

Annular Flow Configuration of Onshore Gas-Lift System for Unconventional Well Increased Production, Reduced Workover Costs, OPEX

Objectives

- Reduce the costs and logistics required for gas lift earlier in the lifecycle of the well by allowing annular flow operations with a proper downhole setup for an onshore gas-lift unconventional well. Annular flow options offer a larger flowing area and less of a pressure loss compared to tubing flow applications.

Our Approach

- Following a thorough examination of the customer's requirement needs and circumstances within the low-permeable, sandstone formation, Weatherford artificial-lift specialists formulated an annular flow strategy to be implemented at an onshore production scale.
- For the annular flow configuration, a snorkel side pocket mandrel (EC SPM) was selected. These field-proven side pocket mandrels have a chamber (called a 'pocket') on the inside where a gas-lift valve can be installed or removed with a wireline unit. This chamber is offset in the side of the mandrel to allow full drift in the tubing.
- To set up the EC SPM for annular flow, a standard retrievable valve (R-1) is installed—initially via tubing injection—so that the flow path will go from inside the mandrels, through the ports placed in the middle of the pocket, and then straight to the bottom of the mandrel via the snorkel, which is the preferably configuration at early life. Whenever the customer needs to switch from annular flow to tubing flow, the valves would be swapped out via a wireline unit and replaced with reverse-flow retrievable valves (R-1R), which were validated by vapor-phase chromatography (VPC).
- The flexibility of this system does not require stripping out the downhole equipment since it adapts to the existing completion. Different configurations exist—packer or packerless—depending on the customer needs.

Value to Customer

- The annular flow system successfully produced unconventional Permian wells by eliminating the need to start up wells using a different artificial-lift method.
- As a result, the customer reduced workover costs and OPEX related to converting the well from annular flow to tubing flow using its original completion.
- The customer also reduced greenhouse gas emissions by eliminating the need for multiple artificial-lift exchanges.



For every gas-lift application, Weatherford mandrels, like the EC gas lift (pictured) deliver unsurpassed reliability and performance to maintain completion integrity.

LOCATION

Permian, United States

WELL TYPE

Gas condensate

CASING SIZE

5-1/2 or 7 in.

TUBING SIZE

2-7/8 or 2-3/8 in.

TEMPERATURE

200°F (93°C)

PRODUCTS/SERVICES

- Gas-lift onshore systems
- Automation systems

