June is:

NATIONAL SAFETY MONTH 2019
Week 1: Hazard Recognition

Hazard Recognition
HAZARDS ARE EVERYWHERE. WHAT RISKS AREN’T YOU SEEING?

Hierarchy of Controls.

• **Elimination** – Physically remove the hazard

• **Substitution** – Replace the hazard

• **Engineering controls** – Isolate people from the hazard

• **Administrative controls** – Change the way people work

• **Personal protective equipment** – Protect the worker with PPE
Today’s Agenda

• PHMSA Update

• Performance Measures/ Data & Statistics

• PHMSA Rulemaking/ Gas Rule

• Risk Based Inspection Process

• Pipeline Technical Resources & other web resources
PHMSA Update

Who is PHMSA - DOT/PHMSA?

[Diagram showing the relationship between FAA, FMCSA, FRA, MARAD, FHWA, NHTSA, FTA, OIG, and PHMSA]
PHMSA Regional Offices

PHMSA Regulated Pipeline Facilities
OPS and States

<table>
<thead>
<tr>
<th>Pipeline Facilities by System Type</th>
<th>System Type</th>
<th>Miles</th>
<th>% Miles</th>
<th># Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hazardous Liquid</td>
<td>215,817</td>
<td>8%</td>
<td>531</td>
</tr>
<tr>
<td></td>
<td>CY 2017</td>
<td>8,118 Tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gas Transmission</td>
<td>301,147</td>
<td>11%</td>
<td>1,045</td>
</tr>
<tr>
<td></td>
<td>CY 2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gas Gathering</td>
<td>17,556</td>
<td>1%</td>
<td>344</td>
</tr>
<tr>
<td></td>
<td>CY 2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gas Distribution</td>
<td>2,234,528</td>
<td>80%</td>
<td>1,283</td>
</tr>
<tr>
<td></td>
<td>CY 2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Miles</td>
<td>2,769,048</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquefied Natural Gas</td>
<td>CY 2018</td>
<td>157 Plants, 228 Tanks, 86 Operators</td>
<td>Plants - 27 Interstate and 130 Intrastate</td>
<td></td>
</tr>
<tr>
<td>Underground Natural Gas Storage</td>
<td>CY 2018</td>
<td>397 Facilities, 451 Reservoirs</td>
<td>Facilities - 221 Interstate and 176 Intrastate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>17,281 Wells, 124 Operators</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

data as-of 3-27-2019
Underlying Principles

• It is the responsibility of the operator to understand and manage the risks associated with their pipelines
• PHMSA’s primary role - establish minimum safety standards (defined in the regulations by required risk control practices) and verify the operators perform to these standards
• PHMSA strives to impact operator performance beyond mere compliance with the regulations
• Focus is on PERFORMANCE

PHMSA Approaches to Promote Improved Performance (1/2)

• Conduct physical and programmatic inspections (management systems, procedures, and processes)

• Clarify expectations through range of public communications (regulations, published protocols, guidance documents including ADBs, public meetings, enforcement transparency, outreach, education)

• Facilitate/promote adoption of a Safety Management System.....
PHMSA Approaches to Promote Improved Performance (2/2)

- Participate in consensus standards development
- Promote public awareness, damage prevention programs and equip emergency responders
- Conduct accident and safety investigations
- Communicate directly with operators on their challenges

Impact Operator Performance

- Improved Operator Performance
  - Minimum Risk Control Practices (Prescriptive)
  - Minimum Operator-Specific Risk Assessment and Management Programs (Performance)
  - Encourage Practices “Beyond Compliance”
  - Promote Enterprise Knowledge Development and Sharing

“Traditional”  “IM”  “SMS”
Pipeline Operators, No Matter Their Size, Can Benefit From a PSMS

- PSMS is centered around Safety Leadership at **ALL** levels and Management Commitment.
- PSMS fosters and requires continual improvement.
- Learn from other industries:
  - [https://www.youtube.com/playlist?list=PL4wHDsuQ-uKm7Mz20uvkeagVv2u_Cro6o](https://www.youtube.com/playlist?list=PL4wHDsuQ-uKm7Mz20uvkeagVv2u_Cro6o)
  - Public Workshop Feb 2014
  - Search PHMSA + SMS
Today’s Environment

- Aging infrastructure
- Expanding new infrastructure

Time to Failure
All Reported Hazardous Liquid Accidents and Gas Transmission Incidents (2010-2015)

Performance Measurement
### Pipeline Serious Incidents with Context Measures (1999-2018)

![Graph showing Index (1999 = 1) for various measures over time, including Natural Gas Consumption (Index), Petroleum Products consumption (Index), Pipeline Mileage (Index), and U.S. population (Index).]

Data Sources: Energy Information Administration, Census Bureau, PHMSA Annual Report Data, PHMSA Incident Data - as of 03/18/2019.

EIA data preliminary for 2018.

### Gas Transmission Performance Measures

- Serious Incident per Mile - trend & cause pie chart
- Onshore Significant Incident per Mile - 3 trends, also HCA and non-HCA trends & cause pie charts
- HCA Immediate Repair per Mile - trend
- HCA Leaks & ILI Detectability - 2 trends & cause pie charts
- Steel Miles (Bare and Unprotected) - 2 trends
- Miles by Decade Installed - 5 trends
- Onshore Pipeline Significant Incident Rates per Decade - rate chart and cause chart
Performance Measurement

• Gas Data Quality & Analysis Team post Gas Distribution and Gas Transmission Performance Measures on the OPS website at


• Key Performance Indicators (KPIs)

• Theme - “What Gets Measured, Gets Done”
Data and Statistics

The data and statistics are publicly available at:

2018 Data Update

Measures counting incidents are updated through CY 2018

Gas performance measures using miles updated through CY 2018

Liquid performance measures using miles updated through CY 2017
Categories of Incident Reports

**Serious** – fatality or injury requiring in-patient hospitalization, but Fire First are 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 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 (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

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**Serious Incidents**

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Incident Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>40</td>
</tr>
<tr>
<td>2017</td>
<td>24</td>
</tr>
<tr>
<td>2016</td>
<td>17</td>
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<tr>
<td>2015</td>
<td>18</td>
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<td>2001</td>
<td>2</td>
</tr>
<tr>
<td>2000</td>
<td>1</td>
</tr>
<tr>
<td>1999</td>
<td>0</td>
</tr>
</tbody>
</table>

Data as of 2-14-2019

40 in CY 2018

- 90% Gas Distribution
- 2.5% Hazardous Liquid
- 7.5% Gas Transmission
- 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

**Significant Incidents**

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

**285 in CY 2018**
26% Gas Distribution
21% Gas Transmission
<1% LNG

<1% Gas Gathering
52% Hazardous Liquid
<1% Underground NG Storage

Data as-of 3-1-2019

Significant Incidents in 2018 (285) declined 6% from 2017 (302) as-of 2-14-2019
2018 Significant Incidents by Cause

CY 2018 Leading Causes:
- Equipment Failure
- Excavation Damage
- Material Failure of Pipe or Weld

Gas Distribution Serious Incidents

All System Types
Increased in 2018

Gas Distribution
Increased in 2018

data as-of 2-14-2019

data as-of 3-1-2019
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
data as-of 2-14-2019

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%

Data as of: 3-18-2019
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.
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

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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

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

Regulatory Code Violations

<table>
<thead>
<tr>
<th>Most Cited Regulation</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric Corrosion Control Inspection (192.481(a))</td>
<td>$109,900</td>
</tr>
<tr>
<td>External Corrosion Control Remedial Action to deficiencies (192.465(a))</td>
<td>$202,800</td>
</tr>
<tr>
<td>External Corrosion Control Cathodic Protection Testing (192.465(d))</td>
<td>$154,100</td>
</tr>
<tr>
<td>Maintain Corrosion Control records (192.491(c))</td>
<td>$41,500</td>
</tr>
<tr>
<td>External Corrosion Control Level of Cathodic Protection (192.463(a))</td>
<td>$211,600</td>
</tr>
<tr>
<td>Atmospheric Corrosion Control Clean and coat pipeline CP protection after installation within one year (192.479(a))</td>
<td>$129,100</td>
</tr>
<tr>
<td>Inspection internal surface after removal (192.475(b))</td>
<td>$43,100</td>
</tr>
<tr>
<td>Cathodic Protection Inspection Frequency (192.465(b))</td>
<td>$92,100</td>
</tr>
<tr>
<td>External Corrosion Control Examination of Buried Pipe (192.459)</td>
<td>$84,000</td>
</tr>
<tr>
<td>Maintain CP Pipe Location Records (192.491a)</td>
<td>$84,000</td>
</tr>
</tbody>
</table>

* Excluded withdrawn violations


<table>
<thead>
<tr>
<th>Most Cited Regulation</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion Control Record Retention Period (195.589(c))</td>
<td>$81,700</td>
</tr>
<tr>
<td>Cathodic Protection Adequacy (195.571)</td>
<td>$329,400</td>
</tr>
<tr>
<td>Atmospheric Corrosion Control Inspection Frequency (195.583(a))</td>
<td>$195,600</td>
</tr>
<tr>
<td>Timely Correction of Corrosion Control Deficiencies (195.573(a))</td>
<td>$349,800</td>
</tr>
<tr>
<td>Rectifiers and other devices performance check (195.573(c))</td>
<td>$128,800</td>
</tr>
<tr>
<td>External Corrosion Control Testing Frequency (195.573(a)(1))</td>
<td>$320,800</td>
</tr>
<tr>
<td>Examine Exposed Portions of Buried Pipe (195.569)</td>
<td>$113,800</td>
</tr>
<tr>
<td>Clean and coat pipeline exposed to the atmosphere (195.581(a))</td>
<td>$431,700</td>
</tr>
<tr>
<td>Take adequate steps to mitigate internal corrosion (195.579(a))</td>
<td>$145,000</td>
</tr>
<tr>
<td>Checking for Internal Corrosion when Removing Pipe (195.579(c))</td>
<td>$130,000</td>
</tr>
<tr>
<td>Cathodic Protection Inspection on Breakout tanks (195.573(d))</td>
<td>$114,900</td>
</tr>
</tbody>
</table>

* Excluded withdrawn violations
### Top 5 Regulatory Code Violations 2017-2018

**All Facilities (GAS, LIQUID & LNG)**

<table>
<thead>
<tr>
<th>Primary Cited Code</th>
<th>Primary Cited Code Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>195.402(a)</td>
<td>Procedural manual for operations, maintenance, and emergencies: General</td>
<td>118</td>
</tr>
<tr>
<td>195.402(c)(3)</td>
<td>Operating, maintaining and repairing the pipeline</td>
<td>91</td>
</tr>
<tr>
<td>192.605(a)</td>
<td>Procedural manual for operations, maintenance, and emergencies: General</td>
<td>52</td>
</tr>
<tr>
<td>195.428(a)</td>
<td>Operation and Maintenance: Overpressure safety devices and overfill protection systems (Inspection Interval)</td>
<td>22</td>
</tr>
<tr>
<td>195.452(b)(1)</td>
<td>Pipeline integrity management in high consequence areas: Programs and Practices (Develop written program)</td>
<td>21</td>
</tr>
</tbody>
</table>

**Data including:**
- The data based on the case opened date from 2017 to 2018 including Notice of Amendments, Warning Letters and Notice of Probable Violations.
- The counting based on primary cited code (entered by inspectors/investigator) under each violation item.
- Exclude withdrawn violation
### Top 5 Regulatory Code Violations 2017-2018
#### Facility: Gas

<table>
<thead>
<tr>
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<th>Total</th>
</tr>
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<tbody>
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<td>192.605(a)</td>
<td>Procedural manual for operations, maintenance, and emergencies: General</td>
<td>52</td>
</tr>
<tr>
<td>192.465(a)</td>
<td>Procedural manual for operations, maintenance, and emergencies: Maintenance and normal operations (Operating, maintaining and repairing the pipeline)</td>
<td>19</td>
</tr>
<tr>
<td>192.12(e)</td>
<td>Gas Transportation: Underground natural gas storage facilities</td>
<td>19</td>
</tr>
<tr>
<td>192.605(b)(2)</td>
<td>Procedural manual for operations, maintenance, and emergencies: Maintenance and normal operations</td>
<td>16</td>
</tr>
<tr>
<td>192.303</td>
<td>Construction: Compliance with specifications or standards</td>
<td>11</td>
</tr>
</tbody>
</table>

Data including:
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- Exclude withdrawn violation

### Top 5 Regulatory Code Violations 2017-2018
#### Facility: Liquid

<table>
<thead>
<tr>
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<th>Primary Cited Code Description</th>
<th>Total</th>
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<tbody>
<tr>
<td>195.402(a)</td>
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<td>118</td>
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<td>91</td>
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<td>Pipeline integrity management in high consequence areas: Programs and Practices (Develop written program)</td>
<td>21</td>
</tr>
<tr>
<td>195.446(a)</td>
<td>Control Room Management</td>
<td>19</td>
</tr>
</tbody>
</table>

Data including:
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- The counting based on primary cited code (entered by inspector/investigator) under each violation item.
- Exclude withdrawn violation
Brief History of Gas Rule

• **September 9, 2010, incident at San Bruno, CA**, kills 8 people, injures many, causes several more to be evacuated, destroys 38 homes, and damages another 70 homes.

• **PHMSA issues Gas ANPRM on August 25, 2011**, seeking public comment on 15 topics (122 questions). PHMSA received 103 comments.

• **NTSB issues several recommendations** to several entities, including PHMSA, CPUC, PG&E, AGA, and INGAA, following the San Bruno incident through its investigation report adopted on August 30, 2011.
Brief History of Gas Rule

• Pipeline Safety Act of 2011 issued on January 3, 2012; includes several mandates related to gas pipeline regulation, many of which correlate to San Bruno investigation findings.

• Incident near Sissonville, WV, on December 11, 2012, destroys 3 homes, damages several other houses, and shuts down I-77 because of the fire and road surface damage.

• NTSB issues new recommendations for IM of Gas Transmission Pipelines in HCAs report adopted January 27, 2015.

• PHMSA issues Gas NPRM on April 8, 2016.

Congressional Mandates (2011 PSA)

• 5 (e) – Allow extension (6 months) for an High Consequence Area (HCA) reassessment if operator submits sufficient justification

• 5 (f) – Expand Integrity Management (IM) requirements or principles beyond HCAs

• 21 – Review gathering line regulations and issue a report to congress recommending the modification or elimination of existing exemptions if appropriate

• 23 – Testing regulations to confirm the material strength of previously untested Gas Transmission (GT) pipelines; records verification

• 29 – Operators must consider seismicity when identifying pipeline threats
NTSB / GAO Recommendations Relating to Gas Rule

• **NTSB-P-11-14** – Amend Part 192 to repeal exemptions from pressure test requirements and require all GT pipelines constructed before 1970 be subjected to a hydrostatic test that incorporates a spike test

• **NTSB-P-11-15** – Manufacturing and construction-related defects can only be considered stable if a pipeline has been subjected to a post-construction hydrotest $\geq 1.25 \times$ Maximum Allowable Operating Pressure (MAOP)

• **NTSB-P-14-1** – Add principal arterial roadways, including interstates, other freeways and expressways, and other principal arterial roadways as defined by Federal Highway Administration (FHA) to the list of “identified sites” that establish an HCA

• **NTSB-P-15-18** – Require all GT pipelines to be piggable by either reconfiguring the pipeline to accommodate ILI tools or through using new technology that permits the inspection of previously un-inspectable pipelines; priority should be given to the highest-risk GT pipelines considering age, pressure, diameter, and class location
NTSB / GAO Recommendations Relating to Gas Rule

• **NTSB-P-15-20** – Identify all operational complications that limit the use of inline inspection (ILI) tools in piggable pipelines, develop methods to eliminate the operational complications, and require operators use these methods to increase the use of ILI tools.

• **NTSB-P-15-21** – Develop and implement a plan for eliminating the use of Direct Assessment (DA) as the sole integrity assessment method for GT pipelines.

• **NTSB-P-15-22** – Develop and implement a plan for all segments of the pipeline industry to improve data integration for IM through the use of GIS.

• **GAO-12-388** – Collect data on Federally unregulated hazardous liquid and gas gathering pipelines.
To Protect People and the Environment From the Risks of Hazardous Materials Transportation


Safety Recommendation P-15-014

Details

Synopsis

There are approximately 208,000 miles of onshore natural gas transmission pipelines in the United States. Since 2004, the operators of these pipelines have been required by the Pipeline and Hazardous Materials Safety Administration (PHMSA) to develop and implement integrity management (IM) programs to ensure the integrity of their pipelines in populated areas (defined as high consequence areas (HCAs)) to reduce the risk of injuries and property damage from pipeline failures. An operator's IM program is a management system designed and implemented by pipeline operators to ensure their pipeline system is safe and reliable. An IM program consists of multiple components, including procedures and processes for identifying HCAs, determining likely threats to the pipeline within the HCA, evaluating the physical integrity of the pipe within the HCA, and repairing or remediating any pipeline defects found. These procedures and processes are complex and interconnected. Effective implementation of an IM program relies on continual evaluation and data integration. The IM program is an ongoing program that is periodically inspected by PHMSA and other regulatory agencies to ensure compliance with regulatory requirements.

Recommendation:

1. THE PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION REVISE 49 C.F.R. 192.911 TO REQUIRE ALL PERSONNEL INVOLVED IN INTEGRITY MANAGEMENT PROGRAMS TO MEET MINIMUM PROFESSIONAL QUALIFICATION CRITERIA.
Safety Recommendation History

From: PHMSA
To: NTSB
Date: 5/25/2017
Response: From Howard W. McMillan, Acting Deputy Administrator: On April 10, 2017, PHMSA issued Advisory Bulletin 2017-02, “Guidance on Training and Qualifications for the Integrity Management Program,” to remind operators of their responsibility to include in integrity management (IM) programs the training and qualification requirements for IM personnel as required by §192.915 and as discussed in ASME B31.8S. PHMSA’s gas transmission pipeline IM rule, published on December 19, 2003, established requirements at §192.915 for supervisory and other personnel with integrity management program functions. PHMSA has since recognized inconsistencies in how the requirements at §192.915 have been implemented by operators. This advisory bulletin was issued to provide guidance on the requirements at §192.915 for the training and qualification of supervisory and other personnel that perform IM-assigned tasks. PHMSA regulations at §192.915 set forth the qualification requirements for, among others, persons supervising IM programs, carrying out assessments, evaluating assessment results, and implementing preventive and mitigative measures. PHMSA regulations require: Any person who qualifies as a supervisor for the integrity management program to have appropriate training or experience in the area for which the person is responsible (§192.915(a)). Therefore, operator personnel involved in IM programs receive on-the-job training under the supervision of a qualified person. Any person who conducts an integrity assessment allowed under Part 192, Subpart N, to be qualified (§192.915(b)(2)). Any person who reviews and analyzes the results from an integrity assessment and evaluation to be qualified (§192.915(b)(2)). This qualification is typically covered by the consensus standard originally approved in 2009, “Personnel Qualification and Certification for In-Line Inspection Technologies Used in the Examination of Pipelines” (ASNT-ILIC), which established minimum qualification and certification requirements for in-line inspection personnel. Any person who implements preventive and mitigative measures to be qualified, including, but not limited to, integrity engineers and others involved in the determination of risk reduction measures that are implemented (§192.915(c)). Installation of preventive and mitigative measures also involves some tasks covered in Part 192, Subpart N, such as marking and locating buried structures. Any person who directly supervises excavation work carried out in conjunction with an integrity assessment to be qualified per §192.915(c)(2).

GAO Recommendations
PIPEC LINE SAFETY

Additional Actions Could Improve Federal Use of Data on Pipeline Materials and Corrosion

What GAO Found

The U.S. gas and hazardous liquid pipeline network is constructed primarily of steel and plastic pipes, both of which offer benefits and limitations that present trade-offs to pipeline operators, as do corrosion prevention technology options. According to data from the Pipeline and Hazardous Materials Safety Administration (PHMSA), over 98 percent of federally regulated pipelines that gather natural gas and other gases and hazardous liquid products, such as oil, and transport those products across long distances are made of steel. An increasing majority of pipelines that distribute natural gas to homes and businesses are made of plastics. Steel pipelines are manufactured in various grades to accommodate higher operating pressures, but require corrosion protection and cost more than plastics, according to operators and experts. In contrast, plastics and emerging composite materials generally are corrosion-resistant, but lack the strength to accommodate high-operating pressures. Operators use a range of technologies to protect steel pipes from corrosion, including applying coatings and cathodic protection, which applies an electrical current to the pipe. (See fig.) While such technologies are generally considered effective, operators and experts stated that coatings degrade over time and that cathodic protection requires ongoing maintenance and costs to deliver the current over long pipeline distances, among other considerations.

Application and Installation of Pipeline Coating and Cathodic Protection

| Pipes are coated at a mill and then transported by truck to a construction site | On construction sites, pipes are welded together, spray coated and installed into the ground | Cathodic protection is added to prevent corrosion from occurring if coating is damaged |

Rectifier

Anodes

Protective current

Damage

Multimedia:

Podcast: U.S. Energy Gas Pipeline Safety

Additional Materials:

- Highlights Page:
  (PDF, 1 page)
- Full Report:
  (PDF, 55 pages)

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PIPELINE SAFETY:
Additional Actions Could Improve Federal Use of Data on Pipeline Materials and Corrosion

Recommendations for Executive Action

1. **Recommendation:** To assess and validate the effectiveness of PHMSA’s Risk Ranking Index Model (RRIM) in prioritizing pipelines for inspection, the Secretary of Transportation should direct the Administrator of PHMSA to document the decisions and underlying assumptions for the design of RRIM, including what data and information were analyzed as part of determining each component of the model, such as the threat factors, weights, risk tiers, and inspection frequency.
   **Agency Affected:** Department of Transportation

   **Status:** Open
   **Comments:** When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.

2. **Recommendation:** To assess and validate the effectiveness of PHMSA’s RRIM in prioritizing pipelines for inspection, the Secretary of Transportation should direct the Administrator of PHMSA to establish and implement a process that uses data to periodically review and assess the effectiveness of the model in prioritizing pipelines for inspection and document the results of these analyses.
   **Agency Affected:** Department of Transportation

   **Status:** Open
   **Comments:** When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.

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**High Level Summary of Proposed Rule**

PHMSA proposed rule changes in the following areas for gas transmission and gas gathering pipelines:

1. Require assessments for non-HCAs
2. Strengthen repair criteria for HCAs and non-HCAs
3. Strengthen requirements for assessment methods
4. Clarify requirements for validating & integrating pipeline data
5. Clarify functional requirements for risk assessments
6. Clarify requirement to apply knowledge gained through IM
7. Strengthen corrosion control requirements
8. Add requirements for selected preventative and mitigative (P&M) measures in HCAs to address internal corrosion and external corrosion
High Level Summary of Proposed Rule

9. Management of change
10. Require pipeline inspection following extreme external events
11. Include 6-month grace period (w/notice) to 7 year reassessment interval (Act § 5(e))
12. Require reporting of MAOP exceedance (Act § 23)
13. Incorporate provisions to address seismicity (Act § 29)
14. Add requirement for safety features on launchers and receivers
15. Grandfather clause/Inadequate records - Integrity Verification Process (IVP)
16. Gathering lines- Require reporting for all & some regulatory requirements

Current Rulemakings in Process
Safety of Gas Transmission and Gathering Lines
(Final Rule stage)

- NPRM published 4/8/2016
  - Comment period closed 7/7/2016
- Major Topics under consideration:
  - Expansion of assessments beyond HCA’s – MCA’s
  - Repair criteria for both HCA and non-HCA areas
  - Assessment methods
  - Corrosion control
  - Gas gathering; additional reporting and regulations
  - Assessment methods for GT Lines
  - MAOP Reconfirmation, Material Records for Grandfathered pipe and Bad Records

Current Rulemakings in Process
Safety of Gas Transmission and Gathering Lines
(Final Rule stage)

- GPAC has completed all of its work except for Gas Gathering (June, 2019 meeting).
- Rule has been broken into three final rules
  1) MAOP Reconfirmation, Material verification, MCA assessments, records, Seismicity, MAOP Exceedance reporting, 6-month grace period for assessments
  2) Repair criteria (HCA and Non-HCA); Extreme weather; MOC; Corrosion control; IM Clarifications, Strengthening Assessment requirements
  3) Gas Gathering: Data, Definitions, regulating large diameter-high pressure lines

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Pipeline Safety: Gas Transmission Pipelines

- Pipeline Safety: Safety of Gas Transmission Pipelines
- Proposed Rule by PHMSA on 06/25/2011:
  - ID: PHMSA-2011-0023-001

Pipeline Safety: Safety of Gas Transmission Pipelines

- Pipeline Safety: Safety of Gas Transmission Pipelines
- Proposed Rule by PHMSA on 11/16/2011:
  - ID: PHMSA-2011-0023-008

Cost Recovery Mechanisms for Modernization of Natural Gas Facilities

- Pipeline Safety: Safety of Gas Transmission Pipelines
- Proposed Rule by PHMSA on 11/16/2011:
  - ID: PHMSA-2011-0023-008

To Protect People and the Environment From the Risks of Hazardous Materials Transportation

Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines

This Proposed Rule document was issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA)

For related information: Open Docket Folder

Action

Proposed rule; extension of comment period.

Summary

On April 8, 2016, (81 FR 20722) PHMSA published in the Federal Register a Notice of Proposed Rulemaking (NPRM) titled: “Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines” seeking comments on changes to the pipeline safety regulations for gas transmission and gathering pipelines. PHMSA has received several requests to extend the comment period. PHMSA is granting these requests and extending the comment period from June 7, 2016, to July 7, 2016.

Dates

The closing date for filing comments is extended from June 7, 2016, to July 7, 2016.

Addresses

Comments should reference Docket No. PHMSA-2011-0023 and may be submitted in the following ways:

- Regulations.gov
- Paper
- Electronic

Document Information

- Date Printed: May 13, 2016
- RN: Not Assigned
- CFR: 49 CFR Parts 191 and 192
- Federal Register Number: 2016-11240
Similarly, DOT provides a publicly available update on significant rules at:

https://cms.dot.gov/regulations/significant-rulemaking-report-archive
Pipeline Safety: Meeting of the Gas Pipeline Advisory Committee

Actions:
Notice of advisory committee meeting.

Summary:
This notice announces a public meeting of the Technical Pipeline Safety Standards Committee, also known as the Gas Pipeline Advisory Committee (GPAC). The GPAC will meet to discuss the gathering line component of the proposed rule titled "Safety of Gas Transmission and Gathering Pipelines."
Advisory Bulletins (2019)

Advisory Bulletin (ADB–2019–01) April
Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Flooding, River Scour, and River Channel Migration

Advisory Bulletin (ADB–2019–02) May
Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Earth Movement and Other Geological Hazards

Risk-Based, Data Informed Inspections
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
Adequacy of One-Call Law Enforcement Programs
As of August 29, 2018

Map produced August 29, 2018 by the U.S. Department of Transportation (U.S. DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA).

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Thank you.

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