



BASIC SYSTEMS

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Integrity Management Inside the Fence

New ruling includes "compressor units, metering stations, regulator stations, delivery stations, holders and fabricated assemblies."

On December 15, 2003, the Office of Pipeline Safety amended 49 CFR Part 192 with Subpart O - Pipeline Integrity Management. Implementing this new rule, which became effective on January 14, 2004, means big changes for gas transmission pipeline operators. While natural gas pipeline operators have monitored and assessed the condition of their pipelines and made repairs as required, the new regulations require much more. Operators are now required to perform ongoing assessments of pipe and equipment condition, collect mountains of data, then integrate and analyze the data in order to implement preventative and mitigative measures to protect the integrity of the pipeline system.

This means that to comply with the regulations, operators will not only have to continue to run the pigs and fix the pipe, they will also have to gather and integrate data and information on the entire pipeline system that could be relevant. This data includes materials of construction, past incident history, corrosion control records, surveillance records, patrolling records, maintenance records, internal inspection records, gas quality records and operating conditions. This data will be used by the operator to identify High Consequence Areas (HCA's), perform risk analysis, continuously evaluate the condition of the pipeline and facilities, mitigate future problems and document all that is done.

The Pipeline Integrity Rule is a new management system, much like ISO, in that performing the tests and documenting the results is but one small part. Given the increase in the amount of pipelines, stations, and equipment subject to the rule, operators with transmission pipelines must take a comprehensive capital management approach to effectively manage their assets and maintain pipeline integrity. As a result, regulatory compliance will likely require many natural gas company operators to develop better

information systems to handle the geospatial data and compliance data that is necessary. In short, asset management has now become critical to implementing pipeline integrity.

Off-pipe to be included

It is clear that the new regulations apply not only to cross-country interstate pipelines, but also to "off-pipe" facilities attached to the pipeline. These are "compressor units, metering stations, regulator stations, delivery stations, holders and fabricated assemblies." This means that operators will have to document and track the same information for these off-pipe facilities that is done for cross country pipelines. It also means that given the single definition of a Potential Impact Circle (PIR), large diameter equipment, such as a filter-separator or dehy tower, may greatly increase a facility's PIR.

The assessment of pipelines is limited to those that are within an HCA. Most compressor stations are located away from homes and businesses. This will keep most of them out of the HCA's and therefore out of the requirements for assessment and monitoring. The number of meter stations that are included in HCA's is much larger. This is due to the nature of the meter station being the transition from transmission pipeline to distribution pipeline - from cross country rural pipeline to urban pipeline. It is also expected that these last transmission pipeline miles to the meter stations will be the most difficult to assess. Other off-pipe facilities will probably fall into an HCA to the same percentage as the pipelines themselves. Initial assessments for HCA's need to be complete by June 17th, 2004, so this should be a top priority.

Operators will establish their HCA's by one of two methods. The first is based on the standard Class locations all operators are familiar with. Using method 1, Class 3 and Class 4 locations are automatically defined as an HCA. If outside Class 3 or 4, and the PIR is greater than 660 feet, then the operator must determine if the area in the Potential Impact Circle has 20 or more buildings intended for human occupancy or contains an

identified site. The second method is based solely on the Potential Impact Circle and what is found within it - either 20 or more buildings intended for human occupancy or contains an identified site.

A facility will have a PIR over 660 feet if it contains pipe/equipment larger than 30" in diameter and its MAOP is 1000 psig. If its MAOP is 1200 psig, its limit is 26" diameter pipe/equipment and if its MAOP is 1480, its limit is 24" diameter pipe/equipment. A storage facility will have a PIR over 660 feet with an 1800 psig MAOP and pipe/equipment larger than 22". Many facilities have filter-separators, scrubbers, dehy towers or other pieces of equipment larger than these dimensions. Will an operator be faced with a PIR well over 2000 feet? Conversely, pipelines and facilities may have a PIR of only 200-300 feet if the pipe/equipment sizes are 12" or less even with an MAOP of 1000 psig.

Most, if not all, off-pipe facilities are designed under the requirements of Class 3, but that does not mean that they meet the residential building requirements of the Class. The PIR definition will require that "identified sites" within a different - larger or even smaller - area than that required by the Class location be considered. The amount of effort required to meet this requirement may be substantial.

Regulatory impact

The impact of the Rule is that those off-pipe systems that are in HCA's will have to go through an initial assessment and follow on assessments in accordance with the Rule. Underground facilities will most likely be assessed using Direct Assessment (DA). Even this is not as easy as it sounds, as visual inspection of portions of the affected pipes is the final step in DA. For aboveground facilities, visual inspection is more reasonable. Hydrostatic testing off off-pipe systems is not expected to be popular and in-line inspection is just not feasible.

The good news is that for the data integration and data evaluation requirements of the Rule, most operators should be able to append the facility

Integrity Management... (continued)

information to their existing asset management systems. Managing the assets then becomes a GIS (Geographic Information Systems) and IT (Information Technology) exercise in maintaining and managing the appropriate databases (both spatial and non-spatial). Even though the rule allows for manual evaluation, this is expected to be a data management-intensive operation because of the requirements of the Rule for data integration, analysis and continuous improvement. To do this continuously - as required by the Rule - and efficiently - as required by management - spatial and non-spatial applications coupled with the right analytical software tools will be key.

Operators should document the materials and construction specifications for each facility, including all the pipe, fittings and equipment in compressor, metering and regulator stations. Required data should include the pipe and fitting size, strength or grade, and wall thickness. For manufactured equipment like compressor cylinders, compressor cases and gas coolers, the data will be similar but in a different format. Starting early will give pipeline operators a head start on a potentially daunting task.

However, information gathering on a pipeline facility will need to overcome one basic problem- although regular pipelines, such as those that travel across the country, are defined by distance markers and stations, piping inside stations usually have no such assignments. Since compressor and metering stations are usually built as an assembled piping structure and not on a per-foot basis, some operators have no easy way of documenting the specific components of their facility. To resolve this, operators can begin to document facilities as if they were pipelines by assigning line numbers. Though the process will require station walk downs, review of as-built drawings, and culling of all available information from databases, assigning line numbers can help operators manage the information required by the Rule.

Long-term benefits

The intent of the Rule is that asset management will allow operators to be proactive

rather than reactive in addressing pipeline integrity issues. After the initial assessments and the resulting improvements, problems will be identified and fixed while they are still minor. In addition to complying with the regulation, pipeline operators will also face the challenge of having to develop the infrastructure and the in-house expertise to manage and apply the information. Once in place, such asset management systems should help operators maintain a custodial approach to their pipelines that allows them to systematically track and record pipeline integrity data and maintenance. By keeping tabs on the wealth of additional information on their stations and facilities, operators will be in a better position to monitor pipeline integrity and implement a more proactive approach to maintenance.

The Rule allows several years to complete the initial assessments- all HCA's must be assessed by December of 2012. Since full compliance isn't necessary in a short period of time, most pipeline operators seem to have time on their side. Acting now will give operators an invaluable head start. Short-term procrastination will only lead to bigger problems down the road. Facility operators will have to document exactly what is in their off-pipe facilities. Once assessments are complete, station operators will be able to better handle any situations that impact the equipment and know where to look for problems should the need arise.

Beyond complying with regulations, asset management of the pipeline systems will result in greater public service and safety as lines both cross country pipelines and off-pipe systems are regularly monitored and assessed. However, operators need to understand that the new regulations have greatly expanded the information management requirements. Complying with government rules may be a normal part of doing business, but in the case of Pipeline Integrity, operators will have to shift to a more comprehensive asset management approach to continue to meet the regulations.

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PIPELINE INTEGRITY regulatory excerpts

Part 192.201

"This subpart prescribes minimum requirements for an integrity management program on any gas transmission pipeline covered under this part."

Part 192.3

"Pipeline means all parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies."

"Transmission Line means a pipeline, other than a gathering line, that:

- (a) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;
- (b) Operates at a hoop stress of 20 percent or more of SMYS; or
- (c) Transports gas within a storage field."



Basic Systems and Dewberry are teaming to provide full-service pipeline integrity services to the natural gas industry.

Basic Systems, Inc. is a consulting engineering firm that specializes in pipeline and facility design and automation for the natural gas industry.

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