

Focused Seismic Processing Via Pre-Stack Migration – the Key to Structural Imaging of the Triassic Play in the Slyne-Erris Basin, Offshore Ireland

Campbell, Mervyn¹, Steve Smith², Dermot Corcoran³ (1) Statoil (UK) Ltd, London, United Kingdom (2) Shell E&P Ireland Ltd, Dublin, Ireland (3) Statoil Exploration (Ireland) Ltd, Dublin, Ireland

In the Slyne-Erris Basin, offshore Ireland, the sub-surface environment for seismic acquisition and processing is characterised by four factors – near seabed heterogeneity due to the presence of relatively thin, high-velocity, volcanic and chalk layers; varying water depth (200-2000 m) and seabed topography; complex geology due to the presence of both Zechstein and Triassic evaporitic detachment layers; and anomalously hard Triassic to Jurassic overburden as a result of uplift from maximum burial depth during the Cretaceous-Tertiary period. The sporadic exploration in the basin to date partly reflects the poor quality of the seismic data and the long learning curve with respect to improvement of the seismic image at the horizon of interest.

Much of the early exploration activity in the Slyne-Erris area concentrated on evaluating Jurassic, rifted, tilted fault block structures - what was then perceived to be the primary play in the basin. However, well 18/20-1, drilled in 1996, discovered a 61m gas column in pre-rift, Triassic, sandstones and proved the presence of a working Carboniferous-Triassic petroleum system. This new play is now the primary hydrocarbon play in the basin with multi-TCF undiscovered resource potential. This paper chronicles the steady incremental improvements in seismic imaging achieved via conventional 2-D and 3-D seismic processing techniques followed by a dramatic leap in data quality from the application of low frequency, pre-stack migration, processing streams to 3-D data sets. Lessons learned and implications for future exploration in the Slyne-Erris basin are discussed in the context of the much improved structural imaging.