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# **Pipeline Integrity Regulations & Standards**

Pipeline Integrity Management  
Period 1

Lee Reynolds, NiSource  
Standards & Compliance



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# Objectives

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- Why the Need for Integrity Management
- Define Pipeline Integrity Management
- Review Integrity Management Regulations
- Highlight Relevant Industry Standards
- What Does the Future Look Like for Integrity Management (What's Next)



# **Pipelines link the nation and are largely unnoticed until...**

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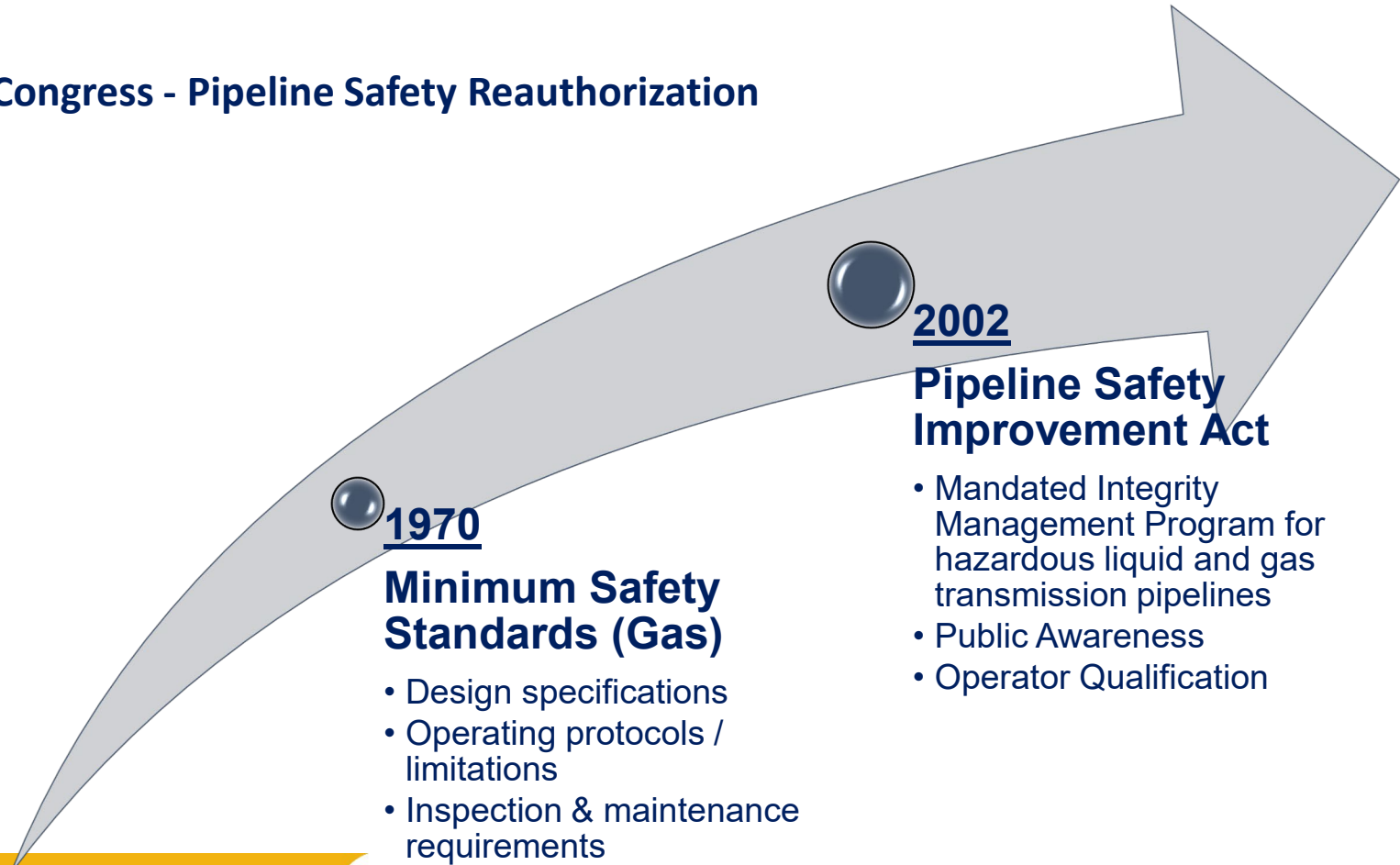
# Pipelines link the nation and are largely unnoticed until...



# The Need to Do More

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## U.S. Congress - Pipeline Safety Reauthorization



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# What is Pipeline Integrity Management?



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# **What is Pipeline Integrity Management?**

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**Integrity Management is a process for identifying, assessing, evaluating and mitigating threats to the integrity of a pipeline system.**



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# What does a Pipeline Integrity Management Program do?



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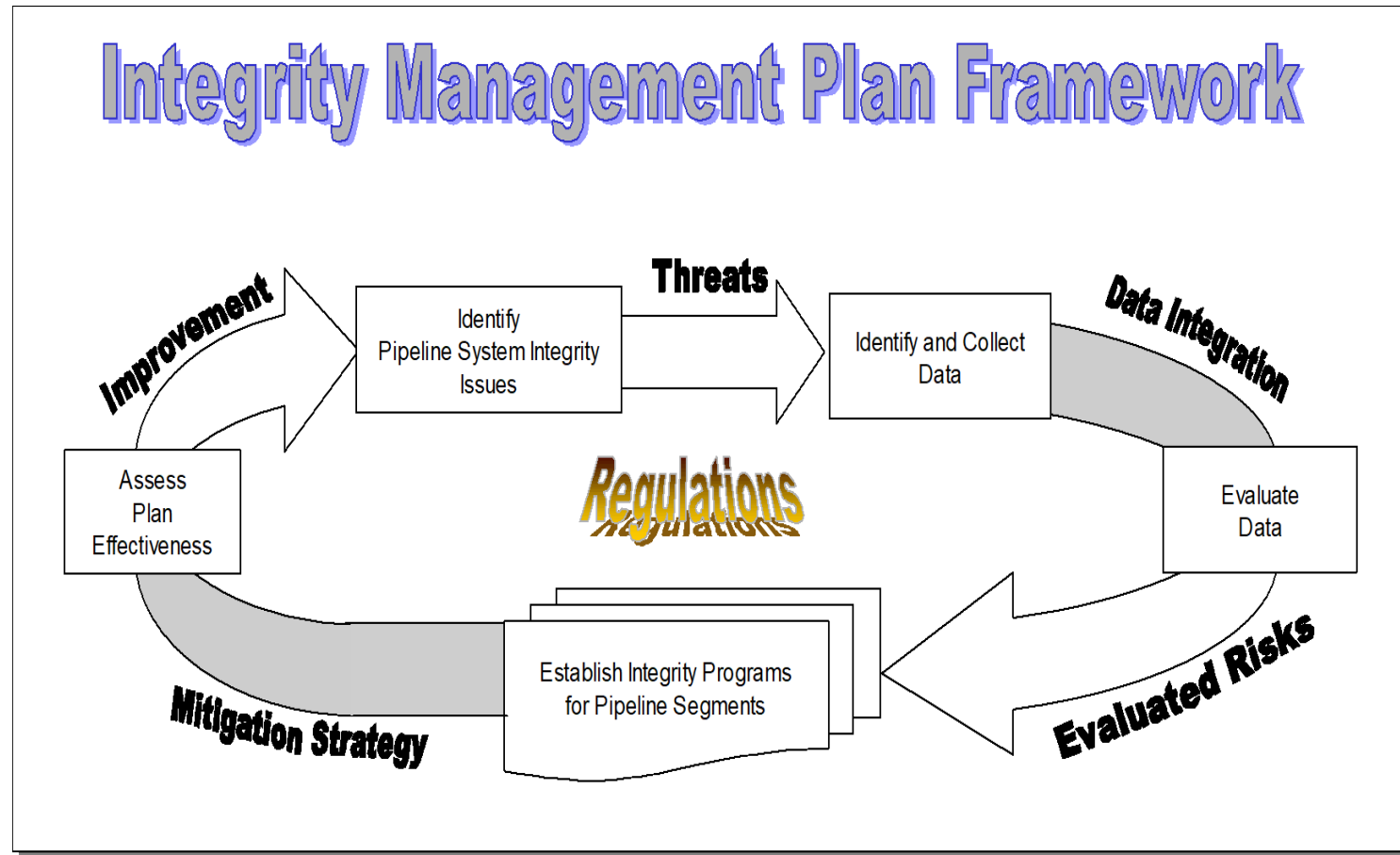
# What does a Pipeline Integrity Management Program do?

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- It helps operators comprehensively **evaluate a range of threats** to pipeline integrity by **integrating** and **analyzing** available information about their pipelines.
- It provides a **road map** for the assessment, integration and analysis of the data, and courses of action available in maintaining pipeline integrity.



# Integrity Management Framework



# Typical Pipeline Threat

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During the installation of a housing development, a piece of excavating equipment hits and gouges a pipeline.

The pipeline operator was not notified by the excavator that the pipeline was damaged.



# Data Integration Example

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- A one-call (811) locate was requested, worked and documented.
- Close interval survey shows a dip in pipe to soil readings in this area, but cathodic protection levels are still adequate.
- In-line inspection indicates a small anomaly on the top portion of the pipeline.
- Each of the three activities on their own may not have raised a flag.
- However, when all of the three pieces of information are put together, we have a better picture of what is going on with this pipeline.



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# Pipeline Integrity Management Regulations



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# **PHMSA**

## **Pipeline Integrity Management Goals**

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- Provide for Increased Assurance to the Public
- Identify Areas Where a Pipeline Rupture Would Produce the Highest Consequence
- Accelerate Integrity Assessment of Pipelines in High Consequence Areas (HCAs)
- Improve Integrity Management Practices within Companies
- Establish a Clear Government Role in Validating Integrity Management



# Federal Pipeline Safety Regulations

## <https://www.phmsa.dot.gov/phmsa-regulations>



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### PHMSA Regulations

PHMSA is responsible for regulating and ensuring the safe and secure movement of hazardous materials to industry and consumers by all modes of transportation, including pipelines.

To minimize threats to life, property or the environment due to hazardous materials related incidents, PHMSA's Office of Hazardous Materials Safety develops regulations and standards for the classifying, handling and packaging of over 1 million daily shipments of hazardous materials within the United States.

The Office of Pipeline Safety ensures safety in the design, construction, operation, maintenance, and spill response planning of America's 2.6 million miles of natural gas and hazardous liquid transportation pipelines.

To browse interpretations, please do with the [Interpretations Search](#).

Last updated: Wednesday, May 5, 2021

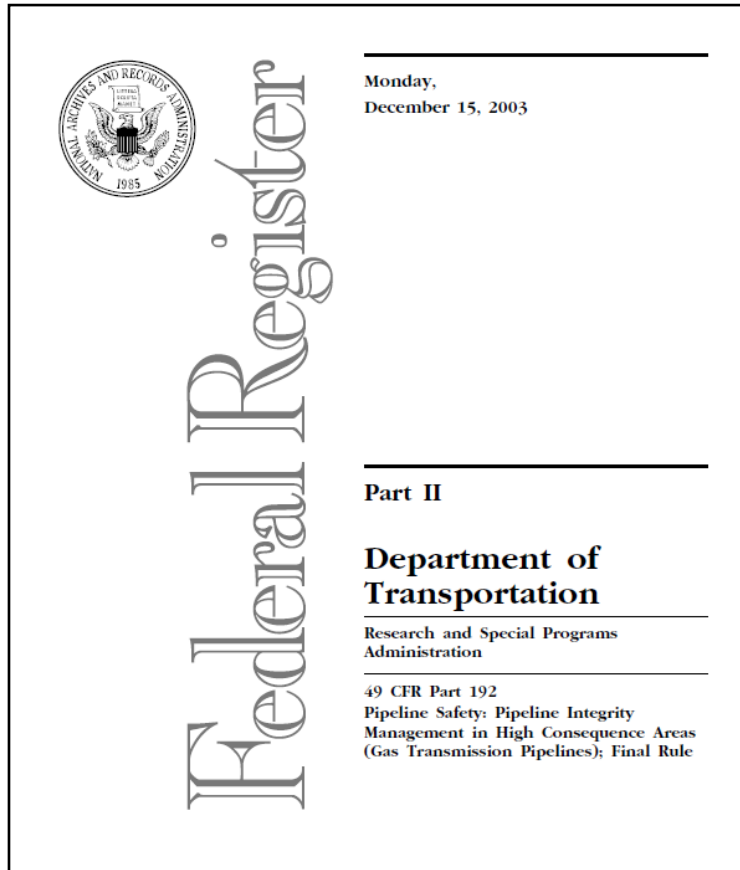
#### Related Links

- [Hazardous Materials Safety Regulations \(Title 49 CFR Parts 100-185\)](#)
- [Pipeline Safety Regulations \(Title 49 CFR Parts 190-199\)](#)
- [Legislative Mandates](#)

**PHMSA's mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives.**

# Part 192 – Subpart O

## Gas Transmission Pipeline Integrity Management



Operators are required to have a written plan which describes aspects (program elements) of the operator's Integrity Management efforts.

Part 192 prescribes minimum program elements that must be included.





# **Part 192 – Subpart O**

## **Gas Transmission Pipeline Integrity Management**

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### Elements of Integrity Management Program

- Identification of High Consequence Areas
- Data Integration, Identification of Threats, and Use of Risk Assessment to Prioritize Segments
- Development of a Baseline Assessment Plan
- Development of a Direct Assessment Plan
- Development of Criteria for Remedial Actions
- Continual Process of Assessment and Evaluation
- Identification of Preventative and Mitigative Measures



# **Part 192 – Subpart O**

## **Gas Transmission Pipeline Integrity Management**

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### **Elements of Integrity Management Program**

- Performance Plan
- Record Keeping Requirements
- Management of Change Plan
- Quality Assurance Plan
- Communication Plan
- Process for Providing Copy of IMP to Regulators
- Process for Ensuring Environmental Protection and Safety



# PHMSA Website Gas Transmission Integrity Management

<https://www.phmsa.dot.gov/pipeline/gas-transmission-integrity-management/gas-transmission-integrity-management-gt-im-overview>



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Pipeline Technical Resources

Gas Transmission Integrity Management (GT IM) Overview

GT IM Fact Sheet

GT IM Performance Measures

GT IM Key Documents

GT IM Meetings

GT IM Notifications

## Gas Transmission Integrity Management (GT IM) Overview

This site provides information regarding the Gas Transmission Integrity Management Rule (68 FR 69778), commonly referred to as the "Gas IM Rule", or alternatively, the "GT IM Rule."

The GT IM Rule resulted in regulations (49 CFR Part 192, Subpart O) which specify 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. These HCAs include certain populated and occupied areas. Operators were given until December 17, 2004 to write and implement their IM programs.

For an overview of the progress being made under the gas transmission pipeline integrity management (GT IM) regulations, please see the [Performance Measures](#) page. There you will find graphs and charts which depict progress and other aspects of operator implementation of the GT IM regulations. You will also find a link to the data provided by pipeline operators in accordance with these regulations.

Other GT IM menu links on the left provide additional information, including a fact sheet that summarizes key requirements of the GT IM regulations; details of the GT IM regulations; a glossary of related terminology; FAQs; and, other information useful in more fully understanding these regulations.

Last updated: Thursday, January 7, 2021

**Related Links**


- [Gas Transmission Integrity Management FAQs](#)



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# PHMSA Website Pipeline Technical Resources Overview

<https://www.phmsa.dot.gov/technical-resources/pipeline/pipeline-technical-resources-overview>



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## Related Links

- [Pipeline Replacement Updates](#)
- [Pipeline Technical Resources](#)

## Contact Us

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disability, please dial 7-1-1 to  
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## Pipeline Technical Resources Overview

The Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety, provides technical information on selected pipeline safety topics. This information is oriented primarily toward operators to provide information useful for complying with the pipeline safety regulations; however, all stakeholders may find this material informative. This site is updated as needed to reflect new developments or to include information pertinent to these topics.

<a href="#">Alternative MAOP</a>	<a href="#">Liquefied Natural Gas</a>
<a href="#">Cased Crossings and Guided Wave Ultrasonics</a>	<a href="#">Low Strength in High Grade Pipe</a>
<a href="#">Class Location Special Permits</a>	<a href="#">Operator Qualification</a>
<a href="#">Control Room Management</a>	<a href="#">Pipeline Construction</a>
<a href="#">Gas Distribution Integrity Management Program</a>	<a href="#">Pipeline Materials</a>
<a href="#">Gas Gathering</a>	<a href="#">Public Meetings</a>
<a href="#">Gas Transmission Integrity Management</a>	<a href="#">Risk Modeling Group</a>
<a href="#">Hazardous Liquid Integrity Management</a>	<a href="#">Research and Development (R&amp;D)</a>
<a href="#">High Volume Excess Flow Valves</a>	<a href="#">Underground Natural Gas Storage</a>
<a href="#">Oil Spill Exercise and Response Training Videos</a>	<a href="#">Valve Rule Fact Sheet</a>



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# Pipeline Operator Resources

<https://www.phmsa.dot.gov/guidance>

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## PHMSA Guidance

PHMSA guidance is intended to help regulated entities and the public to understand PHMSA's regulations. The guidance documents contained herein lack the force and effect of law, unless expressly authorized by statute or incorporated into a contract. DOT may not cite, use, or rely on any guidance that is not available through this guidance portal, except to establish historical facts.

Although some of the materials that can be accessed from this page may fall outside the definitions of "guidance" set forth in 49 CFR 5.25(c), PHMSA has determined that they include potentially useful information for stakeholders and is including them in this database in an effort to make these materials easier for members of the public to find. You may also find useful information that is potentially not accessed from the page in the links below:

- [PHMSA FAQs](#)
- [PHMSA Advisory Bulletins](#)
- [Pipeline Enforcement Guidance](#)
- [Pipeline Glossary](#)
- [Pipeline Guidance Manuals](#)
- [Pipeline Operator Resources](#)
- [Pipeline Technical Resources](#)
- [Hazardous Materials Publications](#)
- [Hazardous Materials Safety Field Operations and Enforcement Guidance](#)

Members of the public may submit comments on draft guidance documents noticed in the Federal Register through Regulations.gov. Comments on any guidance document; requests for issuance, reconsideration, modification, or rescission of any guidance document; or concerns about PHMSA's compliance with the OMB Good Guidance Bulletin regarding existing guidance documents may be submitted to [PHMSA\\_Guidance@dot.gov](mailto:PHMSA_Guidance@dot.gov). Please identify the guidance document in your request.



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# PHMSA IMP Enforcement Guidance

<https://www.phmsa.dot.gov/pipeline/enforcement/gas-integrity-management-enforcement-guidance>

## Gas Transmission Integrity Management Enforcement Guidance Sections 192.901 through 192.951

### INTRODUCTION

The materials contained in this document consist of guidance, techniques, procedures and other information for internal use by the PHMSA pipeline safety enforcement staff. This guidance document describes the practices used by PHMSA pipeline safety investigators and other enforcement personnel in undertaking their compliance, inspection, and enforcement activities. This document is U.S. Government property and is to be used in conjunction with official duties.

The Federal pipeline safety regulations (49 CFR Parts 190-199) discussed in this guidance document contains legally binding requirements. This document is not a regulation and creates no new legal obligations. The regulation is controlling. The materials in this document are explanatory in nature and reflect PHMSA's current application of the regulations in effect at the time of the issuance of the guidance. In preparing an enforcement action alleging a probable violation, an allegation must always be based on the failure to take a required action (or taking a prohibited action) that is set forth directly in the language of the regulation. An allegation should never be drafted in a manner that says the operator "violated the guidance."

Nothing in this guidance document is intended to diminish or otherwise affect the authority of PHMSA to carry out its statutory, regulatory or other official functions or to commit PHMSA to taking any action that is subject to its discretion. Nothing in this document is intended to and does not create any legal or equitable right or benefit, substantive or procedural, enforceable at law by any person or organization against PHMSA, its personnel, State agencies or officers carrying out programs authorized under Federal law.

Decisions about specific investigations and enforcement cases are made according to the specific facts and circumstances at hand. Investigations and compliance determinations often require careful legal and technical analysis of complicated issues. Although this guidance document serves as a reference for the staff responsible for investigations and enforcement, no set of procedures or policies can replace the need for active and ongoing consultation with supervisors, colleagues, and the Office of Chief Counsel in enforcement matters.

Comments and suggestions for future changes and additions to this guidance document are invited and should be forwarded to your supervisor.

The materials in this guidance document may be modified or revoked without prior notice by PHMSA management.

Enforcement Guidance	Part 192, Gas Transmission Pipeline Integrity Management
Revision Date	12/7/2015
Code Section	§192.901
Section Title	What do the regulations in this subpart cover?
Existing Code Language	This subpart prescribes minimum requirements for an integrity management program on any gas transmission pipeline covered under this part. For gas transmission pipelines constructed of plastic, only the requirements in §§192.917, 192.921, 192.935 and 192.937 apply.
Origin of Code	Amdt. 192-95, 68 FR 69778, December 15, 2003
Last Amendment	Amdt. 192-95A, 69 FR 9307, December 20, 2003
Interpretation Summaries	
Advisory Bulletin/Alert Notice Summaries	<p><b>Advisory Bulletin ADB -12-03</b> <b>Notice to Operators of Driscopipe 8000 High Density Polyethylene Pipe of the Potential for Material Degradation</b></p> <p>On March 6, 2012, PHMSA issued this advisory bulletin to alert operators using Driscopipe® 8000 High Density Polyethylene Pipe (Drisco8000) of the potential for material degradation. Degradation has been identified on pipe between one-half inch to two inches in diameter that was installed between 1978 and 1999 in desert-like environments in the southwestern United States. However, since root causes of the degradation have not been determined, PHMSA cannot say with certainty that this issue is isolated to these regions, operating environments, pipe sizes, or pipe installation dates. While the manufacturer has attempted to communicate with known or suspected users, PHMSA and the National Association of Pipeline Safety Representatives (NAPSR) have identified several operators currently using Drisco 8000 pipe who had not received communications about the issue. PHMSA is issuing this advisory bulletin to all operators of Drisco 8000 pipe in an effort to ensure they are aware of the issue, communicating with the manufacturer and their respective regulatory authorities to determine if their systems are susceptible to similar degradation, and taking measures to address it.</p>
Other Reference Material & Source	<p>ASME B31.8S-2004, Supplement to B31.8 on Managing System Integrity of Gas Pipelines</p> <p>Gas Piping Technology Committee (GPTC)</p> <p>Part 192, Appendix E.I</p>



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# **Distribution Integrity Management Program**



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# The Need to Do More

## U.S. Congress - Pipeline Safety Reauthorization

1971

### Minimum Safety Standards

- Design specifications
- Operating protocols / limitations
- Inspection & maintenance requirements

2002

### Pipeline Safety Improvement Act

- Mandated Integrity Management Program for hazardous liquid and gas transmission pipelines
- Public Awareness
- Operator Qualification

2006

### Pipeline Inspection, Protection, Enforcement, & Safety Act

- Mandated Distribution Integrity
- Damage Prevention
- Control Room Mgmt



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# DIMP Regulation & Elements

## Part 192 Subpart P

- 1 – Know the Distribution System & How It's Operated & Maintained
- 2 – Identify Threats (existing & potential)
- 3 – Evaluate and Rank groups based on risk
- 4 – Identify and Implement appropriate measures to manage risks
- 5 – Measure performance and monitor results
- 6 – Periodically evaluate & improve program
- 7 – Make periodic reports to government agencies



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# Federal Register

Friday,  
December 4, 2009

## Part III

## Department of Transportation

Pipeline and Hazardous Materials Safety  
Administration

49 CFR Part 192  
Pipeline Safety; Integrity Management  
Program for Gas Distribution Pipelines;  
Final Rule

# PHMSA Website Distribution Integrity Management

<https://www.phmsa.dot.gov/pipeline/gas-distribution-integrity-management/gas-distribution-integrity-management-program-dimp>



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## Pipeline Technical Resources

[Gas Distribution Integrity  
Management Program \(DIMP\)  
Overview](#)

[DIMP: History](#)

[DIMP: Meetings](#)

[DIMP: Performance Measures](#)

[DIMP: Resources](#)

## Related Links

- [Gas Distribution Integrity Management: FAQs](#)
- [Gas Distribution Integrity Management: Farm Tap FAQs](#)

## Gas Distribution Integrity Management Program (DIMP)

This site is administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA published the final rule establishing integrity management (IM) requirements for gas distribution pipeline systems on December 4, 2009 (74 FR 63906). The effective date of the rule was February 12, 2010, resulting in IM regulations for gas distribution pipelines (49 CFR Part 192, Subpart P). Operators were given until August 2, 2011 to write and implement their distribution integrity management programs (DIMPs).

PHMSA previously implemented integrity management regulations for [hazardous liquid](#) and [gas transmission](#) pipelines. These regulations aim to assure pipeline integrity and further improve the safety of pipeline 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 precluded applying the same tools and management practices as were used for transmission and other cross-country 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. This effort resulted in PHMSA's gas distribution IM regulations.

The gas distribution IM regulations require operators, such as natural gas distribution companies, to develop, write, and implement an integrity management program with the following elements:

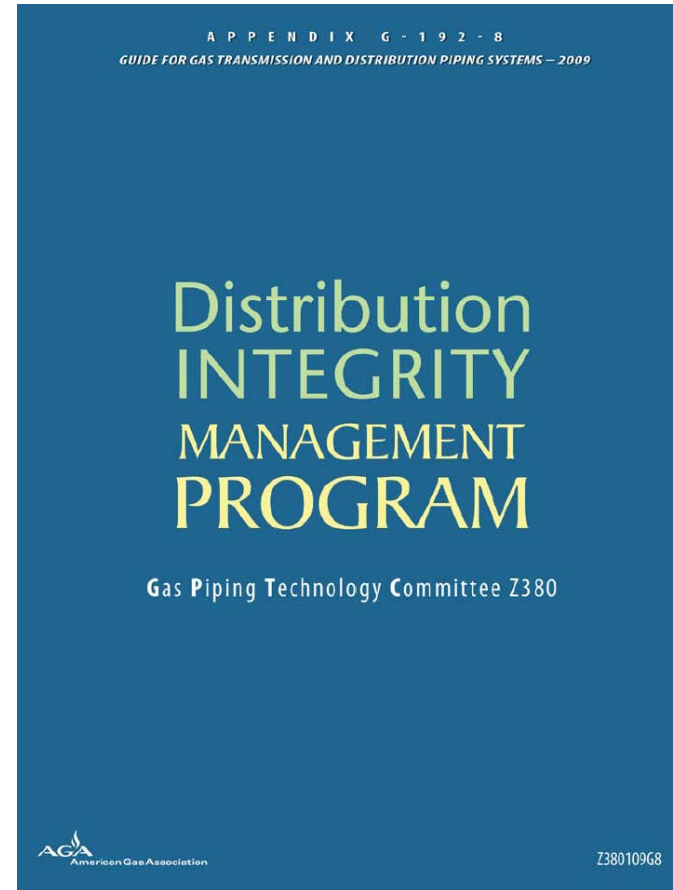
- Understand system design & material characteristics, operating conditions & environment, and maintenance & operating history



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# GPTC Guide Material - Appendix G-192-8

- Guide material provides examples of
  - Threat identification
  - A simple risk assessment method
  - Risk management actions
  - Performance measures
- Appendix G-192-8 is available for purchase thru American Gas Association (AGA)



# Small Operators

## Simple, Handy Risk-based Integrity Management Plan (SHRIMP)

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Developed by the American Public Gas Association (APGA)

<https://apgasif.org/sif-tools/shrimp-dimp/>

- **SHRIMP** stands for “Simple, Handy, Risk-based Integrity Management Plan.” It is an on-line tool that operators of gas distribution systems may use to create a written Distribution Integrity Management Plan.
- The basic purpose of the software is to generate a written integrity management plan that is appropriate for the unique circumstances of each utility.
- It addresses the needs of small utilities that lack in-house engineering and/or risk management expertise.



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# Pipeline Integrity Management Standards



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# API Standard 1160

## Managing System Integrity for Hazardous Liquid Pipelines

API RECOMMENDED PRACTICE 1160  
THIRD EDITION, FEBRUARY 2019



This recommended practice (RP) outlines a process that an operator of a pipeline system can use to assess risks and make decisions about risks in operating a hazardous liquid pipeline to achieve a number of goals, including reducing both the number and consequences of incidents.

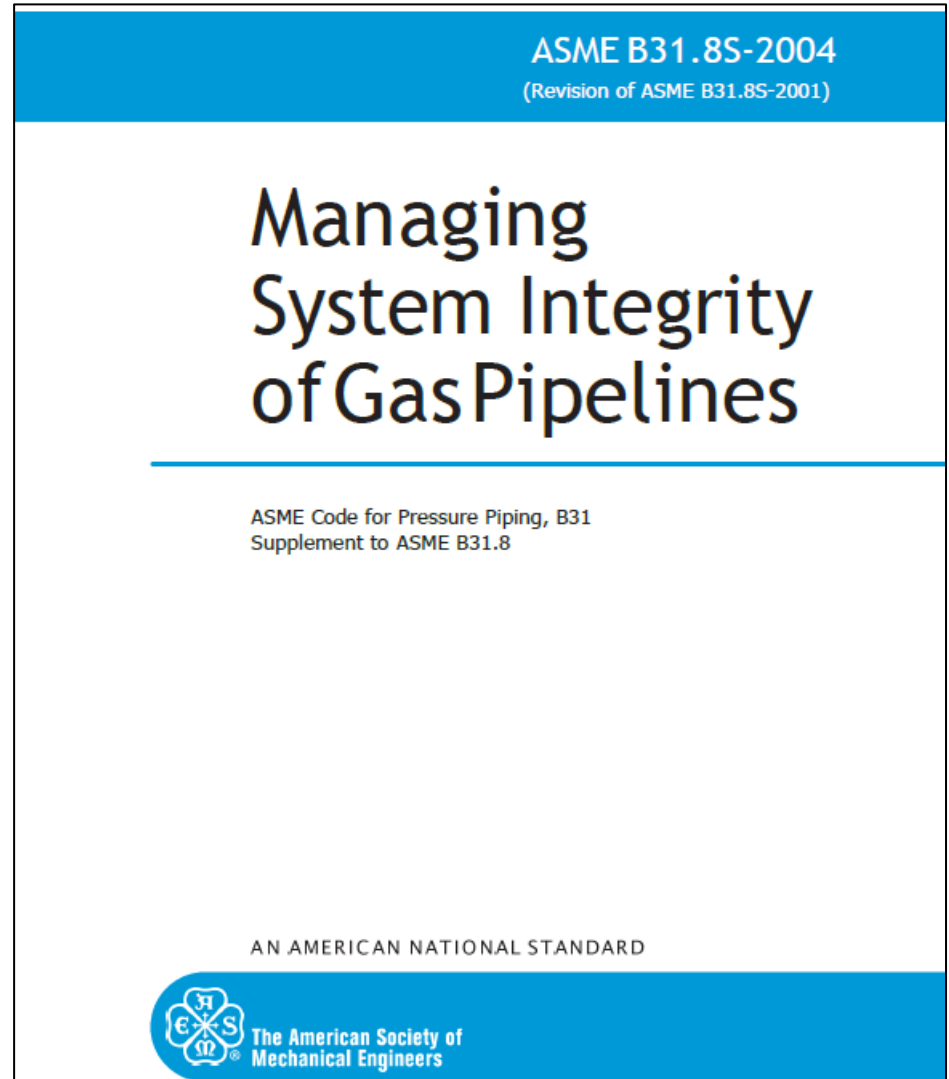
- Integrity should be built into pipeline systems from initial planning, design, and construction.
- Integrity management of a pipeline starts with the sound design and construction of the pipeline.



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# ASME B31.8S 2004

- This Standard describes a process that an operator of a pipeline system can use to assess and mitigate risks in order to reduce both the likelihood and consequences of incidents.
- It covers both a prescriptive- and a performance-based integrity management program.



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# **AMPP/NACE**

## Corrosion Threat Assessment Integrity Standards



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# SP0102-2017 “In-Line Inspection of Pipelines”

- Outlines a process of related activities that an operator can use to plan, organize, and execute an ILI project.
- Companion Guide available
  - Technical Committee Report
  - “In-Line Nondestructive Inspection of Pipelines”
  - NACE Publication 35100

## NACE International Standard Practice (SP0102-2017)

### In-Line Inspection of Pipelines

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3. Tool Selection .....	9
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# SP0502-2010 “Pipeline External Corrosion Direct Assessment Methodology”

Outlines a four-step structured process that is intended to improve safety by assessing and reducing the impact of external corrosion on the pipeline.

- Pre-Assessment
- Indirect Inspections
- Direct Examinations
- Post Assessment



## NACE International Standard Practice

### Pipeline External Corrosion Direct Assessment Methodology

#### Contents

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# SP0206-2016 “Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas (DG-ICDA)”

The methodology is described in terms of a four-step process and is applicable to natural gas pipelines that normally carry dry gas, but may suffer from infrequent, short-term upsets of liquid water (or other electrolyte).



## NACE International Test Method (SP0206-2016)

### Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas (DG-ICDA)

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# SP0204-2015 “Stress Corrosion Cracking (SCC) Direct Assessment Methodology”

Outlines a four-step structured process that is intended to improve safety by assessing and reducing the impact of stress corrosion cracking on the pipeline.



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SP0204-2015

## NACE International Standard Practice

### Stress Corrosion Cracking (SCC) Direct Assessment Methodology

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# What's Next?

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Recent pipeline and underground storage incidents have called for more review, guidance, standards, and regulations to improve safety.



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# Liquids Pipeline Accident



# NTSB Recommendation Pipeline Safety Management Systems

## NTSB Recommendation P-12-17

To the American Petroleum Institute:

Facilitate the development of a **safety management system** standard specific to the pipeline industry that is similar in scope to your Recommended Practice 750, Management of Process Hazards. The development should follow established American National Standards Institute requirements for standard development.



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Enbridge Incorporated  
Hazardous Liquid Pipeline Rupture and Release  
Marshall, Michigan  
July 25, 2010



Accident Report

NTSB/PAR-12/01  
PB2012-916501



National  
Transportation  
Safety Board

# Pipeline Safety Management Systems

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API RP Practice 1173  
(Published July 2015)



## Pipeline Safety Management Systems

ANSI/API RECOMMENDED PRACTICE 1173  
FIRST EDITION, JULY 2015





# Elements of a Pipeline Management Safety System

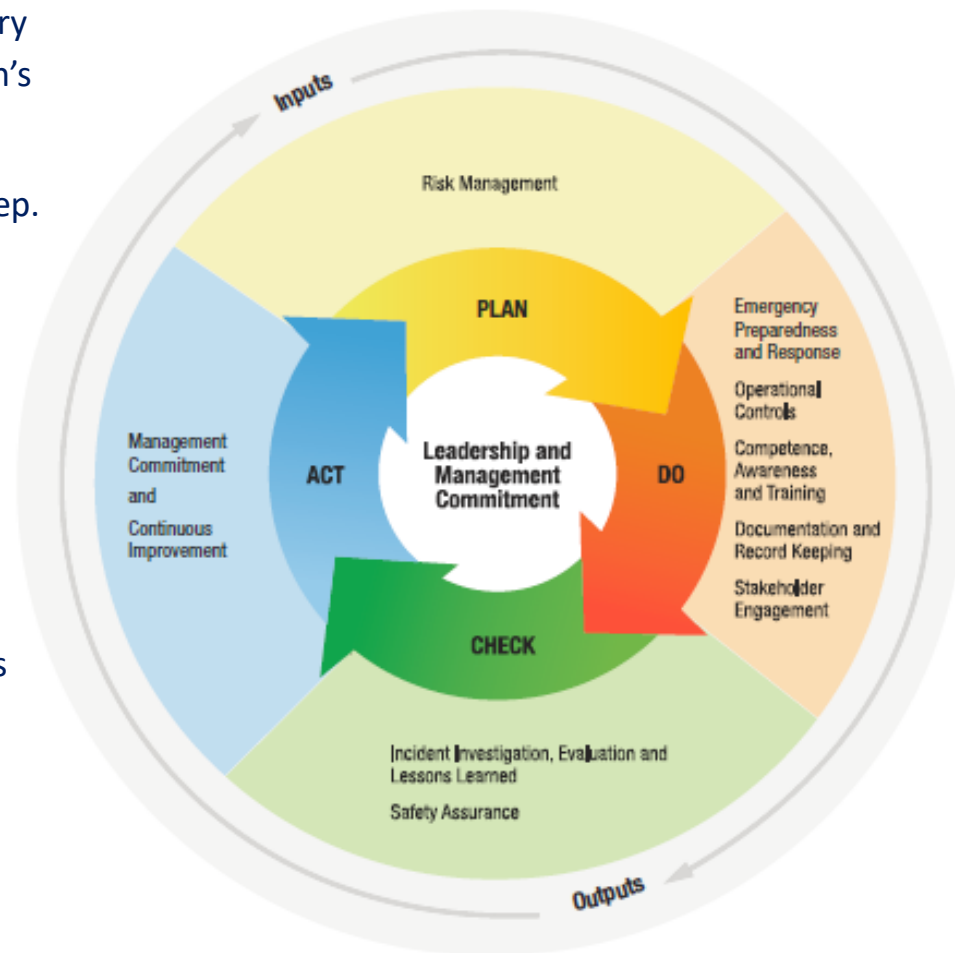
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- Leadership and Management Commitment
- Stakeholder Engagement
- Risk Management
- Operational Controls
- Incident Investigation, Evaluation, and Lessons Learned
- Safety Assurance
- Management Review and Continuous Improvement
- Emergency Preparedness and Response
- Competence, Awareness, and Training
- Documentation and Record Keeping



# Safety Management System (SMS) “Plan-Do-Check-Act”

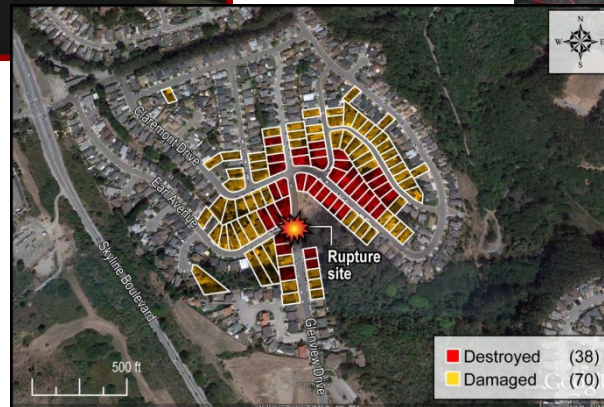
- **Plan:** Establish objectives and processes necessary to deliver results in accordance with the organization’s policies and the expected goals.
- **Do:** Execute the plan designed in the previous step.
- **Check:** Review results and compare with established objectives. Looking for deviation in implementation from the plan.
- **Act:** Take action to continuously improve process performance, including corrective actions on significant differences between actual and planned results, analyzes the differences to determine their root causes, and determines where to apply changes that will include improvement.



# Gas Pipeline Accident



Allentown  
February 9



# The Need to Do More

## U.S. Congress - Pipeline Safety Reauthorization

**1971**

### Minimum Safety Standards

- Design specifications
- Operating protocols / limitations
- Inspection & maintenance requirements

**2002**

### Pipeline Safety Improvement Act

- Mandated Integrity Management Program for hazardous liquid and gas transmission pipelines
- Public Awareness
- Operator Qualification

**2006**

### Pipeline Inspection, Protection, Enforcement, & Safety Act

- Distribution Integrity
- Damage Prevention
- Control Room Mgmt.

**2011**

### Pipeline Safety, Regulatory Certainty and Job Creation Act

- Damage Prevention
- Shut Off Valves (RCVs - ASVs)
- Integrity Management and Class Expansion



Appalachian Underground Corrosion Short Course



# The Need to Do More

- PIPELINE SAFETY, REGULATORY CERTAINTY, AND JOB CREATION ACT OF 2011
- Automatic/Remote Controlled Valves (Sec 4)
- Mandated PHMSA to evaluate whether TIMP requirements, or elements thereof, should be expanded beyond HCAs (Sec 5)
- MAOP Record Verification (Sec. 23)
- Signed into law 1/3/12

## Public Law 112–90 112th Congress

### PIPELINE SAFETY, REGULATORY CERTAINTY, AND JOB CREATION ACT OF 2011

- Sec. 1. Short title; amendment of title 49, United States Code; definitions; table of contents.
- Sec. 2. Civil penalties.
- Sec. 3. Pipeline damage prevention.
- Sec. 4. Automatic and remote-controlled shut-off valves.
- Sec. 5. Integrity management.
- Sec. 6. Public education and awareness.
- Sec. 7. Cast iron gas pipelines.
- Sec. 8. Leak detection.
- Sec. 9. Accident and incident notification.
- Sec. 10. Transportation-related onshore facility response plan compliance.
- Sec. 11. Pipeline infrastructure data collection.
- Sec. 12. Transportation-related oil flow lines.
- Sec. 13. Cost recovery for design reviews.
- Sec. 14. Biofuel pipelines.
- Sec. 15. Carbon dioxide pipelines.
- Sec. 16. Study of transportation of diluted bitumen.
- Sec. 17. Study of nonpetroleum hazardous liquids transported by pipeline.
- Sec. 18. Clarifications.
- Sec. 19. Maintenance of effort.
- Sec. 20. Administrative enforcement process.
- Sec. 21. Gas and hazardous liquid gathering lines.
- Sec. 22. Excess flow valves.
- Sec. 23. Maximum allowable operating pressure.
- Sec. 24. Limitation on incorporation of documents by reference.
- Sec. 25. Pipeline safety training for State and local government personnel.
- Sec. 26. Report on minority-owned, woman-owned, and disadvantaged businesses.
- Sec. 27. Report on pipeline projects.
- Sec. 28. Cover over buried pipelines.
- Sec. 29. Seismicity.
- Sec. 30. Tribal consultation for pipeline projects.
- Sec. 31. Pipeline inspection and enforcement needs.
- Sec. 32. Authorization of appropriations.



# Gas Transmission/Gathering Line Rule

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- Rule 1 – Focused on Congressional Mandates (RIN 1)
  - Published 10-01-2019
  - MAOP reconfirmation
  - Material verification
  - Non-HCA assessments
- Rule 2 – Focus on Non-mandates (RIN 2)
  - Published August 24, 2022
  - Repair Criteria (HCA and non-HCA)
  - Management of Change (HCA and non-HCA)
  - Corrosion control (Assessment Coating Damage, Stray Current, Internal Corrosion)
- Rule 3 – Gas Gathering (RIN 3 - Final Rule 11-15-2021)
  - Prevent and detect threats to pipeline integrity
  - Improve public awareness of pipeline safety
  - Improve emergency response to pipeline incidents.



# Final Rule - Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines - Published October 1, 2019

- The Pipeline and Hazardous Materials Safety Administration (PHMSA) is proposing to change the Federal pipeline safety regulations in 49 CFR Parts 191 and 192, which cover the transportation of gas by transmission and gathering pipelines.



Appalachian Underground Corrosion Short Course



52180

Federal Register / Vol. 84, No. 190 / Tuesday, October 1, 2019 / Rules and Regulations

## DEPARTMENT OF TRANSPORTATION

### Pipeline and Hazardous Materials Safety Administration

#### 49 CFR Parts 191 and 192

[Docket No. PHMSA–2011–0023; Amdt. Nos. 191–26; 192–125]

RIN 2137–AE72

#### Pipeline Safety: Safety of Gas Transmission Pipelines: MAOP Reconfirmation, Expansion of Assessment Requirements, and Other Related Amendments

**AGENCY:** Pipeline and Hazardous Materials Safety Administration (PHMSA), DOT.

**ACTION:** Final rule.

**SUMMARY:** PHMSA is revising the Federal Pipeline Safety Regulations to improve the safety of onshore gas transmission pipelines. This final rule addresses congressional mandates, National Transportation Safety Board recommendations, and responds to public input. The amendments in this final rule address integrity management requirements and other requirements, and they focus on the actions an operator must take to reconfirm the maximum allowable operating pressure of previously untested natural gas transmission pipelines and pipelines lacking certain material or operational records, the periodic assessment of pipelines in populated areas not designated as “high consequence areas,” the reporting of exceedances of maximum allowable operating pressure, the consideration of seismicity as a risk factor in integrity management, safety features on in-line inspection launchers and receivers, a 6-month grace period for 7-calendar-year integrity management reassessment intervals, and related recordkeeping provisions.

**DATES:** The effective date of this final rule is July 1, 2020. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of July 1, 2020. The incorporation by reference of ASME/ANSI B31.8S was approved by the Director of the Federal Register as of January 14, 2004.

**FOR FURTHER INFORMATION CONTACT:** Technical questions: Steve Nanney, Project Manager, by telephone at 713–272–2855. General information: Robert Jagger, Senior Transportation Specialist, by telephone at 202–366–4361.

#### SUPPLEMENTARY INFORMATION:

**I. Executive Summary**  
A. Purpose of the Regulatory Action

B. Summary of the Major Provisions of the Regulatory Action in Question  
C. Costs and Benefits

#### II. Background

A. Detailed Overview

B. Pacific Gas and Electric Incident of 2010

C. Advance Notice of Proposed Rulemaking

D. National Transportation Safety Board Recommendations

E. Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011

F. Notice of Proposed Rulemaking

III. Analysis of Comments, CPAC Recommendations and PHMSA Response

A. Verification of Pipeline Material Properties and Attributes—§ 192.607

i. Applicability

ii. Method

B. MAOP Reconfirmation—§§ 192.624, 192.632

i. Applicability

ii. Methods

iii. Spike Test—§ 192.506

iv. Fracture Mechanics—§ 192.712

v. Legacy Construction Techniques/Legacy Pipe

C. Seismicity and Other Integrity Management Clarifications—§ 192.917

D. 6-Month Grace Period for 7-Calendar-Year Reassessment Intervals—§ 192.930

E. I/I Launcher and Receiver Safety—§ 192.950

F. MAOP Exceedance Reporting—§§ 191.23, 191.25

G. Strengthening Assessment Requirements—§§ 192.150, 192.403, 192.921, 192.937, Appendix F

i. Industry Standards for I/I—§§ 192.150, 192.493

ii. Expand Assessment Methods Allowed for I/I—§§ 192.921(a) and 192.937(c)

iii. Guided Wave Ultrasonic Testing—Appendix F

H. Assessing Areas Outside of HCAs—§§ 192.3, 192.710

i. MCA Definition—§ 192.3

ii. Non-HCA Assessments—§ 192.710

I. Miscellaneous Issues

i. Legal Comments

ii. Records

iii. Cost/Benefit Analysis, Information Collection, and Environmental Impact Issues

IV. CPAC Recommendations

V. Section-by-Section Analysis

VI. Standards Incorporated by Reference

A. Summary of New and Revised Standards

B. Availability of Standards Incorporated by Reference

VII. Regulatory Analysis and Notices

**I. Executive Summary**

A. Purpose of the Regulatory Action

PHMSA believes that the current regulatory requirements applicable to gas pipeline systems have increased the level of safety associated with the transportation of gas. Still, incidents continue to occur on gas pipeline systems resulting in serious risks to life and property. One such incident occurred in San Bruno, CA, on

September 9, 2010, killing 8 people, injuring 51, destroying 38 homes, and damaging another 70 homes (PG&E incident). In its investigation of the incident, the National Transportation Safety Board (NTSB) found among several causal factors that the operator, Pacific Gas and Electric (PG&E), had an inadequate integrity management (IM) program that failed to detect and repair or remove the defective pipe section. PG&E was basing its IM program on incomplete and inaccurate pipeline information, which led to, among other things, faulty risk assessments, improper assessment method selection, and internal assessments of the program that were superficial and resulted in no meaningful improvement in the integrity of the pipeline system nor the IM program itself.

The PG&E incident underscored the need for PHMSA to extend IM requirements and address other issues related to pipeline system integrity. In response, PHMSA published an NPRM seeking comment on whether IM and other requirements should be strengthened or expanded, and other related issues, on August 25, 2011 (76 FR 53086).

The NTSB adopted its report on the PG&E incident on August 30, 2011, and issued several safety recommendations to PHMSA and other entities. Several of these NTSB recommendations related directly to the topics addressed in the 2011 NPRM and are addressed in this final rule. Also, the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (2011 Pipeline Safety Act) was enacted on January 3, 2012. Several of the 2011 Pipeline Safety Act's statutory requirements related directly to the topics addressed in the 2011 NPRM and are a focus of this rulemaking.

Another incident that influenced this rulemaking was the rupture of a gas transmission pipe operated by Columbia Gas near Sissonville, WV, on December 11, 2012. The escaping gas ignited, and fire damage extended nearly 1,100 feet along the pipeline right-of-way and covered an area roughly 820 feet wide. While there were no fatalities or serious injuries, three houses were destroyed by the fire, and several other houses were damaged. The ruptured pipe was one of three in the area that cross Interstate 77, and the incident closed the highway in both directions for 19 hours until a section of thermally damaged road surface approximately 800 feet long could be replaced. Following this incident, the NTSB finalized an accident report on February 19, 2014, issuing recommendations to PHMSA to include principal arterial roadways,

# Gas Transmission Rule (RIN 2)

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## Subpart I Corrosion Control

- 192.461 Protective Coating (and 192.319)
  - 1,000 contiguous feet buried, conduct surveys to assess coating damage
  - Remediate severe coating damage within 6 months
- 192.465 Monitoring
  - Complete remedial action within 12 months or as soon as practicable after obtaining permits
- 192.473 Interference Currents
  - Increase requirements for electrical stray current surveys and remedial action





# Natural Gas Underground Storage

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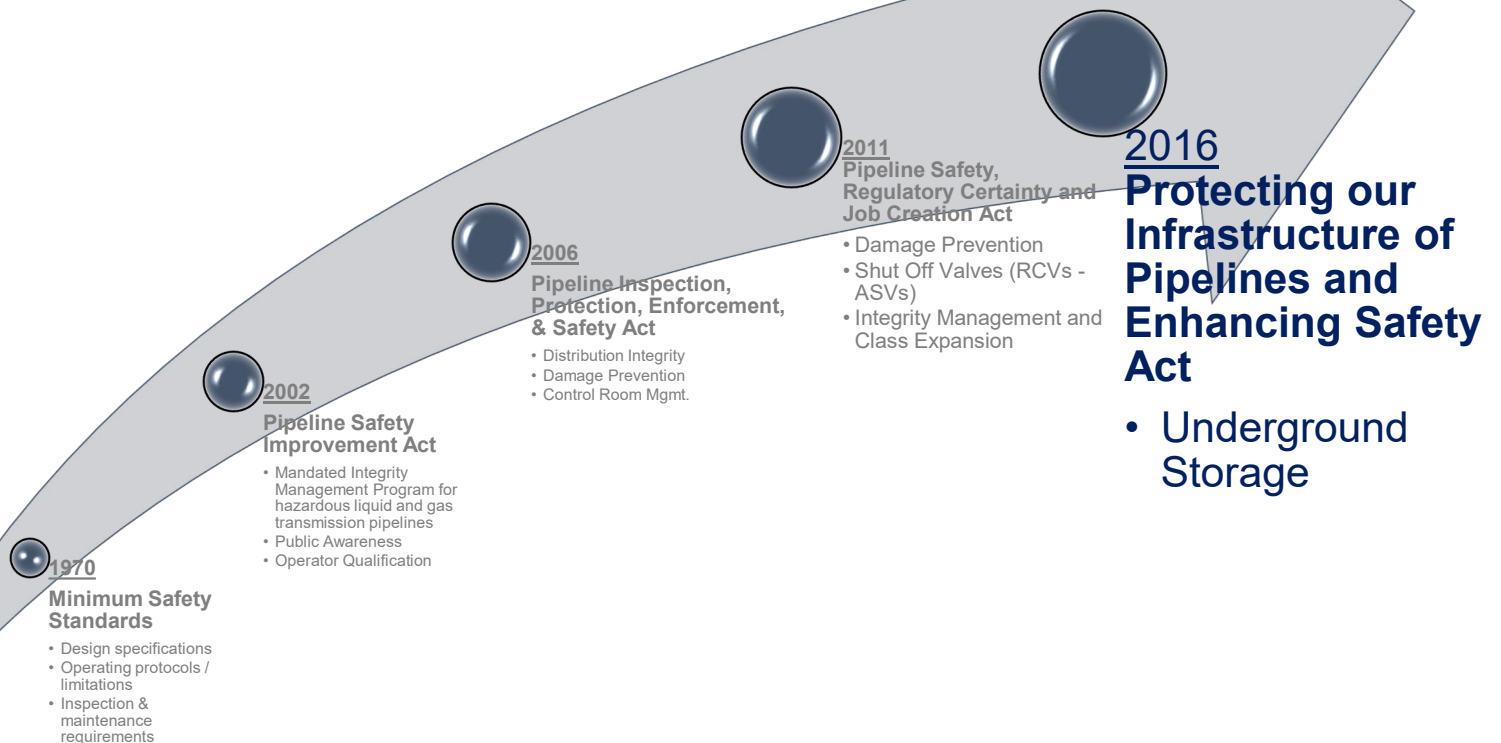
From October 23, 2015 to mid-February 2016 a natural gas leak (California) from an injection well's pipe casing seeping up through the ground received national attention.



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# The Need to Do More

## U.S. Congress - Pipeline Safety Reauthorization



Appalachian Underground Corrosion Short Course

# 2016 Pipeline Safety Reauthorization

## “SAFE PIPES Act”

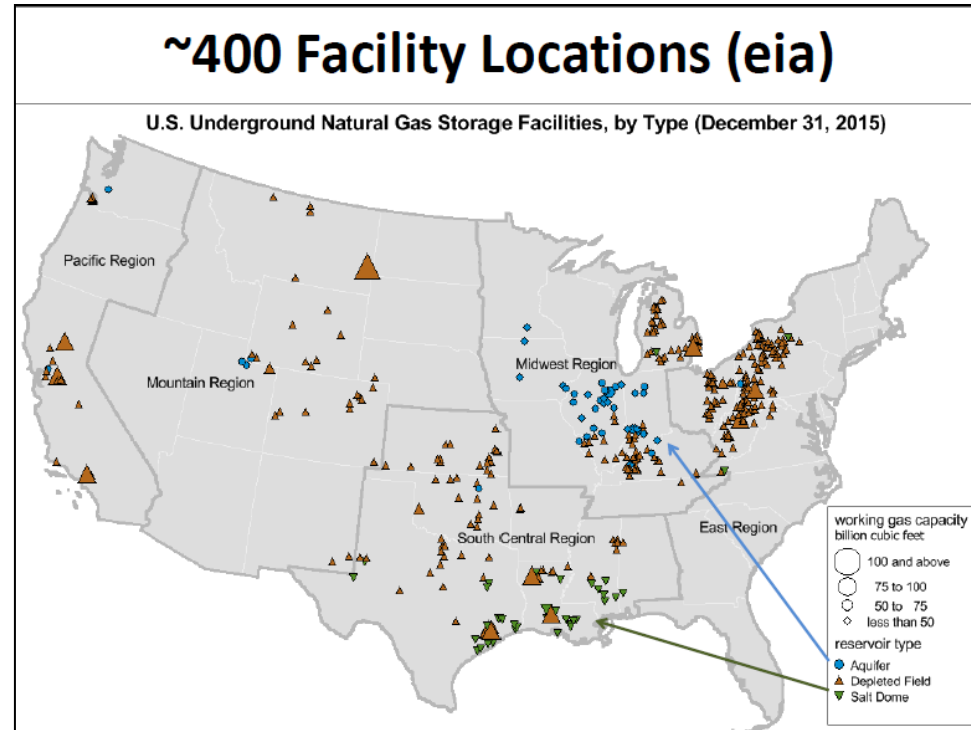
- Proposed – Requires the Secretary of Transportation to issue minimum safety standards for the operation and integrity management of underground gas storage facilities (Section 12) no later than two years after the date of enactment and establishes an underground natural gas storage facility safety account in the Pipeline Safety fund

Sec. 1. Short title; table of contents.  
Sec. 2. Authorization of appropriations.  
Sec. 3. Regulatory updates.  
Sec. 4. Natural gas integrity management review.  
Sec. 5. Hazardous liquid integrity management review.  
Sec. 6. Technical safety standards committees.  
Sec. 7. Inspection report information.  
Sec. 8. Improving damage prevention technology.  
Sec. 9. Workforce management.  
Sec. 10. Information-sharing system.  
Sec. 11. Nationwide integrated pipeline safety regulatory database.  
Sec. 12. Underground gas storage facilities.  
Sec. 13. Joint inspection and oversight.  
Sec. 14. Safety data sheets.  
Sec. 15. Hazardous materials identification numbers.  
Sec. 16. Emergency order authority.  
Sec. 17. State grant funds.  
Sec. 18. Response plans.  
Sec. 19. Unusually sensitive areas.  
Sec. 20. Pipeline safety technical assistance grants.  
Sec. 21. Study of materials and corrosion prevention in pipeline transportation.  
Sec. 22. Research and development.  
Sec. 23. Active and abandoned pipelines.  
Sec. 24. State pipeline safety agreements.  
Sec. 25. Requirements for certain hazardous liquid pipeline facilities.  
Sec. 26. Study on propane gas pipeline facilities.  
Sec. 27. Standards for certain liquefied natural gas pipeline facilities.  
Sec. 28. Pipeline odorization study.  
Sec. 29. Report on natural gas leak reporting.  
Sec. 30. Review of State policies relating to natural gas leaks.  
Sec. 31. Aliso Canyon natural gas leak task force.



# Underground Natural Gas Storage

- There are approximately 400 interstate and intrastate underground natural gas storage facilities currently in operation in the U.S.
  - 326 depleted hydrocarbon reservoirs
  - 43 depleted aquifers
  - 31 salt caverns





# Natural Gas Underground Storage

## Final Rule – 2/12/2020

- Rule establishes minimum safety standards for depleted hydrocarbon reservoirs, aquifer reservoirs, and solution-mined salt caverns used for the storage of natural gas.



Appalachian Underground Corrosion Short Course



8104 Federal Register / Vol. 85, No. 29 / Wednesday, February 12, 2020 / Rules and Regulations

### DEPARTMENT OF TRANSPORTATION

#### Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 191, 192, and 195

[Docket No. PHMSA-2016-0016; Amdt. Nos. 191-27; 192-126; 195-103]

RIN 2137-AF22

#### Pipeline Safety: Safety of Underground Natural Gas Storage Facilities

**AGENCY:** Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

**ACTION:** Final rule.

**SUMMARY:** The Pipeline and Hazardous Materials Safety Administration is publishing this final rule to amend its minimum safety standards for underground natural gas storage facilities (UNGSCFs). On December 19, 2016, PHMSA issued an interim final rule (IFR) establishing regulations in response to the 2015 Aliso Canyon incident and the subsequent mandate in section 12 of the Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2016. The IFR incorporated by reference two American Petroleum Institute (API) Recommended Practices (RPs): API RP 1170, "Design and Operation of Solution-Mined Salt Caverns Used for Natural Gas Storage" (First Edition, July 2015); and API RP 1171, "Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs" (First Edition, September 2015). The IFR required each provision in the API RPs to apply as mandatory (*i.e.*, each "should" statement would apply as a "shall") unless an operator provides written justification for not implementing the practice, including an explanation for why it is impracticable and not necessary for safety. Based on the comments received to the IFR and a petition for reconsideration, PHMSA has determined that the RPs, as originally published, will provide PHMSA with a stronger basis upon which to base enforcement than the IFR. This final rule also addresses recommendations from commenters and a petition for reconsideration of the IFR by modifying compliance timelines, revising the definition of a UNGSCF, clarifying the states' regulatory role, reducing recordkeeping and reporting requirements, formalizing integrity management practices, and adding risk management requirements for solution-mined salt caverns.

**DATES:** This final rule is effective on March 13, 2020. The Director of the Federal Register approved the incorporation by reference on January 18, 2017.

#### FOR FURTHER INFORMATION CONTACT:

**Technical questions:** Byron Coy, Senior Technical Advisor, by telephone at 609-771-7810 or by email at [byron.coy@dot.gov](mailto:byron.coy@dot.gov).

**General information:** Ashlin Bollacker, Technical Writer, by telephone at 202-366-4203 or by email at [ashlin.bollacker@dot.gov](mailto:ashlin.bollacker@dot.gov).

#### SUPPLEMENTARY INFORMATION:

- I. Executive Summary
  - A. Purpose of This Final Rule
  - B. Summary of the Major Provisions
  - C. Costs and Benefits
- II. Background
  - A. Overview of Underground Natural Gas Storage
  - B. Underground Storage Incidents and Regulatory History
  - C. Aliso Canyon Incident
  - D. The PIPES Act of 2016
  - E. Interagency Task Force
  - F. Interim Final Rule
  - G. Petition for Reconsideration
- III. Comment Summaries and PHMSA's Responses
  - A. Introduction
  - B. Incorporation by Reference of API Recommended Practices 1170 and 1171
  - C. Compliance Timelines
  - D. Placement of Underground Storage Regulations in a New Part for Title 49 of the 49 CFR
  - E. Suitability of API RPs 1170 and 1171 as the Basis for Rulemaking
  - F. Integrity Management Practices
  - G. Notification Criteria Under 49 CFR Part 191 for Changes at a Facility
  - H. The States' Role in Regulating UNGSCFs
  - I. Definitions and Terminology
  - J. Requests for Additional or More Stringent Requirements
  - IV. Regulatory Analyses and Notices

#### I. Executive Summary

##### A. Purpose of This Final Rule

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is amending the pipeline safety regulations applicable to underground natural gas storage facilities (UNGSCFs). PHMSA is amending the UNGSCF regulations in response to comments and recommendations received on its interim final rule (IFR) published on December 19, 2016 (81 FR 91860). The IFR implemented PHMSA's authority to regulate UNGSCFs and the Congressional mandate in section 12 of the PIPES Act (Pub. L. 114-183) to establish minimum safety standards for depleted-hydrocarbon reservoirs, aquifer reservoirs, and solution-mined salt caverns used for the storage of natural

gas.<sup>1</sup> Congress issued the mandate to PHMSA following a large-scale natural gas leak at the Aliso Canyon UNGSCF in Southern California on October 23, 2015. The mandate required PHMSA to establish minimum safety standards for UNGSCFs within two years of the PIPES Act issuance on June 22, 2016. To meet the mandate's deadline—and address the urgent need for safer storage of natural gas—PHMSA published the IFR with a 60-day comment period. The IFR went into effect on January 18, 2017.

Since that time, PHMSA has considered public comments and a petition for reconsideration of the IFR and is modifying the minimum safety standards for UNGSCFs in this final rule accordingly. PHMSA has also further reviewed the Final Report of the Interagency Task Force on Natural Gas Storage Safety<sup>2</sup> to ensure any amendments in this final rule are consistent with the Task Force's recommendations to PHMSA.<sup>3</sup> As detailed in this final rule, PHMSA believes these changes will reduce regulatory burdens and reduce costs for industry and gas consumers while sustaining safety and protecting the environment.

##### B. Summary of the Major Provisions

Consistent with the IFR, this final rule maintains the incorporation by reference of American Petroleum Institute (API) Recommended Practices (RPs) 1170 and 1171 (the RPs) as the basis of the minimum safety standards in 49 CFR part 192. API RP 1170, "Design and Operation of Solution-Mined Salt Caverns Used for Natural Gas Storage,"<sup>4</sup> has recommended practices for solution-mined salt cavern facilities used for natural gas storage and covers facility geomechanical assessments, cavern well design and drilling, solution mining techniques,

<sup>1</sup> For a description of these storage types and other basic information about underground natural gas storage, see <https://www.eia.gov/naturalgas/storagebasics/>.

<sup>2</sup> "Ensuring Safe and Reliable Underground Natural Gas Storage," Final Report of the Interagency Task Force on Natural Gas Storage Safety, October 2016. See <https://www.eaenergy.gov/downloads/report-ensuring-safe-and-reliable-underground-natural-gas-storage>.

<sup>3</sup> In addition to their comments on the IFR, on March 17, 2017, the State of Texas and the Texas Railroad Commission petitioned the U.S. Court of Appeals for the Fifth Circuit for review of the IFR under 49 U.S.C. 60119(a). See *State of Texas v. PHMSA*, No. 17-60189 (5th Cir. Mar. 17, 2017). On April 24, 2017, the court granted INCAA and AGA's motions to intervene in the litigation. On July 19, 2017, the court granted a joint motion to hold the petition for review in abeyance pending the issuance of this final rule.

<sup>4</sup> API Recommended Practice 1170 "Design and Operation of Solution-Mined Salt Caverns used for Natural Gas Storage (First Edition, July 2015).

# API Recommended Practice 1170

## Published September 2015

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### API RP 1170

#### Design and Operations of Solution-mined Salt Caverns Used for Natural Gas Storage

- Covers facility geomechanical assessments, cavern well design and drilling, solution mining techniques and operations, including monitoring and maintenance practices.

#### Design and Operation of Solution- mined Salt Caverns Used for Natural Gas Storage

API RECOMMENDED PRACTICE 1170  
FIRST EDITION, JULY 2015



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AMERICAN PETROLEUM INSTITUTE

# API Recommended Practice 1171

## Published September 2015

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### API RP 1171

Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs

- Applies to natural gas storage in depleted oil and gas reservoirs and aquifer reservoirs.
- Focuses on storage well, reservoir, and fluid management for functional integrity in design, construction, operation, monitoring, maintenance, and documentation practices.



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### Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs

API RECOMMENDED PRACTICE 1171  
FIRST EDITION, SEPTEMBER 2015



AMERICAN PETROLEUM INSTITUTE

# Summary PHMSA IMP ACTIONS

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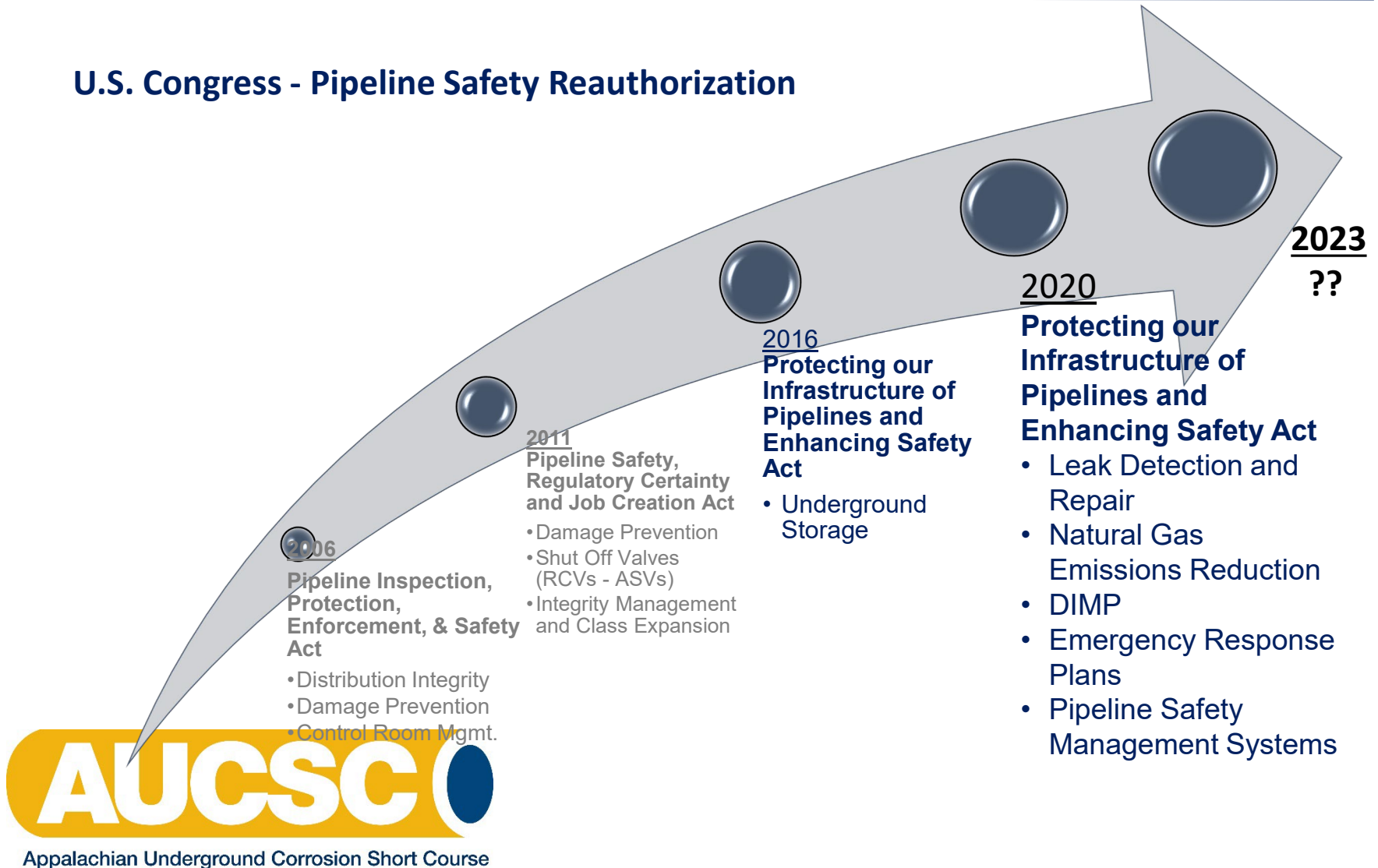
- **Hazardous Liquid (Part 195)**
  - 2001 Final Rule
  - 2015 Notice of Proposed Rulemaking (NPRM)
  - 2019 Final Rule
- **Gas Transmission (Part 192)**
  - 2003 Final Rule
  - 2011 Advanced NPRM
  - 2016 Mega Rule NPRM
  - 2019 Mega Rule (RIN 1)
  - RMV Final Rule 4/8/22
  - RIN 2 Final Rule 8/24/22
- **Gas Gathering**
  - 2016 NPRM
  - 2021 Final Rule
- **Gas Distribution (Part 192)**
  - 2008 NPRM
  - 2010 Final Rule
  - 2020 Final Rule Gas Pipeline Regulatory Reform
- **Underground Gas Storage (Part 192)**
  - 2016 Interim Final Rule
  - 2020 Final Rule





# The Need to Do More

## U.S. Congress - Pipeline Safety Reauthorization



# Objectives Discussed

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- Why the Need for Integrity Management
- Defined Pipeline Integrity Management
- Reviewed Integrity Management Regulations
- Highlighted Relevant Industry Standards
- What Does the Future Look Like for Integrity Management



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# Questions

Lee Reynolds, NiSource  
Standards & Compliance



Appalachian Underground Corrosion Short Course