

Case study: Permian Basin, North America

Slimline CENesis PHASE solution enhanced ESP performance, eliminated NPT, improved oil production 30%

Unconventional horizontal wells present unique production challenges, particularly gas slugs that accumulate in the high side of undulations in the lateral section and then break free. These gas slugs affect the operation of ESP systems, causing gas locking conditions that shutdown the system and/or pump cycling that can lead to motor overheating. These issues shorten the life of the ESP system and limit oil production.

Several weeks after installing an ESP system in a Permian Basin unconventional well completed with 5-½ in. casing, the operator began noticing problems. The system was cycling and tripping on underload and the motor temperature was high. The system was shutting down three times a day.

After installing three ESP systems (with average run time of only 160 days) and trying different gas handling techniques, including surface controller software to improve ESP run time and production, nothing reduced the ESP cycling.

Baker Hughes Artificial Lift Systems engineers recommended the slimline patented* **CENesis™ PHASE multiphase encapsulated production solution** for the small-diameter well. The CENesis PHASE solution fully encapsulates the ESP system to naturally separate gas from the the fluid stream, preventing the majority of the gas from entering the ESP. The system featured 300 series **FLEXPump™ 6** technology in combination with a **GI™ gas insurance boost pump** to handle free gas in the pump at low flow rates. Baker Hughes also provided the WCW6032 scale and corrosion inhibitor to protect the downhole equipment.

After installation all shutdowns related to gas slugs were eliminated. Oil production improved by 30%, and nonproductive time was totally eliminated.

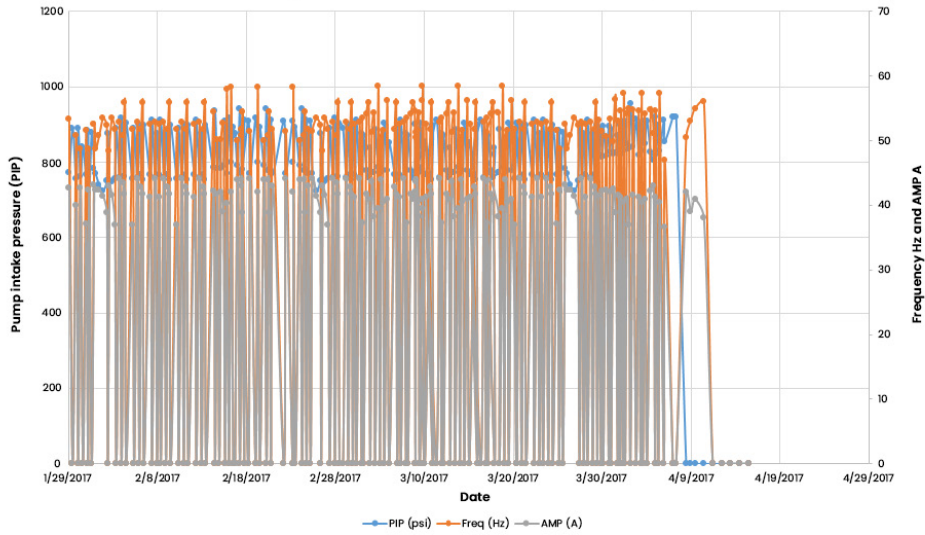
Challenges

- Large gas slugs in the fluid stream causing gas-locking conditions and overheating in the ESP system
- Small-diameter well with 5 ½ in. casing
- Scale issues

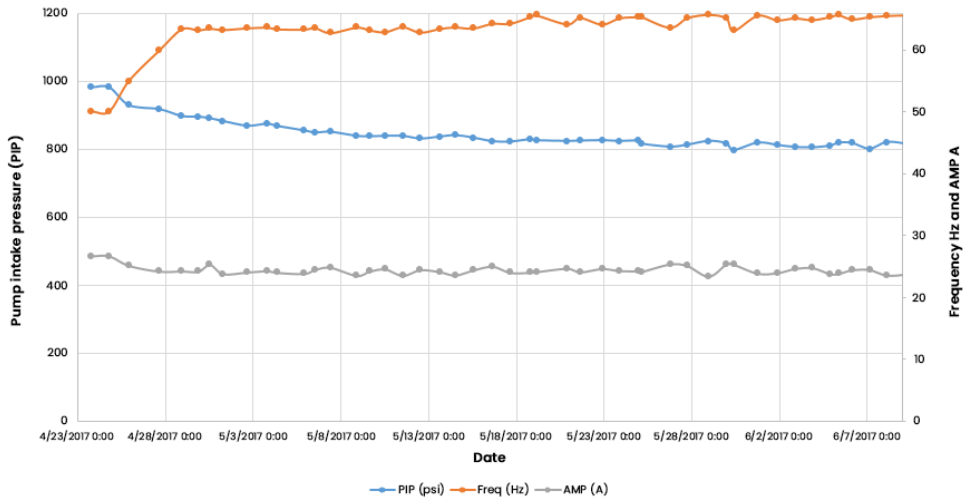
Results

- Improved oil production by 30%
- Eliminated repeated ESP shutdowns due to gas slugs
- Enhanced ESP performance and overall system efficiency due to ESP cycling

ESP performance before CENesis PHASE system



ESP performance after CENesis PHASE system



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