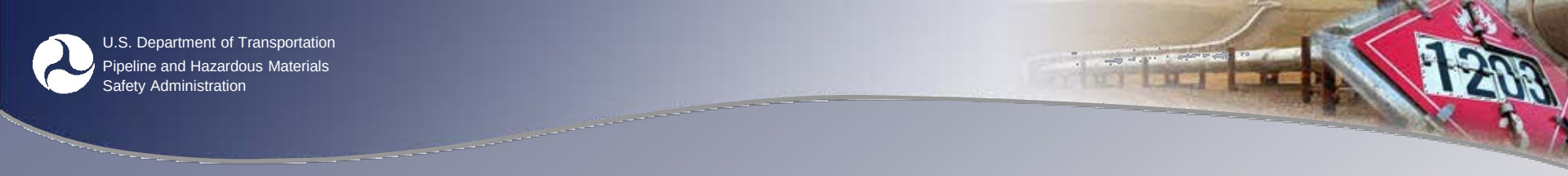
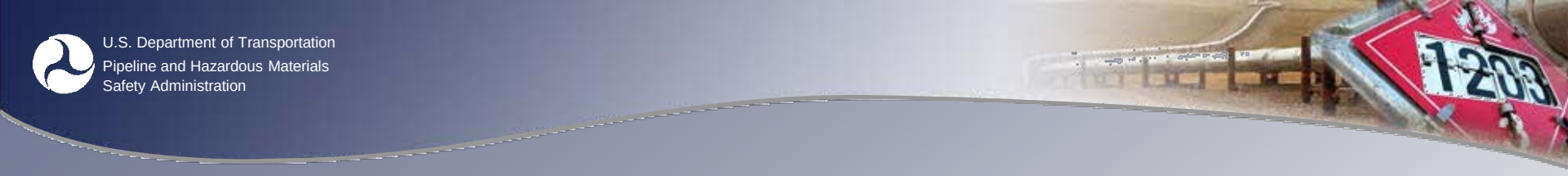


DIMP IMPLEMENTATION

National Association of Pipeline Safety Representatives

US DOT PHMSA Office of Pipeline Safety



Topics Areas for Discussion

- Safety Culture
- Inspection Results and Findings
- Mechanical Fitting Failure Report Data/Analysis
- DIMP Inspection Forms
- DIMP Website and Performance Measures Reporting
- Questions and Answers

Safety Culture

Moving from Compliance to Choice

- Our world has changed - forever
  - Growing public intolerance to risk – yet highly rate sensitive
  - Vastly increased media attention
  - Social media (without editorial control)
  - Energy pipelines have graduated to the national stage, many times for the wrong reasons
- 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

- 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 (continued)

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 select P&M measures
    - Lack of objective, systematic approach
- Much work remains to improve tools

Inspections Identify Weaknesses in Risk Analysis

The current challenge is for industry to develop

- More rigorous quantitative risk analyses including uncertainties and gaps in data
- A more investigative approach to risk analysis
  - Use analysis to find problems, not just display what you already know
- Robust approach for P&M measures
  - Technically sound risk-based criteria
  - Including pipe replacement

DIMP Inspection Results and Findings

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
- 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 foundation for continually improving industry's performance

DIMP Inspections

- Plan development and implementation were required to be complete on August 2, 2011.
- First Round of DIMP Inspections is expected to be completed by the end of 2014.
- For inspections of performance based regulatory programs (Like DIMP), adequate time is required for drill downs of 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.

DIMP Rule Provisions (§192.1007)

- IM Plan and Models used to develop IM Plan
- Knowledge of gas distribution system
- Identify threats that could threaten the integrity of pipeline
- Evaluate and rank risk associated with distribution pipelines
- Identify and implement measures to address risks
- Measure performance, monitor results, and evaluate effectiveness of IM program
- Periodic Evaluation and Improvement of IM Program
- Report results of required performance measures
- Records maintained to demonstrate compliance

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

- 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 over or link to it.
- The Plan should culminate in a ranked/prioritized list of threats, risk reduction measures, and performance measures.
- Treat DIMP as a tool to analyze needs and progress, not as a regulatory exercise.

Knowledge of Gas Distribution System

§ 192.1007(a)

Knowledge of Distribution System

- SME decisions & conclusions must be documented.
- Operators must specify how field information is to be relayed into DIMP. Some Operators have modified field data acquisition forms and internal processes to incorporate new information and correct inaccurate information.
- Plan must reference the missing information list when it resides outside of the DIMP.
- Procedures for identification and collection of additional information must be included or referenced in DIMP to ensure consistent collection and processing.

Knowledge (continued)

- Specific source data and documents used in development and implementation of DIMP must be included in DIMP.
- Procedure for collection of additional or missing information must be documented.
- Plan must list data that the Operator has identified that is needed to fill gaps.
- Plan must include procedure for recording new pipe data, including location and materials used.

Knowledge (continued)

- Data quality is a common concern;
  - Outdated, incomplete, obvious errors.
  - Outdated data systems difficult to use or sort.
  - Data cleanup and scrubbing is often required.
- To achieve adequate data quality, an appropriate level of resource allocation is required.
- When scrubbed data becomes available threat identification may need to be re-run.
- 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)

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)
- Threat Identification, Data Gathering, 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 not being considered:

- 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 be a potential threat.
- Interactive threats are 2 or more threats that, when occurring simultaneously, pose a threat to pipeline integrity.

Interactive Threats (continued)

- Examples of interacting threats include:
  - 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, different materials may be a predominate threat in a region, and segmentation may need to be refined to accommodate different failure rates.

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 miss) 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 PHMSA DIMP Inspection Forms 22 & 23 provides a quick 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

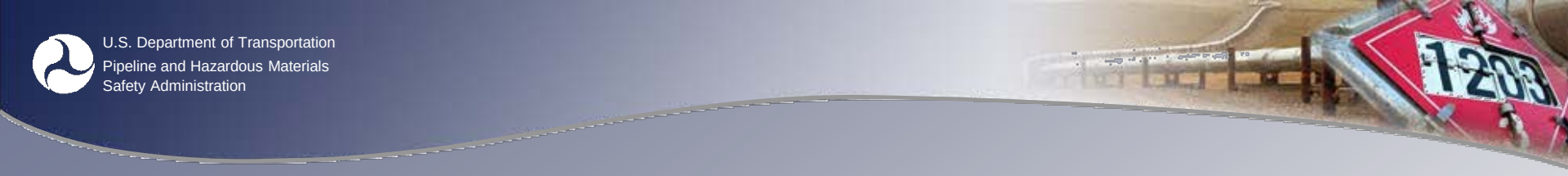
- A Plan must contain procedures for conducting periodic evaluations - changes would be handled with revisions to the original procedure.
- Plans are expected to include procedures for notifying affected operator personnel of changes and improvements made to the plan. or plan requirements.
- Plans must 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

MFFR Reporting

- **§ 192.1009 What must an operator report when a mechanical fitting fails?** (a) Except as provided in paragraph (b) of this section, each operator of a distribution pipeline system must submit a report on each mechanical fitting failure, excluding any failure that results only in a nonhazardous leak, on a DOT Form PHMSA F–7100.1–2. The report(s) must be submitted in accordance with § 191.12.
- (b) The mechanical fitting failure reporting requirements in paragraph (a) of this section do not apply to the following: (1) Master meter operators; (2) Small LPG operator as defined in § 192.1001; or (3) LNG facilities.

MFFR Reporting (continued)

- **§ 191.12 Distribution Systems: Mechanical Fitting Failure Reports.** Each mechanical fitting failure, as required by § 192.1009, must be submitted on a MFFR Form PHMSA F–7100.1–2. An operator must submit a MFFR for each mechanical fitting failure that occurs within a calendar year not later than March 15 of the following year (for example, all mechanical failure reports for calendar year 2011 must be submitted no later than March 15, 2012). Alternatively, an operator may elect to submit its reports throughout the year. In addition, an operator must also report this information to the State pipeline safety authority if a State has obtained regulatory authority over the operator's pipeline.

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 Analysis

- 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

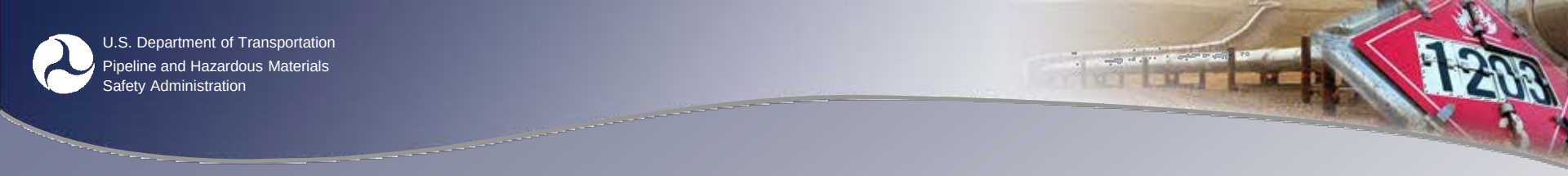
Other(s)

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:
  - MFFRs submitted in 2011 – 8346
  - MFFRs submitted in 2012 – 7575
  - MFFRs submitted in 2013 – 8966
- Data submitted for 2013 shows similar trends to previous 2 years of data collection.

MFFR Data Analysis

- The majority of mechanical fitting failures resulting in a hazardous leak involve nut-follower, coupling type fittings.
- Valves are involved in 14% of reported failures.
- Equipment failure is the leading reported cause of leaks (41%), and Natural forces is second (17%).
- The majority of leaks occur outside (98%), belowground (87%) involving service-to-service connections (60%).
- Steel fittings (62%) are involved the majority of reports, and plastic fittings are second (26%).



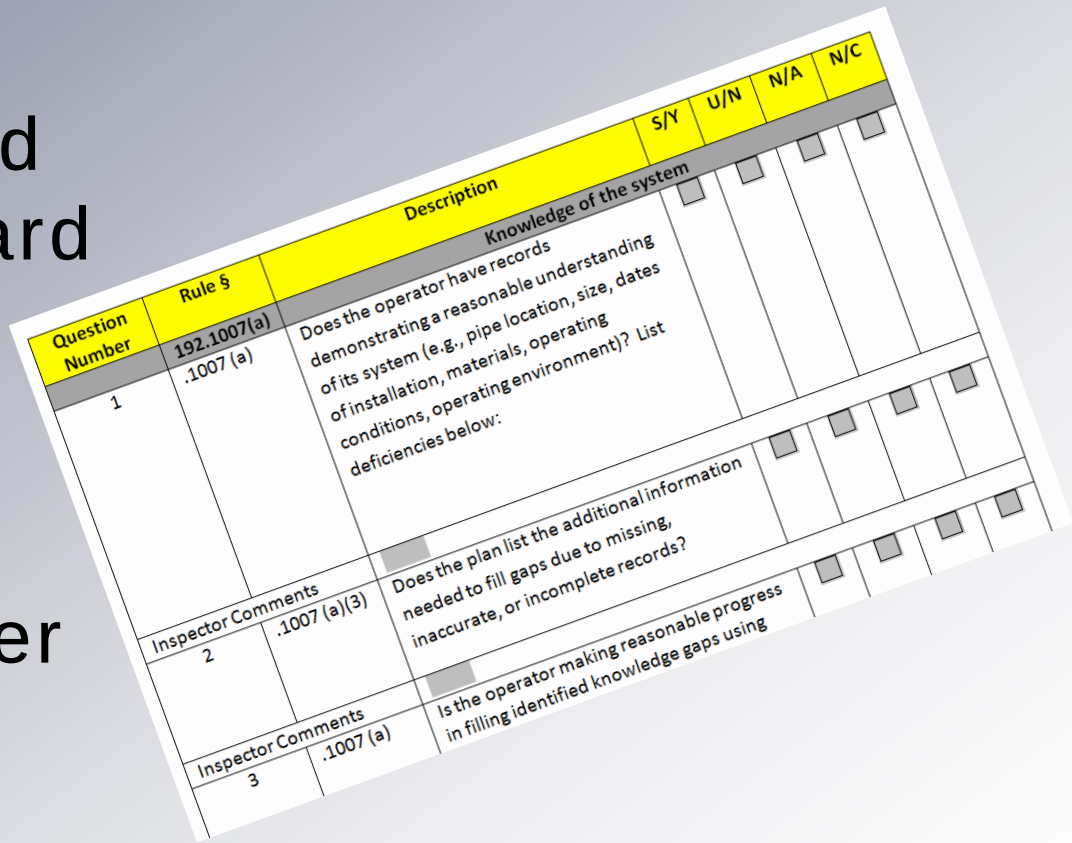
DIMP Inspection Forms

DIMP Inspection Forms

- PHMSA DIMP Inspection Forms for 192.1005 and 192.1015 distribution operators are available at http://primis.phmsa.dot.gov/dimp/resources.htm
- Revisions were implemented in September, 2011 that made the forms more user friendly for Inspectors. No changes were made to the wording of the questions.

Record and Field Inspection Form

- Draft developed per NAPSR Board request – In Review
- Intended for inspections after initial DIMP inspections



Question Number	Rule §	Description	S/Y	U/N	N/A	N/C
	192.1007(a)	Knowledge of the system				
1	.1007 (a)	Does the operator have records demonstrating a reasonable understanding of its system (e.g., pipe location, size, dates of installation, materials, operating conditions, operating environment)? List deficiencies below:				
Inspector Comments						
2	.1007 (a)(3)	Does the plan list the additional information needed to fill gaps due to missing, inaccurate, or incomplete records?				
Inspector Comments						
3	.1007 (a)	Is the operator making reasonable progress in filling identified knowledge gaps using				

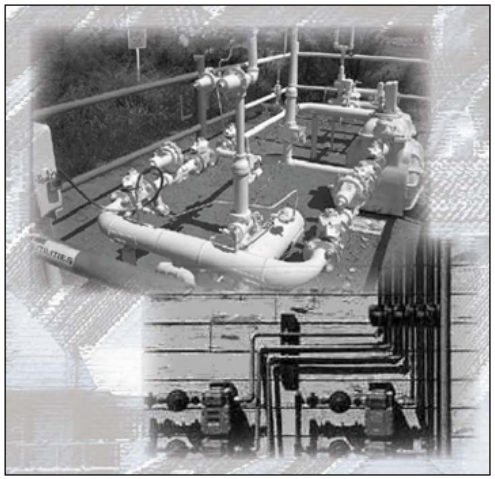
DIMP Website and Posting of DIMP Performance Measures

DIMP Home

U.S. Department of Transportation

- DIMP Home
- DIMP Communications: Public Meetings, Webinars, Webcasts, and State Seminars
- DIMP History
- DIMP Resources
- FAQs
- Performance Measures
- Questions and Comments for OPS
- Regulator Contacts

Distribution Integrity Management



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.

The regulation requires operators, such as natural gas distribution companies to develop, write, and implement a distribution integrity management program with the following elements:

- Knowledge
- Identify Threats
- Evaluate and Rank Risks
- Identify and Implement Measures to Address Risks
- Measure Performance, Monitor Results, and Evaluate Effectiveness
- Periodically Evaluate and Improve Program
- Report Results

The DIMP Inspection Forms as well as other resources to support operators implement their program are on the DIMP Resources page and through PHMSA's Pipeline Safety website.

PHMSA has developed and continues to enhance guidance to help the public and the affected industry understand the requirements of the final rule in the form of FAQs.

DOT Website | PHMSA Website | Privacy Policy | FOIA

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

DIMP Website

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/

Cast Iron Discussion Page

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

DIMP Enforcement Guidance

- DIMP Enforcement Guidance is posted and publicly available on PHMSA's website with the other Enforcement Guidance documents at http://www.phmsa.dot.gov/foia/e-reading-room
- This posting allows Operators to understand Regulators' expectations with regards to the DIMP Regulation

Questions and Answers