

**Probing Gas Recovery from Shales using Non-Aqueous Fracturing Fluids and their  
Role in the Competitive Desorption of Methane**

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**Abstract**

The ability to recover gas from nano-permeability shales is conditioned by capabilities to develop connected porosity from the surface via stable cased-wellbores and once within the reservoir to interconnect various populations of fractures and pores from macrofractures to nano-pores. We report investigations of (i) maintaining wellbore stability to reservoir depth through adverse formations, (ii) the feasibility of driving fractures using various non-aqueous liquid propellants, and of (iii) recovering bound methane through competitive desorption of CO<sub>2</sub> and CH<sub>4</sub>.