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“Peak Production through Optimal Completion Strategy Petrophysics to Define Relative Permeability and Fluid Flow Rates”

Abstract

A major issue in oil and gas operations is the disposal of produced water. An important consideration in designing well completion is to minimize the possibility of perforating levels with mobile water. Using triple-combo log interpretation, relative and effective permeabilities to hydrocarbons and water can be calculated. Additionally, by applying appropriate fluid viscosities, the expected hydrocarbon/water ratio can be estimated. Intervals of interest can be analyzed to determine net potential recoverable hydrocarbon reserves, together with associated water volumes. Additionally, initial daily rates of hydrocarbons and water can be estimated. By input of net income from hydrocarbons and disposal costs for water, estimates of initial daily net income are available. By adjusting the assumed completion interval, prediction of maximum economic advantage is available when completing the well. Examples are presented for both oil and gas wells, showing excellent correlation with produced fluids. Included are wells from the Bakken, Niobrara, the Midland Basin, and the Delaware Basin.

Our Presenter

Dr. Michael Holmes



Michael Holmes, with Digital Formation, Inc., Denver, CO, has a Ph.D. in Geology from the University of London and a M.Sc. in Petroleum Engineering from the Colorado School of Mines. He began his professional career with British Petroleum and then joined Shell Canada. Subsequently, he was a Research Scientist in Marathon's Denver Research Center. For a brief period, he was Exploration and Production Manager for Berry Wiggins in London. In 1974, Dr. Holmes joined H. K. van Poolen and Associates, Petroleum Consultants, as Vice President in charge of North American consulting activities. Additionally, Dr. Holmes was an instructor in a wide range of petroleum courses including geology, well logging, and petroleum economics. In 1978, Dr. Holmes established his own consulting practice, involving petrophysics, technical due diligence, consulting to the United Nations world-wide, expert witness activities, and instructor to IHRDC and the University of Brunei. In 1998, Michael combined consulting activities with software development, to form Digital Formation, Inc. From 1998 to the present, most of Michael's work has been petrophysical analysis and reservoir characterization in reservoirs world-wide. More recently, Digital Formation has developed extensive petrophysical algorithms including rock physics, capillary pressure, and the analysis of unconventional reservoirs.