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Determination of Lithology, Porosity and Water Saturation for Mishrif Carbonate Formation

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Abstract : Well logging records can help to answer many questions from a wide range of special interested information and basic petrophysical properties to formation evaluation of oil and gas reservoirs. The accurate calculations of porosity in carbonate reservoirs are the most challenging aspects of well log analysis. Many equations have been developed over the years based on known physical principles or on empirically derived relationships, which are used to calculate porosity, estimate lithology and water saturation; however these parameters are calculated from well logs by using modern technique in a current study. Nasiriya (NS) oilfield is one of giant oilfields in the Middle East, and the formation under study is the Mishrif carbonate formation which is the shallowest hydrocarbon bearing zone in the NS oilfield. Neurolog software (V5, 2008) was used to digitize the scanned copies of the available logs. Environmental corrections had been made as per Schlumberger charts 2005, which supplied in the Interactive Petrophysics software (IP, V3.5, 2008). Three saturation models have been used to calculate water saturation of carbonate formations, which are simple Archie equation, Dual water model, and Indonesia model. Results indicate that the Mishrif formation consists mainly of limestone, some dolomite and shale. The porosity interpretation shows that the logging tools have a good quality after making the environmental corrections. The average formation water saturation for Mishrif formation is around 0.4-0.6.This study is provided accurate behavior of petrophysical properties with depth for this formation by using modern software.

Keywords : lithology, porosity, water saturation, carbonate formation, mishrif formation
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