

## **THE ROLE OF DIAGNOSTIC FRACTURE INJECTION TESTING TO IMPROVE RESERVOIR EVALUATION AND STRESS CHARACTERISATION IN COMPRESSIVE STRESS REGIMES**

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The diagnostic fracture injection test, commonly known as a DFIT, is frequently used in conventional and unconventional reservoirs (e.g., tight gas, shale gas, tight coals) to calibrate the hydraulic fracture treatment. In a normal stress regime, a single test can calibrate the in-situ stress profile and provide parameters such as reservoir pressure and transmissibility. However, in strike-slip regimes a single test cannot adequately derive strain values to develop an accurate stress profile as compared to multiple, precise, well-designed multi-DFIT program. Thus, if more consideration were given to the design process and stepwise implementation, a more robust stress profile and definitive reservoir characterization can result from implementation of DFITs in low permeability, unconventional gas reservoirs.

This presentation will define the workflow of a multi-DFIT program and the governing equations for stress profiling to allow practitioners to incorporate DFIT data with other available data to derive accurate geomechanical parameters. Further, a well-defined program can provide insight for hydraulic fracturing modelling and key information regarding natural fracturing and transmissibility for reservoir modelling. For unconventional, non-normal, tectonically-stressed reservoirs this includes defining minimum and maximum horizontal strains as well as intermediate stress values acting on known natural fracturing azimuths. Overall, a comprehensive set of recommendations and references are made for the practical application of DFITs to illustrate the overall benefit for the well design processes.