Office of Pipeline Safety
Research and Development
“Blue Ribbon Panel” Meeting
June 10, 2003
Washington, DC
Opening Remarks

Stacey Gerard
Associate Administrator
Office of Pipeline Safety
Goals of Pipeline Safety R&D Program

- Reduce number and impact of incidents
- Advance technologies to ensure safe operations of pipelines.
- Bring products to market within 3-5 years
- Promote use of new technologies
Purpose of Meeting

- Thanks
- Direction of R&D Program and Why
- What Remains to be Worked On
  - Performance Metrics
  - Joint Workshops
  - Fresh priority list
Agenda

- Review Pipeline Safety R&D Requirements in PSIA of 2002
- Review R&D Program to Date
- Review and Discuss OPS R&D Priorities
- Discuss Program Performance Metrics & Evaluation of Effectiveness of R&D Investment
Pipeline Safety Improvement Act of 2002

- R&D Requirements
  - Memorandum of Understanding (MOU)
  - Areas of expertise
    - DOT – pipeline inspection, integrity management and damage prevention
    - DOE – system reliability, leak detection and surveillance technologies
    - NIST – materials research and development of consensus standards
Pipeline Safety Improvement Act of 2002

- R&D Areas in the Act
  - Materials inspection
  - Detection and analysis of internal pipe defects and development of inline detection equipment
  - ILI and leak detection technologies
  - Analyzing content of pipeline throughput
  - Pipeline security, real-time monitoring of ROW, protecting first responders
Pipeline Safety Improvement Act of 2002

- R&D Areas in the Act (cont’d)
  - Risk assessment methodology
  - Communication, control, and information systems surety
  - Fire safety of pipelines
  - Improved excavation, construction, and repair technologies
  - Other elements considered appropriate by participating agencies
Pipeline Safety Improvement Act of 2002

- Authorization of Appropriations
    - FY 2003 Appropriated = $8.7M
    - FY 2004 President’s Request = $9.2M
    - FY 2003 – Appropriated = $8.99M
    - FY 2004 – President’s Request = $0
    - FY 2003 Appropriated = $0
    - FY 2004 President’s Request = $0
- OPS Transfer $3M/year, 2003 – 2006, from Oil Spill Liability Trust Fund
Pipeline Safety Improvement Act of 2002

- R&D Requirements
  - Reporting
    - 5-Year Plan
    - Annual Updates
Pipeline Safety Improvement Act of 2002

• Path Forward
  ➢ Blue Ribbon Panel Meeting
  ➢ Complete MOU
  ➢ Draft 5-Year Plan & Tech. Advisory Committee Review
  ➢ Issue New BAA’s
R&D Program To-Date

Jeff Wiese
Program Development Director
Office of Pipeline Safety
R&D Program To-Date

- Framework for Revamped R&D Program (Objectives)
  - Competitive
  - Co-funded
  - Collaborative
  - Communicative
  - Comprehensive
R&D Program To-Date

- 1st Blue Ribbon Panel Meeting
- November ’01 Workshop
- ID’d three primary areas of R&D focus
- Issued BAA #1 and #2; awarded 10 proposals, additional 3 pending
- Issued BAA #3; Committee meets June 17th; awards to be announced Summer ‘03
- GAO reviewed R&D Program and issued draft report
R&D Program To-Date

- BAA #1 – Awards for Pipeline Damage Prevention and Leak Detection R&D
  - Application of Remote-Field Eddy Current to Inspection of Unpiggable Pipelines ($87,500)
  - Mechanical Damage Inspection Using MFL Technology ($380,000)
  - Feasibility of In-Line Stress Measurement by Continuous Barkausen Method ($80,000)
  - Baseline Study of Alternative In-Line Inspection Vehicles ($40,000)
  - Digital Mapping Of Buried Pipelines With A Dual Array System ($439,000)
  - Pipeline Damage Prevention Through the Use of Locatable Magnetic Plastic Pipe ($95,500)
  - Enhancement of the Long-range Ultrasonic Method for the Detection of Degradation in Buried, Unpiggable Pipelines ($500,000)

http://primis.rspa.dot.gov/rd
R&D Program To-Date

- BAA #2 – Awards to Enhance Pipeline Operations, Controls, and Monitoring
  - Assessment Criteria for TFI-identified Seam Weld Defects ($70,000)
  - Internal Corrosion Direct Assessment (ICDA) of Gas Transmission, Gathering, and Storage Systems ($260,165)
  - Improvements to the External Corrosion Direct Assessment Methodology by Incorporating Soils Data and Managing the Integrity of Early Transmission Pipelines ($297,000)
  - Additional Awards Pending Negotiation

http://primis.rspa.dot.gov/rd
R&D Program To-Date

- BAA #3 – Improved Material Performance and Other Pipeline Safety Improvements
  - White Papers - 82
  - Proposals – 16
  - Awards expected – Summer ‘03

http://primis.rspa.dot.gov/rd
R&D Program To-Date

Figure 1: OPS' R&D Funding, Fiscal Years 1998 - 2003

In millions of dollars

Source: GAO analysis of OPS data.
Figure 2: OPS' Planned Allocation of R&D Funding for Fiscal Year 2003

- Mapping and Information Systems ($1.2 million) - 14%
- Improved Materials Performance ($1.7 million) - 19%
- Enhanced Operations, Controls, and Monitoring ($1.9 million) - 21%
- Damage Prevention and Leak Detection ($4.0 million) - 46%

Source: GAO analysis of OPS data.
Note: Shaded areas represent the major pipeline safety R&D areas funded by OPS.
R&D Program To-Date
Accomplishments Since Nov 2001 Meeting

- Built and Deployed Competitive & Collaborative Process
- Awarded 10 – 13 Co-funded Projects
- R&D website (http://primis.rspa.dot.gov/rd)
  - Available to Public
  - Announcements
  - Meetings
  - Database
  - R&D “Success Stories”
  - Map showing recent R&D awards, with links to Matrix
  - Internal OPS Quarterly R&D Update
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 Web Site
http://primis.rspa.dot.gov/rd
R&D Web Site
http://primis.rspa.dot.gov/rd

The dots on the map indicate the locations of research firms conducting projects for the OPS.
R&D Program Priorities
Evolution of R&D Priorities (1)

- R&D Blueprint Planning Workshop, Nov ‘01
  - Gaps
  - Important Funding Areas
- BAA Focus Areas
  - BAA #1
  - BAA #2
  - BAA #3
Evolution of R&D Priorities (2)

- PRCI Priorities
- PSIA of 2002
- MOU Focus Areas
- GAO Preliminary Findings
  - Priority Ranking – Experts
Redefining OPS’ Program Focus

• Inputs
  ➢ Awards made from BAA's
  ➢ Expert-based Review Team evaluations of continuing need
  ➢ Joint workshops - e.g., MMS-OPS 2/03 Workshop in New Orleans
  ➢ PRCI Priority Focusing Workshop - 03/2003
  ➢ Participated with DOE & NIST in solicitations and competitions
  ➢ Industry presentations and discussion: API, AGA, INGAA Foundation
  ➢ Draft MOU between DOT, DOE, and NIST
  ➢ Reconvene the Blue-Ribbon Panel (06/2003) to examine proposed new priorities
### Redefining OPS’ Program Focus

#### Summary of Perspectives on R&D Priorities (Applicable to OPS Scope)

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<th>Candidate Priorities</th>
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Redefining OPS’ Program Focus

Summary of Perspectives on R&D Priorities (Applicable to OPS Scope)

(*) The numbers represent priorities established by survey of experts

Priorities Source:

A. OPS Plan for OMB
B. R&D Blueprint Planning Workshop (11/21/01) – Gaps & Important Funding Areas
C. BAA Focus Areas
D. PRCI Priorities – Prelim Rank, 2004 Programs, PRCI Board, April 2003
E. Pipeline Safety Improvement Act of 2002 (12/17/02)
F. MMS-OPS International PL Offshore Workshop (2/28/03)
G. GAO Preliminary Findings (Based on Expert Survey)
H. Areas in Which Projects have been Funded
I. Candidate Priorities for 5 Year Plan
Current OPS R&D Priorities (1)

- Develop & Enhance Integrity Management Tools and Practices for Existing Transmission Pipelines
- Develop & Enhance Integrity Management Tools and Practices for Existing Distribution Pipelines
- Improve Pipeline Materials, Coatings, and Manufacturing & Construction Techniques
Current OPS R&D Priorities (2)

- Improve Methods and Technologies for Pipeline Mapping and Data Integration
- Improve Pipeline Security Technologies & Practices
- Improve Risk Assessment Methodologies
- Improve Techniques for Pipeline Incident and Accident Analysis
OPS R&D Priority Identification

The path forward...

• Complete BAA's 1, 2, & 3
• Complete MOU & 5-Year Plan process
• Compete and award BAA #4
• Winter 2003-2004 workshop
• Continuously Refine R&D Program Focus
Potential Complementary R&D Activities

- Universities, National Laboratories, Non-Profits
- Co-fund Work with DOE/NETL, DOI/MMS, DOC/NIST
- Standards writing based on new R&D technology (NACE)
- Hydrogen near-term R&D on supply/demand modeling (e.g., use of natural gas pipelines to transport hydrogen)
Performance Metrics: Evaluating the Effectiveness of R&D Investment

James Merritt
R&D Program Manager
Office of Pipeline Safety
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- GAO
  - Asked: “What is OPS’s process for evaluating the outcomes of the pipeline safety R&D it funds?”
  - Identified best practices for evaluating the outcomes of federal R&D through a review of relevant literature
  - Compared OPS’s existing and planned processes with these best practices.
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- GAO identified best practices
  - Setting clear, quantifiable goals and measuring progress toward these goals
  - Using expert review to evaluate the quality of research outcomes
  - Gathering input of potential users of the results of the research regarding its actual usefulness
  - Reporting periodically on evaluation results
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Performance Metrics – Issues
  - OPS considering ways to improve evaluation
  - No previous program to evaluate, indicators
  - R&D will help achieve safety goals, difficult to show
  - MOU calls for participating agency collaboration in resolving evaluation processes
  - Looking for stakeholder input
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Performance Metrics – OPS Approach
  - OPS involving experts in planning for R&D
  - OPS using peer review in deciding which proposals to fund
  - OPS will use expert review of outcome of R&D projects
  - OPS making strides in communicating R&D information
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Candidate R&D Program Metrics (1)
  - Evaluating Deployment of New Technology Through Oversight
  - Fraction of R&D Funding Tied to NTSB Issues
  - Fraction of Total R&D Funds Represented by Federal Funds
  - Fraction of Total R&D Funds Linked to Strengthening National Consensus Standard or New Rulemaking
  - \( \frac{(R&D \ $)}{(Unfunded \ Industry \ Participants \ Supporting \ Program)} \)
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Candidate R&D Program Metrics (2)
  - Person-Days of Industry Participation in R&D-Related Workshops
  - Extent of Inter-Agency Cooperation in Funding Decisions
  - Fraction of Project Milestones Met
  - Fraction of Project Performance Measures Met
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Candidate R&D Program Metrics (3)
  - (Dollars Expended to Achieve Project Objectives)/(Dollars Budgeted)
  - Number of Web Site Hits
  - Person-Days Participation in Communication Forums
  - Number of Success Stories Submitted and Documented
Performance Metrics
Evaluating the Effectiveness of R&D Investment

- Candidate R&D Program Metrics (4)
  - Fraction of R&D Competitively Funded
  - OPS Participant (FTE)/OPS R&D Program Staff (FTE)
  - R&D Funding ($) / OPS R&D Staff Participation (FTE)
  - New Patents
  - Number of Standards Build on or Validated by R&D Projects (Fraction of R&D $)
## Performance Metrics
Evaluating the Effectiveness of R&D Investment

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<tr>
<th>Goals</th>
<th>Processes</th>
<th>Metrics</th>
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<tr>
<td>Understand diverse R&amp;D needs of industry</td>
<td>Active participation in workshops and working group meeting</td>
<td>Workshop recommendations &amp; working group future needs</td>
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<td>Prioritize R&amp;D areas of effort</td>
<td>11/02, 4/8/03 meetings</td>
<td>Industry drivers, MOU with DOE, DOC, DOI</td>
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<td>Seek diverse perspectives on key issues</td>
<td>Diverse merit Review Panels</td>
<td>BAA 1, 2, &amp; 3 merit panel results</td>
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<td>Leverage R&amp;D funding</td>
<td>Co-funded R&amp;D activities by industry partnership</td>
<td>% of R&amp;D projects funded by partnership</td>
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<td>Relevance of R&amp;D effort</td>
<td>Establish annual industry review process</td>
<td>Increase in Congressional funding levels</td>
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<tr>
<td>Promote rapid deployment</td>
<td>Out-reach activities, success stories, report to Congress</td>
<td>Track # of patents resulting from R&amp;D efforts, rollout of new technologies</td>
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<tr>
<td>Improve Safety &amp; Integrity of pipelines</td>
<td>R&amp;D efforts feed into IMP issues</td>
<td>Lessons learned, NTSB black list</td>
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<td>Manage increased funding with modest staff</td>
<td>Develop and leverage expertise within OPS; collaborate with industry research-partners and use their project management resources</td>
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(1) Industry/OPS Meeting to Prioritize Areas of Interest, (2) BAA#1: Leak Detection/Corrosion, (3) BAA#2, Control & Monitoring, (4) BAA#3: Material, Human Factors, (5) Future BAA –under discussion
Wrap-up

- Additional Questions/Comments
- Review Action Items
- Follow-up Communications

Office of Pipeline Safety
Research and Development
“Blue Ribbon Panel” Meeting
June 10, 2003
Washington, DC