

Geomechanics Enhances Low Permeability Unconventional Resource Development

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Abstract

Lack of an effective hydraulically induced fracture system with proppant conductivity is a key factor limiting the efficient development of low permeability unconventional resources. Geomechanics provides the right tools for creating an effective hydraulically induced fracture system. This article focuses on how geomechanics designs and generates such a hydraulically induced fracture system for low permeability resource development. Firstly, based on geomechanics characteristics of formations, the fracturable section can be identified, which is favorable to generate an effective hydraulically induced fracture system. Then, according to the in-situ geomechanical conditions, a hydraulically induced fracture system is optimized and developed in the identified fracturable section, which includes the commonly recognized horizontal wells with multi-stage hydraulic fracturing. After that, the performance of the created hydraulically induced fracture system and stress-dependent permeability is evaluated from a geomechanics perspective, which in turn is used for production prediction. Therefore, with a hydraulically induced fracture system, geomechanics plays a crucial role to enhance low permeability unconventional resource development.