
Injection Well Testing: A Case Study from Unity Area, Muglad Basin, Sudan

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Testing injection wells is particularly important for efficient planning and operation of both secondary and tertiary recovery projects. Satisfactory injection performance over a long period of time and the prompt detection of increasing wellbore damage are important to the economics of recovery projects. Authors studied both Injectivity and falloff testing in liquid-filled, unit-mobility-ratio reservoirs and discussed methods for determining average reservoir pressure and for analyzing composite systems in non-unit -mobility ratio reservoirs and well testing, its analysis, using the step-rate method. Mobility ratio less than one suggests an efficient, "piston-like" oil displacement process, while mobility ratios greater than one may result in inefficient displacement. In the present study, it is observed that the mobility ratio between the injected and in-situ fluids is near unity, the analysis techniques for injection tests are similar to those developed for production tests. Unit-mobility ratio approximation applies for both mature water flood, that initially had mobility ratios significantly different from unity, and early in the life of Tertiary recovery projects, when little fluid has been injected and injected fluid bank appears as a skin effect. When the unit-mobility-ratio condition is satisfied, injection well testing is analogous to drawdown testing, while shutting in an injection well results in a pressure falloff that is analogous to a pressure buildup test. Injectivity testing is pressure transient testing, and is analogous to drawdown testing for both constant and variable injection rates. If the mobility ratio is not unity and radius of investigation has not exceeded the radius of the injected-fluid bank, then, the effective permeability and skin factor (but not static drainage-area pressure) in the inner zone can still be determined. Authors had discussed the real case history that has significantly helped in effective reservoir management in Unity area of Muglad basin.
