Remote, Real-Time Surveillance and Control

Case study: Phoenix MultiSensor monitoring system motor temperature protection prevented ESP failure

Challenge
Phoenix* MultiSensor* monitoring systems were installed with REDA* electrical submersible pump (ESP) systems in 18 wells in the Wafra field for Petroleum Development Oman. On Well 9 in March 2003, unknown to the operator, an ESP was running against a closed valve and the motor temperature increased because there was no cooling flow.

Solution
The motor oil temperature was one parameter used as fail-safe protection against adverse operation conditions for the ESP. Threshold operating limits were preprogrammed in the motor controller. Therefore, the ESP was automatically shut down at 120 degC motor temperature, preventing a failure.

Results
The shutdown point protected the ESP from exposure to excessive temperature. The intelligent controls minimized ESP shutdowns, prolonging run life.

Temperature monitor tripped
Phoenix MultiSensor monitoring systems were installed with REDA* ESP systems in 18 wells in the Wafra field for Petroleum Development Oman. On Well 9 in March 2003, the ESP was automatically shut down at 120 degC [248 degF] motor temperature, preventing a failure.

Fail-safe protection
The motor oil temperature was one parameter used as fail-safe protection against adverse operation conditions for the ESP. Threshold operating limits were preprogrammed in the motor controller. The shutdown point protected the ESP from exposure to excessive temperature, thereby minimizing ESP shutdowns and prolonging run life.

Postevent data analysis by the LiftPro* XP proprietary software package showed the ESP was running against a closed valve. The motor temperature increased because there was no cooling flow. Analysis of the typical ESP motor control data indicated that the amperage had not reached the threshold for shutdown. The additional protection provided by the Phoenix MultiSensor gauge was essential in saving the ESP.

Analysis of intake and discharge pressures showed the ESP running at maximum head and close to zero flow. The gradient traverse plot and pumphead curve showed little drawdown on the reservoir and validated poor ESP operating conditions. The resulting wellhead pressure diagnosis indicated a closed valve at surface.

Data from MultiSensor monitoring system shows motor temperature trip.
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**Detailed, remote diagnosis**

Remote, real-time surveillance and control of ESP field operations using key downhole monitoring parameters are made available through the espWatcher* service. When required, Schlumberger experts can perform a detailed emergency diagnosis remotely with espWatcher Web-based data and LiftPro XP artificial lift analysis and optimization software.

*Mark of Schlumberger

Shut-in pump gradient traverse plot.

Shut-in pumphead curve.

E-mail wcp@slb.com or contact your local Schlumberger representative to learn more.