

Multiattributes and Seismic Interpretation of Offshore Exploratory Block in Bahrain – A Case Study

Suresh Thampi¹, Aqeel Ahmed¹, Yahya Al-Ansari¹, Ali Shehab¹, Ahmed Fateh¹, Anindya Ghosh¹, and Ghada Almoulani¹

¹BAPCO

Abstract

An exploration well, M-1, was drilled targeting a low relief four-way dip closure mapped at Jurassic and Cretaceous levels. M-1 well logs show an oil-water contact in the Jurassic Arab zone, which was confirmed by an oil gradient from reservoir pressure points. A quick post drilling analysis of the seismic data showed that the well M-1 was drilled down dip of the low relief structure. This compelled a challenging reinterpretation and mapping of the seismic vintage over such low-relief structures with abundant velocity variations. A different approach was used with improved velocity models and depth conversion to overcome these challenges and better understand the subsurface structures. Seismic attribute analysis was carried out to locate and define subtle stratigraphic and structural features, and to delineate potential reservoir as well as non-reservoir litho-facies within the mapped reservoir units. Attributes calculated from seismic amplitude data are used in conjunction with horizontal time slices and vertical sections to identify and allocate potential hydrocarbon pay zones. In addition, it was observed that the M structure is located in a merging zone between two seismic vintages and thus an effort was made to remap the prospect by attempting to minimize the effect of merging. Generated maps suggest that the well was drilled at the edge of a more robust M structure which extends at deeper Permian levels. The study concludes that there is a significant upside exploration potential in this area.