PREDICTION OF FULL CYCLE CAPILLARY PRESSURE CURVES FOR JURASSIC SILICICLASSTIC SEDIMENTS WITH PETROPHYSICAL DATA

Alexander Petrov
Well Logging/Petrophysics, Gubkin Russian State University of Oil and Gas, Moscow, Russia
a.n.petrov@hotmail.com

This study is devoted to the development of capillary pressure petrophysical models for different lithotypes of granular reservoirs. Proposed models describe core analysis data better than widely used models (Brooks-Corey model, J-function, Tiksie model, Burdine model). Models are verified on the representative core samples collections (over 200 samples) – Jurassic sandstones with complex mineral composition from different fields in Western Siberia. For described formations effective porosity is single value reservoir indicator. Control parameters of developed models have strong correlations with reservoir properties.

Effective and dynamic porosities, hydrocarbon saturation in effective pore space (effective hydrocarbon saturation) determined with well logging data provide evaluation of entry capillary pressure values and hydrocarbon distribution in transition zones.

The new well logging data interpretation technology is applied for effective porosity and saturation determination. This technology is based on the effective porosity petrophysical model of granular reservoirs. It provides prediction of effective porosity values in reservoir conditions with standard well log data interpretation (spontaneous potential log, formation density log, gamma-ray log, neutron log and sonic log). The developed technique of resistivity log data interpretation is established for determination of effective hydrocarbon saturation. Proposed models of capillary pressure are used in dynamic reservoir properties prediction algorithms with well logging data. Dynamic properties are transferred in digital geological and hydrodynamic models for reservoir development process simulation.

Fluid filtration and mass transfer processes are the basis of the oilfields development for reservoirs with complex structure. Obtained results are applied for fluid filtration processes modeling and reservoir development technology.

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