

Investigation of injectivity impairment and corresponding chemical treatment during PWRI: An experimental and modelling study

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Production of hydrocarbons from underground formations is always accompanied by a co-produced water stream that needs physical and chemical treatment before disposal. Produced water reinjection (PWRI) into geological formations instead of sea disposal is a desirable and environmentally friendly handling method. However, PWRI may decrease the injectivity dramatically. To address this issue, we have first screened the primary mineral scales leading to clogging. Core flooding experiments were performed to identify the extent and rate of the potential clogging utilizing real produced water and sea water samples from the North Sea. The core flood experiments were carried out for 200+ pore volumes to mimic near well bore conditions. Then, we evaluated a chemical treatment to minimize mineral precipitation. The efficiency of the chemical treatment was first assessed through batch experiments. The experimental results were used to calibrate a model which can be later used to optimize the chemical recipe required to diminish/prevent the precipitation of major mineral scales in PWRI schemes under different physiochemical circumstances.