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Low-Sulfate Seawater Injection into Oil Reservoir to Avoid Scaling Problem

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Abstract: This study presents the results of laboratory experiments carried out to investigate the formation of calcium, strontium and barium sulfates from mixing Angsi seawater or low sulfate seawater with the following sulfate contents (75, 50, 25, 5 and 1%) and formation water contain high concentration of calcium, strontium and barium ions at various temperatures (40-90°C) and atmospheric pressure. The knowledge of solubility of common oil field scale formation and how their solubilities are affected by changes in salinity and temperatures is also studied. Results show a large of precipitation occurred in all jars containing seawater while the amount of precipitation decreased when the low sulfate seawater was used. At higher temperatures the mass of precipitation of $CaSO_4$ and $SrSO_4$ scales increases and the mass of precipitation of $BaSO_4$ scale decreases since the solubilities of $CaSO_4$ and $SrSO_4$ scales decreases and the solubility of $BaSO_4$ increases with increasing temperature. It can be concluded that even at sulfate content of 1% there may still be a scaling problem.

Key words: Scaling problems, low sulfate seawater, high salinity, high barium, temperature

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