

Case study: Delaware basin, North America

CENesis PHASE solution increased ESP run time, eliminated gas-related shutdowns

A key operator in the Delaware basin was producing from the Bone Spring reservoir using a competitor's electrical submersible pumping (ESP) system, but the ESP failed after just 273 days. The unconventional horizontal well had higher gas content in the fluid stream compared to offset wells.

The operator contacted Baker Hughes for a solution to improve ESP performance in the well. After reviewing the historical production data, Baker Hughes Artificial Lift Systems engineers proposed installing the patented* **CENesis™ PHASE multiphase encapsulated production solution** in the well to handle the high gas-to-liquid ratio (GLR) versus the competitor's conventional tapered pump design. The CENesis PHASE solution was also ideally suited to handle the anticipated higher gas production as the oil production rate rapidly declined.

The CENesis PHASE solution fully encapsulates the ESP system to naturally separate gas from the fluid stream, preventing the majority of the gas from entering the ESP. The design creates a reservoir of fluid to keep the ESP system primed when gas slugs displace fluid in the well and a recirculation pump keeps fluid flowing past the motor to prevent overheating.

The CENesis PHASE solution featured a **FLEXPump™ 10 production pump** and a **GI™ gas insurance pump** as the recirculation pump. A **WellLift™ downhole gauge**, combined with a Baker Hughes ESP production surveillance service, was installed to monitor the ESP system and the well's performance.

The targeted flow rate was 600 BFPD, a GOR of 6,500 Scf/STB, 75% water cut, and 84% free gas. The well was making 550+ BFPD at 974 psi using the competitor's ESP.

During the first month of operation with the CENesis PHASE solution, the well was making 600+ BFPD and shutdowns related to gas locking/blocking had been eliminated. In that same month, the gas-to-liquid ratio increased from 280 Scf/STB to 1,500 Scf/STB while the ESP performance didn't change—demonstrating the superior gas-handling capabilities of the CENesis PHASE solution.

At the time of publication, the ESP system had run for 380 days, improving the run life of the competitor's system by 107 days. Over the 380 days of operation, production has declined from 600 BFPD to 300 BFPD and pump intake pressure has declined from 974 psi to 612 psi.

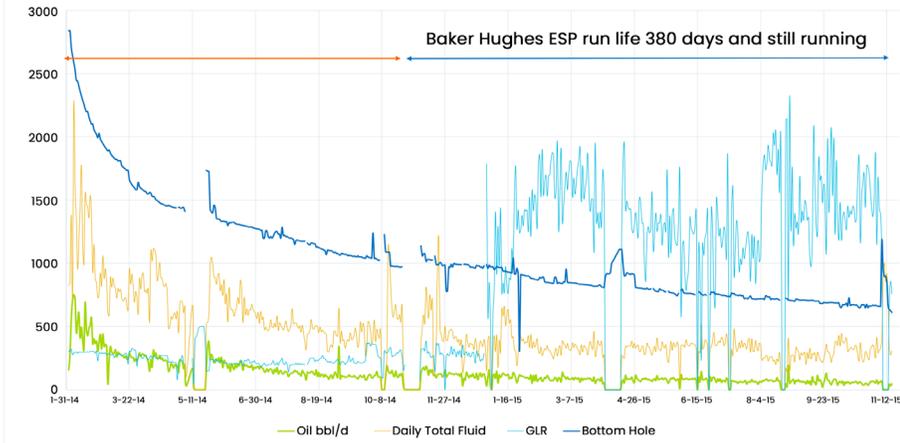
Challenges

- Rapid production decline
- High gas-to-liquid ratio
- High free gas at the pump intake
- Anticipated low production and higher GLR

Results

- Eliminated gas-related shutdowns
- Enabled the well to produce with higher gas-to-liquid ratio and low production
- Increased ESP run life by 107 days to date
- Reduced OPEX

ESP operation and well production history



Historical production and operation data of the well with the run life of a competitor's ESP system on the left and the performance of the CENesis PHASE solution on the right

*The CENesis PHASE multiphase encapsulated production well solution design is patented under Patent 9920611

