NAPSR – PHMSA DIMP Implementation Team

National Association of Pipeline Safety Representatives
Office of Pipeline Safety

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Welcome

Thank you for Your Participation at LGA's 2012 Annual Operations Conference!

Today's Topics

1. Lessons learned from DIMP Inspections
2. Specific areas of concern to regulators
3. Feedback and Comments from Operator's DIMP Inspection Experiences

Data

- 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  - Outdated, incomplete, obvious errors.
  - Outdated data systems difficult to use or sort.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.
- Reasonable balance between SME and hard data is important.
- Integration of data to identify existing and potential threats requires an appropriate level of resource allocation.
- When scrubbed data becomes available threat identification may need to be re-run.

Knowledge of Gas Distribution System

- SME qualifications, decisions and conclusions must be documented.
- How will field information be relayed into the DIMP.
  - May be necessary to modify field data acquisition forms and internal processes to incorporate new information and correct inaccurate information.
- Plan must account for identification and collection of missing and additional information needed to fill gaps.
- Plan must include procedure for recording new pipe data, including location and materials used.
  - Field data collection and acquisition forms may need to be enhanced.

Identify Threats to Integrity

- A DIMP must provide sufficient detail to address specific 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 which may identify existing and potential threats.
- System subdivision for identifying 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., flood, earthquake). However, if materials with identified performance issues are a predominate threat in a region, specific segmentation may be needed to account for their different failure rates.

Threat Identification

- Threat categories
  - Time Dependent
  - Time Independent
- Threat Identification, Data Gathering, Data Integration, and Risk Assessment are inter-related and dependent upon each other
- A failure of one of these processes can result in threats to the integrity of the pipeline not being addressed
- Threats are Potential Pipeline Failure Mechanisms or Pipeline Failure Cause Categories
- Identifying Threats is key to Operator Integrity Decisions regarding measures to implement to reduce risk(s).

Incident Causes or Threats to the Integrity of a Pipeline from B31.8S

- Third Party Damage
  - Third party inflicted damage (instantaneous/immediate fail)
  - Previously damaged pipe (delayed failure mode)
  - Vandalism
- Corrosion Related
  - External
  - Internal
- Miscellaneous Equipment and Pipe
  - Gasket O-ring failure
  - Stripped threads/broken pipe/coupling fail
- Control/Relief equipment malfunction
  - Seal/pump packing failure
  - Wrinkle bend or buckle
  - Miscellaneous
- Incorrect Operations
  - Incorrect operation company procedure
- Weather Related
  - Cold weather
  - Lightning
  - Heavy rain or floods
  - Unknown
- Manufacturing Related Defects
  - Defect pipe seam
  - Defective pipe
- Welding/Fabrication Related
  - Defective pipe girth weld
  - Defective fabrication weld
- Outside Forces
  - Earth movement
- Environmental Cracking
  - Stress corrosion cracking

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

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

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.

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 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
- An Operator should also consider that Interactive Threats (interaction of multiple threats) can be a potential threat.

Potential Threats

- Some Operators are struggling 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

Potential Threat Identification

- It is not as overwhelming as it may sound like “eliminate all free radicals” from James Bond movie
- This is a thoughtful consideration of what else could go on that standard risk assessment models do not account for
- Consider what other threats (and interactive threats) exist in the Operator’s unique operating environment
- Consideration of near miss events and abnormal operating condition events (just to name a couple) is needed
- It can be resource intensive depending on the materials and operating environment
- Sufficient time and resources should be committed to the task(s)

Identified Potential Threats

Examples of potential threats often 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

Interactive Threats

- Interact – To act on each other
- Two or more threats that, when occurring simultaneously, pose a threat to pipeline integrity.

- The concept of interactive threats and how to address them has perplexed many transmission operators.
- One operator created a matrix of susceptibility for each combination of the B31.8S threats along with decision flow process for each set of credible interactive threats.

Interactive Threats

- Distribution Operators should look to their Leak and Incident history and Operations and Maintenance history to identify interactive threats specific to their system.
- Some interacting threats to continue 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

- System subdivision for evaluating 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., flood, earthquake). However, if different materials are a predominate threat in a region, other segmentation may be needed to accommodate different failure rates.
- Operators must consider non-leak failures in analyzing risk. DIMP should address failures that do not result in a release (e.g., near miss) to identify potential threats.
- Risk ranking must include all risks to pipeline facilities.

Evaluate and Rank Risks (cont.)

- The risk ranking model results must be validated. One operator identified that the “COF” can be diluted by Frequency of Failure (“FOF”) – a larger range for consequences was needed to get reasonable results.
- Plan must provide explanation of the process used to validate the data used in the risk ranking and to review the output of the risk ranking model for “reasonableness”.
- The Plan (or “Model” used) must address risks specific to services as well as mains.
- When changes are made to a risk model, the risk ranking should be re-run and results incorporated into DIMP promptly.

Measures to Address Risks

- The Plan must provide a link between a specific risk (either a threat or consequence) and the measure to reduce that risk.
- 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.)
- Intervals must be established for the re-evaluation of measures implemented to reduce risks to gage their effectiveness and identify if the measure is appropriate.
- DIMP Models must rank proposed projects/replacements based on risk and not the cost.

Performance Measurement

- Each Measure Implemented to Reduce Risk must have a Performance Measure established to monitor its effectiveness.
- Operators must develop and monitor performance measures from an established baseline.
- A DIMP must include procedures for establishing baselines for Performance Measures (192.1007(e))
- Some Operator's Plans had “triggers” to initiate development of new or additional performance measures depending on program performance and the operating environment
- Operators have used a single performance measure to evaluate the effectiveness of multiple risk control measures.

Periodic Evaluation and Improvement

- A Plan must contain procedures for conducting periodic evaluations of its performance.
- If it is found necessary to make changes to the periodic evaluation procedure, the changes would be handled with revisions to the original procedure.
- Plans are expected to include procedures for notifying appropriate operator personnel of changes and improvements made to the plan.
- The Plan must provide for the incorporation of changes to facilities or to risk factors, such as:
  - Pipe replacement program changes risk ranking by removal of vintage pipeline facilities.
  - Flood control project reduces flood risk.

Report Results

- The DIMP must include (or reference) procedure(s) describing the collection and reporting of DIMP data (192.1009(g)) as part of the Annual Report to PHMSA.
- If a State agency exercises jurisdiction over the Operator's pipeline and requires reporting, the Plan must include (or reference) instructions for sending these reports the state pipeline safety authority as well.

This may seem duplicative of other reporting requirements, but the DIMP reporting rules were adopted before it was arranged for the information to be added to Annual Reports. Copying or referencing other reporting procedures should make this requirement easy to meet.

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).
- The Plan must describe how superseded plans and data will be maintained and kept secure
- Plans must include an adequate revision log that includes: the Plan effective date, revision dates, and a description of each revision
- Some Plans included statements that “all Company records were used in the development of the DIMP.” Only the records actually used to develop and implement the DIMP should be referenced; otherwise all records must be kept for 10 years.

Other Comments

- Pre-DIMP risk reduction measures need to be incorporated into the DIMP plan.
- If risk evaluation concludes new or additional risk reduction measures are not needed to address a particular threat, that is acceptable but needs to be explained in the Plan.
- 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.

Industry Comments on DIMP Inspection Experiences

- Operators presented on their experience with DIMP Audits and implementing DIMP at the SGA Operating Conference, Fort Worth, TX July 24, 2012
  - Atmos Energy
  - SourceGas
  - CenterPoint Energy
- Full presentations are available on the meeting's website
- Let's talk about some of their findings and feedback

Planning and Preparation for Audit

- Prepared 30-45 minute PowerPoint presentation for intro:
  - Provided a general overview of the program
  - Established our DIM approach
  - Set the stage for the audit
  - Open discussion
- Preparation was key to success
- Provide auditor with latest revision of the plan (prior to audit) - Helps them become well versed
- Performance based plan is difficult to audit - How do you audit a difference in opinion? Be prepared for lengthy discussions.

Planning and Preparation for Audit

- Compliance Manager(s) would complete the PHMSA inspection protocol prior to audit.
- Assigned roles and responsibilities to various members of audit team relative to discussing Plan and risk ranking model.
- Be an “open book” and be able to tell your story!
- Audit Protocol Format - audits to date by state regulators have been done using the PHMSA inspection protocol.
- Location (Centralized versus Location-Specific) - both types of audits. The centralized audits generally have covered the Plan and risk ranking model results whereas the location-specific audits focused on facilities and records.

Pre Audit Communication

- It is recommended to give a DIMP presentation to the regulatory agency before the audit in a less formal and open discussion type situation. Don't wait for the audit to talk about the plan in order to build trust and buy in.
- Advantageous to have all hands on board during the audit. Invite as many SME's as possible and include Directors, Managers, etc. so that leadership buy in is demonstrated. The audit also helps to build interest and knowledge from those key internal resources as they will continue to see the increased focus on distribution integrity.
- "Audits have been successful" - Received positive feedback regarding our approach and Collected constructive comments to improve our written plan. Anticipate in-depth audit once performance measures have been established

Lessons Learned

- A challenge for multi-state operators is the difference among state regulators regarding the extent to which they may want an Operator to expound upon a topic, such as a procedure, in their Plan. Depending upon the subject matter, some states may require more detail in an Operator's plan than others.
- Know your pipeline systems and their issues. Be able to discuss your data gaps – Every Operator has them! More importantly, how will you manage them?
- Know how to fully integrate your legacy data into your DIM analysis. Also how does an Operator replicate and retain their SME's knowledge?
- Ensure the identification and integration of new and potential threats.

Lessons Learned

- DIMP is not a leak management plan - Avoid the appearance of a leak management program
- Most of our initial knowledge is coming from leak history or damages to our lines. As we go forward, we will improve on using other measures such as patrol records, maintenance history, corrosion control records, etc. Analysis of these records will add value to the discussions during the audits.
- Show that plan anticipates threats. (Potential threats)
- Regulatory relationships are a big key to success. Good relationships foster open communication from both sides. The plan is a dynamic and evolving program and thus is continually undergoing modifications and revisions. A good relationship helps both sides agree on the right execution strategy.

Data and Records

- Difficulties Encountered included:
  - Consistency/scrubbing of data
  - Training of operations personnel
  - OTHER as a leading cause
  - Revisions to the initial plan
- Additional data - Auditors are requesting more root cause breakdowns then we typically gather in the field or that PHMSA identifies in the primary threat causes as described in 192.1007. This may drive an increase in data integrity and increased data capturing choices (added choices in mobile data).
- Records Focus - Data integrity will be a primary focus going forward along with record accuracy.

Thank you for Your Participation