

Downhole Pressure Boosting in Natural Gas Wells: Well Candidate Selection and Project Progress

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There are many approaches currently being investigated to enhance production. One approach is pressure boosting near a reservoir to accelerate production as well as increase the recovery. In this case, downhole gas compression (DGC) was investigated to determine the potential increase in incremental production. This approach is to be applied to wet or dry gas fields where the tubing performance is friction dominant and where the reservoir pressure is average. This approach is expected to stabilise the wellbore flow regime as well as increasing the wellbore tubing transport capacity, stimulating the reservoir inflow by increasing the drawdown and lowering the abandonment pressure. Rate improvements of over 40% have been predicted.

PROSPER and OPENSERVR were used along with the multiphase flow correlation 'Petroleum Experts 2' to simulate the well performance with and without DGC to analyse the effects and benefits. Sensitivities were carried out for a range of parameters to determine DGC efficiency:

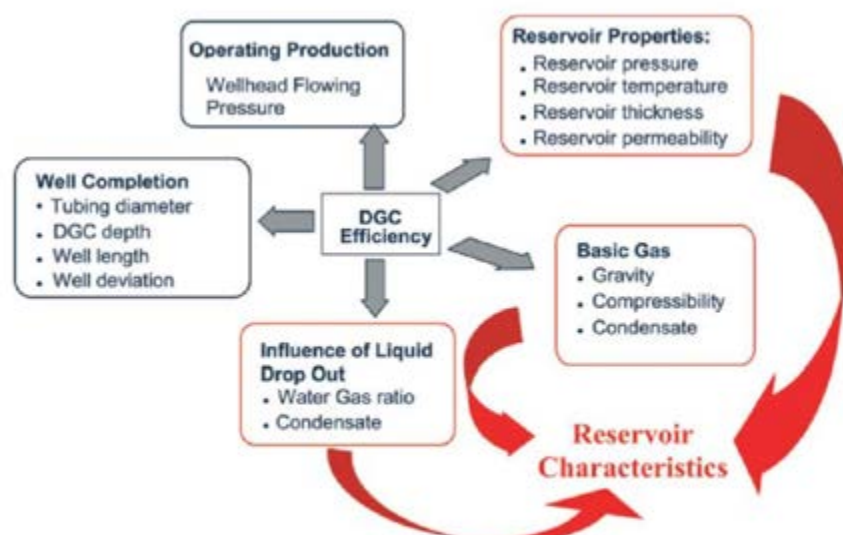


Fig. 1—Parametric study variables.

This paper describes in greater detail how these sensitivities were carried out and how they impacted on each other but the overall conclusions were:

- The most important and sensitive parameters were: well tubing and casing diameters, well length, reservoir pressure, wellhead flowing pressure and liquid gas ratio.
- When comparing identical well models, DGC always provided more.
- The best DGC candidates were deeper, partially depleted reservoirs where the flow potential was low.
- The greatest incremental production was gained from wells producing some liquid or experiencing liquid loading.