GPTC Guidance for Distribution Integrity

PHMSA DIMP Outreach Webcast

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GAS PIPING technology committee

OUTLINE

- Who is GPTC?
- How the guidance was developed
- Examples of selected guidance topics
- How / when the guidance will be available for review

Who is GPTC?

- Gas Piping Technology Committee
- Providing guidance for compliance with federal pipeline safety regulations since 1970
- Began as an ASME committee
- An ANSI Accredited Standards Committee - Z380 - since 1992
- Large, well balanced, consensus oriented committee

Who is GPTC?

Unique Membership

- Gas Industry
  - Distribution
  - Manufacturing
  - Transmission
- Government
  - Federal Regulators
  - State Regulators
  - NTSB
- General Interest

Primary mission:
Write and publish Guide Material (The GUIDE) for 49 CFR Parts 191 and 192

What is The GUIDE?

- An ANSI standard – Z380.1
- Provides “how-to” guidance for compliance activities
- Based on sound engineering and operating principles
- Advisory in nature – does not restrict other methods of compliance

What is in The GUIDE?

- Already covers most aspects of distribution system integrity
  - ✓ Leak detection, grading and control
  - ✓ Cast iron pipe maintenance
  - ✓ Continuing surveillance
  - ✓ Excess flow valves
- Recognizes distribution system and operator diversity

How was the distribution integrity guidance developed?

GPTC DI GUIDANCE

PHMSA & NAPSR requested GPTC to develop companion DI guidance to the anticipated regulation that would

- Provide different options for operators
- Be developed in parallel with regulation, i.e., before an NPRM is published
- Be based on the “Report of Phase 1 Investigations” (Phase 1 Report) prepared for PHMSA by joint work/study groups (Dec. 2005)

GPTC DI GUIDANCE

- Major findings of the Phase 1 Report
  - ✓Design differences between Distribution and Transmission pipelines preclude the wholesale use of transmission integrity techniques in distribution systems.
  - ✓DIMP rule should be high level and permit flexibility for the wide diversity of distribution operators.

GPTC DI GUIDANCE

- *DI guidance Task Group* asked to:
  - ✓Include members from outside GPTC - particularly regulators and small operators
  - ✓Address the needs of small operators – preserve the KISS principles
  - ✓Follow the 7 elements of Phase 1
  - ✓Provide examples to indicate level of effort expected
  - ✓Make available as a stand alone appendix to the GUIDE

Examples of the guidance

Know the Distribution System

- Materials
- Type of construction
- Operating conditions
- Other relevant factors
- Use best information available
- Do not have to dig up system to collect data

Note: More than physical components

Know the Distribution System

A Basic Source:

DOT Annual Report Information

- Includes basic information
  - ✓ Material, diameter, # of services, installation decade, leaks eliminated/repaired during the year

Other Sources:

Maps/GIS/Records

- Pipe location and connectivity
- Mains and services
- Pipe attributes – material, year installed, size, pressure, CP protected?, etc.

Know the Distribution System

- What is happening in and to the system is known from data gathered through O&M activities:

  * Leak history
  * Maintenance
  * Damages
  * Work records
  * Repairs
  * Failures
  * Pipe condition
  * Corrosion inspections

Identify Threats to the System

Eight primary threats to consider:

(From Distribution Annual Report – Leak Cause Categories)

* Corrosion
* Natural forces
* Excavation
* Other outside force damage
* Material or welds
* Equipment
* Operations
* Other

Identify Threats to the System

Example: Corrosion threat can be considered in sub-categories

- External corrosion – bare steel
- External corrosion – cast iron
- External corrosion – coated & wrapped pipe
- External corrosion – other metallic materials
- Internal corrosion

Guidance offers sub-categories for most threats

Identify Threats to the System

- Determine if one or more threats causes a problem
- Answer appropriate questions to help determine whether the threat
  - ✓ Exists throughout the system (General), or
  - ✓ Is limited to a certain geographic region or material (Local).
- Alternatively, some risk models perform threat identification
- Some threats may be insignificant, non-existent, or not applicable (NA).

Identify Threats to the System

- Guidance provides sample questions (not all-inclusive)

  Sample Questions for the Corrosion Threat

  Sub-category = External corrosion: bare steel pipe

  ✓ Does bare steel exist in the system?

  ✓ Is the pipe cathodically protected?

  ✓ Have corrosion leaks occurred?

  ✓ Do exposed pipe inspections indicate external corrosion?

  ✓ Are cathodic protection readings consistently adequate during annual monitoring?

Identify Threats to the System

Sample Questions for the Other Outside Force Damage Threat

Sub-category = Vehicular

- ✓ Are aboveground facilities being hit by vehicles?
- ✓ Are aboveground facilities located near a roadway, driveway, or other location where they may be susceptible to vehicular damage?
- ✓ Are susceptible aboveground facilities protected from vehicular damage?

Identify Threats to the System

Information evaluation may be done by any means suitable to the operator. Methods may include:

- Simple stand-alone approach:
  - ✓ One, or more, subject matter expert reviews available data
  - ✓ Periodic inter-departmental meetings
  - ✓ Periodic meetings with subject matter experts
- More sophisticated approach:
  - ✓ Electronic database or work management system
  - ✓ Risk evaluation software that compiles relevant information

Evaluate Risks and Rank Facilities

Risk = Likelihood x Consequences

- Facilities or groups of facilities that do not experience problems may be removed from the risk evaluation and no further action taken.
- Stable or improving problem trends may require no further action.
- Frequency may be an indicator of Likelihood

Sample Frequency Factors for Excavation Damage

Low	Few problems, excavators generally responsive, good map and locating records.
Medium	Moderate number of problems, excavators not very responsive, moderate map and locating records.
High	High number of problems, excavators non-responsive, poor or no map and locating records.

Sample Consequence Factors for Excavation Damage

Low Rural location, small diameter pipe, low operating pressure.

Medium Residential location, medium diameter pipe, medium operating pressure.

High Predominantly multi story buildings, large diameter pipe, high operating pressure.

Sample Relative Risk Calculation

Consequence Factor (Multiplier*)	**Frequency Factor** (Multiplier*)		
	Low (1)	**Medium (2)**	**High (3)**
Low (1)	**1 x 1**	**1 x 2**	**1 x 3**
Medium (2)	**2 x 1**	**2 x 2**	**2 x 3**
High (3)	**3 x 1**	**3 x 2**	**3 x 3**

*Determined by Operator

Relative Risk Calculations

- A high score is not an absolute measure of risk.
- Scores can help determine a relative risk between two or more groups to help prioritize risk management actions.
- Can enhance the matrix by adding more detail

Example – A small diameter pipeline, operating at medium pressure and located in a residential area.

Small diameter	Low risk = 1
Medium pressure	Med risk = 2
Residential area	Med risk = 2
Total consequence factor	= 5

Validation

- Validate the risk ranking results:
  - ✓ Do the results and O&M records focus on the same facilities or groups of facilities?
  - ✓ Do the results agree with the SME experiences?

- If either answer is no, the differences need to be understood. Consider:
  - ✓ Review / revise evaluation process,
  - ✓ Gather more data,
  - ✓ Reevaluate the SME perspective

Risk Management

- Risk can be managed
  - ✓ By eliminating or reducing the likelihood of a problem occurring
  - ✓ By lessening the consequences of a potential problem
- DIMP expects you to be pro-active in one or both

Additional or Accelerated Actions (A/A)

- The guidance gives examples of activities that are performed in addition to the requirements of the Code to manage risk.
  - ✓ Identify and rank risks to the system
  - ✓ Determine which risk management techniques and practices are most appropriate.
  - ✓ Implement one or more A/A, or other action determined by the operator, when addressing one or more of the risks.

Examples of A/A Actions

Threats		**A/A Examples**
Corrosion	External Corrosion	• More frequent leak surveys • Replace/insert/rehab • Hot spot protection • Correct CP deficiencies
Excavation	3rd Party or Operator Damage	• Enhanced awareness education • Request regulatory intervention • Inspect targeted excavation/ backfill areas • Inspect for facility support • Participate in pre-construction meetings with project engineers and contractors in high risk areas • Expand use of EFVs

Performance Measures

- Should address your specific risk management practices
- Should be something that can be counted, tracked, monitored and supported
- Select “a critical few” measurements
- Select performance measures that use data collected currently or in the past
- Where practical, use numeric performance measures, but
- Don’t ignore non-numeric methods

Example Performance Measures

Corrosion

- Leaks due to external or internal corrosion
- Exposed pipe condition reports that found corrosion or coating damage
- Repairs required due to non-leaking pitting or coating damage (above/below ground)
- CP zones found with low protection levels

Example Performance Measures

Excavation

- Excavation caused damages
- Damages per 1,000 tickets (normalized damages)
- Ratio of ticket no-show to total tickets received
- Failure by notification center to accurately transmit tickets to the operator
- Damages by cause, facility type (mains, services) and responsible party

How and When to Review the GPTC DIMP Guidance

Guidance Availability

- GPTC will verify guidance is consistent with the NPRM after it is issued
- Anticipate only editorial changes since PHMSA has monitored the development process

Guidance Availability

- If no substantive changes, guidance will be available to the public
  - ✓ Within weeks of the NPRM
  - ✓ Through ANSI public review procedures
  - ✓ Announced in “ANSI Standards Action”
  - ✓ Posted on AGA web site
  - ✓ Comment to GPTC Secretariat (AGA) for committee review/resolution
- Concurrently, it will be letter balloted for approval by GPTC main body

Guidance Availability

- If NPRM conflicts with draft guidance
  - ✓ Revision will be required
  - ✓ Approval needed from GPTC Divisions – Most likely mid July
  - ✓ Revised guidance would be available to public through ANSI by end of July
- Final guidance should be published two to six months after ANSI review period begins

Summary

- GPTC is consensus-based and has provided guidance for compliance with federal pipeline safety regulations since 1970
- The DI guidance was developed by an enhanced task group to
  - ✓ Follow the 7 elements of Phase 1
  - ✓ Address the needs of all operators, including small systems
  - ✓ Provide examples

Summary

- DI guidance provides examples of
  - ✓ How to identify threats
  - ✓ A simple risk assessment method
  - ✓ Risk management actions
  - ✓ Performance measures
- Guidance will be available to the public
  - ✓ Through ANSI public review procedures
  - ✓ Within weeks of the NPRM if no substantive changes
  - ✓ By end of July if revisions are needed