DIMP Update -
There is a lot to talk about

PHMSA Office of Pipeline Safety
Re-Authorization in 2019

Three themes in the reauthorization:
(1) safety, innovation, and information programs;
(2) encouraging energy infrastructure; and
(3) regulatory improvements/reform
Gas Regulatory Reform (NPRM stage)

• A NPRM is under review to amend several sections of the Pipeline Safety Regulations in response to the Executive Orders 13771, 13777, and 13783, which call for regulatory review and reform.

• PHMSA initiated internal teams to identify areas for improvements in the regulations

• PHMSA received comments from the public on many topics in Part 192
Ongoing NTSB Investigations of Incidents in Gas Distribution Systems

- Minneapolis, Minnesota – August 2, 2017 - Minnehaha Academy
  [Link](https://www.ntsb.gov/investigations/AccidentReports/Pages/DCA17MP007-prelim-report.aspx)

- Dallas, Texas – February 23, 2018 - ATMOS
  [Link](https://www.ntsb.gov/investigations/AccidentReports/Pages/PLD18FR002-preliminary.aspx)

  [Link](https://www.ntsb.gov/investigations/AccidentReports/Pages/pipeline.aspx)

- Response to Event in Lawrence, MA – September 13, 2018 -
  [Link](https://www.ntsb.gov/investigations/AccidentReports/Pages/PSR1802.aspx)

- San Francisco, CA – 3rd party fiber optic conduit installation contractor damaged a PG&E 2-inch natural gas main at the connection to a 4-inch main, February 6, 2019

- Durham, North Carolina Fiber Optic Ditch Witch incident
Lessons Learned Programs

• NTSB has asked - How did this happen and Why did the DIMP not identify the “threat” as an issue?

• Similar to what Congress asked in forming the VIS Committee – Why do we have so many failures following in-line inspections?

• VIS Committee Learning - Implementing lessons learned programs support development of a safety culture
  • Corrective Action Programs & Near Miss Reporting
  • FAA – Aviation Safety Alert Programs
  • FRA - Confidential Close Call Reporting

• Quantitative Data Programs take longer to implement
Addressing Risks to Improve Safety

- §192.605(c)(4) Abnormal operation. Periodically reviewing the response of operator personnel to determine the effectiveness of the procedures controlling abnormal operation and taking corrective action where deficiencies are found.

- 192.613 Continuing surveillance (a) Each operator shall have a procedure for continuing surveillance of its facilities to determine and take appropriate action concerning changes in class location, failures, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating and maintenance conditions. ...

- 192.617 Investigation of failures Each operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the causes of the failure and minimizing the possibility of a recurrence.

- TIMP - Part 192 SubParts O - Identify threats, integrity assessments & implement measures to reduce risks.

- DIMP - Part 192 SubParts P - Identify risks & implement measures to address risks.
“What gets measured, gets done.”

- To ensure Risk Mitigation Measures are Improving Safety, Performance must be Measured and Trended
- There are many websites that provide performance monitoring for Stakeholders on public websites at the National, Regional, and Operator level

PHMSA Data and Statistics Overview -

PHMSA National Pipeline Performance Measures -

PHMSA DIMP Website –

PHMSA State Pipeline Performance Metrics -
# Trends in Gas Distribution Leaks

## Operator Level – Examples from Website

### Gas Distribution Leaks – Operators with 10,000 miles or more

**Time run:** 10/3/2018 8:33:57 AM  
**Data Source:** US DOT Pipeline and Hazardous Materials Safety Administration  
**Data as of:** 10/02/2018

For multi-year rates, a rate is calculated for each year. The annual rates are summed and then averaged.

<table>
<thead>
<tr>
<th>Operator ID</th>
<th>Operator Name</th>
<th>5 Year Average Hazardous Leaks Eliminated (leaks per 1,000 miles)</th>
<th>10 Year Average Leaks Eliminated (leaks per 1,000 miles)</th>
<th>5 Year Average Leaks Eliminated (leaks per 1,000 miles)</th>
<th>10 Year Average Leaks Scheduled for Repair (leaks per 1,000 miles)</th>
<th>2017 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1640</td>
<td>BOSTON GAS CO</td>
<td>400.88</td>
<td>784.84</td>
<td>728.71</td>
<td>18.09</td>
<td>10,860.76</td>
</tr>
<tr>
<td>1688</td>
<td>BALTIMORE GAS AND ELECTRIC COMPANY</td>
<td>211.70</td>
<td>527.59</td>
<td>601.59</td>
<td>72.16</td>
<td>13,653.28</td>
</tr>
<tr>
<td>2364</td>
<td>DUKE ENERGY OHIO</td>
<td>197.93</td>
<td>473.84</td>
<td>469.00</td>
<td>79.92</td>
<td>11,533.27</td>
</tr>
<tr>
<td>213-09</td>
<td>VIRGINIA NATURAL GAS</td>
<td>187.12</td>
<td>414.79</td>
<td>367.92</td>
<td>41.02</td>
<td>11,623.69</td>
</tr>
<tr>
<td>18532</td>
<td>TEXAS GAS SERVICE COMPANY, A DIVISION OF ONE GAS, INC.</td>
<td>168.22</td>
<td>351.55</td>
<td>365.54</td>
<td>113.63</td>
<td>15,611.97</td>
</tr>
<tr>
<td>4499</td>
<td>CENTERPOINT ENERGY RESOURCES CORPORATION</td>
<td>157.78</td>
<td>457.62</td>
<td>424.39</td>
<td>67.49</td>
<td>67,245.81</td>
</tr>
<tr>
<td>180</td>
<td>SPIRE ALABAMA INC.</td>
<td>147.75</td>
<td>340.48</td>
<td>269.63</td>
<td>67.84</td>
<td>23,883.71</td>
</tr>
<tr>
<td>12350</td>
<td>CENTERPOINT ENERGY RESOURCES CORP., DBA CENTERPOINT ENERGY MINNESOTA GAS</td>
<td>145.17</td>
<td>297.84</td>
<td>274.80</td>
<td>16.64</td>
<td>25,745.82</td>
</tr>
<tr>
<td>22182</td>
<td>WASHINGTON GAS LIGHT CO</td>
<td>143.69</td>
<td>105.67</td>
<td>227.53</td>
<td>48.04</td>
<td>26,999.06</td>
</tr>
<tr>
<td>4660</td>
<td>DOMINION ENERGY OHIO</td>
<td>140.41</td>
<td>451.05</td>
<td>327.20</td>
<td>106.12</td>
<td>21,653.88</td>
</tr>
</tbody>
</table>

### Gas Distribution Leaks – Operators with less than 10,000 miles

**Time run:** 10/3/2018 8:53:57 AM  
**Data Source:** US DOT Pipeline and Hazardous Materials Safety Administration  
**Data as of:** 10/02/2018

For multi-year rates, a rate is calculated for each year. The annual rates are summed and then averaged.

<table>
<thead>
<tr>
<th>Operator ID</th>
<th>Operator Name</th>
<th>5 Year Average Hazardous Leaks Eliminated (leaks per 1,000 miles)</th>
<th>10 Year Average Leaks Eliminated (leaks per 1,000 miles)</th>
<th>5 Year Average Leaks Eliminated (leaks per 1,000 miles)</th>
<th>10 Year Average Leaks Scheduled for Repair (leaks per 1,000 miles)</th>
<th>2017 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>31964</td>
<td>KAMPS PROPANE</td>
<td>1,262.99</td>
<td>6,852.97</td>
<td>2,601.20</td>
<td>5,819.41</td>
<td>7.71</td>
</tr>
<tr>
<td>13133</td>
<td>CONOCOPHILLIPS (E&amp;P - L-49)</td>
<td>766.28</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>12916</td>
<td>MCBS POINT MUNICIPAL GAS SYSTEM, CITY OF</td>
<td>702.84</td>
<td>1,795.54</td>
<td>1,764.18</td>
<td>218.25</td>
<td>141.14</td>
</tr>
<tr>
<td>2704</td>
<td>CONSOLIDATED EDISON CO OF NEW YORK</td>
<td>699.03</td>
<td>1,308.40</td>
<td>1,456.52</td>
<td>2.97</td>
<td>7,608.03</td>
</tr>
<tr>
<td>5209</td>
<td>FITCHBURG GAS &amp; ELECTRIC LIGHT CO</td>
<td>601.31</td>
<td>1,151.77</td>
<td>1,455.04</td>
<td>9.36</td>
<td>382.07</td>
</tr>
<tr>
<td>32521</td>
<td>CITY OF MARFA</td>
<td>500.25</td>
<td>1,225.66</td>
<td>1,571.77</td>
<td>20.61</td>
<td>14.10</td>
</tr>
<tr>
<td>15166</td>
<td>PHILADELPHIA GAS WORKS</td>
<td>449.76</td>
<td>1,851.24</td>
<td>1,677.33</td>
<td>4.65</td>
<td>5,934.55</td>
</tr>
<tr>
<td>4356</td>
<td>ELIZABETH/TIGHTOWN GAS CO</td>
<td>449.30</td>
<td>523.94</td>
<td>648.11</td>
<td>161.68</td>
<td>5,450.99</td>
</tr>
<tr>
<td>1898</td>
<td>KEYSPAN ENERGY DELIVERY - NY CITY</td>
<td>289.53</td>
<td>408.27</td>
<td>489.17</td>
<td>2.82</td>
<td>9,889.33</td>
</tr>
<tr>
<td>1134</td>
<td>BARROW UTILITIES &amp; ELECTRIC CORP</td>
<td>379.76</td>
<td>265.26</td>
<td>379.76</td>
<td>0.00</td>
<td>41.00</td>
</tr>
</tbody>
</table>
Integrity Management Systems
Performance Measurement

- Guidance is available on methods to develop and use metrics that provide for meaningful insights into reducing risks of specific threats and system wide risks
- ADB 2014-05 - Guidance for Meaningful Metrics
  - ADB–2012-10 Using Meaningful Metrics in Conducting Integrity Management Program Evaluations
- ADB 2014-02 - Lessons Learned from the Marshall, Michigan, Release
Gas Distribution Serious Incidents

Gas Distribution
Increased 44% from 2017 to 2018
Gas Distribution Serious Incidents
CY 2018

Leading Causes:
Other Outside Force Damage (Vehicular Damage)
Excavation Damage (Third Party)
All Other Causes (Under Investigation)

Data as of 3-1-2019
Gas Distribution Significant Incidents

Gas Distribution
Increased 16% from 2017 to 2018

data as-of 2-14-2019
Gas Distribution Significant Incidents
CY 2018

Leading Causes:
- Excavation Damage (Third Party)
- Other Outside Force Damage (Vehicular Damage and Other)
- All Other Causes (Under Investigation)

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 Leaks per 1,000 Miles 2005-2018

Rate for Hazardous Leaks Eliminated has increased 10% since 2010
The effective date for PHMSA’s gas distribution integrity management (DIMP) regulations was 2011. PHMSA expects an eventual decrease in the rate as pipeline operators identify integrity threats and implement measures to reduce risk.
Rate for all Leaks Eliminated has decreased 10% since 2005
Rate for Leaks Scheduled for Repair at End of Year has increased 2% since 2005
Gas Distribution Cast and Wrought Iron 2005-2018

Cast and Wrought Iron Main Miles have decreased 42% since 2005. Cast Iron mains make up 1% of the total gas distribution main miles. Cast and Wrought Iron Service Count have decreased 79% since 2005. Less than .1% of all gas distribution services are Wrought Iron.

Data as of 3-27-2019.
Risk Model Work Group

- It was published in the Federal Register for comments on Thursday, August 16, 2018 (Vol. 83, No. 159, Notices page 40843). A final version is under review for publication at this time.
- PHMSA’s plans for the report and expectation of operators after Report is published?
- Guidance Document details learnings from work on advantages of quantitative and probabilistic risk models
- More and better quality data provides more useful insights for management decisions on resource allocation
DIMP Risk Models

Should Grade 3 leaks be factored in risk model and if so, what is the appropriate weighting? Yes.

- Insights from direct inspections of “like regions” may need to be applied depending on the density of grade 3 leaks as this may be a leading indicator of hazardous conditions in an area.
- Mapping of Grade 3 leaks (along with other leaks) can identify problematic regions or age of installation concerns.
- Accounting for specific leaks or regions may require some massaging of a risk model by weighting or clustering or other solution
DIMP Risk Models

If records are missing or incomplete, can conservative values be used vs. having to spend the money to dig up the pipe and retrieve that information, especially for pipelines operating below 60 psi?

- Assumptions may be applied and should be documented for review by the regulator.
- Areas with similar environments, construction techniques, and materials may provide valuable insights into risks.
- As pipe is exposed, data gathered, and materials verified, assumptions and data will need to be validated, and the risk model should be updated.
DIMP Risk Models

What decisions should operators be making to reduce risk of Excavation Damage, based on risk model?

- Density of known past damage may indicate where latent damage is more prevalent
- Virginia Pilot Project sought to incorporate GPS Technology to Enhance One-Call Damage Prevention before incidents occur. The concepts and actions taken are provided in posted materials.

# Measures to Address Risks (Threats)

The Plan should culminate in a ranked/prioritized list of threats, risk reduction measures, and performance measures.

<table>
<thead>
<tr>
<th>Primary Threat Category</th>
<th>Threat Subcategory, as appropriate</th>
<th>Measure to Reduce Risk implemented</th>
<th>Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Corrosion</td>
<td>External Corrosion on Copper Service Lines</td>
<td>Replace approximately 100 copper service lines each calendar year</td>
<td>Track number of leaks caused by external corrosion per 1000 copper service lines annually</td>
</tr>
<tr>
<td>2 Excavation Damage</td>
<td>Third Party Damage</td>
<td>Conduct pre-construction meetings or Monitor locate for life of ticket</td>
<td>Track frequency of failures per 1000 excavation tickets annually</td>
</tr>
<tr>
<td>3 Equipment Failure</td>
<td>Mechanical Fittings, Couplings or Caps/Seals</td>
<td>Repair or replace problem materials as found</td>
<td>Track frequency of failures by equipment type annually</td>
</tr>
</tbody>
</table>
Identify Threats – Awareness & Data

• Awareness of DIMP by all personnel – at the Operations, Headquarter & Compliance Levels
• Consistent Training of All personnel regarding DIMP requirements
• Field Personnel are critical to acquiring Quality Data to support Business operations and Risk-based decision making by Management
• Appropriate level of resource allocation is required to produce Good Quality Data
  ➢ Modernize Your Field data acquisition forms
  ➢ Train Personnel on Procedure and Need
Potential Threats Emerge Over Time

- Over pressurization events – low pressure systems
- Regulator malfunction or freeze-up
- Cross-bores into sewer lines
- Materials, Equipment, Practices, etc. with performance issues
- Vehicular or Industrial activities
- Incorrect maintenance procedures or faulty components
- Mechanical fitting failures (Vintage Plastic and Steel)
- Operator error/quality of workmanship
- Age of system and equipment
- Electrical arcing onto the gas systems
- Other potential threats specific to the operator's unique operating environment
Handling Consequences

- Subdividing DIMP into “Regions” can address Threats and Consequences
  - Class Location can group Consequences based on population densities and usages into “like” Regions
  - Construction “eras” can group Threat Categories (Materials and Practices) into “like” Regions
  - Evaluating specific Materials and Equipment allows Data to be evaluated for specific threats and performance monitored
- Needs to Fit Your Unique Operating Environment
Improving Quality Management Systems (QMS) for Pipeline Construction Activities

• QMS was Topic M in Gas IM ANPRM in 2011

• PHMSA sponsored a Construction Management R&D paper - used as basis for API RP 1177
  https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=504

• API RP 1177 – Recommended Practice for Steel Pipeline Construction Quality Management Systems. Draft available for viewing at
  http://ballots.api.org/pipeline/ballots/docs/1177_PipelineConstructionQMS_1E_ballot_3916.pdf
Emergency Responders

- Pipeline Emergency Responders Initiative (PERI)

- Partnership to improve emergency response.
  - Enhance responders understanding of pipeline risks and hazards;
  - Strengthen relations in the interest of public safety;
  - Improve management of pipeline emergencies nationwide

- PHMSA R&D Program on Tools for Predicting Gas Migration and Mitigating its Occurrence/Consequence
  https://primis.phmsa.dot.gov(matrix/PrjHome.rdm?prj=748
LNG Rulemaking

- Executive Order issued April 10, 2019
- Sec. 4. Safety Regulations. (a) The Department of Transportation’s safety regulations for Liquefied Natural Gas (LNG) facilities, found in 49 CFR Part 193 (Part 193), apply uniformly to small-scale peak shaving, satellite, temporary, and mobile facilities, as well as to large-scale import and export terminals. Driven by abundant supplies of domestic natural gas, new LNG export terminals are in various stages of development, and these modern, large-scale liquefaction facilities bear little resemblance to the small peak shaving facilities common during the original drafting of Part 193 nearly 40 years ago. To achieve the policies set forth in subsection 2(b) of this order, the Secretary of Transportation shall initiate a rulemaking to update Part 193 and shall finalize such rulemaking no later than 13 months after the date of this order. In developing the proposed regulations, the Secretary of Transportation shall use risk-based standards to the maximum extent practicable.
## PHMSA Regulated Pipeline Facilities  
**OPS and States**

### Pipeline Facilities by System Type

<table>
<thead>
<tr>
<th>System Type</th>
<th>Miles</th>
<th>% Miles</th>
<th># Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Liquid</td>
<td>CY 2017</td>
<td>215,817</td>
<td>531</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8,118 Tanks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CY 2018</td>
<td>301,147</td>
<td>1,045</td>
</tr>
<tr>
<td>Gas Transmission</td>
<td>CY 2018</td>
<td>17,556</td>
<td>344</td>
</tr>
<tr>
<td>Gas Distribution</td>
<td>CY 2018</td>
<td>2,234,258</td>
<td>1,283</td>
</tr>
</tbody>
</table>

**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*
Employee Retention and Training

- Vacancies created by an aging workforce (turn-over) have created voids in operating knowledge of pipeline systems, and trained personnel have not always been available for inspections.
- Retention of trained and qualified employees has been identified as a common issue requiring transition planning and training.
- Documentation of pipeline system and OM&I procedures is important to retain knowledge.
- APGA SIF is working on training videos to support staff training and development.
Cyber Security has Everyone’s Attention

NATIONAL STRATEGY FOR TRANSPORTATION SECURITY

updated in 2018

OIL AND NATURAL GAS SUBSECTOR CYBERSECURITY CAPABILITY MATURITY MODEL (ONG-C2M2)
What is the ONG-C2M2?

A model and evaluation method that supports ongoing evaluation and improvement of cybersecurity capabilities within the ONG subsector

Objectives

• Strengthen cybersecurity capabilities in the ONG subsector.
• Enable ONG organizations to effectively and consistently evaluate and benchmark cybersecurity capabilities.
• Share knowledge, best practices, and relevant references within the subsector as a means to improve cybersecurity capabilities.
• Enable ONG organizations to prioritize actions and investments to improve cybersecurity.
ONG-C2M2 Model Overview

MIL3 (advanced)
- Includes a progression of practices from MIL1 to MIL3
- MIL2 & MIL3 practices are progressively more complete, advanced, and ingrained; target levels should be set for each domain based on risk tolerance and threat environment

MIL2 (intermediate)
- MIL1 practices are basic activities that any organization should perform; these are the starting blocks

MIL1 (beginning)
- No practices

MIL0

4 Maturity Indicator Levels

10 Model Domains: logical groupings of cyber security practices — activities that protect operations from cyber-related disruptions

- RM: Risk Management
- ACM: Asset, Change, and Configuration Management
- IAM: Identity and Access Management
- TVM: Threat and Vulnerability Management
- SA: Situational Awareness
- ISC: Information Sharing and Communications
- IR: Event and Incident Response, Continuity of Operations
- EDM: Supply Chain and External Dependencies Management
- WM: Workforce Management
- CPM: Cybersecurity Program Management

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

Thank you for your commitment and participation in Pipeline safety!