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Entitled

*POSSIBLE STORAGE OF CO<sub>2</sub> IN SALINE AQUIFER: STORAGE FACTOR ESTIMATION*

by

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Date & Venue

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Abstract

The objective of this study is to perform laboratory measurements and CO<sub>2</sub> underground storage study to cover the knowledge gap on CO<sub>2</sub>-Brine relative permeability and assess various variables on the storage of CO<sub>2</sub> in a selected aquifer. Several factors that affect CO<sub>2</sub> storage have been discussed in the literature. These include both macroscopic and microscopic displacement efficiency of brine as a function of CO<sub>2</sub> pore volume injected. It is clear from the literature that there is still more work needed to investigate the effect of various variable such as formation temperature, brine viscosity, and possible presence of free gas in the aquifer on the CO<sub>2</sub> storage efficiency of the selected aquifer.

Experimental tests were conducted on four carbonate-limestone core samples to determine the capillary pressure curves and to conduct CO<sub>2</sub> flooding into 100% brine saturated core samples. Each core sample has with different brine salinity. Flooding tests were conducted at constant injection pressure yet, the injection temperature for each core sample was different. Brooks-Corey correlation was used to obtain the relative permeability curves of CO<sub>2</sub>-Brine system. Using experimental results of capillary pressure, modified Ritter and Drake correlation was used to determine the pore throat size distribution.

This paper represents the results of limestone core flooding tests and CO<sub>2</sub> flooding of an aquifer runs obtained using Petroleum Solution software to evaluate the effect of brine viscosity, temperature, gas saturation on aquifer CO<sub>2</sub> storage capacity (storage factor). The results revealed that the CO<sub>2</sub> storage capacity increases as temperature increase because of thermal effects. Whereas, as the gas saturation increases, the storage capacity of the selected zone decreases. In addition to that, the flooding runs showed that relatively high viscosity brine aquifer hider the CO<sub>2</sub> storage capacity of the reservoir.

**Keywords:** Relative Permeability, Enhanced Oil Recovery, CO<sub>2</sub> flooding, Capillary Pressure, CO<sub>2</sub> Storage Factor, Brine Saturation, Brine Salinity, Irreducible Water Saturation (Swirr), Drainage Displacement, Wettability.