



APPLICATION SPOTLIGHT

Wireless Remote Monitoring of Pump Jack Operation in Oil Fields



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APPLICATION:

A pump jack is a common sight in the oil field used to mechanically extract crude oil out of a non-self-flowing well. Ensuring pump jacks operate according to schedules is imperative to oil production. Hundreds of thousands of existing pump jacks in North America are not instrumented and must be configured as part of a remote monitoring and control system to optimize operations.

PRODUCT SUPPLIED:

- TiltSCOUT intrinsically safe wireless inclinometer sensor for tank hatch detection
- Gateway Stick - Integrated Gateway and High-Gain Antenna that serves as the processing hub for data obtained from the TiltSCOUT
- Two-way mesh network - allows wireless nodes to automatically setup without configuration.

CHALLENGE:

Monitoring pump jack status without remote monitoring is ineffective and costly. But, retrofitting pump jacks into a wired remote monitoring system is expensive and time-consuming. A wired sensor control system requires cable runs from the control room to the pump jack to wire sensors into a network. The wire length between the two points could represent a significant expense. Even when considering wireless asset monitoring technology, the network must operate over wide expanses

of the oil field and hardware must stand up to hazardous environments and easily integrate into existing equipment.

SOLUTION:

The SignalFire Remote Sensing System™ (SRFSS) offers a wireless remote monitoring and control solution that eliminates wire requirements and retrofits into existing Pump Jack machinery. Instead of wired sensors, the SRFSS utilizes a TiltSCOUT as a wireless node that both monitors and reports pump jack motion status to a central Gateway for transmission to a control center for remote monitoring.

The patent-pending TiltSCOUT uses a three-axis sensor that continually monitors angle to detect the pump jack's cyclical up-and-down motion to verify operations and report on/off events. With feedback from the wireless sensor, workers can determine if a pump jack is idle to can take immediate corrective action to ensure proper operations. Modbus or digital alarming is available at the Gateway of the remote monitoring and control network so operators can receive notifications if the pump jack stops.

Instead of wiring sensors the TiltSCOUT magnetically attaches to the pump jack without any tools. Featuring a small footprint and simple design, the angle sensor is easy to install. Operators simply hand mount the TiltSCOUT on the pump jack. With



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a NEMA4X enclosure for outdoor environments, the unit is Class 1 Division 1 certified for use in hazardous locations.

This maintenance-free, non-contacting sensor incorporates a 900mHz radio and antenna for long-range data transmissions (up to ½ mile), and an internal battery pack that supports offers long-term operation of five years.



Instead of wiring sensors to the pump jack as part of a remote monitoring and control system, the TiltSCOUT magnetically attaches to the pump jack without any tools. Operators simply hand-mount the unit in any orientation, calibrate the zero position with a local push-button, and the unit checks in with the Gateway automatically.