

Integration of Core Data for Calibrated Shaly-Sand Log Analysis

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ABSTRACT

Routine and special core analysis, were used to calibrate shaly-sand log analysis models. Results from a calibrated Modified Simandoux model compare favorably with actual field performance and other 4th Grubb special core analysis data. The 4th Grubb reservoir is a deep, multi-sand interval, located in the San Miguelito Field in Ventura County, California. These sands are deep water, longitudinal turbidite deposits of Miocene and Pliocene age. Interbedded with these shaly sands are turbidite related silts and marine shales. A typical logging suite would include, gamma, dual induction, density and neutron. Occasionally sonic and dielectric logs were also run. Routine core analysis included porosity, permeability, grain density and saturations. Fourier transform infrared spectroscopy (FTIR), x-ray diffraction (XRD), thin sections, and scanning electron microscope (SEM) photomicrographs were used to identify clay type and clay content. Laboratory petrophysical measurements were made to determine the appropriate formation factor, saturation exponent and clay properties. Capillary pressure data were used to estimate irreducible water saturations (S_{wi}), and relative permeability data were used to estimate fractional flows. Results of the log analyses and core analysis data were then compared to actual field performance.