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

- Problem Identification
  - Data
  - Accidents

- Technical Challenge

- Improved Practice
  - Standards
  - Methodologies

- Set Goals Regulations

- Develop Technology
  - R&D
  - Field Validations
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)**: 3 Projects, $299,706
- **BAA #2 (June 2002)**: 7 Projects, $1,622,021
- **BAA #3 (Dec 2002)**: 3 Projects, $1,182,000
- **SBIR (June 2003)**: 7 Projects, $1,915,000

Total Projects Awarded Since March 2002: 25

- **Total OPS Funding**: $5,018,727
- **Total Industry Co-Funding**: $5,568,475
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
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
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
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
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
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
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
液态与双聚焦管道液化气 & 双聚焦管道液化气
研究与开发

评估与验证 TFI-识别的异常
修复标准和可用的修复方法

CC Technologies Services, Inc. - PRCI

- 为了编制和评估早期管道焊缝的独特
属性，编制缺陷类型目录，并开发评估
焊缝缺陷的检验方法，以确定管道完整性
是否已受损。

总项目成本：$140,000.00

全面更新管道评估

EMC^2, Inc. - PRCI

- 更新API标准
1104的管道焊缝缺陷验收
标准，以反映机械化焊接
和自动超声波检测在
新管道施工中的更广泛
使用。

总项目成本：$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
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.
R&D Projects Map

For a list of funded projects visit

http://primis.rspa.dot.gov/rd/projectmap.htm
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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