

Engineered ESP System and Lift IQ Service Extend Run Life 300% in Abrasive Well for Salym Petroleum

Continuum stages and RC4000 pump reduce power consumption by 20% and increase production by 12%, Western Siberia

CHALLENGE

Reduce power consumption and improve ESP run life in a high-flow-rate, high-water-cut well with abrasives production and scaling issues.

SOLUTION

- Install REDA* ESP system with REDA Continuum* unconventional extended-life ESP stages and RC4000 pump.
- Monitor and optimize the new ESP system with Lift IQ* production life cycle management service.

RESULTS

- Decreased power consumption by more than 20% compared with prior third-party ESPs.
- Increased well production by 12%.
- Extended run life from 50 days to more than 200 days.



Power costs and short ESP run life reduce production

ESPs are commonly used to optimize production from high-flow-rate, high-water-cut wells in the mature fields of Western Siberia. Power consumption accounts for most of the overall lifting cost. High sand production and scale formation severely limit ESP run life. Operators are looking for ways to reduce the power draw while improving ESP reliability and longevity in such harsh conditions, which would directly translate into lower overall production costs.

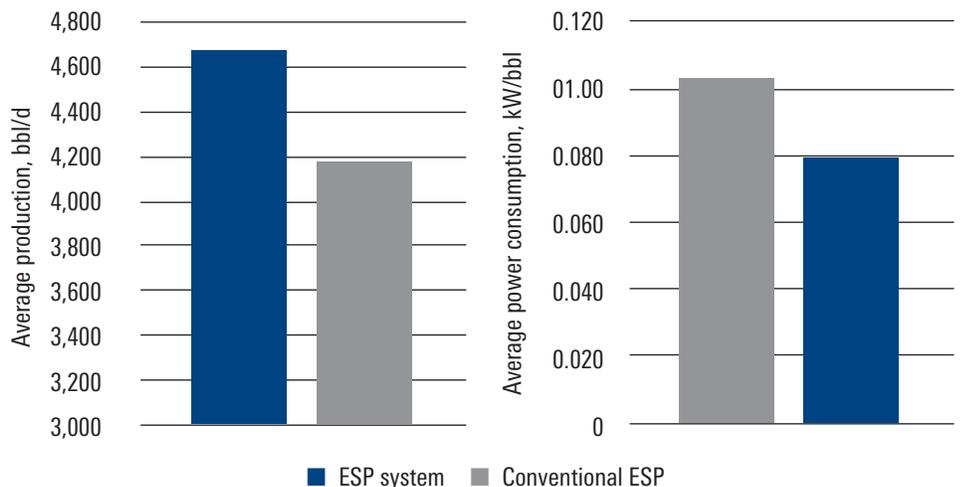
With a combination of high water cut, abrasives production, and high dogleg severity (DLS) at the pump setting depth, Salym Petroleum was experiencing increased power consumption, higher operating costs per unit of oil produced, and frequent failures of a third-party conventional ESPs in one well. Two of the third-party ESPs failed after less than 50 days of production because of sand abrasion, plugging, and heat damage related to scale deposition. The result was repeated workovers and deferred production.

Abrasion-resistant pump and monitoring service optimize efficiency

Schlumberger engineers recommended installing an energy-efficient ESP system with Continuum stages protected by antifriction coatings. The system would be engineered with an RC4000 high-efficiency pump to reduce energy consumption, and the stage coatings would minimize long-term damage from sand abrasion and scale.

Schlumberger also recommended the Lift IQ service, which monitors and optimizes artificial lift equipment in real time 24/7/365 from Artificial Lift Service Centers around the world. The service relies on data from installed sensors and data acquisition units.

For the well in this case, surveillance engineers focused on maximizing system efficiency and optimizing the drawdown to increase production while controlling the sand influx.



Production increased and power consumption decreased after Salym Petroleum replaced a third-party conventional ESP with an engineered system containing Continuum stages and an RC4000 pump and began monitoring ESP performance with the Lift IQ service.

Power consumption drops and production improves

After the new ESP system was installed, the average power consumption per barrel of liquid produced dropped by 20% from 0.1 to 0.08 kW/bbl, mostly because of the significantly more efficient pump but also because of Lift IQ service adjustments to maximize that efficiency.

In addition, the average well production increased by 12% from 4,180 to 4,680 bbl/d [664 to 744 m³/d] because the pump design and Lift IQ service optimization enabled higher drawdown compared with the third-party ESPs.

The ESP system's improved efficiency also helps the motor and pump run cooler, further reducing the intensity of scale formation.

During Lift IQ service remote surveillance, engineers monitored and adjusted alarm and trip setpoints in real time to maximize flow rates (drawdown) with available downhole motor HP and surface power system disturbances and limitations. These actions eliminated ESP nuisance trips and deferred production.

The engineered ESP system continued to operate without issues for more than 200 days, surpassing the run life of the third-party conventional ESPs by more than three times.