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Gas Injection Transport Mechanism for Shale Oil Recovery

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Abstract : The United States is now energy self-sufficient due to the production of shale oil reserves. With more than half of it being tapped daily in the United States, these unconventional reserves are massive and provide immense potential for future energy demands. Drilling horizontal wells and fracking are the primary methods for developing these reserves. Regrettably, recovery efficiency is rarely greater than 10%. As a result, optimizing recuperation offers a significant benefit. Huff and puff gas flooding and cyclic gas injection have all been demonstrated to be more successful than tapping the remaining oil in place. Methane, nitrogen, and carbon (IV) oxide, among other high-pressure gases, can be injected. Operators use Darcy's law to assess a reservoir's productive capacity, but they are unaware that the law may not apply to shale oil reserves. This is due to the fact that, unlike pressure differences alone, diffusion, concentration, and gas selection all play a role in the flow of gas injected into the wellbore. The reservoir drainage and oil sweep efficiency rates are determined by the transport method. This research assesses the parameters that influence the gas injection transport mechanism. Understanding the process causing these factors could accelerate recovery by two to three times, according to peer-reviewed studies and effective field testing.

Keywords : enhanced oil recovery, gas injection, shale oil, transport mechanism, unconventional reserve
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