

Study of Taiwan's Pre-Miocene Reservoir (Eastern Pei-Kang High)---An Overall Analysis and Interpretation

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ABSTRACT

The present study combined geochemical, geophysical and petroleum geological data to gain a better picture of the characteristics of source rocks, reservoir rocks, fault evolution and structural closures of the Pei-Kang High and its eastern part. The interpretation was made from the petroleum system's point of view to identify the Pre-Miocene structural closures with higher potential for hydrocarbon accumulation. The conclusion of the study can then provide some important information for the exploration of the area.

Fossils, petrophysics, logging and seismic data were integrated to gain an understanding of the sedimentary environment of the study area. This along with the source rocks and reservoir rocks analysis enabled the establishment of the geological sedimentary model of the area.

In terms of Pre-Miocene source rock, the upper part of Cretaceous strata lying between Pei-Kang, Yuong-Kung and Pu-Tze are better ones. The majority of those are "moderate" to "little" grade of source rocks, which mainly produce gas. Between B fault and E fault (Wanshing to southern Pei-kang) is the better source rock. The upper part of the lower Cretaceous strata contain some good source rocks that produce gas with condensate. Its organic maturity falls between 0.7% to 1.0%, and it did not produce oil and gas until 3 MA ago. There might exist another "sort of good" Paleocene and upper part of lower Cretaceous source rock between Dou-Nan and Ming-Hsuang with its organic maturity ranging from 0.8% to 1.2%. Its generation and expulsion of gas mainly occurred during the Miocene and Pliocene age. The majority of the Jurassic and lower Cretaceous source rocks in the Yün-Chia area produced and expelled gas during the Pu-Li Move period, and the generated gas was likely to be accumulated in the Cretaceous reservoir rocks.

The Pre-Miocene rocks in the study area are very complicated in terms of their properties. The secondary porosity resulting from dissolving and fissuring is prevailing in the sandstone. The diagenesis was mainly controlled by the rock Pre-Miocene reservoir rocks of the area, it is found that the reservoir rocks between MS-3 well and YK-1 well deserve more attention to look into.

In the seismic data interpretation, the tops of A, B and C were first considered to construct the top structural map of time. The map was then used to further study the potential structural closures and fault bounded closures for hydrocarbon accumulation. The fault system is trending east-west direction around Pei-Kang, and gradually swing to the northeast-southwest direction when approach Ta-Lin area. Towards Gu-Keng, these two sets of fault are both present, along with the third set of fault trending northwest-southeast direction. This indicates that the structure here is not simple at all. What really happened could be lot more complicated than the interpretation, and thus require further study.

To conclude, the hydrocarbon potential of the area is not as pessimistic as it was originally thought. It would need more effort to undertake further research, and the results can then be used for the exploration of the area.

Key words: Hydrocarbon potential evaluation, Pre-Miocene, Pei-Kang High.