

## **Wettability Alteration in the Eagleford: How to Design Drilling Fluids to Improve Recovery in Shale Plays**

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### **Abstract**

The current economic conditions have challenged producers to find methods to lower costs and improve production. While incremental improvements in efficiency are possible, the current 50% reduction in oil prices means we need significant changes to stay competitive. Wettability has a significant effect on hydrocarbon recovery and offers a basis to substantially improve well performance. Each reservoir has a wettability state that leads to maximum recovery, but the initial wettability of a reservoir is usually not optimal. Traditionally, we have used surfactants and chemical agents to try and optimize wettability and recovery, but this process is expensive and does not always produce the desired results. This talk will outline recent advances in the science of wettability, as well as a practical methodology to realize the goal of increasing well recovery in Eagleford reservoirs.

In unconventional reservoirs the opportunity to increase initial flow rates and extend decline curves is an attractive goal. We can optimize wettability by changing the water chemistry of well fluids during hydraulic fracturing and completions in unconventional targets. The technique has several advantages including substantially lower costs, ease of application and lower probability of negative outcomes. Recent studies have shown that rather than fresh water formulations, brackish water generates better well recovery. Not only does the use of the correct brackish water increase recovery but the costs associated with fresh water use can be avoided.

A successful approach to wettability alteration requires several key steps: screening the formation to identify current wettability, simple laboratory tests to evaluate the increased recovery potential, economic evaluations to estimate costs and benefits, and finally, well-constrained geochemical models to help correctly design the wettability-modifying fluids. While some current assumptions will be refined as we become more knowledgeable, the basic idea, that we can alter wettability with water chemistry to optimize recovery seems well justified.