Research & Development:
Hazardous Liquid Pipelines – A National Perspective

PHMSA/NAPSR Pipeline Research & Development Workshop

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❖ **API/AOPL Pipeline Safety Improvement Areas**

❖ **Research Initiatives**

  ↻ **Initial Priorities**

  ↻ **Focus Areas**

❖ **ILI Enhancement Program**

❖ **PRCI Roadmapping Areas**

❖ **Challenge**

Pipeline Safety Improvement Areas

- ❖ **Leak Detection**
- ❖ **Damage Prevention**
- ❖ **Data Integration**
- ❖ **Information Sharing and Lessons Learned**
- ❖ **Public Awareness & Communication**
- ❖ **Strategic Planning**
- ❖ **Emergency Response Preparedness**
- ❖ **Research & Development – Enhanced Technology**

While all the initiatives are important and may generate R&D ideas,
our focus is on advancing current Research & Development

Research & Development – Enhanced Technology

❖ Goals

- ↺ Assess research gaps, identify critical research needs, and determine how existing funding strategies and timelines should change

- ↺ Determine areas where additional advancement through technology application or new R&D could significantly impact pipeline safety

- ↺ Leverage processes pooling industry <u>all</u> resources to determine how best to advance R&D in critical technology areas

Initial Research Priorities

- ❖ **Improve Leak Detection capabilities across all ranges of pipeline operations, physical properties, and products**

- ❖ **Enhance Damage Prevention Technologies including remote surveillance and sensor development**

- ❖ **Improve understanding of flaws in longitudinal pipe seams that lead to failures**

- ❖ **Enhanced In-Line Inspection (ILI) technologies capabilities**

❖ **SCC & Cracking – welds and pipe body**

❖ **Mechanical Damage defect implication**

❖ **Data Integration along with decision-making processes and tools**

❖ **Facility Integrity**

 ↻ **Unpiggable pipelines**

 ↻ **NDE**

ILI Technology Enhancement

❖ **The Industry (both liquids & gas) want to expand and accelerate its comprehensive research and development program aimed at enhancing current in-line inspection (ILI) tools and develop the next generation of technology to ensure pipeline safety, integrity, and reliability.**

❖ **Using Pipeline Research Council International, Inc. (PRCI) as the vehicle, the industry recently pooled its resources of personnel, consultants, vendors, and in-kind resources and invested over a million dollars to an initial very focused project in this area.**

❖ **This will be a multi year, multi-million dollar effort**

ILI Technology Enhancement (cont.)

❖ **The project is to evaluate the ability of current ILI technology to determine a pipeline metallurgical "fingerprint."**

❖ **The project is to use data from ILI tool runs to determine when there are changes in pipeline materials and/or properties.**

❖ **The analysis and evaluation will take into account a detailed review of historical pipeline manufacturing processes and chemistries as they relate to ILI data sets (use this knowledge along with timelines to understand potential pipe properties).**

❖ **These data sets will help operators target areas where there may be discrepancies in their knowledge of the as-built system details and ensure that operators are meeting the requirements for confirming traceable, verifiable, and complete records.**

PRCI Roadmapping Areas

❖ **Corrosion Roadmaps**
- ↻ **Internal & External Corrosion**
  - ▤ **Prevention**
  - ▤ **Assessment**
  - ▤ **Mitigation**
- ↻ **Stress Corrosion Cracking (SCC)**
- ↻ **Ethanol Transportation**

❖ **Design, Materials and Construction**
- ↻ **Design & Construction**
- ↻ **Materials, Welding & NDE**
- ↻ **Structural Integrity Assessment**

❖ **Operations & Integrity**

 ↻ **Leak Detection**

 ↻ **ERW/Longitudinal Seam Welds**

 ↻ **SCC & Cracking – welds and pipe body**

 ↻ **Integration & Decision-making Processing Tools**

 ↻ **Mechanical Damage Prevention**

 ↻ **Damage Prevention & ROW Monitoring**

 ↻ **Anomaly Assessment**

 ↻ **Facility Integrity**

 ↻ **Difficult to inspect pipelines (unpiggable)**

 ↻ **ILI Technology Enhancements**

 ↻ **Risk Assessment**

"Although pipelines continue to be the safest mode of transportation, it is imperative that the industry continues to innovate to ensure the integrity of these key systems to achieve our goal of zero incidents. This goal cannot be met without research and development delivering the next generation of solutions"

stated Andy Black
AOPL President & CEO