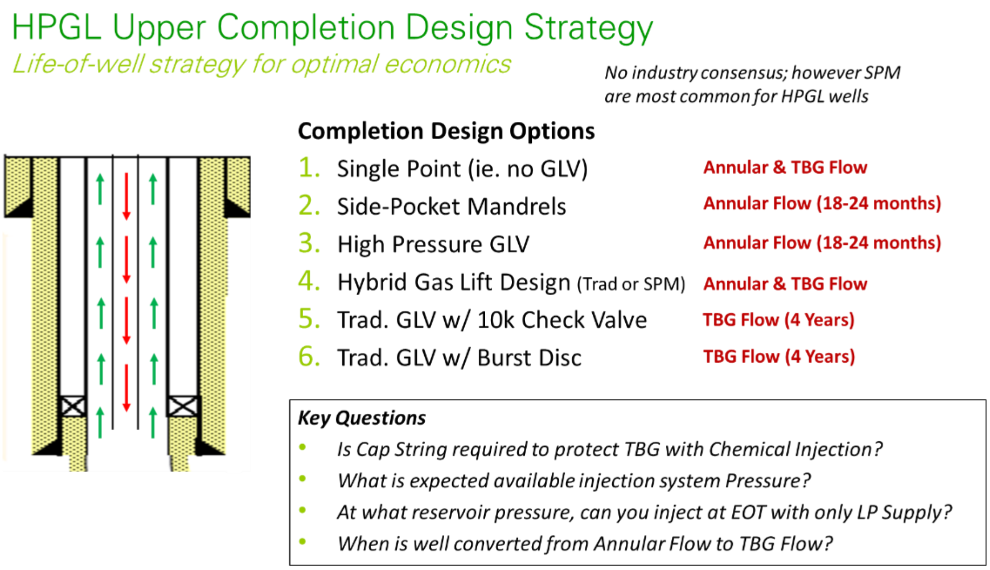
HPGL Upper Completion Design Strategy

Objective / Scope:
This paper explores the High Pressure Gas Lift Upper Completion Design Strategy, focusing on optimizing gas lift design for a life-of-well approach that ensures optimal economics. Various design options are assessed to balance cost savings, reliability, and operational efficiency.

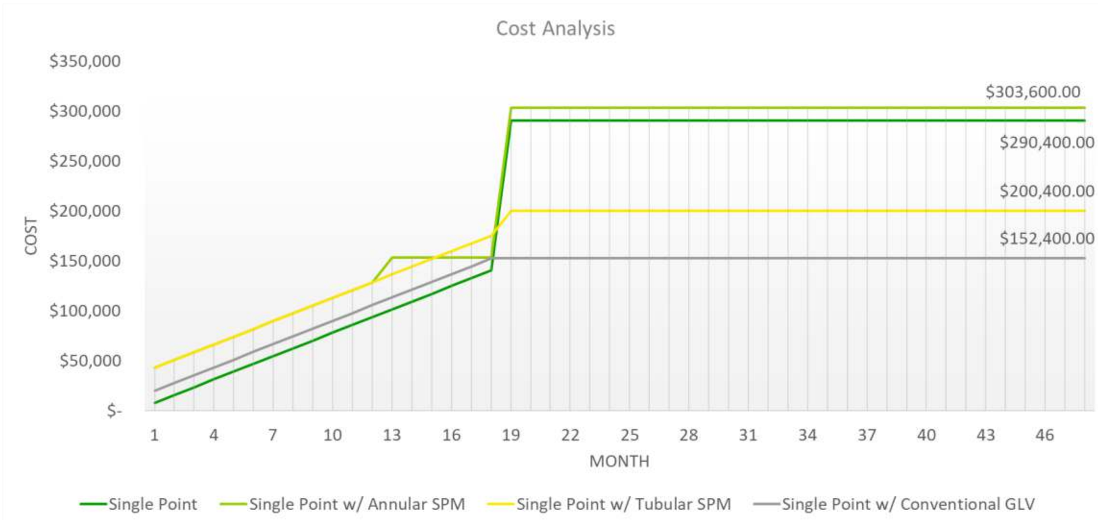
Methods:
A comparative analysis of different gas lift designs, including Single Point (no GLV), Side-Pocket Mandrels (SPM), High Pressure GLV, Hybrid Gas Lift Designs, Traditional GLV with 10k Check Valve, and Traditional GLV with Burst Disc, was conducted. The study evaluated economic performance, reliability, and operational feasibility.



Procedures:
Field data from wells with annular flow periods ranging from 18 to 30 months were analyzed to determine the most cost-effective and reliable gas lift strategy. Cost-benefit analysis and operational reliability assessments were conducted to evaluate each design.

Processes:
The study involved simulating production scenarios for different gas lift configurations and analyzing their performance under various well conditions. OPEX savings, failure rates, and overall well performance were key factors considered in the evaluation.

Annular Flow Period of 18 Months



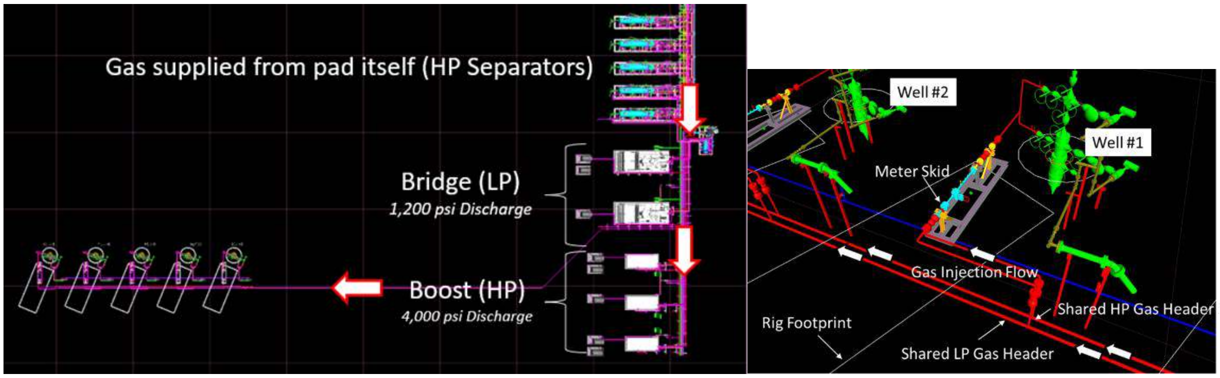
Results:

- Wells with **18-30 month annular flow periods**:
  - **Single Point with conventional GLV** installation proved most economical, saving ~$140k per well in OPEX compared to slick tubing installs. However, it presented reliability concerns during the initial flow period.
  - **SPM designed for tubular flow phase** emerged as a competitive alternative, offering ~$100k per well in OPEX savings while maintaining a better balance between cost and reliability.
- Wells with **annular flow periods exceeding 30 months**:
  - **Annular flow SPMs** resulted in ~$100k per well in OPEX savings versus slick tubing.
  - **Alternative approach** of keeping the well on a high-pressure compressor until tubing failure led to an OPEX cost of ~$374k per well over 48 months.

Observations:

- Single Point installation offers significant cost savings but poses early reliability risks.
- SPM-based designs offer a balance between cost efficiency and reliability, making them a viable alternative.
- Long-term annular flow scenarios favor SPMs, while compressor-based operations prove costly over extended periods.
- Monthly compression costs play a crucial role in determining the most suitable gas lift system. Wells requiring extended compression support may see reduced overall savings if compression costs outweigh OPEX reductions from gas lift selection.

- Shared compression costs on HPGL systems have significantly lowered expenses compared to a one-to-one well-to-compressor setup, making centralized compression a more attractive economic alternative.



Conclusions:
A tailored gas lift design strategy is essential for achieving optimal well economics. While Single Point installations provide the highest OPEX savings, reliability concerns must be addressed. SPM designs present a competitive and balanced solution, particularly for long-term production scenarios. Strategic planning based on annular flow duration and operational constraints is critical for maximizing efficiency and cost savings. Additionally, leveraging shared compression infrastructure can further enhance cost-effectiveness and operational flexibility.

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