The role of biostratigraphy in the definition of an updated J sequence scheme for the Jurassic – lowermost Cretaceous (Hettangian – Berriasian) of the North Sea Basin (UK, Norway & Denmark sectors)

Copestake, P.[1] & Partington, M. A.[2]

[1] *Merlin Energy Resources Ltd., Newberry House, New St., Ledbury, Herefordshire, HR8 2EJ, UK. Email: philip_copestake@merlinenergy.co.uk*

[2] *Woodside Energy Ltd, 11 Mount St, Perth, Western Australia, 6000, Australia*

The North Sea Basin has been considered to be a mature hydrocarbon province, however, discoveries have continued to be made in recent years in Jurassic reservoirs. Complex structuration and rising creaming curve trajectories for the Jurassic suggest that considerable exploration potential remains in this interval. The application of sequence stratigraphic methodologies, both in exploration and field development, is key to the realisation of the remaining hydrocarbon potential of the Jurassic. In addition, the enhanced understanding of reservoir architecture and connectivity that will derive from sequence stratigraphic insights will also be of direct relevance in future carbon capture and storage projects that involve Jurassic reservoirs.

A regional "J" sequence stratigraphic scheme was developed within BP and published in the early 1990s (Mitchener *et al.,* 1992, Partington, Mitchener *et al*., 1993; Partington, Copestake *et al*., 1993), and has since become widely used in the North Sea Basin. An update to this scheme, including a full documentation of the sequence definitions, with type wells and reference seismic lines, is being prepared for publication (Copestake & Partington, in press). Part of this documentation includes a full definition of the biozones that were first published by Partington, Copestake *et al*. (1993).

The updated J sequence stratigraphy scheme described identifies 38 stratigraphic sequences, recognisable in the UK, Norway and Denmark sectors of the North Sea Basin. The documented biozonation scheme for the Jurassic (Hettangian) to lowermost Cretaceous (Upper Berriasian) incorporates 49 palynology biozones plus subzones (based on dinocysts, spores and pollen) and 27 microfaunal zones plus subzones (based on foraminifera, radiolaria and ostracods), to provide the essential chronostratigraphic calibration of the defined sequences. Where possible, correlation of microfossil events is made with standard ammonite zones in UK onshore exposures and with occasional ammonite records from cores in North Sea wells.

Many of the subsurface sequences can be correlated with sedimentary cycles in outcrop sections in onshore Europe, particularly Britain. This provides the means for a large scale overview of the North West European Jurassic, and is a foundation for detailed comparisons of the Jurassic successions in other regions of the world.

The conference presentation will summarise the updated scheme and, in particular, outline the role of biostratigraphy in the calibration and characterisation of the J sequences. The presentation will be illustrated by reference wells, seismic lines and outcrop sections.

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