

## Optimization of Multi-Zone Unconventional (Shale) Gas Reservoir Using Hydraulic Fracturing Technique

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**Abstract :** Hydraulic fracturing is one of the most important stimulation techniques available to the petroleum engineer to extract hydrocarbons in tight gas sandstones. It allows more oil and gas production in tight reservoirs as compared to conventional means. The main aim of the study is to optimize the hydraulic fracturing as technique and for this purpose three multi-zones layer formation is considered and fractured contemporaneously. The three zones are named as Zone1 (upper zone), Zone2 (middle zone) and Zone3 (lower zone) respectively and they all occur in shale rock. Simulation was performed with Mfrac integrated software which gives a variety of 3D fracture options. This simulation process yielded an average fracture efficiency of 93.8% for the three respective zones and an increase of the average permeability of the rock system. An average fracture length of 909 ft with net height (propped height) of 210 ft (average) was achieved. Optimum fracturing results was also achieved with maximum fracture width of 0.379 inches at an injection rate of 13.01 bpm with 17995 Mscf of gas production.

**Keywords :** hydraulic fracturing, optimisation, shale, tight reservoir

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