

## **Low Cost Recovery Optimization of Mature Onshore Sour Gas and Gas Condensate Assets**

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### **Abstract**

Two mature onshore gas condensate fields, treated in one sour gas plant, are investigated with the objective to increase their recovery and to extend their economic field life. The impact of a surface pressure reduction on both reservoir delivery and facility operability is examined.

A predecessor project successfully proved the capability of the sour gas plant to treat declining gas flow rates under a wide pressure range from some 1000 psia down to about 200 psia. This paves the way for an integrated method looking at stepwise pressure reduction in the whole system from the wellheads via the compressor stations and down to the sour gas treatment plant. In an iterative approach the outcomes of a subsurface PETEX model, a surface HYSYS model and compressor capacity calculations are matched. Production rate and system pressure are predicted versus time.

It is fundamental that the discharge pressure of the reciprocating machines in the compressor stations can be reduced because this provides lower suction pressures at given capacities. This in turn reduces wellhead pressures and, in consequence, enhances recovery. Respective subsurface and surface modeling and engineering studies indicate the feasibility of a system pressure reduction and the positive effects on recovery and process safety.

In particular, full system test runs covering most of the anticipated pressure ranges and specific compressor tests confirm the modeling and engineering results.

Production forecasts as well as CAPEX and OPEX estimates indicate that this optimized approach saves about 85% of the total CAPEX and 40% OPEX per year compared to scenarios involving adapted or new compressors. However, the latter scenarios would allow for a quicker pressure reduction at the wellheads.

The low cost scenario increases ultimate gas recovery by 5% compared to the Asset Base. In total, the economic field life is extended by approximately five years. Additionally, the process safety increases due to the lower system pressure.

Low cost and optimized production solutions in mature onshore gas assets can only be developed using a strongly integrated multidisciplinary approach. The entire production system from the reservoir to the sales gas handover point must be considered. Notably, the suggested system pressure reduction in declining fields works with complex sour gas plants and with reciprocating and centrifugal compressors.