A big part of what we do involves making sure that data gets from point A to point B. The ubiquity of smartphones makes it easy to *expect* communication technology to simply work, but in reality a great deal of effort is required to ensure that level of confidence. A recent example, PEI provided telemetry upgrade services for a client operating two wastewater treatment plants, various pump stations and 20 remote lift stations. The telemetry and alarm system for the remote lift stations were obsolete and needed to be replaced. The existing system used voice/data radios for alarm notification. Alarms generated at remote sites were reported over the radio system as a tone that was identified at the master site. The alarm was displayed single line dot matrix printer. Operators were alerted to the alarm condition simply by hearing the tone on the radio or by a hardwired auto dialer.

This system had many limitations such as requiring the operator to go to the main plant to see what alarm was active and not knowing if communications with each remote site were functional without triggering an alarm condition. In addition, replacement parts for this system were very difficult to find. These deficiencies had become apparent to our client and several projects were started to design and install a new system, but due to budget and resource limitations none of these projects were completed. In the spring of 2013 Portland Engineering was tasked with the design and implementation of a new telemetry and alarm system. Our client had already purchased some hardware (Siemens PLC's and radio modems) for replacing the system but did not have the resources internally to bring the project to completion.

PEI evaluated the requirements of the system to determine if the hardware that had been purchased was suitable for the job. Immediately following the evaluation PEI assembled the necessary hardware and programming to do a proof of concept to demonstrate communication using the exiting radios and the functionality of the operator interface and alarm notification system.

PEI developed programming for Siemens S7-1200 PLC's, Teledesign TS-2000 modems to communicate using the data capabilities of the existing radio system. One PLC was programmed as the Master Telemetry Unit (MTU) that would actively poll 20 Remote Telemetry Units (RTU). A new Wonderware Intouch operator interface application was created to monitor and display alarms and alarm notification is managed using a Win911 application. A primary requirement for the project was to install and startup the new system must be installed and tested in one day. To accommodate this requirement, PEI tested and simulated all PLC, modem, operator interface and alarm dialer programming on the bench to ensure correct functionality.

System installation consisted of installing a new PLC control panel at each site and wiring existing alarm relays, installing the MTU PLC at the main plant, re-configuring the radios and testing communication, alarms and notifications. Due to the extensive testing and simulation, very few changes to the system programming were required and the system was started up and tested as fast as the new equipment could be installed. The entire system was installed and tested in less than 14 hours. Using equipment purchased by the client, PEI completed this project over the span of 3 months for less than $20,000 in engineering fees and $5,000 in panel construction costs.