CASE STUDY

HALLIBURTON

Permian Basin

Intelevate™ digital platform protects electric submersible pumps (ESPs) running through extreme doglegs (DLS)

Reinstalled in horizontal section of wells, production increased 155 BOPD

CHALLENGE

Increase production on three wells by setting ESPs in the horizontal, despite running through severe DLS

SOLUTION

- A team of five, including Intelevate members, engineers, and R&D personnel consulted on the recommended solution
- The Intelevate team used advanced bending stress analysis to ensure system integrity
- Halliburton Deviator flanges used to protect downhole equipment and maintain bending stresses below 55,000 psi in high doglegs
- A rotating intake, two Hydro-Helical gas separators, and two Liberator vortex gas separators were used to manage breakout gas production

RESULT

- Ensured each system was able to go through the extreme doglegs and maintain mechanical integrity
- Increased PIP for all wells, ranging from 115 psi to 300 psi
- Increased production a total of 155 BOPD or over $12,000/ day (@ $78/BO)

Overview

A customer operating in the Permian Basin predominantly employs ESPs set at approximately 30-ft above the kick-off point (KOP) for horizontal wells. However, due to concerns about pump intake pressure (PIP) declining and a desire to increase production, they wanted to evaluate reinstalling the ESPs deeper within the horizontal section of the wellbore.

Challenge

Running the ESPs in the hole without compromising equipment integrity would be challenging due to extreme dogleg severity in all three wells and landing zones, with a DLS greater than 3° per 100 feet. There were also concerns about gas handling capabilities while operating in the horizontal.

Solution

A team of five, comprised of multiple Intelevate team members, distinguished engineers, and Summit ESP® R&D, introduced a design to preserve the integrity of the ESP while running in the hole by utilizing Halliburton Deviator Flanges to limit the extreme bending stresses typically associated with severe doglegs. The issues surrounding gas interference were addressed by installing a combination of tandem Hydro-Helical® and Liberator® Vortex gas separators, complemented by a rotating intake.

SUMMIT ESP
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Result

The customer implemented the recommendation of the team, who had also performed bending stress computational analysis before installation. The Deviator flanges successfully protected the integrity of each ESP, maintaining bending stresses to as little as half of the theoretical stress without them. All three ESPs were run in the hole without issue and comfortably set within the recommended landing zones, increasing the pump intake pressure (PIP) for all three wells by 115, 300, and 250 psi. Production increased by 52, 12, and 91 BOPD, respectively, for a total of 155 BOPD, earning the operator approximately $12,000 in increased revenue per day (@ $78/BO).

For more information on Halliburton geothermal services, please go to halliburton.com/geothermal

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