

Petrophysical analysis of rock drilled in sumari-01 well to evaluate their reservoir potential, Kohat, KP, Pakistan

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Abstract

The research principally involves Petrophysical assessment of reservoirs from well logs interpretation of Sumari-01 located in Sumari village in the Kohat Basin, Pakistan. The data was provided by Land Mark Resources Ltd (LMKR), and approved by Directorate General of Petroleum Concessions (DGPC). Petrophysical properties include volume of shale (Vsh), various porosities, water saturation, hydrocarbon saturation, gas effect. The crossover of porosity and resistivity log, LLD-LLS separation, and bulk volume of water using self-potential, resistivity, density, neutron log were used in the study for the determination of the various Petrophysical parameters.

Total depth of Sumari-01 is 1466.08 m. Rock units in the Sumari_01 well ranges from the Middle Jurassic to Early Eocene that includes Panoba, Patala, Hangu, Kawagarh, Lumshiwai, Chichali, and Samana Suk Formation from top to bottom. In Sumari-01 Samana Suk, Lumshiwai, Kawagarh and Hangu Formations were selected for detail Petrophysical analysis using the cut off factors. The Samana Suk Formation overall is an excellent reservoir based on the cut off factor such as high effective porosity (9.52%), low water saturation (21%) and low volume of shale (17%). Crossover of porosity on LLD (20.1m) and LLD-LLS separation (8m) is also satisfactory. The Lumshiwai Formation is a moderate reservoir with good effective porosity (7.21%), low water saturation (25%), low shale volume (41%), significant crossover of porosity on LLD (16m) and LLD-LLS separation (12m). Kawagarh Formation too is an excellent reservoir having high effective porosity (8.89%), low water saturation (29%) and low volume of shale (25%). Crossover of porosity on LLD (18.8m) and LLD-LLS separation (18.5m) is also satisfactory. Two reservoir zones occurs in Hangu Formation, i.e. zone A and zone B. Zone A has thickness of LLD-LLS separation (0.4m) and porosity and resistivity crossover (0.6m), while Zone B has a LLD-LLS separation (1.1m) and crossover of PHID on LLD (1.1m).