CASE STUDY

HALLIBURTON

Montney Formation, Canada

Operator increases production and eliminates slug-related ESP shutdowns in Montney well

Integrated gas-management strategy improves production continuity and adds nearly US$1 million in annual revenue

CHALLENGE

- Manage severe gas slugging in a tight-clearance well
- Eliminate frequent ESP shutdowns
- Reduce electrical stress on downhole equipment

SOLUTION

- Install 400 series high-flow Hydro-Helical Slugger™ gas separator
- Deploy integrated gas-handling configuration
- Optimize ESP design for tight-clearance well

RESULT

- Eliminated gas slug-related shutdowns
- Lowered current swing amplitude by 81%
- Increased runtime by 77%
- Improved pump intake pressure drawdown by 31%
- Increased annualized revenue by nearly US$1 million

Overview

A Canadian operator sought to improve electric submersible pump (ESP) performance in a Montney formation well affected by severe gas slugging. Tight casing clearance created recurrent production interruptions that increased stress on downhole equipment and limited overall well performance.

The previous ESP installation used tandem vortex gas separators but experienced frequent shutdowns during slug events, which reduced production continuity and accelerated equipment wear. Over 85 days, the system shut down 23 times, experienced current swings of up to 23.8 A, and ultimately was pulled because of a downhole electrical short. Teardown inspection identified burned motor windings, which confirmed the effect of severe operational conditions on equipment reliability.

The operator required a solution that could maintain production through severe slug events, reduce electrical and mechanical stress, and improve overall runtime without sacrificing production objectives.

Challenge

Severe slugging creates difficult operating conditions for the ESP system. In many applications, operators attempt to manage slugging by reducing production rates, lowering operating frequency, or using variable speed drive (VSD) algorithms to maintain a fluid column above the pump. While these approaches can improve stability in some wells, they often limit production and may not adequately address severe slugging conditions.

SUMMIT ESP

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CASE STUDY

In this Montney well, severe slugging combined with tight clearance in the 5.5-in., 23-lb/ft casing created persistent operational challenges. Large gas slugs repeatedly disrupted pump operation which triggered shutdowns and significant current fluctuations.

These conditions increased stress on electrical and mechanical components and reduced equipment life. The operator required a solution capable of maintaining stable pump operation during slug events while reducing the factors that contributed to equipment damage and production interruptions.



Transparent test device showing formation of gas

Solution

Summit ESP®, a Halliburton service, designed an integrated gas-management solution tailored to the well's severe slugging conditions and tight-clearance environment. The configuration combined a 400-series high-flow Hydro-Helical Slugger™ gas separator, a high-flow vortex gas separator, a 338-series SDGH1600 gas handler, SD2000 pumps, and a 420-series EMS motor. Halliburton also provided monitoring support of the slimline ESP equipment to evaluate system performance after installation.

The Hydro-Helical Slugger gas separator helped maintain pump priming in gas slug events through an internal fluid reservoir design. The remainder of the gas-handling technologies processed substantial free-gas volumes before fluid entered the pump, which improved operating stability and supported continuous production. The slimline system design improved gas-handling performance and natural separation efficiency in the heavy-wall casing environment. The motor configuration provided the required horsepower with fewer downhole connections.

Result

The operator achieved significant improvements in production stability, equipment reliability, and overall well performance. In an equivalent 85-day evaluation period, the integrated gas-management solution eliminated shutdowns associated with severe gas slugging and reduced overall shutdown frequency by 60%. The system also reduced current swing amplitude by 81%, which created substantially more stable operating conditions and reduced stress on electrical and mechanical components.

Improved stability translated directly into longer equipment life and improved production continuity. Runtime increased by 77% compared with the previous ESP installation and continues to increase. The system maintained target production rates and operated at approximately 12 Hz or lower.

The operator also improved pump intake pressure drawdown by 31%, which demonstrated stronger reservoir access and improved production efficiency. Compared with the previous ESP run, average gas production increased by approximately 27% and oil production increased by approximately 22%, which generated nearly US$1 million in additional annual revenue. The results demonstrate that an integrated gas-handling approach can help operators manage severe slugging conditions in tight-clearance wells while improving equipment reliability and production performance.

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