

Tight Gas Development Concepts for a Dutch Offshore Rotliegend Reservoir

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This paper discusses the development of a complex Rotliegend reservoir located in the Dutch sector of the North Sea. The field is strongly heterogeneous and poorly developed with the majority of the gas bearing sands at permeability below 1mDarcy and classified as 'tight'. As a result of the low porosities, the transition zone is large and extends almost over the entire gas column to the top of the reservoir. Reservoir GIIP is about 11 Bcm.

To support development of this complex reservoir, a pragmatic but still detailed field development study was completed in three months. The study comprised the reinterpretation of available gas production tests, the construction of a 3D geological model in Petrel and the generation of a range of reservoir simulation models in Imex to evaluate the gas benefits for various well designs.

In this paper, the integrated reservoir modelling workflow allowing a fast track review of various development options will be discussed in detail. The rapid screening of the impact of various reservoir uncertainties to the potential gas reserves will be demonstrated. Using the reservoir models, the benefits of underbalanced drilling (UBD) vis-à-vis reservoir fracturing have been evaluated. In addition, concepts around improved mobility of gas in reservoirs with a large transition zone will be addressed.