**Diagenetic constraints on reservoir quality on deep Middle Jurassic Tarbert Formation in North Viking Graben, Norwegian North Sea**

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The Oswig discovery, drilled in 2022, is a low permeability, high pressure high temperature (HPHT) gas-condensate siliciclastic reservoir located in the North Viking Graben, within the Mokkurkalve Fault Complex, North Sea Basin. In the area of interest, the primary exploration target is Tarbert Formation, consisting predominantly of delta front to delta plain deposits that formed during the retreat and eventual drowning of the Brent deltaic system in late Middle Jurassic.

Understanding the diagenetic evolution that shaped the reservoir's petrophysical properties is part of an integrated multidisciplinary workflow. Based on core observations on almost 100 m interval in Tarbert Formation, several 5th order depositional packages were identified that can be easily correlated with neighboring fields, such as Tune, consisting of an overall wave-dominated deltaic depositional setting. Detailed petrographic analysis was carried out to quantify the mineralogy and textures present in the reservoir samples, with focus on the mineralogy of the pore filling cements. Generally, upper shoreface and mouth bar deposits are considered to have the best reservoir quality. However, compaction and diagenesis have significantly overprinted depositional trends in this reservoir, defined by permeabilities below 0.5 mD. Quartz overgrowth and authigenic illite are the main diagenetic products affecting permeability.

Developing a tight, HPHT reservoir will require non-conventional techniques, such as hydraulic fracturing. Capturing heterogeneity on reservoir quality linked to diagenetic processes is paramount because it affects the fluid flow to the hydraulic fracturing plane that is assumed to deliver commercial rates. Currently, the Oswig data is being evaluated to determine how to commercially produce the proven hydrocarbons in a future development phase.