Weatherford

Inverse Gas Lift System (IGLS)

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Why is IGLS needed?

- Many wells are now reaching the stage that they may require to be gas lifted.

- These wells may not be designed to allow conventional gas lift systems.

- Workover cost may prevent traditional gas lift system installation

- Annulus integrity may also be compromised preventing gas injection.

- Full depth gas injection may be required.
What is IGLS?

- IGLS allows a method of gas injection via an insert string with no reliance on well annuli.
- Injection through new insert bore.
- Production via annular spaces & bores of the IGLS components.
- Installed using traditional intervention techniques thereby minimising topside disruption.
- Utilises existing tree.
- Fully removable with no effect on original completion components.
The IGLS components consist of the following (bottom to top):

- Gas injection valve at depth (customer specific), with coiled tubing to dual flow safety valve.
- Dual flow safety valve installed in the existing safety valve profile, locked in place using a suspension hanger.
- Seal stinger and tubing to intermediate spool and concentric hanger at surface.
Components

• Dual Flow Safety Valve (DFSV)
  – API 14A, Class 1, qualified, rod piston design.
  – Controlled via existing DHSV control line.
  – Two flow paths, Gas through centre bore & Production through annular bores.
  – Flapper closes off both Injection & Production giving full well control.
  – Metal / Metal sealing of flapper & flow tube nose seal.
Components

- Dual Flow Safety Valve (DFSV) - Flapper in closed position.
Components

- Dual Flow Safety Valve (DFSV) - Flapper in open position.
Components

- Dual Flow Safety Valve (DFSV) – Flow path through safety valve.
Components

• Dual Flow Safety Valve (DFSV).
Components

- **Dual Flow Safety Valve Sizes:**
  - 4-1/2 x 3.813
  - 5-1/2 x 4.313
  - 5-1/2 x 4.562
  - 7 x 5.750 – Statoil 3 Stage System
  - 7 x 5.950

- **Dual Flow Safety Valve Seals:**
  - Standard Chevron Stack.
  - Weatherford Damaged Bore (certain sizes).
  - Swellable Stack (certain sizes).
Components

- **Suspension Hanger**
  - Carries full string weight, minimises load on DFSV no-go.
  - Gas Injection through bore.
  - Production via annular space past slips.
  - PBR or Latching Seal Bore for connection to upper components.
Components

- **Seal Stinger**
  - Used for connection to upper completion & surface equipment.
  - Seal Stinger mates with PBR on suspension hanger.
  - Shearable centraliser gives positive indication of mate.
  - Sealing within the PBR has been verified under a simulated dynamic 20 year temperature, pressure & movement life cycle.
Components

- Intermediate Spool
  - Normally supplied by well head supplier.
  - No modification to xmas tree required.
  - ID dependant on existing tree and hanger (Client specific requirements).

- Concentric Hanger
  - No-go within intermediate spool.
  - Lock-down & self locking systems.
  - Gas injection & production bores.
  - Run with standard industry tools.
Summary Statements

- Means of introducing gas lift to a well which has no gas lift capability or a well which has casing integrity problems.
- Utilizes existing tree & completion.
- DFSV isolates both production and injection flow paths providing full well control.
- DFSV utilises existing safety valve seal bores for control.
- Current sizes of DFSV Qualified to API 14A 11th Edition Class 1.
- Installed using intervention techniques, saving rig time and costs.
- No reliance on the DHSV no-go.
- Removable with no effect on existing completion or well integrity.
- Full well depth gas injection possible.
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