MATURE FIELDS

UNCONVENTIONALS

Well Surveillance and Monitoring Service

360° COVERAGE OF WELL OPERATIONS AND 24/7 EXPERT ANALYSIS

SUMMIT ESP

A HALLIBURTON SERVICE

Summit ESP® Well Surveillance and Monitoring Service

ANALYZE AND UNDERSTAND WELL CONDITIONS

Summit ESP® – A Halliburton Service uses a holistic approach to well surveillance. Backed with 24/7 monitoring services, this approach increases production, improves run life, and reduces downtime and labor. Monitoring is a key part of increasing production and extending run life. Maximizing run life requires flawless execution during every part of the electric submersible pump (ESP) run cycle.

Operational Benefits

Real-time well surveillance increases the return on investment of an ESP system and the multimillion-dollar investment in the well's production potential. Without the use of a monitoring system, optimizing an ESP can require extensive labor and onsite field service. Operators are forced to send field personnel to the wellsite to collect performance data and restart wells after nuisance shutdowns due to set points that quickly become irrelevant as well conditions change.

The Summit ESP well surveillance service eliminates the need for manual interventions. Set points can be adjusted without the need to send field personnel out to location. Operators are able to specify acceptable operating ranges via a remote computer or mobile device. If an operating parameter drifts outside of the specified range, the operators are automatically alerted through text messages, phone calls, or emails. This alert system allows for rapid intervention without the added expense and delays associated with dispatching field personnel to remote well locations where cell phones may not function.

Our full-service intensive monitoring platform arms analysts with all set points and logs, enabling them to act quickly and accurately in real time.

Effective applications are designed by incorporating lessons learned from operations, real-time monitoring, field optimization, and the results of root cause analysis from previous runs.

Flexible Systems

The well surveillance platform supports multiple SCADA systems that store key operating parameters in a centralized database for remote monitoring, analysis, and control.

Our proprietary web-based field service ticketing, dispatch, and applications engineering system gives our monitoring group a complete 360° view of each well's equipment and operations.

The SCADA systems track and plot key parameters in real time, including motor current, variable-frequency drive (VFD), winding temperature, and pump intake pressure into an interface that has been optimized for readability. Operators and Summit ESP service professionals closely monitor trends and either remotely make any necessary adjustments or notify field personnel.

Optimize Performance

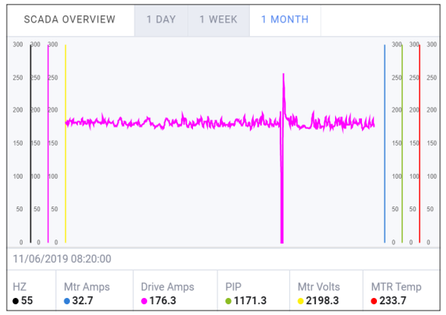
A team of degreed petroleum engineers continuously monitors wells on a 24/7 basis from our state-of-the-art monitoring center. For every newly installed system, our engineers configure personalized alerts that automatically notify field personnel and engineers of any problems. Each time a well is surveyed, our engineers reassess alerts to minimize nuisance alarms and optimize performance.

Using proprietary web-based applications engineering software, surveillance engineers mathematically model the operating conditions of downhole equipment and the inflow characteristics unique to each well, allowing them to fine-tune operating conditions, maximize production, reduce operating costs, and extend run life.

Many operators hold regular weekly meetings with Summit ESP surveillance engineers and regional personnel, where they are presented with an overview of their wells' performance. These meetings allow operators to work together with diverse ESP experts to get the most out of their operations. Our surveillance engineers often also assist in monitoring wells on an operator's in-house SCADA well management systems.

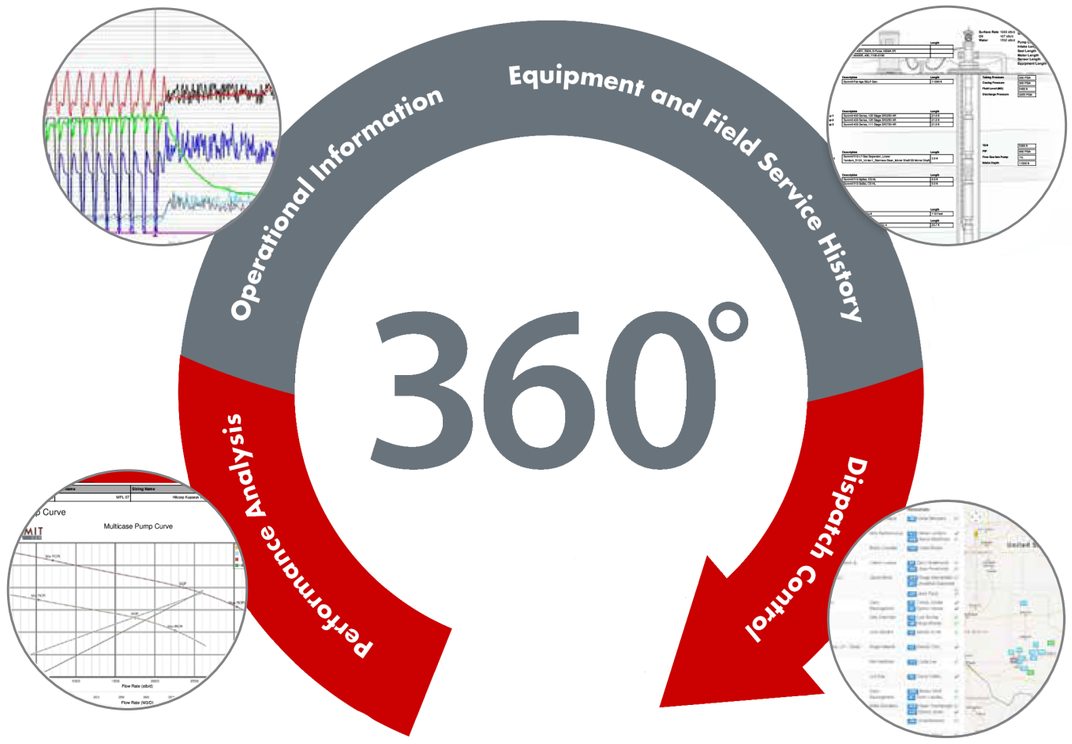
360° VIEW OF OPERATIONS

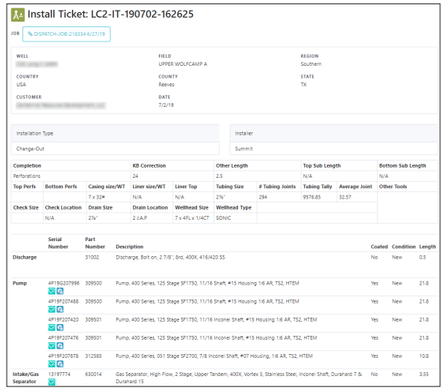
Our well applications engineers have access to a complete 360° view of every well's operational information, downhole equipment, application design, and field service history. This allows the engineers to analyze and understand each well's operational conditions and to identify when there is an issue.



Operational Information

Monitoring the SCADA parameters for each well is just the first part of the picture. The SCADA system itself allows engineers to understand the in-situ operational condition of the ESP – when to make remote adjustments and when to notify field personnel of any issues or shutdowns.



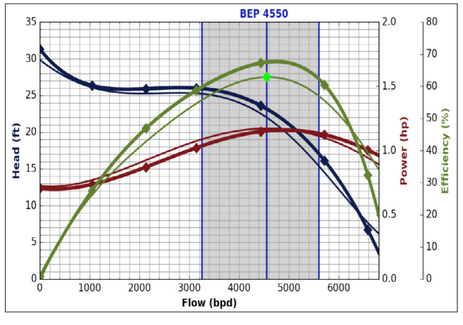


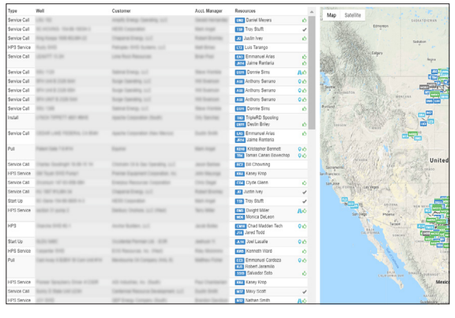
Equipment and Field Service History

Summit ESP well surveillance systems offer access to each well's equipment and field service history. Our proprietary web-based field service and equipment tracking system provides a comprehensive history of every well. It gives operators and applications engineers an immediate overview of currently installed equipment. Further, it provides a complete history of all field service interventions, previous problems with the wells, and what was done to fix those problems.

Performance Analysis

The Summit ESP monitoring service provides access to its proprietary web-based sizing system. Our web-based applications engineering software enables operators and applications engineers to quickly perform performance analysis on wells, model current operating conditions, and make recommendations on how to optimize production and extend run life.





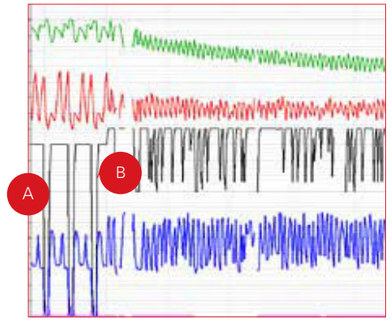
Dispatch Control

The Summit ESP dispatch system provides a complete view of all available field service technicians and their current locations. This real-time dispatch system allows customers and applications engineers to view the well and field via global positioning system data, see real-time locations of nearby field service technicians, and quickly dispatch them to wells that require immediate attention.

Case Study: Gas Locking

In one scenario, the unit experienced repeated shutdowns due to high motor temperature. (A) The drop in current indicates that the shutdowns are due to gas interference. The increased gas volume limits necessary liquid flow from effectively cooling the motor. In this case, the monitoring team notified the salesperson/field personnel of this event and the proper steps were taken to remedy the problem. (B) Our gas lock mode was implemented to automatically adjust the frequency of the variable-speed drive (VSD) to account for the changes in motor current and intake pressure. This mode significantly reduces the number of shutdowns and increases the overall efficiency of the pump.

Gas Locking

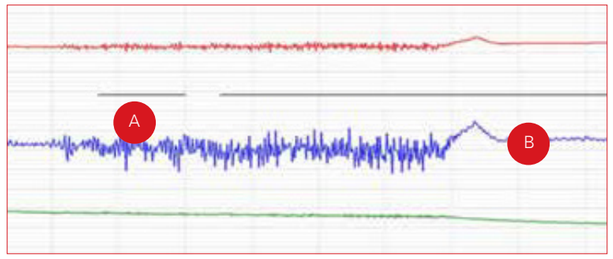


Motor Current (amps)
Motor Temp (ºF)
Motor Frequency (Hz)
Intake Pressure (psi)

Case Study: Gas Interference

This scenario has the intake pressure nearing the bubble point pressure of the fluid (A). Gas starts to come out of solution, and the motor current and temperature behave more erratically. To optimize the running conditions of this well, the surveillance team alerted the field personnel and recommended adding back-pressure to the system. Once the choke was adjusted (B), additional tubing pressure increased the pump intake pressure and forced the gas back into solution, stabilizing the motor current and temperature. This allowed the pump to operate under more optimal conditions, thus extending the life of the pump.

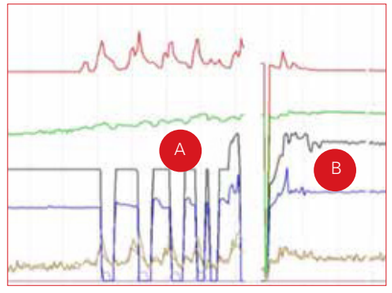
Gas Interference



Case Study: Intake Blockage/Plugging

In another case, the intake of the pump became blocked or plugged with debris from the well. (A) As the pump intake started to plug, the intake pressure and equipment vibration steadily increased, along with motor temperature. The increased vibrations indicate that solids were entering the system. At this point, the surveillance engineer notified the operator and recommended flushing the well. (B) After the unit was flushed, a proportional integral derivative (PID) mode was applied to optimize the running conditions of the pump. This mode allows the operator to maintain a selected parameter at a constant value by varying the drive frequency. In this case, the frequency is adjusted to maintain a steady motor current – thus ensuring consistent production over time, and allowing the operator to reuse its equipment.

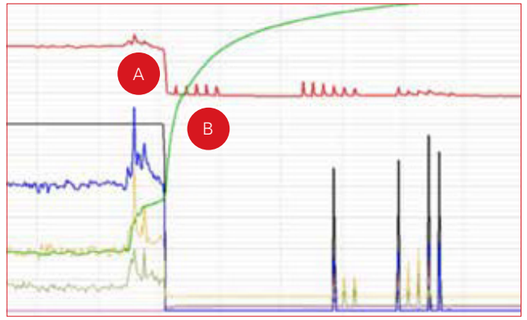
Gas Blockage/ Plugging



Case Study: Remote Shutdown

Sometimes, a well needs to be shut down remotely in order to prevent costly damage to the equipment. In this case (A), solids and debris started to enter the pump, causing a spike in motor current and intake pressure. The equipment vibrations also increased as the debris was ingested. Once the monitoring team saw the spikes in the trends (B), it was able to shut down the well remotely via computer before the debris could do any further damage to the equipment, allowing the operator to reuse its equipment.

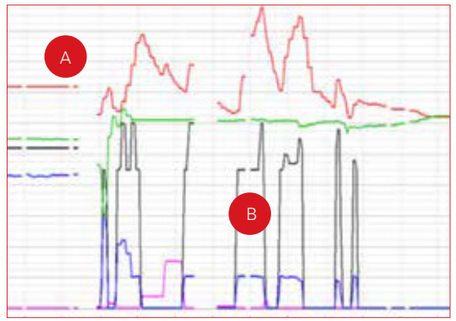
Remote Shutdown



Case Study: Broken Shaft

Here, the pump was running under normal conditions with no problems and then shut down (A). Several attempts to restart the pump were made; however, each time, the motor current failed to reach its normal operating value and the pump intake pressure (PIP) was not drawn down (B). Low current draw and decreased drawdown are signs of a broken shaft. At this point, the monitoring group notified the salespersons and field personnel of the issue, so the pump could be pulled, assessed, and replaced. The quick response of the monitoring team prevented further damage to the equipment, saving costly repairs and allowing the operator to reuse much of the equipment.

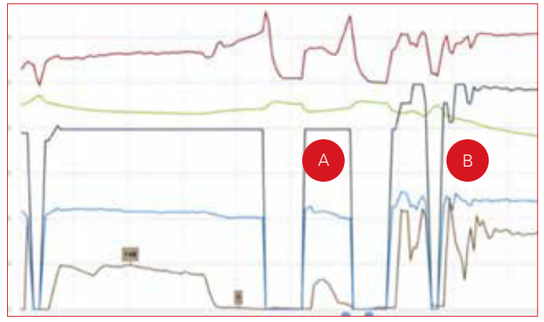
Broken Shaft



Case Study: Deadheading

(A) The discharge valve was mistakenly left closed. This resulted in a spike in the intake pressure and motor temperature, and a lack of drawdown. In the deadheading condition, the temperature of the motor rose because the unit was no longer cooled by the flow of production fluid. The surveillance team notified field personnel. (B) Once the discharge valve was opened, production returned to normal, averting a downhole failure and deferred production.

Deadheading



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