The Luno Discovery and the future of North Sea exploration

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The Luno discovery is situated on the south-western part of the Utsira High which at the Jurassic has a tripartite separation into a western Haugaland High is separated from the eastern Haugesund High by the Karmsund Graben .

The well 16/1-8 drilled in the period 08.09-13.11.2007 encountered undersaturated oil in sandstones of Jurassic age. The reservoir comprises a mixed lithology of sand matrix supported conglomerates and cleans sandstone. The sand and sand matrix is arkositic and the conglomerate pebbles and boulders sub-rounded to angular. The reservoir sequence is related to an Upper Triassic to Jurassic inlier basin capped by 25 m Upper Cretaceous chalk.

Due to the heterogeneous nature of the reservoir (alluvial fan and breccias flow deposits) conventional log interpretation techniques proved unsuccessful. The oil column is however well documented documented by oil sampling and pressure measurements and observations in cores and sidewall cores.

The discovery well indicates the Luno inlier Basin to hold between 65 mmboe to 190 mmboe of recoverable oil. The oil is undersaturated with oil density of 850 kg/ equating to an API gravity of and a GOR 125 /.

The awareness of inlier basin beneath the chalk was the prime challenge based on the original 3D seismic, but was identified in by interpreting on arbitrary lines in a direction that discriminated primaries from the multiples beneath the chalk. The later reprocessing iterations have improved the seismic and new iterations are ongoing.

The main surprises related to the discovery were the immature nature of the reservoir and the light undersaturated oil in an area with saturated oil and gas. This clearly demonstrates that the Norwegian North Sea is immature in understanding even in densely drilled areas and that the classification of a mature basin can be misleading.