CENesis PHASE System Maximized Fluid Drawdown and Increased Oil and Gas Production 19% and 43% Respectively vs. Gas Lift

Location: Oklahoma

Results
- Increased oil production 19%
- Increased gas production 43%
- Extended ESP run life by 200+ days or 73% compared to the average ESP run life in similar applications

Challenges
- High gas content in the fluid stream
- Formation of gas slugs in the horizontal lateral
- Inadequate bottomhole pressure drawdown with gas lift limited production

Baker Hughes solution
- 5½-in. CENesis PHASE multiphase encapsulated production system for 7-in. casing
- Electrospeed Advantage™ variable speed drive

An operator in Oklahoma had a well that was completed with 7½-in. casing and was using continuous gas lift as the preferred form of artificial lift. However, after 2.5 years on gas lift, the bottomhole pressure (BHP) in the well was still 683 psi. Although gas lift is stable, typically requires minimal intervention costs, and is unaffected by gas slugs in the fluid stream, it limits the bottomhole pressure drawdown necessary to maximize inflow from the reservoir.

The operator recognized that the required inflow performance (IP) of the well was greater than gas lift could provide which was constraining production. The operator approached Baker Hughes for a reliable alternative artificial lift solution.

After evaluating the well conditions, Baker Hughes engineers determined that an electrical submersible pumping (ESP) system was the best solution to effectively draw down the bottomhole pressure to increase production and reserve recovery. However, the high gas content in the production stream was a serious consideration for the ESP system design.

Based on the production parameters, Baker Hughes and the operator determined that the CENesis PHASE™ multiphase encapsulated production solution for 7-in. casing was the best option to maximize the well’s performance and to optimize ESP system reliability. The CENesis PHASE system design encapsulates the entire ESP system in a shroud to allow natural separation of the gas before it can enter the pump. The shrouded system optimizes production and improves equipment reliability by preventing gas locking and pump-off conditions that plague standard ESP systems in wells with gas slugging conditions. To further enhance reliability, the CENesis PHASE solution features a patented integrated recirculation system that continually pumps fluid past the ESP motor to prevent overheating in dynamic well conditions.

The CENesis PHASE multiphase encapsulated production solution maximized the inflow of the well by decreasing the bottomhole pressure from 683 psi to 150 psi. Oil and gas production increased 19% and 43% respectively and run life increased 73% compared to the average run life of a typical ESP in similar downhole conditions.