

# DOT Pipeline Safety Forum

## April 18, 2011

---

### *Panel 1: Highest Risks on Liquid Petroleum Pipelines*

Greg Smith

President, Shell Pipeline Company L.P.

# Pipelines Make it Possible

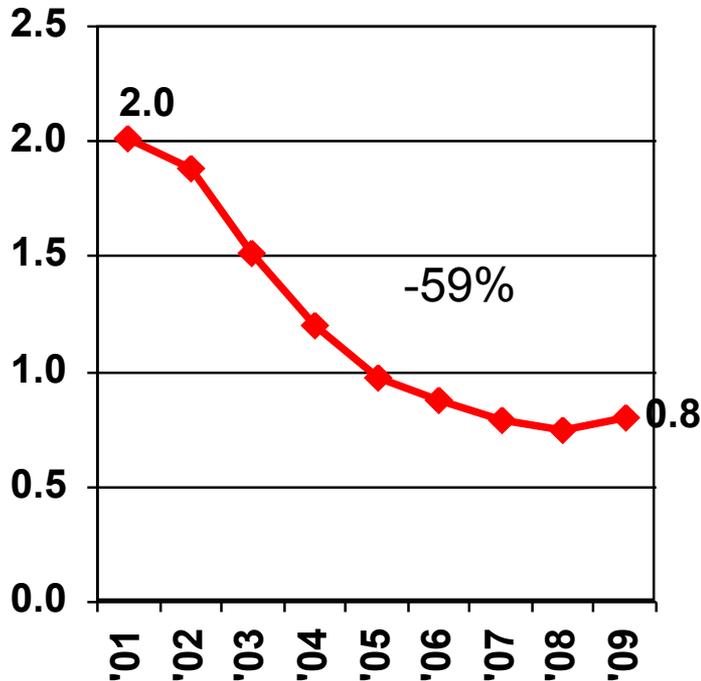
- A network of more than 168,000 miles of liquid petroleum pipelines move energy and raw materials to fuel the nation's economic engine.
- Interstate pipelines deliver over 11.3 billion barrels of petroleum each year; the cost to transport a barrel of petroleum products is about 2.5 cents per gallon at the gas station.
- Petroleum, used as a raw material, contribute to many other industries, including food, drugs and pharmaceuticals, plastics, chemicals, and road construction.

# Industry Action

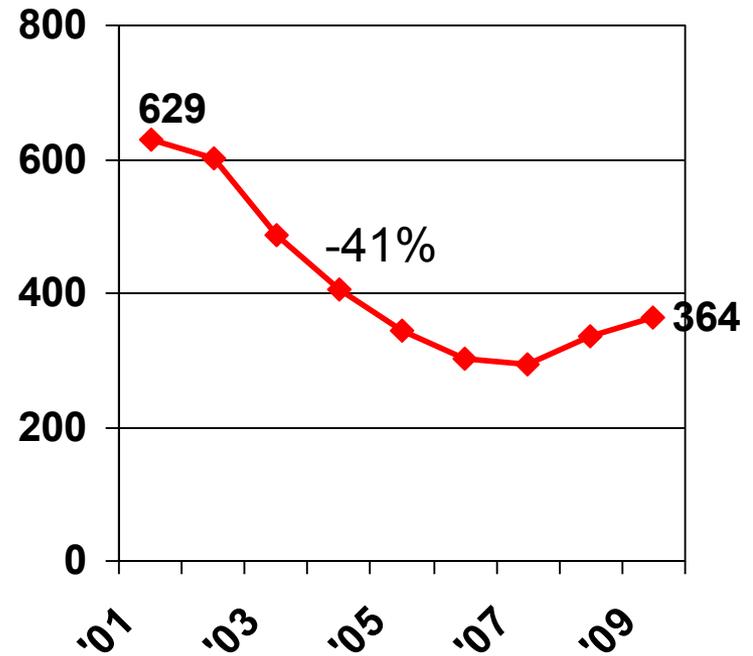
- The pipeline industry has decades of improving standards, technology and expanded regulatory oversight
- Infrequent but high profile accidents prompt more scrutiny:
  - Major incidents in the late-90's resulted in a heightened safety culture awareness for all operators as well as new regulatory mandates based on lessons-learned
  - Operators voluntarily started tracking smaller spills and participating in industry forums to learn from incidents.
- Between 1999 and 2009, failure causes are down for all causes.
- The industry aspires to no accidents.

# Dramatic Improvement: Liquids Pipeline Industry Onshore Pipe Spill Record

**Number of Spills per 1,000 Miles**



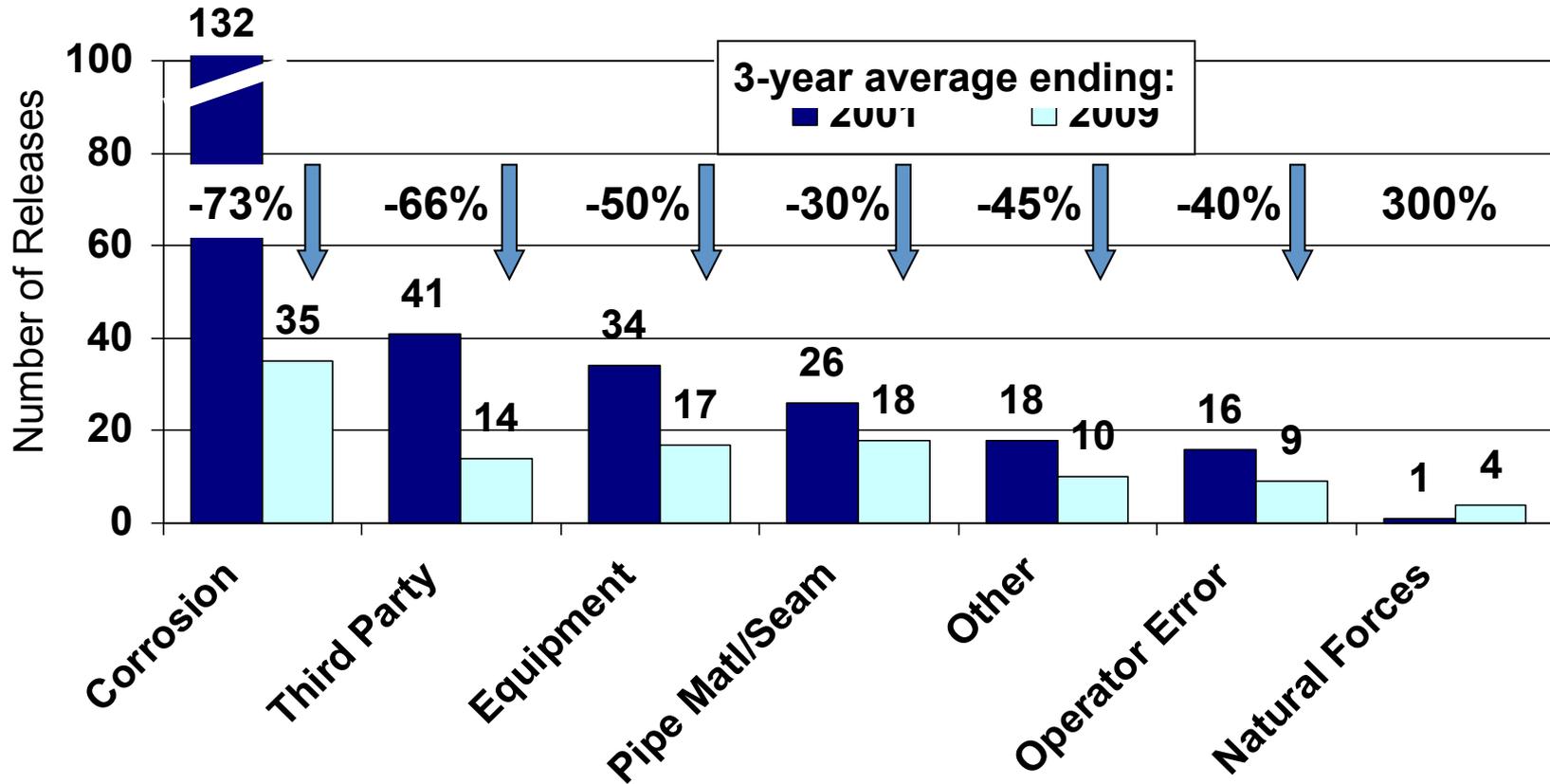
**Barrels Released per 1,000 Miles**



**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.

# Pipeline threats targeted by diverse strategies



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

# Focus on Corrosion

- Largest cause of spills along pipeline routes (45%)
- Reduced by 73% between 1999 and 2009,\* so recent share of spills along pipeline route is 33%
- 56% are less than 5 barrels
- More important in crude oil systems than in refined product systems
- Billions \$ of investment have reduced spills
  - Inspection and repair on both HCA and non-HCA segments
  - First 5-year cycle of integrity assessments is completed
  - 2<sup>nd</sup> cycle now using improved technology, some operators are on their 3<sup>rd</sup> assessment

\*3-year average 1999-2001 v 2006-2009

# Pipeline Infrastructure

- PHMSA has requested information regarding pipeline infrastructure.

Pipe Material	Miles
Bare Steel	3,081
Coated Steel	172,174
Cast Iron	0
Copper	0
Polyethylene	0
Plastic	0

Cathodic Protection → Pipe Material ↓	Cathodically Protected	Not Cathodically Protected
Bare Steel	2,982	99
Coated Steel	171,579	595

- Bare steel represents about 2% of all hazardous liquids pipeline miles.
- Of the 3,081 miles of pipe that are bare, all of it is onshore and 97% is cathodically protected.

# “Fitness for Service” not “Aging Pipe”

- It is not the age of pipe that determines risk; rather, the operating conditions, monitoring, maintenance and care of the asset.
  - Varying operating conditions, soil types, geography, material quality, and other factors greatly impact pipe management.
- Important to focus on root-causes and trends to avoid distracting resources
- Pipelines are an asset and maintaining reliable, economic and safe service is vital
- Therefore, determining a pipe segment’s “fitness for service” is a more constructive focus for our shared path forward toward goal of zero releases and zero impacts to the public and the environment.

# Time Dependent Statistics

- The industry record on “time dependent” causes (those that occur or worsen over time):
  - Releases due to time-dependent causes **were reduced by 36%** between 2002 and 2009;
  - Large releases (50 barrels or more) due to time-dependent causes **were reduced even faster --by 50%** -- between 2002 and 2009;
  - Releases due to time-dependent causes and originating from pipe installed before 1950 **were reduced faster still -- by 83%** -- between 2002 and 2009;
  - Releases due to causes other than time-dependent causes **were reduced by 37%** between 2002 and 2009, demonstrating that operators are managing the full array of threats.

# Management of Material Threats

- Industry has increased focus on pipe seam failures.
  - No single dominant cause of seam failures has been identified, but is focusing on more in-depth assessment and cause-analysis.
- Industry has a mechanism to address current and future concerns with seam issues.
  - Some mechanisms of seam failures are better understood than others.
  - More investigation and improved technology in this area should continue to be pursued.
  - Significant investment in R&D will continue.
    - Strategy and shared-funding with PHMSA.

# Continued Focus on Excavation Damage

- Excavation or other mechanical damage has a significant impact on public safety and the environment.
- Diverse third parties (“them”) but can't forget first and second parties (“us” – operator or its contractor).
- Not the greatest number, but the highest consequence:
  - 90% occur along ROW
  - Only 7% of incidents overall, BUT
    - 15% of incidents on the ROW and 35% of incidents of 50 barrels or more on the ROW
    - 58% of fatalities; 38% of injuries
    - 38% of incidents with explosion

Source: PPTS, 1999-2009

# Management of Pipeline Threats

- Petroleum pipelines are a vital asset to our nation.
- The safety record has improved dramatically over recent decades.
- But we have more to do:
  - Improved assessment technology.
  - Ongoing investments to assure “fitness for purpose.”
- Shared focus by industry, regulators and the public:
  - Reducing time-dependent causes;
  - Ongoing improvements in damage prevention;
  - Continued attention on avoiding operator error.
- Industry takes its responsibility seriously.

- Improvement in the Hazardous Liquids record; More to do.
- Asset Management --- NOT Age
- Various threats identified over time:
  - Includes lack of fusion, cracks, excavation, corrosion, etc.
- Continuing to work of solutions for those things unaddressed.
  - New manufacturing methods, careful management, better crack tools, public awareness, ILI, corrosion mitigation
- Need to continue to focus on these areas to learn and improve.