Regulatory Requirements for Cased Pipelines

Appalachian Underground Corrosion Short Course

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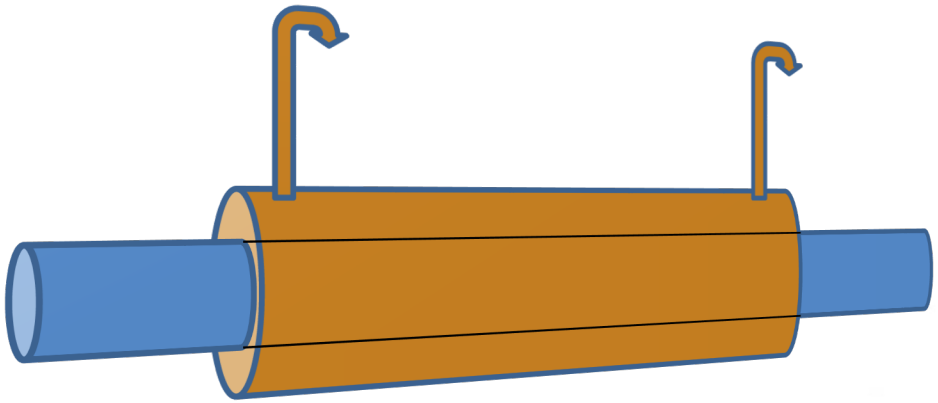
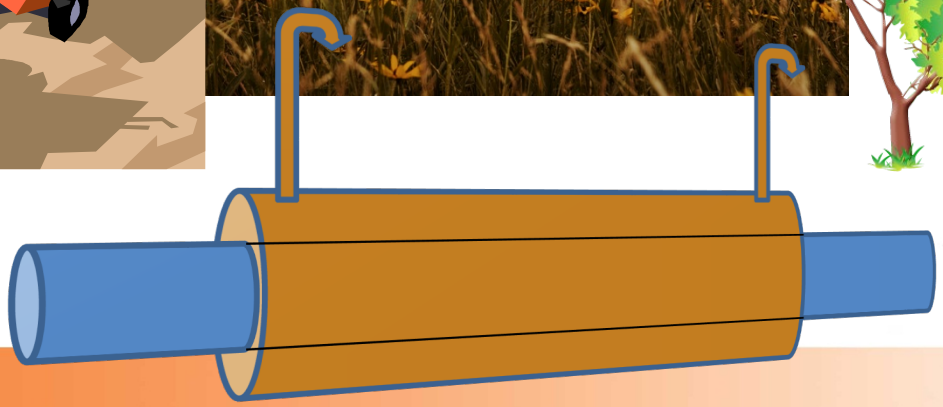
Presentation Outline

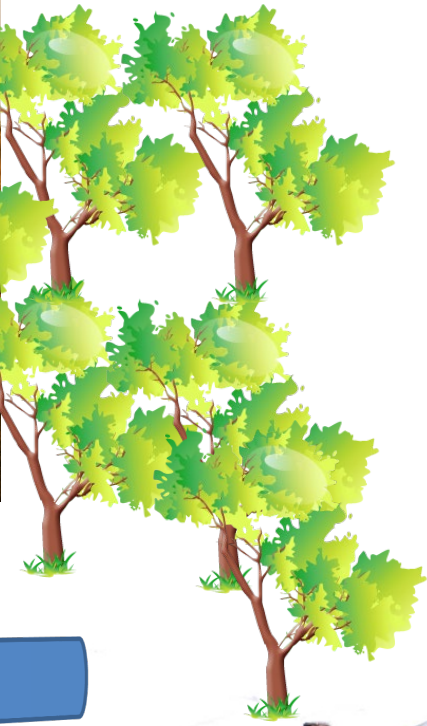
- Regulatory Corrosion Control Requirements (Subpart I)
  - Annual Monitoring
- Regulatory Requirements Inside High Consequence Areas (HCA's)
  - Use of "Other Technology" to assess cased pipelines
  - Use of External Corrosion Direct Assessment (ECDA) to assess cased pipelines



Corrosion Control Regulatory Requirements

192 Subpart I





§192.467 External corrosion control: Electrical isolation.

(a) Each buried or submerged pipeline must be electrically isolated from other underground metallic structures, unless the pipeline and the other structures are electrically interconnected and cathodically protected as a single unit.

§192.467 External corrosion control: Electrical isolation.

(c) Except for unprotected copper inserted in a ferrous pipe, each pipeline must be electrically isolated from metallic casings that are a part of the underground system. However, if isolation is not achieved because it is impractical, other measures must be taken to minimize corrosion of the pipeline inside the casing.

PHMSA Expectations
Interpretation PI-18-0003, March 11,2019

- Maintain electrical isolation between pipeline and casing where practical
- Test for shorts during annual CP survey
- Clear electrical shorts where practical (prompt remedial action)
  - Excavate both ends of casing
  - Inspect and re-center pipe inside casing
  - Remove any electrolyte in casing
  - Repair or replace damaged casing insulator spacers and end seals

PHMSA Expectations
Interpretation PI-18-0003, March 11,2019

- Where impractical to clear shorts the operator *"must take other preventive measures to mitigate corrosion of the pipeline inside the casing and maintain safety."*
- Examples of other preventive measure that may be used:

"1) filling "high dielectric fill or corrosion inhibiting materials" between the casing/carrier pipe that the operator can demonstrate will minimize corrosion of the carrier pipe and monitoring of the dielectric fill or corrosion inhibiting materials at a minimum in accordance with the timing and during the patrolling and leakage surveys required in §§192.705(b) and 192.706;"

PHMSA Expectations
Interpretation PI-18-0003, March 11,2019

"2) monitoring corrosion with in-line inspection (ILI) tools that have demonstrated that they can properly detect and assess corrosion over the shorted locations and including concentrated pinhole corrosion areas along the carrier pipe. When assessing the shorted locations, the operator must use the proper application of ILI tool tolerance, class location safety factor in determining the safe operating pressure for any shorted corrosion area, and corrosion growth rate, and at intervals that meet either §192.939 or at a more often reassessment interval if required based upon corrosion growth rate. If the shorted casing masks a proper inline inspection tool assessment, this would not be an applicable method;"

PHMSA Expectations
Interpretation PI-18-0003, March 11,2019

"3) utilizing leak detection monitoring and intervals in combination with Items 1 or 2 above, if leak monitoring can maintain safety based upon parameters such as assessments of risk and the consequences to the public. The risk assessment must be based upon the pipeline MAOP, diameter, operating stress levels, odorization of the gas, usage of remote or automatic closure valves for isolation, the pipeline material properties, whether the pipeline would only leak at operating pressures, and that leak detection monitoring (periodic or ongoing) would reduce the impact of an in-service leak to safety;"

PHMSA Expectations
Interpretation PI-18-0003, March 11,2019

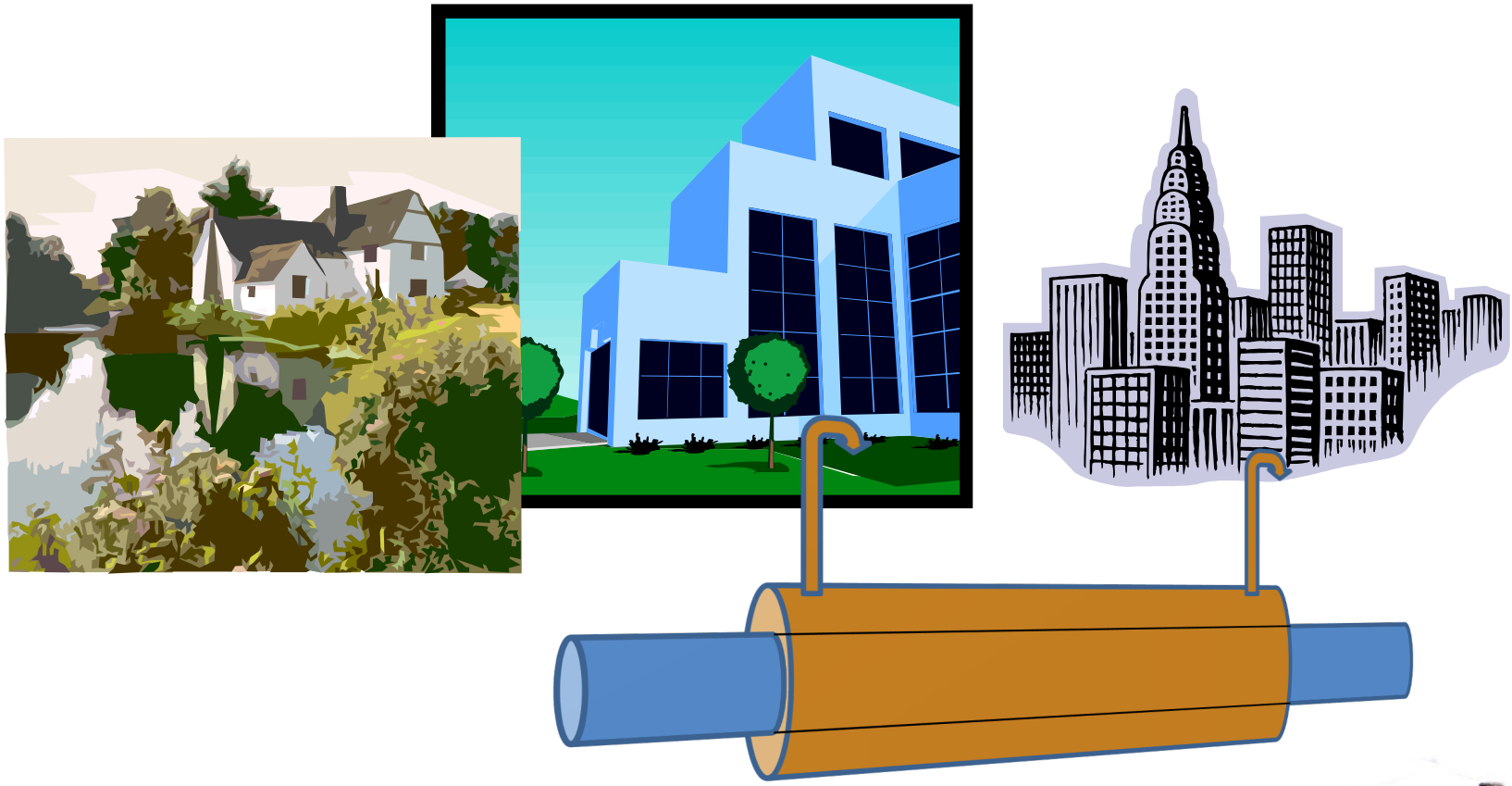
"4) implementing remedial measures to maintain the carrier pipe MAOP based upon suitable remaining strength calculation methods (§192.933(d)(l)(i)) and using the class location design factor (§192.111) of the pipeline whether it is in a high consequence area or non high consequence area for any assessment findings, and whether through findings in conducting Items 1, 2, or 3 above or other findings; or"

"5) applying for a special permit in accordance with §191.341 that is applicable to the pipeline operating, safety, and environmental conditions."

- O&M Manual must contain written procedures for testing and remediating casings

Regulatory Requirements Inside High Consequence Areas (HCA's)

192 Subpart O - Integrity Management



§192.921 How is the baseline assessment to be conducted?

(a) *Assessment methods*. An operator must assess the integrity of the line pipe in each covered segment by applying one or more of the following methods depending on the threats to which the covered segment is susceptible. An operator must select the method or methods best suited to address the threats identified to the covered segment

NOTE: More than one method may be necessary to address all threats!

§192.921 How is the baseline assessment to be conducted?

(1) Internal inspection tool or tools capable of detecting corrosion, and any other threats to which the covered segment is susceptible…

(2) Pressure test conducted in accordance with subpart J…

(3) Direct assessment to address threats of external corrosion, internal corrosion, and stress corrosion cracking…

(4) Other technology that an operator demonstrates can provide an equivalent understanding of the condition of the line pipe…

Other Technology

- Assessment methods other than ILI, DA or pressure test
- Must notify OPS 180 days before conducting assessment
  - and appropriate state regulatory agencies
- Notification should contain;
  - description of “other technology”
  - basis for concluding that the method will result in an equivalent understanding of pipe condition
  - What procedures will be followed
  - What criteria will apply to data analysis and evaluation, including verification excavations and acceptance and rejection of anomalies
  - Schedule for completing assessment
  - Procedures for ensuring that qualified personnel will implement the technology

Guided Wave Ultrasound (GWUT)

- When using GWUT as “other technology” use PHMSA guidance
  - Guided Wave UT Target Items for Go-No Go Procedures
  - 18 point checklist
- When using GWUT as one of the indirect inspection tools of the ECDA process it is not considered “other technology” and does not require notification (FAQ-198)
  - Use PHMSA 18 point checklist
- When using GWUT as the direct inspection method of the ECDA process it is considered “other technology” and requires notification

External Corrosion Direct Assessment (ECDA)

- ECDA, must be done per NACE RP 0502-2010
- Unfortunately, NACE RP 0502 does not address ECDA requirements for cased pipe very well
- PHMSA has published guidelines on the assessment of cased pipelines
- ECDA can not be used if you don't know coating type, seam type, material specification and manufacturer
- May need additional assessment methods if pipeline is subject to threats other than external corrosion such as, seam or weld defects, SCC and internal corrosion

Timeline for Guidance Development

- July 2008 First PHMSA Casing Workshop - Chicago
- 2009: Casing Assessment Quality Action Team (CASQAT) formed
- CASQAT drafted guidelines for:
    - Conducting ECDA on Cased Pipelines
    - Practices for Filling Casings
    - Monitoring Casings
- August 2009: PHMSA Finalized Guidelines
    - Technical Review/Legal Review
- December 2009: Guidelines Released for Public Review
- April 2010: Second PHMSA Casing Workshop - Baltimore
- Guidelines/FAQ's published on PHMSA Gas IMP website

NACE RP 0502

- To Comply with NACE RP 0502, must implement all four steps of the ECDA process
  - **Step 1 (Pre-assessment)** Required for all casings
  - **Step 2 (Indirect Inspection)** Required for all casings
  - **Step 3 (Direct Examination)** Required for SELECTED casings
  - **Step 4 (Post Assessment)** Required for all casings
- When all 4- ECDA-steps are accomplished for a region, all casings in the region are “assessed” (even though all may not have a direct examination)

NACE RP 0502

- Key phrases in NACE RP 0502:
  - "other assessment activities"
    - (RP0502 §3.3.2, & Table 1)
  - "additional considerations"
    - (RP0502, Table 2, footnote 3)
- NACE RP 0502 does not specify or explain these "other activities" or "additional considerations" activities
- PHMSA built the guidance around establishing these "other activities" or "additional considerations"

Guidance Highlights

- Identifies "other assessment activities" and "additional considerations" which PHMSA finds acceptable
- Guidelines reflect PHMSA's current application of the regulations to the specific implementation scenarios presented
- Guidance materials do not create legally enforceable rights or obligations
- Provided to help the public understand how to comply with the regulations
- If the operator chooses to address a consideration differently than recommended, the operator needs to develop and document a technical justification for its course of action

GUIDANCE DOES NOT allow operator to declare that cased pipe has no corrosion threat

- Effectively managing a threat is not a valid basis for declaring that you do not have the threat
- Purpose of integrity assessment is to verify that threat management/mitigation continues to be effective

GUIDANCE DOES provide information on:

- Developing procedures for use of ECDA
- Establishing ECDA Regions for cased pipe
  - allows multiple casings in 1 region
- Selecting indirect assessment tools
- Developing procedures for monitor casings after assessment
  - both filled and unfilled casings

Feasibility (Guidance section 3.1.2)

"Whenever these guidelines cannot be effectively implemented for casing/region, PHMSA considers the ECDA process not feasible for that casing/region."

Indirect inspection tool selection (sections 3.1.3 & Exhibit A)

- Per NACE RP 0502, select tools based on their ability to detect corrosion activity and/or coating holidays reliably under the specific pipeline conditions to be encountered
- Indirect inspection tools have limited ability to detect and locate corrosion activity and/or coating holidays reliably for pipe inside casings

Establishing Regions (Guidance section 3.1.4 & Exhibit B)

- Cannot include cased pipe in same region as direct buried pipe (NACE RP 0502-2002, Table 1)
- Separate regions required based on the following factors:
  - Carrier Pipe Coating
  - Casing Material and Design
  - Corrosion History on Adjacent Pipe
  - CP Maintenance History
  - Past metallic shorts or electrolytic contacts
  - Risk of MIC
  - Other appropriate considerations

Establishing priorities for direct examination (section 3.3)

- Immediate
  - Metallic Short
  - GWUT indication > 5% of X-section area
  - Change in casing integrity or fill level/quality (Appendix D)
- Scheduled
  - Electrolytic Contact

Combining Regions (Guidance section 3.3)

- Regions can be combined if all casings in multiple regions do not contain any immediate or scheduled indications
  - Direct exam not required in each region
  - One excavation is required in one of the ECDA regions identified as most likely to have external corrosion during the pre-assessment (NACE RP 0502 §5.10.2.3)
    - Two direct examinations required the first time ECDA is used

FAQ-274 100% Direct Examination

- Requires 100% examination of carrier pipe surface within a casing
- Based on PHMSA's concern over the ability of indirect inspection tools to accurately locate and categorize corrosion anomalies and coating holidays within a casing

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News & Updates

- PHMSA Issues Corrective Action Order to Texas Eastern Transmission, LP (Spectra Energy Partners, LP)
- PHMSA Final Rule Incorporates by Reference ASME Standards Into Hazardous Materials Regulations
- PHMSA Supplemental Proposed Rule Would Incorporate by Reference ASME Standards Into Hazardous Materials Regulations
- DOT Releases New Emergency Response Guidebook
- USDOT Observes Ninth Annual National

PHMSA Updates

- MAP-21 and the HAZMAT Safety Improv
- Safe Transportation of Energy Products (SAFE)
- Pipeline Safety Act of 2011: Track Our Progress
- Hazardous Liquid Pipelines
- Natural Gas Pipelines
- Hazmat Cylinder Safety Alerts

PHMSA Resources

Regulations
Regulations & interpretations, proposed rules, approvals & permits, and bulletins for pipeline and hazmat safety.

Data & Reports
PHMSA tracks data on the frequency of failures, incidents and accidents.

Inspection & Enforcement
Incident forms, regional office contacts, and general information on PHMSA enforcement programs.

NTSB Recommendations
Get information and updates for PHMSA responses to National Transportation Safety Board recommendations.

Online Services
Access forms for the Operator Registration System, hazmat registration, incident reporting and more.

Preparedness & Response
Resources for the emergency response community including ERG and National Response Center hotline

Promoting Safety

Safe Transportation of Energy Products | Call Before You Dig | Safe Travel | National Pipeline Mapping System

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What's New

PHMSA Pipeline Technical Resources

This site is administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA). It provides technical and regulatory information concerning issues and recent rulemaking for selected pipeline safety topics. This site is oriented primarily toward operators to provide information useful for complying with PHMSA regulations. However, all stakeholders might find this material informative. The below links provide information for the latest rulemaking, advisory bulletin, and instructions for submitting required notifications. This site is updated as needed to reflect new developments and information pertinent to these i s.

Alternative MAOP
- Alternative MAOP web site

Cased Crossings & Guided Wave Ultrasonics (GWUT)
- Cased Crossings & Guided Wave Ultrasonics web site

Class Location Special Permits
- Class Location Special Permits web site

Control Room Management (CRM)
- Control Room Management web site

Gas Distribution Integrity Management Program (DIMP)
- Gas Distribution Integrity Management Program web site

Gas Transmission Integrity Management (GT IM)
- Gas Transmission Integrity Management web site

Hazardous Liquid Integrity Management (HL IM)
- Hazardous Liquid Integrity Management web site

Risk Modeling Work Group (RMWG)
- Risk Modeling Work Group

igh Volume Excess Flow Valves (EFV)
- High Volume Excess Flow Valve web site

Low Strength Pipe
- Low Strength Pipe web site

Operator Qualification (OQ)
- Operator Qualification web site

Pi ne Construction
- ipeline Construction web site

esearch & Development (R&D)
- Research & Development web site

LNG Facility Siting
- LNG Facility Siting Application

Public Meetings
- Public Meeting web site

Gas Tr[illegible]ion Integrity Management

Gas IM Menu

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- Regulations
- Advisory Bulletins
- Interpretations

[illegible]e is administered by the Pipeline and Hazardous Materials Safety [illegible]ministration (PHMSA). It provides information concerning the Gas Transmission Integrity Management Rule (49 CFR Part 192, Subpart O), commonly referred to as the "Gas IM Rule." The Gas IM Rule specifies how pipeline operators must identify, prioritize, assess, evaluate, repair and validate the integrity of gas transmission pipelines that could, in the event of a leak or failure, affect High Consequence Areas (HCAs) within the United States. HCAs include certain populated and occupied areas.

For an overview of the progress being made under the Gas IM Rule, please see our Performance Measures page. There you will find graphs and charts, which depict progress and other aspects of rule implementation. You will also find a link to the data provided by pipeline operators in accordance with this rule.

Other links on the left provide a great deal of additional information, including an operator IM process flowchart and a fact sheet that summarizes key requirements of the Gas IM Rule; details of the Gas IM Rule itself; FAQs; and other information useful in more fully understanding the Gas IM Rule.

When continuing implementation of the Gas IM Rule results in rule revisions, new interpretations, or expanded clarifications, this site is updated to reflect those developments.

Gas Transmission Integrity Management: Key Documents

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Documents related to the Gas Transmission Pipeline Integrity Management process are available below. The most recent documents are listed first.

- August 2013: Gas IMP Inspection Protocols
  - Gas Integrity Management Protocol Results Form (Microsoft Word)
  - Summary Listing of Changes (Microsoft Word)
  - Updated Protocol Fishbone Diagrams
- February 2011: Gas Transmission Integrity Management Progress Report
- November 1, 2010: Guidelines for Integrity Assessment of Cased Pipe for Gas Transmission Pipelines in HCAs, Revision 1
  - Frequently Asked Questions (Integrity Assessment of Cased Pipe)
- March 11, 2009: Microsoft Word template to be used for submission of Notifications
- April 10, 2008: Letter from PHMSA to AGA; Re: Use of ECDA on Cased Pipelines for Completion of Baseline Assessments
- January 2008: Gas IMP Inspection Protocols
  - Gas Integrity Management Protocol Results Form (Microsoft Word)
  - Gas Integrity Management Protocol Results Form (Microsoft Word — Redline / Strikeout)
  - Summary Listing of Changes (Microsoft Word)
- July 2007: Gas IMP Inspection Protocols *(Superseded, See January 2008 Revision)*:
  - Gas Integrity Management Protocol Results Form (Microsoft Word)
  - Gas Integrity Management Protocol Results Form (Microsoft Word — Redline / Strikeout)
  - Summary Listing of Changes (Microsoft Word)

Questions ?

http://www.phmsa.dot.gov/pipeline

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