re-spud took place 20 m from the original location on 15 September 1989 and the well was drilled to TD at 4859 m in the Early Permian Rotliegend Group. BHA component failures in the 12.25" and 8.5" hole sections accounted for 9.4 days of lost time, but generally drilling and operations went without significant problems, and the well was drilled within the scheduled time. Possible shallow gas had been warned pre-drill at 160, 425 and 535 m, but no shallow gas was encountered. The well was drilled with seawater and hi-vis pills down to 850 m, with KCl/PHPA/PAC mud from 850 m to 3875 m, and with HRM/polymer mud from 3875 m to TD.

The lowermost part of the chalk was of Santonian age. The Coniacian, Turonian and Cenomanian were apparently absent as they where in well 2/9-2. A 12 m thick Early Cretaceous section was penetrated, dating Valanginian to Early Barremian. No evidence of Albian, Aptian and Ryazanian was seen. Top Late Jurassic came in at 3846 m, close to prognosed depth. A seismic event at 4190 m, originally interpreted to mark the top of Middle Jurassic, occurs within the Late Jurassic shale. The Late Jurassic sequence proved to be a good source rock for oil, with maturity in the upper part of the oil window. The well penetrated 57 m of Bryne Formation at 4543 m, and the Triassic section came in at 4600 m, 175 m deep to prognosis. The well drilled from Triassic "Red Beds" directly into the Lower Permian, without any Zechstein salt being penetrated. The Permian section consisted of a brick red and medium grey claystone at the top grading into varicoloured sandstone from 4730 m downwards. This sandstone was fine grained, hard, well cemented with volcanic fragments scattered throughout. The Permian Volcanic Basement was penetrated at 4852 m, and the final TD reached 7 m deeper at 4859 m.

Occasional weak shows were seen on claystones and limestone of the Tyne Group from 3874 m down to 4155 m. Shows were recorded on sandstones throughout the interval 4542 m to 4677 m in the Bryne Formation and into the Triassic.

Two cores were cut at 4524.6 m to 4552.2 m in the lower part of the Late Jurassic section. Core 1 (10.8 m) consisted of very fine, well cemented and tight sandstone with poor reservoir quality. Core 2 (16.6 m) consisted of claystone/shale with minor siltstone at the top. No fluid samples were taken in the well.

The well was permanently abandoned on 14 December 1989 as a dry hole with minor oil shows.

TESTING

No drill stem test was performed.

LITHOSTRATIGRAPHY & HISTORY FOR WELL: 2/9-3