

Systematic Geomechanical Application For Unconventional Resource Development

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The application of geomechanics has been recognized as a necessary process for the successful exploration and development of an unconventional resource, shale gas or tight oil reservoir. This article summarizes the geomechanical applications for unconventional gas and tight oil reservoir exploration and development. The applications discussed include wellbore stability for drilling operations by way of optimizing mud weights and well trajectory; geomechanical evaluation for the possibility of openhole completion; optimization of the horizontal wellbore azimuth for multi-stage hydraulic fracturing development; geomechanical consideration for optimization of hydraulic fracturing design, stress-dependent fracture permeability, natural fracture characterization and identification of critically stressed fractures; formation evaluation from a geomechanics prospective of brittleness and fracability; and production prediction with considerations towards integrated geomechanical parameters. Clear knowledge on how to apply geomechanics in a proper manner will increase exploration and development efficiency in an unconventional resource reservoir.