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Overcoming Gas-Lift Limitations Through Subsurface Gas Generation: A Field-Proven Engineering Approach

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Introduction

Sustaining production in Field D has been increasingly challenging due to:

- **decrease in reservoir pressure**
- un-optimised lifting in **absence of permanent gas-lift facilities**

One of the key producers, Well A, ceased flow post well intervention activity & could not be kicked off naturally after multiple attempts.

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Problem Statement

Well A performance deteriorated due to :

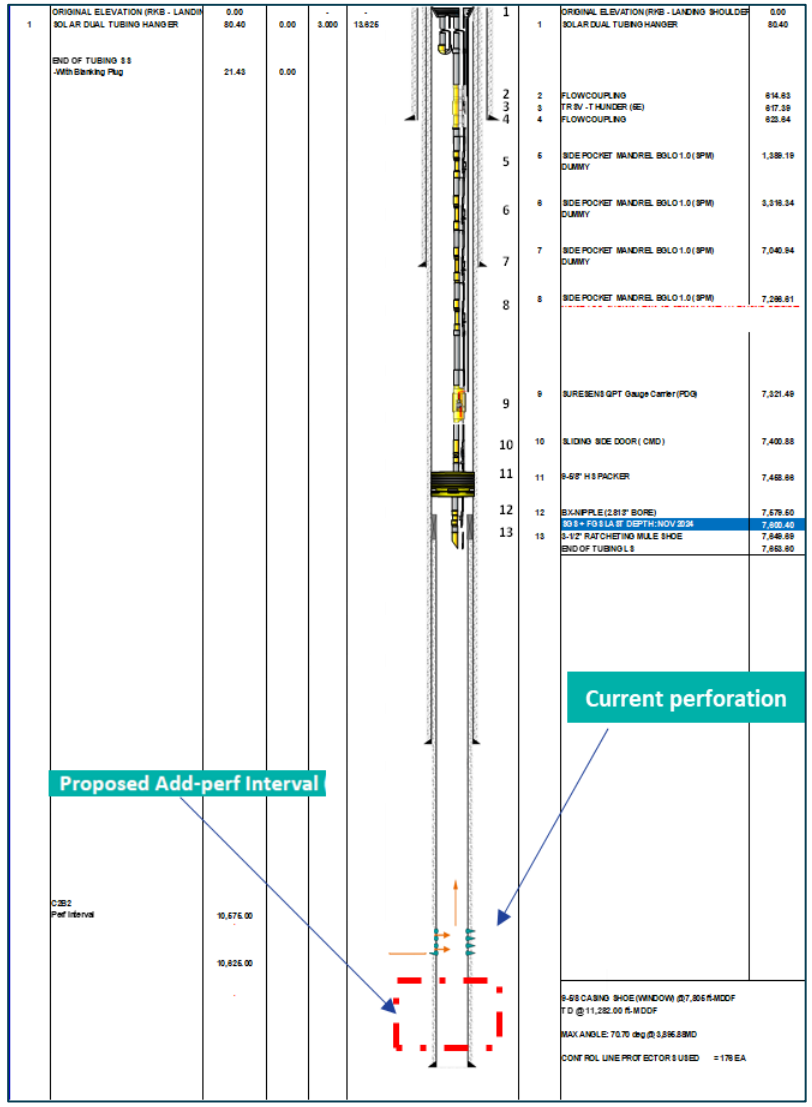
Suspected water breakthrough

- Current producing zone has stand off from WUT~15ft away, hence more water encroached to the zone.
- Active producing interval below end of tubing leads to liquid loading .

Conventional well-to-well gas lift attempts

- Unsuccessful due to donor high GOR wells pressure below than required kick off pressure.

Repeated unsuccessful attempts of revival Well A probed investigation to identify **alternate lifting strategies.**



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Methodology & Execution

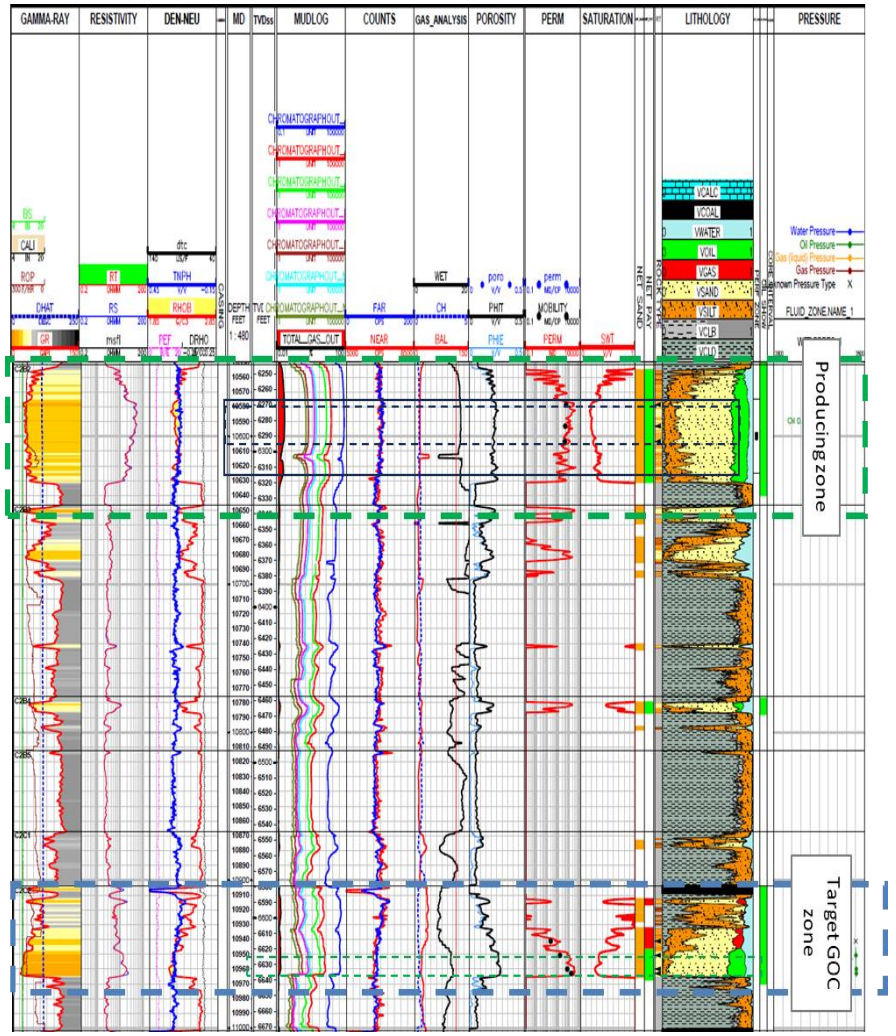
A **deeper oil-bearing interval**, characterized by a fining-upward depositional sequence and relatively lower reservoir quality **near the gas–oil contact**, was **selectively co-perforated** with the primary oil zone. This configuration **enabled the overlying gas interval to act as an in-situ energy source**, effectively functioning as a natural gas-lift mechanism to enhance oil production while managing excessive gas influx.

Aim :

To **restore and sustain production** by **leveraging in-situ gas energy** for liquid unloading, **eliminating dependency on surface gas-lift systems**.

Workflow :

- to quantify **the required in-situ gas-lift rate**
- **evaluate liquid unloading** capability
- **assess flow stability** under varying production scenarios.



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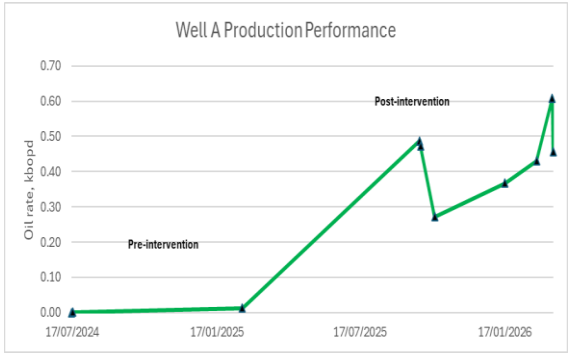
Findings

✓Petrophysical interpretation played a key role in identifying the source of gas from the existing untapped reservoir.

✓Sensitivity analysis investigated WC variations in both producing and new zones and GOR variability in the new zone, resulting in a flowing well condition.

Production Performance

✓Post-intervention successfully restored the well to a flowing condition, achieving an **average oil rate** of approximately **0.44 kbopd.**



Nodal Analysis

Pre-intervention

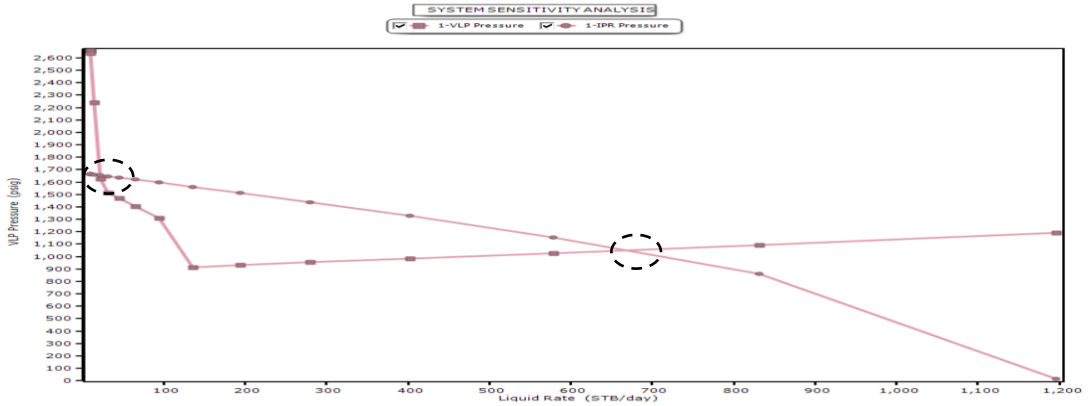


Figure 1: VLP/IPR plot demonstrated unstable well condition (reflected on the gassing condition) without gas lift. Production from producing zone.

Post-intervention

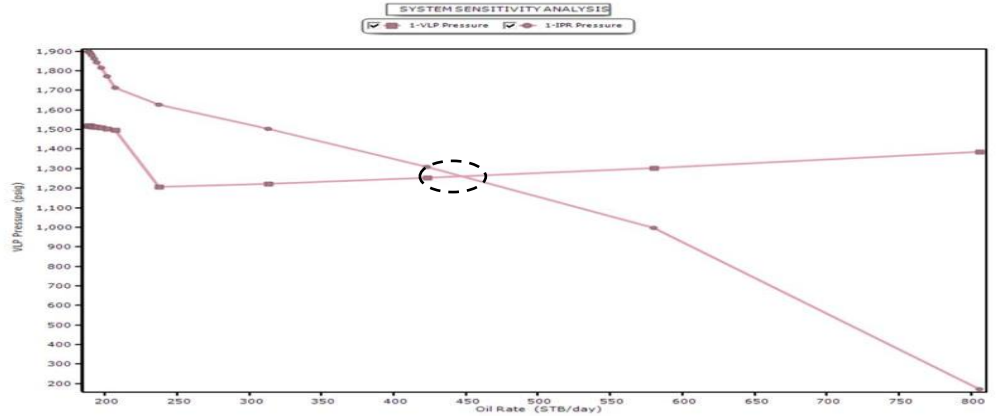


Figure 2: VLP/IPR plot demonstrated flowing well condition with in-situ gas lift. Production commingle from producing zone and newly perforated zone.

Conclusion

The successful application of in-situ gas lift demonstrates that, when supported by robust analysis of risk-tolerant and risk-reward decision frameworks, fields lacking artificial lift facilities can still achieve meaningful production restoration using existing subsurface energy.