

Residual Oil Saturation – Can Correctly Controlled Laboratory Experiments Provide the Answer?

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Rock and Fluid Characterization

Summary

Residual oil saturation is a necessary parameter to connect relative permeability from initial saturation to final saturation in a reservoir model. Residual oil saturation is often a theoretical value which may require large injection volumes to achieve: unfeasible and uneconomical at the field scale. However, failure to correctly identify this theoretical endpoint can result in inaccurate scaling of relative permeability data, since the mathematical models are based upon immobile fluid endpoints.

Core analysis has long been used as one method to determine residual oil saturation, but may be affected by several external sources during various stages of the experimental process: core capture, handling, preparation and testing. Poor understanding of these influences can lead to data inaccuracy resulting in larger upscaling errors. However, knowledge of these sources and well controlled, well designed experiments can provide reliable data with less uncertainty, greater confidence and higher value.

This presentation will highlight many of the influencing factors leading to poor quality residual saturation data and indicate techniques for determining accurate data.