Condensate Influenced Loading: A case study

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Case Study Summary

- Sweet gas well in South West Alberta
- Experienced a continuous production decline
- Liquid loading
  - 90:10 brine:hydrocarbon condensate
- Initial surfactant batches had short term production benefits
- Capillary deployment and on site chemical selection increased cumulative production
Outline

- Historical Production
- Foam Lift Candidate Characteristics
- Well Candidate Selection
- Surfactant Testing Procedures
- Production Impact
- Return on Investment
- Summary and Go Forward
Surfactant batches had short term success

**Diagram:**
- Batching chemical every 2 days
Foam Lift Candidate Characteristics

- Gas rates below critical velocity
- Cyclic production
- High tubing to casing differential pressure
- Responds to soap sticks or batch treatments
- High fluid levels
Onsite Chemical Testing Conducted

- Representative field brine/condensate sample is obtained
- Blender test is used to measure foam height and foam half-life
- Foam tower is used to determine liquid lift efficiency
  - Measured volume of brine/condensate is used
  - Selected volume of surfactant is added (based on blender test results)
  - Measured rate of gas is “bubbled” through column
  - Carried over foam/liquid is weighed
Chemical Selection Challenges

- Cost effectiveness
- Capillary approved
- Winterized
Production Benefit

- Cumulative production was much less than the peak production rate due to the cyclical curve.
- Estimated that only 60% of the peak production rate was actually produced over a 24 hour period.

- Production before capillary
  - $15 \times 10^3 \text{m}^3/\text{d} \times 60\% = 9 \times 10^3 \text{m}^3/\text{d}$ cumulative daily production
  - $530 \text{Mscfd} \times 60\% = 320 \text{Mscfd}$ cumulative daily production

- Production after capillary
  - $13 \times 10^3 \text{m}^3/\text{d}$ cumulative daily production
  - $460 \text{Mscfd}$ cumulative daily production
Economic Benefit

- 4 e³m³/d increased production x $250 per e³m³ = $1000/day increased revenue
- 140 Mscfd increase x $7.00 per Mscfd = $1000/day
- 23 BOE/d increase in production
- 40% increase after capillary install.
- 10-12 day payout
- Daily chemical operational cost $15.00/day est.
Tangible Benefit

• Reduced operator time and efficiencies (2 hour/day avg. x $90/hr)
• Constant flow through compressors and dehydrators reduces upsets
Conclusions

- Condensate tolerant surfactants developed
- Increased cumulative production
- Conventional surfactant applications methods not always best practice
- Optimization of hidden cost including operations personnel and upsets

- Going forward.....
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