Liquid Pipeline Industry Perspective on Risk Assessment

PHMSA Risk Assessment Panel

July 21, 2011

Arlington, VA

Association of Oil Pipe Lines

Liquid Industry Perspective on Risk Assessment

- Stakeholder Expectation
- Pipeline Risk Knowledge
- Overview of Pipeline Risk
- Risk Assessment Processes
- Continual Improvement

Stakeholder Expectation

Stakeholder expectation is that we understand and manage our risk.

Exponential Increase in Knowledge

- Over the past several decades knowledge about pipeline risk has increased exponentially.
- Operators understand the risks associated with pipeline assets to a higher degree than ever in the history of our industry.
- This knowledge has been used to ensure higher and higher levels of pipeline safety through industry standards, regulations, best practices, new technology, improved methodologies, information management, etc, applied to every aspect of a pipeline's life:
  - Manufacturing
  - Transportation & Storage
  - Design
  - Construction
  - Operation
  - Maintenance & Inspection
  - Service Retirement

Pipeline Risk

Pipeline Integrity Threats

- **Third Party / Mechanical Damage**
  - Instantaneous Failure (1st, 2nd, or 3rd party)
  - Delayed Failure (1st, 2nd, or 3rd party)
  - Vandalism
- **External Corrosion**
- **Internal Corrosion**
- **Manufacturing Related Defects**
  - Defective Pipe Seam
  - Defective Pipe Body
- **Welding/Fabrication Related Defects**
  - Defective Girth Weld
  - Defective Fabrication Weld
  - Wrinkle Bend or Buckle
  - Stripped Threads, Coupling Failure
- **Incorrect Operations**
- **Stress Corrosion Cracking**
- **Equipment**
  - Gasket or O-ring Failure
  - Control/Relief Equipment Malfunction
  - Seal/Pump Packing Failure
  - Misc Equipment Failure
- **Weather Related and Outside Force**
  - Cold Weather
  - Lightning
  - Heavy Rains or Floods
  - Earth Movements

Consequences

- **Impact on the Public**
- **Impact on the Environment**

Pipeline Risk Assessment

- No “Push Button” Solution
  - No “one” magic risk model
  - No “one” be all and end all database
  - No “one” process or application
  - No “one” person, no “one” department
- Risk Assessment Requires *Multiple*
  - Processes
  - SME’s
  - Records
  - Databases
  - Data Integration Tools and Applications
  - etc
- Risk-based analysis and decision making permeate every aspect of our business

Pipeline Risk Assessment

- (An Abbreviated List of) Risk Assessment Processes
  - LSW Analysis
  - Pressure Cycle Fatigue
  - In-line Inspection Technology
  - Shielded Coating Evaluation
  - Stress Corrosion Cracking
  - Leak Detection Evaluation
  - Maintenance and Inspection
  - Over-pressure Protection
  - ILI Data Analysis
  - Data Integration
  - Depth of Cover Assessment
  - Incident History Analysis
  - Incident Investigation
  - EFRD Analysis
  - Overland Spread Modeling
  - Air Dispersion Modeling
  - Emergency Response Planning
  - Identification of New HCA's
  - Human Resources
  - Information Management
  - Records Management
  - Etc, etc, etc

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Pipeline Risk Assessment

- Continual Improvement Results to Date
  - More data than ever, better data than ever
  - Better QA/QC of raw data
  - Better data integration and analysis through improved databases and applications
  - Better ILI signal identification
  - Better interpretation of ILI tool run results
  - More detailed analysis and assessment of risk issues in whole and in part
  - Greater understanding of, and more effective use of risk assessment tools such databases, applications, processes, documentation and records management
  - Better communication and sharing of data, information, and knowledge throughout a company
  - Establishment of Integrity-specific industry work groups through API, PRCI, NACE, etc
  - Significant increase in information sharing amongst operators
  - Significant increase in information sharing between operators and regulators
  - Greater understanding of threats and consequences
  - **Higher level of pipeline safety.**
- Exponential increase in knowledge of pipeline risk

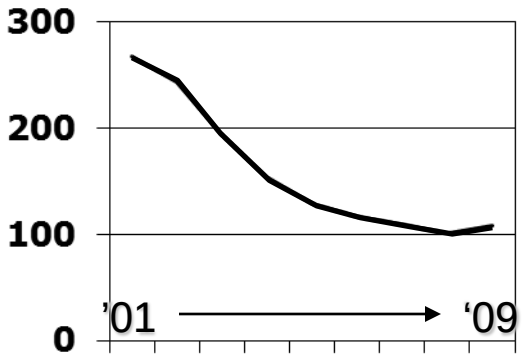
Not Done Learning Yet

- Better than ever, but not done yet
- Continue to have incidents
- Learning opportunities for the industry
- Properly managed, recent incidents can be used to prevent future incidents
- Stakeholder communication and cooperation accelerate risk reduction

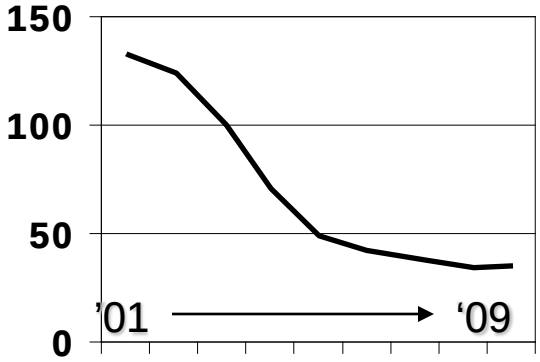
PPTS Onshore Pipe Incidents, '99-'09

3-Yr Average Ending Year Shown

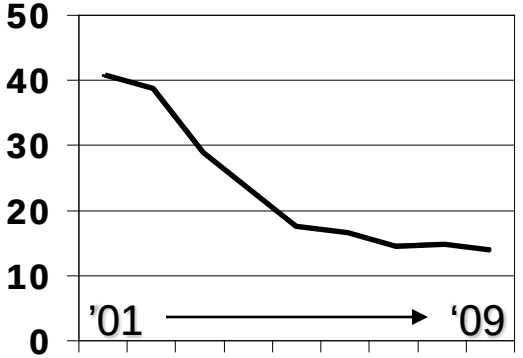
TOTAL, ALL CAUSES



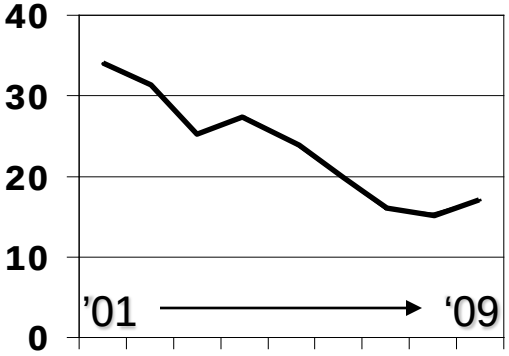
CORROSION



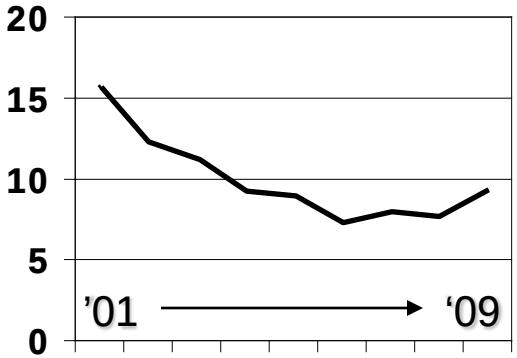
THIRD PARTY



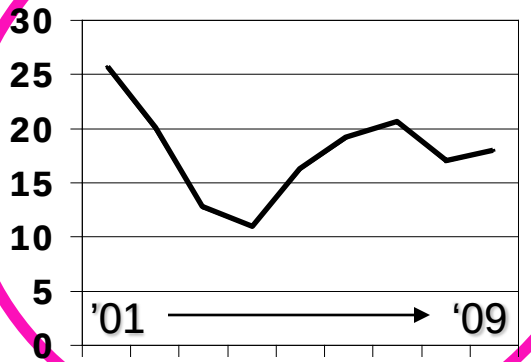
EQUIP./NON-PIPE



OPERATOR/OPER'N



MAT'L/SEAM/WELD



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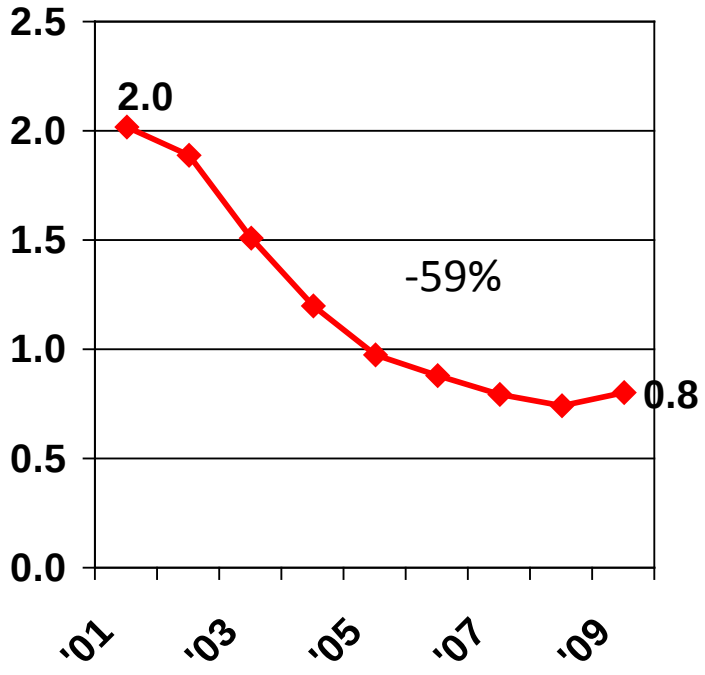
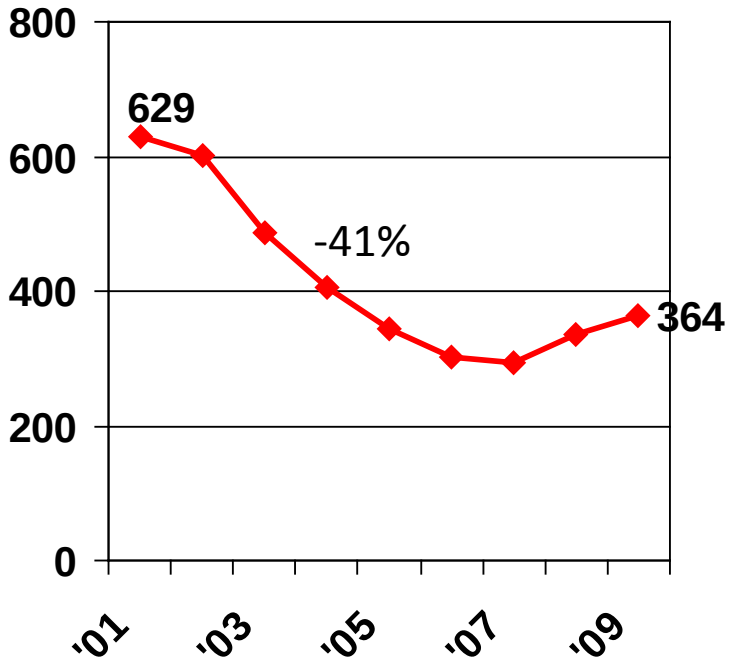
Dramatic Improvement:

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.

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