5258 Roles and Charge and Structural Timing in Relation to Hydrocarbon Prospectivity of the Paleozoic reservoirs of Abu Dhabi

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Abstract

Structural timing in relation to hydrocarbon charge timing has a significant impact on hydrocarbon prospectivity for Khuff and pre-Khuff reservoirs in Abu Dhabi.

Maturation of Silurian source rocks began more than 150 million years ago and continues on until today in some parts of northern offshore Abu Dhabi. A mix of structural growth histories is also observed with some very old structures pre-dating source rock maturation and other very young structures related both to emplacement of the Semail Ophiolites and Zagros uplift. The tectonic events during the cretaceous and the tertiary enhanced somehow the vertical migration of the hydrocarbon from the Silurian hot shale source rock to the upper reservoirs in pre-Khuff

Some of these young structures are located in areas where charge had already finished before the structure formed. In addition some of the onshore structures believed to be younger than offshore however there could be a possibility where onshore traps might have benefited from secondary migration.

Comparing the growth history of each individual structure to the Silurian source rock maturation history at each structure location can explain much of the observed Paleozoic gas distribution that has been observed by exploration drilling. This study investigates the impact of growth timing on the presence of hydrocarbons. It is believed that the use of this analysis substantially increases the confidence in assessing prospect risk ahead of drilling.

In this paper, we reflect on our efforts to undertake comprehensive investigations of the geology of the region. This discussion will cover the methodology which is used to perform the analyses of the growth history. Measuring the growth from seismic sections and from depth contour maps were the two basic methodologies applied. The interpreted growth histories are compared to the tectonic history of the basin. Basin modeling to understand the timing of source maturation was a separate study, but the results of that work will be shown and the growth history will be compared to the charge history. Examples from Abu Dhabi fields are provided in this study to illustrate our concepts. Offshore and onshore hydrocarbon potentiality will be discussed according to the analyses in this paper.