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Entitled

POSSIBLE STORAGE OF CO2 IN SALINE AQUIFER: STORAGE FACTOR ESTIMATION

by

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Abstract

The objective of this study is to perform laboratory measurements and CO2 underground storage study to cover the knowledge gap on CO2-Brine relative permeability and assess various variables on the storage of CO2 in a selected aquifer. Several factors that affect CO2 storage have been discussed in the literature. These include both macroscopic and microscopic displacement efficiency of brine as a function of CO2 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 CO2 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 CO2 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 CO2-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 CO2 flooding of an aquifer runs obtained using Petroleum Solution software to evaluate the effect of brine viscosity, temperature, gas saturation on aquifer CO2 storage capacity (storage factor). The results revealed that the CO2 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 CO2 storage capacity of the reservoir.

Keywords: Relative Permeability, Enhanced Oil Recovery, CO2 flooding, Capillary Pressure, CO2 Storage Factor, Brine Saturation, Brine Salinity, Irreducible Water Saturation (Swirr), Drainage Displacement, Wettability.