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### **The Modernization of Old Log Suites**

In the last few decades the use of computers has transformed our ability to perform petrophysical evaluation. One of the major consequences of this transformation involves our ability to modernize old log suites. For example, consider the case of an oil field with multiple pay zones that was drilled in the 1950's and is currently undergoing water encroachment. Populating a reservoir simulation model with porosity and permeability data for each well and zone in the field would be problematical using the old ES logs available for the study. The solution to this predicament is to modernize the old log suites.

Log suite modernization encompasses four basic steps. The first step consists of verification and clean up of the digital data for the logs. Inversion processing is then performed on the SP and resistivity curve data to eliminate thin-bed and borehole effects. This processing results in static SP (SSP), invaded zone resistivity ( $R_{xo}$ ), and true formation resistivity ( $R_t$ ) curves for the well. In the third step, these curves are then used to produce a model of the contemporary curve data for the well. The approach is to train computer programs to predict either core analysis data or modern log data using the processed curves. Neural network programs have proven to be excellent processing tools for completing this step, although other methods such as fuzzy logic or regression may be used. The final step in the process is to perform normal petrophysical analysis using the modeled curve information.