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Invasion-Flowback Processes During Hydraulic Fracturing Well Interference SHAKEN KENZHEKHANOV, Colorado School of Mines, KAI HE, LIANG XU, PAUL LORD, Multi-Chem - A Halliburton Service, MARTIN LOZANO, KEITH NEEVES, XIAOLONG YIN, Colorado School of Mines — Drainage-imbibition cycles that simulate hydraulic fracturing fluid's invasion and flowback during well interference were investigated using NOA81 microfluidic micromodels. Well interference is quite common in unconventional oil and gas fields. It is not unusual for the fracturing fluid injected into a well to be discovered in a nearby well. Normally, the effect of such interference is considered to be negative, as fracturing fluid will be imbibed into the porous rock and block the flow path of hydrocarbons. However, field data show that some interferences are beneficial, and microfluidic experiments presented in this study show that surfactant in the fracturing fluid may be a reason for the observed positive interference. Two fluid drainage-imbibition cycles were conducted in micromodels. The first cycle simulates fracturing of the old well and the second cycle simulates fluid invasion from the new well into the old well's fracture network. The experimental data show that while most such interferences indeed can cause production loss, when the old well's fracturing fluid does not contain surfactant yet the new well's fracturing fluid does, interference can be positive, as the residual water saturation in the porous medium is effectively reduced by surfactants.

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