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# Integrated Artificial Lift Excellence: Technologies, Operations, and the Digital Future

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# Integrated Artificial Lift Excellence: Technologies, Operations, and the Digital Future



## Lessons learned from the development of Electric Gas Lift optimization

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# What is Electric Gas Lift

- Electric Actuated (from Surface)
- API = Surface Controlled
  - Direct Electric
  - Hydraulic
  - Others?
- Downhole valve types
  - Multiple Fixed Orifices
  - Adjustable Valve
  - Fixed Orifice





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## Benefits and Goals (GL to EGL)

Fully Adjustable

Adaptive (rapidly changing)

Reduction of OPEX and HSE

Production Optimization

Enabler for dual completions

Clear understanding of the well (multiple gauges)

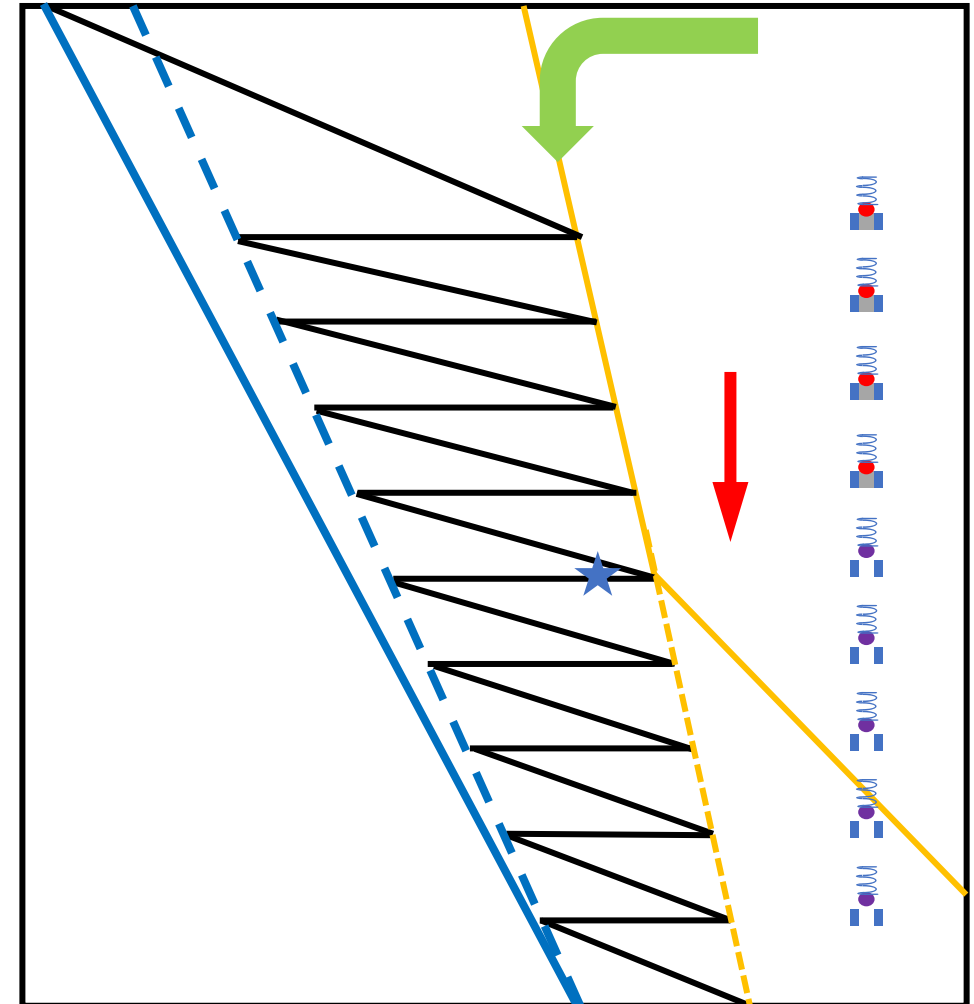
No required pressure drop



# Disadvantage of EGL

Not “self adjusting”

(Must adjust from the surface)





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# Process for Valve operation automation

Develop Logic

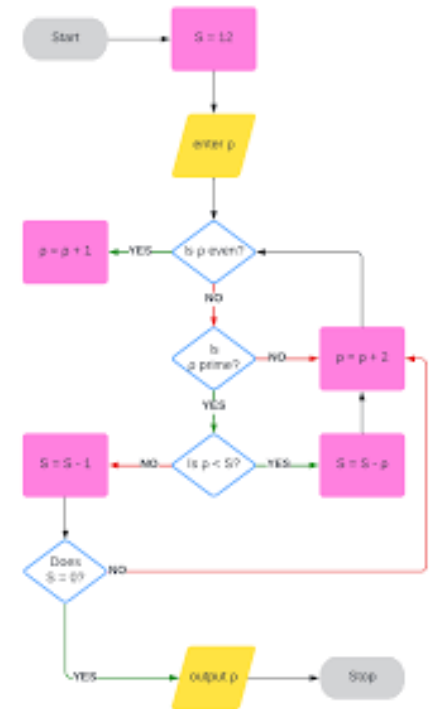
Manually perform

Lessons learned

Modify Logic

Results: Very good system.

Results were not what we originally hypothesized.

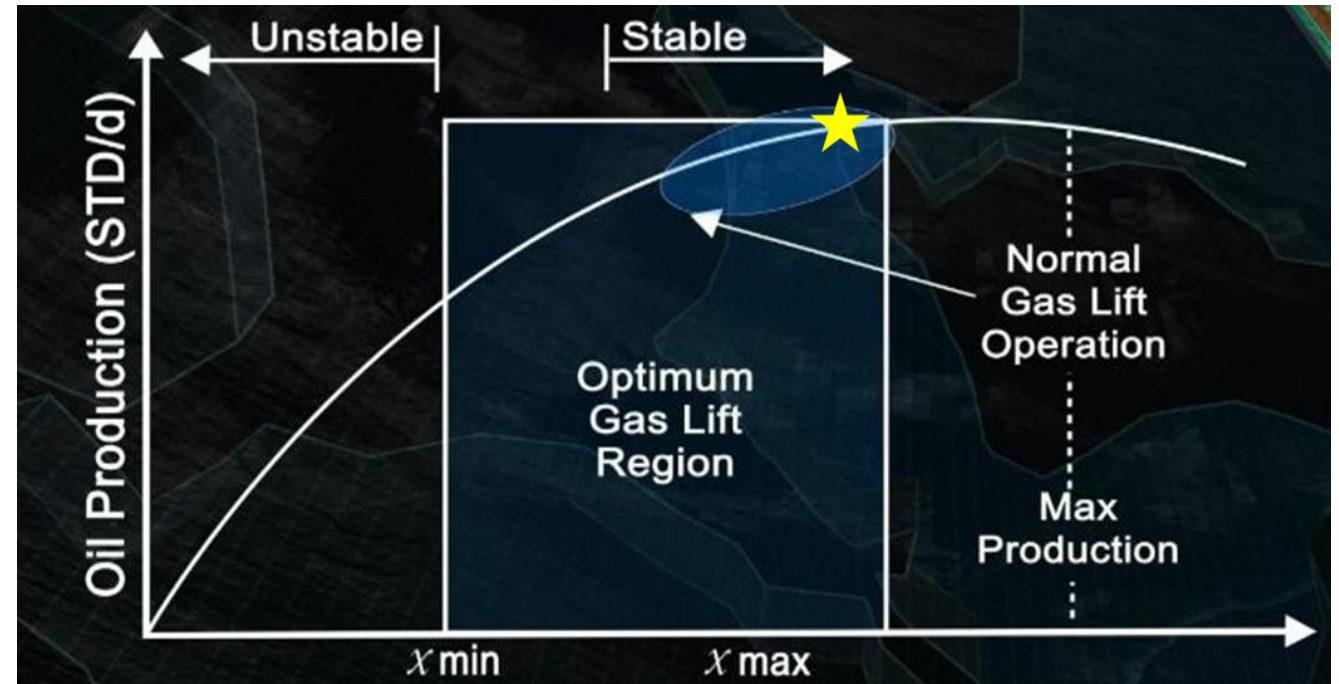


# Optimization of GL Wells

**Goal:** Find injection rate for maximum production.

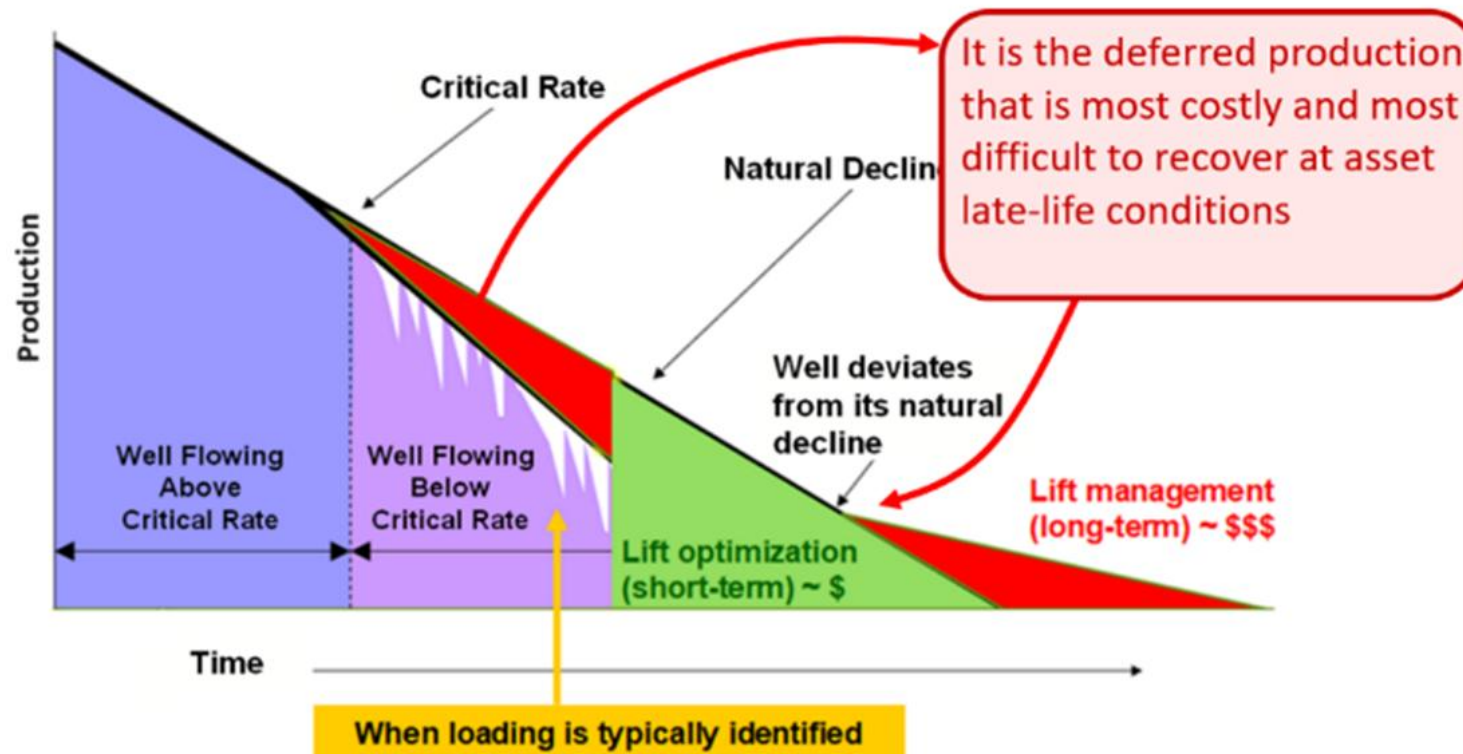
## Multi-rate test

- Best method
- Takes time and resources
  - Good Well tests
  - Stabilized production



# Decline curve

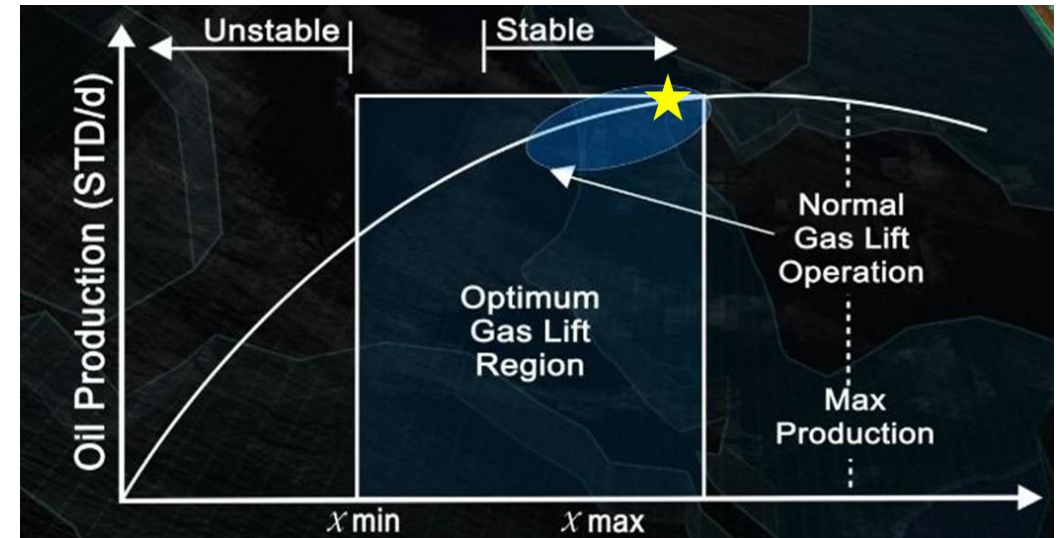
**Goal:** To maintain the maximum available production



# Optimization Methods

## Two primary methods

- Continuous Optimization
- Multi-rate Test (Valve Position vs FBHP)





## Learnings (thus far)

### 1. Focused on FBHP vs Production Rate

We use FBHP instead of production data.

FBHP (@heal) is direct measurement and ideal for well optimization

Production Data is ideal for pad / platform optimization

### 2. Changes in the system have an almost instant effect.

It takes some time for change to show its total result.

### 3. The more measurement points are better

Pressure is far more valuable than temperature



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## Learnings - continued

4. Unstable surface operations can have a significantly greater effect on the operation of the well.

\*We can develop optimization routines to adjust for this.

5. Critical SCADA data greatly helps the engineer's



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# Platform Optimization

Allocation of Lift Gas

Production Data Key