

Case study

Oil and Gas

Wireless solutions in high-noise environments

Wireless communication for tank farm applications



Summary

- BP validates Phoenix Contact Trusted Wireless technology for reliable data transmission in high EMI environments
- Data radios with I/O provide easy-to-wire-and-install wireless system for access to remote I/O site without additional remote PLCs
- Additional diagnostic values, such as RSSI, power supply voltage and site temperature are provided at no additional cost
- Return on Investment (ROI) was over \$75,000

Customer Profile

British Petroleum

BP, originally British Petroleum, is a British oil and energy company with global headquarters in London. It is one of the largest private energy corporations in the world. In the United States, BP operates numerous refineries, including one in Ohio.



Remote monitoring at BP Refinery

Challenge

At this refinery, engineers and technicians researched wireless communication possibilities for increased efficiency and timer monitoring. They needed to determine whether reliable data transmission via radio would stand up to an environment with a high level of EMI, and if the cost of cabling a large area with remote storage tanks could be reduced or eliminated.

The power stations close to the plant carry large amounts of power via high-voltage lines, creating strong interference fields. The possible negative effects of these voltage fields to wireless transmissions were the primary concern. The installation sites of the monitored crude oil tanks did not have their own power supply, which required battery power at any remote sites.

For a proof of concept, the BP engineers selected a remote ground-water pump, monitoring level with an ultrasonic level meter. The water level was indicated via an industry standard 4-20mA analog signal and when a high level limit was reached, a digital alarm signal was generated via a remote contact. Due to the remote location of this pumping station, cabling for the level and alarm information would have been cost prohibitive and impractical.

Solution

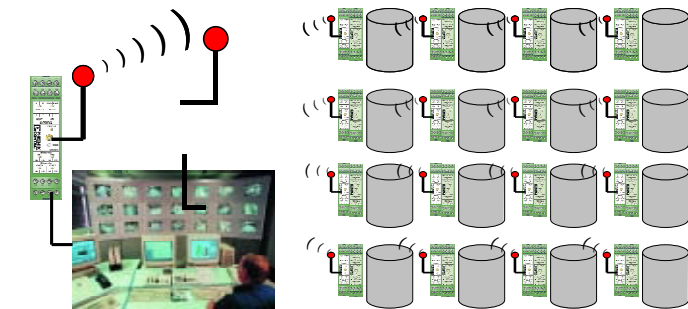
BP installed the Trusted Wireless Data Radio with I/O system from Phoenix Contact to collect the analog and digital I/O data from the remote site and transmit that data wirelessly back to their control station. The wiring at the remote site was straightforward using I/O extension modules from Phoenix Contact.

These add-on I/O 'slices' allow I/O wiring to take place as it would in a hard-wire system, but the I/O transmits to another transceiver without wires, making this modular I/O approach flexible for future system expansions.

At the control room, the data from the remote site was received with another Phoenix Contact Trusted Wireless data



Solar Interference System (SIS) from Phoenix Contact provides wireless telemetry at remote tank monitoring site without an A.C. power source



RAD...ISM-DATA-BD BUS system provides easy access to level and alarm data in tank farms

radio where it was interfaced to the plant's Honeywell DCS system (TDC3000) via RS-232 wired cable talking MODBUS protocol. This allowed the DCS to read and write data to the remote site in the same way as a conventionally wired system.

Another advantage of the solution was the option to evaluate additional information from the wireless system. In addition to the groundwater level and alarm status, the DCS can also poll RSSI (receive signal strength indication), supply voltage generated by the solar power system, as well as the local temperature inside the RTU (remote terminal unit) via MODBUS registers inside the Trusted Wireless Data Radio. These values are supplied at no extra charge and can be archived in the DCS using trend diagrams.

Results

BP determined that if the system required cabling, it would require ditches and cables installed over a distance of approximately 2,300 feet. The cost of completing this depended on the type of surface to be excavated for cable installation. BP estimated that by going wireless, they could save over \$75,000 in installation costs.

According to BP, the wireless communication system was exceptionally reliable in the high EMI environment. As a result, BP implemented wireless technology for the level monitoring function for all the crude oil tanks on this site and at an additional plant on the Ohio River. Wireless technology was installed in a total of sixteen crude oil tanks at the plant. In addition to the Ohio site, BP has since taken several previously cabled sites, each with up to fifty tanks, and implemented wireless monitoring from Phoenix Contact.

For more information visit

www.phoenixcontact.com/wireless