DIMP IMPLEMENTATION INSPECTION EXPECTATIONS (FORM 24)

SGA Distribution Integrity Management Workshop

Tuesday, March 24TH 10:30 – 11:30 AM

Chris McLaren, PHMSA Office of Pipeline Safety

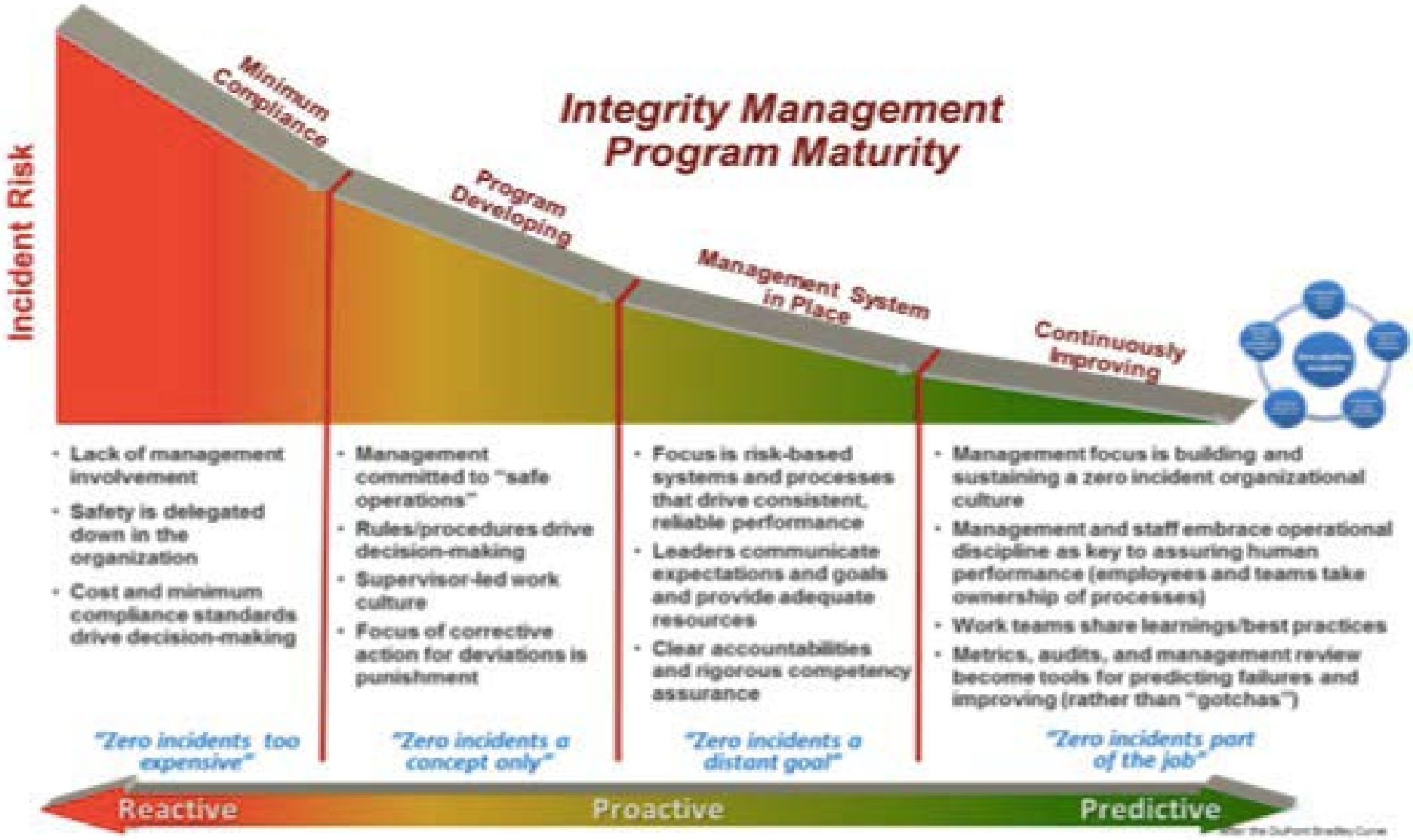
Topics Areas for Discussion

- 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

Continuous Improvement

- Continuous improvement is a requirement to meet the minimum safety regulations for integrity management programs.
- Safety Culture provides a platform from which to drive continuous improvement in the safe operation and integrity of a pipeline system.

Assessing Maturity



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 later 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 even though 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.

DIMP Inspection Findings (cont.)

- The inspection revealed the operator failed to include all required leaks on their Annual Report and many assigned causes were not correct.
- 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 operator did not validate the risk evaluation generated by their consultant using SHRIMP, and the prioritization of risks was not reasonable.

DIMP Inspection Findings (cont.)

- 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
- Q13 (Form 22) asks “Has the operator demonstrated an understanding of its system?” Our Inspectors are answering “No” on many municipalities and other small operators that have hired contractors to fill in leak data into SHRIMP and print out a DIMP.

DIMP Inspection Findings (cont.)

- The operator used the SHRIMP program in 2011 and pulled the book off the shelf for the inspection. There were many commitments made in the DIMP to implement risk reduction measures and monitor performance metrics. None of the tasks had been completed – procedural violations.
- The "Leader" at a municipal operator is an elected official and knows nothing about operating a gas system and sees the gas system as a way to fund the water and sewer projects which are mostly what the voters care about.

IM Plans and Development Models

- 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.
- 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.
- List or document the actions committed to in the DIMP to ensure requirements are not “missed”.

IM Plans and Development Models §192.1005

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Knowledge of Distribution System § 192.1007(a)

- 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.

Threats from DIMP Rule § 192.1007(b)

- §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.
- Plan must include procedures to evaluate and obtain data from external sources that are reasonably available to identify existing and potential threats.
- 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)

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, near misses)
  - Manufacturing and Construction Threats
  - Maintenance history and Other Operator documentation

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

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)

- 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.
- Operators must consider non-leak failures in analyzing risk and address non leak events (e.g., near misses) as existing or potential threats.

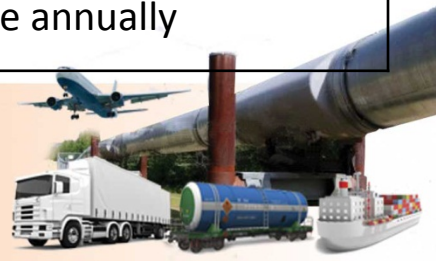
Measures to Address Risks § 192.1007(d)

- 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 consider 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)

- 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.*

- **An operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas.**
- **Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure.**
- **An operator must conduct a complete program re-evaluation at least every five years.**
- **The operator must consider the results of the performance monitoring in these evaluations.**

Periodic Evaluation and Improvement

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

Report Results
§ § 192.1007(g) & 192.1011

- 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

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 (03/18/2015):
  - MFFRs submitted in 2011 – 8356
  - MFFRs submitted in 2012 – 7572
  - MFFRs submitted in 2013 – 9431
  - MFFRs submitted in 2014 – 9078
- 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.
- The form asks inspectors to review records and perform field observations regarding the implementation of the required DIMP elements.

PHMSA Form 24

PHMSA Form 24 - Gas Distribution System DIMP Implementation Inspection, July 7, 2014, Rev 0

Question Number	Rule §	Description	S/Y	U/N	N/A	N/C
	192.1005	Issues Identified in previous Integrity Management Inspection(s)				
1	* - If not satisfactory, insert appropriate code section(s)	Have all issues raised in previous DIMP inspections been satisfactorily addressed? Provide comments below.	☐	☐	☐	☐
Inspector Comments						
	192.1007(a)	Knowledge of the system				
2	.1007 (a)(3)	Is the operator collecting the missing or incomplete system information and data needed to fill knowledge gaps to assess existing and potential threats?	☐	☐	☐	☐
Inspector Comments						
3	.1007 (a)(3)	Is the operator collecting the missing or incomplete system information and data using the procedures prescribed in its DIMP plan?	☐	☐	☐	☐

PHMSA Form 24

PHMSA Form 24 - Gas Distribution System DIMP Implementation Inspection, July 7, 2014, Rev 0

Question Number	Rule §	Description	S/Y	U/N	N/A	N/C
	192.1007 (b) and (c)	Identify Threats; Evaluate and Rank Risk				
9	.1007(b)	Has the operator acquired any new information relevant to system knowledge that may affect its threat identification?	☐	☐	☐	☐
Inspector Comments						
10	.1007 (b)	Have any changes occurred that require re-evaluation of threats and risks? Examples include, but are not limited to, the following: • Acquisition of new systems • Completion of pipe replacement program • New threats (e.g., first time natural forces damage, etc.) • Increase in existing threats (e.g., washouts, land subsidence, etc.) • Increase in consequences (e.g., new wall-to-wall pavement, etc.) • Organization changes (e.g., downsizing of staff, company restructuring, etc.) • Applicable code revisions	☐	☐	☐	☐

PHMSA Form 24

PHMSA Form 24 - Gas Distribution System DIMP Implementation Inspection, July 7, 2014, Rev 0

Question Number	Rule §	Description	S/Y	U/N	N/A	N/C
	192.1007(d)	Identify and implement measures to address risks				
18	.1007 (d)	Does the documentation reviewed demonstrate the operator is implementing the measures to reduce risks per the DIMP plan?	☐	☐	☐	☐
19	.1007 (d)	Has the operator completed any measures to reduce risks resulting in the elimination/mitigation of the associated identified threat? (e.g., pipe replacement program completed, etc.)	☐	☐	☐	☐
Inspector Comments:						

PHMSA Form 24

PHMSA Form 24 - Gas Distribution System DIMP Implementation Inspection, July 7, 2014, Rev 0

Question Number	Rule §	Description	S/Y	U/N	N/A	N/C
	192.1007(e)	Measure performance, monitor results, and evaluate effectiveness				
23	.1007 (e)	Is the operator collecting data for the required performance measures in §192.1007(e)? i) Number of hazardous leaks either eliminated or repaired, categorized by cause? ii) Number of excavation damages? iii) Number of excavation tickets? iv) Total number of leaks either eliminated or repaired, categorized by cause? v) Number of hazardous leaks either eliminated or repaired, categorized by material? (Note: Not required in PHMSA Distribution Annual Report Form 7100.1-1) vi) Any additional measures the operator determines are needed to evaluate the effectiveness of the DIMP plan in controlling each identified threat? (Note: Not required in PHMSA Distribution Annual Report Form 7100.1-1)	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐

PHMSA Form 24

28	.1007 (f)	Did the periodic evaluation include the following: • Verification of general system information (e.g., contact information; form names; action schedules, etc.)? • New information acquired since the previous evaluation? • Review of threats and risks? • Was the risk model re-run? • Review of performance measures? • Review of measures to reduce risks? • Evaluation of the effectiveness of measures to reduce risks? • Modification of measures to reduce risks, if necessary?	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

PHMSA Form 24

29	.1007 (e)	If any established performance measures indicated an increase in risk beyond an acceptable level (as established in the DIMP plan), did the operator implement new risk reduction measures along with their associated performance measures?	☐	☐	☐	☐
Inspector Comments						
30	.1007 (f)	If the periodic evaluation indicates that implemented measures to reduce risks are NOT effective, were risk reduction measures modified, deleted or added?	☐	☐	☐	☐
Inspector Comments						

PHMSA Form 24

Additional Inspector Comments:

Conditions observed in the field can provide insights into the effectiveness of the operator's DIMP plan implementation. Please comment on your general field observations.

Please comment on the operator's 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. A positive safety culture is essential to an organization's safety performance regardless of its size or sophistication. Characteristics of a positive safety culture include the following:

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,
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.

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!