

Summary of a Geoscience Wales recent Project

The OGA ran a two stage competition in 2015/2016 to stimulate activity in consultancy companies in the UK oil and gas sector and exploration activity in the North Sea. Service companies were invited to outline projects over either area of the Mid North Sea High or Rockall that would advance the understanding of the potential for oil and gas in these two frontier areas using new 2D seismic surveys that the OGA had commissioned.

10 projects, 5 for each area, were selected by the OGA and awarded seed money to develop the ideas and the project scope further. These concepts were then presented again to the OGA and 1 project in each area was awarded £100,000 to undertake the study that had been designed by the winning company. GWL was very pleased have been awarded the MNSH area and the subsequent work that we undertook in 2016 was delivered to the OGA to assist with the decisions to award licenses in the 28th Round.

The MNSH Study;

A structural framework interpreted using the new regional broadband seismic data acquired on behalf of OGA in 2015, along with reprocessed legacy data. The well database was used to construct a series of Gross Depositional Environment (GDE) maps, and was integrated with the seismic to understand three major periods of uplift and erosion. Source rock data was used to identify the principle source rocks of the area, and assist in understanding the periods of uplift and erosion. From this, 1D and 3D maturity modelling was carried out to understand the charge potential in the area. The results were then combined with the GDE maps to produce a series of composite Common Risk Segment (CRS) maps.

The source rock screening revealed that the principal source rocks of interest to be found in the area are the Scremerston Coal Group and in the overlying Namurian sequences. The Scremerston Coal Group is principally a gas-prone source rock, and there is some evidence to suggest some modest oil-potential. The Namurian source rock is also principally of gas-prone source of lesser quality of the Scremerston Coal Group.

Three major phases of exhumation have been identified and quantified, namely the Variscan (end Carboniferous), the 'Mid-Cimmerian' (Middle Jurassic), and the Alpine (Mid-Miocene to Recent). Comprehensive modelling has been undertaken, which included these events. Thirty two 1D models were built and integrated with a Trinity model built from the seismic interpretation.

It was found that the three phases of uplift and erosion are important, since they turn off hydrocarbon generation. Generation does not resume until the source rocks are buried to a higher temperature than their previous burial. This is extremely important on the central part of the Mid North Sea High, because of magnitude of the Variscan and 'Mid-Cimmerian' uplift and erosion.

The model accounts for the oil shows documented on the Mid North Sea High and for the Breagh Field. The model predicts that the main gas kitchens of significance lie to the south of the Mid North Sea High and that the principal phase of gas generation occurred in the Late Cretaceous and Early Tertiary. An assessment of gas migration vectors, that takes

into account the structural modification implicit in the Late Tertiary uplift, identifies a sweet spot for Carboniferous charge.

A group of Geoscience Wales' Associates undertook the project; Stephen Corfield, Maurice Bamford, Andrew Barnwell, Sarah Parker and Julian Moore.

The study was delivered to the OGA by the deadlines set so that the results could be used to assist the OGA making award decisions for the 29th Round. Since then, members of the team have gone on to work for the OGA on several other projects.

The MNSH Study is now available to buy as a multi-client study from GWL. For further information on content and price please contact info@geoscience.wales