

Seismic Stratigraphic Framework of an Early Cretaceous Sand Lobe at The Slope of Southern Loppa High, Barents Sea, Norway

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The Hammerfest Basin was formed through downfaulting in the Late Jurassic-Early Cretaceous times, allowing the deposition and preservation of Jurassic sediments which were later covered by thick Cretaceous sequences filling the basin. As a result of the Loppa High uplift and subaerial erosion, thick Jurassic sediments have been eroded and deposited along the slope of Loppa High in the form of fans. This study has been conducted along the southern margin of the Loppa High to develop a complete sequence stratigraphic framework and to map one such turbidite lobe along the slope of the high, the Early Cretaceous Knurr Formation. Three wells drilled along the southern margin of the Loppa High have proved small amounts of oil are present, with an oil discovery in Shell's 7120/1-2 well. Thick Massive sandstones of Early Cretaceous age (Valanginian-Hauterivian) display very good reservoir quality gravity flow (turbidite) sands in wells 7120/1-2 and 7122/2-1.

One regional seismic profile has been selected as a type section for interpretation along the southern margin of the Loppa High. A complete sequence stratigraphic framework has been developed to mark the major surfaces (Sequence Boundary, MFS) by geologic characterization of high-resolution seismic reflection geometries (truncation patterns; onlap, downlap, toplap and sigmoidal reflections) and seismic facies using the coarsening-up, fining up and blocky gamma ray (GR) log motifs from both the offset wells and the well located on the seismic section. The whole sedimentary package is divided into various sequences and system tracts. In addition to a detailed sequence stratigraphic analysis to investigate the hydrocarbon prospectivity, an Early Cretaceous turbidite sand lobe has been mapped (LHSG- 84-428) using seismic stratigraphy.