

WORKSHOP ON PIPELINE SAFETY RESEARCH & DEVELOPMENT

Office of Pipeline Safety
U.S. Department of Transportation

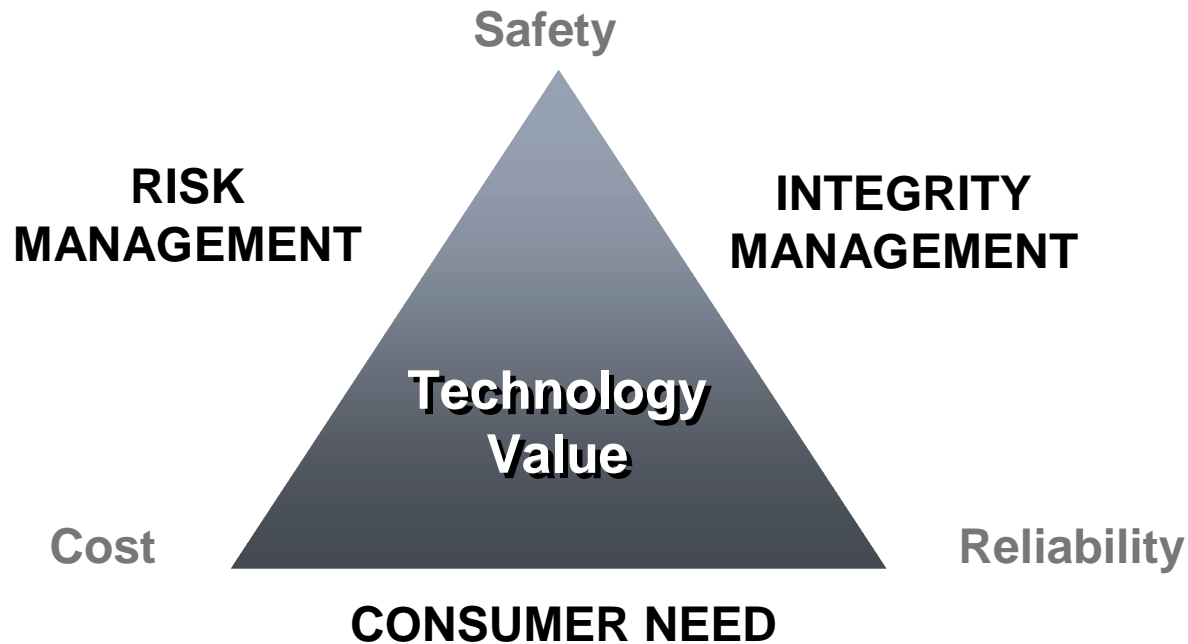
“R&D Drivers”

George W. Tenley, Jr.
President

Pipeline Research Council International, Inc.

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Why Technology?



- ⇒ Safety of the Public, Employees and the Environment
- ⇒ Reliability for Customers and Suppliers
- ⇒ Cost Minimization While Maintaining Safety and Reliability

Why Technology?

Risk & Integrity Management

Reliability of service to customers

Drives

Integrity of the pipeline system

Provides

Safety of the public, employees and the environment

Demands

Knowledge to optimize operations and drive the process

Data – information – knowledge - wisdom

Integrity Management can only be built upon sound technology

The Role of Technology

Three Phases; In Sequence or in Combination

- ⇒ **Identify the Problem (not the symptoms)**
- ⇒ **Assess/Understand the Problem**
- ⇒ **Control or Prevent the Problem**

This paradigm enables all drivers to be addressed

Technology and Pipeline Operations

The Fundamental Questions

⇒ Do What?

- *Select the right response for the problem or condition*

⇒ Why Do It?

- *Protect workers, the public, the environment and the asset*
- *Security, the emerging issue; need to start by asking the right questions*

⇒ Do it How?

- *Optimize opportunities to assure integrity management*

The Operations Drivers

⇒ The Tools to Determine and Enhance the State of the Infrastructure

- *Pipe and equipment condition*
- *Nature and threats from the surrounding environment (people, soil, water, etc.)*
- *Repair methods that are “better, faster, cheaper”*
- *Internal inspection that can “see, assess, and report” accurately*
- *Assuring “leak before rupture” of gas transmission pipelines*
- *Improving leak detection capabilities, natural gas and hazardous liquid pipelines*

⇒ The Analyses and Tools for the New and Replacement Infrastructure

- *New design methods*
 - *Reliability-based design*
 - *Limit states analysis*
 - *Finite element analysis*
- *New pipe materials that are damage and defect resistant*
- *New inspection and test methods; less intrusive, more reliable, more efficient*
- *New construction methods that are “better, faster, cheaper”*
- *New techniques and tools for welding, corrosion control, flow control*

The Operations Drivers

⇒ **Establishing the Technical Basis for Standards and Regulations**

- *Baselines for all critical operating aspects*
- *Foundation for ongoing introduction of new technology*
- *Common ground for pipeline operators and all stakeholders*
- *Foundation of risk management; integrity management*

The “External” Drivers

⇒ The Concerns and Needs of Government

- *Assuring the industry does the right thing, the right way, at the right time*
 - Key to the government fulfilling its public service obligation
 - The “quality assurance audit” vs the “compliance checklist”
 - Key to successful integrity management
 - Industry standards that are credible, technologically sound, and auditable
 - Assuring that government personnel know more about “pipelining”

- *The aging of the pipeline infrastructure*
 - How old is too old?
 - Age as a key risk factor; not a sole determinant of integrity
 - Assuring new tools keep up with “old” pipes to enable a substantially “unlimited” life

- *Preventing external force damage – both instantaneous and delayed failures*
 - DOT: damage from 3rd-party excavators; damage from other buried facilities
 - MMS: subsea conditions; bottom stability; marine activities

The “External” Drivers

⇒ The Concerns and Needs of Government

- *Achieving improved leak detection, particularly for hazardous liquid pipelines*
 - DOT & MMS: integrity includes environmental protection
 - DOT & MMS: real-time; fast response to limit impacts

- *Reducing the number and impact of failures*
 - Overall trends reflect fewer failures; but impacts can still be large
 - Controlling the impacts of encroachment – “risks to pipelines”
 - Improving public awareness and involvement; getting the technology message out – in place and coming on line

- *Assuring the appropriate protection for the level of risk after reasonable measures (regulatory compliance) are taken – industry operating above the compliance bar*

The “External” Drivers

⇒ Interacting with the Regulatory System

- *Assuring sound technical basis for standards and rules*
- *Enabling an incentivized and credible integrity management system*
- *Increasing shared knowledge and understanding of pipeline operations*

⇒ The Public Interest and Industry Commitment

- *Clarifying the risks and the means to manage them*
- *Communicating the right information to the right audience*
- *Industry as “Information provider” not “excuse maker”*
- *Demonstrating industry knows what it is doing, and is doing the right things*
- *Increasing public confidence in the system and in those who operate and oversee it*

⇒ The Political Situation

- *Move legislative debate to risk, capabilities ,and performance and away from the last incident*
- *Legislative direction narrows and stifles technology development*
- *More government R&D funding will require a focused and rational plan; must assure key role for industry technical and management expertise*

The Business Drivers

⇒ **Preserve, Enhance, and Extend the “Hard Assets”**

- *New supplies from domestic sources*
- *Connecting new pipelines to a sound, existing system*
- *Engines and equipment that are fully compliant while highly efficient*
- *Metering to assure product quality and enable faster transactions*
- *Storage to assure system flexibility and responsiveness*
- *The “commoditization” of transportation; fluid market for assets – due diligence*

⇒ **Maximize Asset Value and Shareholder Return**

- *New demand for gas-fueled electric generation*
- *System functionality and flexibility (markets and products)*
- *New supplies; new and shifting markets; multiple commodities; two-way flow*
- *Leverage resources and skills with better tools; key to assuring productivity*
- *Assure capacity and deliverability – how much, where, and when*
- *A key goal: 30 Tcf natural gas market by 2020*

⇒ **Maximize Value by Minimizing Liabilities**

- *Identify, assess, and control/manage risks; “keep the product in the pipe”*
- *Establish integrity-based relationship with regulators*
- *Prepare a better case for permitting & building new facilities*
- *Goal: energy security = integrity and reliability*

Industry Technology Collaboration Mirrors the New Initiative and Focus on Integrity Management

- ⇒ **Find, Understand and Control the Problem**
- ⇒ **Goal to Make Direct Assessment (DA) an Equivalent Tool to Prove System Integrity Over Time (Creating Baselines, Managing Changes)**
- ⇒ **Technology Development is a Key Source for Critical Data to Substantiate DA for Integrity and Risk Management**
- ⇒ **Industry Focus on Crafting Singular Technologies into Higher Impact “Tools” to Better Locate, Understand, and Control Threats to Integrity**

Technology Collaboration of Government, Industry, and Constituent Groups is Timely and Necessary

- ⇒ **Unfocused, Parochial Funding of Technology is Wasteful**
- ⇒ **A National “Technology Blueprint” for Key Work to be Done and Appropriate Role and Focus for Federal Funding; Consensus-based Effort Will Draw Multiple-**
 - *Interests,*
 - *Perspectives*
 - *Capabilities*
 - *Impacts*
- ⇒ **New leadership in DOT committed to technology as key plank in policy platform; technology seen as critical to:**
 - *Assuring accessibility and accountability of both industry and government*
 - *Enhancing public confidence*
 - *Increasing knowledge of pipelines for all stakeholders*

In Summary

Technology

- ⇒ **Provides the Means to Identify, Understand, and Control Problems**
- ⇒ **Enables the Development and Application of the Best Solution for Each Problem in the Operating Environment in Which it Occurs**
- ⇒ **Provides the Critical Building Block of Sound, Thorough Integrity Management**
- ⇒ **Produces Value; Value = Improvement and Innovation; Enables Operations that are Productive, More Responsive, and Lower Cost**