U.S. DOT
Pipeline and Hazardous Materials Safety Administration

August 29, 2019

William (Bill) Lowry, PE
Community Liaison

Today's Agenda

- Performance Measures/ Data & Statistics
- Pipeline Safety Research Development & Technology: Competitive Academic Agreement Program (CAAP)
- Risk Based Inspection Process
- Pipeline Technical Resources & other web resources

PHMSA Regulated Pipeline Facilities
OPS and States

Pipeline Facilities by System Type				
System Type		**Miles**	**% Miles**	**# Operators**
Hazardous Liquid	CY 2017	**215,817 8,118 Tanks**	**8%**	**531**
Gas Transmission	CY 2018	**301,147**	**11%**	**1,045**
Gas Gathering	CY 2018	**17,556**	**1%**	**344**
Gas Distribution	CY 2018	**2,234,528**	**80%**	**1,283**

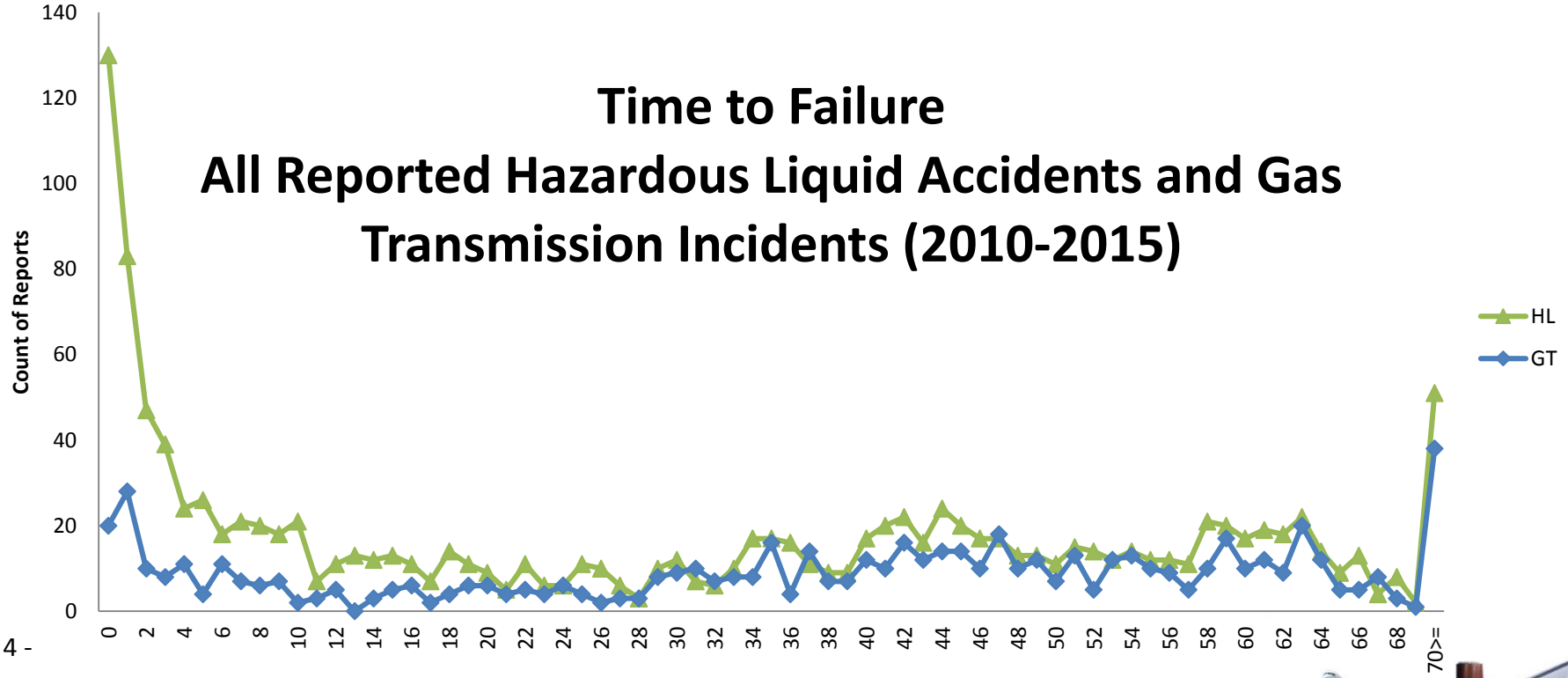
Total Miles	**2,769,048**

Liquefied Natural Gas CY 2018	**157 Plants, 228 Tanks, 86 Operators** **Plants - 27 Interstate and 130 Intrastate**
Underground Natural Gas Storage CY 2018	**397 Facilities, 451 Reservoirs** **17,281 Wells, 124 Operators** **Facilities - 221 Interstate and 176 Intrastate**

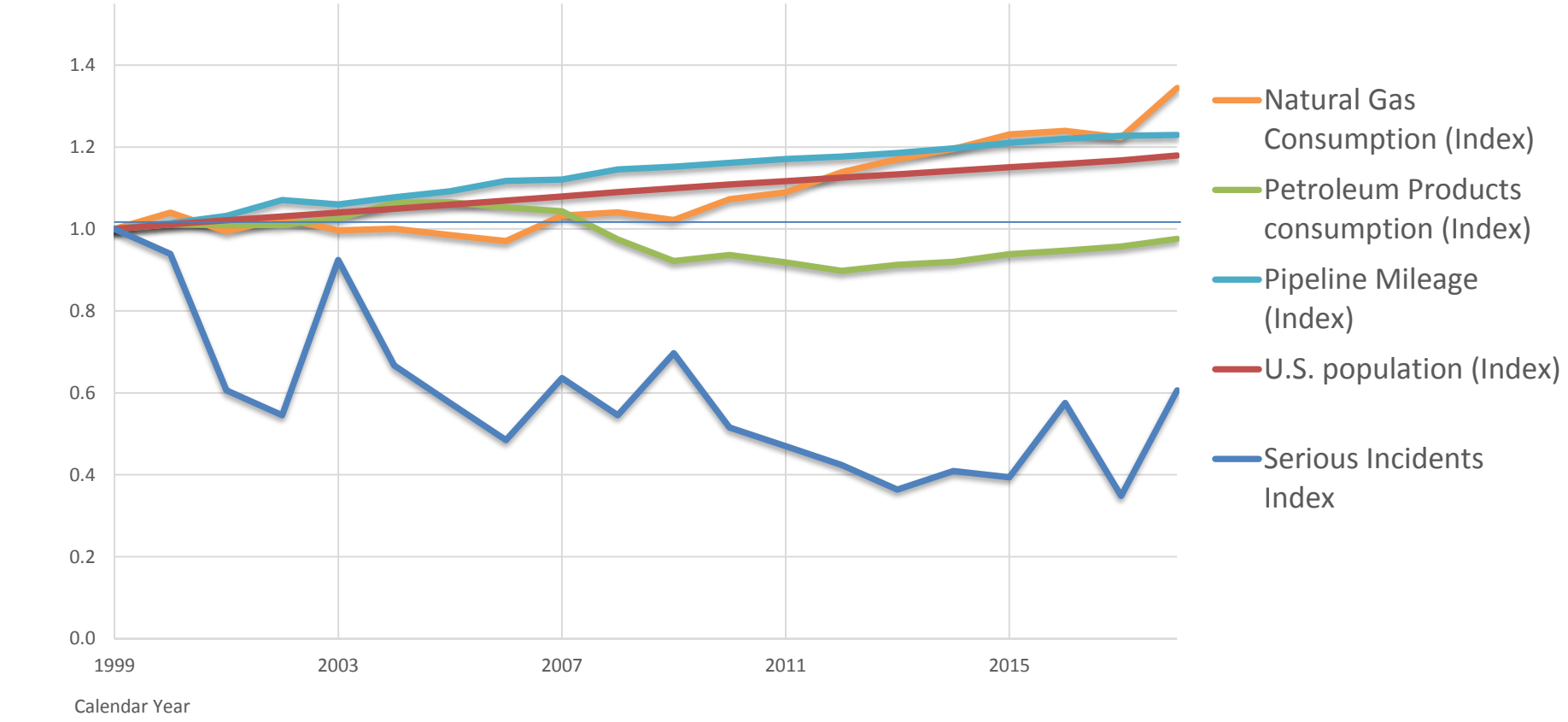
data as-of 3-27-2019

Today's Environment

- Aging infrastructure
- Expanding new infrastructure



Pipeline Serious Incidents with Context Measures (1999-2018)



Data Sources: Energy Information Administration, Census Bureau, PHMSA Annual Report Data, PHMSA Incident Data - as of 03/18/2019
EIA data preliminary for 2018

Data and Statistics

The data and statistics are publicly available at:

https://www.phmsa.dot.gov/data-and-statistics/pipeline/data-and-statistics-overview

Performance Measurement

https://www.phmsa.dot.gov/data-and-statistics/pipeline/national-pipeline-performance-measures

Data and Statistics

https://www.phmsa.dot.gov/data-and-statistics/pipeline/data-and-statistics-overview

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PHMSA
Pipeline and Hazardous Materials Safety Administration

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Home » Data and Statistics » Pipeline

- Data and Statistics Overview
- Pipeline Operator Safety Program Data
- National Pipeline Performance Measures
- State Pipeline Performance Measures
- Pipeline Replacement Updates
- Federal Enforcement Transparency
- Operator Information
- National Pipeline Mapping System

Data and Statistics Overview

PHMSA's Office of Pipeline Safety (OPS) provides a variety of data about federally-regulated and state-regulated natural gas pipelines, hazardous liquid pipelines, and liquefied natural gas (LNG) plants. The operators of these pipeline facilities report this data in accordance with Part 191 and Part 195 of PHMSA's pipeline safety regulations. PHMSA provides downloads of the raw data, yearly summaries, multi-year trends of safety performance metrics, and inventories tracking the removal of aging and other higher-risk infrastructure.

Frequently Requested Data

Pipeline Mileage and Facilities

Pipeline Incident Flagged Files

Contact Us

Pipeline Data and Statistics
U.S. Department of Transportation,
Pipeline and Hazardous Materials Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
United States
PHMSAPHPDataandStatistics@dot.gov

Phone: 202-366-4595

Business Hours:
9:00am-5:00pm ET, M-F

100%

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

"To protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives."

Data and Statistics Overview
Pipeline Operator Safety Program Data
National Pipeline Performance Measures
State Pipeline Performance Measures
Pipeline Replacement Updates
Federal Enforcement Transparency
Operator Information
National Pipeline Mapping System

SERIOUS INCIDENT 20 YEAR TREND – Serious Incidents include a fatality or injury requiring in-patient hospitalization. From 2004 forward, gas distribution incidents caused by a nearby fire or explosion that impact the pipeline system are excluded.

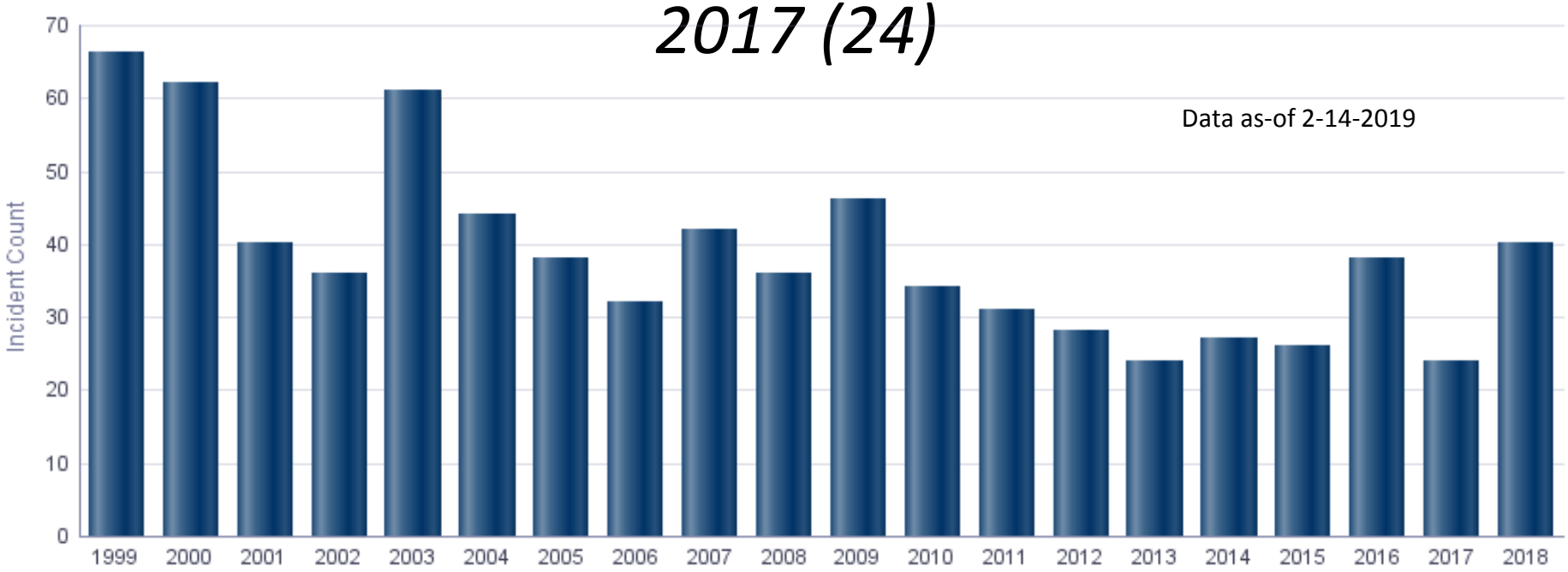
SIGNIFICANT INCIDENT 20 YEAR TREND - Significant incidents are those including any of the following conditions, but gas distribution incidents caused by a nearby fire or explosion that impacted the pipeline system are excluded:

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

ALL REPORTED INCIDENT 20 YEAR TREND - Includes all reports

Serious Incidents

Serious incidents in 2018 (40) increased 67% from 2017 (24)



40 in CY 2018

90%	Gas Distribution	7.5%	Gas Transmission
2.5%	Hazardous Liquid	0%	LNG, Gas Gathering, Underground Natural Gas Storage

2018 Serious Incidents by Cause

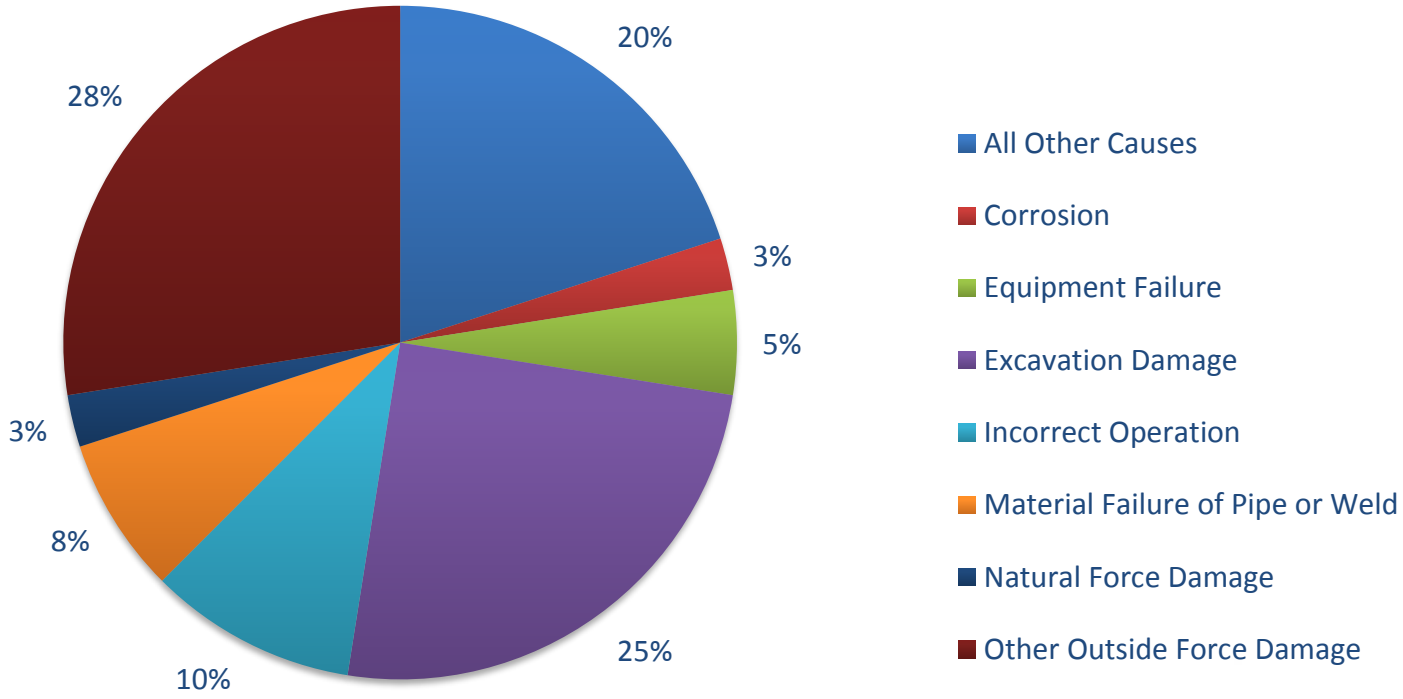
CY 2018 Leading Causes:

Other Outside Force Damage

Excavation Damage

All Other Causes

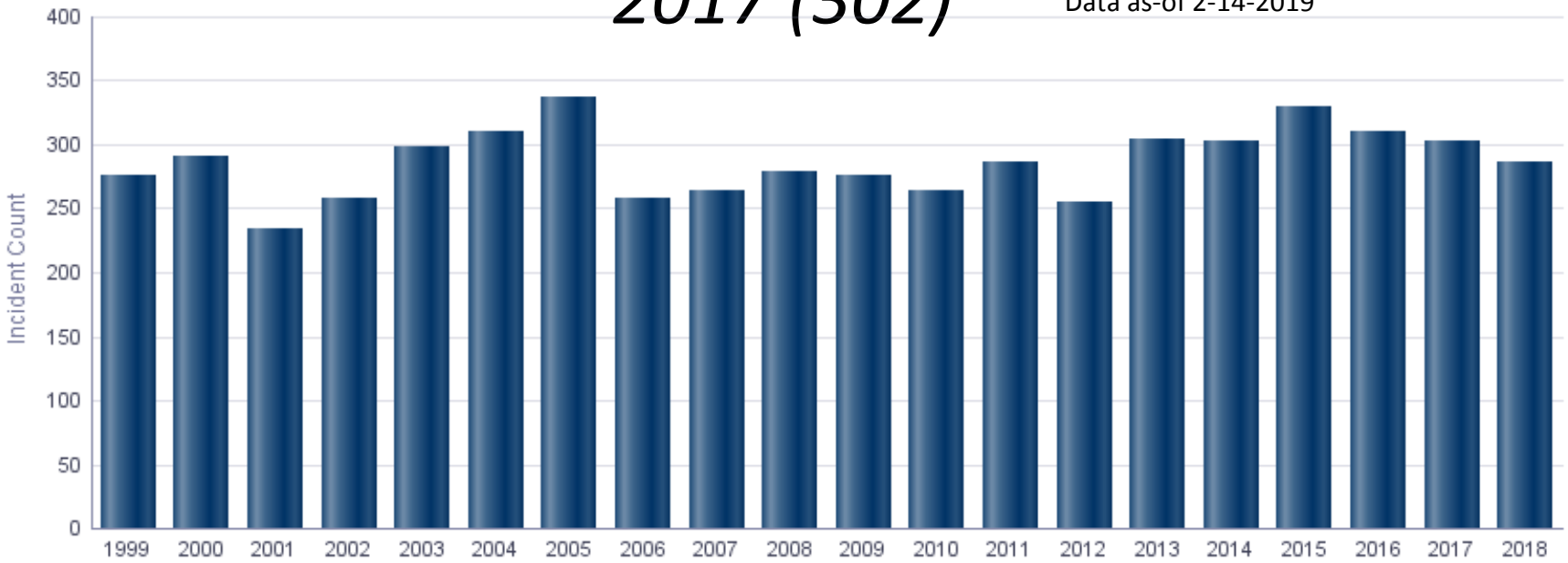
data as-of 3-1-2019



Significant Incidents

Significant Incidents in 2018 (285) declined 6% from 2017 (302)

Data as-of 2-14-2019



285 in CY 2018

26%	Gas Distribution	<1%	Gas Gathering
21%	Gas Transmission	52%	Hazardous Liquid
<1%	LNG	<1%	Underground NG Storage

2018 Significant Incidents by Cause

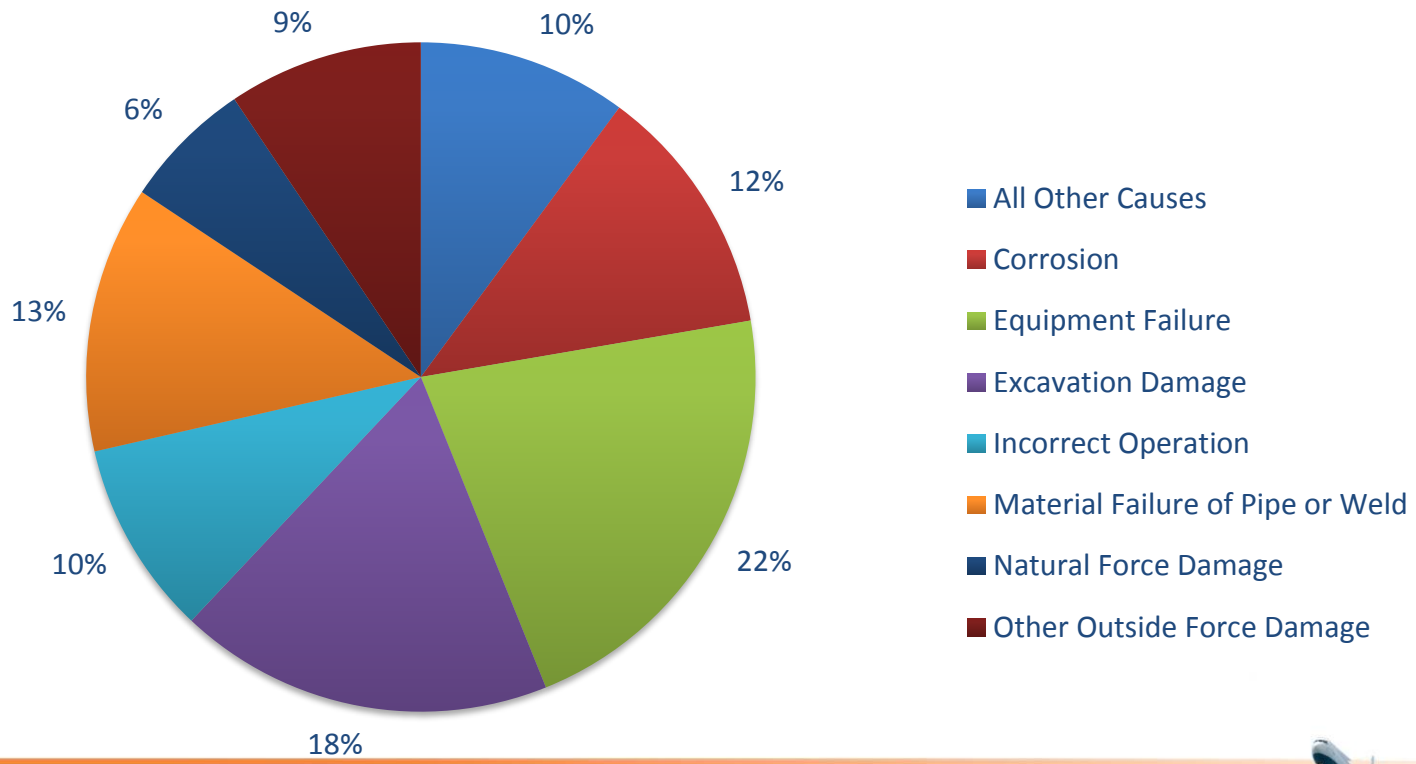
CY 2018 Leading Causes:

Equipment Failure

Excavation Damage

Material Failure of Pipe or Weld

data as-of 3-1-2019



Gas Distribution Serious Incidents

All System Types
Increased in 2018

Gas Distribution
Increased in 2018

data as-of 2-14-2019

Gas Distribution Serious Incidents

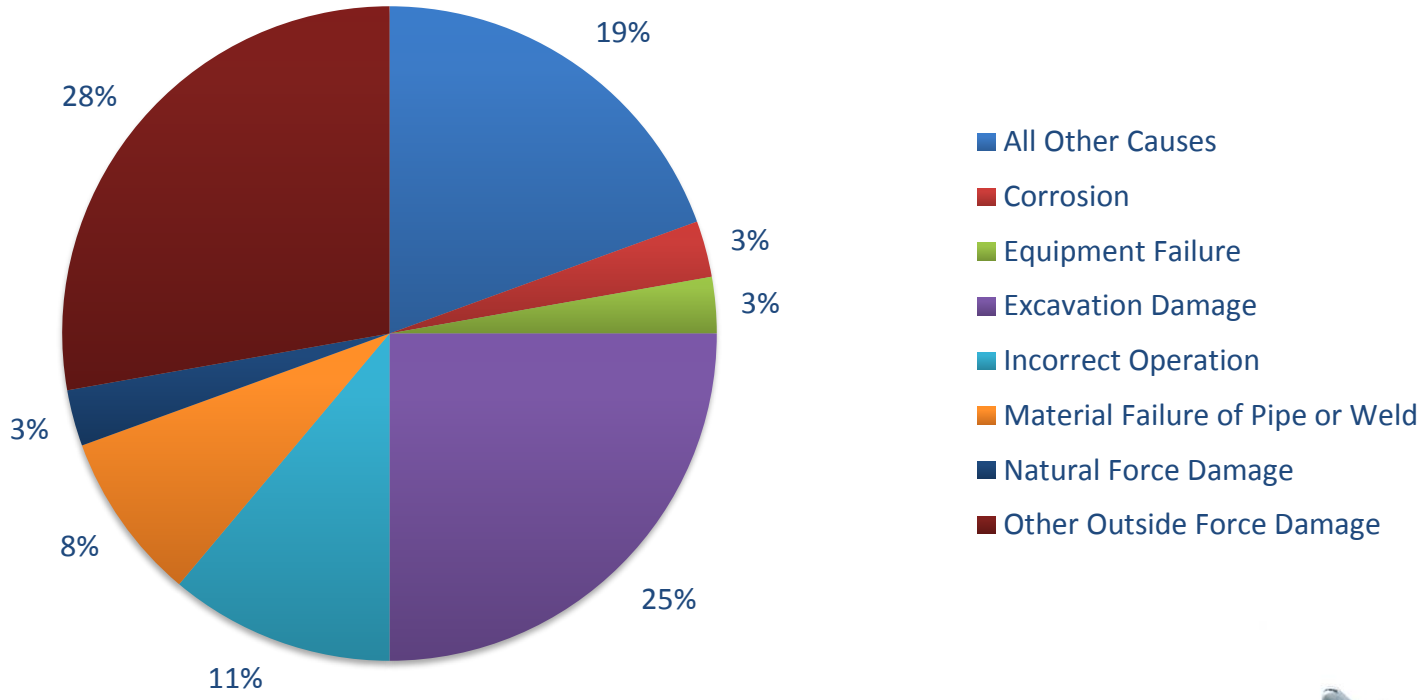
CY 2018 Leading Causes:

Other Outside Force Damage

Excavation Damage

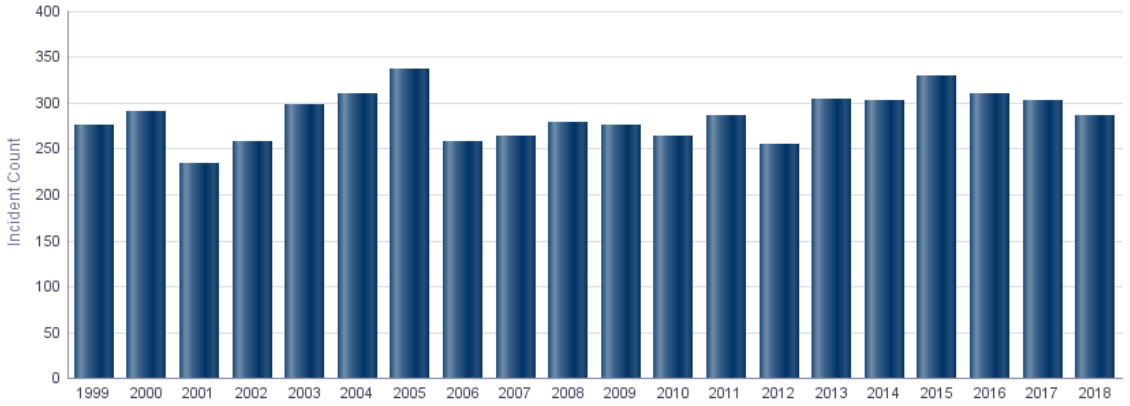
All Other Causes

data as-of 3-1-2019



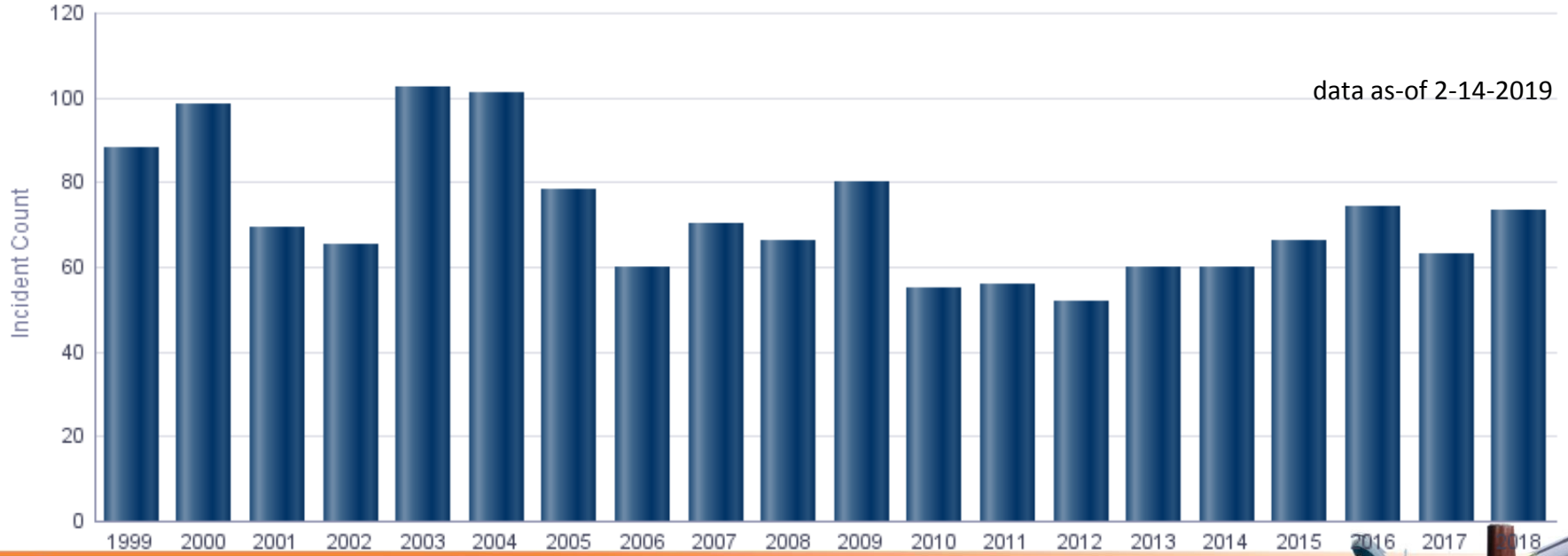
Gas Distribution Significant Incidents

All System Types
Decreased in 2018



Gas Distribution
Increased in 2018

data as-of 2-14-2019



Gas Distribution Significant Incidents

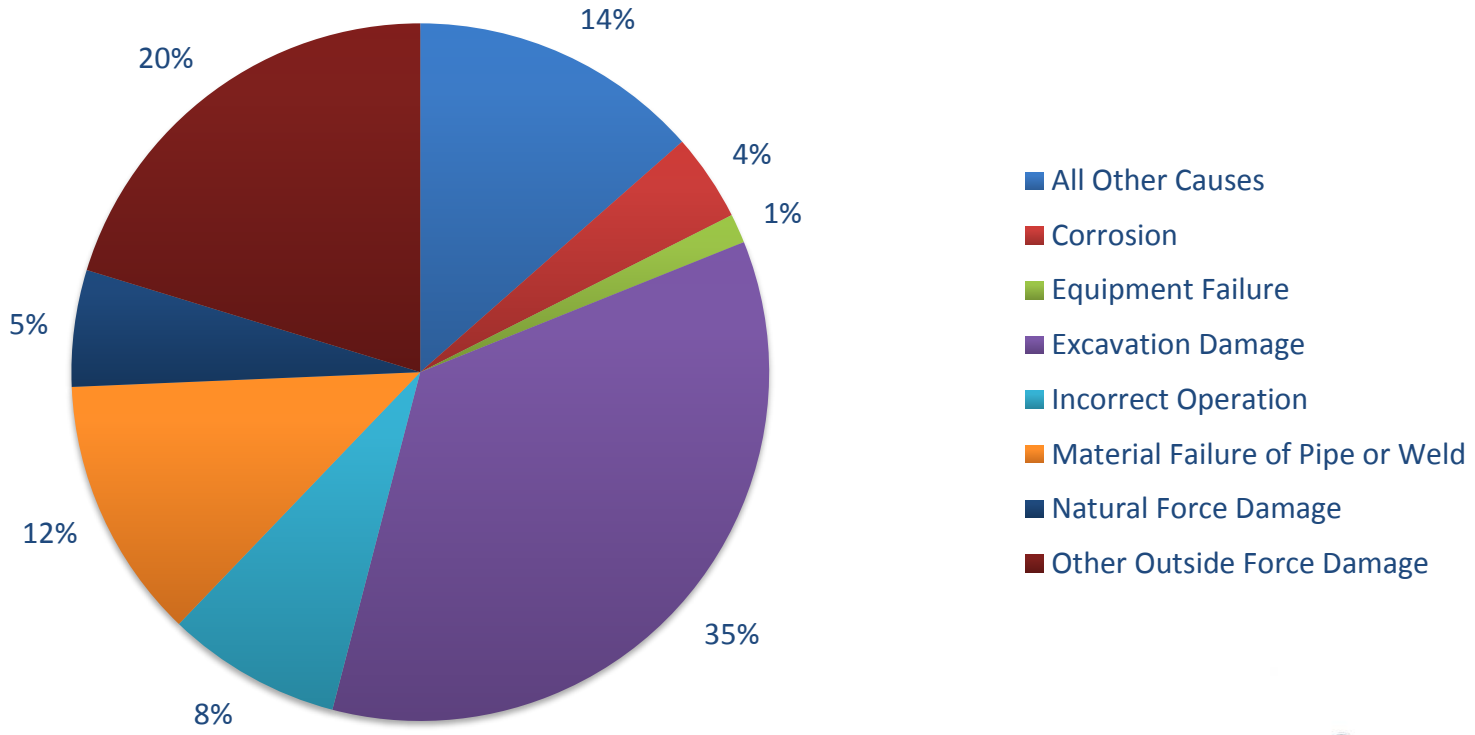
CY 2018 Leading Causes:

Excavation Damage

Other Outside Force Damage

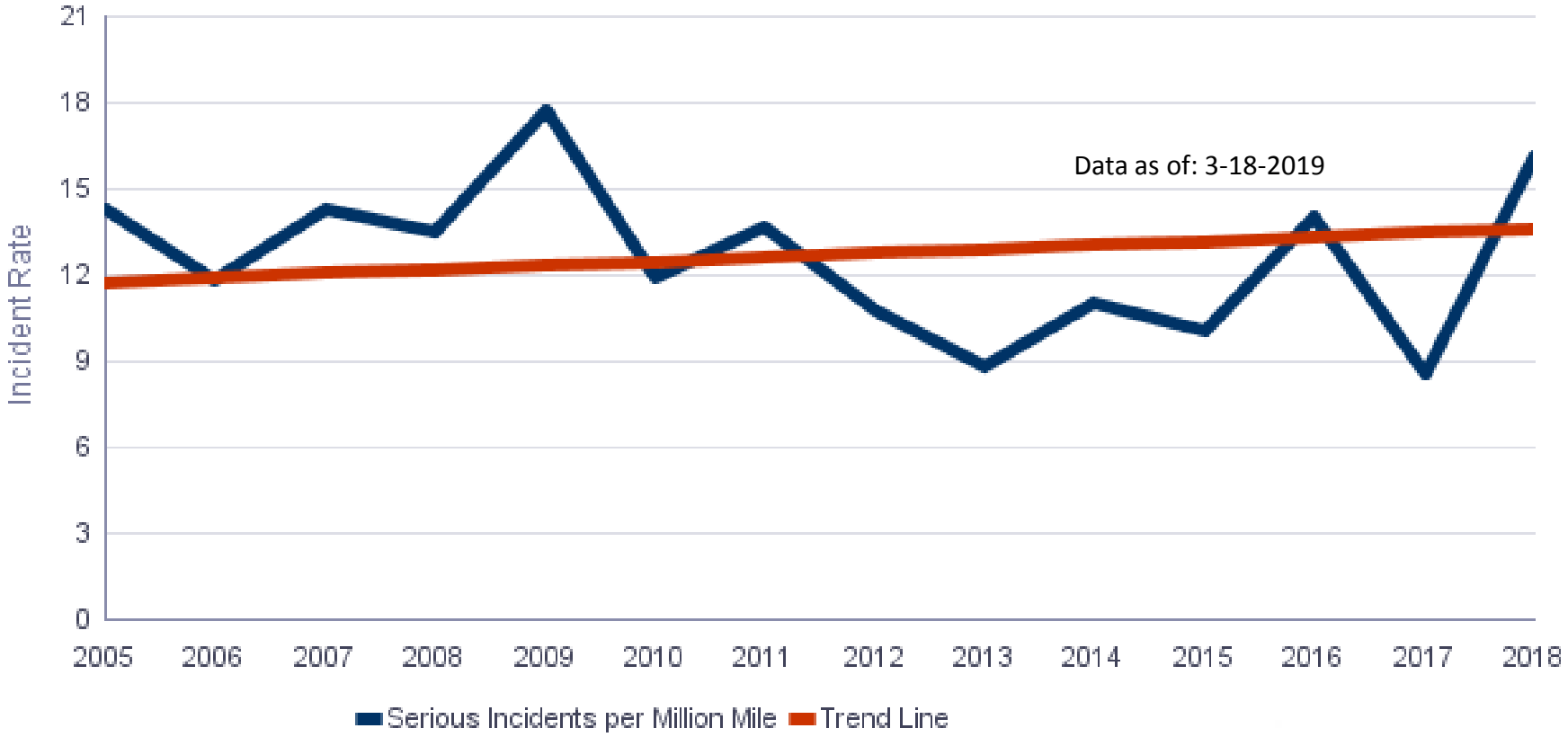
All Other Causes

data as-of 3-1-2019



Gas Distribution Serious Incidents per Million Miles 2005-2018

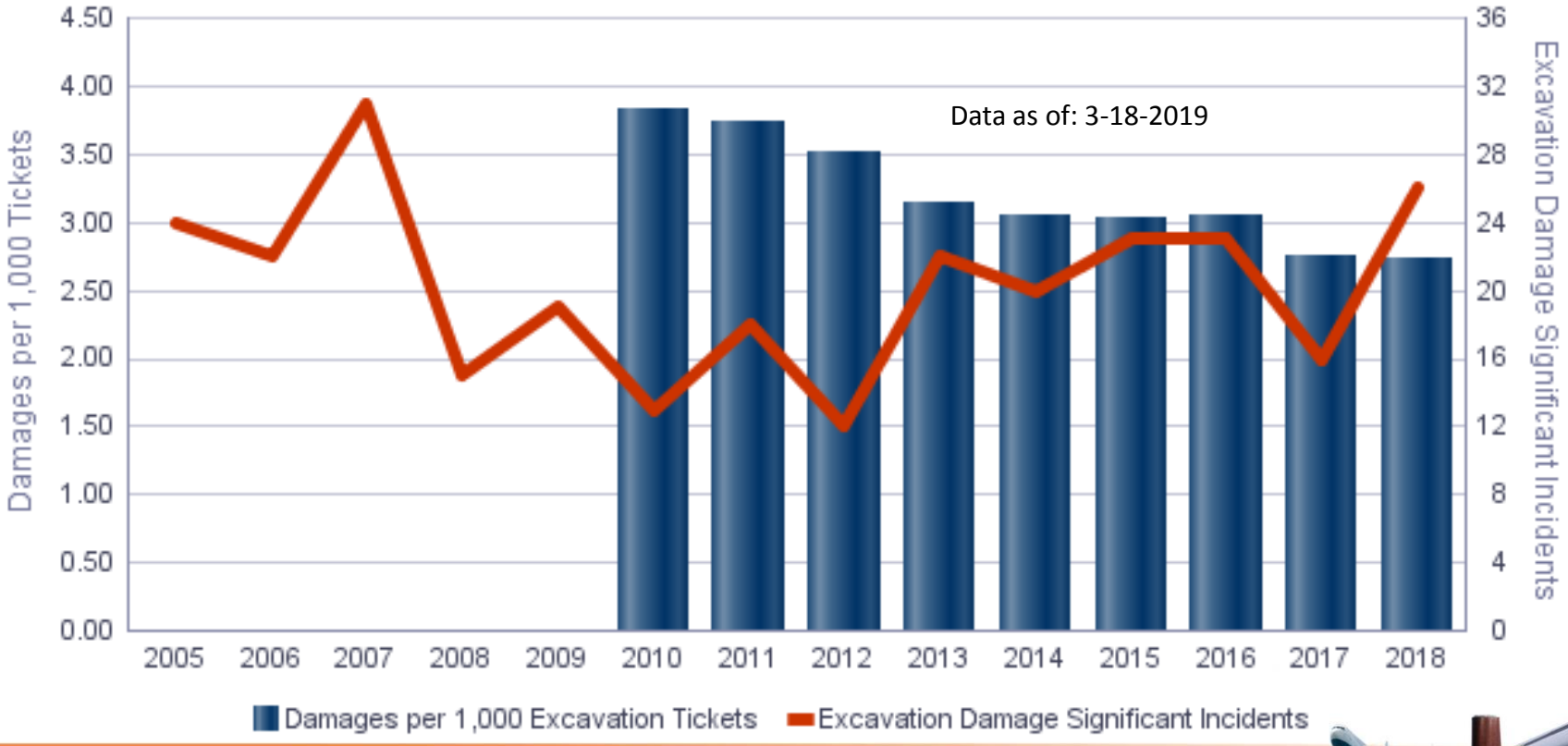
Rate has fluctuated since 2005 with overall increase of 13%



Gas Distribution Excavation Damage 2005-2018

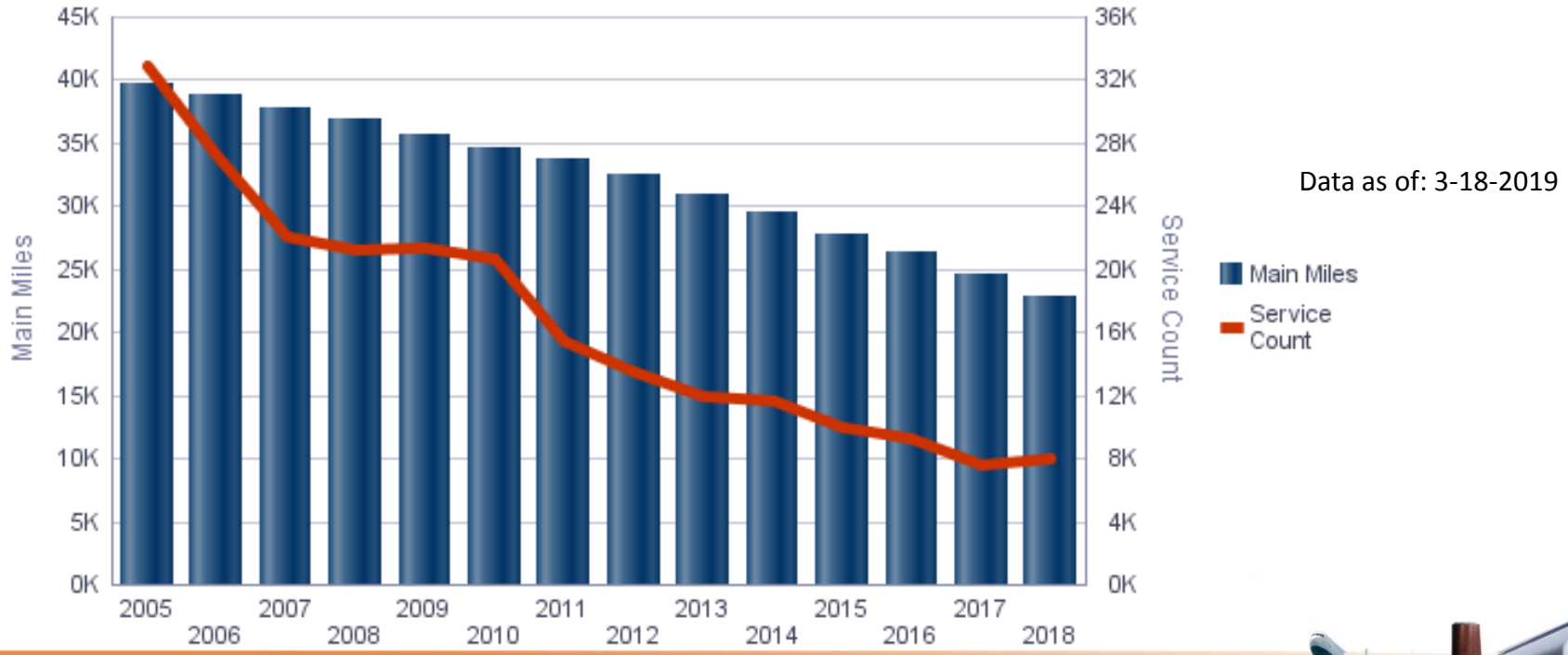
Number of **Significant Incidents** caused by **Excavation Damage** has fluctuated since 2005 and increased 8% overall

Rate of **Damages per 1,000 Tickets** has decreased 29% since 2010



Gas Distribution Cast and Wrought Iron 2005-2018

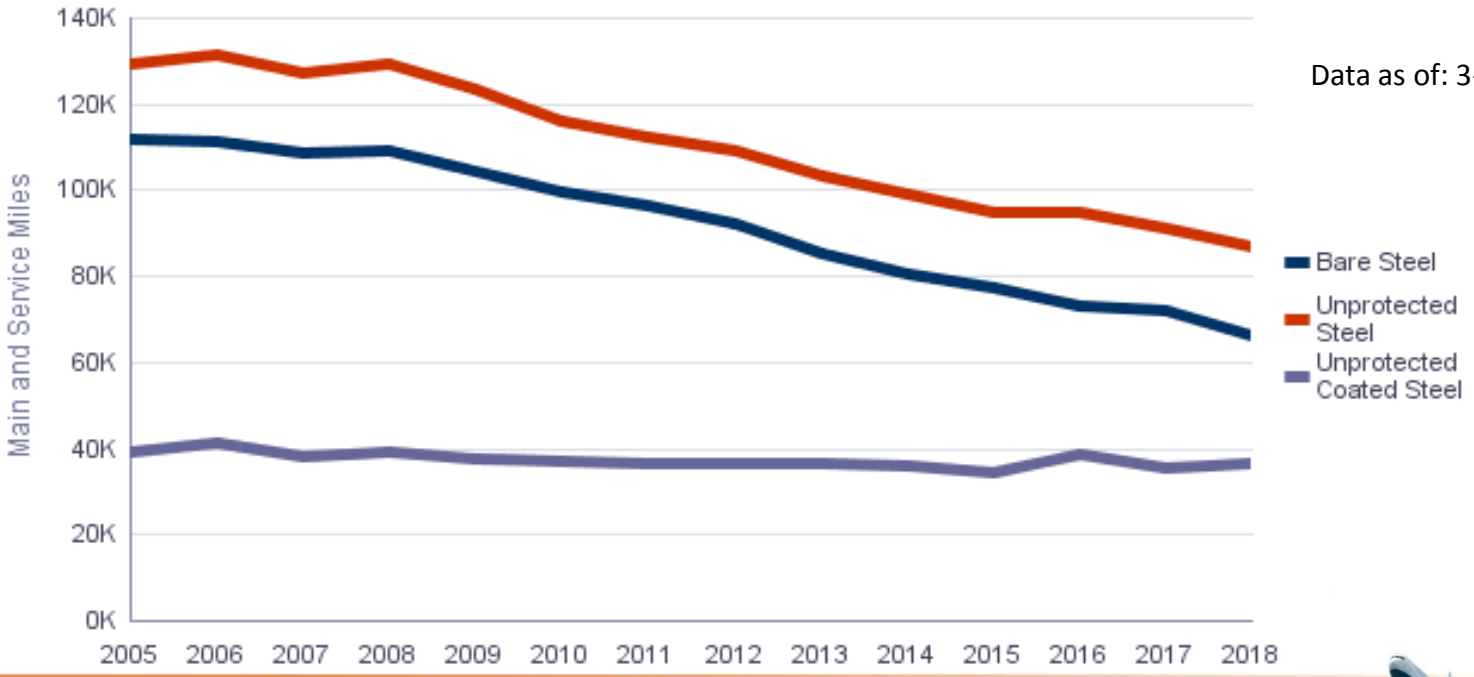
Cast and Wrought Iron Main Miles have decreased 42% since 2005
Cast and Wrought Iron mains make up 1% of the total gas distribution main miles.
Cast and Wrought Iron Service Count data quality efforts are underway
Less than .1% of all gas distribution services are Cast and Wrought Iron.



Data as of: 3-18-2019

Gas Distribution Steel Miles – Bare and Unprotected 2005-2018

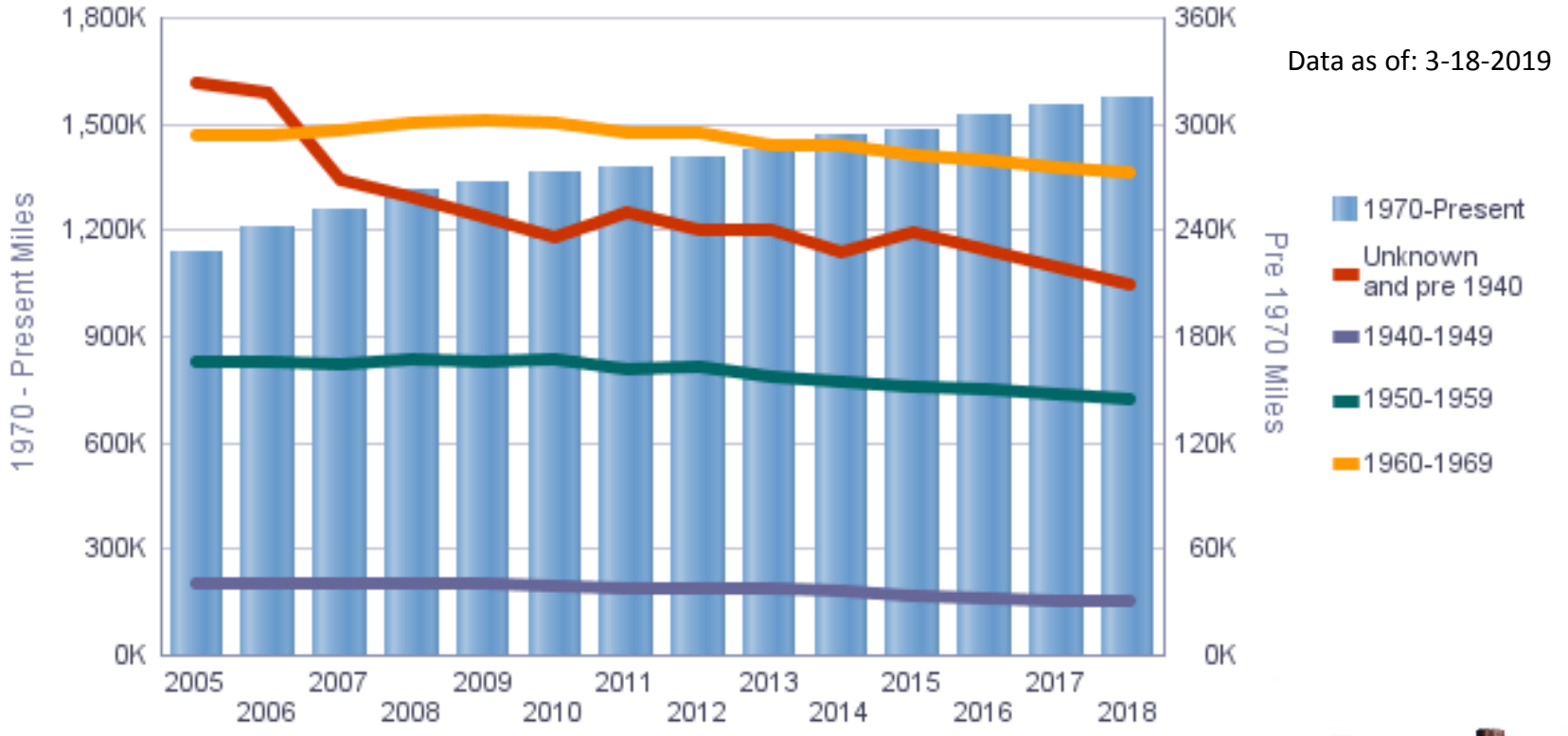
Miles of **Bare Steel** has declined steadily since 2005
Decrease since 2005 is 40% 3% of gas distribution systems are Bare Steel
Miles of **Unprotected Steel** has declined steadily since 2005
Decrease since 2005 is 33% 4% are Unprotected Steel
Miles of **Unprotected Coated Steel** has declined since 2005
Decrease since 2005 is 7% 3% are Unprotected Coated Steel



Data as of: 3-18-2019

Gas Distribution Miles by Decade Installed 2005-2018

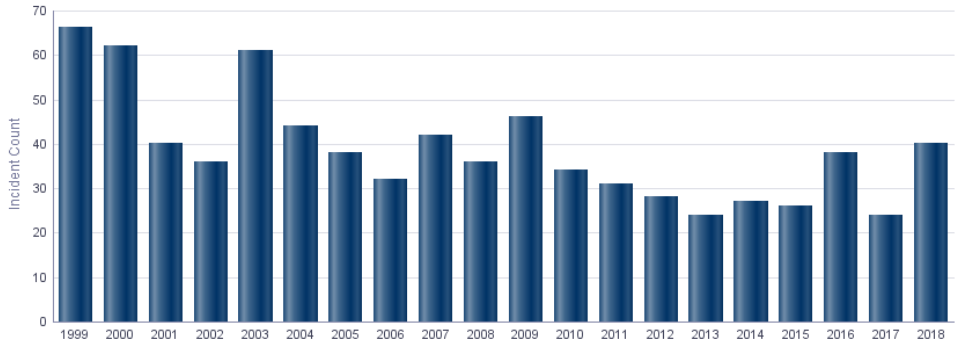
Miles of pipeline system installed **Pre-1970** has declined 20% since 2005
29% of gas distribution systems were installed Pre-1970



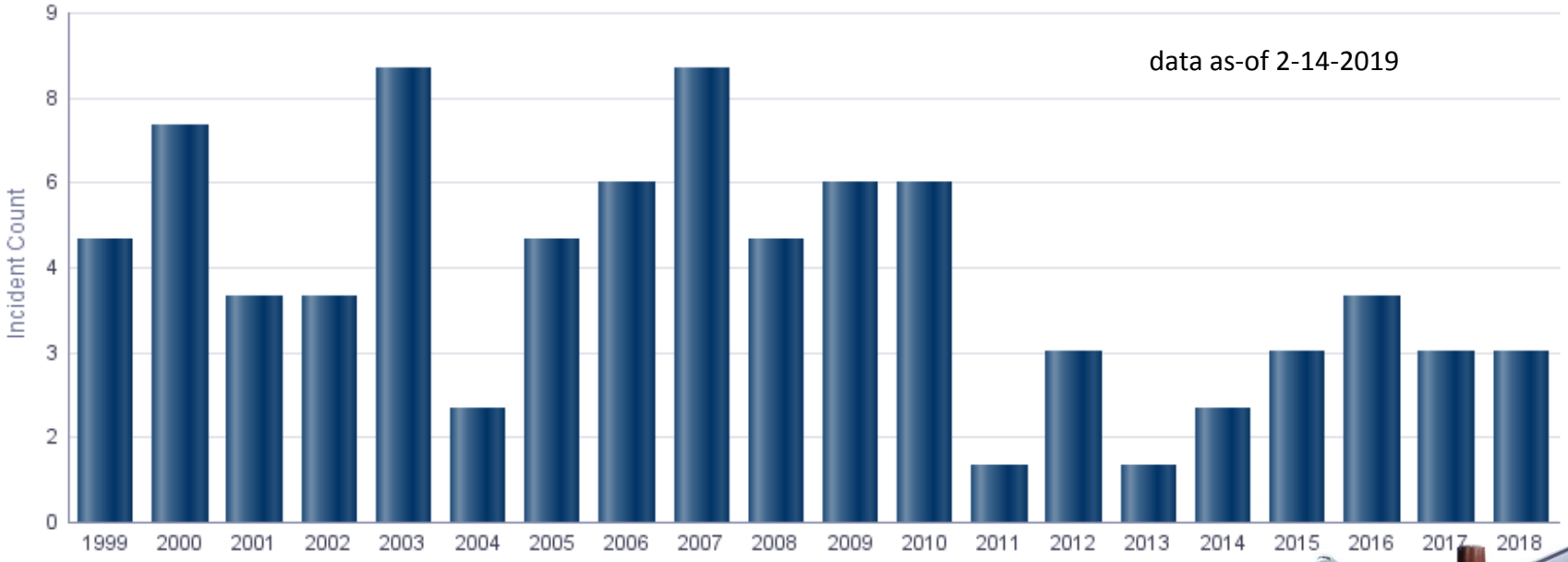
Data as of: 3-18-2019

Gas Transmission Serious Incidents

All System Types
Increased in 2018



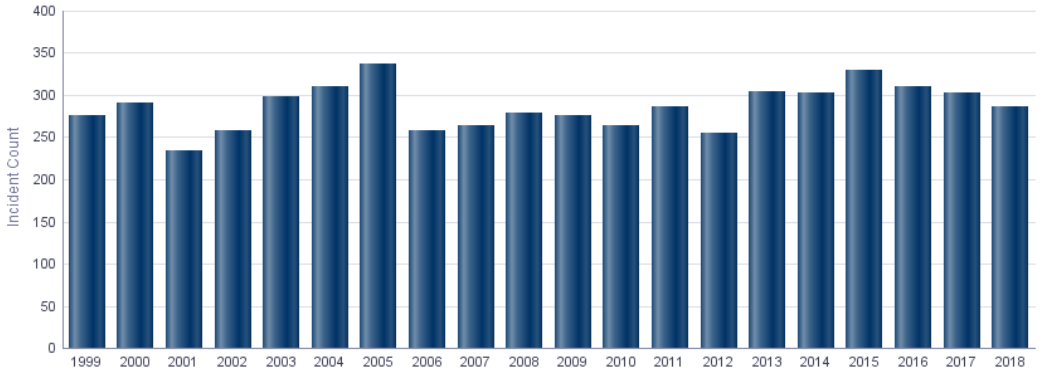
Gas Transmission
Unchanged in 2018



data as-of 2-14-2019

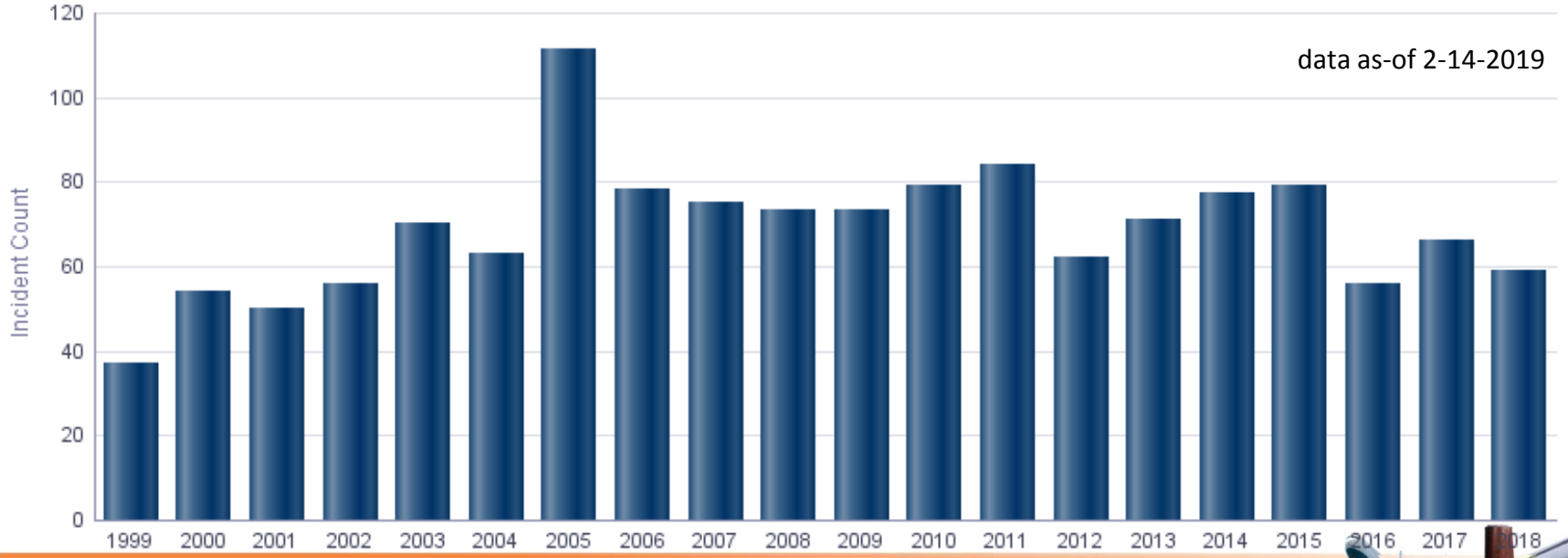
Gas Transmission Significant Incidents

All System Types
Decreased in 2018



Gas Transmission
Decreased in 2018

data as-of 2-14-2019



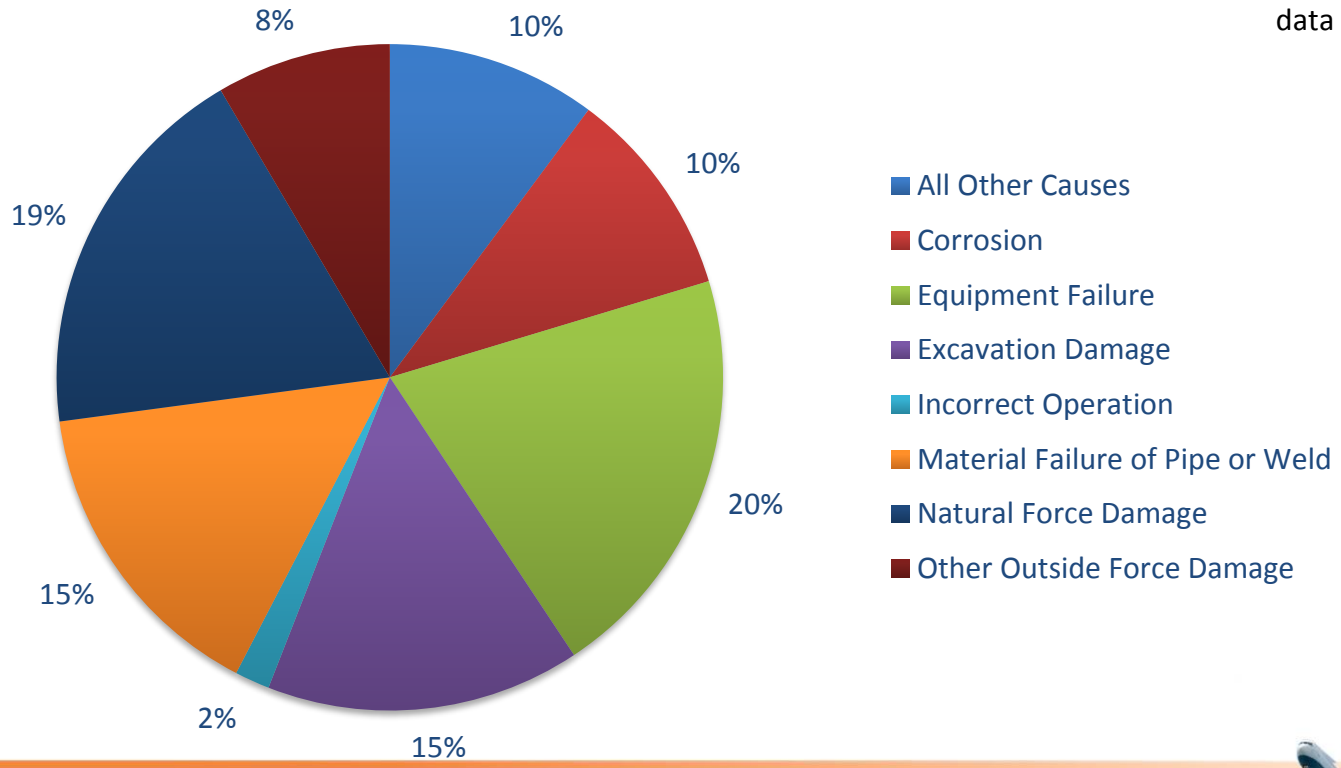
Gas Transmission Significant Incidents

CY 2018 Leading Causes:

Equipment Failure

Natural Force Damage

Material Failure of Pipe or Weld & Excavation Damage



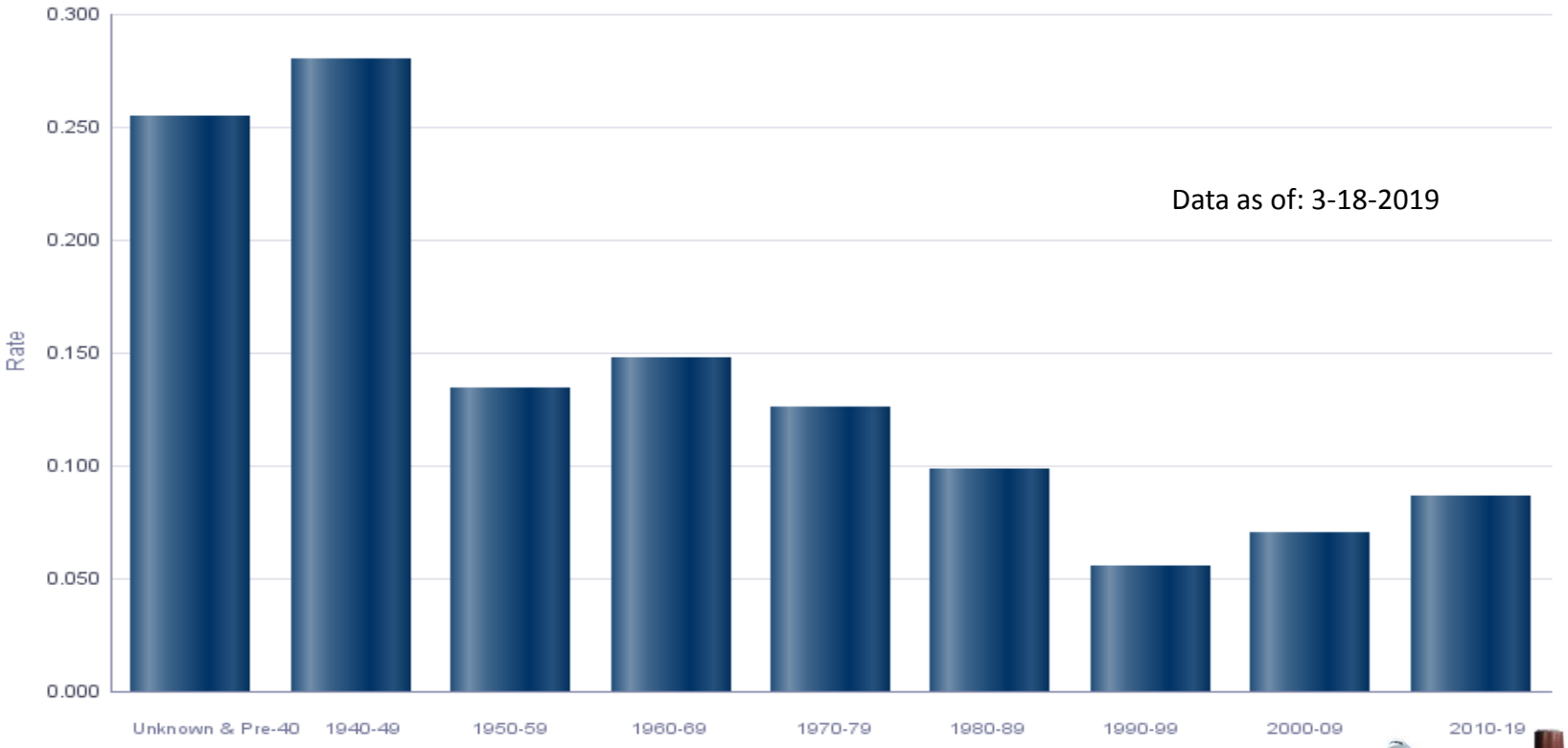
data as-of 3-1-2019

Gas Transmission Onshore Pipeline Significant Incident Rates per Decade 2005 - 2018 - Incidents per 1,000 Miles

"Unknown and Pre-1940" decade leading cause is Corrosion

"1940s" decade leading cause is Material Failure of Pipe or Weld

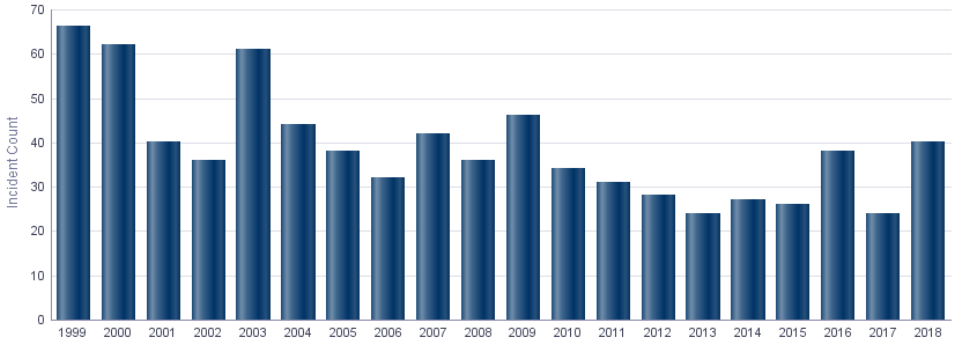
"2010s" decade leading cause is Equipment Failure



Data as of: 3-18-2019

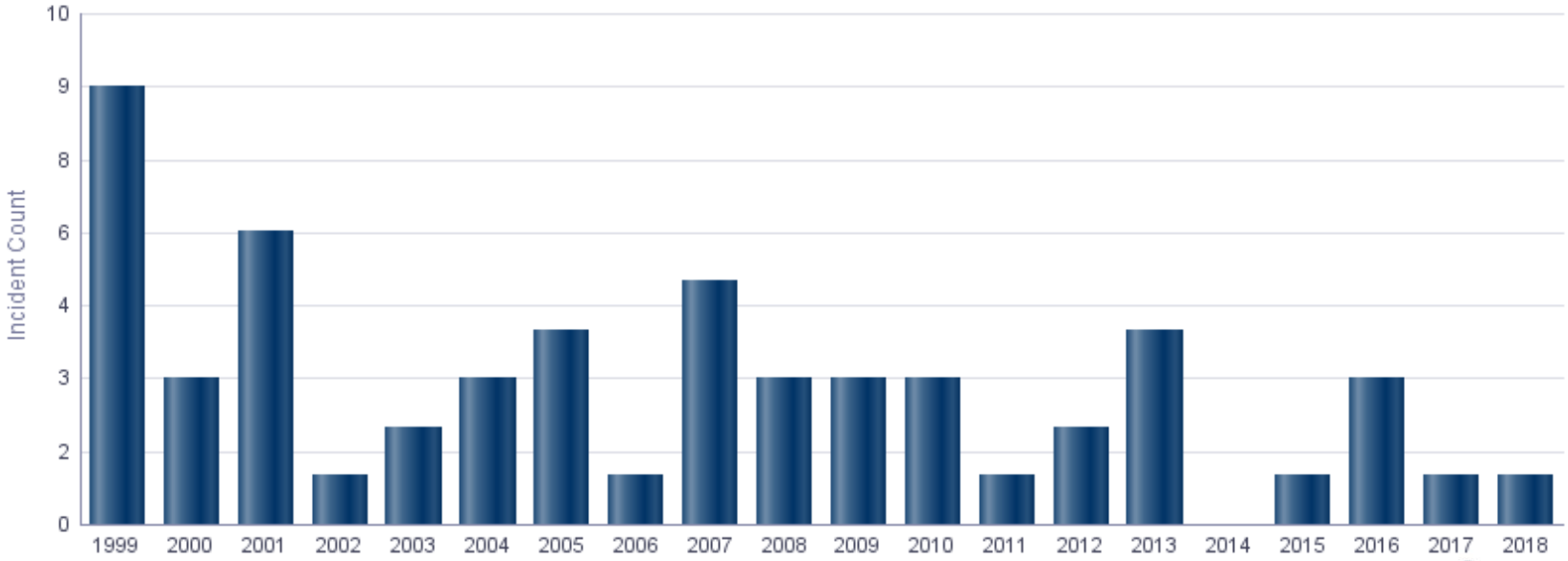
Hazardous Liquid Serious Incidents

All System Types
Increased in 2018



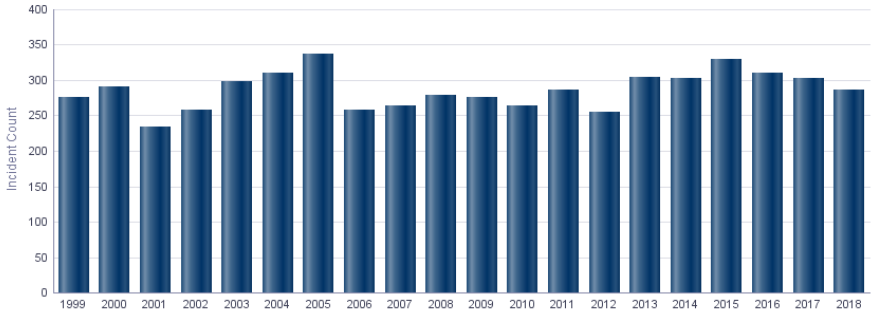
Hazardous Liquid
Unchanged in 2018

data as-of 2/14/2019



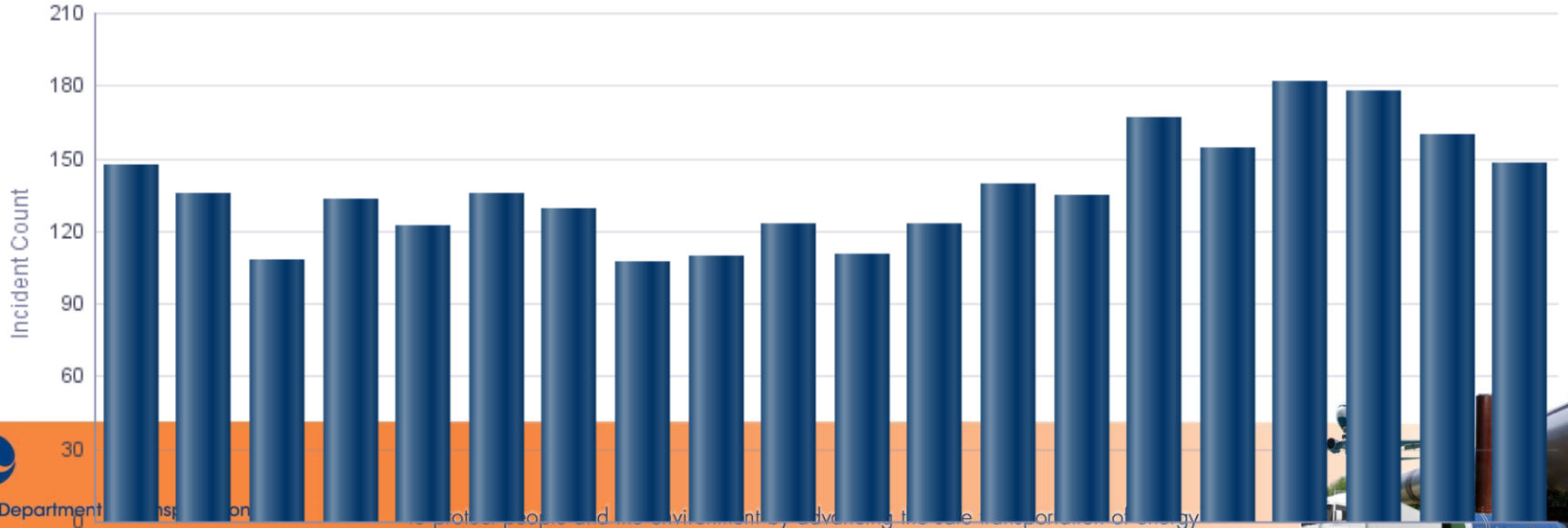
Hazardous Liquid Significant Incidents

All System Types
Decreased in 2018



Hazardous Liquid
Decreased in 2018

data as-of 2-14-2019



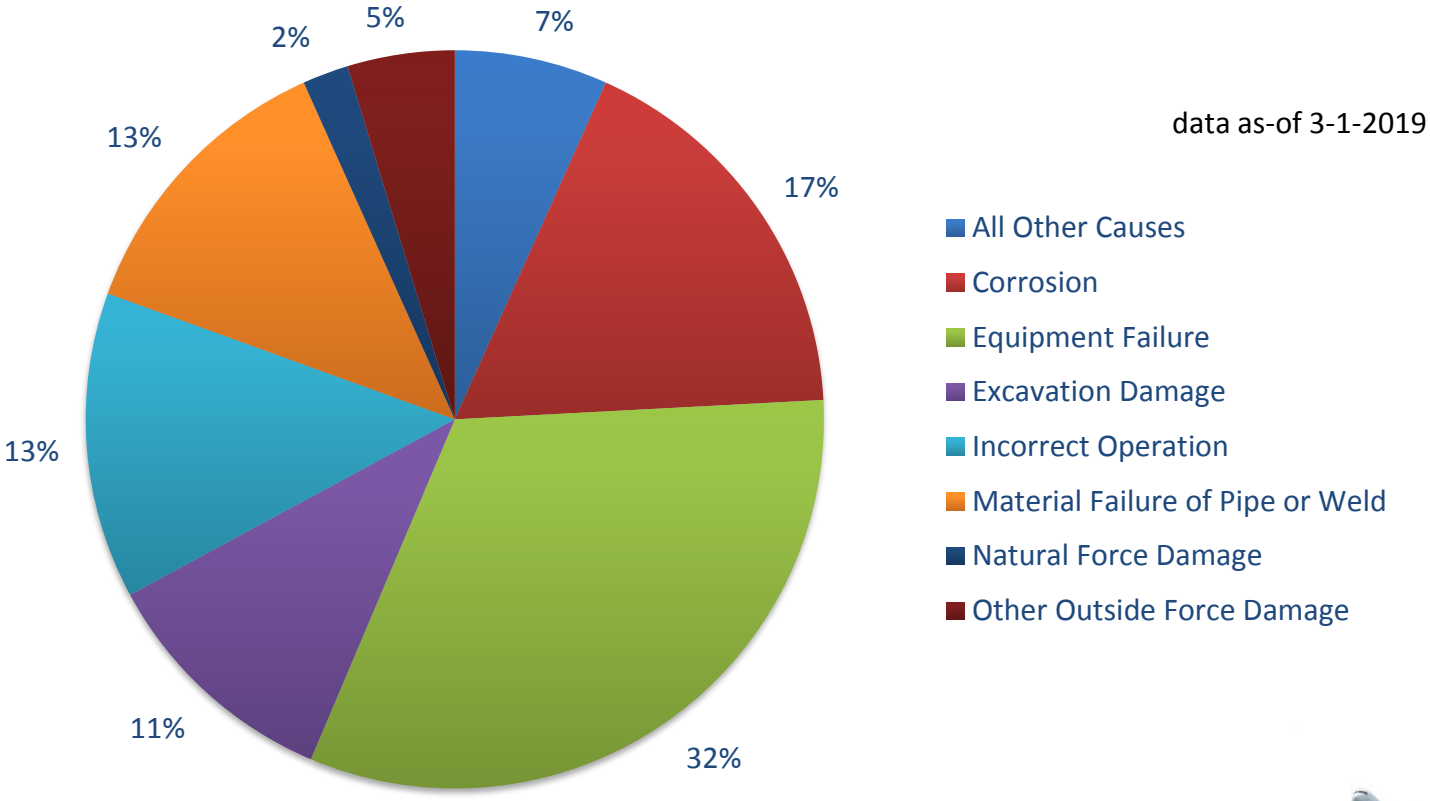
Hazardous Liquid Significant Incidents

CY 2018 Leading Causes:

Equipment Failure

Corrosion

Incorrect Operation & Material Failure of Pipe or Weld



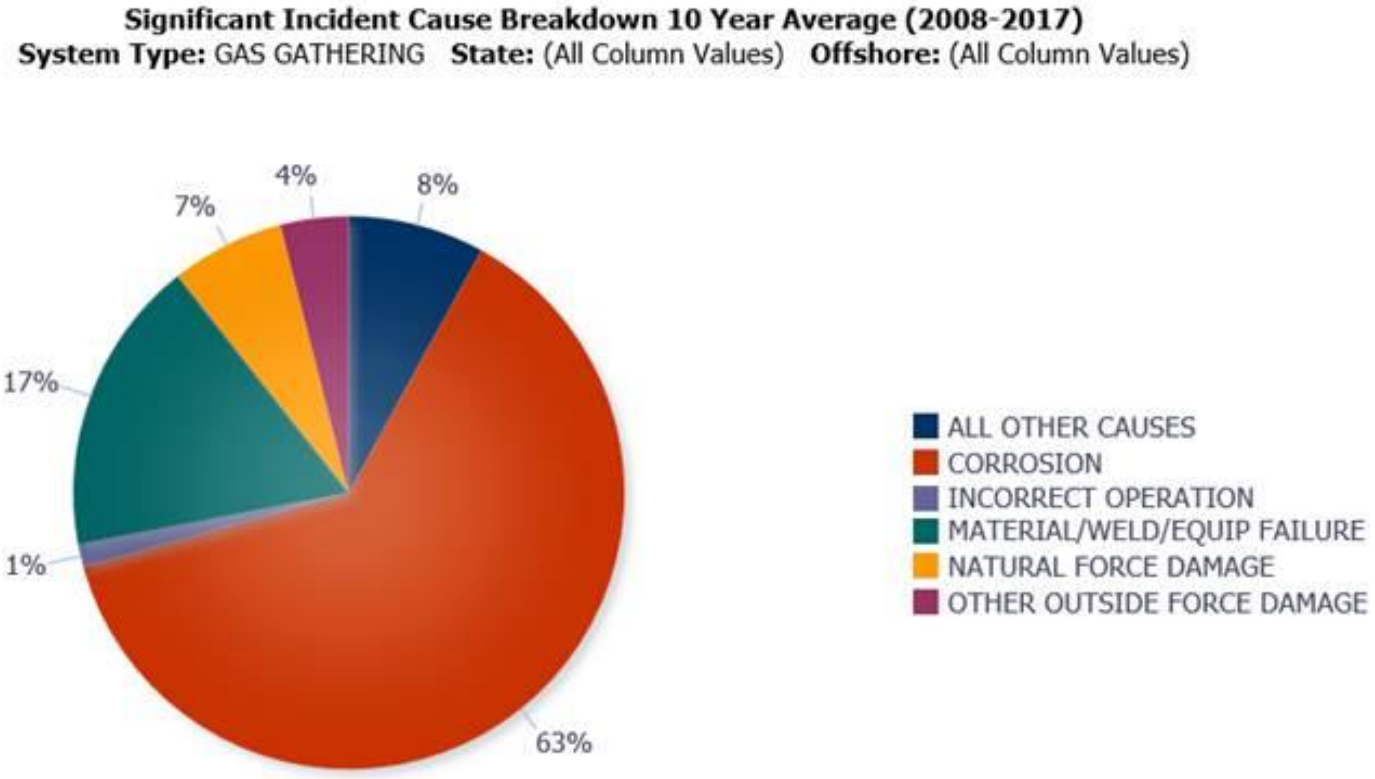
Regulated Gas Gathering Significant Incidents – 2008-2017

CY 2008 to 2017 Leading Causes:

Corrosion - 63%

Material/Weld/Equipment Failure - 17%

All Other Causes - 8%



Lessons Learned

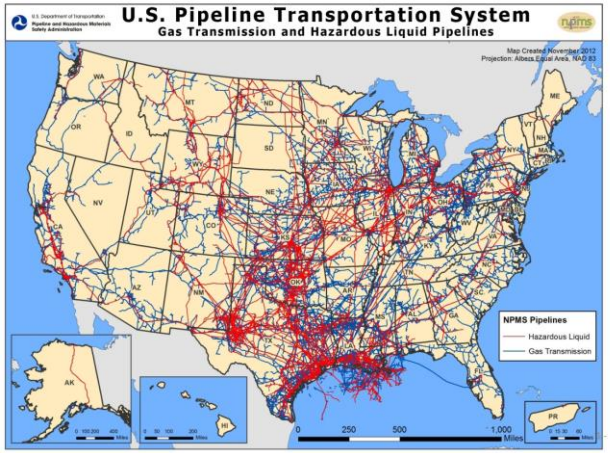
- Operators need to know their systems well for successful risk management
- IMP is a good foundation that must be built upon
  - Safety Management Systems – API RP 1173
- Construction challenges remain.
- Theme - “What Gets Measured, Gets Done”

Pipeline Safety Research Development & Technology: Competitive Academic Agreement Program

CAAP

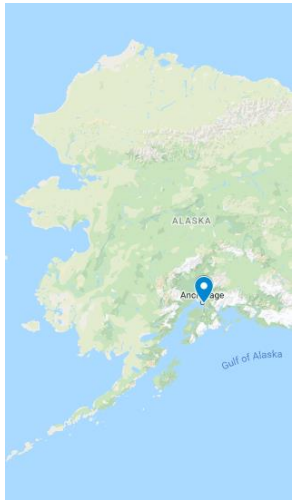
R&D Program Drivers

- **Alignment with PHMSA mission & safety risk**
- Congressional Mandates
- NTSB, GAO, & IG recommendations
- Support PHMSA basic research gaps
- Input from R&D Forum & Spur Innovation
- Technical Advisory Committees oversight



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.

- Arizona State University
- Colorado School of Mines
- Columbia University
- Georgia Institute of Technology
- Iowa State University
- Michigan State University
- North Dakota State University
- Ohio University
- Ohio State University
- Rutgers University
- Texas A&M Engineering Experiment Station
- University of Akron
- University of Alaska Anchorage
- University of Buffalo
- University of Colorado Boulder
- University of Colorado Denver
- University of Missouri Rolla
- University of Nebraska Lincoln
- University of North Dakota
- University of Tulsa
- University of Texas at Austin
- West Virginia University



CAAP 2013-2018:

22 Universities

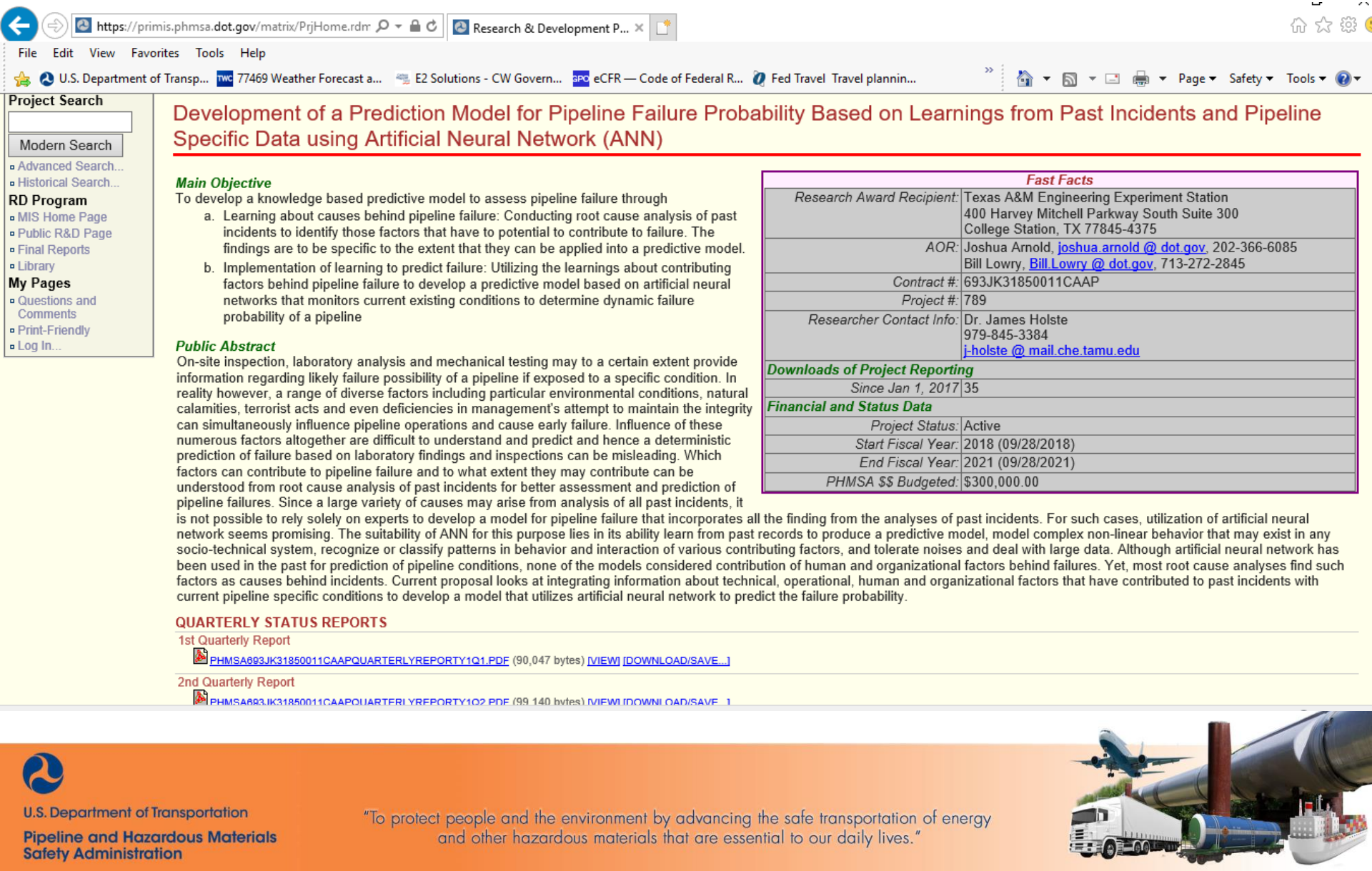
42 Projects

$9.2M PHMSA /$3M Cost Share

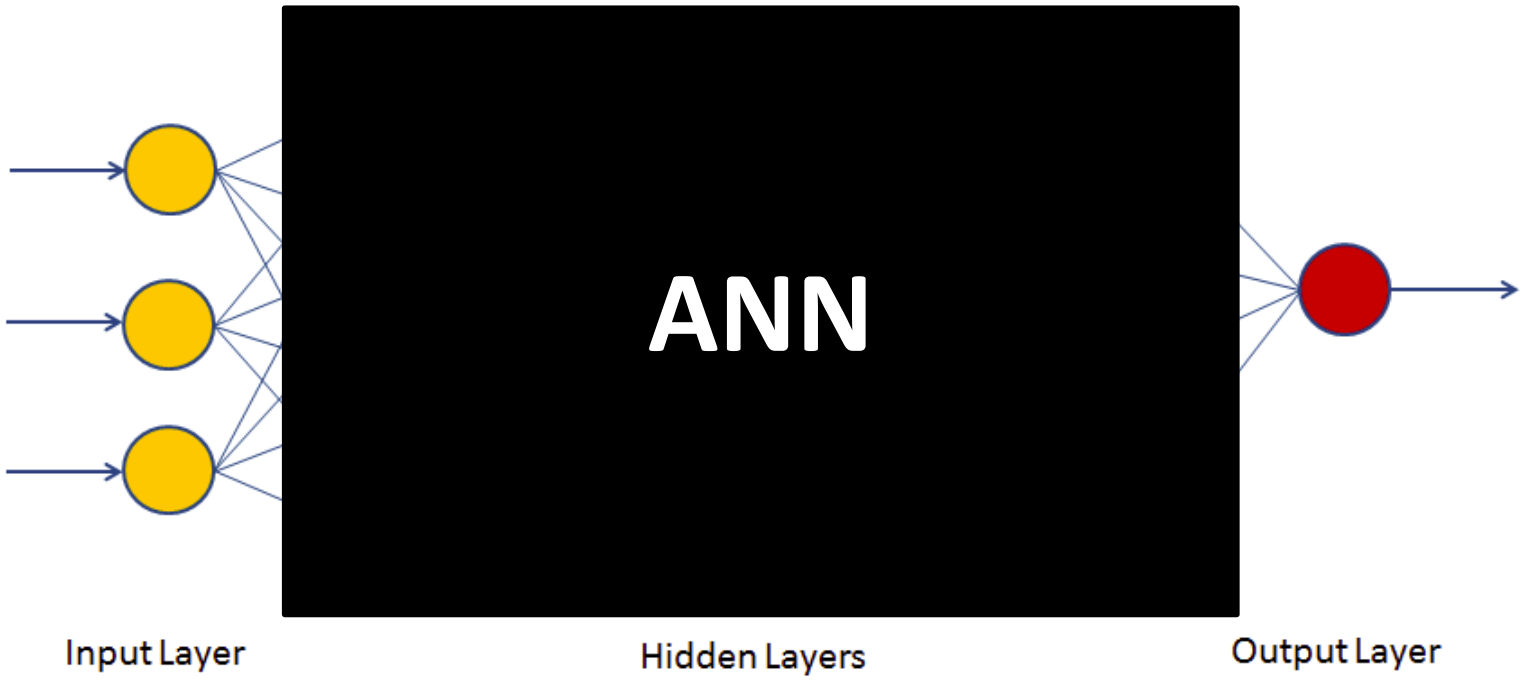
Monitoring Project Performance

- Technical Representatives will monitor the contractor's progress in completing project scope and milestone deliverables
- Project Modifications
- Quarterly Reporting
- Technical Representatives will monitor both federal and cost sharing on their project(s)

https://primis.phmsa.dot.gov/matrix/



Artificial Neural Networks (ANN)=Set of algorithms(mathematical structure) capable of recognizing patterns and representing complex processes



Risk-Based, Data Informed Inspections

Step 1 Data Analysis – At the National Level

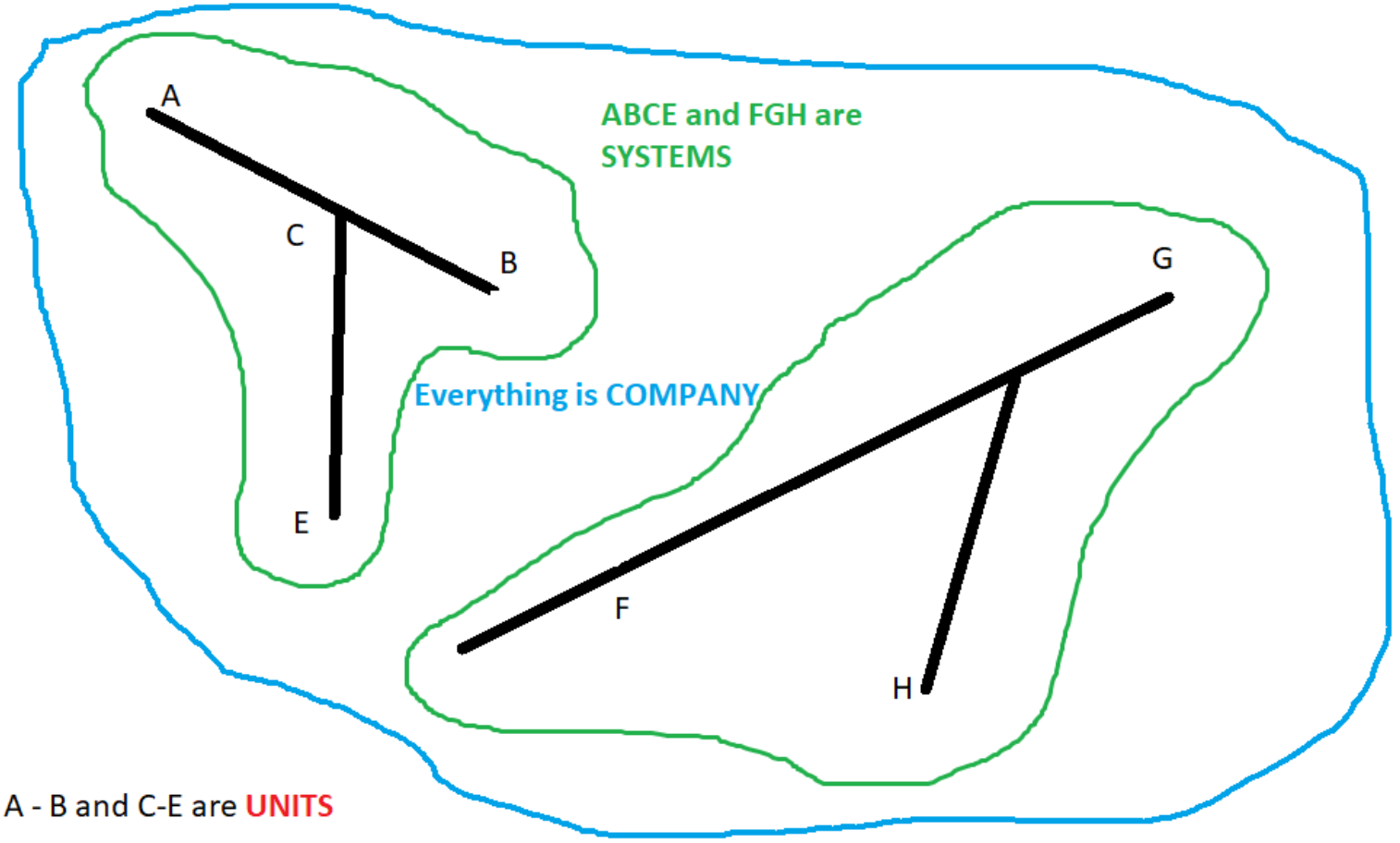
Step 2 Risk Prioritized List of Systems

Step 3 Second Level Data Evaluation – At the System Level

Step 4 Tailored, Risk Informed Inspection Protocol

Data Analysis – National Level

Pipeline data is tracked at the UNIT, SYSTEM and COMPANY level.



Data Analysis – National Level

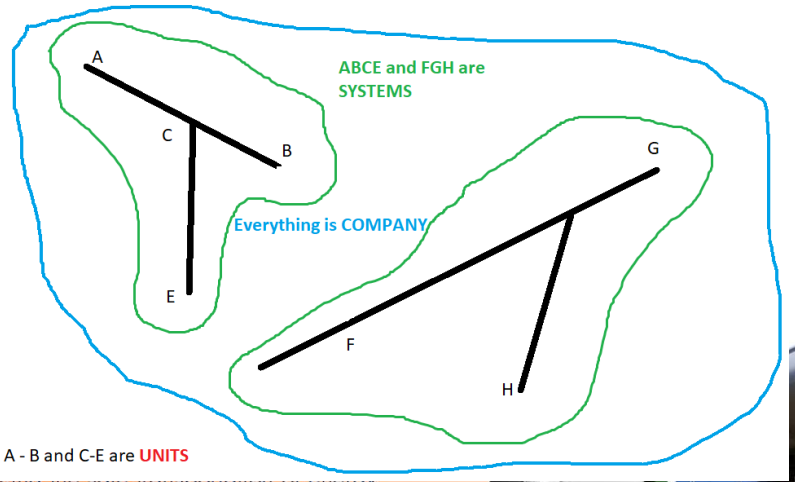
- For all units in an inspection system, a unit risk score is generated based on known risk factors, i.e. bare steel, seam type, incident history, enforcement, etc.

- Consequence calculations take into commodity, proximity to high consequence areas like drinking water, population centers, and ecological areas, etc.

Data Analysis – National Level

- The inspection system risk score is the average of the risk score for the units within the inspection system.
- Each inspection system risk score is assigned to one of three risk tiers, each with a maximum time since last inspection (TSLI).

(3, 5 and 7 years)



Steps 3 and 4

- Steps 1 and 2 produce an annual risk ranked list of systems for inspection.
- An Inspection Team meets with the company to conduct a “Screening” session to make sure key data points have not changed.
- The Team then identifies the most risky areas for the system using data, experience and other factors.
- The Team creates a tailored inspection protocol, from over 2400 inspection questions, that will add an additional focus on risk areas, such as corrosion, cracking, operational controls, training, etc.

PHMSA Website Locations for Regulatory Status

Interpretations (Search by date or regulation)

http://www.phmsa.dot.gov/pipeline/regs/interps

Special Permits and State Waivers

http://www.phmsa.dot.gov/pipeline/regs/special-permits

Rulemakings (tabular with links to detail)

http://www.phmsa.dot.gov/pipeline/regs/rulemaking

Advisory Bulletins (tabular with links to detail)

http://www.phmsa.dot.gov/pipeline/regs/advisory-bulletin

The Significant Rulemakings Report

https://www.transportation.gov/regulations/report-on-significant-rulemakings

Additional PHMSA Website Locations

Pipeline Technical Resources
https://primis.phmsa.dot.gov/ptr.htm

Meetings
http://primis.phmsa.dot.gov/meetings/

Electronic Reading Room
http://www.phmsa.dot.gov/foia/e-reading-room

Stakeholder Communications
http://primis.phmsa.dot.gov/comm/

PSA 2011 Reports and Studies
https://www.phmsa.dot.gov/pipeline/psa/related-reports-and-studies

Additional PHMSA Websites– Pipeline Technical Resources

https://primis.phmsa.dot.gov/ptr.htm

- Alternative MAOP
- Cased Crossings & Guided Wave Ultrasonics (GWUT)
- Class Location Special Permits
- Control Room Management (CRM)
- Gas Distribution Integrity Management Program (DIMP)
- Gas Transmission Integrity Management (GT IM)
- Hazardous Liquid Integrity Management (HL IM)
- High Volume Excess Flow Valves (EFV)
- Low Strength Pipe
- Operator Qualification (OQ)
- Pipeline Construction
- Research & Development (R&D)
- Public Meetings
- Regulations & Interpretations

https://primis.phmsa.dot.gov/gasimp/index.htm

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Pipeline Technical Resources

Return to Pipeline Safety Community

Gas Transmission Integrity Management

Gas IM Menu

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- Performance Measures
- Flowchart

This site is administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA). It provides information concerning the Gas Transmission Integrity Management Rule (49 CFR Part 192, Subpart O), commonly referred to as the "Gas IM Rule." The Gas IM Rule specifies 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. HCAs include certain populated and occupied areas.

For an overview of the progress being made under the Gas IM Rule, please see our Performance Measures page. There you will find graphs and charts, which depict progress and other aspects of rule implementation. You will

Thank you.

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