Gas Well Deliquification Workshop
Sheraton Hotel, Denver, Colorado
2012
Breakout Session

Ask the Expert: Analyzing & Troubleshooting Plunger Lifted Wells

Special Thanks to Board of Experts
Dave Cosby, Ferguson Beauregard
Stan Lusk, Integrated Production Systems
Ryan Olsen & Gavin Hein, WPX Energy
Bill J. Hearn, Conoco Phillips
Lynn Rowlan, Echometer Company
Breakout Session Details

Session Purpose – Held discussion on various topics with respect to trouble shooting and various plunger problems. Team of 6 experts fielded questions from the audience and asked the audience questions.

Number of Attendees:

Approximately 90. Most were operators, maybe 20% vendors.

Duration of Session ~ still at it when time was up.
People

What is the optimal normal operation polling rate?
• 1 min. best
• 5 min. too long
• 1 hr. way too long

How many people/well?
• 90 wells/optimizer on the ground
• 1500 wells/engineers/senior foreman

How long does it take to analyze a well?
• normal trend analysis on one well a few seconds
• problem wells elevated to higher level. More involvement of upper group.
• Engineer may spend 30 min./well
• It takes time to get there.
• Take bite size pieces.
• Do a little something. See what happens
Plunger Life

When do you inspect/change plungers?
- Change before seal lost or damage occurs
- Some wells require plunger change monthly
- Keep track of plunger life in well. May change based on previous life expectancy.
- Bumper Spring every two years (1 year better but not done)
- If casing pressure increasing – may need new plunger

What causes plunger to wear out quick?
- Plunger material
- Sand tears up plunger
- 1 manufacturer may work best in one well, but another type manufacturer better in another well
- Some companies may be better than others
- Spiral cut of solids plungers helps even out wear in S shaped wells – by rotating plunger and not wearing on one side
Plunger Limitations

When to use Gaslift vs Plunger lift?
  • Gaslift, if well produces lots of liquid and sand
  • Use rule of thumb ~ 400 scf/bbl liquid/1000 feet of depth

Plunger lift seating nipple depth in deviated/horizontal wells
  • 60 degrees ~ maybe up to 70 degrees
  • How deep can the wireline go to retrieve plunger?
  • Padded plungers speed up above 20 degrees, loose seal
  • Solid Plungers > 20 Degrees slow down due to friction
  • Normal 45-50 degrees in Barnett Shale

What is the maximum Dog Leg Severity
  • For pretty short Plunger maybe up to 4.5 deg/100 – limit
  • Start thinking about problem > 3 deg/100
  • Plunger dependent
  • Short padded works better in dog leg 25-40 degrees/100
Do you use SV
- During shut-in, if tubing & casing pressure get closer together
- Always run, must justify why not
- Wet wells consider uses pressure relief SV
- Don’t notch seat
- 200+ BPD with fast cycle plungers

How many cycles do you allow a missed arrival?
- Only 1
- Move than 1, then probably will have loaded up well
- Only 1 - Verify that arrival sensor is working, if not look for arrival based on tubing pressure rise when liquid arrives

Where do you set tubing intake?
- Near bottom – in dryer wells; 5% off bottom
- 40-60% into perforations
- Never above perfs
- 100 ft above best gas producing zone; at best zone
Other Thoughts

What control setting used to start and stop plunger lift well?
- Shut-down when drops below critical rate during after flow
- Use arrival velocity to make adjustments
- On horizontal wells, wait and look for leg to have 2\textsuperscript{nd} unload
- Many different types of control algorithms, use the right one for the well

What maximum gas production rate?
- 4 mmcf/d with line pressure 1000-1800
- Low pressure and low liquid rate is tougher/more dangerous

When do you convert your flowing well to on Plunger Lift?
- 45% – wait until production drops and liquid loads
- 45% – proactive put plunger to maintain production
- 10% – don’t know
- Should start when 20% - 30% above Turner Critical Rate
- Vendor recommends to be proactive, but operator complains because NO uplift and just stayed on decline curve
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