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USE OF A HIGH MAGNETIC FIELD TO VISUALIZE FLUIDS IN POROUS MEDIA BY MRI

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ABSTRACT

Magnetic Resonance Imaging (MRI) is very useful in core analysis because it gives information about petrophysical parameters: porosity and fluid saturations. This paper deals with several applications of MRI to the study of fluid distribution in porous media, with a strong 9.4 tesla magnetic field. The use of a strong magnetic field coupled with high gradients produces images with good resolution and enables very thin slices to be obtained.

Oil and water were visualized in small core samples (1 cm in diameter and 2.5 cm in length). The MRI profiles were compared to those from a numerical simulator based on generalized Darcy's law. Good agreement was observed between experiment and simulation showing the validity of MRI profiles.

A 3-D reconstruction of oil distribution was presented for oil and gas. The 3-D visualization showed a preferential path for gas.