INTEGRATING FORMATION EVALUATION AND PETROPHYSICS IN GAS BEARING RESERVOIRS DRILLED IN EOCENCE SUCCESSION IN QADIRPUR AREA, CENTRAL INDUS BASIN, PAKISTAN

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Abstract

The Gas bearing Reservoirs of Eocene age in the Qadirpur area, Central Indus Basin are the second largest prolific reservoirs in Pakistan. In 1990, Gas was discovered in Eocene Limestone in Qadirpur area. Till today around 25 wells have been drilled for extensive development of the field. Sui Main Limestone (SML) and Sui Upper Limestone (SUL) are the main producer while limestone of Habib Rahi (HRL) overall ismeasured as tributary reservoir. The Ghazij Shales act as cap for SML and SUL while Sirki Shales over HRL act as a cap rock.The present study focused on the formation evaluation and integrating it with petrophysics based on well log data in Eocene reservoirs in Qadirpur area. Computer-assisted log analyses were used to evaluate the petrophysical parameters such as the shale volume (Vsh), total porosity (PHT), effective porosity (PHE), water saturation (Sw), hydrocarbon saturation (Sh), flushed zone saturation (Sxo) and true resistivity (Rt). Cross-plots of the Petrophysical parameters versus depth were illustrated for lithology determination, gas effect and bulk volume of water (BVW). Eocene reservoirs in the Qadirpur area are carbonates and gas producing. The BVW shows that the reservoirs are at reducible or nearly irreducible water saturation hence will produce the water free hydrocarbon. This study marks the expected reservoirs to be Habib Rahi Limestone and Sui Main Limestone, Whereas Sui Upper Limestone is non-reservoir as a whole, and only parts of it can be producing where hydrocarbon (gas) saturation and effective porosity are high. In the Qadirpur area the Gas in place in cubic feet, was calculated successfully for the wells i.e. Qadirpur-03, 11, 15, 16 and17. Based on well log data, the Eocene reservoirs are interpreted as a good quality reservoir rocks which is evident from high effective porosity and hydrocarbon saturation.