



FESAus April 2021 Talk

Modelling Permeability in Clastic Reservoirs – Chiew Fook Choo

Subsurface static modelling is increasingly accepted as the method of choice for assessment of hydrocarbon resources from exploratory drilling data, and for post-discovery field development. Accurate permeability prediction is vital, and without doubt a challenging task in such endeavor. Despite tremendous advancements in well-data acquisition technologies, permeability determination remains problematic. To date, most permeability models and techniques are merely curve fittings, or empirical approaches that rely on retrofitting permeability as a function of one or more petrophysical parameters.

This technical talk presents the new developments and applications of the techniques published in my paper in 2010, namely 'The State-Of-Art Permeability Determination from Well Logs to Predict Drainage Capillary Water Saturation in Clastic Rocks'. Permeability which governs the movement of fluids through pore networks, can also be expressed by the effective cross-section area perpendicular to direction of flow. A millidarcy is equivalent to a nanometer square in SI units. Besides porosity, this effective cross-section area is also dependent on grain size which in turn is influenced by the lithological make-up of the reservoir rocks.

Increasingly, grain size evaluation has been emphasized as prerequisite step to model effectively permeability over large area and away from well controls. This approach fits well with inputs and participations from geophysics, geology and reservoir engineering, delivering more credible models, and allowing quantifiable audit trail for subsequent modifications. The permeability equations given in the paper can be exploited to evaluate independently the grain size profile in a well. Again, only traditional logs such as gamma-ray density and neutron are used. Core data like sieve analysis and laser particle size assessments are used only for verification if they are available. This presentation will detail the methodology, and show examples to convince the audience that the basic density-neutron logs, which are almost always available in oil/gas fields, are all that is needed to determine grain size, permeability, porosity, lithology, and capillary water saturation in clastic reservoir property modelling.

Mr. Choo is a highly recognised expert in Petrophysics with in-depth practical knowledge. He has 40 years of global experience in the search of oil and gas. He held several Executive and Technical positions for major service and E & P companies, namely Schlumberger, Woodside/Shell and Petronas, working in the Netherlands, UK, Australia, Middle East, Malaysia & Indonesia. As a result of his long career experience in both wireline services and in reservoir development and management, he has in recent years developed and successfully applied several unifying petrophysical techniques for Sub-surface Modeling in Petroleum Engineering. He has a B.E. (Hons) in Electrical Engineering and Applied Physics from the University of Canterbury, New Zealand. He retired from his last position as a Custodian and Technical Advisor for Petronas in 2018. He is now residing back in Perth.

DATE: Tuesday April 13, 2021 - 12:30 – 1:30 PM (WAST, GMT+8)
VENUE: Ibis hotel (Perth), on the web (rest of the world)
COST: Members \$30.00; Non Members \$40.00; Students/Retirees \$10.00; Remote access also available
Online registration at www.fesaus.org by Friday 9th April at 11.00 am

