

Defining Prospective Play Fairways Across the Southern Mid North Sea High

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ABSTRACT

Despite early interest in the initial stages of North Sea hydrocarbon exploration, the Mid North Sea High (MNSH) has exhibited limited prospectivity relative to the neighbouring basins of the North Sea Rift System (Central Graben and Outer Moray Firth) and Southern Permian Basin. Recently, a rejuvenation in interest has been driven by: a) the discovery of the Breagh and Cygnus Fields on the southern margin of the MNSH; b) better understanding of long-distance migration onto basement highs driven by recent discoveries in the Central and Viking Grabens; c) the acquisition of new 2D seismic data as part of the Oil and Gas Authority (OGA)'s Frontier Basins program; and d) the announcement of the 29th UKCS Licencing Round for which a large number of blocks over the MNSH were offered. This work integrates the new OGA 2D seismic with other 2D and 3D volumes and an extensive well database to draw conclusions on the structural development, subsidence history and prospectivity of the MNSH. The results provide the basis for understanding the extent of reservoir play fairways across this relatively underexplored region of the UKCS. In particular, the study has allowed the nature of the southern boundary of the MNSH to be defined and highlights the main controls on the petroleum systems that govern exploration success in the Triassic Bunter Sandstone Formation, Permian (Rotliegend Group) Leman Sandstone Formation and at various stratigraphic levels in the Carboniferous. The work also highlights that the regional extent of reservoir facies, charge migration routes and trap formation timing remain key exploration risks over parts of the MNSH.