

Stoneley: The Permeability Probability Log

Nabil Al-Adani*

Schlumberger, Calgary, Alberta, Canada

adani@calgary.oilfield.slb.com

and

Doug Hardman

Petro-Canada, Calgary, Alberta, Canada

Abstract

Over decades, Stoneley measurement was considered the closest measurement of formation permeability. Biot wave propagation in porous media theory and modified theories for wide frequencies band were the basis of proving the strong correlation between formation permeability and Stoneley wave. Several methods have been proposed and used on modeling the Stoneley wave to estimate mobility or permeability. In parallel, new tools were introduced as well to improve the tube wave detection based on wave dispersion measurement.

In this presentation, a quick overview on Stoneley wave modeling will be introduced. Then; the latest improvement and way forward will be discussed. Log and core data examples on two wells will demonstrate that the correlation between Stoneley and Permeability can be used as a probability profile to determine the potential pay with confidence.