

Technology and Processes Transform Compliance into a Business Opportunity



Regulatory Scrutiny — Strong and Growing

Pipeline failures with catastrophic results may have spurred the Pipeline Safety Improvement Act of 2002, but more recent events — including the fatal tragedies in San Bruno, Calif. and Allentown, Penn. — were what U.S. Department of Transportation Secretary Ray LaHood referenced when he first announced his agency's Pipeline Safety Action Plan in 2011. Congress incorporated many parts of this action plan into the Pipeline Safety, Regulatory Certainty and Job Creation Act, which President Obama signed into law in January 2011.

The result was regulation with more bite. "This legislation gives the Pipeline and Hazardous Materials Safety Administration (PHMSA), an important part of DOT, stronger enforcement tools and increases civil penalties for pipeline operators who do not meet safety regulations," LaHood wrote in his blog. "The bill doubles the maximum fines that pipeline operators face for safety violations."

The Bill also requires PHMSA to evaluate whether integrity management (IM) system requirements should apply beyond high-consequence areas (HCAs) and whether risk-based reassessment intervals are more effective than a seven-year reassessment interval in HCAs.

Clearly, regulation isn't easing up; it's gaining momentum.

And, even before the new legislation was signed into law, pipeline operators had been busy meeting increased regulatory requirements related to the Pipeline Safety Improvement Act. For transmission pipeline operators, those requirements include identification of HCAs and completion of baseline risk assessments on HCA pipe segments by December 17, 2012.

Plus, operators have been working on mandatory transmission integrity management plans (TIMP) and distribution integrity management plans (DIMP) that must include remediation provisions for corrosion, manufacturing defects, construction problems, third-party damage and other issues. And, of course, all of this has been taking place while operators are under increasing demand strain — as electric utilities shift from coal-fired generation to natural gas plants.

Given these market pressures, it's time for natural gas utilities to consider different approaches to pipeline integrity problems. It's not that the gas utility industry has been lax or inattentive to safety and compliance. It hasn't. The industry enjoys a long history of safe and reliable service delivery and infrastructure management.

But, at many gas utilities, pipeline integrity, safety and compliance has relied on the knowledge and commitment of field personnel. That approach is inefficient and unsustainable in today's regulatory environment.

Fortunately, the information systems, automated processes and tools that enable both system-wide compliance and a high level of efficiency are mature and proven. In fact, today's compliance pressures are actually an opportunity for gas utilities to implement technology that will help organizations meet today's regulatory imperatives and operate more profitably in the future.

Thinking Outside the Box ... and File Cabinet ... and Storeroom

If there is one overriding impediment most utilities face in implementing high-quality IM programs, it's tradition.

Gas utilities do a great job of conducting inspections, maintaining pipelines and managing leaks. But, they're usually doing it at a localized level, working out of district offices and, often, maintaining records in boxes and storerooms of those district offices.



Therein lies problem number one: Programs like TIMP and DIMP are really intended to be system-wide, and it's almost impossible to roll up information about the assets the utility has in the ground when information is on three-by-five cards or notebooks stored in boxes and file cabinets throughout the utility service territory. Even distributed databases and spreadsheets with no link to assets make integrity analysis difficult.

In assessing compliance with maximum allowable operating pressure (MAOP) regulations for various pipeline segments, most utilities are collecting paper-based, historical information, scanning it and then storing it electronically. That's a good start.

After utility workers comb through decades of data on paper or in spreadsheets, clean up the information and organize it into the best possible system of record they can construct, there are more steps they should take. Utilities must stop the paper-based madness by implementing technology that ensures records will be easy to access and analyze going forward. With business processes and systems in place, utilities can ensure that any new construction, inspection results and new maintenance activities are recorded in the field by the people doing the work. These advances will ensure that utility managers have accurate, current information for smarter and faster decision making.

Pipeline Integrity Requires Data Integrity

Gas utility operators are already looking at information technology to manage their transmission and distribution systems more effectively. This trend, combined with TIMP and DIMP plans, offers huge opportunity for operational improvements. Technology that enables utilities to collect and maintain complete, accurate current-state data that correctly represents the state of transmission and distribution networks is critical to effective pipeline integrity. That technology should start where the networks reside: in the field at the point of inspection or construction.

For example, without field-based automation tools, a technician writes something in a notebook or marks up a construction drawing. It gets shipped back to the office to a clerk who eventually files it or types it into a computer system. And,

at that point, you don't have the person who is most qualified saying, "Yes, that is eight-inch coated pipe" entering the data into a computer system. What's more, manual processes like these introduce errors and duplication of effort that hinder compliance efforts. Automation can significantly reduce such errors by having technicians themselves — the best qualified people for the job — record information and by applying data-integrity rules to the automated processes.

Technicians equipped with devices and electronic data capture tools help utility managers drive improvement in the quality and completeness of asset information. Implementing straight forward data validation rules in the field can significantly improve the information technicians report by limiting options or catching errors at the point of data entry. For instance, if the technician puts eight-inch steel in the first box, the system could prevent him from associating that with a plastic connector. Adding validation to the data capture process in the field won't complicate the process, but it will increase the value of the data captured significantly.

Furthermore, pipeline operators can dramatically increase the amount of data captured in the field without adding significantly to workloads. Technology exists to address the component traceability requirements for every piece of equipment used to construct a gas distribution or transmission system. Using it would allow for immediate and accurate recording of pipeline statistics, such as manufacturer, pipe wall thickness, tensile strength of the steel, ladle analysis and more.

All of that information is available from a manufacturer when the pipe is delivered, although utility workers will want to verify the data by conducting inspections during installation. After all, if the utility is using an outsourced materials supplier, the supplier may have pipe on hand that meets the specifications, but comes from different mills. For integrity management, understanding what really went into the ground is crucial.

More Information, Better Outcomes

Integrity management doesn't stop when the pipes are buried in the ground. Utilities must capture which contractor did the work. When was it done? Who inspected it? What are the physical aspects of the installation, such as the, digging method, backfill over the pipe and buildings around it? This information sets the basis for answering questions about how inspection and maintenance needs will be met.



Starting today, it is important to capture what standards and procedures were in effect at the time the construction was completed. For many of the new regulations being written today, there is a strong emphasis on management of change. That

is, 20 or 30 years from now, it's likely to be of value for operators to know what policies were in force at the time and what policies or procedural changes have occurred subsequent to construction.

Beyond compliance, this data will help pipeline operators more cost-effectively manage their transmission and distribution systems. For instance, take a situation where several segments of pipe are installed using the same materials and processes throughout the service territory. What if 10 years after installation, seams on pipes begin to fail? Having the right data allows operators to quickly determine where all the potential problems are so workers can address potential issues before real trouble erupts.

Granted, most gas utility workers could do that today at a district level based on paper documents and tribal knowledge. But, workers are retiring, and regulators are pushing utilities to know the entire transmission and distribution system, which often means looking at several thousand miles of pipe. It's difficult to do that without well designed, comprehensive and integrated work and asset management software and processes in place.

Systems Investments that Deliver O&M Savings

For several years now, electric utilities have treated work and asset management automation as an imperative for cost-efficient operations. Gas utilities are starting to do so as well. And, such systems can deliver impressive ROI.

Today, TAMP means that many utilities are faced with the prospect of digging through 50 year-old records and proving that the characteristics of the pipe at a given location meet the specifications for the amount of pressure running through it. Not only is the discovery process cumbersome, the discoveries themselves could be costly.

And, there are service implications. If an operator can't prove that pipe should run at current pressure levels, the utility may have to lower the pressure on the pipe. That could mean the utility can't push the volume necessary to serve downstream customers. It also means the operator will have to run new pipe or go through a more elaborate testing process, such as hydrostatic testing, which shuts down service.



Given that government data show more than half of the gas pipelines in the U.S. were installed before 1970, the volume of work to verify condition could be troublesome news for utilities, many of which are already spending some 20

percent more in field costs to meet new regulatory requirements for system scrutiny. Worse, if reporting requirements increase, there's even more cost ahead. Utilities will need to put more people in the field, which means higher O&M costs.

Capital expense allows utilities to roll investments into the rate base and earn a return on them. If \$10 million invested in new tools and systems allows the utility to forego an ongoing \$700,000 annual increase in O&M spend, that's the kind of investment smart gas utilities will start to examine.

The analytic power to be gained by adding information systems can help operators target areas in greatest need of maintenance and inspection, which will translate into more cost-efficient O&M expenditures. The right information systems and automation tools have the power to deliver cost-saving analytics, making tools like these a smart investment in the utility's future operational efficiency.

The Integrated Approach

Traditionally, gas utility managers have viewed asset management systems as compliance tracking tools. Did we do our leak surveys? Have inspections been conducted? Yes, tracking is invaluable, but utilities could be using asset management data for so much more.

First, however, utility managers need to start looking at the business as an integrated set of functions. At a recent conference, an attendee was talking about IT systems at his gas utility. "Sure," he said, "We have a pipeline integrity program. We run it in its own database." His utility also had a good work management system, but the worker admitted the asset management system was merely adequate.

Notice that all of these systems were, in this utility manager's view, separate and distinct. Certainly, a utility can approach systems this way. You can put in work management independently to increase productivity in the field.

However, if you're looking to implement asset management — and if you're looking for ways to meet increasing regulatory requirements efficiently — you need to do work and asset management simultaneously. The two are inextricably linked for any utility trying to stop the madness of paper-based and disaggregated asset recordkeeping.

Without integrated work and asset management systems, integrity management tools are likely to remain separate and inefficient. Granted, plenty of gas utilities have spreadsheets or even integrity management tools that spit out a list of things to do. Yet, once the system creates the task orders, that information stays on paper until the tasks are completed and then someone types task results back into the system.



As already noted, manual processes like these are more vulnerable to errors. Plus, this approach limits a utility’s ability to get the completeness, accuracy and up-to-date information that supports integrity management capabilities. To ensure timely, accurate and complete data, utilities must start using work management systems, asset management system and field-data collection tools — such as hand-held computers for technicians — and feed data into a central repository.



With a central repository for system-wide asset and activity information, data management will also be important. In fact, gas utilities could be looking at the same kind of “big data” challenges other industries have faced. This is because pipeline operators have structured, relational database asset information, as well as unstructured data, such as X-rays, pigging results, pictures, construction drawings and more. Plus, there is a temporal component related to how things were managed in different periods of time, and there is spatial data, such as that which resides in the geographic information system (GIS). Additionally, operators need to identify HCAs, because they will ensure a higher degree of public safety and help determine many strategies and challenges around maintenance.

It’s a complicated, integrated data environment, but all of this data is important. With an integrated view of work and asset data, a system operator can identify and prioritize areas in greatest need of inspection and maintenance. Without such data in hand, operators must take the broad-brush approach — a time-consuming and costly option.

Along with data management, it’s time for utility managers to hone in on the components that will build and sustain pipeline integrity. The “Hierarchy of Pipeline Integrity Maturity” shows all the elements that will come into play.

As mentioned earlier, asset data integrity is vital to IM programs, and it will result from properly designed workflow processes, material management, accurate asset models, work standards and GIS data, all of which will be crucial for managing compliance related to HCAs. Additionally, GIS data could be expanded to include information about other, non-operator-owned pipelines to help utilities avoid cross-bores and the damage that can result from them. These elements lead to compliance excellence. They allow utility managers to apply systems for predictive compliance tracking, risk management, as well as system-generated inspections and maintenance to prevent damage.

Along with these efforts, operators should implement processes that lead to organizational excellence. These include the field-force automation tools, such mobility strategies that put mobile computing technology in worker hands for in-field data capture and work forecasting tools to keep crews efficiently assigned.

Hierarchy of Pipeline Integrity Maturity



Source: CSC, October 2012

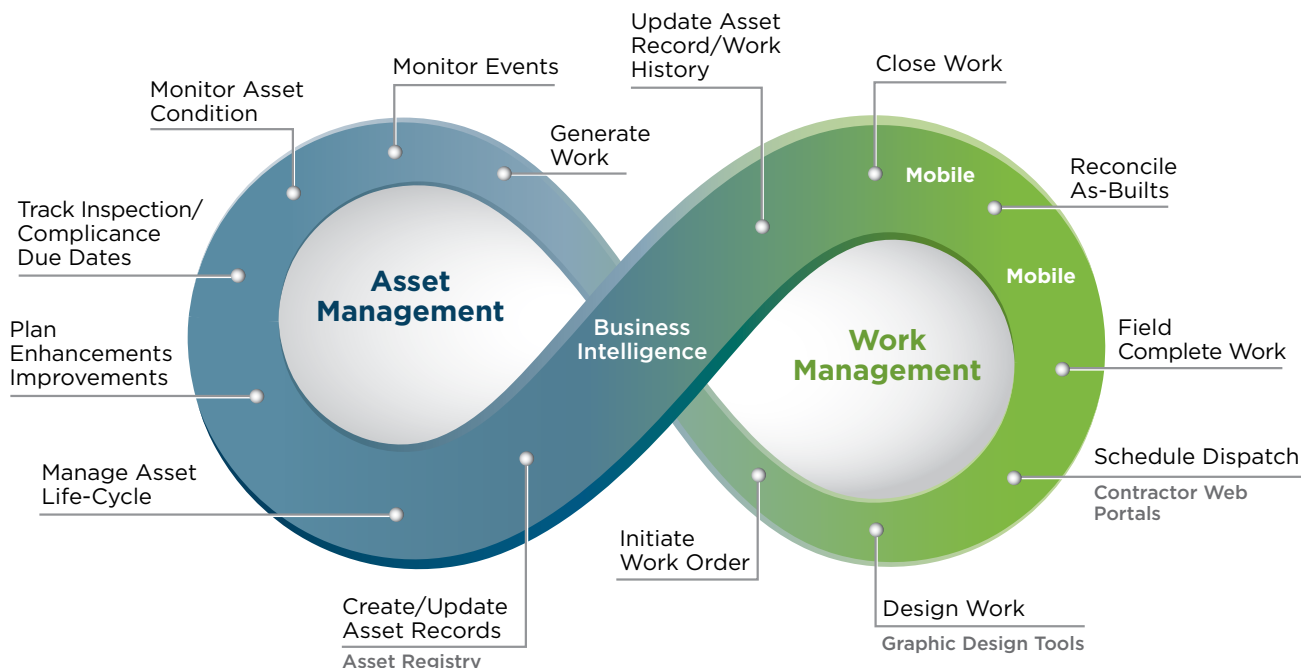
With these foundational elements in place, utility managers can then begin to fine-tune engineering processes for more effective risk analysis, field redlining, standards development and more.

Leveraging the Alignment of Multiple Information Systems

To be effective and to ensure that asset work is performed in a timely manner by the proper resources, gas utilities must evaluate the effectiveness of their work management systems and processes. To that end, work management and asset management systems should be integrated with each other and with back office systems.

Ultimately, the work management system will become the heart of a fully integrated enterprise asset management system. This is because the work management system determines who does what work where. It is the source for the creation, design, estimation, accounting, materials ordering and settlement, job tracking, job scheduling, field data capture and job close-out functions for all asset-related work activities.

While a gas utility could view work management within gas operations as simply the “processing engine” for asset management, the approach that is likely to bring the highest level of benefit is a model that leverages both work and asset management capabilities seamlessly, as depicted here.



Under this model, the asset management system — which some operators call their compliance system — tells managers where they need to do tasks, such as leak-survey and above-ground corrosion inspections. By integrating these tasks into the work management system, workers will automatically be deployed. And, by using highly accurate, system-wide data to feed the analytics that determine priorities and work assignments, utility operators can be assured that they’re sending workers to the most important pipeline segments for optimal integrity management.

Capturing data electronically, as close as possible to the work site and time, is what ensures the flow of accurate data and enables integrity analysis. Data from completed work orders moving through an integrated work and asset management system supplies the integrity manager with anomalous conditions that, when considered individually, can be ranked low risk. But when aggregated and viewed geospatially, they link transmission facilities with HCAs and identify segments of the system that warrant further investigation.

This methodology not only applies to transmission facilities, but also to management of distribution assets. The work management and asset management approach adds the predictive element that is necessary for a highly effective integrity management program system-wide.

Information systems integration also allows utility managers to ensure that the entire work and asset lifecycle is optimized to deliver the most efficient, effective maintenance procedures possible. Beyond public safety, which is obviously paramount, this approach to integrity management extends the safe, functional life of utility assets.

Key Takeaways for Utilities

- No one wants to be faced with the next San Bruno or Allentown catastrophe. When focused on preventing such nightmares, operators can do more than merely meet regulations. The same systems that ensure pipeline integrity can also help utility managers centralize planning and decision making — a big shift for an industry that has previously been district-oriented.
- To truly enable a beneficial asset management strategy that supports pipeline integrity management effectively, utilities should examine the entire lifecycle of all pipeline related work activities. Understanding the lifecycle and the use of paper or automated tools for Work Management, Asset Management, Field Data Capture and GIS will help utilities eliminate duplication of effort and inconsistency of work practices.
- The operational benefits from such capabilities are significant, and now is the time to grab the opportunities pipeline integrity efforts present. As regulatory requirements increase the effort required to comply will as well. Investing in end to end automation of the work and asset management processes and tools today can eliminate the need to increase staff and O&M spend in the future.
- The focus on current, accurate, and complete data to support integrity management has increased significantly in just the last couple of years. Gas utilities that have existing work and asset management systems in place should really take a hard look at the ability of their current systems and processes to meet new requirements.
- Typically, everything cannot be addressed all at once. It is, however, important that gas utilities have, or develop, a holistic roadmap that provides a foundation for long term success while addressing today's most pressing data gathering and integrity management functions. Operating tactically will likely have an adverse effect on data quality and O&M spend in the future — something that should be aggressively avoided.

About CSC's Global Utilities Division

CSC's Utilities Division serves gas, electric and water utilities with 35 years of industry experience. Its experts tackle industry challenges including: data growth, public safety, compliance, critical infrastructure protection, supply chain risk, cybersecurity, aging workforce and infrastructure. Clients include many Fortune 500 and Forbes Global 2000 companies. CSC is a member of the American Gas Association.

Learn more about our solutions, thought leadership and client successes at www.csc.com/utilities.



Worldwide CSC Headquarters

The Americas

3170 Fairview Park Drive
Falls Church, VA 22042
United States
+1.703.876.1000

Europe, Middle East, Africa

Royal Pavilion
Wellesley Road
Aldershot, Hampshire GU11 1PZ
United Kingdom
+44(0)1252.534000

Australia

26 Talavera Road
Macquarie Park, NSW 2113
Australia
+61(0)29034.3000

Asia

20 Anson Road #11-01
Twenty Anson
Singapore 079912
Republic of Singapore
+65.6221.9095

About CSC

The mission of CSC is to be a global leader in providing technology-enabled business solutions and services.

With the broadest range of capabilities, CSC offers clients the solutions they need to manage complexity, focus on core businesses, collaborate with partners and clients, and improve operations.

CSC makes a special point of understanding its clients and provides experts with real-world experience to work with them. CSC is vendor-independent, delivering solutions that best meet each client's unique requirements.

For more than 50 years, clients in industries and governments worldwide have trusted CSC with their business process and information systems outsourcing, systems integration and consulting needs.

The company trades on the New York Stock Exchange under the symbol "CSC."

www.csc.com

Copyright © 2012 Computer Sciences Corporation. All rights reserved.

ny12_0439 | CENR