1130319 Geological Evaluation and Petroleum Prospectivity of the Jeffara Basin in Southern Tunisia

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Outcrop data as well as petrographical studies, tectono-stratigraphic overview and sedimentological investigation were used to construct the depositional environments of Lower Cretaceous series. The rock units, including several third-order sequences were deposited in a variety of inner platform environments with distinct fauna associations in relation with tectonic events and sea level change. The Carbonate facies, associated with benthic foraminifera of two main outer shelves, are orbitolina pack-grainstones, enriched in Bivalve and Algae.

Southeast Tunisia, in the Jeffara Basin, they are shelf deposits, concerning the Lower to Upper Cretaceous series. They exhibit exploration targets for hydrocarbons and form the proven reservoirs of significant oil-fields (e.g.: Ezzaouia, El Bibane and Robbana).

The Jaffara basin displays variety of siliciclastic and carbonate reservoirs, most likely extending from Ordovician to Cretaceous time. Source rock kitchens, regionally known within the Ordovician, Silurian, Carboniferous, Permian, Jurassic and Cretaceous successions, are locally deeply buried and fully mature in various parts of the basin. Traps are mainly structural; anticlines at Jurassic and Cretaceous level, forming the hydrocarbon pool in the Ezzaouia oil field. Lower Cretaceous reservoirs are hydrocarbon producer in the northeastern part of the Jeffara basin. Barremian sandstones (Sidi Aïch Fm.) have tested oil in some wells. Cenomanian Zebbag carbonates are hydrocarbon bearing in the Ezzaouia field and tested oil in El Bibane. The latter and also in some adjacent wells tested oil in the Aptian Orbata carbonates. Commonly, the Jeffara Basin has proven / moderate hydrocarbon play. In the central and northwest part of the basin, based on some control points, the area prospectivity is likely to moderate.

The siliciclastic deposits display substantial heterogeneity resulting from depositional environment and may hold basin-ward structural / stratigraphic traps. These lithofacies are showing hydrocarbon potential and could promote the poorly explored zone where locally several objectives within Jurassic and Cretaceous series are penetrated.

Furthermore, the southern corner of the basin is concluded to have high to moderate prospectivity with likelihood plays in deep Ordovician, Silurian and Triassic reservoirs where structural and / or stratigraphic traps could be predicted.

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