SIGNALFIRE
WIRELESS TELEMETRY

APPLICATION SPOTLIGHT

SignalFire Remote Sensing System with Pressure Scout Monitors Water Tower Pressure and Water Supply Levels

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APPLICATION:

Water towers are used by many communities to provide a reliable water supply during peak usage hours and power outages. These elevated structures are deliberately tall to maintain sufficient pressure to deliver potable water by gravity through a pump distribution network that supplies water to homes. As residential water pressure ranges between 45 and 80 psi (pounds per square inch), the average height of a water tower must be around 165 ft. to deliver water at pressures between 50-60 psi. Municipalities must monitor the overall water distribution system to ensure proper pressure and water levels. Pressure management is critical as too high or low pressure levels could result in inefficient system operations and damaged pumps.

PRODUCT SUPPLIED:

- **PressureSCOUT:** Integrated wireless node, pressure sensor, and intrinsically-safe internal battery in one package
- **Gateway Stick:** Integrated gateway and high-gain antenna

CHALLENGE:

Typically, pressure sensors are strategically mounted in the tanks of water towers to measure pressure to determine the water level. Pressure sensors are also placed on the suction and discharge pumps to monitor pressures. Because of the height of the water towers, maintenance to sensors hardwired to a control system is costly. Operating in the outside environments of the water distribution system, wired monitoring systems are susceptible to lighting strikes and ground faults that can destroy sensors and everything wired to it. Running power lines in conduit on water towers also is an expensive and difficult.

SOLUTION:

A SignalFire Remote Sensing System (SFRSS) is capable of monitoring the complete water distribution system in outdoor environments without the need for wires, power sources or separate pressure sensors. While most remote monitoring and control systems must install both an independent digital pressure transmitter and a radio device on the water tower, the SignalFire Wireless Telemetry system utilizes the PressureSCOUT that integrates a battery-powered pressure sensor and integral radio with a transmission range of up to ½ mile.

Adding PressureSCOUTs on both the suction and discharge of the pumps in the water distribution system is easy as the SFRSS system recognizes new devices and seamlessly integrates them into the system. When operating within a ½ mile range of a Gateway, PressureSCOUTs automatically mesh into the network. Working in one wireless monitoring and control network, multiple PressureSCOUTs can provide feedback at various points to verify water levels and ensure the system is working in balance.

The PressureSCOUT integrates with a Gateway that stores the most recent sensor readings in the network in Modbus format. An Ethernet interface module connects the Gateway to a local area network, a WI-FI network, or a cellular modem,

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bringing the information to laptops or smartphones. Maintenance staff can monitor water levels on a smart phone or iPad from the convenience of their trucks while operators at the main dispatch can view status on laptops.

A mesh network supports a long-range data transmission that sustains signal strength through terrain, structures, or weather. As a result, the SignalFire wireless system can operate unattended for years without being affected by environmental conditions such as snow, rain, dust storms and ice.

CONCLUSION:

A SignalFire Remote Sensing System (SFRSS) is uniquely designed to wirelessly monitor the water distribution system in all locations as it is battery powered, rugged and low-maintenance.

Ideal for outdoor application, the SRSS system is not susceptible to ground faults or lightning strike effects that effect wired systems. Depending on the terrain and size of the overall water distribution system, the sensor control system can operate on a meshed network with PressureSCOUTs operating within ½ mile to one another or by positioning additional solar-powered Gateway antennas.

Eliminating the need for cabling, individual pressure sensors or external devices to power the sensor, the PressureSCOUT represents a very cost-saving and low-maintenance solution for monitoring the water distribution system.

Monitoring Critical Pressure Measurements and Water Levels in a Water Distribution System

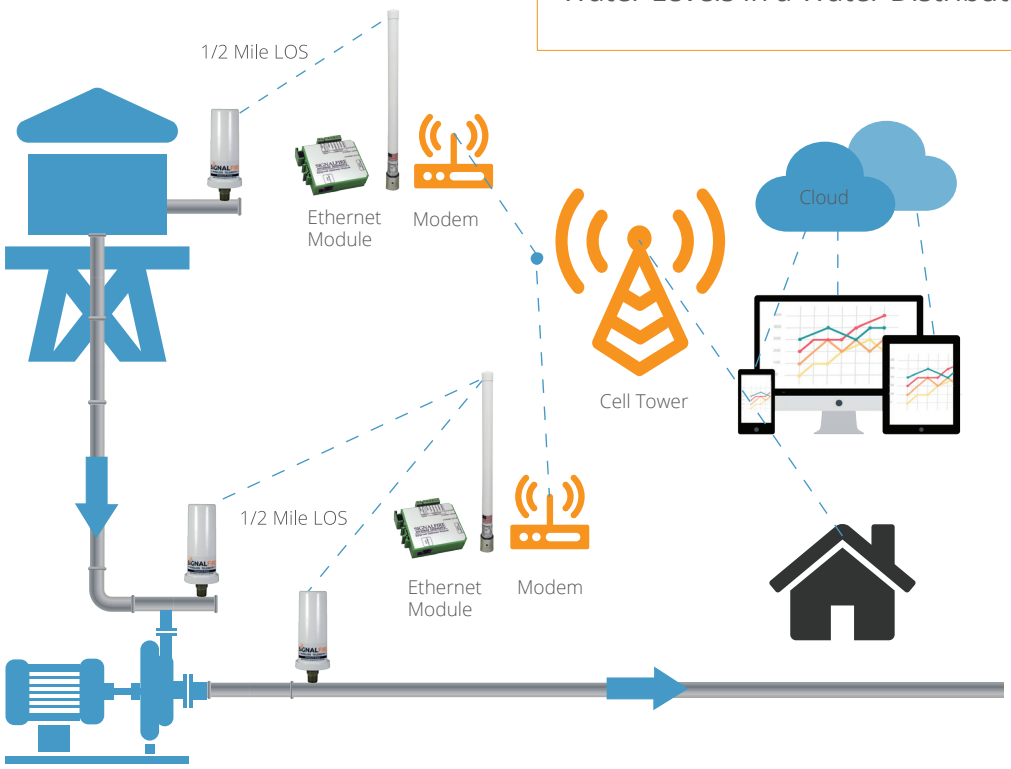

Figure 1 *illustrates the working configuration of a SignalFire wireless remote sensor system in a water distribution system. PressureSCOUTs are installed on the water towers and pumps to monitor water levels and pressure. Data is sent to a Gateway that connects to an Ethernet interface module, which ties information into either a local Wi-Fi network for local access or a cellular modem that connects the Internet and a cloud service provider. Field personnel can access data via a web browser on their mobile laptop or cellular devices while performing maintenance or troubleshooting.*