

2004 API Pipeline Conference and Cybernetics Symposium

Regulatory Update - Research & Development

Office of Pipeline Safety

April 13-15, 2004

New Orleans, Louisiana

Hilton New Orleans Riverside Hotel



Our Mission

Office of Pipeline Safety

To ensure the safe, reliable, and environmentally sound operation of the Nation's pipeline transportation system

Office of Pipeline Safety Research & Development Program

To sponsor research and development projects focused on providing near-term solutions that will increase the safety, cleanliness, and reliability of the Nation's pipeline transportation system



Research & Development Paradigm



R&D Program Elements for Pipeline Safety

1. Damage Prevention & Leak Detection
2. Pipeline Inspection & Direct Assessment
3. Defect Assessment, Characterization & Mitigation
4. Improved Design, Construction, & Materials
5. Mapping & Information Systems
6. Enhanced Operation Controls & Encroachment Monitoring
7. Risk Management & Communications
8. Other Safety Issues for Emerging Technologies

Collaborate/Coordinate/Co-Fund Activities and Drivers

Pipeline Safety Improvement Act (PSIA) of 2002

- Develop a five-year research program plan
- Establish memorandum of understanding
- Quarterly coordination meetings
- Future combined pipeline R&D solicitations
- Common Pipeline R&D Program Presentation

Joint Government/Industry R&D Forum

- Challenge/Gap identification
- Program and project information dissemination and feedback

Blue Ribbon Panel

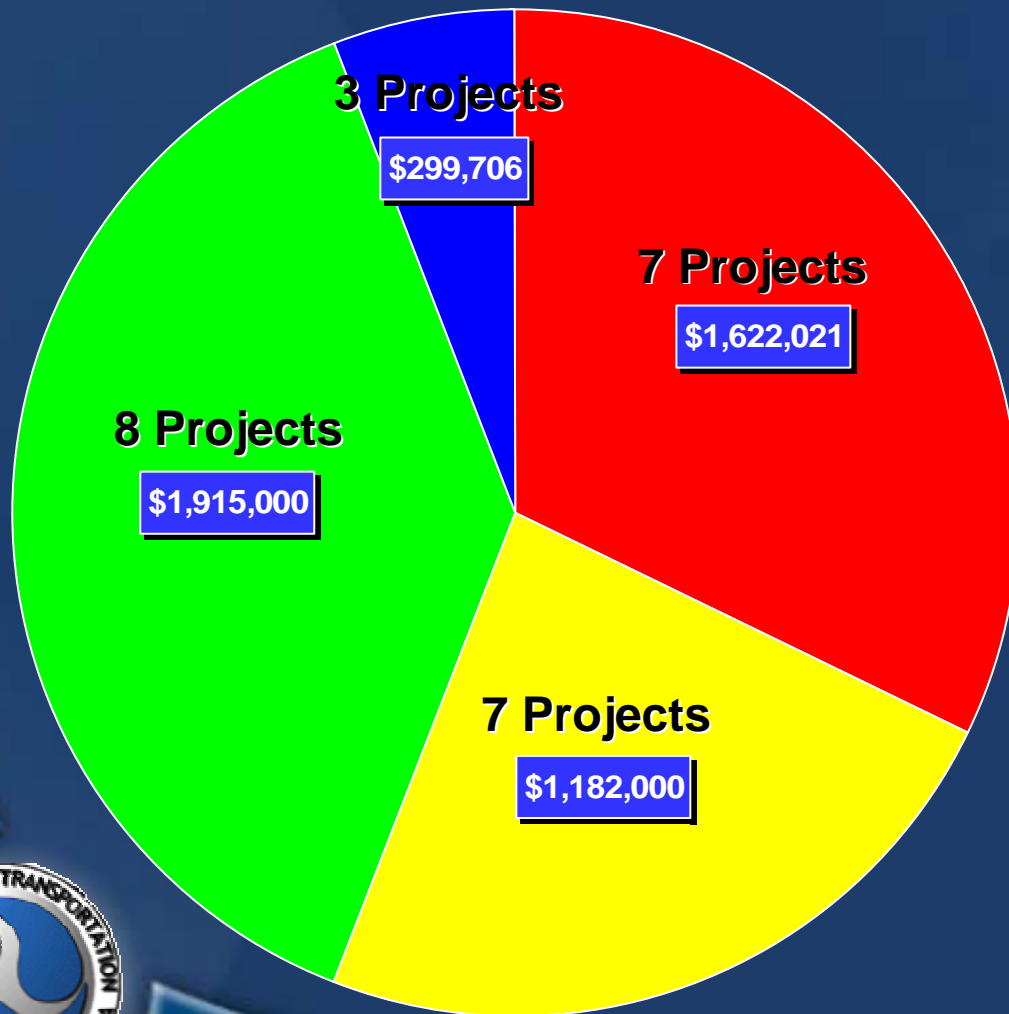
- Stakeholder input on program direction and feedback

Pipeline Safety Advisory Committees

- Program dissemination and feedback on activities



Broad Agency Announcements & Small Business Innovation Research



- BAA #1 (March 2002)
- BAA #2 (June 2002)
- BAA #3 (Dec 2002)
- SBIR (June 2003)

Total Projects Awarded Since March 2002

25

Total OPS Funding

\$5,018,727

Total Industry Co-Funding

\$5,568,475



Liquid & Dual Focused Pipeline Research & Development

1. Application of Remote-Field Eddy Current Testing to Inspection of Unpiggable Pipelines
2. Mechanical Damage Inspection Using MFL Technology
3. Feasibility of In-Line Stress Measurement by Continuous Barkhausen Method
4. Baseline Study of Alternative In-Line Inspection Vehicles
5. Digital Mapping of Buried Pipelines with a Dual Array System
6. Enhancement of the Long-Range Ultrasonic method for the Detection of Degradation in Buried, Unpiggable Pipelines
7. High CP Potential Effects on Pipelines
8. Managing the Integrity of Early Pipelines
9. Emerging Padding and Related Pipeline Construction Practices
10. NoPig Metal-Loss Detection System for Non-Piggable Pipelines
11. Assessment & Validation of TFI-Identified Anomalies Criteria for Repair and Available Repair Methods
12. A Comprehensive Update in the Evaluation of Pipelines Weld Defects
13. Corrosion Assessment Criteria: Rationalizing Their Use Applied to Early vs. Modern Pipelines
14. Alternate Welding Processes for In-service Welding
15. Validation of Sleeve Weld Integrity and Workmanship Limit Development
16. Improved Inspection and Assessment Methods for Pipeline Girth Welds and Repair Welds
17. High-power, Long-range, Guided-wave Inspection of Pipelines
18. Intrinsic Distributed Fiber Optic Leak Detection
19. Airborne LIDAR Pipeline Inspection System (ALPIS) Mapping Tests
20. Strain-Based Design of Pipelines - 2nd Effort
21. An Assessment of Magnetization Effects on Hydrogen Cracking for Thick Walled Pipelines
22. International Workshop on Advances Research & Development of Coatings for Corrosion Protection
23. An Assessment of Safety, Risks and Costs Associated With Subsea Pipeline Removals

Liquid & Dual Focused Pipeline Research & Development

Application of Remote-Field Eddy Current Testing to Inspection of Unpiggable Pipelines

Southwest Research Institute
- PRCI

The purpose of the research is to determine if an ILI using RFEC testing is adequate to inspect currently unpiggable pipelines.

Total Project Cost: \$175,000.00

Mechanical Damage Inspection Using MFL Technology

Battelle Corporation
- PRCI

To address mechanical damage ILI through the use of smaller/simpler MFL tools. The project hypothesis is that this approach might work for inspection of currently unpiggable pipelines since the tools will be smaller.

Total Project Cost: \$760,000.00

Liquid & Dual Focused Pipeline Research & Development

Feasibility of In-Line Stress Measurement by Continuous Barkhausen Method

**Southwest Research Institute
- PRCI, Rosen USA,
Iowa State University**

This project will demonstrate the use of modified MFL ILI tools to inspect mechanical damage, cracks, wrinkles and corrosion.

Total Project Cost: \$160,000.00

Baseline Study of Alternative In-Line Inspection Vehicles

**Southwest Research Institute
- PRCI**

To conduct a baseline study of alternative ILI vehicles that might be able to negotiate unpiggable pipelines. The researchers will: (1) Identify unpiggable pipelines and mitigation options, (2) Compare designs of ILI devices in other industries, (3) Identify inspection options (4) Identify current ILI systems in the U.S. and abroad, and (5) Discuss internal tool capability in other related industries.

Total Project Cost: \$80,000.00

Liquid & Dual Focused Pipeline Research & Development

Digital Mapping of Buried Pipelines with a Dual Array System

Witten Technologies
- ConEdison

To develop a non-invasive system for detecting, mapping and inspecting steel and plastic pipelines from the surface.

Total Project Cost: \$944,000.00

Enhancement of the Long- Range Ultrasonic Method for the Detection of Degradation in Buried, Unpiggable Pipelines

PetroChem Inspection
- Penn State, Plant Integrity, Ltd.,
FBS, Inc.

To develop better ultrasonic technologies for detecting degradation in buried, unpiggable, pipelines.

Total Project Cost: \$1,133,325.00

Liquid & Dual Focused Pipeline Research & Development

High CP Potential Effects on Pipelines

CC Technologies Services, Inc.
- PRCI

To develop a set of guidelines for pipeline operators, which would enable the users to determine the limiting cathodic protection potentials for a given steel metallurgy and coating type and thickness to mitigate possible hydrogen-induced damage and coating disbondment and/or blistering.

Total Project Cost: \$160,000.00

Managing the Integrity of Early Pipelines

Battelle Corporation
- PRCI, INGAA

To develop a quantitative basis for evaluating the significance of specific time-dependent threats, as the basis to determine the effectiveness of mitigative measures proposed in a given IMP.

Total Project Cost: \$402,000.00

Liquid & Dual Focused Pipeline Research & Development

Emerging Padding and Related Pipeline Construction Practices

**Battelle Corporation
- INGAA**

To quantify the merits of modifications to existing construction practices and emerging practices related to pipeline padding. The work will assist the Office of Pipeline Safety (OPS) in determining the value of such construction practices when made in the context of performance-based inspection or in re-inspection plans.

Total Project Cost: \$140,000.00

NoPig Metal-Loss Detection System for Non-Piggable Pipelines

**FINO AG
- PRCI**

To confirm the NoPig System provides accurate pipeline metal-loss detection within present specifications, improve the system to be able to discriminate between Defects and apply the technology to larger diameter pipelines for metal-loss detection and discrimination.

Total Project Cost: \$815,000.00

Liquid & Dual Focused Pipeline Research & Development

Assessment & Validation of TFI-Identified Anomalies Criteria for Repair and Available Repair Methods

CC Technologies Services, Inc.
- PRCI

To compile and evaluate the unique properties of early generation pipeline weld seams, compile a catalog of defect types, and to develop methods for evaluating seam weld defects to determine whether pipeline integrity has been compromised.

Total Project Cost: \$140,000.00

A Comprehensive Update in the Evaluation of Pipelines Weld Defects

EMC², Inc.
- PRCI

To update Appendix A of API Standard 1104 for girth weld defect acceptance criteria to reflect the increased use of mechanized welding and automated ultrasonic testing in new pipeline construction.

Total Project Cost: \$700,000.00

Minerals Management Service

Pipeline R&D

Focus on Offshore Pipelines - Arctic, Ageing Infrastructure & Deepwater

1. Corrosion Internal/External
2. Repair & Inspection
3. Risk Assessment & Reliability
4. Identification & Mitigation of Geohazards
5. Operational Development

Co-Funded MMS/OPS

1. Strain-Based Design of Pipelines - 2nd Effort
2. An Assessment of Magnetization Effects on Hydrogen Cracking for Thick Walled Pipelines
3. Int. Workshop on Advances Research & Development of Coatings for Corrosion Protection
4. An Assessment of Safety, Risks and Costs Associated With Subsea Pipeline Removals

MMS Funded

5. Reliability/Integrity of Large Steel Catenary Risers for Ultra-DeepWater Applications
6. New Touch Down Zone Solutions for Steel Catenary Risers
7. Design of Cathodic Protection Systems for Steel Catenary Risers
8. Hurricane Lili Induced Pipeline Damage
9. Spanning/Vortex Induced Vibrations

<http://www.mms.gov/tarphome/index.htm>



<http://primis.rspa.dot.gov/rd>

Research & Development

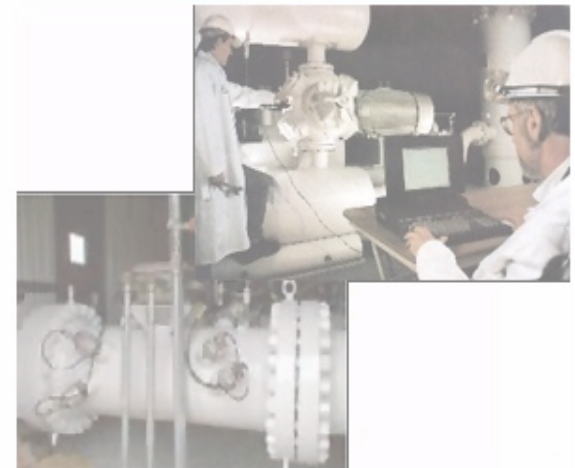
- R&D Home
- Announcements
- Recent Projects ▶
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- Feedback
- OPS Communications

Welcome to RSPA's Pipeline Safety Research and Development Website.

This site is dedicated to the coordination and dissemination of Research and Development information related to Pipeline Safety.

OPS conducts and supports research to support regulatory and enforcement activity and to provide the technical and analytical foundation necessary for planning, evaluating, and implementing the pipeline safety program. OPS is sponsoring research and development projects focused on providing near-term solutions that will increase the safety, cleanliness, and reliability of the Nation's pipeline system.

Recent R&D projects are centered on leak and damage detection and prevention of the leading causes of pipeline failure. This includes: leak detection; detection of mechanical damage; improved pipeline system controls, monitoring, and operations; and, improvements in pipeline materials. These projects are addressing technological solutions that can quickly be brought to bear to improve pipeline safety.



Broad Agency Announcement #4

148 White Papers Submitted

Damage Prevention (28 White Papers)

- Focus on the detection and prevention of excavation damage

Leak Detection (12 White Papers)

- Focus on the detection of small leaks

Enhanced Pipeline Operations, Controls, and Monitoring (19 White Papers)

- Human factors
- Airborne chemical mapping and pipeline encroachment monitoring
- Improved directional drilling

Improved Materials Performance (19 White Papers)

- Evaluation and development of promising new pipe materials
- Pipe coatings

Other Pipeline Safety Improvements (70 White Papers)

- Strengthening and validating direct assessment (DA) practices
- Mathematical pipeline modeling enhancements or computational pipeline modeling enhancements
- In Line Inspection for damage or defects
- Crack detection and Stress Corrosion Cracking (SCC)
- Design and Safety technology enhancements for LNG facilities

Thank You!

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