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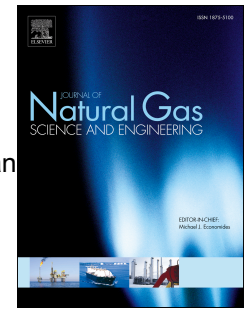

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Fines Surface Detachment and Pore-Throat Entrapment due to Colloidal Flow of Lean and Rich Gas Condensates

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Abstract:

This paper describes about the lean and rich gas condensate effects on fines migration in porous rocks. Fines detachment from rock surface and pore throat entrapment are frequent causes of formation damage and well productivity loss. In condensate reservoirs, there is a large volume of liquid formation during reservoir pressure depletion. This will result in liquid loading and production decline. In this work, we critically discuss the fines migration and the permeability decrease mechanism in the gas condensate reservoir. For this purpose, we numerically simulated a condensate reservoir, which is capable of undergoing a phase transition from gas to liquid as a function of pressure depletion, temperature, and time. We have implemented CFD modeling to simulate this retrograde condensation process. The major results revealed that there is a high amount of heat release during phase transition. This heat release and condensed liquid flow detached the fines from the rock surface and finally, get trapped in the pore-throat. Our models have been validated against the experiments and showed good agreement. Overall, this work may serve as a base to re-examine the gas condensate reservoir behavior with fines transport in porous rocks.

Keywords: Lean Condensate, Rich Condensate, Heat Transfer, Enthalpy, Fines Migration, Arc Length

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