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 R&D Forum

Houston, Texas • March 22, 2005

# GOVERNMENT/INDUSTRY PIPELINE R&D FORUM

## Brainstorming Session on the Benefits of Pipeline R&D

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**Session Chair**  
Houston, Texas  
March 22 – 24, 2005



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## Today's Goals

- **Identify a Core Set of the Most Significant Research Benefits**
- **Identify the Role of Tangible & Intangible Benefits in Setting Realistic Performance Measures**
  - *For research deliverables*
  - *For the research process*



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## Today's Goals

- **Assess Where the Benefits Needed by Industry & Government Intersect**
- **Assess the Extent to Which Those Needs are being Met by Research Currently Underway**



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## Research

### Core Elements:

1. Knowledge
2. Technology
3. Technology Transfer
4. Application

*Must Have 3 & 4 to Get Benefits*



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## Role Of Research

**To Produce Benefits to Meet Primary Challenges Facing the Pipeline Industry:**

- **Assuring the Reliability of the National Pipeline Asset**
- **Anticipating Change ⇒ Adapting Existing Infrastructure - Or – Building New Pipelines Where & When They are Needed**
- **Continuing to Reduce Risks By & To Pipelines & Surrounding Communities**



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## Tangible v. Intangible Benefits

Webster Says:

- Tangible – “Capable of being appraised at an actual or approximate value.”
- Intangible – Not “Capable of . . .”

**Is it Either/Or? Can Tangible Follow Intangible as Quantification Becomes Possible?**



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## Why Does Benefit Evaluation Matter?

- **Research Should Be Supported Only Where Value Is Created**
  - *A variety of stakeholders enjoy these benefits*
    - Sometimes unknowingly
  
- **“Value” Cannot Be Determined Without Assessing Benefits**
  - *Benefits to the pipeline, the customer and the public*
    - Government & industry may see these benefits differently



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## Why Does Benefit Evaluation Matter?

- **Therefore, If Research Has a Future, Benefits Must Be Demonstrated**
  - *If the benefits are real, and can be captured by a segment, should that segment pay for the research? Alone?*
    - It must be made aware of this value creation
    - Therefore, performance metrics are essential





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## When Does a Research Benefit Emerge?

Three Necessary Prerequisites:

- When a Technology Transfer Vehicle Exists
- When the Technology Transfer Vehicle is Used
- When the Participants Apply & Assess the Result
  - *“Used and Useful”*



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## Candidate Benefit Elements: Tangible or Intangible?

- Fewer Customer Interruptions; Avoidance of Shutdown for Repair
- Fewer Excavations
- Technically-justified Re-inspection Intervals
- Technically-justified Re-inspection Methods



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## Candidate Benefit Elements: Tangible or Intangible?

- Technically-justified Pipe Remediation: Nature, Type, Extent
- Life Extension & Enhanced Productivity of Existing Assets
- Timely Warning of Imminent Harm to and from Pipelines



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## Candidate Benefit Elements: Tangible or Intangible?

- **Earliest Possible Leak Detection**
- **Reduced Leak Mitigation Costs**
- **Faster, Less Complicated Project Permitting**
- **Reduced Frequency & Impacts of Unscheduled Outages**



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## Candidate Benefit Elements: Tangible or Intangible?

- **Least-cost Pipeline Construction**
- **More Finite & Cost-effective Assessment of Real-time Conditions**
- **Providing the Technically-sound Bases for Cost-effective Rules & Industry Voluntary Standards**



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## Tangible Benefits

# A PRCI Cost-Benefit Study Approach

- **Assessing Projects that Led the Operator to Do Something Different:**
  - *New design, engineering or operating practice/guideline*
  - *Direct contribution to a new standard or code*
  - *Eliminated a pending requirement or historical practice*
  - *Changed a purchasing specification, or*
  - *Had a measurable/verifiable cost-impact*



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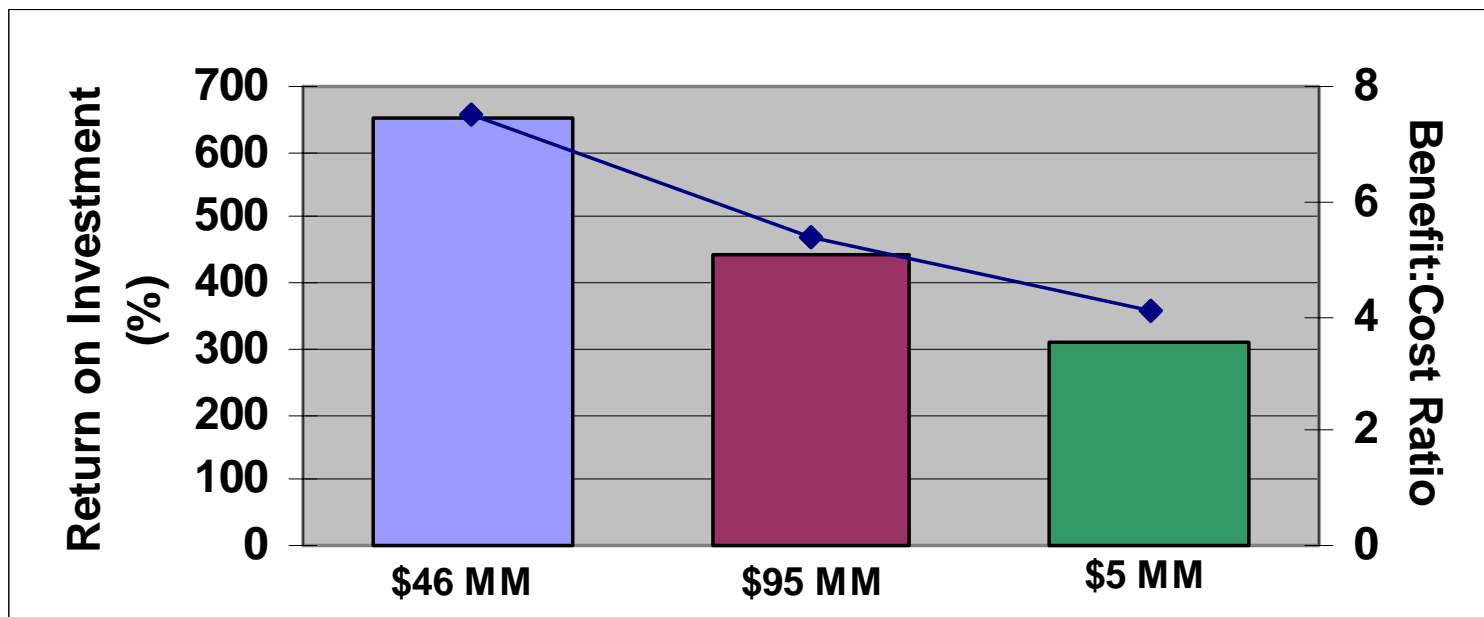
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## Tangible Benefits

### A PRCI Cost-Benefit Study Approach

- **Projects That Validated Existing Practice, Improved Safety Margins, or Provided Better Understanding of Various Phenomena were not Included – *INTANGIBLE?***

# R&D Tangible/Financial Returns



PV of Net Benefits (circa 2002)





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## Quantified & Non-Quantified Items in Use

Project	Impacts/Benefits 1992-2002	Capital or Operating Budgets
X70 Linepipe	\$ 5.4 MM + \$0.1 MM/yr	Capital Operating
Girth Weld Defect Acceptance Criteria	\$ 5.1 MM	Capital
RSTRENG	\$ 16.3 MM/yr (2002 and 2003)	Operating
Phosphoric Acid Pipe Coating Purchase Specifications	\$ 1.5 MM + \$0.16 MM/yr	Capital Operating
Integrity of cold field-bent pipe	Fracture Control Technology to establish pipe toughness specs	Pipeline Repair Manual
Serviceability of corroded girth welds	H2 cracking of high-strength steel	Weld deposition repair methods
External Corrosion Direct Assessment	Plastic deformation of girth-welded and structural sleeves	Valve-spacing basis



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## Additional Research Benefits – Intangible?

- **Most Involve System Integrity & Safety**
  - *“Scientific validation of existing practice”*
    - Valuable for regulators, insurance co’s and in litigation
  - *Lower risk of failure or outage = avoided costs*
  - *Improved safety margins*
    - Significant value, but hard to quantify



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## Summary: Tangible vs. Intangible

- **The R&D Financing System Responds Best to Tangible Benefits**
  - *'Show me the money'*
  
- **Intangible Benefits are Important & Legitimate**
  - *Public safety*
  - *Service reliability (including the "emotional" toll of unreliability)*



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## Summary: Tangible vs. Intangible

- **R&D Value Assessment Should Capture Both**
  - *Should it attempt to quantify the unquantifiable?*
  - *Or is simple enumeration of intangible benefits adequate?*
- **Performance Metrics are Needed to Evaluate Research Results & the Research Process**



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## — Finally; About Benefits & Metrics . . .

**Who Gets to Set the Goals?**

**Whose Benefits Matter Most?**

**When Do You Determine Them?**

**Who Gets to Say if They Were Achieved?**

**Can the Benefits Achieved by One Interest Be a Setback to Another?**