



## Association of Oil Pipe Lines Annual Business Conference 2011 Pipeline Safety 101

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# Course Summary

- Introduction and Course Overview
- Life Cycle Review of Part 195
- Evolution of the Regulatory Regime
- Performance History and the Effects of Regulatory Change (e.g., IMP)
- Current Issues and Initiatives
- Q&A

# Introduction and Course Overview

## Key Questions: What is “Safety”? What does it take to be “Safe”?

- Public and the Environment?
- Personnel Safety?
- Process Safety?
- Pipeline Safety Regulations?
- Policies and Procedures?
- Best Practices?
- Safety Culture?

# Introduction and Course Overview

## The Hazardous Liquids Pipeline Safety Act of 1979 (HLPISA)

- The HLPISA was cloned from the Natural Gas Pipeline Safety Act of 1968 (NGPSA)
- The NGPSA and the HLPISA were recodified in 1994 into the Pipeline Safety Act (PSA)
- 49 United States Code 60101, *et seq*

# Introduction and Course Overview

## Power and Authority

- The PSA grants authority over pipeline safety to the Secretary of the U.S. Department of Transportation (DOT)

### **Among the powers granted by Congress:**

- To promulgate safety standards (regulations) for the design, installation, inspection, emergency plans and procedures, testing, construction, extension, operation, replacement, and maintenance, as well as to protect the environment during the course of pipeline transportation activities
- To inspect pipeline systems, pipeline facilities, and components for adherence to the safety standards
- To enforce compliance with the safety standards through warnings, orders, and penalties
- To direct that unsafe, or hazardous, pipeline systems be made safe through testing, repair, replacement, and other appropriate actions

# Introduction and Course Overview

## **Among the powers granted by Congress, cont.:**

- To certify State pipeline safety programs for oversight of intrastate pipelines
- To encourage and cajole State damage prevention programs
- To grant funds for State programs and research activities
- To collect user fees from pipeline operators

# Introduction and Course Overview

## Jurisdictional Overview: Interstate vs. Intrastate

- What it is
- What it means

### ***Interstate Jurisdiction***

The Office of Pipeline Safety (OPS) in the Pipeline and Hazardous Materials Safety Administration (PHMSA), in the DOT is delegated the Secretary's powers. PHMSA/OPS is the agency with primary safety jurisdiction over interstate pipelines.

### ***Intrastate Jurisdiction***

Safety oversight for intrastate hazardous liquids pipelines is largely the role of the states.

State laws and regulations must be no less stringent than the PSA and the federal regulations (but may be more stringent).

### ***What it Means***

All pipelines that fall within the scope of 49 CFR Part 195 will be subjected to the same or similar regulations.

# Introduction and Course Overview

## The Federal Pipeline Safety Regulations – Title 49, Code of Federal Regulations, Part 195

- **Subpart A: General**
- **Subpart B: Annual, Accident, and Safety-Related Condition Reporting**
- **Subpart C: Design Requirements**
- **Subpart D: Construction**
- **Subpart E: Pressure Testing**
- **Subpart F: Operation and Maintenance**
- **Subpart G: Qualification of Pipeline Personnel**
- **Subpart H: Corrosion Control**



# Introduction and Course Overview

## Overarching Subjects

- Performance-Based Regulation
  - Performance vs. “Specification” (sort of)
  - Desired safety objectives can be reached
  - Without impeding future industry innovations
  - 33 Fed. Reg. 10213 (July 17, 1968)
- Standards Incorporated by Reference
  - API
  - ASTM
  - ASME
  - NACE
  - Etc.
- Best Practices – You Will Be Compared To Others...

# The Pipeline Safety Life Cycle

## Life-Cycle Review

- Design
- Construction
- Operation and Maintenance
- Integrity Management
- Reporting
- Enforcement

Following are Select Provisions of Part 195  
(Many Have Been Omitted From This Presentation)

# The Pipeline Safety Life Cycle

## Design – Subpart C

- § 195.102 Design temperature.
- § 195.106 Internal design pressure.
  - (a) Internal design pressure is determined in accordance with the following formula:  $P=(2 St/D ) \times E \times F$
- § 195.108 External pressure.
- § 195.110 External loads.
- § 195.116 Valves.
- § 195.120 Passage of internal inspection devices.
- § 195.132 Design and construction of aboveground breakout tanks.
- § 195.210 Pipeline location.

# The Pipeline Safety Life Cycle

## Construction – Subparts D & E

### **Subpart D - Construction**

- § 195.204 Inspection—general.
  - Trained and qualified.
- § 195.207 Transportation of pipe.
  - (a) *Railroad.*
  - (b) *Ship or barge.*
- § 195.214 Welding procedures.
  - API 1104 or ASME Boiler and Pressure Vessel Code
- § 195.222 Welders: Qualification of welders.
  - API 1104
- § 195.228 Welds and welding inspection: Standards of acceptability.
  - Each weld and welding must be inspected – visual and nondestructive.

# The Pipeline Safety Life Cycle

## Construction – Subparts D & E (continued)

- § 195.234 Welds: Nondestructive testing – procedures, training, 10% vs. All
- § 195.246 Installation of pipe in a ditch.
  - Minimize the introduction of secondary stresses and the possibility of damage to the pipe.
- § 195.248 Cover over buried pipeline.

Location	Cover inches (millimeters)	
	For normal excavation	For rock excavation*
Industrial, commercial, and residential areas	36 (914)	30 (762)
Crossing of inland bodies of water with a width of at least 100 feet (30 millimeters) from high water mark to high water mark	48 (1219)	18 (457)
Drainage ditches at public roads and railroads	36 (914)	36 (914)
Deepwater port safety zones	48 (1219)	24 (610)
Gulf of Mexico and its inlets in waters less than 15 feet (4.6 meters) deep as measured from mean low water	36 (914)	18 (457)
Other offshore areas under water less than 12 ft (3.7 meters) deep as measured from mean low water	36 (914)	18 (457)
Any other area	30 (762)	18 (457)

\*Rock excavation is any excavation that requires blasting or removal by equivalent means.

# The Pipeline Safety Life Cycle

## Construction – Subparts D & E (continued)

- § 195.252 Backfilling.
- § 195.260 Valves: Location.
  - Station isolation
  - Minimize damage or pollution from accidental hazardous liquid discharge
  - Water crossings
- § 195.266 Construction records.

## **Subpart E – Pressure Testing**

- § 195.302 General requirements.
- § 195.304 Test pressure.
  - at least 4 continuous hours at a pressure equal to 125 percent, or more, of the maximum operating pressure
- § 195.305 Testing of components.
- § 195.307 Pressure testing aboveground breakout tanks.
- § 195.310 Records.

# The Pipeline Safety Life Cycle

## Operation and Maintenance – Subpart F, G & H

- § 195.401 General requirements.
  - (a) No operator may operate or maintain its pipeline systems at a level of safety lower than that required by this subpart and the procedures it is required to establish under § 195.402(a) of this subpart.
- § 195.402 Procedural manual for operations, maintenance, and emergencies.
  - *General.*
  - *Maintenance and normal operations.*
  - *Abnormal operation.*
  - *Emergencies.*
  - *Safety-related condition reports.*
- § 195.403 Emergency response training.
- § 195.404 Maps and records.

# The Pipeline Safety Life Cycle

## Operation and Maintenance – Subpart F, G & H (continued)

- § 195.406 Maximum operating pressure.
- § 195.410 Line markers.
- § 195.412 Inspection of ROW and navigable water crossings.
- § 195.420 Valve maintenance.
- § 195.432 Inspection of in-service breakout tanks.
- § 195.436 Security of facilities.
- § 195.440 Public awareness.
- § 195.442 Damage prevention program.
- CPM leak detection



# The Pipeline Safety Life Cycle

## Operation and Maintenance – Subpart F, G & H (continued)

- § 195.446 Control room management.
  - *Roles and responsibilities.*
  - *Provide adequate information.*
  - *Fatigue mitigation.*
  - *Alarm management.*
  - *Change management.*

# The Pipeline Safety Life Cycle

## Operation and Maintenance – Subpart F, G & H (continued)

### **Subpart G—Qualification of Pipeline Personnel**

- § 195.501 Scope.
  - For the purpose of this subpart, a covered task is an activity, identified by the operator, that:
    - (1) Is performed on a pipeline facility;
    - (2) Is an operations or maintenance task;
    - (3) Is performed as a requirement of this part; and
    - (4) Affects the operation or integrity of the pipeline.

### **Subpart H—Corrosion Control**

- § 195.557 Which pipelines must have coating for external corrosion control?
- § 195.563 Which pipelines must have cathodic protection?
- § 195.565 How do I install cathodic protection on breakout tanks?

# The Pipeline Safety Life Cycle

## Operation and Maintenance – Subpart F, G & H (continued)

### **Subpart H—Corrosion Control (continued)**

- § 195.567 Which pipelines must have test leads and what must I do to install and maintain the leads?
- § 195.571 What criteria must I use to determine the adequacy of cathodic protection?
- § 195.573 What must I do to monitor external corrosion control?
- § 195.579 What must I do to mitigate internal corrosion?
- § 195.581 Which pipelines must I protect against atmospheric corrosion and what coating material may I use?

# The Pipeline Safety Life Cycle

## Integrity Management

- § 195.450 High Consequence Area
  - Commercially navigable water way
  - High population area
  - Another populated area
  - Unusually sensitive area
- § 195.452 Pipeline integrity management in high consequence areas.
  - This section applies to each hazardous liquid pipeline and carbon dioxide pipeline that could affect a high consequence area.
    - Develop a written integrity management program that addresses the risks on each segment of pipeline
    - Written baseline assessment plan

# The Pipeline Safety Life Cycle

## Integrity Management (continued)

- § 195.452 Pipeline integrity management in high consequence areas.  
(continued)
  - This section applies to each hazardous liquid pipeline and carbon dioxide pipeline that could affect a high consequence area. (continued)
    - Assess the integrity of the line pipe
      - (A) Internal inspection tool or tools capable of detecting corrosion and deformation anomalies including dents, gouges and grooves;
      - (B) Pressure test conducted in accordance with subpart E of this part;
      - (C) External corrosion direct assessment in accordance with § 195.588
    - A schedule for completing the integrity assessment
    - An explanation of the assessment methods selected and evaluation of risk factors considered

# The Pipeline Safety Life Cycle

## Integrity Management (continued)

- § 195.452 Pipeline integrity management in high consequence areas (continued)
  - Risk factors for establishing an assessment schedule:
    - Results of the previous integrity assessment, defect type and size that the assessment method can detect, and defect growth rate;
    - Pipe size, material, manufacturing information, coating type and condition, and seam type;
    - Leak history, repair history and cathodic protection history;
    - Product transported;
    - Operating stress level;
    - Existing or projected activities in the area;
    - Local environmental factors that could affect the pipeline ( e.g., corrosivity of soil, subsidence, climatic);
    - Geo-technical hazards; and
    - Physical support of the segment such as by a cable suspension bridge.

# The Pipeline Safety Life Cycle

## Integrity Management (continued)

- § 195.452 Pipeline integrity management in high consequence areas (continued)
  - What are the elements of an integrity management program?
    - A process for identifying which pipeline segments could affect a high consequence area;
    - A baseline assessment plan;
    - An analysis that integrates all available information about the integrity of the entire pipeline and the consequences of a failure;
    - Criteria for remedial actions to address integrity issues raised by the assessment methods and information analysis;
    - A continual process of assessment and evaluation to maintain a pipeline's integrity;
    - Identification of preventive and mitigative measures to protect the high consequence area;
    - Methods to measure the program's effectiveness;
    - A process for review of integrity assessment results and information analysis by a person qualified to evaluate the results and information.

# The Pipeline Safety Life Cycle

## Integrity Management (continued)

- Preventive and mitigative measures
  - An operator must take measures to prevent and mitigate the consequences of a pipeline failure that could affect a high consequence area.
  - Conducting a risk analysis.
- Assessment intervals.
  - An operator must establish five-year intervals, not to exceed 68 months, for continually assessing the line pipe's integrity.



# The Pipeline Safety Life Cycle

## Reporting – Subpart B

- § 195.49 Annual Report – Form 7000-1.1 (June 15)
- § 195.55 Safety-Related Conditions
  - Corrosion
  - Movement or loading, e.g. earthquake, landslide
  - Impaired serviceability, e.g. defect or damage
  - Surge greater than 110% MOP
  - A leak that constitutes an emergency
  - Pressure reduction (20%) or shutdown – any safety related condition
- § 195.50 Accidents
  - Explosion or fire
  - Release of 5 gallons (ROW exception)
  - Death
  - Injury requiring hospitalization
  - Damage greater than \$50,000

# The Pipeline Safety Life Cycle

## Enforcement

- Inspections
- Investigations
- Notice of Amendment
- Warning Letter
- Notice of Probable Violation
- Compliance Order
- Civil Penalty
- Safety Order
- Corrective Action Order
- Administrative Procedure

# Performance History and the Effects of Regulatory Change

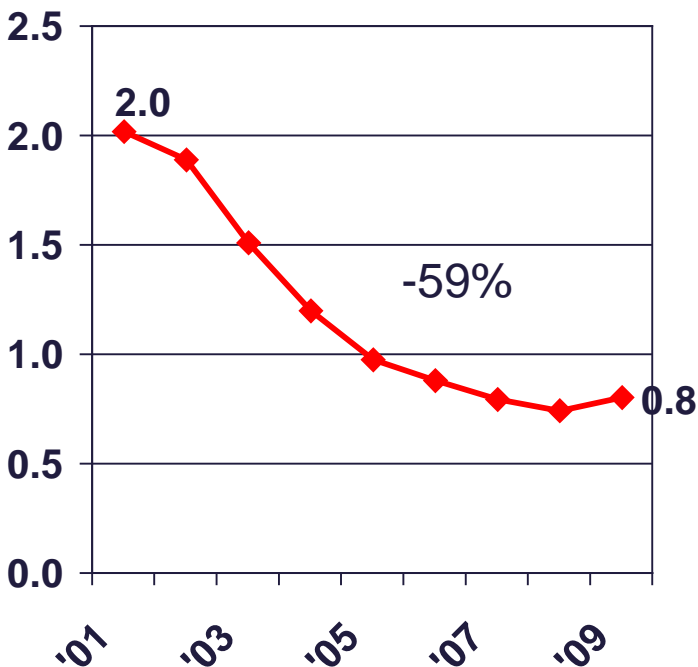
## Significant Decline in Hazardous Liquids Spills from 1999 to 2011

- Driven by Industry Performance Improvement Processes
  - Pipeline Performance Tracking System (1999)
    - Data Mining Team & Lessons Learned (PPTS Advisories)
    - What does our history tell us?
  - Performance Excellence Team (2001)
    - How can we do better in the future?
  - Pipeline Information eXchange (2008)
- Also, new Integrity Management Regulations
  - Focus on Integrity Management Programs has had benefits for HCA could affect segments as well as non-HCA segments

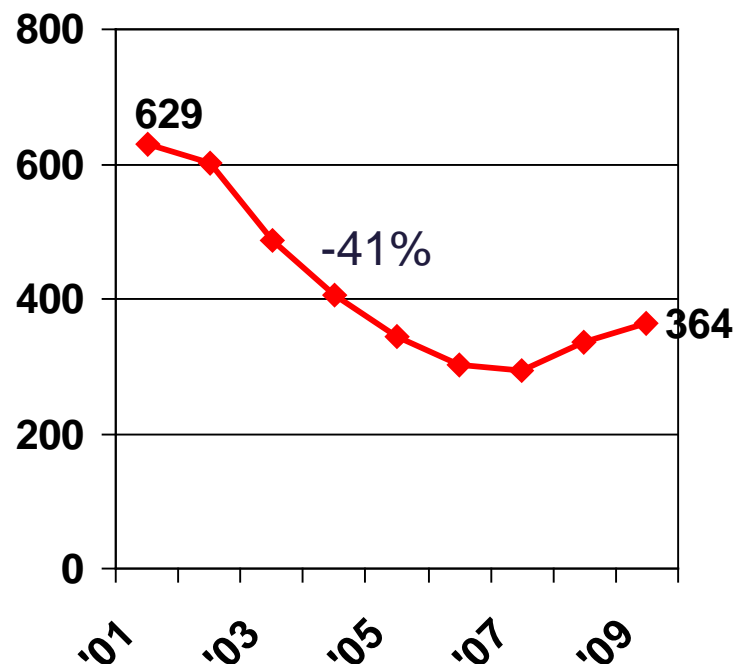
# Performance History and the Effects of Regulatory Change - continued

## Dramatic Improvement: Liquids Pipeline Industry Onshore Pipe Spill Record

Number of Spills per 1,000 Miles



Barrels Released per 1,000 Miles

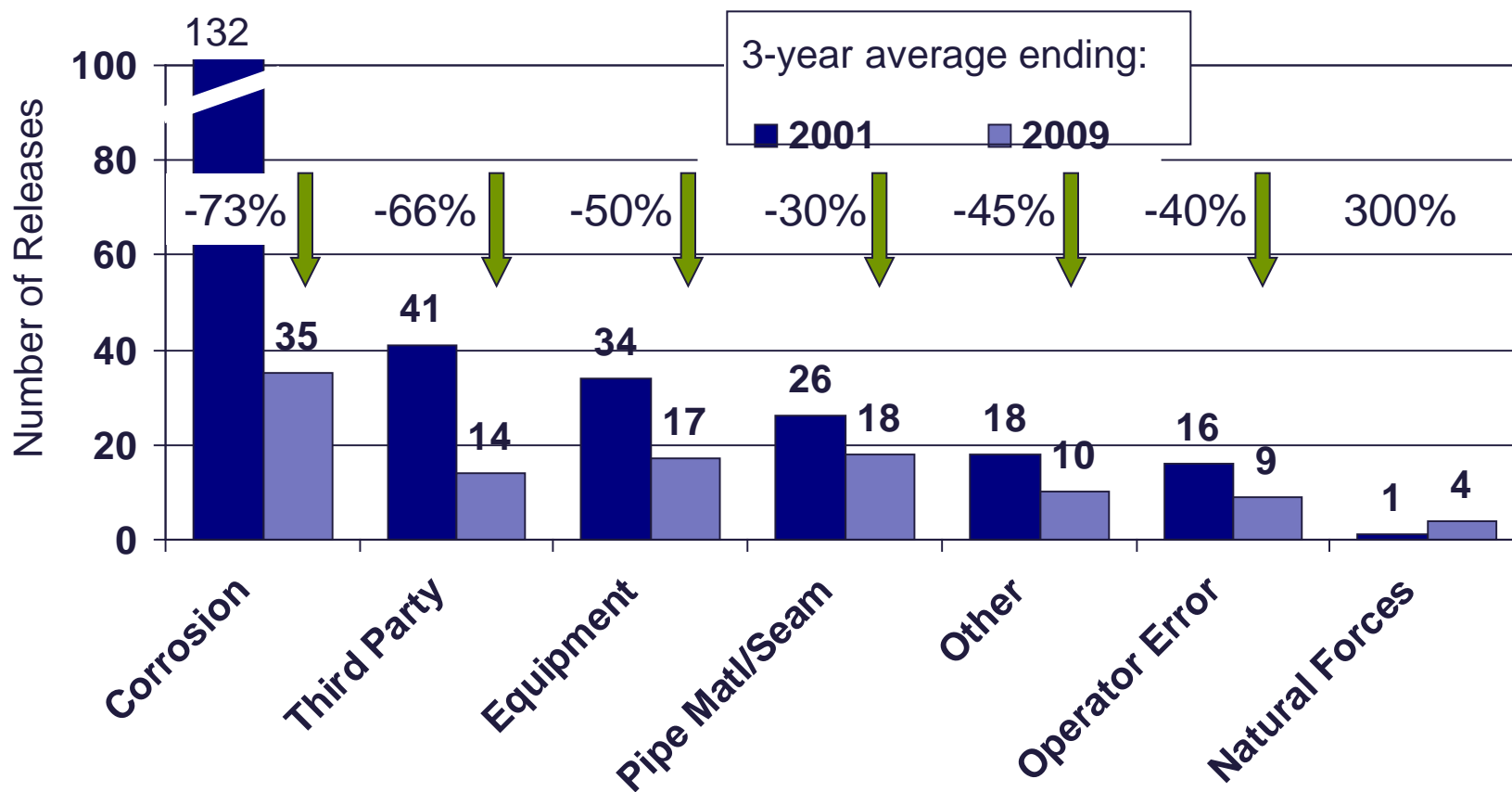


3-Year Averages Ending in Year Shown

Source: Pipeline Performance Tracking System, a voluntary spill reporting system involving 85% of the U.S. liquids pipeline mileage. Percentage decline from 1999-2001 average to 2007-2009 average.

# Performance History and the Effects of Regulatory Change - continued

## Spills Are Down In Every Major Cause Category



Source: Pipeline Performance Tracking System, a voluntary spill reporting system involving 85% of the U.S. liquids pipeline mileage

# Current Issues and Initiatives

## Recent Pipeline Accidents Have Raised Questions For The Public, Regulators and Legislators About Pipeline Safety

- Enbridge Crude Release In Marshall, MI – release to water
- Salt Lake City, UT Crude Release (I & II) – release to water
- San Bruno, CA Gas Transmission Explosion and Fire – fatalities/property loss
- Allentown, PA Gas Distribution – fatalities/property loss
- Laurel, MT – Crude Release to Water

## Resulted in DOT Secretary LaHood Call To Action

- April 18 Pipeline Safety Forum
- October – Secretary’s Report to the Nation on Pipeline Safety

# Current Issues and Initiatives - continued

## API-AOPL Leadership Safety Initiatives

- Leak Detection
- Damage Prevention
- Enhanced Data Integration
- Sharing Practices
- External Communications
- Strategic Planning
- Research & Development/Enhanced Technology

**Purpose: undertake significant near-term and long-term actions that will make real improvements in industry performance**

# Current Issues and Initiatives - continued

## Implementing Control Room Management Rule

- October 1 – Start date for first set of requirements
- August 1, 2012 – everything else

## ANPRM on Hazardous Liquids Pipelines

- Leak Detection
- HCA Definition
- EFRDs and Valve Spacing
- Repair Criteria for non-HCA segments

## ANPRM on PHMSA Enforcement of Damage Prevention Laws

- NPRM expected later this year or early next



# Thank you!

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