U.S. DOT
Pipeline and Hazardous Materials Safety Administration

Metrics

Washington, DC

August 25, 2015
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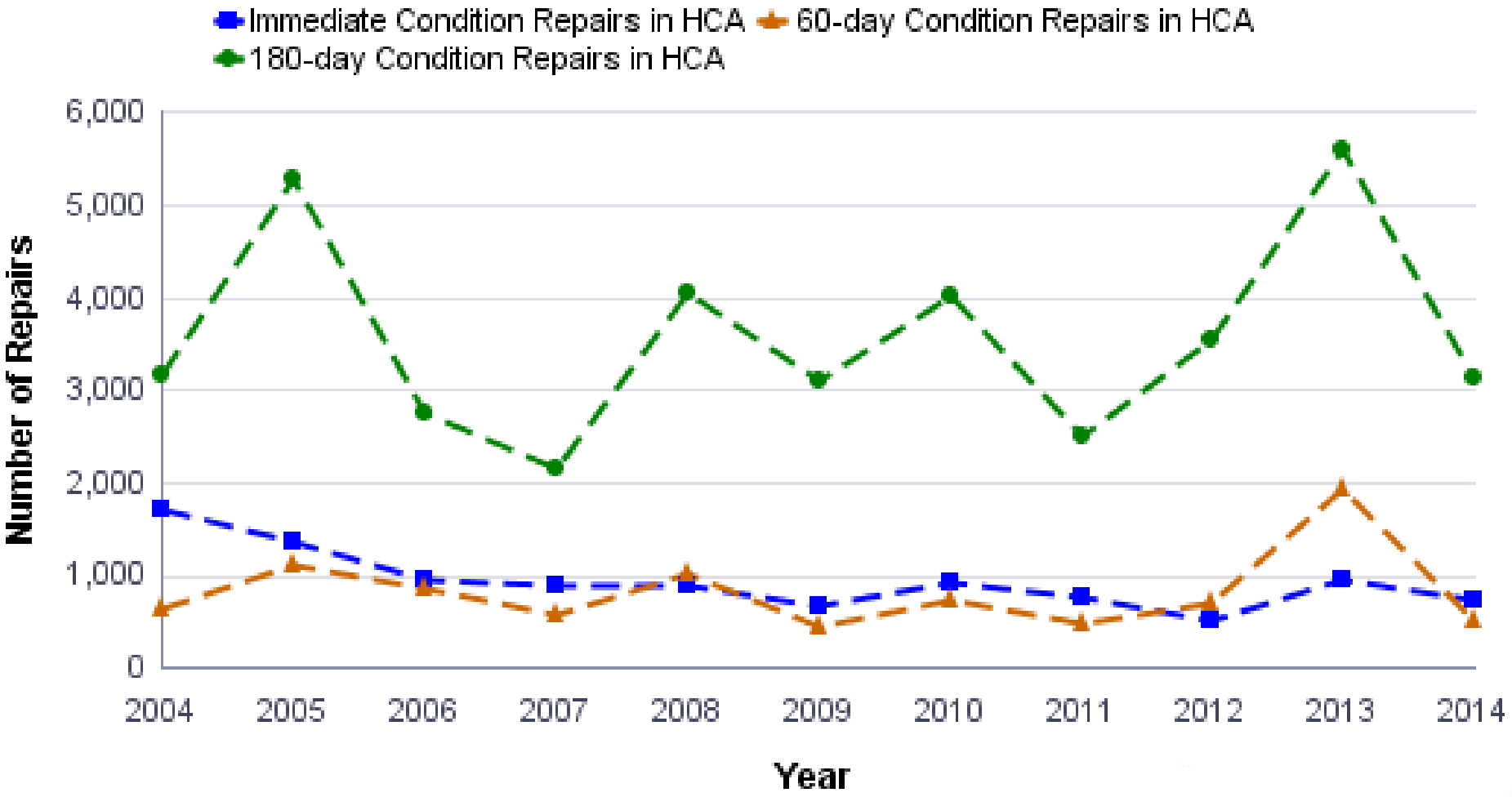
811 Know what's below. Call before you dig.

Metrics – The Good, The Bad and The Ugly

- Well chosen metrics serve as a guide and provide insight.
- Poorly chosen metrics can:
  - Can mislead or misinform
  - Can waste resources
- Understanding context is critical!

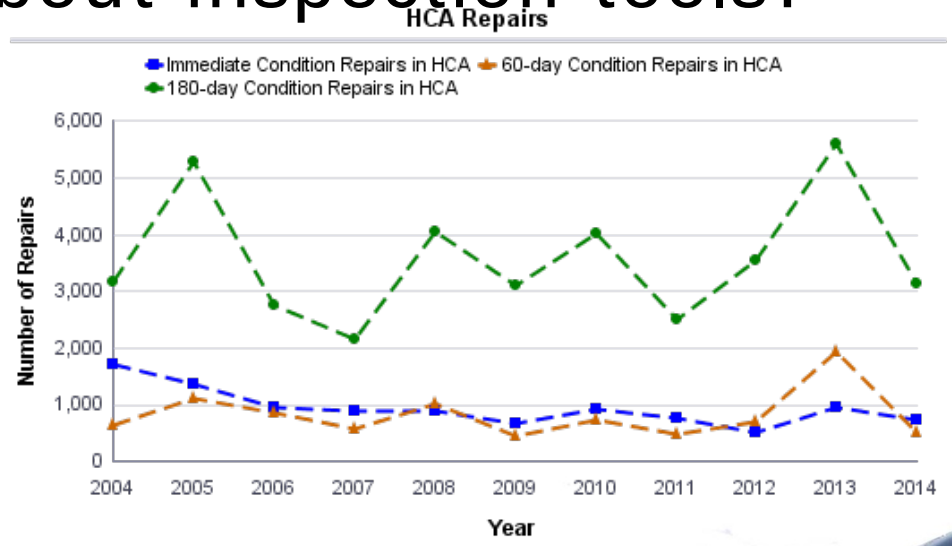
Hazardous Liquid

HCA Repairs

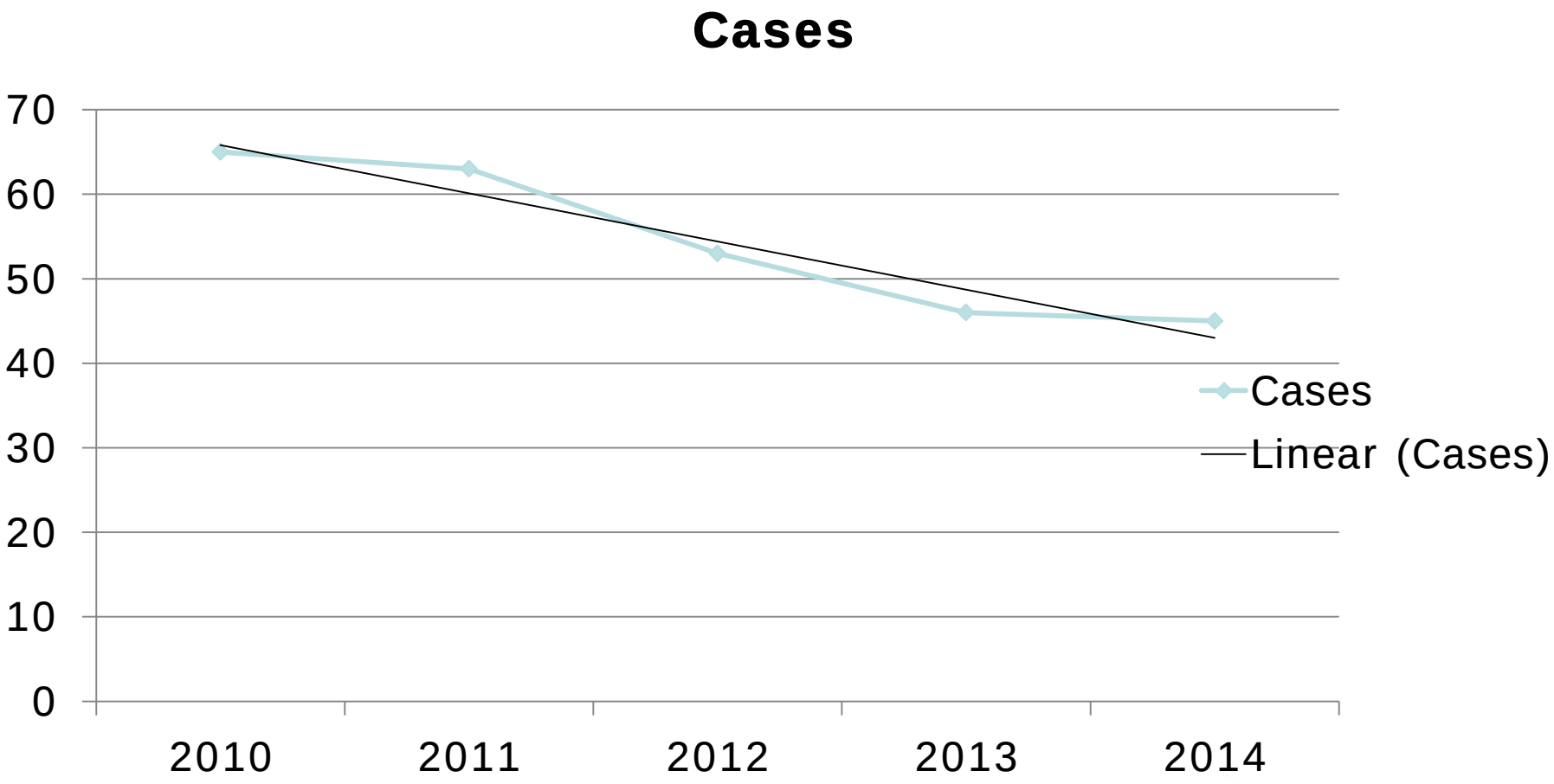


What Does the Public See?

- What does this chart tell us about the pipeline infrastructure?
- Shouldn't repairs be dropping to zero?
- What does it tell us about inspection tools?



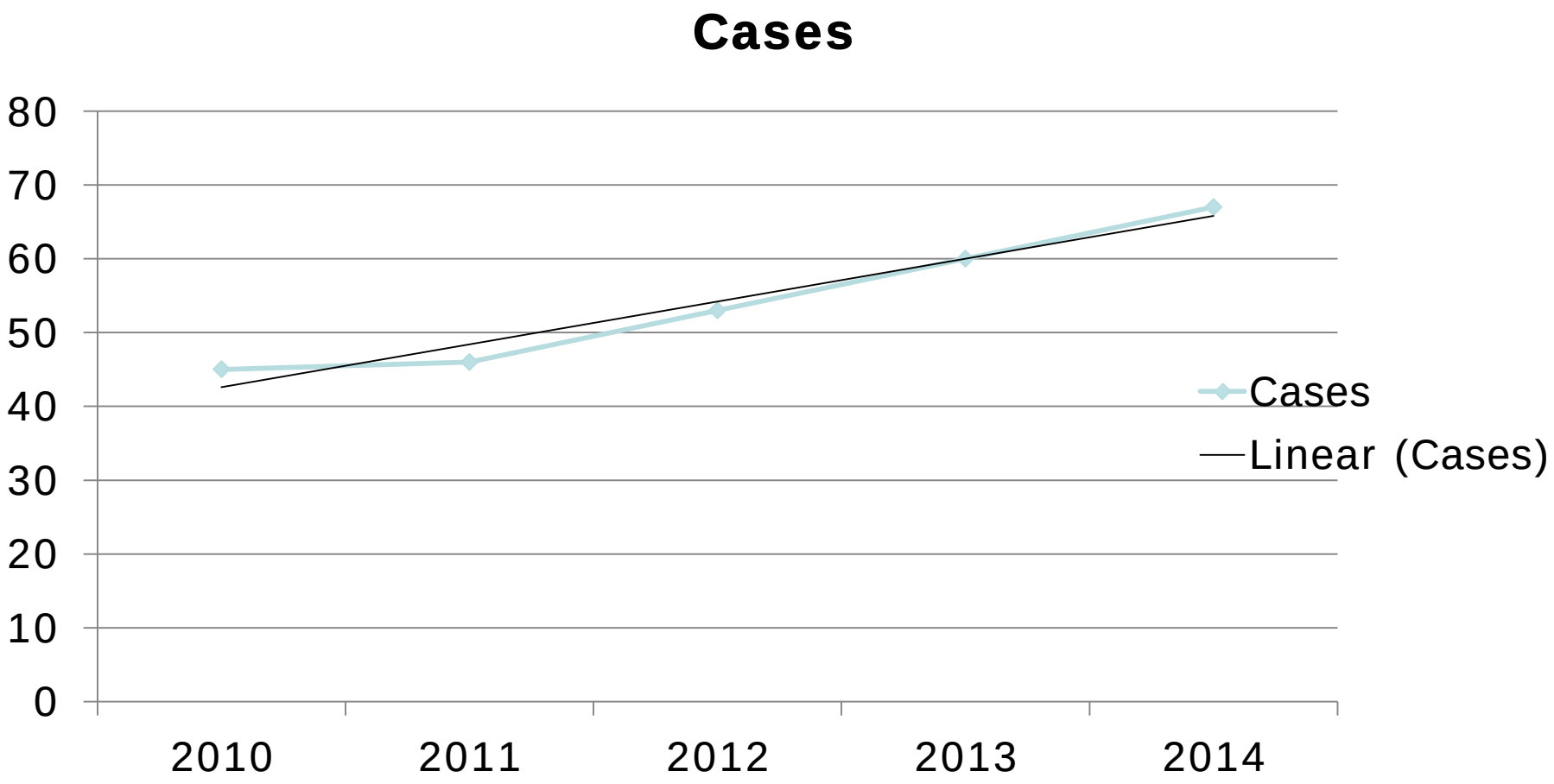
Enforcement Case Metrics



Meaningful Metrics?

Does an overall decrease in the number of enforcement cases mean:

- Pipeline companies are more compliant?
- Inspectors are less thorough?
- Inspections are taking longer, so there are fewer cases generated?


Cases
80
70
60
50
40
30
20
10
0
2010
2011
2012
2013
2014
Cases
Linear (Cases)

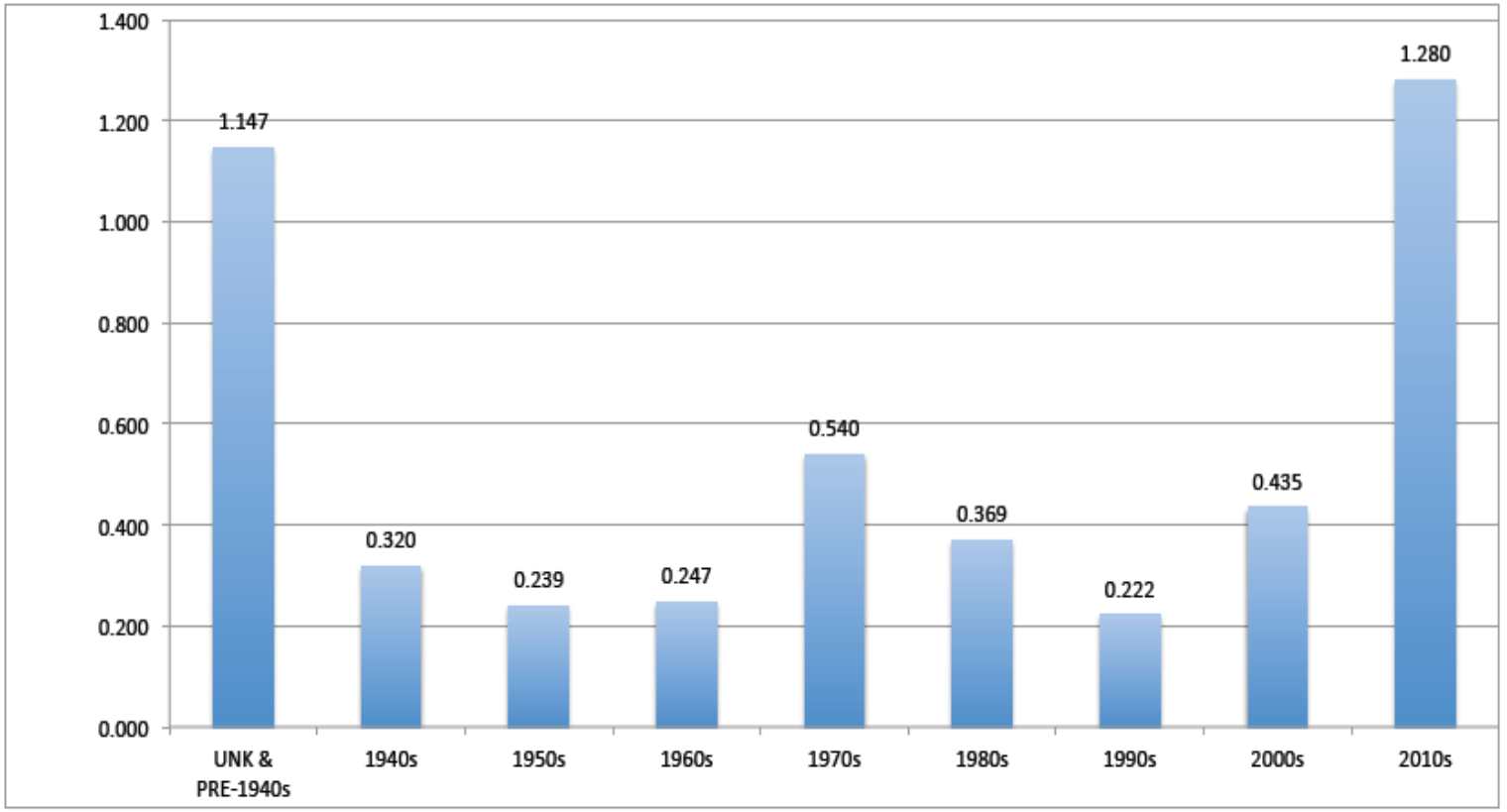
Meaningful Metrics?

Does an overall increase in the number of enforcement cases mean:

- Pipeline companies are less compliant?
- Inspectors are more thorough?
- Inspections are taking longer, so multiple cases are being generated?

Is this chart meaningful?

 # INCIDENTS per 1,000 MILES OF GAS TRANSMISSION PIPELINE BY DECADE OF PIPE INSTALLED (AVG of ANNUAL INCIDENTS 2002-2012)



Sources:

Mileage data from PHMSA GT Annual Reports, 2002-2012 (B3TON+OFF data series for 2002-2009; PART J(T) data series for 2010-2012)

2002-2009 incident data from PHMSA Incident Reports <incident_gas_transmission_gathering_2002_dec2009> count of total # records by year, filtered by various installation decade ranges (PRTYR)

2010-2012 incident data from PHMSA Incident Reports <incident_gas_transmission_gathering_jan2010_present> count of total # record by year, filtered by various pipe installation decade ranges (INSTALLATION_YEAR)

Metrics – Uncovering Clues

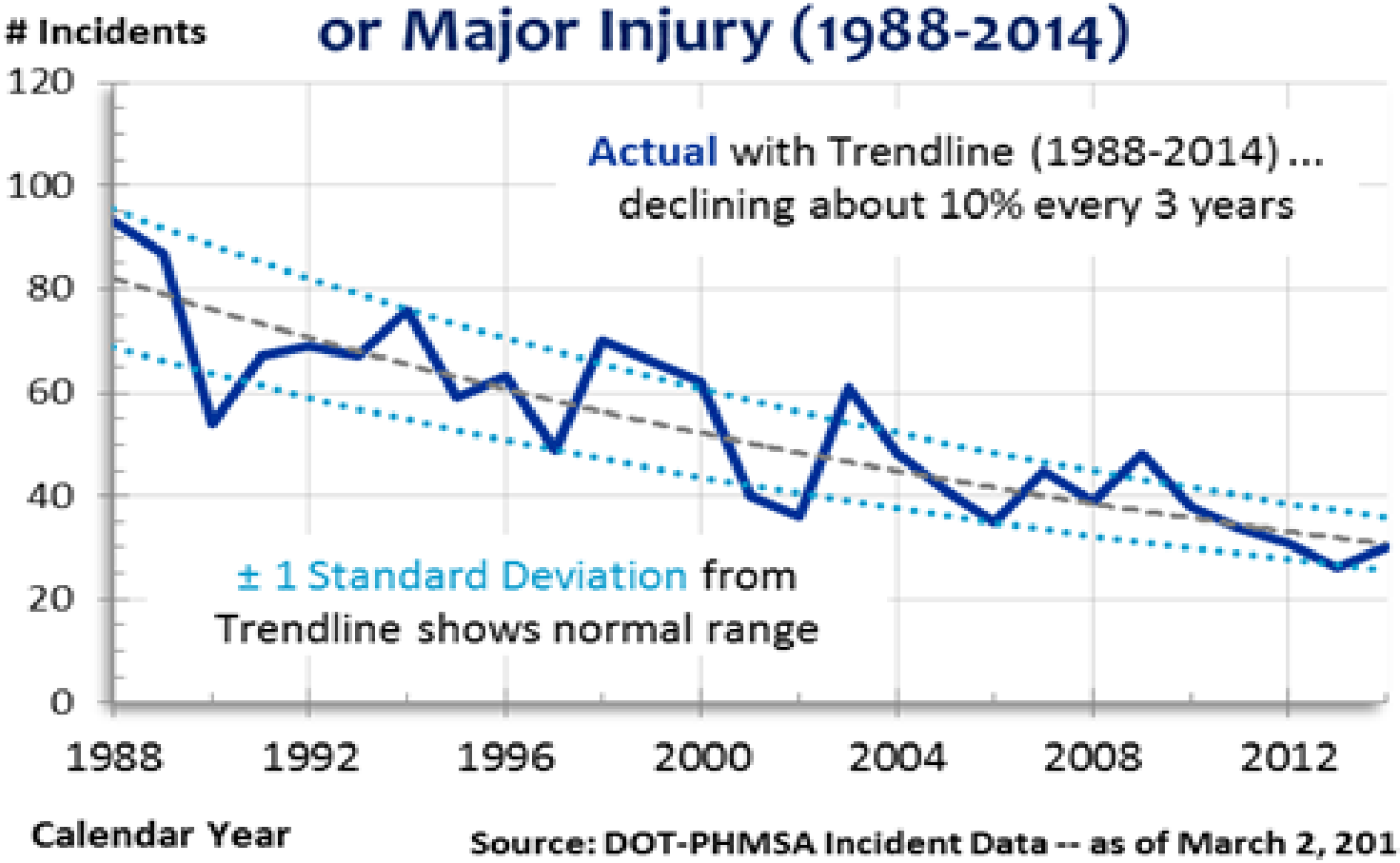
- Construction
  - A lot of construction inspections & a lot of time on site
  - Anecdotal stories of what inspectors were finding
  - Not a lot of major cases???

Metrics – Uncovering Clues

- Construction
  - More Warning Letters, Notices of Amendment than NOPV & Compliance Orders or Civil Penalties
  - Why?
    - Warning Letters and NOA are quicker to issue – safety impact is almost immediate.
    - NOPV & Compliance Orders & Civil Penalties – broader impact but time delayed.
  - Identified Issue – Working on a solution.

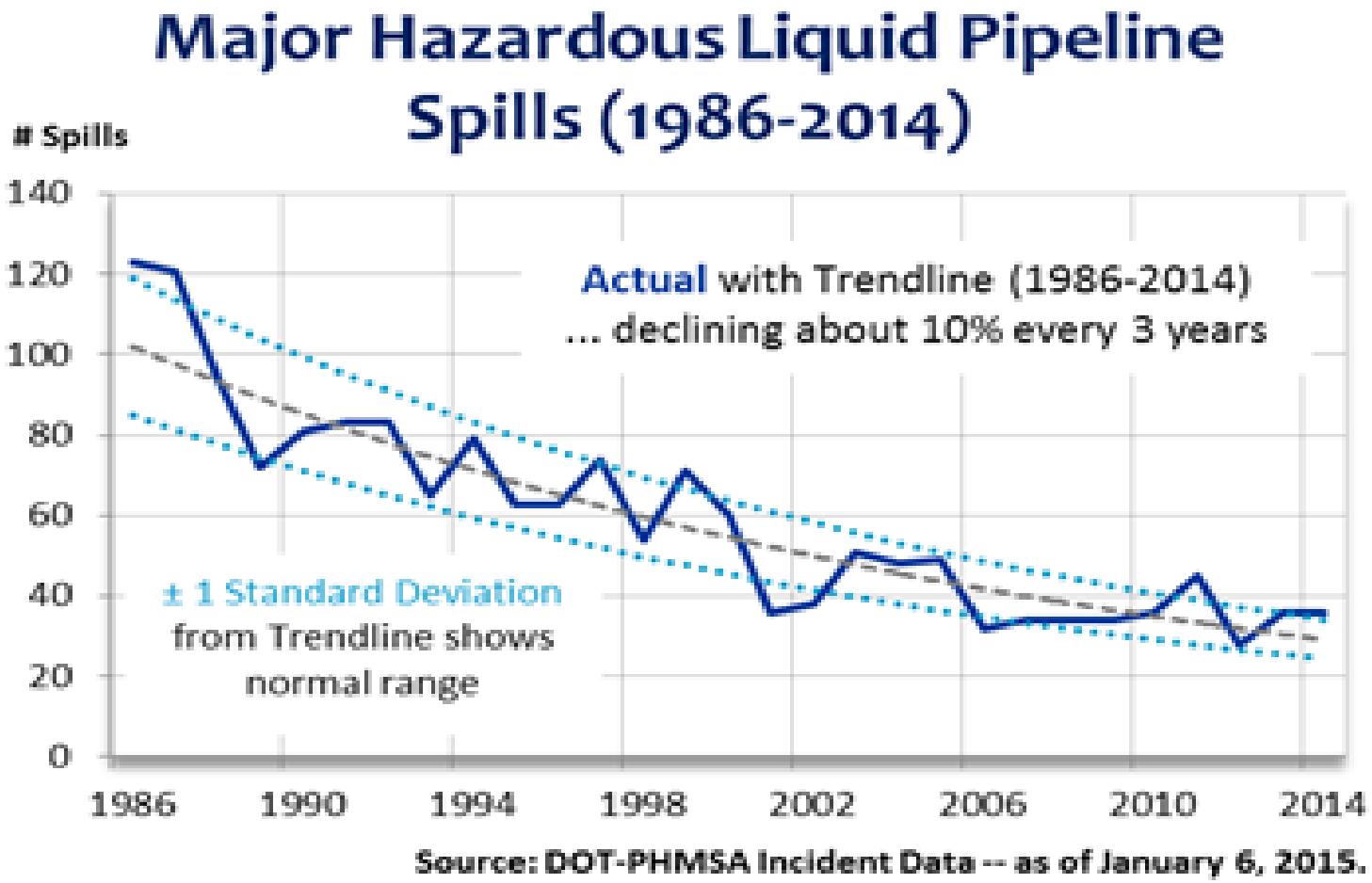
A Favorite

Pipeline Incidents with Death or Major Injury (1988-2014)



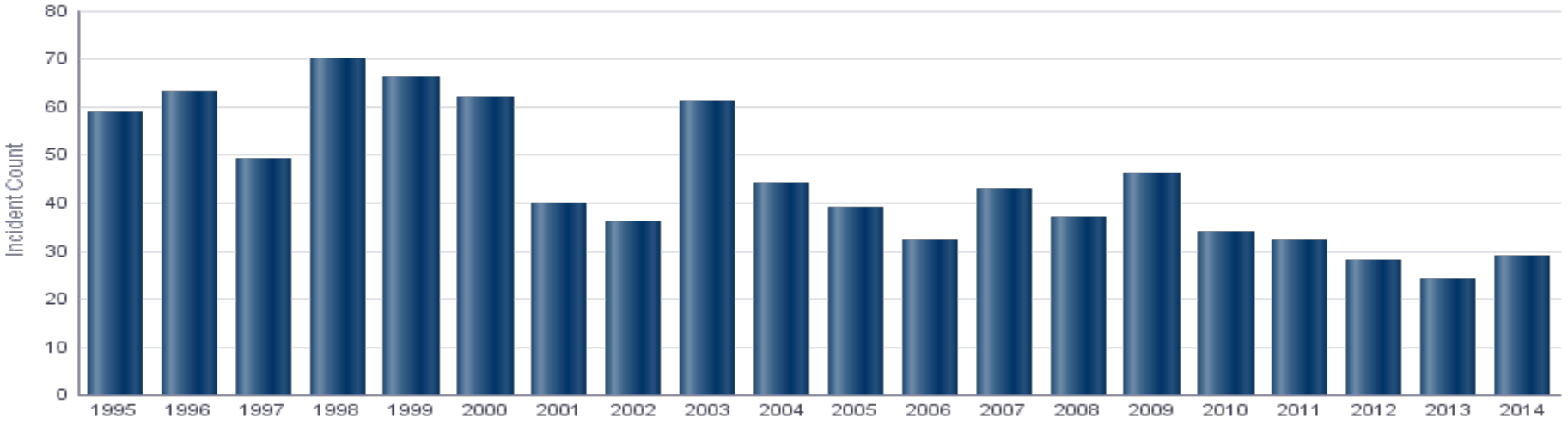
Source: DOT-PHMSA Incident Data -- as of March 2, 2015.

A Favorite


Major Hazardous Liquid Pipeline Spills (1986-2014)
Spills
140
120
100
80
60
40
20
0
1986
1990
1994
1998
2002
2006
2010
2014
Actual with Trendline (1986-2014)
... declining about 10% every 3 years
± 1 Standard Deviation
from Trendline shows
normal range
Source: DOT-PHMSA Incident Data -- as of January 6, 2015.

Serious Incidents

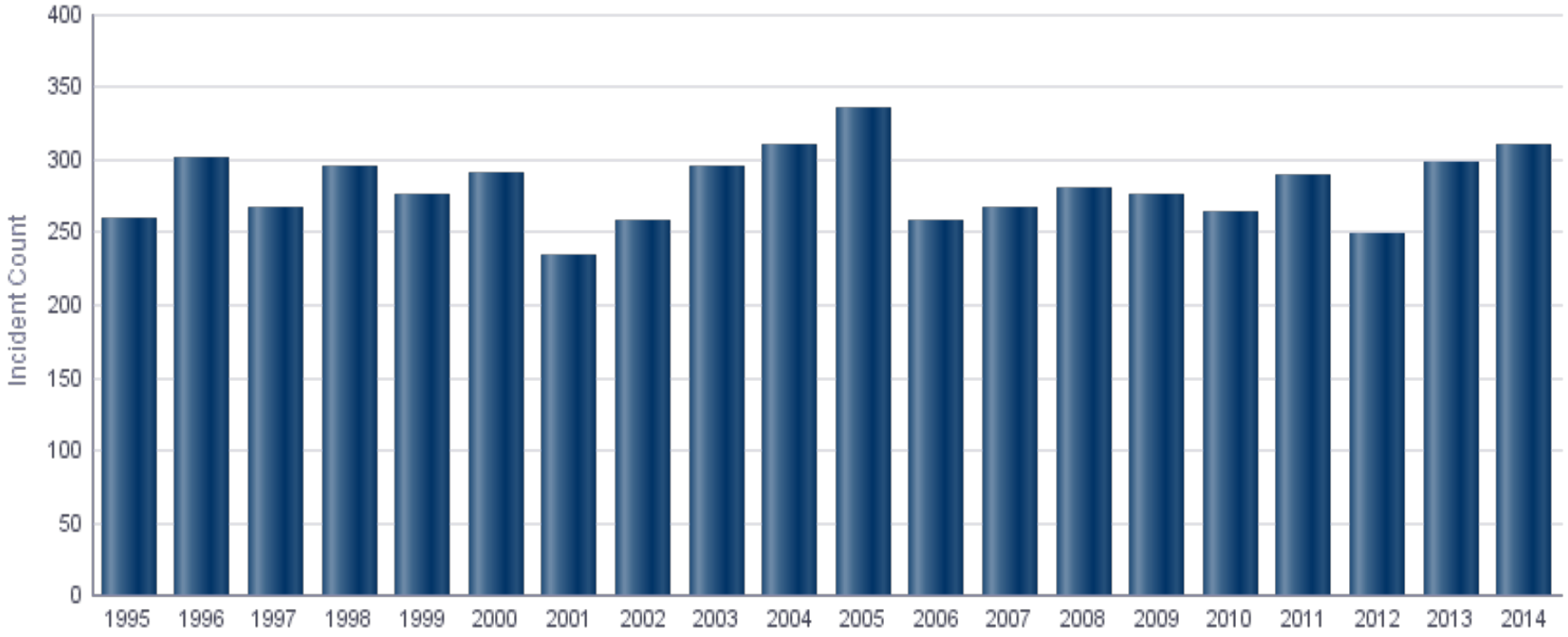
All System Types



data as-of 2/2/2015

Significant Incidents

All System Types



data as-of 5/18/2015

Transparency – Blessing and Curse

- The World is Watching and Judging both Industry and Regulator Performance.
- Transparency – especially with metrics is a very good thing. And a very scary thing.
  - The public has a right to know.
  - Everyone is an expert? We must provide context along with all data and metrics.
  - Sometimes clear sight requires distance.

Task: Identify 6-12 metrics that will reflect the performance of the national pipeline infrastructure (and the regulator).

Status

- Various stakeholder input
- Metrics identified – not a consensus in all cases
  - Some tweaking still going on.
- Context/verbal descriptions of most/all metrics will be provided
- Gas Team metrics completed and in demo stage in Pipeline Data Mart
- Liquid Team metrics being created in Oracle for Pipeline Data Mart
- Will be available by OpID and Safety Program Relationship
- **NEW METRICS DO NOT DISPLACE OTHER, EXISTING METRICS!**

Gas Distribution Performance Metrics

- *Serious Incidents per million Miles* trend line
- *Serious Incident Cause* pie chart
- *Significant Incidents per million Miles* three trend lines: All Significant, Significant with Evacuation, and Significant with Public Property Damage
- *Leaks per 1,000 Miles* three trend lines: Hazardous Leaks Eliminated, Leaks Eliminated, and Leaks Scheduled for Repair
- *Excavation Damage* two trend lines: Significant Incidents and Damages per 1,000 Tickets
- *Cast and Wrought Iron* two trends: Main Miles and Service Count
- *Steel Miles – Bare and Unprotected* three trend lines: Bare Miles, Unprotected Miles, and Unprotected Coated Miles
- *Miles by Decade Installed* six trend lines: Unknown Decade, pre-1940, 1940s, 1950s, 1960s, 1970s and forward

Gas Transmission Performance Metrics

- *Serious Incidents per 1,000 Miles* trend line
- *Serious Incident Cause* pie chart
- *Onshore Significant Incidents per 1,000 Miles* three trend lines: All Significant, Significant with Evacuation, and Significant with Public Property Damage
- *Onshore Significant Incidents per 1,000 Miles* two trend lines: HCA and non-HCA
- *Onshore Significant Incident Cause* two pie charts: HCA and non-HCA

Gas Transmission Performance Metrics

- *HCA Immediate Repairs per 100 HCA Miles Assessed* trend line
- *HCA Leaks* two trend lines: ILI Detectable and ILI non-Detectable
- *Steel Miles – Bare and Unprotected* three trend lines: Bare Miles, Unprotected Miles, and Unprotected Coated Miles
- *Miles by Decade Installed* six trend lines: Unknown Decade, pre-1940, 1940s, 1950s, 1960s, 1970s and forward
- *Onshore Significant Incident Rates per Decade Pipeline Failures per 1,000 Miles*

- **Hazardous Liquid (excluding CO2) Performance Metrics**
- *Serious Incident* trend line
- *Fatality and Injury* two trend lines: Fatalities and Injuries
- *Pipeline Right-of-Way Accidents Impacting People or Environment* two trend lines: Accidents per 1,000 Miles and Barrels Spilled per billion Barrel-Miles
- *Integrity Inspection Targets for Pipeline Right-of-Way Accidents Impacting People or Environment* two trend lines: Accidents per 1,000 Miles and Barrels Spilled per billion Barrel-Miles
- *Operations and Maintenance Targets for Pipeline Right-of-Way Accidents Impacting People or Environment* two trend lines: Accidents per 1,000 Miles and Barrels Spilled per billion Barrel-Miles
- *Miles Inspected* seven trend lines: ILI Corrosion Tool, ILI Dent Tool, ILI Crack Tool, ILI Other Tool, Pressure Test, ECDA, Other Method

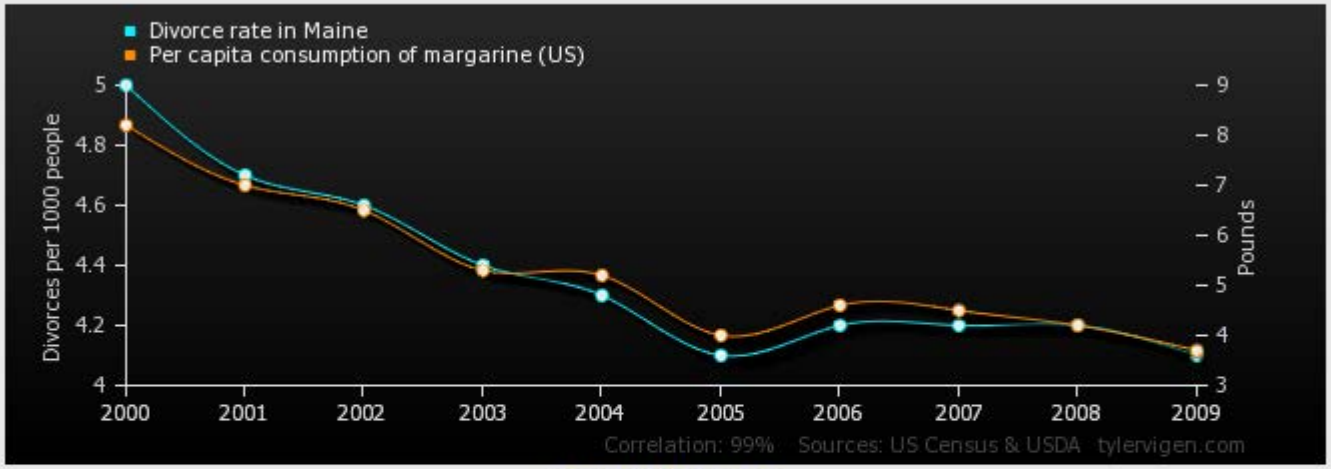
And One Last Thing…

Correlation is NOT Causation

Divorce rate in Maine

correlates with

Per capita consumption of margarine (US)



Upload this chart to imgur

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Divorce rate in Maine *Divorces per 1000 people (US Census)*	5	4.7	4.6	4.4	4.3	4.1	4.2	4.2	4.2	4.1
Per capita consumption of margarine (US) *Pounds (USDA)*	8.2	7	6.5	5.3	5.2	4	4.6	4.5	4.2	3.7

Correlation: 0.992558

Permalink - Mark as interesting - Not interesting

- From “Spurious Correlations” at http://www.tylervigen.com/

Thank you

811
Know what's below.
Call before you dig.

DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

Categories of Incident Reports

All Reported – everything operators report

Serious – fatality or injury requiring in-patient hospitalization, but **Fire First** excluded. **Fire First** are gas distribution incidents with a cause of "Other Outside Force Damage" and sub-cause of "Nearby Industrial, Man-made, or Other Fire/Explosion"

Significant include any of the following, but **Fire First** excluded:

1. Fatality or injury requiring in-patient hospitalization
2. $50,000 or more in total costs, measured in 1984 dollars
3. Highly volatile liquid (HVL) releases of 5 barrels or more
4. Non-HVL liquid releases of 50 barrels or more
5. Liquid releases resulting in an unintentional fire or explosion