SEDIMENTOLOGY AND RESERVOIR CHARACTERIZATION OF KINGRIALI FORMATION IN ZALUCH NALA, WESTERN SALT RANGE, PUNJAB, PAKISTAN

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ABSTRACT

The Triassic Kingriali Formation has been studied in detail in Zaluch Nala, Western Salt Range, Punjab, Pakistan. The study was conducted on outcrop and well logs data to investigate the detail sedimentology and reservoir characterization of Kingriali Formation. A total of 36 rock samples have been collected from 76m outcrop section to delineate the microfacies and depositional environment of Kingriali Formation. In Kingriali Formation three main microfacies were identified i.e., mudstone, packstone and boundstone microfacies. These microfacies were subdivided into sub-microfacies i.e., fenestral mudstone and bioclastic mudstone sub-microfacies, fenestral ooidal packstone and peloidal packstone sub-microfacies. The Kingriali Formation was deposited on intertidal to subtidal marginal plate reef and inner shelf restricted environment with sub-environments i.e., shoal, bars and beaches. The XRD analysis suggests that Kingriali Formation does not display any significant variations in stoichiometry and crystal ordering. The reservoir characterization was carried out using the parameters i.e., visual porosity, diagenesis, SEM analysis and petrophysical analysis. The visual porosity ranging from 1.8 to 10% was determined with the help of Image J. software. Diagenetic processes identified were dissolution, dolomitization, micritization, compaction, neomorphism and cementation. The dissolution, dolomitization and fracturing enhances while the compaction, micritization, neomorphism and cementation decreases the reservoir potential of Kingriali Formation. The SEM analysis shows various microporosity types i.e., vugs, pores, intracrystaline and intercrystaline porosity and fractures. Petrophysical analysis suggests an average effective porosity of 8% and average sonic porosity of 8% and 12% for Kingriali Formation in Isakhel-01 and Chonai-01 wells respectively, which indicates good reservoir character. However, due to low laterolog deep (LLD) value at different depth and the absence of cross over between neutron and density porosity Kingriali Formation may not be recommended as hydrocarbon reservoir.

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