

Sequence Stratigraphy of the Lower Triassic Kangan Formation, Northern Part of the Persian Gulf: Implications on Reservoir Characterization

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The Lower Triassic Kangan Formation includes the main reservoirs for natural gas in SW Iran and the northern Persian Gulf, and is equivalent to the Upper Khuff Formation. This formation was investigated in three gas fields, indicating that it is composed of limestone, dolomite, anhydrite, shale. It comprises 14 facies which were deposited in tidal flat, lagoon and oolitic barrier settings in the inner part of a homoclinal carbonate ramp or platform. Vertical variations of microfacies and gamma-ray log profiles show that the formation consists of three depositional sequences (KG1-3), each consisting of transgressive and highstand systems tracts and each bounded above by a type two unconformity. These depositional sequences are also well constrained by carbon and oxygen isotopic profiles from a well-dated section, exhibiting negative and positive peaks matching with sequence boundaries and maximum flooding surfaces, respectively. Results of strontium isotopic analyses provided means to date estimate the age of the Kangan Formation between 254Ma and 250Ma.

Reservoir quality of the Kangan Formation in the studied areas was recognized based on facies analysis, lithology, diagenetic processes, type of porosity, size of dolomites, and geometry of dolomites with attention to the gamma ray, neutron and sonic logs. This investigation shows that the Kangan Formation is a heterogeneous reservoir which consists of two flow units (P1 and P2) and two barrier units (D1 and D2). This zonation is confirmed by other studies on the upper part of Khuff Formation in the Persian Gulf Basin.