Central Optimization Ltd.

Recent Innovations in Flowing Well Optimization

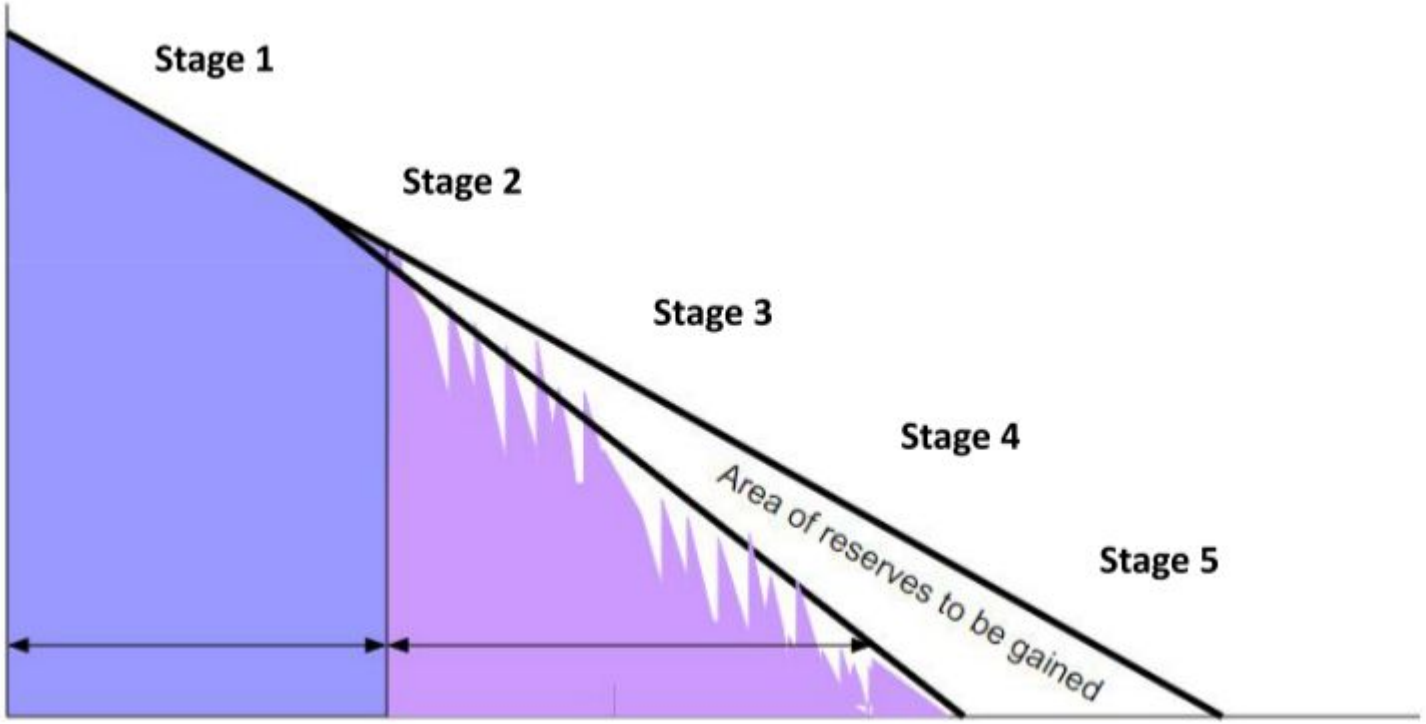
www.CentralOptimization.com

When to use a Plunger Lift vs. a Pumpjack?

- Plunger lifts have competed with pumpjacks for decades, but have been gaining popularity in recent years as the technologies have improved and widened the “window” where plunger lifts can be used effectively.
    - This is especially true with horizontal wells (HZ)

How do you maintain a natural decline?

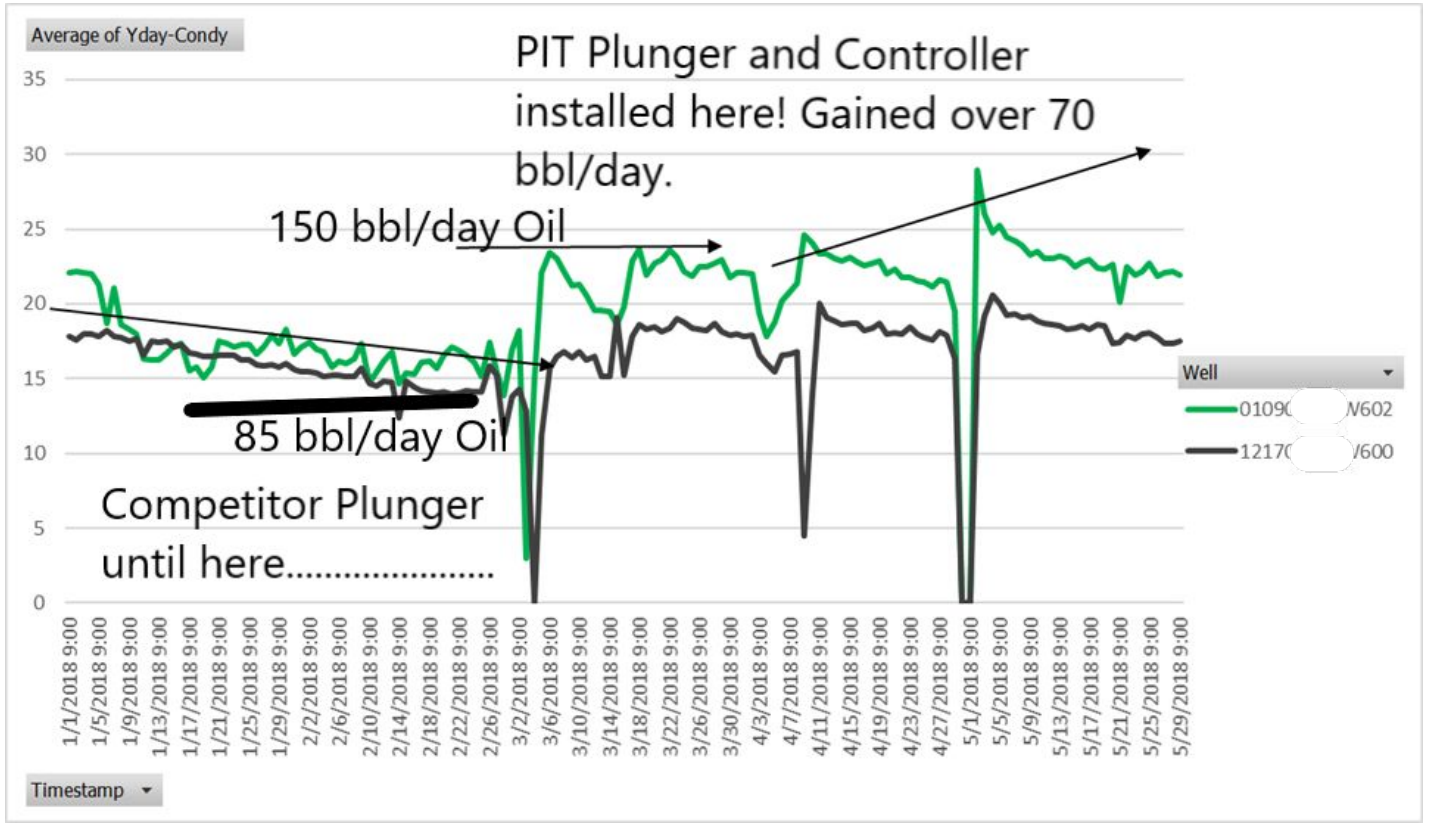
- In order to increase recoverable reserves, we need the right tools that match well potential as it declines:



Stage 1: Well flowing above critical rate
Stage 2: Flowing at critical rate. Opportunity for continuous style plunger to prevent lost production.
Stage 3: Flow beginning to decline. Fast fall style plunger for new semi-continuous dual stage.
Stage 4: Recommend conventional plunger with off time.
Stage 5: Dual stage plunger lift will keep decline rate on its natural trend.

New Strategies for Changing Well Designs

- How do we help the well flow longer?
  - We adopt new strategies to increase overall production



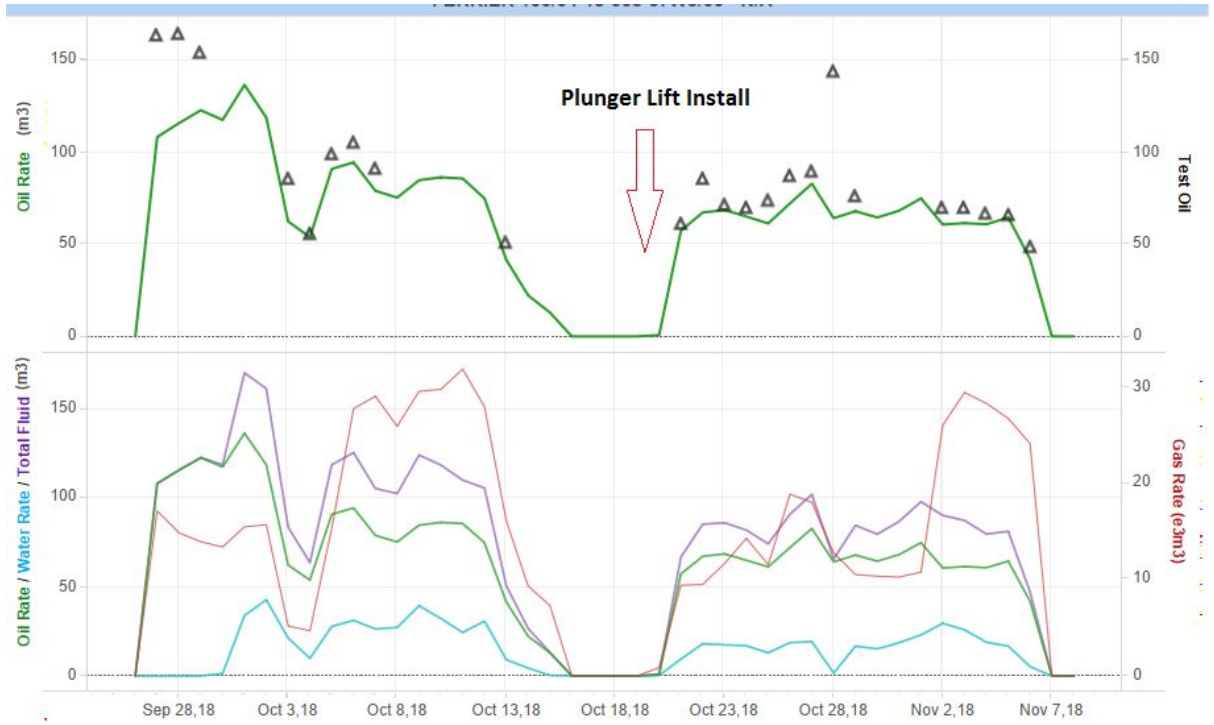
Low Cost Temporary Plunger Lift Upfront Before a Pump

- Since most HZ fracked wells WANT to flow and need help to recover Frac Fluid we have evolved our tools/processes to help use the Plunger Lift as the Initial Tool, just to help keep the well flowing a few months longer at maximum rates.

- Recent Examples:
  - HZ UMann, 1200 m TVD deep east Alberta, 15 e3m3/day gas, 60m3/day fluid (70% water initially), lasted 6 months. Waxcutter & NEW controller.
  - Cardium HZ Oil, 2000m TVD west Alberta, 20-30e3m3/day with 55-70 m3/day Oil, Fastfall & Control.

Keep it Flowing Longer - Examples

- Cardium Hz well, 2000m TVD. FastFall Plunger with shorter off time, fast falling, many cycles per day.
- Well was on Pad with 2 other similar wells w/PumpJacks & “HEAL Systems”
- Our well with Fastfall Plunger made MORE volume on average “ON DAYS” than the pumping wells.
  - ***Less than 10% of the cost*!**



Successful install in Cardium, AB

How to Evaluate When it's Time to Switch to Plunger Lift

- Each well is evaluated to see if its Gas to Liquid Ratio (GLR) & pressure makes it a suitable candidate.
  - >0.5 E3M3/d per 1 M3/d oil, per 1000m of depth

- Many applications are successful with half of this GLR, so lower GLR should not be discounted

- We can reliably calculate your success of switching to a Plunger Lift at very low cost.
  - ***LOWER YOUR RISK*!**

New and Improved Technology to Optimize Wells

- Semi-Continuous Dual Stage:
  - Avoid GasLift install cost in horizontal wells
- Better sealing plungers with improved design for HZ's, sand, and wax.
- *Remotely* control well start-up and optimization in real-time, *plus* alerts & flow information.
- More effective dewax chemicals with Plunger Lift
- Pressure relief safety valves in bottom hole spring assemblies to allow for easier plunger recovery vs swabbing or wireline intervention

Gas Assisted Plunger Lift (GAPL)

- Central Optimization helps you to adapt to the lifecycle of the well with easy to implement additions to an existing plunger or GasLift system.

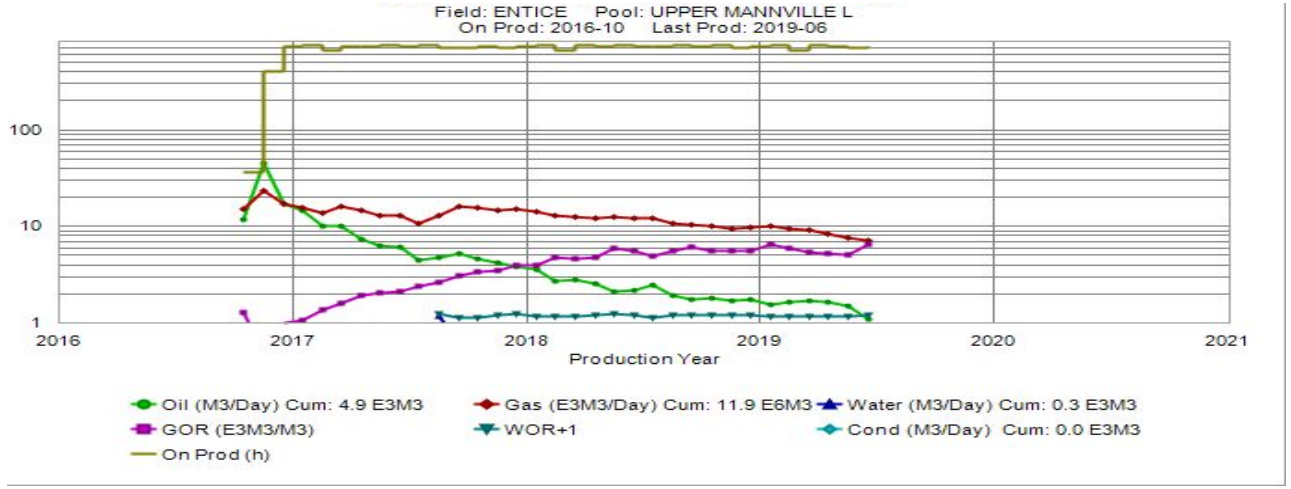
- Calculators help to predict how much gas injection is needed in various scenarios:
  - GAPL, PAGL, PoorBoy GAPL and Semi-Continuous Dual Stage with Gas Injection.

- As the well starts to deplete gas reserves, a small compressor can be added to lower line pressure and reinject gas down the annulus.
  - This is very effective and there are excellent compressors on the market with service/maintenance included approximately $4k per month. (This can also be an option from the start).

GAPL Examples: Changing the Reserve Bookings

- One Compressco unit was injecting into 2 wells in Strathmore, AB for UMann Oil. Central Optimization eliminated the wax problem by using a continuous 2 piece steel and tungsten pacemaker plunger.
    - De-wax cost savings payed out plunger costs in just 3 weeks.

- In both vertical and horizontal wells, average production gains were 1m3/day Oil and 4 e3m3/d gas.



Results After Replacing 25 Pumpjacks in 5 Months

- Key Results after 6-8 weeks
  - From 4-5 M3/d oil to 16+m3/d
  - Levelling out to 8-10m3/d Oil

- Well Specs
  - Line 350 kpa
  - Casing 2100 kpa
  - Reservoir 4000 kpa
  - Profile 730mkb at 65 deg

Successful install near Provost, AB

Well Optimization and Compliance Services

- Central Optimization offers a full spectrum of testing, reporting, and engineering services.

Acoustic Well Sounding	Reservoir Performance	Dynameter
AWS full spectrum services	Foam Depression, IPR, Build-ups, and Pressure Transient Analysis (PTA)	Tests and analysis, design, recommendations

Frac Monitoring	Regulatory
Live data recording and alarm set point monitoring	SCVT, Packer Isolation tests, Gas Migration, GOR, various required tests

About Central Optimization

Leverage our 30+ years experience as we evaluate, test, recommend & identify the upside for your wells.

From plunger lift designs to full plunger installs to replacement parts to systems and servicing – even for former Premier Integrated Technologies (P.I.T) designs – *we are your Alberta-made, go-to plunger lift equipment experts.*