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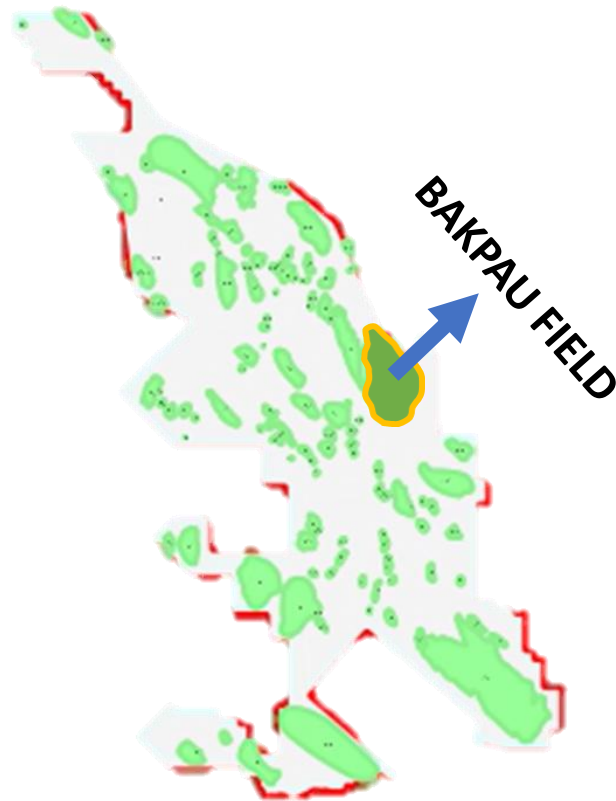


Proactive Solution to Reduce Loss Production Opportunity (LPO) and Simultaneously Mitigating Water Conning Issue by Using Spotfire System to Increase Oil Production in Bakpau Field

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Hidden in Maturity: Unlocking Remaining Value in the Bakpau Field



Field character

- Waterflood Management
- +150 Wells Producer Active
- +30 Wells Injector Active

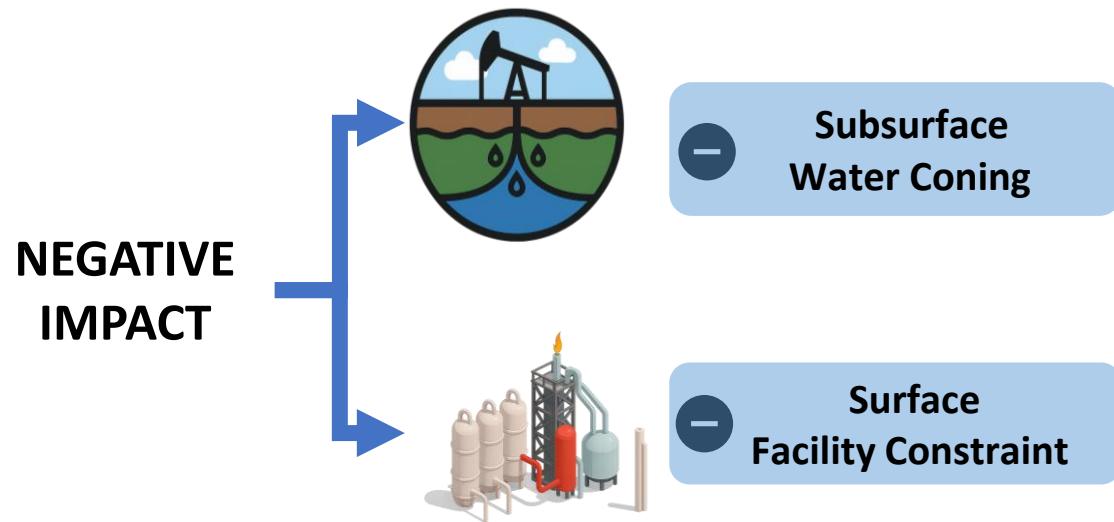
Development Insight

- Produce up to 70 years which manage peripheral waterflood scheme since 1997.
- Recovery factor relatively high (49%) with cumulative 7.1 MBOPD and 412 MBFPD.
- Actively inject 520 MBWIPD thru waterflood management.
- Although RF relatively high, this field still actively drilled with potential +10 wells infill/year

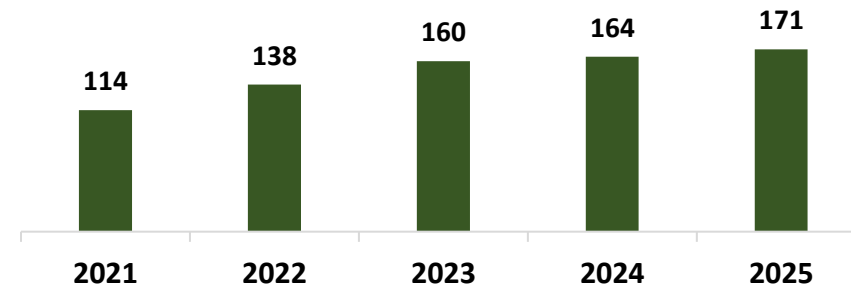
A Mature Waterflood Field with Sustained Performance and Remaining Development Potential

Surface Facility Constraints Under Aggressive Drilling Development

Drilling and WOWI optimization activities deliver significant fluid production to the Gathering Station (GS), with wells produced at **high flow rates** to achieve production targets.



Bakpau Producer Growth



- 114 → 171**
 Well Count (2021–2025)
- ~6%/yr**
 Water Production Increase Rate
- ~0.5 MM**
 BWPD Handling Demand (2025)
- ~200 BOPD**
 LPO Trade-off (2025) Due to facility constraint

Opportunity to reduce production losses by optimizing production rates and minimizing water coning under facility constraints.

Unlocking Opportunity from Water Coning Through Spotfire-Based Detection and Optimization

- **Spotfire-based** analysis enables rapid screening of candidate wells using dynamic production and swab data
- **CHAN & WOR plots** are effective diagnostic tools to confirm water coning behavior
- **High-rate wells** with steep decline trends are identified as **primary candidates**
- **Temporary shut-in** and **downsizing pump** identified as key optimization lever.

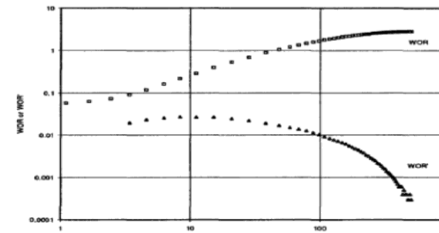
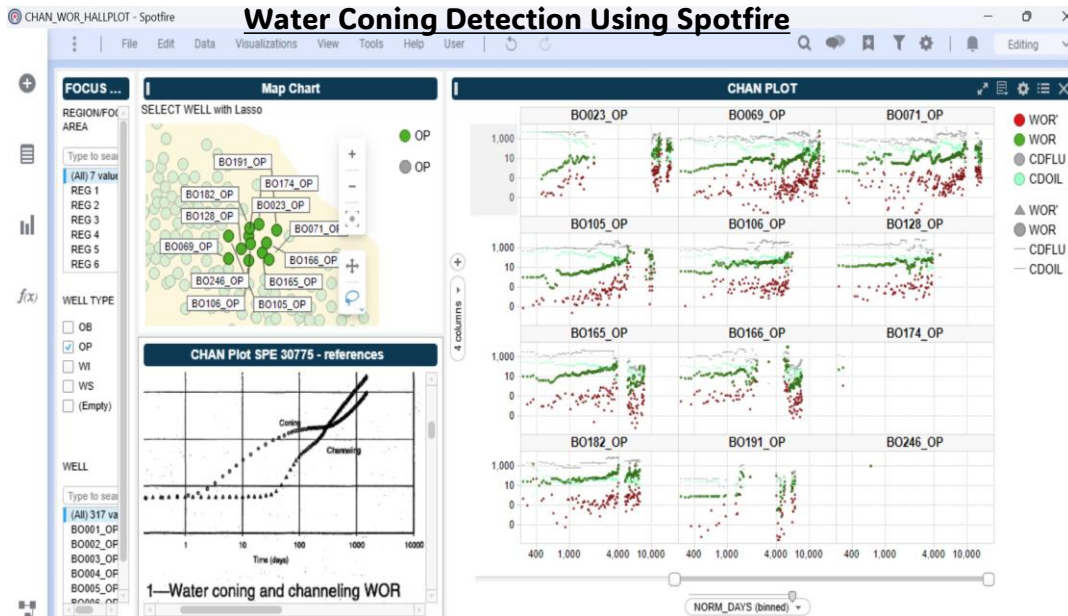


Figure 3—Bottomwater coning WOR and WOR' derivatives.

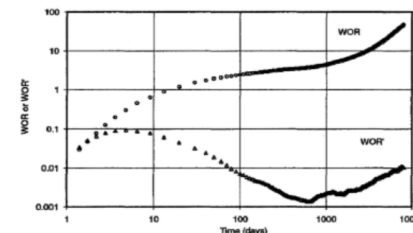
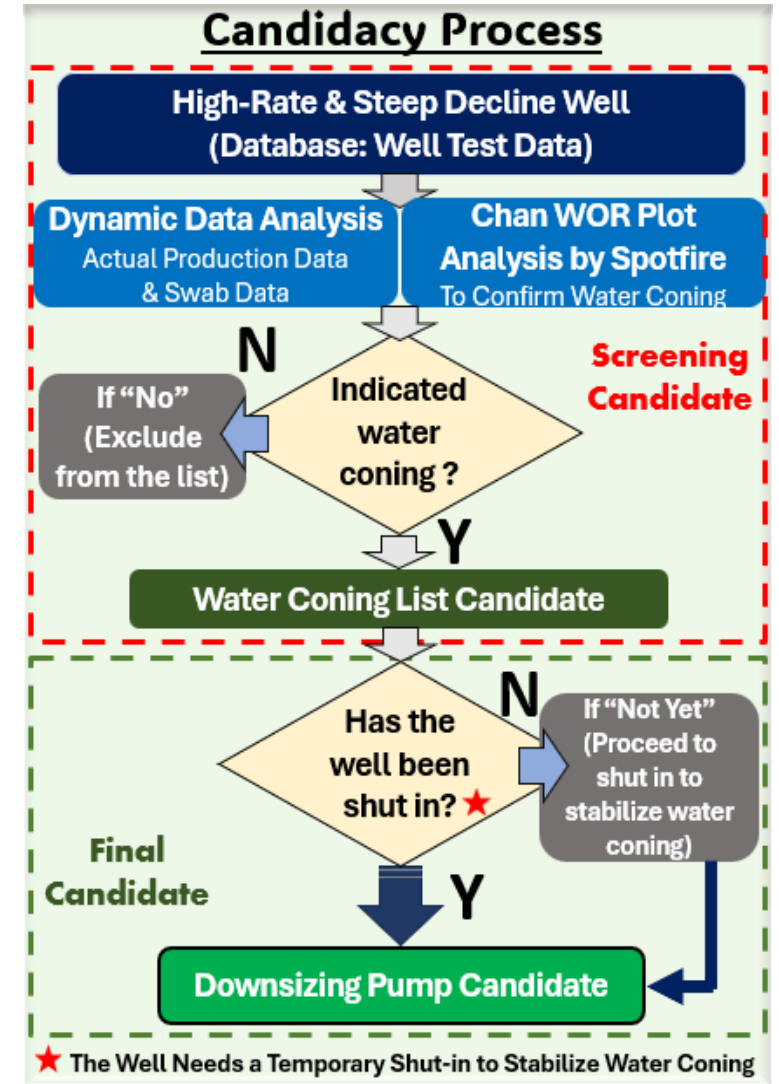


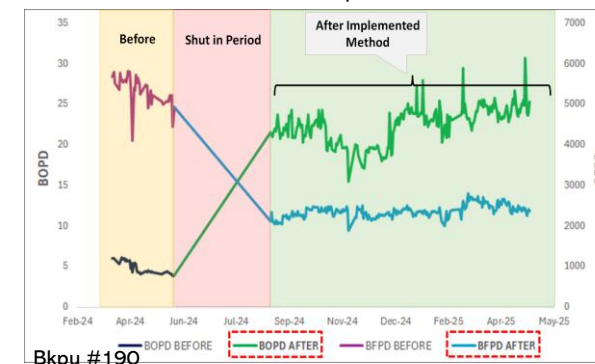
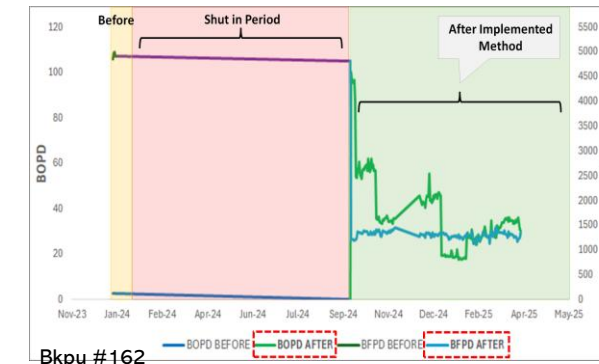
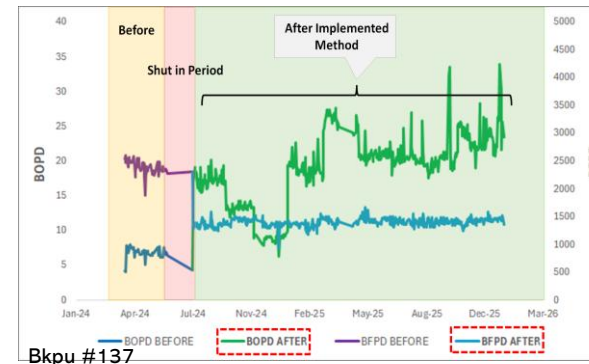
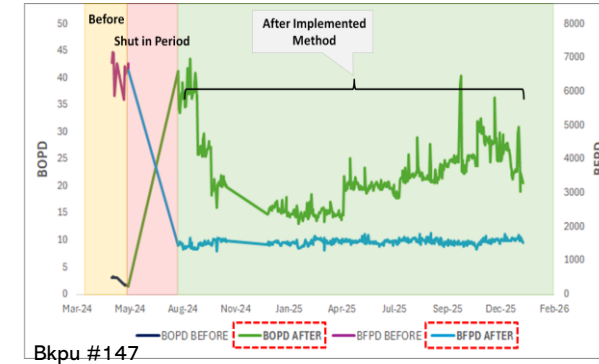
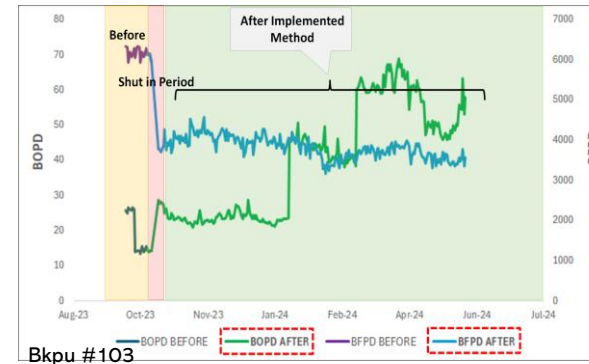
Figure 4—Bottomwater coning with late time channeling behavior.





Delivering Production Gains and Value Creation Through Optimized Water Management

- Achieved optimal recovery, directly contributing to incremental oil production
- Successfully implemented the method in five wells, demonstrating effectiveness and enabling significant cost avoidance
- Surface facility constraints at the Gathering Station are being addressed progressively to align with long-term capacity requirements



250 BOPD

Production Oil Gain



99.9% → 91%

Improve Water Cut



~16 MBWPD

Reduce water production



IDR 13.1 Billion

Cost avoidance



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Key Takeaways



1

Simple & Accurate Method

“The method applies a simplified approach that maintains accuracy and ensures practical & easy implementation”

2

Cost Effective

“The implementation of this method requires low cost ~20K USD & delivers optimal results”

3

Coning Problem Mitigation

“This method is effective in analyzing and addressing water coning problems”