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NMR Logging tools providing better answers for hydrocarbon bearing reservoirs, North Western Desert, Egypt

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Abstract: This study aims to evaluate the hydrocarbon potentiality of the Kharita Formation of Lower Cretaceous age which is one of the most promising reservoirs in the Western Desert of Egypt. The conventional well log data and the advanced Nuclear Magnetic Resonance (NMR) logging technique in addition to the Formation MicroImager (FMI) have been collected from Selkit-1X Well and used for analysis and interpretation. The Density-Magnetic Resonance (DMR) porosity can be used in volumetric calculations to provide more accurate reservoir volume estimates than previously possible. Reservoir productivity, and fluid contacts are the topmost objectives in petrophysical analysis especially in hydrocarbon-bearing reservoirs. On the other hand, designing a wireline formation testing job is very much dependant on knowing reservoir permeability and fluid types.

The study indicates that the NMR has played an essential role with the help of FMI in reservoir characterization of the Kharita Formation. These techniques have been used also to identify, quantify movable and immovable water saturations, hydrocarbon fluid typing, and it has better permeability estimation. Also, when integrated with bulk density, data from both tools were used to enhance calculated total porosity and permeability. The combination of NMR log derived permeability and other tools confirm the obtained

result and facilitate the determination of accurate fluid contact of the Kharita reservoir. It can be concluded that the NMR logging combinations with other logs provides better answers to hydrocarbon-bearing reservoirs in today's search for hydrocarbons.

Key words: NMR logging, FMI logging, Reservoir characterization, Kharita Formation, DMR porosity, Hydrothermal fluid typing

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