

Pipeline Integrity Monitoring By Wireless

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The key building block to a cost-effective, pipeline integrity, corrosion protection program is vital, timely wireless monitoring and reporting of cathodic protection data from remote corrosion protection field sites to a centralized data collection system complete with automated regulatory reporting. The first step in implementing this level of automation technology exists today in the form of supervisory control and data acquisition systems (SCADA). Now there is a radio-based system that can support these requirements.

Energy and pipeline companies are wrestling to meet new stricter state and federal pipeline integrity requirements while trying to control operating costs. Recent pipeline news events elevated corrosion and cathodic protection to the front page in news outlets across the nation. This raised public concern to the extent the U.S. Congress and several states are working on legislation directed specifically toward cathodic protection practices.

Many companies are looking to new technologies and automation for answers. Some have tested and use cell phone technologies for remote pipeline monitoring. Unfortunately, ever-changing cell phone technologies have left some companies scrambling to stay ahead of telemetry obsolescence. Effective answers to critical issues affecting public safety often are found in a combination of both old and new technology.

Aging Infrastructure

From the time the first steel pipeline was constructed in Pennsylvania in the late 1870s to today, nearly 2.3 million miles of buried steel pipeline are now in place and aging. With roughly 70% of North America's energy supply running through these aging, metal assets, pipeline integrity management (PIM) has never been more important. To meet rising energy demands, new pipeline construction is at a record pace, driving steel prices to a historic high and making replacement pipe harder to come by. One creative pipeline company reportedly resorted to buying an existing buried line, unearthing it and reinstalling the pipe elsewhere.

Pipeline remote cathodic protection systems installed since the 1920s were implemented to protect these vital assets and extend their useful lifespan. However, maintaining these remote systems is onerous, expensive and difficult to optimize using aging tech-

nologies and practices. With many of the major domestic transportation pipelines reaching 50 years of age, national concerns are being raised about their long term integrity and ability to serve the public safely or economically. One analyst speculates that pipeline integrity issues alone could drive energy prices higher by 27%.

Legislation

As pipeline operations in North America grew, so also grew federal and state regulations governing the industry. Recent legislation passed by Congress further develops the legal implications of pipeline integrity management. At the heart of this growing legislative effort is protecting public safety, the environment, national energy reserves and the U.S. economy.

High-profile pipeline tragedies have placed increasing focus on the protection and integrity of all U.S. pipeline operations. Evidence of the increased national public awareness is shown by the passage of the Pipeline Safety Improvement Act of December 2002, and the Pipeline Inspection, Protection, Enforcement and Safety Act of 2006. Both acts serve not only to illustrate growing awareness, but also to spotlight pipeline operation best practices.

The Pipeline Safety Improvement Act of December 2002 mandates significant changes and new requirements in the way the pipeline industry ensures the safety and integrity of its pipeline facilities including:

- Each pipeline operator must prepare and implement an Integrity Management Program (IPM),
- Participation in planned-excavation one-call notification programs,
- Increased penalties for violations of safety standards,
- Authorization of state participation in interstate pipeline oversight,
- A multi-agency program of research, development, demonstration and standardization to enhance the integrity of pipelines, and
- An inter-agency task force to expedite environmental reviews when necessary to expedite pipeline repairs.



The Pipeline Inspection, Protection, Enforcement and Safety Act of December 2006 added further regulations.

While the recent Pipeline Safety Acts send a clear message of increased regulatory oversight of pipeline operations, they also provide a glimpse of even more stringent oversight at both the federal and state levels.

Corrosion Act

In March 2007, Bill H.R. 1770, the Corrosion Prevention Act of 2007, was introduced into the U.S. House of Representatives. This bill will provide a tax credit to companies that invest in corrosion control and mitigation technologies. H.R. 1770 directly benefits nearly all owners and operating companies that must protect their assets and businesses from the impact of corrosion and that must help protect the environment and public safety from the harmful effects of corroding assets.

Technology Obsolescence

Changing communication technologies have soured some energy and pipeline companies from implementing widespread remote monitoring of pipeline facilities. The recent switch from analog cellular technologies to the now diverse offering of digital protocols required the wholesale change of thousands of cell phone modems costing the consumer tens, and possibly hundreds, of thousands of dollars. Many companies were hit again for cell phone modem conversions when many communication providers switched to different digital protocols, once again costing tens of thousands of dollars. Understandably, companies are concerned about the long-term stability of their communications services provider.

In addition, homeland security issues are

leading more companies to reconsider farming out their communication systems outside the firewall. Many have or are considering implementing their own communication system in an effort to boost network protection of vital company assets.

New Technology

Since the early 1820s, transportation companies have turned to new technology to solve tough corrosion-related safety, environment and operation issues. The corrosion problems facing energy and pipeline companies today can be solved in much the same way. A new low-cost cathodic protection monitoring and reporting technology is helping pipeline owners and operators automate and optimize one of the most difficult, yet vital, of facility operations — corrosion protection systems. The solution is simple and the first step may already be in place.

First Step

A Supervisory Control and Data Acquisition (SCADA) system is the backbone to a wireless data communication network that sends and receives data to and from secure, central IT networks and remote field assets such as pipelines, compressor sites, pigging stations, pump stations, wellhead controls, tank farm units, rectifiers, pipe-to-soil test stations, city gates, measurement stations, isolation points and above-ground appurtenances.

For operational and security reasons, many



energy and pipeline companies already own and operate their own SCADA networks. Therefore, they can finish the job by leveraging their existing capital investment in SCADA through extending the data communication network farther out in the field to include their cathodic protection equipment as well. Many companies already remotely monitor measurement points, compressors and pumping stations using cost-effective SCADA solutions.

For companies that do not own a SCADA system, small-scale cathodic protection SCADA systems can be implemented with minimal investment in readily available software, off-the-shelf personal computers and the services of internal or external local integration companies. SCADA systems were first implemented in the 1960s and typically

were mainframe-based, thus, very centralized, used custom communication protocols and were very expensive to implement. Now, SCADA systems are commonly available for as little as a few thousand dollars, use open communication protocol such as Modbus, and implementation is simple through standardization and templating of basic pipeline operations.

Finish The Job

With an effective SCADA system in place, remote cathodic protection monitoring field devices are easily and cost-effectively installed on rectifiers, pipe-to-soil test stations, pigging stations and pressure monitoring points. Cathodic protection monitoring field devices automatically collect and report mission critical, corrosion

prevention data and transmit data back to the central SCADA system via wireless modems — often using an existing radio network.

Extending the companies' existing SCADA and radio infrastructure leverages this investment further and automates the operational function of cathodic protection monitoring. Many of the same reasons SCADA was justified in the first place years ago hold true of pipeline integrity automation as well:

- Public safety, company safety and operator safety;
- Reduced operator windshield time, road usage, vehicle maintenance, risk exposure and general liability insurance;
- Reduced operating costs, operators spend time on vital company functions rather than driving around collecting data;
- Automated and timely regulatory reporting;
- Timely operational data retrieval, with enhanced automated trending capabilities and alarming functionality and automated operator notification; and
- Enhanced cathodic protection performance — the systems get worked on in a timely fashion when problems arise, not three months later.

Today, multi-purpose, built-for-purpose, all-in-one, pipeline integrity automation, wireless, data communication radios are available that monitor and report all cathodic protection rectifier operations, automate rectifier interruption, monitor rectifier operational status, monitor and report pipe-to-soil potential, pipeline pressure and pipeline pigging operations. These new cathodic protection monitoring radios wire directly to field assets and feed critical pipeline information into existing company data systems without going outside the company's firewall security protection. They are relatively low cost, easy to install, have no licensing fees and no monthly fees.

Each radio also can serve as an infinite data communication repeater site. Adding new radios extends the radio network's ability to reach further into remote areas, thus enabling additional monitoring of remote compressors, energy fields, oil and gas wells, gas plants, pump stations, etc.

Many energy and pipeline companies already own other similar radio products, and the new monitoring radios easily integrate into these existing systems with minimal investment.

Pipeline Integrity Automation Now

Automation of pipeline integrity management has never been more needed, available or affordable. New remote monitoring technologies merged with existing company assets solve a very difficult and expensive task of corrosion prevention monitoring extending the useful lifespan of buried pipeline facilities. **P&GJ**

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reasons

to use FreeWave for cathodic protection remote monitoring:

NO MONTHLY FEES!

With the FGRCPC Radio-based Cathodic Protection Remote Monitor from FreeWave Technologies, you own the technology. You're **free** from monthly fees and **free** from upgrades due to technology obsolescence. The FGRCPC Industrial 900 MHz is:

- Affordable – one-time cost and the best ROI available
- Easily added to existing SCADA systems
- Secure – all data is retained within company firewall with features to prevent detection or unauthorized access
- Monitor both rectifiers and pipe-to-pipe soil test stations with the same model
- Backwards compatible
- Long range – up to 60 miles line of sight
- High speed – 115 kbps true throughput

Available through:

For more information call 1.866.730.1466 or visit us online at www.FreeWave.com/CP3