DIMP IMPLEMENTATION & INSPECTION FINDINGS

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APGA SIF Operations Conference
Wednesday, March 4th 1:00-2:00 pm

Topics Areas for Discussion

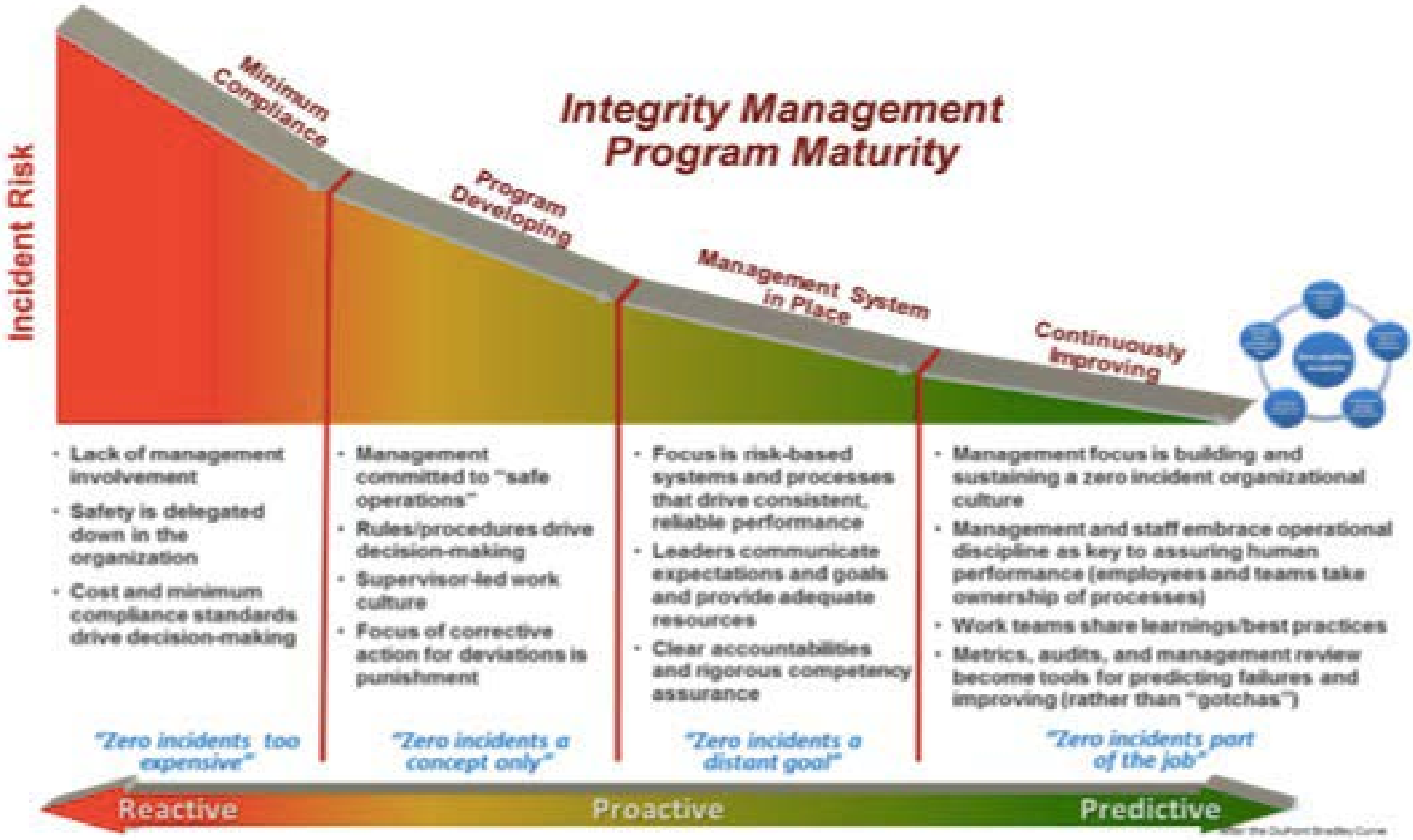
- Safety Culture supports Continuous Improvement
- Inspection Results and Findings
- Mechanical Fitting Failure Report Data/Analysis
- DIMP Inspection Forms
- DIMP Website and Performance Measures Reporting
- Current Regulatory Topics

Safety Culture

Moving from Compliance to Choice

- Our world must move from a “checkbox” mentality to understanding the health of our pipeline systems by analyzing and understanding data and information and promptly acting to reduce risks
- Safety Culture provides a platform from which to drive continuous improvement in the safe operation and integrity of a pipeline system.
- Continuous improvement is a requirement to meet the minimum safety regulations for integrity management programs.

Assessing Maturity



Underlying Principles

- The Pipeline Operator Alone is Responsible for Safe Operations:
  - It is the responsibility of pipeline operators to understand and manage the risks associated with their pipelines.
- The Regulator Can Influence Operator Performance:
  - PHMSA's primary role is to establish minimum safety standards and inspect to them
- Regulators strive to impact operator performance beyond mere compliance with the regulations
- More must be done by both the Operator and Regulator to ensure public safety
- Safety culture is a critical piece of the foundation for continually improving industry's performance

Safety Culture Elements

- Safety Culture is the collective set of attitudes, values, norms and beliefs, which pipeline operator's employees share that demonstrate a commitment to safety over competing goals and demands.
- The following are the most critical elements of a strong safety culture:
  1. Embraces safety (personnel, public, and asset) as a core value,
  2. Ensures everyone understands the organization's safety culture goals,
  3. Inspires, enables, and nurtures culture change when necessary,

Safety Culture Elements (cont.)

4. Allocates adequate resources to ensure individuals can successfully accomplish their safety management system responsibilities,
5. Encourages employee engagement and ownership,
6. Fosters mutual trust at all levels, with open and honest communication,
7. Promotes a questioning and learning environment,
8. Reinforces positive behaviors and why they are important,
9. Encourages non-punitive reporting and ensures timely response to reported issues.

Recent Events Illustrate Weaknesses in Managing Risk

- Effective risk analysis might have prevented or mitigated recent high consequence accidents
- Weaknesses identified include inadequate:
  - Knowledge of pipeline risk characteristics including recordkeeping
  - Processes to analyze interactive threats
  - Evaluation of ways to reduce or mitigate consequences
  - Process to implement risk reduction measures
  - Lack of objective, systematic approach
- Much work remains to improve tools and techniques

DIMP Inspection Results and Findings

High Level Observations

- DIMPs need to Mature and be Continuously improved
- The DIMP Rule was designed as a performance based regulation to be flexible and allow operators to implement their DIMP in the most efficient and effective manners to improve pipeline safety.
- Regulators have identified the need/requirement for operators to implement their DIMPs on a continuous basis so that programs mature to fit the operator's unique operating environment.
- Findings indicate that operators need to do more work implementing DIMPs to reduce risks.

DIMP Inspections

- First Round of DIMP Inspections were expected to be completed by the end of 2014.
- For inspections of performance based regulatory programs (Like DIMP), adequate time is required for Inspectors to drill down into data sets to gather a comprehensive understanding of an operator's system.
- Vacancies created by an aging workforce (turn-over) have created voids in operating knowledge of pipeline systems, and trained personnel have not always been available for inspections.

DIMP Inspection Findings

Inspection findings and concerns will be discussed by "element", but here are some all too common observations:

- The inspection revealed the operator did not identify additional information needed and a plan for gaining that information over time through normal activities conducted on the pipelines. However, Design and Construction records were unavailable for the operator's high pressure distribution main and town's original pipeline.
- Records indicated that the operator did not consider all of their recent leak history in the development of their DIMP plan.
- The inspection revealed the operator did not validate the current risk evaluation generated on 8/4/2014 by their consultant

DIMP Inspection Findings (cont.)

- The records reviewed during this inspection indicated the operator is not following procedures for their Leak Management System. The documentation on several leak repair reports did not include the classification, cause of leak, and the follow-up action required in their procedures.
- The inspection revealed the operator failed to include all the required leaks on their Annual Report.
- The information sources and records used for the re-evaluation of operator's DIMP plan could not be verified
- The documentation for two risers installed in 2013 did not list the design of material installed
- the operator did not consider the reasonably available information to identify existing and potential threats

IM Plans and Development Models

§192.1005

IM Plans and Development Models

- When a “Model” Program is used, documentation of how the “Model” Program works must be integrated or referenced.
- An Operator’s O&M procedures may need to be integrated or referenced in the DIMP depending on program’s structure.
- Procedures are required in 192.1007, and plans must contain adequate procedural documentation.
- Procedure means a fixed, step-by-step sequence of activities or course of action (with definite start and end points) that must be followed in the same order to correctly perform a task.

Other DIMP Plan Comments

- Treat DIMP as a tool to analyze needs and progress, not as a regulatory exercise.
- The Plan should culminate in a ranked/prioritized list of threats, risk reduction measures, and performance measures – Table in Inspection Form.
- Multi-state operators may have one or more plans but must be able to filter their risk ranking and measures to reduce risk by state.
- The DIMP rules may require something that is already being done in another context – copy it or link to it.
- List or document the actions committed to in the DIMP to ensure requirements are not "missed".

Knowledge of Gas Distribution System

§ 192.1007(a)

Knowledge of Distribution System

- Field data acquisition forms and internal IT processes to incorporate new information and correct inaccurate information may need to be modified. If so, this must be expedited.
- QA/QC checks should be run to ensure incoming data is accurate (e.g., categorizing leaks, determination of probable cause, accurate pipe type and facility information)
- Data quality is a common concern, and an appropriate level of resource allocation is required;
  - Outdated, incomplete, obvious errors.
  - Outdated data systems difficult to use or sort.
  - Data cleanup and scrubbing is often required.

Knowledge (continued)

- Plan must list data (or reference document) that the Operator has identified that is needed to fill gaps.
- Procedures for identification and collection of additional and missing information must be included or referenced in DIMP to ensure consistent collection and processing.
- Specific source data and documents used in development and implementation of DIMP must be included in DIMP.
- Plan must include procedure for recording new pipe data, including location and materials used.

Identify Threats to Integrity

§ 192.1007(b)

Threats from DIMP Rule

- §192.1007 What are the required elements of an integrity management plan? A written integrity management plan must contain procedures for developing and implementing the following elements:
- (b) Identify threats. The operator must consider the following categories of threats to each gas distribution pipeline: Corrosion, natural forces, excavation damage, other outside force damage, material or welds, equipment failure, incorrect operations, and other concerns that could threaten the integrity of its pipeline. An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.

Identify Threats to Integrity

- A DIMP must provide adequate details and specificity to address specific potential and existing threats and risks in the Operator's unique operating environment.
- Consideration must be given to applicable operating and environmental factors affecting consequence (e.g., paved areas, business districts, hard to evacuate) relating to the Consequence of Failure (COF) when evaluating risk.
- Plan must include procedures to evaluate and obtain data from external sources that are reasonably available to identify existing and potential threats.

Threat Identification

- Threat categories
  - Time Dependent
  - Time Independent
- Threats are Potential and Existing Pipeline Failure Mechanisms or Pipeline Failure Cause Categories
- Identifying Threats is key to Operator Integrity Decisions regarding measures to implement to reduce risk(s)
- Data Gathering, Threat Identification, Data Integration, and Risk Assessment are inter-related and dependent upon each other

Gas Distribution Threat Categories from GPTC G-192-8

- External Corrosion
  - Bare Steel Pipe (CP or no CP)
  - cast iron pipe (graphitization)
  - coated and wrapped steel pipe (CP or no CP)
  - Other metallic materials
- Internal corrosion
- Natural Forces
  - Outside force/weather: steel pipe
  - Outside force/weather: plastic pipe
  - Outside force/weather: cast iron pipe
- Excavation Damage
  - Operator (or its contractor)
  - Third-party
- Other Outside Force Damage
  - Vehicular
  - Vandalism
  - Fire/Explosion (primary)
  - Leakage (previous damage)
  - Blasting
  - Mechanical damage: Steel pipe, Plastic pipe, Pipe components

Gas Distribution Threat Categories from GPTC G-192-8 (continued)

- Material or Weld
  - Manufacturing defects
  - Materials/Plastic
  - Weld/Joint
- Equipment Failure
  - System Equipment
- Incorrect operation
  - Inadequate procedures
  - Inadequate safety practices
  - Failure to follow procedures
  - Construction/Workmanship defects
- Other Failure Causes that the Operator has experienced

Potential Threats

- Some Operators struggle with potential threats:
  - Threats the Operator has not previously experienced (from industry or PHMSA information)
  - Threats from aging infrastructure and materials with identified performance issues may need to be considered existing threats depending on the materials in question and the operating environment
  - Threats that endangered facilities but have not resulted in a leak (e.g., exposed pipe, near misses).
  - Non-leak threats (overpressure, exposure)
  - Manufacturing and Construction Threats
  - Maintenance history

Identified Potential Threats

- Examples of potential threats commonly not being considered by operators:
  - Over pressurization events
  - Regulator malfunction or freeze-up
  - Cross-bores into sewer lines
  - Materials, Equipment, Practices, etc. with identified performance issues
  - Vehicular or Industrial activities
  - Incorrect maintenance procedures or faulty components
  - Rodents, plastic eating bugs, tree roots
  - Other potential threats specific to the operator's unique operating environment

Threat Identification

- An Operator Must :
  - Consider and Evaluate Existing and Potential Threats
  - Justify Elimination of Threats from Consideration
- So, there is more to do than account for just Time Dependent and Time Independent Existing Threats
  - An Operator must look at “near misses”, known threats identified in Industry literature, PHMSA Advisory Bulletins, etc. and understand how threats interact with each other in their system

Interactive Threats

- An Operator should also consider that Interactive Threats (interaction of multiple threats) can represent potential threats.
- Interactive threats are 2 or more threats that, when occurring simultaneously, pose a threat to pipeline integrity.
- Operators should look to their Leak and Incident history and Operations and Maintenance history to identify interactive threats specific to their system.

Examples of Interactive Threats

- Slow crack growth in older plastics where pipeline was pinched during operational event or where over-squeeze occurred due to improper tools or procedure
- Slow crack growth in older plastics where non-modern construction practices were used
- Water main leakage areas or areas of soil subsidence with cast iron mains
- Installation of mechanical fittings without restraint (category 2 & 3) in soils or conditions (excavation damage) that cause pipe to pull out of fitting

Evaluate and Rank Risks

§192.1007(c)

Evaluate and Rank Risks

- System subdivision for the evaluation and ranking of risks must be sufficient to appropriately analyze risk(s) present in the Operator's unique operating environment.
- Geographical segmentation may be appropriate when systems are separated by space or a specific, predominate threat exists (e.g., where flooding can be expected, earthquake prone area).
- However, materials or construction may be the predominate threat(s) in a region, and segmentation may need to be refined to accommodate different failure rates to adequately differentiate and identify significant threats.

Evaluate and Rank Risks (cont.)

- The risk ranking model results must be validated. The "COF" can be diluted by Frequency of Failure ("FOF") – a larger range for consequences may be needed to get reasonable results
- The Plan (or Model used) must address risks specific to services as well as mains
- When risk model changes are made, the risk ranking should be re-run and results incorporated into DIMP promptly
- Operators must consider non-leak failures in analyzing risk and address non leak events (e.g., near misses) as existing or potential threats.

Measures to Address Risks

§ 192.1007(d)

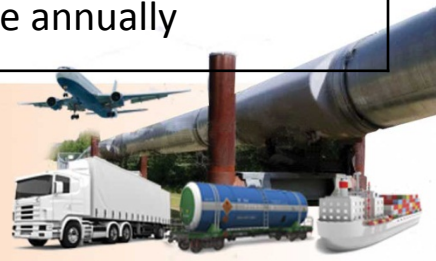
Measures to Address Risks

- The Plan must provide for a link between the specific risk (either a threat or consequence) and the measure to reduce risk that has been identified and implemented.
- The Plan must contain or reference an effective leak management plan unless all leaks are repaired when found.
- If an Operator repairs all leaks when found, that must be stated or referenced in the DIMP.
- DIMP Models must rank proposed projects and replacements based on risk and not the cost.

Measure to Address Risks (Threats)

- Table 1 in DIMP Inspection Forms 22 & 23 provide an overview of risk reduction and monitoring methods

	Primary Threat Category	Threat Subcategory, as appropriate	Measure to Reduce Risk	Performance Measure
1	Corrosion	External Corrosion on Copper Service Lines	Replace approximately 100 copper service lines each calendar year	Track number of leaks caused by external corrosion per 1000 copper service lines annually
2	Excavation Damage	Third Party Damage	Conduct pre-construction meetings or Monitor locate for life of ticket	Track frequency of failures per 1000 excavation tickets annually
3	Equipment Failure	Mechanical Fittings, Couplings or Caps/Seals	Repair or replace problem materials as found	Track frequency of failures by equipment type annually



Performance Measurement

§ 192.1007(e)

Performance Measurement

- A DIMP must include procedures for establishing baselines for Performance Measures required in 192.1007(e)
- Operators must develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program.
- Each Measure Implemented to Reduce Risk must have a Performance Measure established to monitor its effectiveness
- Operators may identify a single performance measure to evaluate the effectiveness of multiple risk control measures

Periodic Evaluation and Improvement

§ 192.1007(f)

Periodic Evaluation and Improvement

- A Plan must contain procedures for conducting periodic evaluations - changes would be handled with revisions to the original procedure.
- Plans are expected to include procedures for notifying affected operator personnel of changes and improvements made to the plan. or plan requirements.
- Plans must provide for the incorporation of pipe replacement programs in the DIMP as the future risk results will be affected by the removal of vintage pipeline facilities.

Periodic Evaluation and Improvement

- Operator's plan must have procedures that include criteria for when re-evaluations are to be done based on timing (< 5 years) or events (e.g., replacement program completed, goals achieved, new significant threats identified).
- Plan re-evaluations may generate changes to the results of the risk ranking and risk mitigation measures needed to address risk.
- Operators should be cognizant of changes that occur in the DIMP as a result of the periodic plan evaluation.

Reporting and Records

§ § 192.1007(g) & 192.1011

Report Results

- If a State agency exercises jurisdiction and requires reporting, a procedure must include instruction to send reporting information to the state pipeline safety authority.
- While Performance Measures 192.1007(e)(v) & (vi) are not required to be reported, they must be monitored by the operator and maintained for inspections. Operators are failing to collect and analyze these performance measures that address hazardous leaks eliminated or repaired categorized by material ((e)(v)) and performance measures developed to monitor actions implemented to control identified threats and reduce risks ((e)(vi)).

Records Required to be Maintained

- An operator must maintain records demonstrating compliance with the requirements of this subpart for at least 10 years (Including records not otherwise kept for 10 years).
- Plans must include an adequate revision log that includes: the Plan effective date, revision dates, and a description of each revision
- Only the records actually used to develop and implement the DIMP should be referenced; otherwise “all” records must be kept for 10 years.

Mechanical Fitting Failures

Reporting and Data Analysis

§ 192.1009

Mechanical Fitting Failures
Reporting and Data Analysis

- The MFFR instructions have been revised to better communicate that Operators are to report all failures involving mechanical fittings and compression type couplings, regardless of material, that result in a hazardous leak.
- Failures resulting from a construction or installation defect should be identified with the “Incorrect Operations” leak cause and not the “Material or Welds/Fusions” leak cause category (as is described in PHMSA F 7100.1-2 and the Instructions).

MFFR Data Entry

- Make an entry in each block for which data are available. Some companies may have very old pipe for which installation records do not exist. Make a best effort at quantifying data.
- Avoid entering “Unknown” if possible.
- Specify the Mechanical Fitting Involved

Stab Type

Nut Follower

Bolt Type

MFFR Data Analysis

- Communication of Performance Data is through the DIMP web page. To view MFFR data, go to:
- http://primis.phmsa.dot.gov/dimp/perfmeasures.htm
- Total Report Submitted Numbers (03/01/2015):
  - MFFRs submitted in 2011 – 8356
  - MFFRs submitted in 2012 – 7571
  - MFFRs submitted in 2013 – 9405
  - MFFRs submitted in 2014 – Complete 03/15/2015
- Data currently submitted for 2014 shows similar trends to previous 3 years of data collection.

MFFR Data Analysis

- Mechanical Fitting Failures are being identified in many DIMPs as a significant threat requiring that risk mitigation measures be implemented.
- The majority of mechanical fitting failures resulting in a hazardous leak involve nut-follower, coupling type fittings.
- Steel fittings (61%) are involved the majority of reports, and plastic fittings are second (26%).
- The majority of leaks occur outside (98%), belowground (87%) involving service-to-service connections (60%).
- Equipment failure is the leading reported cause of leaks (41%), and Natural forces is second (17%).
- Valves are involved in 14% of reported failures.

DIMP Inspection Forms

DIMP Inspection Forms

- PHMSA DIMP Inspection Forms for 192.1005 and 192.1015 distribution operators (Forms 22 & 23 respectively) are available at: http://primis.phmsa.dot.gov/dimp/resources.htm
- New PHMSA Form 24 has been posted for use
- NAPSR and PHMSA are looking to incorporate field investigation and verification of the Operator's DIMP Implementation into regulatory inspection programs with the new "Records and Field Implementation" Inspection Form

PHMSA Form 24

- PHMSA Form 24 is for the evaluation of an operator's implementation of its DIMP through a review of its records and actions performed on pipeline facilities.
- Intended for inspections of Implementation of DIMP after initial DIMP inspections
- The form asks inspectors to review records and perform field observations regarding the implementation of the required DIMP elements.

DIMP Website and Posting of DIMP Performance Measures

DIMP Home

PHMSA
U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

Pipeline Technical Resources

Return to Pipeline Safety Community

Home | Alternative MAOP | Cased Crossings and GWUT | Class Location | CRM | DIMP | Gas IM
HL IM | High Volume EFV | Low Strength Pipe | OQ | Pipeline Construction | R&D | LNG Facility Siting | Public Meetings

Gas Distribution Integrity Management Program

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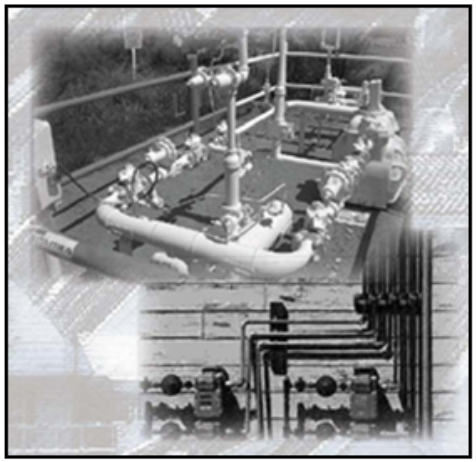

The Pipeline and Hazardous Materials Safety Administration (PHMSA) published the final rule establishing integrity management requirements for gas distribution pipeline systems on December 4, 2009 (74 FR 63906). The effective date of the rule is February 12, 2010. Operators are given until August 2, 2011 to write and implement their program.

PHMSA previously implemented integrity management regulations for hazardous liquid and gas transmission pipelines. These regulations aim to assure pipeline integrity and improve the already admirable safety record for the transportation of energy products. Congress and other stakeholders expressed interest in understanding the nature of similarly focused requirements for gas distribution pipelines. Significant differences in system design and local conditions affecting distribution pipeline safety preclude applying the same tools and management practices as were used for transmission pipeline systems. Therefore, PHMSA took a slightly different approach for distribution integrity management, following a joint effort involving PHMSA, the gas distribution industry, representatives of the public, and the National Association of Pipeline Safety Representatives to explore potential approaches.

http://primis.phmsa.dot.gov/dimp/index.htm

Gas Distribution Integrity Management Program: Meetings

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Upcoming

- LGA Operations Conference, New Orleans, LA, July 23-24, 2015
- SGA Operating Conference, Nashville, TN, July 20-22, 2015
- SGA DIMP Workshop, Charlotte, NC, March 23-25, 2015
- APGA Operations Conference, Destin, FL, March 2-4, 2015
- Regulations and Code Compliance State Seminars

Completed

- AGA Distribution Integrity Management Workshop, Ft. Worth, Texas, October 27-28, 2014
- DIMP Webinar, September 4, 2014 [Webinar Recording]
  This is the fourth webinar provided by the State and Federal Distribution Integrity Management Program Implementation Team. This webinar covered: Safety Culture; A new DIMP Inspection Form for Field Observations and Records Review; Findings from DIMP inspections Conducted to Date; Mechanical Fitting Failure Reporting Data and Analyses; An Operator's Perspective on Successes and Lessons Learned from Implementing DIMP; Plastic Pipe Ad Hoc Committee (NAPSR and PHMSA Team) Activities and PPDC update; and a question and answer session.
  - PDF of September 4, 2014 presentation

PHMSA Websites

Please regularly use PHMSA websites as they are a primary form of communication with Stakeholders

PHMSA Office of Pipeline safety

http://phmsa.dot.gov/pipeline

DIMP Home Page

http://primis.phmsa.dot.gov/dimp/index.htm

Pipeline Safety Stakeholder Communications

http://primis.phmsa.dot.gov/comm/

Pipeline Replacement Updates

http://opsweb.phmsa.dot.gov/pipeline_replacement/

Questions and Answers

- Thank you for your participation!