

New Technologies Optimize Production

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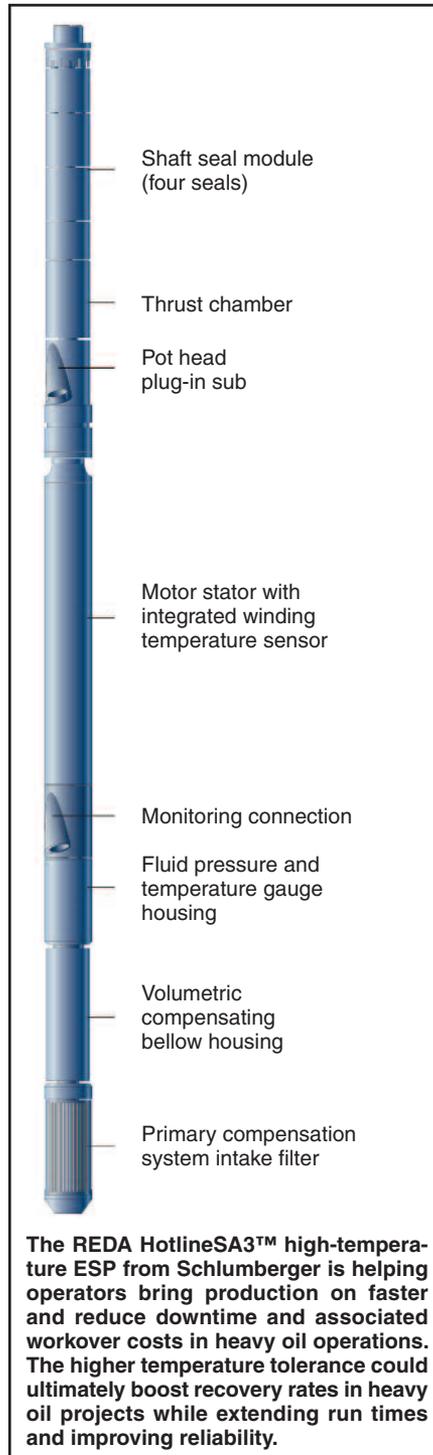
Optimizing production economics is always a concern for oil and gas companies, but with robust demand and high activity levels creating upward pricing pressures on all types of equipment and field services, production optimization has become a top priority to maximize revenue streams in both conventional and unconventional fields. Consequently, operators are examining their oil and gas properties to determine how advanced technologies and services can help them improve production performance and better monetize the value of their assets.

Equipment manufacturers and service companies are responding by rolling out new technologies in an effort to help operators meet their production goals while minimizing costs and staying ahead of increasingly stringent emissions regulations. Downhole technological advances in solids separators and electrical submersible pumps are helping operators get the most out of producing formations. On the surface, innovations are reducing fuel costs, enhancing safety and giving producers the ability to more efficiently monitor equipment on remote production sites to reduce downtime and bolster the bottom line.

High-Temperature ESP System

Schlumberger's new third-generation electric submersible pump for steam-assisted recovery operations and geothermal applications already is enhancing production for heavy oil producers in western Canada and the Middle East, according to Sergio Oscar Peric, product champion for Hotline systems.

In addition to increasing production, the REDA HotlineSA3™ high-temperature ESP system is helping operators bring production on faster and reduce downtime and associated workover costs, Peric says, noting that the pump is designed to withstand bottom-hole temperatures to 250



degrees C (482 degrees F) to accommodate demand for higher-temperature equipment to maximize recovery, especially in western Canadian tar sands.

“The higher temperature rating allows operators to install the ESP at the earliest stages of developing the drainage chambers, when pressure and temperature are highest in SAGD heavy oil recovery wells,” he says.

Peric says the hotter temperature tolerance could potentially boost recovery by an additional 15-22 percent from current values in such wells. “We do not have hard data yet because some of these units are only now being pushed to the upper temperature limits of 250 degrees C, but there is certainly strong potential for improved recovery rates,” he holds.

The HotlineSA3 is engineered to build on previous generations of REDA Hotline ESPs for improved reliability and run lives to reduce workover costs in heavy oil operations. “While the new 250-degree C systems already have surpassed 400 operating days on some projects, older-generation systems are exceeding 2,000 uninterrupted working days before a workover is required,” Peric says. “We expect the HotlineSA3 will extend run life even further.”

The new motor system is fully integrated and comes sealed from the factory, requiring no preassembly or oil filling in the field, Peric notes. “The preassembled design simplifies installation, which means there is less likelihood of making mistakes, which obviously helps with system reliability,” he says. “Additionally, it eliminates assembly and oil filling time in the field and speeds installation in the well.”

The motor uses high-temperature materials and is factory filled with ultrahydrated dielectric oil encased within a sealed housing, Peric explains. The system includes a multifunction integrated motor unit, thermally compensated pumps, downhole monitoring gauges for pressure and temperature, power cables and a surface controller, according to Peric, who adds that integrated monitoring and control

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through reliable fluid pressure, temperature and internal motor temperature measurements help reduce subcool and steam-to-oil ratios.

“The integrated system monitors pressures and temperatures at the intake, where the fluid is going into the pumps,” he says. “This is critical, because if operators understand how fluid is behaving at the intake, they can control the pump

properly and keep production as stable as possible or shut down if necessary. This helps the system withstand unstable production environments that are typical of heavy oil operations and accompanying steam-assisted recovery.”

The ESP system achieved third-party qualification at C-FER Technology laboratories in Canada, with collaboration and sponsorship by ConocoPhillips. It

also has undergone extensive field testing in SAGD fields in Canada and steamfloods in Oman, Peric reports. “The criteria set for field testing was in excess of 2,000 cumulative running days for eight operators, and the objective was surpassed. To date, individual units have passed 400 days at the highest possible well temperatures,” he relates. □