

# +20% production gain, 40% energy saving

## Group of fields in Western Siberia, Russia

### Complicating factors

- Narrow operating range of existing ESPs
- Gas content at pump intake is above 60%
- Sand content is above 1,500 ppm (1,500 mg/l)
- High DLS
- High power consumption

### Results

- Oil production has been increased by an average of 20%
- Specific power consumption has been reduced by an average of 40%
- Runlife has been increased by 23%
- The runlife of UHS ESP has reached 15,000 successfully operated cycles in the well with over 2,000 ppm (2,000 mg/l) of sand content
- Total cost of ownership in comparison with competitors has been reduced by 25%

**There is the case of successful mass implementation of Ultra-High-Speed ESP Systems (UHS ESP™) at a group of fields in Western Siberia.**

**The project was targeted to produce oil and gas safely and efficiently and to reduce Total Cost of Ownership (TCO). From the beginning of the project the total number of installations exceeds 300 units.**

Fields' reservoirs are found at 6,900–8,200 ft TVD (2,100–2,500 m TVD). Oil wells are drilled from well pads, ESP friendly deviated along 8,860–11,500 ft MD (2,700–3,500 m MD) and completed with 7" (177,8 mm) and 6.61" (168 mm) API Casing. Downhole temperatures are ranging between 176 and 212 °F (80–100 °C).

After doing research and detailed analysis, we proposed installing several models of Ultra-High-Speed ESPs with a nameplate operating speed of 10,000 rpm:

- Low-flow rate **UHS-200** system designed for NP flow range from 50 to 280 bblpd with 190 bblpd at BEP (from 8 to 45 m<sup>3</sup>/d with 30 m<sup>3</sup>/d at BEP)
- Wide-range **UHS-500** system designed for NP flow range from 125 to 560 bblpd with 500 bblpd at BEP (from 20 to 90 m<sup>3</sup>/d with 80 m<sup>3</sup>/d at BEP)
- Power efficient **UHS-600** system designed for NP flow range from 280 to 720 bblpd with 500 bblpd at BEP (from 45 to 115 m<sup>3</sup>/d with 80 m<sup>3</sup>/d at BEP)

Upon every phase of technology deployment the client evaluated obtained results. They were found stable and consistent with prior results, allowing to development of a solid economic model.

Since 2016 **UHS ESP™** systems are approved for use in group of fields under Lex engineering support and supervision.

We centrally managed the monthly delivery of equipment for installation or maintenance between the field base and the main repair facility. Also, we rejected the field workshop construction due to the compact design of the **UHS ESP™** system and minimum on-site preparation requirements.

The obtained results proved the high potential of Lex UHS ESPs to optimize production and provide operational advantages in harsh well conditions.

**UHS ESP™** advantages vs. standard equipment:

- Wide operating range provides adapting to inflow changes keeping high efficiency
- 3 times reduced length of the **UHS ESP™** string gives passing high DLS wells
- Improved gas separator efficiency leads operating with 75% gas at the pump intake
- Reliable operation with sand content up to 2,000 ppm (2,000 mg/l) is possible due to wear-resistant stage materials

Implementation of Lex Ultra-High-Speed (**UHS ESP™**) technology is increasing despite oil prices drop and OPEC+ 2020–2021 restrictions. For today, we installed more than 500 units at offshore and onshore projects worldwide.