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Field Case Study #3

Impact of Diesel vs Water Overflush on Squeeze Treatment Life

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Flow Assurance & Scale Team: Scale Workshop
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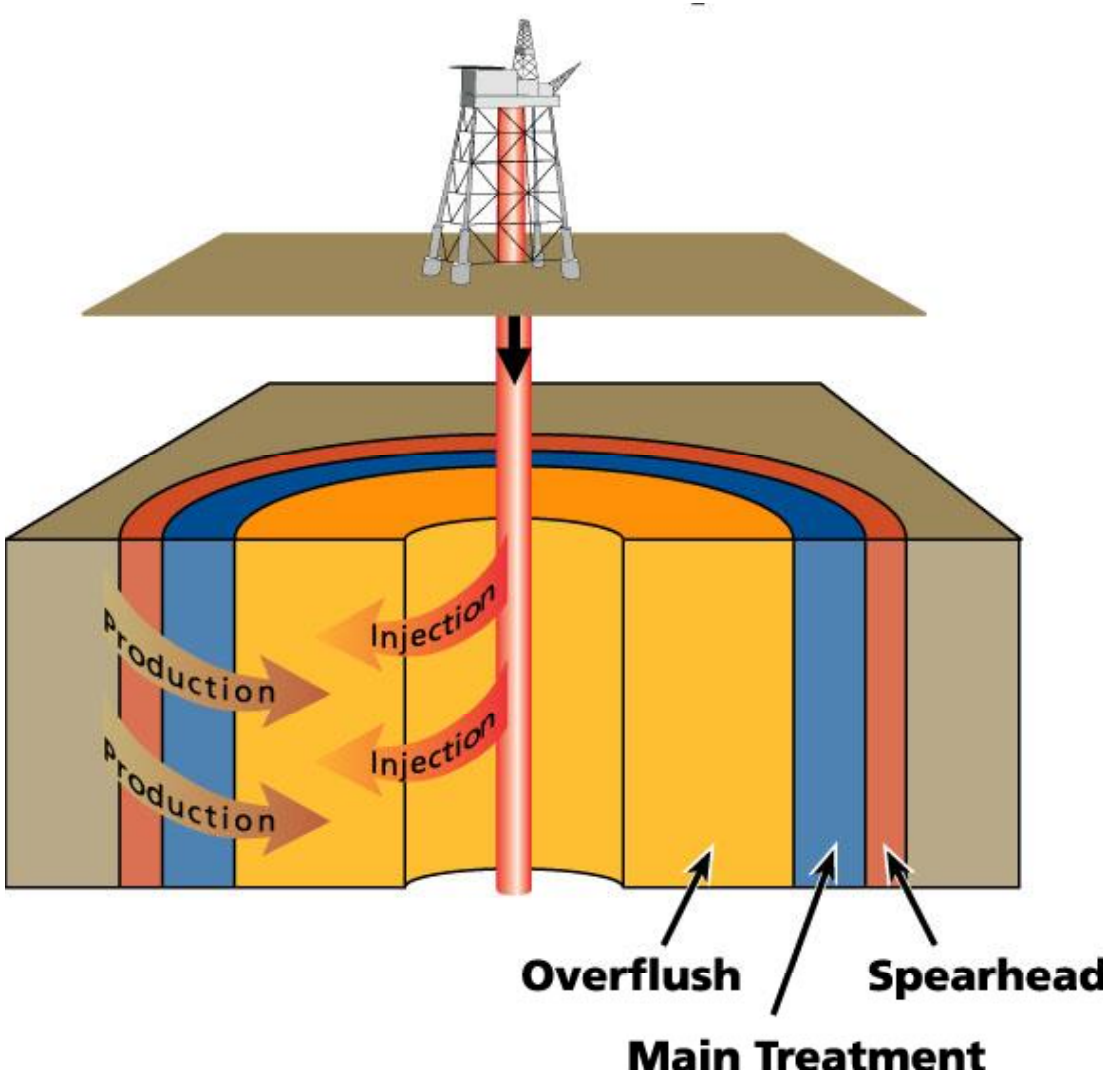
Case Study: Well A4

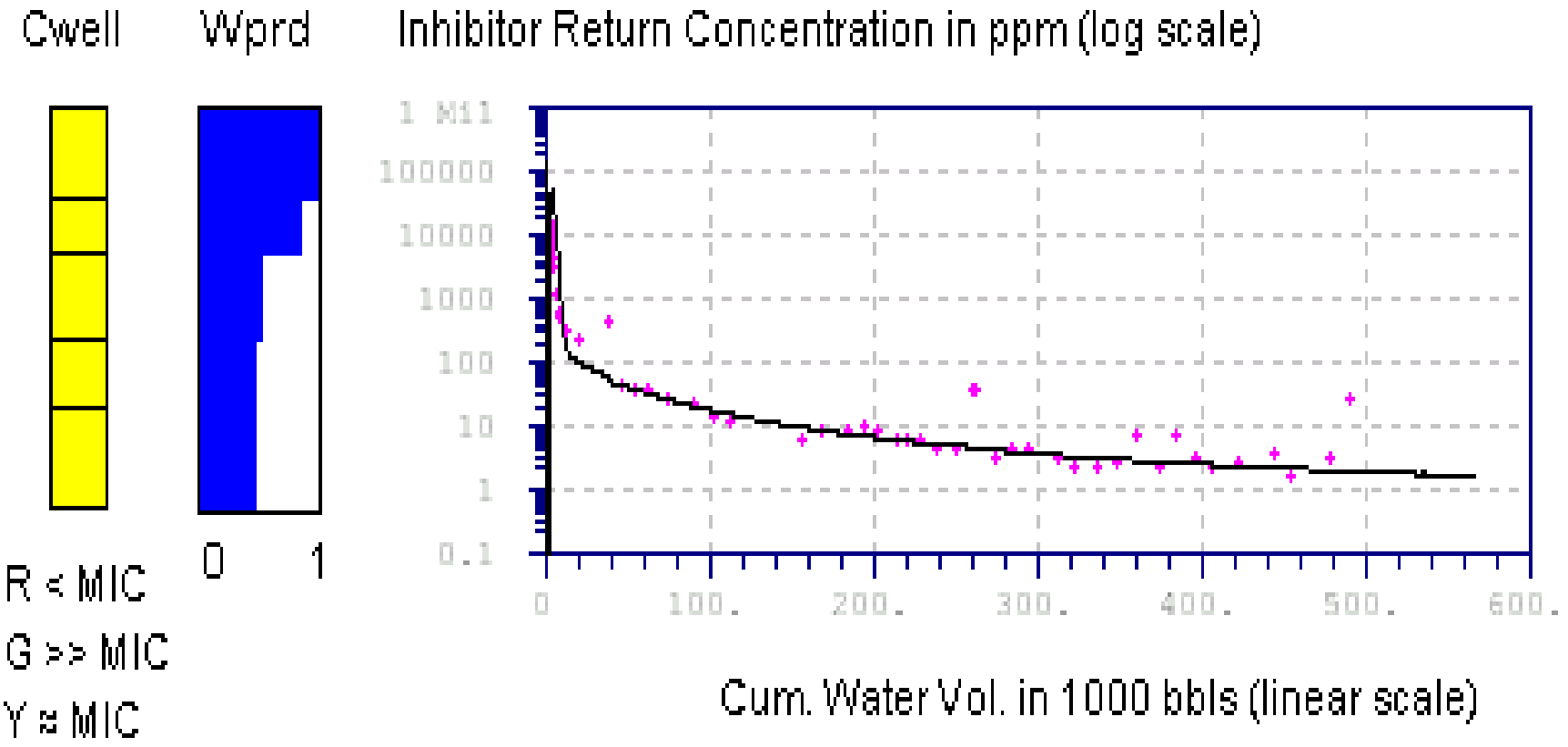
- Campos Basin, offshore Brazil
- Water depth from 2,300 to 2,800 ft
- Initial average production of 60,000 bpd, dropped to 50,000 bpd due to early seawater breakthrough leading to $BaSO_4$ scale.
- Three conventional squeezes into 5 layer heterogeneous formation

Conventional Squeeze Design



Conventional Water Overflush

3rd design for squeeze treatment to well A4 - Radial 5 layer squeeze model, seawater overflush - New squeeze field isotherm to fit field data.

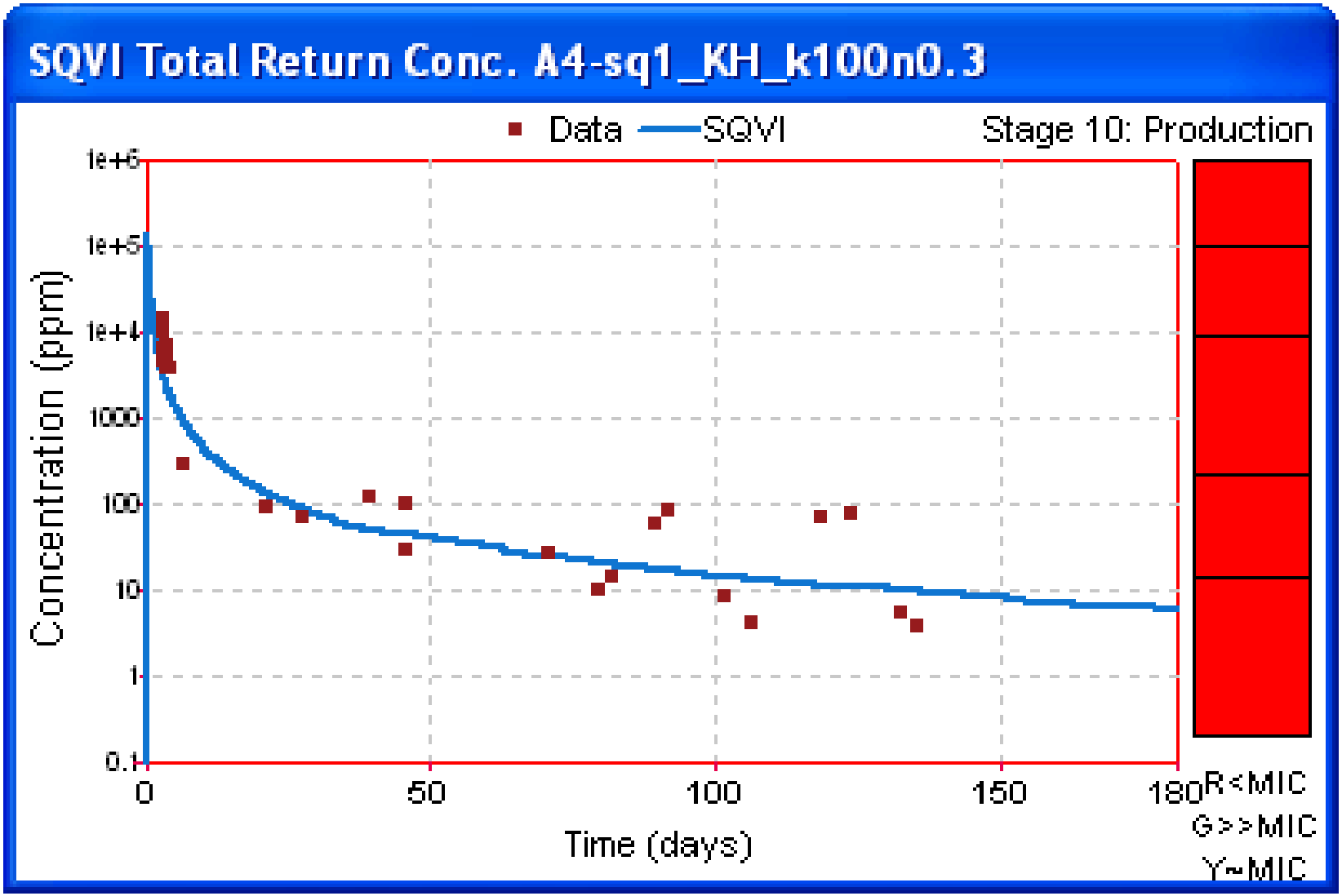


Key Challenges in Well A4

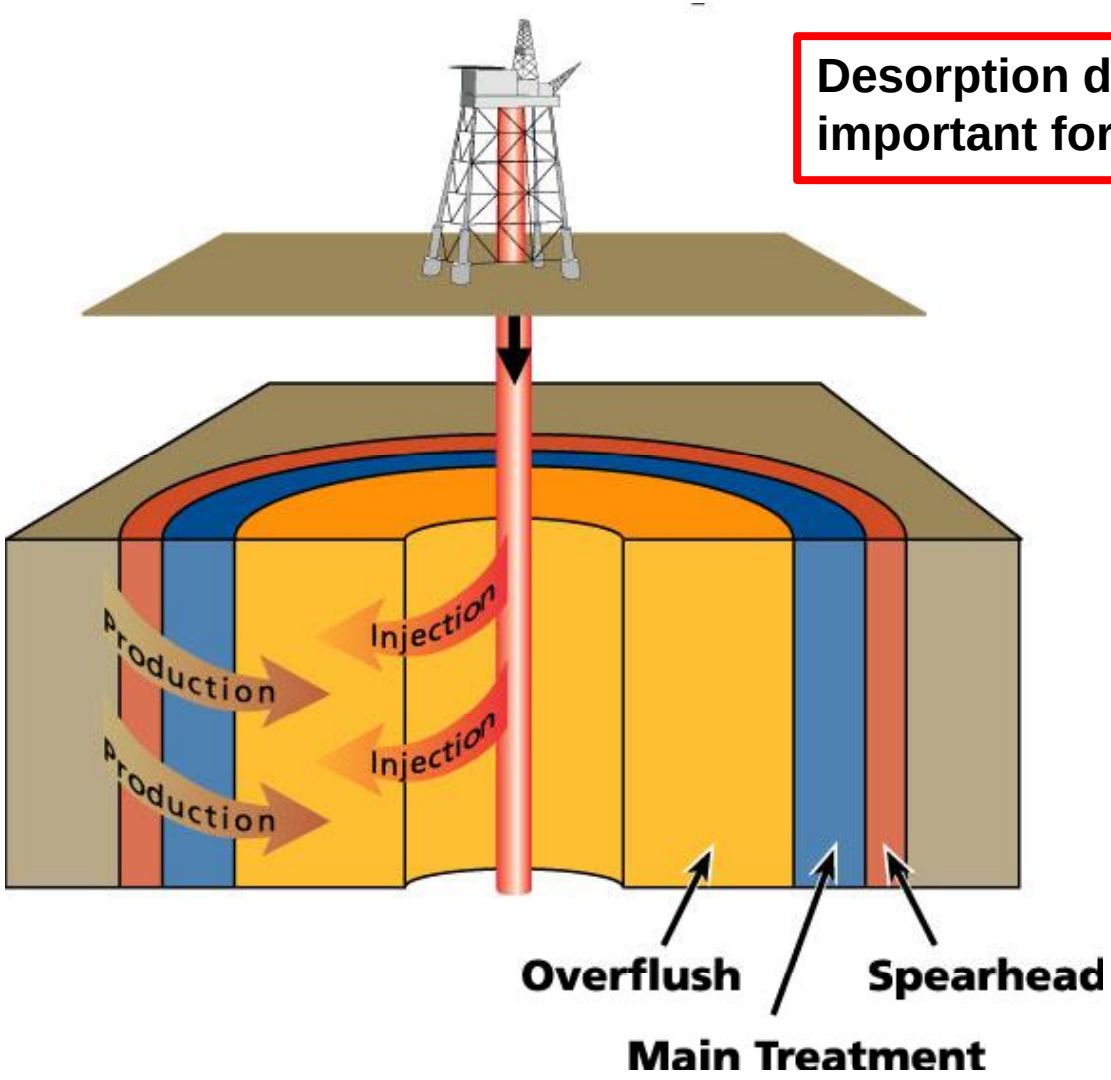
- Low reservoir energy:
  - difficult to restart wells after treatments
- Subsea wells:
  - hydrate risk on flow back

- Use of diesel overflush instead of water resulted in shorter treatment lives:
  - Why?
  - How to overcome this?

Diesel Overflush

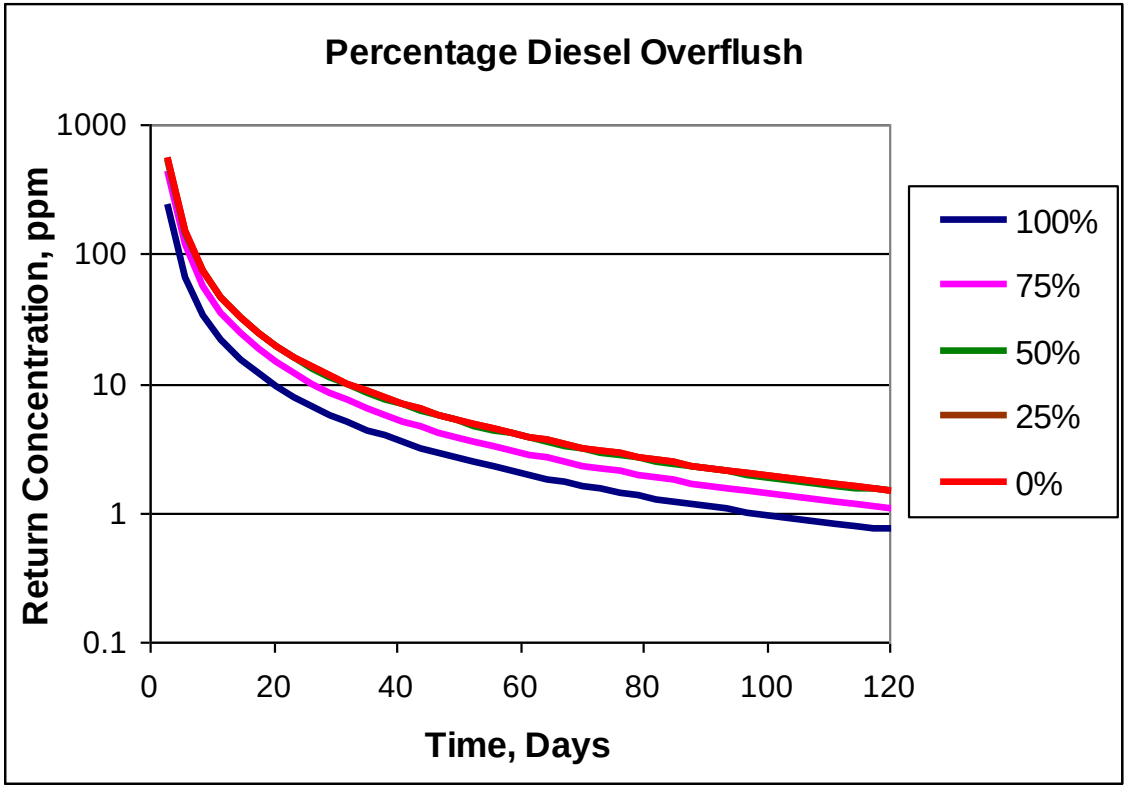


Mixed Fluid Squeeze Design



Desorption during overflush important for propagation

Split Diesel/Water Overflush



- 100% (100% diesel-0% water)
- 75% (75% diesel-25% water)
- 50% (50% diesel-50% water)
- 25% (25% diesel-75% water)
- 0% (0% diesel-100% water)

Outcome

Operator stopped using 100% diesel overflushes and switched to 50% water – 50% diesel instead, improving squeeze lives by 15%

Another operator saved £3M per well per year by reducing the frequency of squeeze treatments from a treatment every six months to a yearly treatment – based on SQUEEZE calculations.

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