Case Study: Schlumberger Tackles ESP Challenges In Kazakhstan

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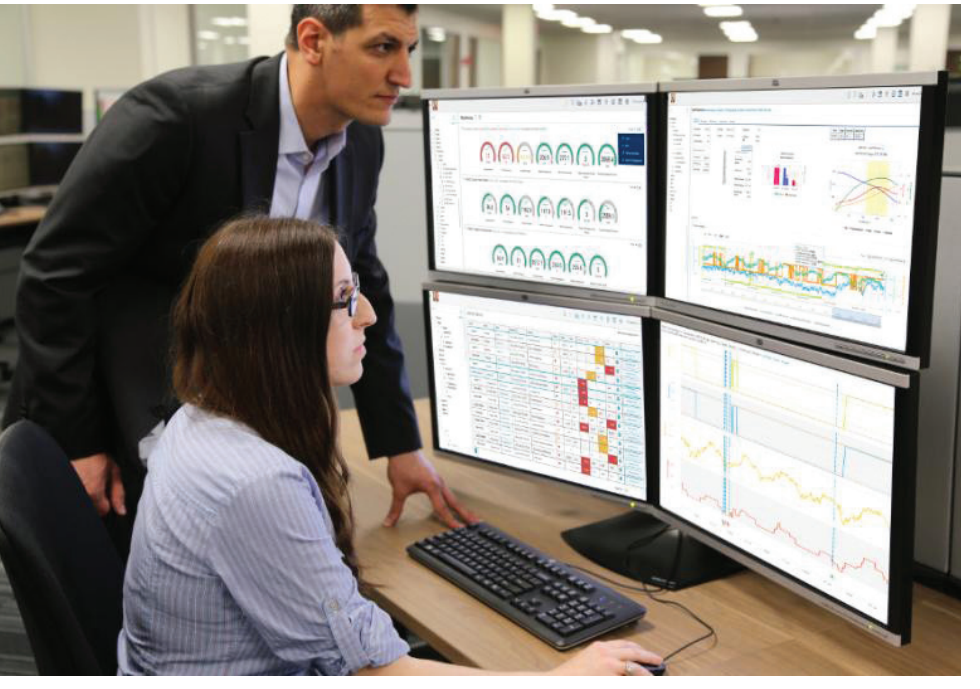
After transitioning from gas lift to an electric submersible pump (ESP) in several mature gas condensate wells, an operator in Kazakhstan found that varying reservoir conditions led to poor pump performance and production deferment.

As an initial step, new pumps were chosen to better suit the well conditions. Then a real-time data acquisition and analysis service analyzed downhole data and adjusted pump parameters to accommodate the production variations.

Gas, Production Variations

After producing since the 1950s and 1960s, the field's wells produced high volumes of sand and gas. The first ESPs installed, from a third-party supplier, lasted 22, 10 and 4 days, respectively. The operator asked Schlumberger for a better solution.



Dedicated engineers based at one of many Schlumberger Artificial Lift Surveillance Centers continuously monitor alarms. (Source: Schlumberger)

For a trial in one well, Schlumberger installed a TPS-Line Russia-compatible ESP system with components, check valve and sand trap designed for the well's high sand and gas production characteristics. That system's run life was 122 days, representing a more than 500% improvement from the lower-quality systems.

Subsequent wells used the same ESP systems and accessories and included the Lift IQ production life cycle management service that acquired and analyzed real-time data from the downhole pumps and recommended changes to optimize production and run life.

The Lift IQ service provides real-time analytics and optimization with four levels of coverage. From operations in a single well to an entire field, the service taps into Schlumberger's expertise in engineering, manufacturing and surveillance, with access to global, round-the-clock service centers.

Real-time Optimization

Engineers at the Artificial Lift Surveillance Center in Tyumen, Russia, monitored the operator's wells 12 hours a day. From this study, the surveillance engineers determined that the wells' high gas-oil ratio (about 3,370 cubic feet per barrel), varying periods of natural flow, limited drawdown pressure and unusual wellhead configuration resulted in frequent ESP stops, motor heating and downtime.

The next step in the Lift IQ service was for the engineers to analyze the data using proprietary flow simulation, production analysis and ESP design software, and compare the results to similar situations in the company's extensive engineering knowledge base.

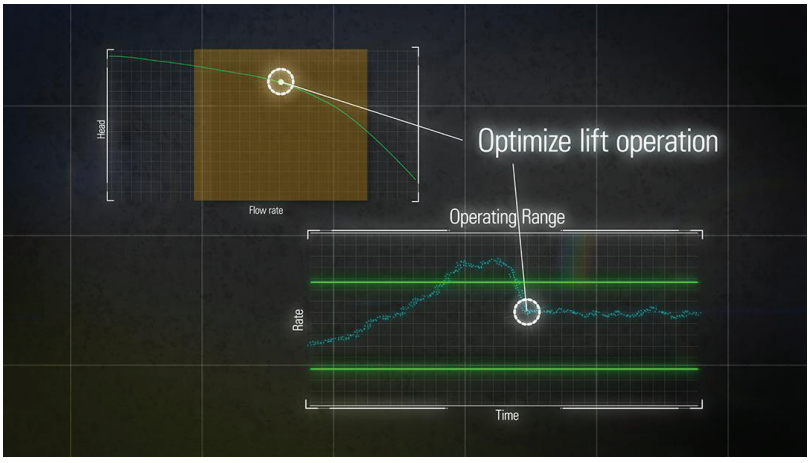
Based on recommendations from the analysis, the artificial lift team recommended proactive adjustments to ESP trips and set points, improvements to cyclic-mode periods and modifications to the motor amps and load-feedback modes to better suit the reservoir conditions encountered for each well. After seeing the potential benefit of

real-time adjustments, the customer agreed to allow the Lift IQ service team to remotely control the pumps, enabling rapid changes for critical adjustments to minimize unnecessary shutdowns.

Further Downtime Improvements

The proactive changes eliminated ESP stops, enhanced ESP run life and reduced downtime by an additional 27% to improve overall lift efficiency. Because the well conditions involved variations, the Lift IQ service continued with surveillance engineers monitoring downhole conditions and pump operations to develop additional production optimization strategies.

For example, the Schlumberger artificial lift team worked with customer personnel to develop a reasonable, economical workover program and clear startup procedures to ensure top performance. The technical relationship made the customer more willing to engage with the Schlumberger team and share information that might impact design, selection and installation processes. EXP



Optimizing artificial lift operations improves well and field recovery in addition to extending equipment run life and uptime. (Source: Schlumberger)