2015 Executive Conference
Northeast Gas Association

PHMSA Pipeline Safety Program Updates

September 14, 2015

Alan Mayberry
Topics for Today

• Introductions
• Snapshot of Regulated Community Performance
• Context
• Highlights from 2014
• What is happening in 2015
• R&D T
Introductions

• **Anthony Foxx** – Secretary of Transportation

• **Marie Therese Dominguez** – Administrator
  – **Vacant** – Deputy Administrator
  – **Stacy Cummings** – Interim Executive Director
  – **Vacant** – Chief Counsel, (Vasiliki Tsaganos Deputy Chief Counsel)
  – **Artealia Gilliard** – Director, Governmental and International Affairs

• **Jeff Wiese** – Associate Administrator for Pipeline Safety
  • **Linda Daugherty** – Deputy Associate Administrator for Field Operations
  • **Alan Mayberry** – Deputy Associate Administrator for Policy and Programs
## What We Regulate

<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>192,388 Miles</td>
<td>7%</td>
<td>442</td>
</tr>
<tr>
<td></td>
<td>6,970 Tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Transmission</td>
<td>302,811 Miles</td>
<td>11%</td>
<td>993</td>
</tr>
<tr>
<td>Gas Gathering</td>
<td>17,437 Miles</td>
<td>1%</td>
<td>357</td>
</tr>
<tr>
<td><strong>Gas Distribution (Mains &amp; Services)</strong></td>
<td>2,149,291 Miles</td>
<td>81%</td>
<td>1,371</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,661,927</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
<tr>
<td>Liquefied Natural Gas</td>
<td>133 Plants</td>
<td></td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>203 Tanks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some Operators have multiple System Types
Pipeline Safety with Context Measures (1988-2014)

Index (1988 = 1)

Calendar Year

Data Sources: Energy Information Administration, Census Bureau, PHMSA Annual Report Data, PHMSA Incident Data -- as of March 25, 2015

Natural Gas Consumption
Petroleum Product Consumption
Pipeline Mileage
U.S. Population
Major Hazardous Liquid Spills
Incidents with Death or Injury

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
To Protect People and the Environment From the Risks of Hazardous Materials Transportation
Pipeline Incidents with Death or Major Injury (1988-2014)

Actual with Trendline (1988-2014) ... declining about 10% every 3 years

± 1 Standard Deviation from Trendline shows normal range

Calendar Year

Source: DOT-PHMSA Incident Data -- as of March 2, 2015.
Pipeline Spills w/Environmental Consequences (2002-2014)

Actual with Trendline (2002-2014)
... declining about 10% every 8 years

± 1 Standard Deviation from Trendline shows normal range

Calendar Year
Source: DOT-PHMSA Incident Data -- as of March 2, 2015.
Categories of Incident Reports

**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
Serious Incidents
All System Type rises slightly in 2014

29 each in CY 2014  90% Gas Distribution
7%  Gas Transmission
3%  LNG

data as-of 2/2/2015
Gas Distribution Serious Incidents

CY 2014 Leading Causes:
- Other Outside Force Damage
- Other
- Excavation Damage

Data as of 2/2/2015
Significant Incidents

All System Types flat in 2014

Gas Distribution slight rise in 2014

data as-of 2/2/2015
Gas Distribution Significant Incidents

CY 2014 Leading Causes:
- Excavation Damage
- Other Outside Force Damage
- Other

Data as of 2/2/2015
Incidents by Vintage

# Significant Incidents per 1,000 Miles Gas Transmission pipeline By Decade of Pipe Installed (Avg of Annual Incidents 2005-2013)
Our Current World: Threat and Result

Santa Barbara, CA – 05/2015

New York 03/2014

Yellowstone River 01/2015

Sissonville, WV – 12/2012

New Pipe
Context

- Looking back at last year:
  - Energy picture and policy quickly evolving
  - Pipelines on national stage, but joined by crude by rail
  - Media becoming more interested in PHMSA and industry
  - Quite a few high vis accidents, despite overall trend
- Reauthorization process has begun
- Continued calls for PHMSA/OPS to do more
- Significant increased resources for OPS
CY 2014 Highlights

• Continued progress on over 82 mandates and recommendations
• Active regulation writing continued (more later)
• Full transition to “Integrated Inspections”
• Progress on developing meaningful metrics
2015: What is happening...

- Rulemaking action continues
  - Covering all Congressional mandates / recommendations
- Non-rulemaking
- Significant policy development underway:
  - Integrity Verification Process for HL pipelines
  - LNG; small scale applications to fuel transportation
- R & D program; research awards
- Reauthorization
- Recruiting, developing and retaining people
2015 Budget

• Federal staffing increase:
  – Positions, 109 includes:
    • 5 – state grants
    • 4 – training instructors
    • 4 – HQ
    • 85 – Field
    • 7 – attorneys
    • 4 – oil spill / emergency response

• State funding increase: $10 million
RD&T

• Strong & Successful PHMSA/NYSEARCH Partnership In Researching Technology Solutions since 2002
  – 14 projects awarded & 3 projects being considered to NYSEARCH to develop a wide range of technological solutions
  – $10.6M PHMSA + $12.4M NYSEARCH co-funding investment
  – Technology improvements from 3 projects are now in the market
# Past R&D Projects with NYSEARCH

<table>
<thead>
<tr>
<th>Start</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Infrasonic frequency seismic sensor system for preventing third party damage to gas pipelines</td>
</tr>
<tr>
<td>2004</td>
<td>Validation and enhancement of long range guided wave ultrasonic testing: A key technology for DA of buried pipelines</td>
</tr>
<tr>
<td>2004</td>
<td>Design, Construction and testing of a segmented MFL sensor for use in the inspection of unpiggable pipelines</td>
</tr>
<tr>
<td>2004</td>
<td>Design, construction and demonstration of a robotic platform for the inspection of unpiggable pipelines under live conditions</td>
</tr>
<tr>
<td>2006</td>
<td>Long Term Monitoring of Cased Pipelines Using Long-Range Guided-Wave Technique</td>
</tr>
</tbody>
</table>
## Past R&D Projects with NYSEARCH

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<th>Start</th>
<th>Project Title</th>
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<tr>
<td>2006</td>
<td>Long Term Monitoring of Cased Pipelines Using Long-Range Guided-Wave Technique</td>
</tr>
<tr>
<td>2006</td>
<td>Ultra-Low Frequency Pipe and Joint Imaging System</td>
</tr>
<tr>
<td>2008</td>
<td>Advanced Development of Proactive Infrasonic Gas Pipeline Evaluation Network</td>
</tr>
<tr>
<td>2010</td>
<td>Completion of Development of Robotics Systems for Inspecting Unpiggable Transmission Pipelines</td>
</tr>
<tr>
<td>2010</td>
<td>Advanced Development of PipeGuard Proactive Pipeline Damage Prevention System</td>
</tr>
<tr>
<td>2010</td>
<td>Development and Field Testing of a Highly Sensitive Mercaptans Instrument</td>
</tr>
</tbody>
</table>
# Active Projects with NYSEARCH

<table>
<thead>
<tr>
<th>Start</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Advanced Development and Technology Transfer of a Methane/Natural Gas Microsensor</td>
</tr>
<tr>
<td>2013</td>
<td>Development, Field Testing and Commercialization of a Crack and Mechanical Damage Sensor for Unpiggable Natural Gas Transmission Pipelines</td>
</tr>
<tr>
<td>2013</td>
<td>Technology Transfer, Demonstrations and Post-Mortem Testing of Cast Iron and Steel Pipe Lined with Cured-in-Place Pipe Liners</td>
</tr>
</tbody>
</table>
## Projects currently under consideration

<table>
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<tr>
<th>Project Title</th>
</tr>
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<tr>
<td>Emissions Quantification Validation Process</td>
</tr>
<tr>
<td>Development of an AMR Eddy Current-Based Crack Detection Sensor for the Live Inspection of Unpiggable Natural Gas Transmission Pipelines</td>
</tr>
<tr>
<td>Development of a Hardness Tester for Quantification of Material Properties in Live Natural Gas Transmission Pipelines</td>
</tr>
</tbody>
</table>
Competitive Academic Agreement Program (CAAP)

1. **Spur innovation:** Enable academic research for high risk/high reward solutions for pipeline safety challenges
   - Projects can “hand-off” to PHMSA’s core research program for further development

2. **Expose students to pipeline industry & safety:** “Plant seed” to connect Universities with pipeline industry and pipeline safety. Encourage talented students to enter industry.
Since 2013, PHMSA has awarded 15 projects.
- Each project: $100k, ≤ 2 year duration
- Total: $1.5M PHMSA + $745K Resource Sharing
- 79 involved students

### CAAP FY13 & FY14

<table>
<thead>
<tr>
<th>Annual Announcement</th>
<th># Awards</th>
<th>PHMSA</th>
<th>Resource Sharing</th>
<th># U-Grad Students</th>
<th># Grad Students</th>
<th># PhD Students</th>
<th>Total # Students</th>
<th># Interns (a)</th>
<th># Career Employed (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAP-1-13</td>
<td>8</td>
<td>$814K</td>
<td>$353K</td>
<td>21</td>
<td>18</td>
<td>14</td>
<td>53</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CAAP-2-14</td>
<td>7</td>
<td>$699K</td>
<td>$391K</td>
<td>4</td>
<td>12</td>
<td>10</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Totals:</td>
<td>15</td>
<td>$1,513K</td>
<td>$745K</td>
<td>25</td>
<td>30</td>
<td>24</td>
<td>79</td>
<td>1</td>
<td>0</td>
</tr>
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</table>

Footnotes:
(a) Denotes the number of internships offered by engineering firms, research organizations, government agencies or pipeline operators to students involved with CAAP research projects.
(b) Denotes the number of full time career employment/jobs offered by engineering firms, research organizations, government agencies or pipeline operators to students involved with CAAP research projects.
Research & Development: University Partnerships

Competitive Academic Agreement Program (CAAP)

In 2013, PHMSA’s Pipeline Safety Research Program implemented a new program entitled CAAP breathing further innovation into pipeline safety research. PHMSA targets University Graduate Students for the future pipeline safety workforce. PHMSA’s vision for this program is to select 5 or more awards annually utilizing $100,000 PHMSA plus a 30% cost sharing by our university partners on each project. These are Cooperative Agreements that are competitively selected and can run up to 24 months in duration. However, the number of awards are dependent upon quality of submissions and grant limitations. These initiatives are intended to research a wide set of solutions for many known pipeline integrity challenges.

The CAAP is intended to spur innovation through enabling an academic research focus on high risk and high pay-off solutions for wide ranging pipeline safety challenges. The CAAP is different in focus, execution and reporting than PHMSA’s core program on Pipeline Safety Research. It is intended to potentially deliver desired solutions that can be "handed-off" to further investigations in CAAP or in PHMSA’s core research program that employs partnerships with a variety of public/private organizations. One goal in this strategy would be to validate proof of concept of a thesis or theory potentially all the way to commercial penetration into the market.

Another goal for CAAP is to expose graduate and PhD research students to subject matter common to pipeline safety challenges for illustrating how their engineering or technical discipline is highly desired and needed in the pipeline field. The pipeline industry and federal/state regulators are all experiencing low numbers of entry level applications to positions that are engineering or technically focused. Public conferences, meetings and journals have identified similar shortfalls. The ultimate benefits from this goal would be to reflect new talent in all aspects of pipeline similar to how programs at other Federal Agencies and non-profit organizations have provided talent to other industries over time.

Summary De-Brief Presentation: Submitting Superior CAAP Applications

CAAP Summary Totals

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<td>16</td>
<td>15</td>
<td>54</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>CAAP-2-14</td>
<td>7</td>
<td>$699K</td>
<td>$331K</td>
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<td>$745K</td>
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<td>30</td>
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CAAP Universities

- **FY 13 (8 Awards)**
  - Columbia U.
  - Iowa U.
  - N. Dakota State U.
  - Ohio U.
  - Texas A&M
  - U. Buffalo
  - U. Colorado Denver
  - U. Tulsa

- **FY 14 (7 Awards)**
  - Colorado School Mines
  - Iowa State U.
  - Texas A&M
  - U. Colorado Denver
  - U. Nebraska
  - U. Tulsa
  - U. Tulsa
2014 R&D Forum: CAAP Poster Session

8 Poster Papers presented to Pipeline Industry & Industry Researchers
CAAP FY15

- Total budget increased to $2M
- Each project: ≤$300k, ≤ 3 year duration
- Solicited in April 2015, received 37 proposals
- 6 awards anticipated in FY2015-Q4
- Awards require non-federal funding match of 20%
Thank You!

Alan Mayberry

US DOT / PHMSA