Schlumberger

HEAL System Helps Increase Production Rate 33% by Enhancing Rod Pumping Efficiency

Proprietary system provides cost-effective, higher-performance alternative to gas lift

A Wolfcamp operator wanted to replace gas lift with rod pumps to increase drawdown and reduce opex, but the well profiles and high GOR presented a challenge. The HEAL System™ minimized slug flow and produced an average increase of 33% in the total liquid production rate from seven horizontal wells.

Operator sought efficient and cost-effective artificial lift

As with many unconventional plays, initial production declines rapidly in the Permian Basin's Wolfcamp Formation, and artificial lift is required to prolong the life of the well.

What the operator tried first

The operator was using gas lift, which results in high bottomhole pressures (BHPs), limiting drawdown and hence production. In addition, operating costs are high. The operator wanted to replace gas lift with rod pumps—a cost-effective solution—but the depths, well profiles, and high GOR would lead to slug flow and consequent gas locking and inefficient intermittent production.

What Schlumberger recommended

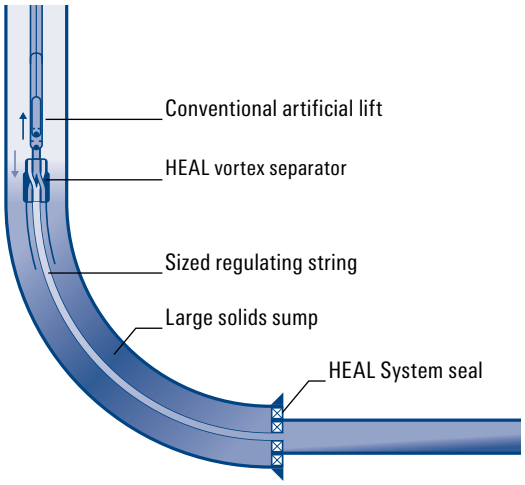
The horizontal enhanced artificial lift system—the HEAL System—guides production from the horizontal section into a sized regulating string (SRS) in the build section. Production flows up the SRS, where it is conditioned into a stabilized multiphase state, lowering fluid density, lifting liquids, and mitigating slugs. The conditioned flow is delivered to a vortex separator, which separates gas and solids from the liquid. The gas rises through the annulus and conditioned liquids are drawn up the vortex separator and delivered to the pump located in the vertical section. Extremely efficient downhole separation and consistent flows maximize pump fillage; the system also maintains a very low BHP, enhancing drawdown to increase production. Solids are dropped into the sump for a second stage of solids control.

Liquid production rate increased 33%

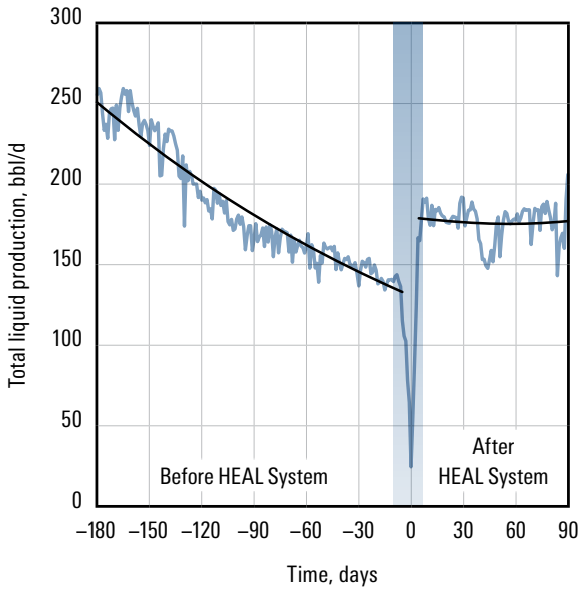
The HEAL System in conjunction with rod pumps replaced gas lift in seven wells, which had the following characteristics:

- TVD: 6,000–6,900 ft [1,830–2,105 m]
- Initial oil production: 20–100 bbl/d [3–16 m^3/d]
- GOR: 620–8,000 ft^3/bbl [110–1,425 m^3/m^3].

Total liquid production rate increased by 33% on average and the declining trend was replaced by steady output. In addition, operating costs reduced.



The HEAL System enhanced rod pumping efficiency by minimizing gas slugs while increasing drawdown.



Total liquid production rate from the seven wells increased significantly compared with using gas lift.

HEAL SYSTEMS™