

New Techniques for Estimating Solution-Gas Drive Reservoir Properties Using Production Data

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Abstract

A number of attempts have been made to establish the theories of rate decline in solution-gas drive reservoirs with multiphase flow, and to formulate techniques for reservoir properties estimation using production data. Until recently, none of the attempts have established a consistent functional link between the empirical and the theoretical domains of decline analysis for such reservoirs. The absence of such link has inhibited the formulation of simple techniques for reservoir properties estimation.

This work presents a new, simple technique for estimating reservoir permeability in solution-gas drive reservoirs, using production data. The technique is based on a recently-established relationship between the empirical and the theoretical domains of decline curve analysis for solution-gas drive reservoirs. The technique has been applied to a number of cases and found to yield excellent estimates of reservoir permeability, even for heterogeneous reservoirs. In addition, this work presents a new technique for estimating a well's drainage area, using production data in solution-gas drive reservoirs. This is based on a 2-phase material balance equation. Analyses have been performed on the sensitivity of the techniques to some key parameters.

