**Abstract**

**Chemical Reactivity of Caney Shale to KCl-Brines at Elevated Temperature and Pressure**

Development of unconventional resources beginning in the past decade has created a paradigm shift in the definition of reservoir and seal rocks. Formations that were previously considered seals are now being reappraised with the possibility of being considered reservoirs. The Caney Shale located in South-Central Oklahoma Oil Province (SCOOP) is one such plays that has been appraised and is currently being developed. Due to its previous classification as seal rock, little work has been conducted on the formation’s response to drilling and fracturing fluids.

Available published researches on low permeability shale rock’s interaction with drilling and fracturing fluids have confirmed nano-scale, micro-scale and macro-scale interactions with varied implications. For instance, during rock-fluid interactions in the subsurface, dissolution of carbonates create secondary permeability whilst clay swelling, dislodgement and transport of clay fines lead to significant permeability reductions. Permeability-enhancing reactions as well as permeability-reducing reactions are significant considering the magnitudes of scale of permeabilities in shale reservoirs. These reactions and outcomes, though similar for different shale reservoirs, are unique for every formation in terms of the extent of damage or enhancement. These differences may be due to mineralogical and microstructural differences in various shale rocks.

In this research, rock-fluid interactions between the Caney Shale and various compositions of fracturing fluids at *in-situ* conditions were examined to ascertain the responses of the formation to these fluids. Mineralogical and microstructural analyses of core samples from formation have been undertaken using X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM) methods. Results of mineralogical microstructural analyses show samples are mainly quartz, clay and carbonates and micro-fractures interspersed between the interlocking mineral grains. Core flooding experiments were conducted on proppant filled core slabs at constant temperature of 95oC to mimic formation temperatures of the Caney Shale. Confining pressures for core flooding experiment were varied from 0psi to about 12000psi. During the experiments, effluents were collected at predetermined time intervals and analyses conducted on them to ascertain the elemental concentrations. Preliminary results from effluent analyses shows the presence of Ca, Si, Al, Na, B, K and sulphates. Core flooding experiments are expected to be completed in one month. This research was limited to geochemical and geomechanical interactions of the Caney Shale. This research is expected to unravel new insights into Caney Shale behavior thus allowing for optimal fracturing and enhanced hydrocarbon recovery operations.