Raising the dead without $CO_2$$ting the Earth

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SERVING EVERY WELL

PTC
PETROLEUM TECHNOLOGY COMPANY

What are the most likely options if the well stalls/slugs or stops producing?

- A full recompletion workover optimizing all aspects of the completion
- Shut in/plug and ultimately abandon well
- Retrofit Gas Lift to restart production

Why choose Retrofit GoLift

- Failed or inoperative gas lift equipment and still have access to lift gas at surface.
- Require quick reinstatement of production with a design optimised for the remaining life of the well.
- Improving profitability from accelerated production and lower OPEX, while significantly minimising GHG emissions in comparison to alternative remedial workover operations.

Avoid $CO_2$$ting the Earth by recovering oil reserves

Rig Workover vs Platform Intervention*

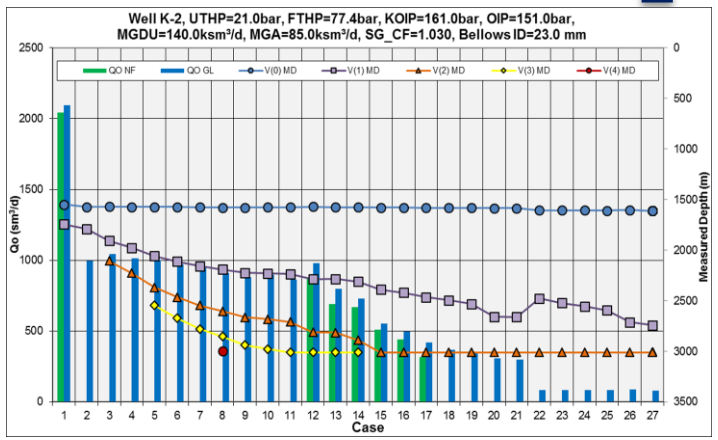
	TIME (DAYS)	TOTAL COST (£M)	CO2 EMISSIONs (TONS)
Rig Workover	30	10.4	1,440
Platform Wire Line Intervention	12	0.4	24
SAVING	18	10	1,416

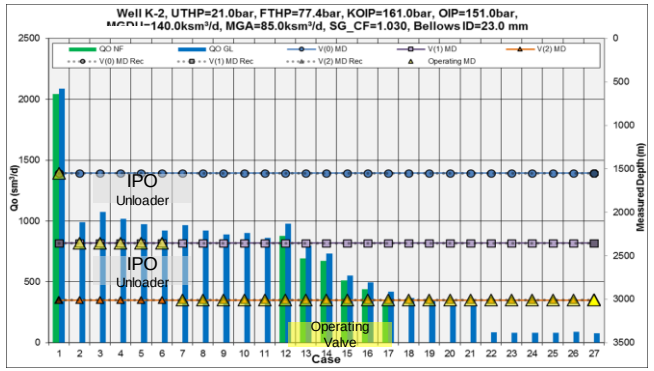
*level 1 estimates – in other words they are very immature and would normally carry an additional 25%

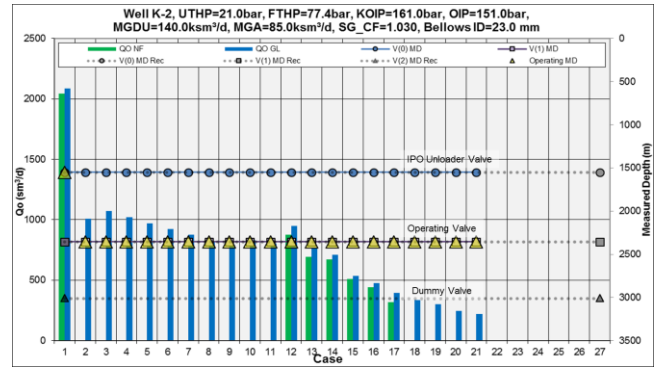
Plan to optimize production over the life of the well

PTC uses a Life of Field Gas Lift design methodology when evaluating the requirement from the operator.

- Multiple cases for the well are reviewed
- An optimal setup for each valve is selected which will best work for the life of the well
- Calculate GoLift Sub setting depth or depths



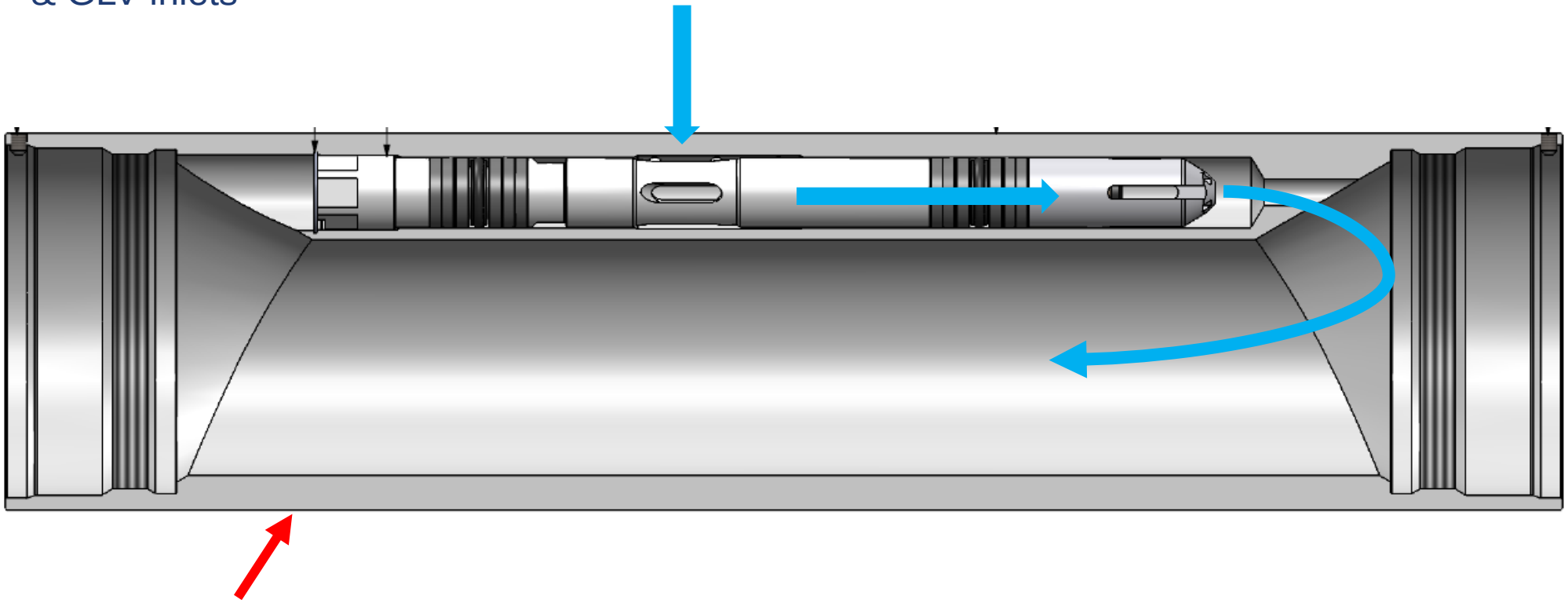




GoLift™ - How it works

Lift Gas from A-Annulus travels through the punched tubing and enters the GoLift & GLV inlets

Gas travels through the valve's internal orifice

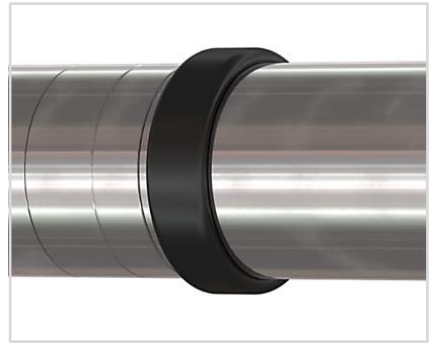


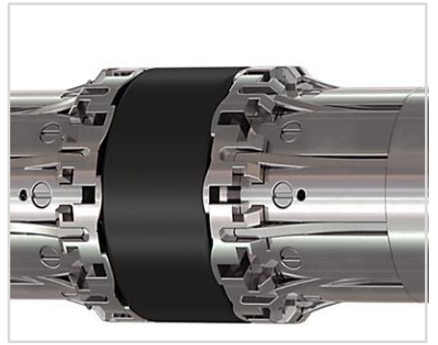
GoLift Main body assembly

Lift gas leaves the nose of the valve and stimulates production

Interwell Anchored Production Straddle (APS)

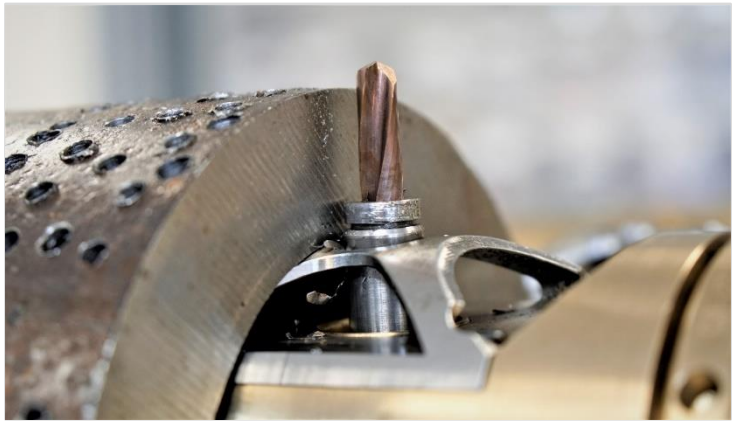
- ISO 14310 validation grade V0 qualified (gas-tight)
- Maximised throughbore ID
- Single-Run or Multi-Run configuration
- Standard stocked APS for 3-1/2”, 4-1/2”, 5”, 5-1/2” & 7” tubing
- Custom APS using Medium Expansion (ME), High Pressure High Temperature (HPHT) and High Expansion (HEX) technology



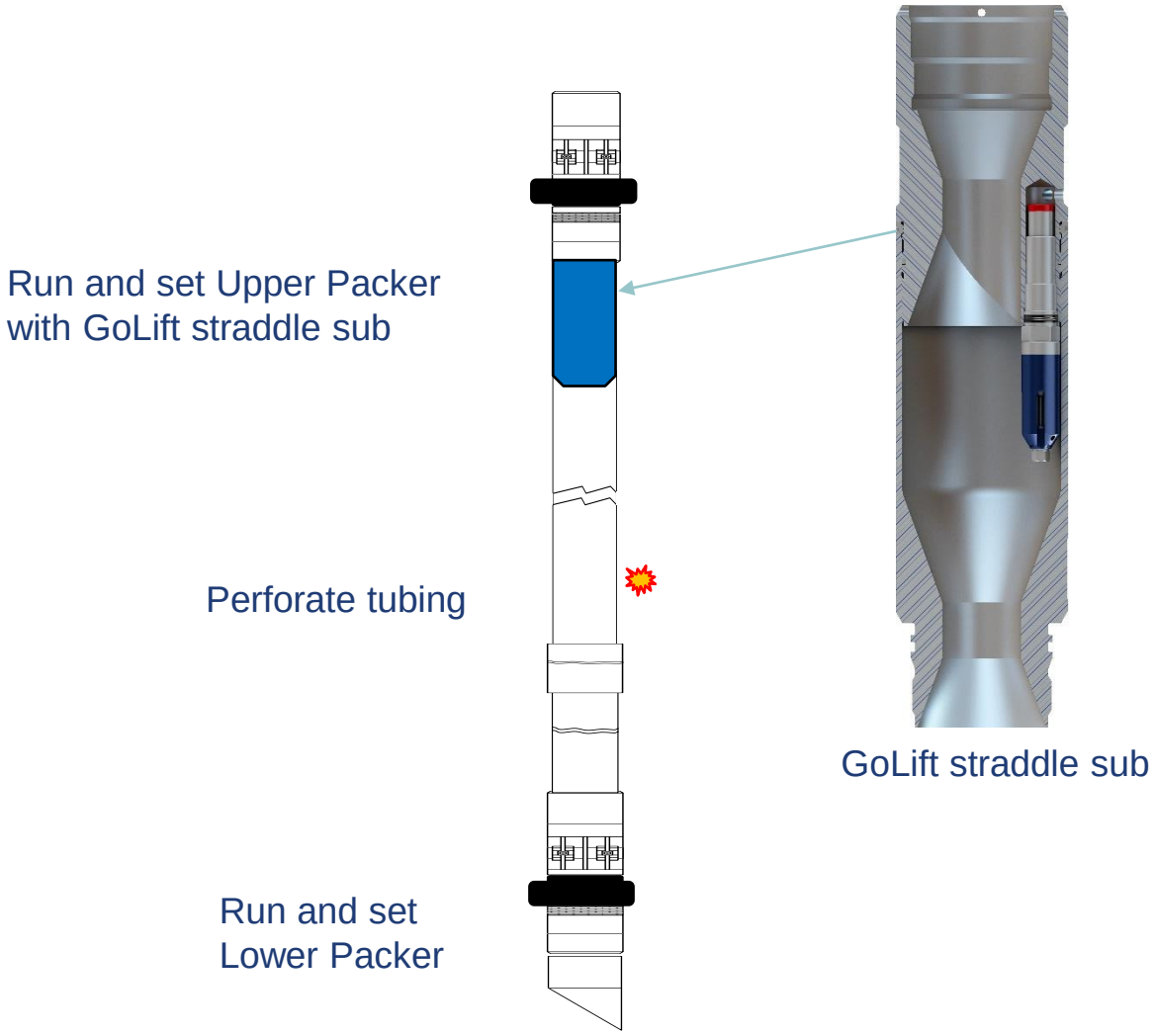


Interwell electronic Precision Drilling Tool (ePDT)

- Drilling of single or multiple holes with the exact same diameter on e-line
- Expandable anchor that maintains position during drilling operation and allows deployment through tight restrictions to drill holes in large ID casings
- Electronic feedthrough enabling it to be run in conjunction with other tool applications
- Set a lower APS module or plug and drill or vice-versa in one run



Retrofitting GoLift Straddle Sub via wireline in tubing



Case Study

- Major UK operator – Subsea well – LWIV
- Identified two APS c/w GoLift™ to be installed
  - Lower APS Operating Valve
  - Upper APS Injection Pressure Operated (IPO)/Unloading Valve
- High CO_2 content – Super 13% Cr. metallurgy required
- For each APS, the lower run was set and holes drilled in one run reducing the number of intervention runs. The upper run was then run.
- The two Gas Lift Straddles were successfully installed in the subsea well from the LWIV.

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Reduce Cost,

Increase Production,

Enhance Well Integrity