Sideload and Wear in Rod Pumped Deviated CBM Wells

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ConocoPhillips
San Juan CBM “S” Wells

• Sideload vs. Runtime
• Sideload vs. SPM
• Repair #1
  – Hole in tubing in unguided slant section
• Repair #2
  – Significant wear in sinker bar interval in slightly deviated slant section
San Juan CBM “S” Wells

- Drill down vertically from surface
- Curve and slant to get to desired bottomhole location
- Curve down then drill vertically down and complete in CBM zone
- Shallow curves have significant sideloads
Sideload and “Runtime”

• Runtime
  – Adjusted historical runtime based on how many months the well was producing at or near capacity and therefore unloaded (all water pumped out of the well)
  – Some wells have pump-off control capability. Runtimes not adjusted for the possibility of pump off control. Industry reported runtimes do not usually account for POC off-time

• Rod Guides in Bare Tubing
  – Typically ran 5-8 guides per rod in curved sections. Guides per rod data not available for all wells
  – Typically guided depth intervals for which SRod recommended > 3 guides/rod
Sideload vs. “Runtime”

- “Years Unloaded” instead of runtime
- Some wells have some history of POC
- Some wells have failed (black squares).
- Two have been repaired
- You can probably achieve runtimes > 5 yrs with < 200# sideloads, with guided rods
SPM and Sideload

- There was some variation of SPM in the well’s history
- Tested range of SPM’s noted in records
- SPM has little effect on sideload
Repair #1

- Maximum sideload is 380#
Tubing Split
Unguided

- Ran 8/2006
- Tubing leak 1/2012
- Failed at 60# sideload in un-guided slant section
- Three other red band joints in unguided slant section
- Corrosion possibly a factor
- Consistent wear in guided section; wear absorbed by guides
- Minor rod wear on bottom 1/3 of rod couplings
- Most rods re-run
Guide Wear
- Downhole pump failed due to wear
- Note small dogleg in sinker bar section. Sinker bar section has sideload as high as the lower curve, despite much lower dogleg severity.
Sinker Bar Wear

- The top 15 rods (unguided) showed significant wear on couplings
- The top 4 sinker bars were worn down to the threads on the couplings
- All other rods were in good condition
- A little more rod wear on tubing in the deeper curve
- Corrosion present
Sideload vs. Runtime

- The two repaired systems may have run longer if:
- Guided in slant section
- No sinker bars in slant section

"S" Well Runtimes

0 100 200 300 400 500
0 2 4 6 8 10
Max Sideload (lbs)

Years Unloaded

Failures:
- Wear, Sinker Bars
- Leak, Unguided

POC: Passed organizer check
No Active POC: No organizer check
Failed: Failed organizer check
Conclusions

• You can probably achieve 5 year runtimes with guided rods at less than 200# sideloads

• One well is still running after 8 years with 190 lb sideload

• Strokes per minute has a small effect on sideload

• Guide everything with sideload > 30 lb, or just everything...

• Sinker bars in a slightly deviated section had significant wear in a short period of time
Questions?
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