Interagency Research and Development Five-Year Program Plan

For Pipeline Safety and Integrity

Annual Update Report
Fiscal Year 2004

Department of Transportation, the
Department of Energy and the
Department of Commerce's
National Institute of Standards and Technology

Interagency Research and Development Five-Year Program Plan
For Pipeline Safety and Integrity
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As mandated by statute, the Department of Transportation, after extensive coordination with the Department of Energy and the National Institute of Standards and Technology, submits this annual update report of the five-year pipeline safety research and development program plan.

This annual update report to Congress describes the progress made during fiscal year (FY) 2004 in implementing joint activities identified in the initial program plan.

Executive Summary

The Pipeline Safety Improvement Act of 2002 (PSIA-2002) mandates that the Department of Transportation (DOT), the Department of Energy (DOE) and the National Institute of Standards and Technology (NIST) in the Department of Commerce (DOC) "shall carry out a program of research, development, demonstration and standardization to ensure the integrity of pipeline facilities." A fundamental component of this program is the five-year program plan to guide and integrate R&D activities of these agencies. While it was not one of the agencies formally mandated to participate, the Department of the Interior's (DOI) Minerals Management Service (MMS) contributed to the development of the initial plan and has been part of the interagency group since its inception. These agencies are identified as the participating agencies.

This annual update report to Congress is the result of substantial collaboration among the participating agencies during FY 2004. The report updates the progress resulting from working together to achieve shared objectives. Working together has contributed to clarification of R&D focus areas as well as supported identification of alternative technology development opportunities, prevented duplication of effort, and improved communications among the participating agencies. This process has resulted in leveraging expertise and harmonizing funding priorities among agencies in the development and demonstration of promising technologies.

In addition to working with the other participating agencies, the Department of Transportation's Office of Pipeline Safety (OPS) has developed and will monitor research performance measures. This OPS effort has been underway for some time, but its importance was underlined during a Government Accountability Office (GAO) audit of the OPS R&D Program. The results of this audit were reported in the Final Report # GAO-03-746. In Section 4.1 of this interagency annual update report, OPS elaborates on the types of performance measures developed.

Processes described in this update report are designed to better integrate the activities of each participating agency, including improving collaboration in determining stakeholder perspective on critical issues, promising technologies and areas deserving the highest priority for R&D funding. These processes have served to maximize the effectiveness of our collective investment in R&D. The body of this update report will provide details of the progress from these initial collaboration areas:

- Semiannual interagency meetings to assess progress on projects and overall program effectiveness;
- Periodic joint R&D solicitations, including publication of an integrated interagency procurement schedule to increase the predictability of the procurement process, thereby assisting prospective contractors in responding effectively to appropriate solicitations. Procurements continue to be agency-by-agency;
- Annual joint R&D Forums to gather stakeholder input on issues, candidate technologies and development priorities;
- Technology demonstrations supporting interagency hand-off of R&D project responsibility as technologies are proven feasible but need additional effort to demonstrate their effectiveness; and
- Technology applications and transfer promoted by joint agency efforts.

The participating agencies conduct ongoing discussions for improving R&D performance measurement and for complying with requirements of the Government Performance and Results Act and the Office of Management & Budget's Program Assessment Rating Tool (PART). Each of the participating agencies collaborates with the Washington Research Evaluation Network (WREN), which serves as a forum for the R&D evaluation community to explore new approaches to improve the management and the performance measurement of science and technology organizations. Participation at WREN events provides critical insight to comply with the directives of PART and to develop effective agency specific strategic and performance plans.

Appendices to this report contain summary tables of the following activities:

1. FY 2004 Collaborative Activities and Milestones (Table A.1)

2. Matrix of New Project Awards for FY 2004 (Table A.2)

3. List of Future Interagency Group Activities and Milestones for FY 2005 (Table A.3)

1. Memorandum of Understanding Among The Department of Transportation, Department of Energy And The National Institute of Standards And Technology

A Memorandum of Understanding (MOU) has been developed among the participating agencies. The purpose of this MOU is to detail the responsibilities of the DOT, the DOE, and NIST in a program of research, development, demonstration, and standardization to ensure the integrity of pipeline facilities. This MOU was agreed to and signed on January 20, 2004. The MOU identifies program elements, as well as specific areas of agency expertise, and establishes a framework for coordination and collaboration by the federal agencies mentioned in PSIA 2002. The MMS was not required to sign this MOU but remains as one of the participating agencies for the purposes of coordination, collaboration and co-funding.

The MOU can be viewed at http://primis.phmsa.dot.gov/rd/mou.pdf and is available to the public.

2. R&D Program Goals and Objectives

2.1 Goal of Interagency R&D Program

As stated in the PSIA-2002, the goal of the five-year R&D program plan is to "guide activities needed to carry out a program of research, development, demonstration and standardization to ensure the integrity of pipeline facilities." Attainment of this goal must involve recognizing legitimate differences in individual Agency priorities and harmonizing these priorities to ensure complete coverage of critical developmental needs and opportunities.

2.2. Objectives of Interagency R&D Program

The participating agencies believe that attainment of this goal requires joint pursuit of the following objectives:

1. *Identify Safety & Integrity Issues* - Understand stakeholder perspectives on the issues that must be resolved to ensure integrity of current and future pipeline facilities;
2. *Identify Opportunities to Resolve Issues* - Identify a broad spectrum of opportunities for resolving these issues through research, development, demonstration and standardization activities;
3. *Identify Gaps Between Needs and Available Technologies* - Understand the gaps between existing technologies and those needed to resolve the key issues;
4. *Solicit & Select Projects* - Collaborate in the identification of solicitation topics, selection and management of the projects needed to fill identified gaps;
5. *Promote Continuity in Technology Development* - Confirm proof-of-concept and promote continuity of technology development from the concept stage through demonstration and validation;
6. *Evaluate Project and Program Results* - Evaluate the results of program activities using jointly designed performance measures and jointly managed evaluation processes;
7. *Increase Accessibility of R&D Results to Users (Promote Application)* - Support increased accessibility of R&D results to users; and

8. *Seek Promising Technologies from Outside Sources* - Collaborate with other agencies and stakeholder organizations in recognition, development and demonstration of promising new technologies.

3. Management Plan

3.1. Areas of Responsibility

The PSIA-2002 enumerated ten R&D program elements as the focus of the agencies participating in the pipeline safety and integrity R&D program.

Lead agency responsibilities for each of these program elements are shown in Table 1.

Table 1. Summary of Planned Lead Agency Responsibilities from PSIA 2002 R&D Program Elements

Program Elements	On-Shore	Off-Shore
1. Materials inspection	DOT	DOI
2. Pipe anomaly detection	DOT	DOI
3. Internal inspection and leak detection technologies	DOT	DOI
4. Methods of analyzing content of pipeline throughput	DOT	DOI
5. Pipeline security	DOT	DOI
6. Risk assessment methodology	DOT	DOI
7. Communication, control, and information systems surety	DOT	DOI
8. Fire safety of pipelines	NIST	DOI
9. Improved excavation, construction, and repair technologies	DOT	DOI
10. Other appropriate elements a. Materials analysis & development b. Standardization activities	DOT NIST NIST	DOI NIST NIST

General agency responsibilities related to these ten R&D program elements are summarized below:

- DOT: Assuring the safety and integrity of hazardous liquid and natural gas pipelines through R&D activities designed to support identification, characterization, detection and management of risks to safety and integrity;

- DOE: Historically focused on developing new and advanced infrastructure technologies having greater developmental risk and expected to be commercialized over a longer time frame. The Administration has proposed to transfer responsibility for developing these pipeline integrity and reliability technologies to the Department of Transportation's Office of Pipeline Safety.
- NIST: Developing standards, advanced materials and fire safety technologies; and
- DOI: Through the Minerals Management Services, assuring pipeline safety and integrity through regulation and inspection of offshore pipelines.

3.2. Management Processes to Achieve Objectives (How have we worked together?)

The objectives of the interagency pipeline safety and integrity R&D program are listed in Section 2.2. The planned processes to achieve these objectives are discussed below.

The participating agencies strongest success to date has been collaboration on merit review panels during research solicitations. This representation in each others' solicitation evaluations has provided assurances that programs are not duplicative and that the best researcher is selected for project awards.

The participating agencies are committed to continuously refine the definition and implement practices in each of these areas of collaboration and to initiate a process that assures deadlines are met.

3.2.1 Semiannual interagency meetings to assess progress on projects and overall program effectiveness

The interagency group agreed to schedule progress meetings quarterly and to change this collaboration focus area title to *"Interagency Coordination Meetings"* for future reference.

Update Statement – The participating agencies held quarterly coordination meetings to focus on the collaboration and coordination of the PSIA 2002 group activities. These meetings provide opportunities to assess progress on projects and overall program effectiveness and support: review of major issues and their priorities; identification of gaps between high priority safety, integrity and reliability issues and R&D designed to support their resolution; identification of promising technologies; review of measures of performance; updating and integration of plans for future solicitations; and updating project portfolios.

The first interagency coordination meeting was held on February 19, 2004. The meeting was attended by representatives from each participating agency. Subsequent meetings were held on May 19, August 11 and October 20, 2004 and were attended by representatives from each participating agency. These meetings have facilitated healthy discussions and the identification of further collaboration in the many areas described in section 2.2.

3.2.2 Periodic Joint Solicitations

This collaboration focus area has received intense discussion at each interagency coordination meeting. While trying to develop a process or framework for joint research solicitations, many impediments were identified which may prevent this from becoming a reality. The interagency group has therefore agreed that until these impediments can be removed, joint research solicitations may not be possible.

Update Statement – At each interagency coordination meeting, significant discussion took place on the incentives and barriers for holding joint solicitations. The following barriers are reasons why joint research solicitations may not be possible:

1. *Solicitation Volume* – Recognition of many technical gaps and challenges has created a high demand for new technologies and field solutions. Each program has received hundreds of white papers and proposals for each individual solicitation. The majority of these papers focus exclusively on one agency's mission. Very few papers have a broader scope that would be more appropriate for submittal to multiple agencies. Joint Solicitations may lead to the submission of many more white papers and proposals requiring more administrative time to organize and evaluate.

2. *Timing* – The time required from the announcement of a solicitation to project awards can last from eight to ten months. The administrative burden associated with joint solicitations could increase the time from solicitation to award to much greater than ten months.

3. *Appropriations* - Among the participating agencies, annual appropriations cover periods from one to three years. Since one-year funds must be obligated during that fiscal year, joint solicitations would create enormous pressure to make awards prior to the end of that appropriation year. Considering the current duration of the procurement cycle noted above, the risk of lapsed appropriations may be significantly increased.

4. *Procurement & Financial Requirements* - The Departments of Transportation, Energy, Commerce and Interior, have many different procurement and financial requirements and restrictions. Some of the participating agencies require co-funding amounts of 20% or 50% on awards, while others having no co-funding requirement. Other agency requirements mandate that awards must be made to U.S. businesses only, thereby eliminating some international submissions. Many different types of awards are made by the agencies ranging from Contracts to Other Transaction Agreements to Cooperative Agreements to Grants. These diverse awards are employed to help achieve individual agency missions. Joint Solicitations will require one agency's procurement system to be utilized to facilitate the submissions and address these various requirements and restrictions. Having one agency manage the solicitation will greatly complicate addressing other agencies' requirements and restrictions.

5. *Procurement & Administrative Support* - Joint Solicitations will produce significant workloads and logistic demands on the agency that is hosting the solicitation. The barriers noted above may require additional administration to bring a solicitation to successful closure. The Economy Act

requires conservation of Federal Funds among Federal Agencies and can impede joint funding to the agency hosting the joint solicitation. Due to requirements in the Economy Act, funds may expire on Interagency Agreements if the period of performance does not match the period of performance for research solicitations.

The participating agencies will continue to seek ways to remove these barriers. In the interim, the agencies will continue to participate in joint reviews of individual solicitations. This practice has succeeded in promoting the efficiency objectives described in PSIA 2002 and the Interagency Research and Development Five-Year Program Plan.

3.2.3 Annual Joint R&D Forum

Joint R&D forums have been a successful method for developing a national pipeline research agenda. It also serves to ensure that current priorities are pursued through individual research solicitations. All the participating agencies have been involved with the planning and execution of this forum. Each agency presents its assessment of the research gaps and challenges and an overview of its program activities. The interagency coordination meetings include discussions of the planning and timing of these forums to support compatibility with our procurement schedules. Stakeholder feedback recommended that the forum be held on an eighteen month or other periodic cycle. The interagency group agreed to change this collaboration focus area title to *"Periodic Government/Industry Pipeline R&D Forum"* for future reference.

Update Statement - On December 11-12, 2003, DOT's Office of Pipeline Safety (OPS) together with Pipeline Research Council International, Inc (PRCI) and the Gas Technology Institute (GTI) hosted an R&D Forum on the Role of the Pipeline Safety Improvement Act of 2002 in the development of Energy Pipeline Technology.

The purpose of the meeting was to identify the impacts, opportunities, and needs arising from the R&D provisions of the PSIA-2002 from the perspective of relevant government agencies, industry, and pipeline R&D funding organizations, and to identify the key challenges facing industry and government, current research efforts, and potential research to meet these challenges.

Forum proceedings are available on the OPS R&D Program website at http://primis.phmsa.dot.gov/rd/mtg_121103.htm and are available to the public.

The next Government/Industry Pipeline R&D Forum will be held March 22-24, 2005 and the results from that forum will support a national pipeline research agenda for FY 2005/2006. The organization and planning for this next forum began in summer 2004 with the identification of a steering committee. This steering committee consists of representatives from the participating agencies as well as nine industry trade organizations and research groups. The forum proceedings will then be available on the OPS R&D Program website and available to the public.

The draft agenda for this next forum can be found in Appendix A.4 and available on the OPS R&D Program website at http://primis.phmsa.dot.gov/rd/mtg_032305.htm and is available to the public.

3.2.4 Technology Demonstrations

Various aspects of holding technology demonstrations are discussed at the interagency coordination meetings. The participating agencies identify commonalities in technology currently being developed in their individual project portfolios. The participating agencies will plan for and support a technology demonstration when common technologies are being developed and are ready to be benchmarked.

Update Statement – The DOE initiated and the DOT co-funded the development of extensive field demonstrations of advanced technologies for remote sensing of natural gas leaks and the internal inspection of non-piggable gas pipelines. These two technology demonstrations both occurred during the week of September 13-17, 2004: one at the Rocky Mountain Oilfield Testing Center (RMOTC) in Casper, Wyoming, and the other at the Battelle Pipeline Simulation Facility (PSF) in Columbus, Ohio. Each agency modified its research contracts to support participation in the pertinent demonstration.

The purpose of these technology demonstrations is to provide realistic testing beds to support benchmarking and technology transfer for several related government funded research efforts. A detailed demonstration test plan was developed with strong input from both an industry advisory board and the demonstration test participants. A final report was issued for both demonstrations and is available on the DOE & DOT pipeline research websites.

For further information on these initial and future collaborative technology demonstrations, please view the following pipeline research websites:

Department of Energy's National Energy Technology Laboratory

http://www.netl.doe.gov/scngo

Department of Transportation Pipeline and Hazardous Materials Safety Administration's Office of Pipeline Safety

http://primis.phmsa.dot.gov/rd/techdemo.htm

3.2.4.1 Interagency Hand-Off of R&D Project Responsibility

The participating agencies have not yet identified a formal process for interagency hand-off of R&D project responsibility. However, discussions of project merit and technology transfer occur at coordination meetings and informally identify candidate projects. To date the most effective practice has been for one soliciting agency to add a related technical topic to its next solicitation, and the researcher managing the subject R&D project to be notified of this opportunity. Such projects are then reviewed by a merit review committee, and new awards made as appropriate.

Update Statement: For FY 2004, interagency hand-off of R&D project responsibilities occurred on three R&D projects. These three projects were being managed by DOE to determine feasibility or

proof of concept. After successful competition and award by DOT, these technologies are being demonstrated in the field for ultimate commercialization. Table 2 identifies these projects. For additional information, please visit http://primis.phmsa.dot.gov/matrix/ for detailed descriptions.

Table 2. Research & Development Projects with Successful Hand-Offs

	Project Title	**Research Contractor**
1.	Application of Remote-Field Eddy Current Testing to Inspection of un-Piggable Pipelines - DTRS56-02-T-0001	Southwest Research Institute 6220 Culebra Road San Antonio, TX 78238-5166
2.	Mechanical Damage Inspection Using MFL Technology - DTRS56-02-T-0002	Battelle 505 King Ave. Columbus, OH 43201
3.	Hazardous Liquids Airborne Lidar Observation Study (HALOS) - DTRS56-04-T-0012	ITT Industries Space Systems 1447 St. Paul Street, Rochester, NY 14653

3.2.5 Technology Transfer & Commercialization

The participating agencies are exploring how best to promote industry awareness of newly developed technology applications and how to collaborate on this technology transfer process to lead to successful commercialization. Technology demonstration is a component of a technology transfer process, and will be supplemented by efforts at benchmarking followed by communication of the strengths of developed technologies and their ultimate commercialization.

Update Statement – Since the participating agencies have now developed refined approaches for many of the other coordination areas, technology transfer and commercialization will be a focus for FY 2005. Most of the January 2005 interagency coordination meeting will focus on this topic. Presentations will be made from each participating agency on how they handle technology transfer and commercialization. From this interaction, a framework for technology transfer can be developed.

Coordination with our stakeholders is critical for a systematic and effective approach for technology transfer. Another component to be incorporated is standards development supporting technology implementation. At the next Government/Industry Pipeline R&D Forum, significant attention and effort will be focused on how to systematically implement technology transfer. The forum agenda is presented in the appendix. It is important to develop an acceptable model that both government and the pipeline industry can implement.

4. R&D Performance Measurement

The participating agencies conduct ongoing discussions for improving R&D performance measurement and for complying with requirements of the Government Performance and Results Act and the Office of Management & Budget's (OMB) Program Assessment Rating Tool (PART). Due to different agency missions, different research subject areas and types of research funded

(basic/development), the structure of performance measures must be derived from each agency's own mission and budgetary directives. Program strategy and performance must be derived from an agency's mission statement and translated into strategic and performance plans that are agency specific. The PART directs the focus on individual research programs but requires interagency involvement through external reviews. Holding interagency quarterly coordination meetings facilitates external reviews and contributes to improved performance.

Each of the participating agencies collaborates with the Washington Research Evaluation Network (WREN) attending many sponsored events. WREN serves as a forum for the R&D evaluation community to explore new approaches to improve the management and the performance measurement of science and technology organizations. Participation at WREN events has provided critical insight for the participating agencies to comply with the directives of PART. Please visit http://www.science.doe.gov/sc-5/wren/index.html for more information on WREN and the types of events that have been held.

4.1 Update on OPS R&D Program and Research Performance Measurement

In June 2003, the GAO released Final Report # GAO-03-746 on the OPS R&D Program. The specific GAO recommendations are shown below. Program results are shown in Table 4. and were added to this report for OPS to complete its executive actions.

The GAO recommended that the Secretary of Transportation direct OPS to:

- develop a systematic process for evaluating the outcomes of its R&D program that incorporates identified best practices and

- include in the annual reports to Congress, which are required by the Pipeline Safety Improvement Act, information on the results of R&D evaluations.

To address the recommendation, the OPS developed R&D strategic and performance plans that include methods to systematically manage and measure to include specific performance measures. These plans are available on the OPS R&D Program website http://primis.phmsa.dot.gov/rd/. In addition, individual projects are monitored and evaluated using contractual performance measures required as part of contractor monthly and quarterly reports. While developing these performance measures to address the GAO recommendation, the OPS R&D Program submitted similar required information under an OPS umbrella PART evaluation.

OPS research program goals are (a) fostering development of new technologies, (b) strengthening regulatory requirements and consensus standards and (c) promoting knowledge for decision makers. To ensure achievement of OPS goals, systematic methods have been developed for managing the program and for measuring both the program's conformance with identified management practices and the impact of program and project activities. The OPS has developed performance measures to evaluate whether the program is achieving its goals as expressed through a set of documented "desired impacts." Numerous processes along with a Management Information System (MIS) were created to collect, track, and report out data on these desired

impacts. Desired impacts have been identified for each of these goals along with impact measures to quantify related progress and accomplishments. Table 3 illustrates program goals, lists the impact measures and reports current performance.

Table 3. OPS R&D Program Goals, Impact Measures and Current Performance Metrics

Fostering Development of New Technologies		Strengthening Regulatory Requirements and Consensus Standards		Promoting Knowledge for Decision Makers	
Number of projects contributing to	18	Number of projects contributing to	24	Number of projects contributing to	43
Number of projects demonstrated	6	Number of projects contributing to new or revised standards	24	Number of final reports publicly available	12
Number of projects filing for U.S. Patents	4	Number of projects contributing to new or revised regulations	15	Number of conference papers presented	TBD
Fast Facts: 1. First project award on October 1, 2002 2. Total awards from four Broad Agency Announcements: 43 projects 3. Current number of projects completed: 12 projects 4. Total funding distribution for 43 projects: $11,100,248 (OPS) $14,641,638 (Industry co-Funding)					

All measures will be tracked and reported by the OPS R&D Program in an annual Performance Report. The measures will be reported in future update reports mandated from PSIA-2002. A baseline year for 2005 is required to quantify the number of conference papers presented. Recent contractual changes will facilitate this quantification. Additional information on program processes and performance data is maintained in the OPS R&D MIS.

4.2 A Management Information System for OPS R&D Program Management

OPS has developed a Pre and Post Award Management Information System (MIS) specifically to support procurement and tracking of research and development projects. The MIS is used to record solicitations, procurement activities, and contracts, and to track performance as the project spends its budget and moves toward completion. Using the MIS, information is electronically collected on project accomplishments, contractor performance, status on spending, and progress toward contracted goals and milestones. In addition, the MIS provides management with program reporting, project accomplishments, and tracking on other deliverables. The system is designed to improve and maintain program quality, efficiency, and accountability.

System features and benefits include:

- Paperless processing with secure online submission and review of white papers and proposals.
- Tracking, inventory, and accountability features through database management.
- Linking of program and project activities with procurement and financial requirements.
- Automated message notification for approaching scheduled project milestones.
- Reduction of workload for submitters, reviewers, Contracting Officers, Contracting Officer's Technical Representatives and program management.

- Rapid/accurate query functions for a variety of program and project level information requests.
- Assist with transfer of technology on overall program and project status to industry partners.

The MIS was brought on line in December 2004 and will facilitate program and project level data collection for annual performance reporting. This system is necessary for accurate reporting of detailed performance information, will assist in the achievement of goals and will increase program and project efficiencies.

5. Communication of R&D Results

The participating agencies currently use several mechanisms to make potential users aware of newly developed technologies. These individual efforts will continue into the future. In addition, several mechanisms will be explored to increase the consistency and quality of the processes used to communicate R&D results. The primary means of communicating R&D results among the agencies, stakeholders, and industry are discussed below.

1. *Government/Industry Pipeline R&D Forum* – As described above, this is a mechanism to bring together government agencies, industry, and pipeline R&D funding organizations to identify the key challenges facing industry and government, current research efforts, and potential research that can help to meet these challenges.

2. *GTI/DOE Gas Technology Conference* – This annual joint industry/government conference attracts a large group of attendees to discuss new technologies for the natural gas transmission and distribution industry. Progress on many of the advanced technologies funded by DOE is presented.

3. *Transportation Research Board's (TRB) Annual Meeting* – The participating agencies are working with the TRB to be added to the agenda. The intent is to hold panel discussions about group activities resulting from the PSIA 2002. A technical research theme will be selected to promote technology cross cutting among the participating agencies and the diverse audience.

4. *Interagency Program Presentation* - The main objective is to provide an informative, joint pipeline R&D program presentation which describes the collaboration, coordination and project co-funding activities resulting from the passage of the PSIA-2002. This presentation will be updated periodically by DOT with input from the participating agencies and presented at various public events such as the R&D Forum. It will also be available to the public via the joint PSIA-2002 Interagency Group website.

More specifically, this presentation will identify and describe the following:

a. The requirements of PSIA-2002 on affected Federal R&D Programs
b. Introduction and background information on each agency's pipeline R&D program
c. Current agency project funding levels

d. Current agency project co-funding among programs
e. Technology demonstrations
f. Future joint activities

5. *PSIA-2002 Interagency Group Website* - For the participating agencies, DOT has established a joint website to describe and document the interagency group activities and milestones.

Please visit our joint PSIA-2002 Interagency Group website at the following address:

http://primis.phmsa.dot.gov/rd/psia.htm

6. Security Research & Development Among the Participating Agencies

Since September 11, 2001, a greater awareness exists of security related issues affecting transportation of natural gas and hazardous liquids. Pipeline research and development is an effective tool to investigate solutions to any recognized security gaps and challenges. These solutions may range from providing the knowledge required to make appropriate policy decisions to the technology needed to protect hard assets. With the post September 11, 2001 reorganization of Federal agency structures and missions, the Transportation Security Administration (TSA) and the Department of Homeland Security (DHS) have been designated to address overall security research and specifically, pipeline security research. For this reason the participating agencies have not directly addressed pipeline security R&D. However, some technical topics involving technologies for encroachment monitoring and third party damage prevention relate to pipeline security.

The GAO has issued Final Report # GAO-04-890 "Transportation Security R&D" in September 2004. This report shows that neither TSA nor DHS has funded any specific pipeline security R&D for fiscal years 2003 & 2004. In light of this report, the participating agencies will coordinate with the TSA and DHS to foster efficiency in addressing mutual technology development goals.

7. Collaborative Success Stories

For FY 2004, the participating agencies have identified many opportunities for leveraging resources, disseminating information, and other collaborations. Some of these opportunities have resulted in notable success stories. The intent of this section is to describe some of these success stories resulting from our coordination and collaboration. Please find all our FY 2004 activities, milestones and accomplishments in Appendix A.1.

1. *Joint Agency Representation on Research Solicitations* - The participating agencies strongest success to date has been collaboration on merit review panels during research solicitations. This representation in each others' solicitation has provided assurances that programs are not duplicative and that the best researcher is selected for project awards. This agency participation has occurred since FY 2002 and will continue when new solicitations are announced. Table A.1. identifies these collaborations illustrating interagency involvement for FY 2004.

2. *Two Technology Demonstrations Held* – DOE and DOT have collaborated and co-funded the development of two technology demonstrations on technologies for natural gas leak detection and internal inspection of un-piggable pipelines. Section 3.2.4 provides additional details.

3. *Successful Interagency Hand-off on Three (3) R&D Projects from DOE to DOT* - The feasibility or proof of concept was pursued under three projects funded by DOE. Those projects were then found acceptable for further development by DOT, where they will be benchmarked and demonstrated in the field supporting commercialization. Section 3.2.4.1 provides additional details.

4. *Five Consecutive Years of DOT & DOI Research Project co-Funding* – FY 2004 marked the fifth consecutive year for which DOT and DOI have leveraged R&D resources on mutual jurisdictional areas offshore. This coordination and co-funding has created a perception in the offshore pipeline industry that regulators can effectively cooperate to pursue R&D efforts which promote safety, protection of the environment and address our energy needs.

Appendices

A.1. FY 2004 Collaborative Activities and Milestones for the Participating Agencies

During FY 2004, the participating agencies have collaborated on and coordinated several activities. These activities and associated milestones are itemized in Table A-1.

Table A.1. List of FY 2004 Collaborative Activities and Milestones for the Participating Agencies

Collaborative Activities and Milestones	DOT	DOE	NIST	DOI
Government/Industry Pipeline R&D Forum - December 11-12, 2003	X	X	X	X
Joint Review of DOI/MMS Research Solicitation Submissions – January 13, 2004	X			X
MOU Among DOT, DOE And NIST – Signed January 20, 2004	X	X	X	
Presentation of Interagency Group Activities with the two DOT Safety Advisory Committees – February 4, 2004	X			X
Roadmapping Workshop on Natural Gas Delivery Reliability – February 8-12, 2004	X	X	X	
Interagency Coordination Meeting – February 19, 2004	X	X	X	X
Joint Review of DOE/NETL Research Solicitation Submissions – March 30, 2004	X	X		
International Workshop on Advances Research & Development of Coatings for Corrosion Protection – April 14-16, 2004	X	X	X	X
Interagency Coordination Meeting – May 19, 2004	X	X	X	X
Coordination and discussion of program effectiveness to the OPS Blue Ribbon Panel of Stakeholders – May 20, 2004	X	X	X	X
Joint Submission to Congress of the Five Year Interagency Research and Development Program Plan – July 15, 2004	X	X	X	X
Joint Review of DOT/OPS Research Solicitation Submissions – August 10, 2004	X	X	X	
Interagency Coordination Meeting – August 11, 2004	X	X	X	X
Technology Demonstration of Natural Gas Pipeline Leak Detection Technologies - September 13-17, 2004	X	X		
Technology Demonstration of Internal Inspection Technologies for non-Piggable Natural Gas Pipelines - September 13-17, 2004	X	X		

A.2. Current R&D Activities

As evidence of the focus of recently funded R&D activities, the matrix below (Table A.2) shows new project starts categorized by the areas on which these activities are focused for FY 2004. The matrix also displays the amount of funding from the government (Agency Funding) along with the funding levels of the projects provided by industry (co-Funding).

Specific project information can be found at the following R&D Program websites:

Department of Transportation

http://primis.phmsa.dot.gov/rd/index.htm

Department of Energy

http://www.netl.doe.gov/scngo/

Department of Commerce

http://www.metallurgy.nist.gov

Department of the Interior

http://www.mms.gov/tarprojectcategories/pipeline.htm

Table A.2. Matrix of New Project Awards for FY 2004[1,2,3]

R&D Topic (Agency)	Number of New Projects	Agency Funding ($)	Co-funding ($) (industry cost share)
Assessment of non-Piggable Pipelines (DOT/OPS)	3	$980,000	$1,100,000
Improved Integrity Management (DOT/OPS)	4	$1,095,000	$2,300,000
Damage Prevention (DOT/OPS)	3	$275,000	$330,000
Improved In-Line Inspection (DOT/OPS)	5	$1,660,000	$2,450,000
Improved Welding (DOT/OPS)	4	$930,000	$1,650,000
Coating Improvement (DOT/OPS)	2	$510,000	$700,000
Repair Methods (DOT/OPS)	1	$75,000	$75,000
Defect Severity Characterization (DOT/OPS)	3	$391,000	$291,000
Improved Leak Detection (DOT/OPS)	3	$1,300,000	$850,000
Improved Pipeline Design (DOT/OPS)	1	$75,000	$75,000
Risk Assessment – LNG (DOT/OPS)	1	$112,000	$112,000
Standardization Activities (DOT/OPS)	1	$500,000	$0
Assessing Human Factors - Fatigue (DOT/OPS)	1	$430,000	$450,000
Inspection Technologies (DOE/NETL)	10	$5,940,030	$4,637,973
Remote Sensing (DOE/NETL)	2	$700,559	$112,300
Materials Development (DOE/NETL)	1	$50,000	$0
Operational Technologies (DOE/NETL)	3	$3,975,000	$2,010,000
Control System Technologies (DOC/NIST)	1	$150,000	$0
Standardization Activities (DOC/NIST)	1	$0	$500,000
Improved Integrity Management (DOI/MMS)	5	$411,000	$250,000
Pipeline Strain Mitigation (DOI/MMS)	1	$25,000	$0
Improved Coatings & Insulation (DOI/MMS)	1	$30,000	$0
Improved Pipeline Design (DOI/MMS)	2	$174,967	$225,000

1. Table only illustrates new project awards for Fiscal 2004.
2. Table does not indicate if future funding for these projects will be proposed.
3. Co-Funding was not required on some awards.

A.3. Identification of Future Interagency Group Activities and Milestones for FY 2005

These known future activities and milestones for FY 2005 are itemized in Table A-3. Additional items are likely.

Table A.3. FY 2005 Collaborative Activities and Milestones

FY 2005 Collaborative Activities and Milestones	DOT	DOE	NIST	DOI
Interagency Coordination Meeting – October 20, 2004	X	X	X	X
Roadmapping Workshop on Liquefied Natural Gas – November 8-9, 2004	X	X	X	
Joint Review of DOI/MMS Research Solicitation Submissions – TBA	X			X
Transportation Research Board's 84th Annual Meeting – January 11, 2005	X	X	X	X
GTI/DOE Gas Technology Conference - January 30-February 2, 2005	X	X	X	
Interagency Coordination Meeting – February 2005	X	X	X	X
Government/Industry Pipeline R&D Forum - March 22-24, 2005	X	X	X	X
Interagency Coordination Meeting – May 2005	X	X	X	X
Interagency Coordination Meeting – September 2005	X	X	X	X

A.4. Draft Agenda for the Next Government/Industry Pipeline R&D Forum

Government/Industry Pipeline R&D Forum
Draft Agenda

Forum Objective: *To allow government and industry pipeline stakeholders to develop a consensus on the technical gaps & challenges for future R&D. It will address both short and long term research objectives for liquid and gas and transmission and distribution pipelines, covering onshore, offshore and Arctic environments. In addition, details of the ultimate research goals, technology demonstrations and transfer and commercialization will be discussed.*

Day 1 Tuesday March 22, 2005

8:00 AM	Welcome/Opening Remarks	TBA
8:15 AM	Key Challenges Facing Government & Industry	DOT/PHMSA/OPS DOE/NETL DOC/NIST DOI/MMS Industry (gas) Industry (gas/LNG) Industry (liquid) Industry (liquid)
10:15 AM	Break	
10:30 AM	Presentation of Interagency Coordination	TBA
11:00 AM	Presentation of *"Critical Pipeline Infrastructure and Research"*	TBA
11:30 AM	Direction on Brainstorming Sessions	TBA
12:00 PM	Luncheon Speaker *"Benefits and Role of Research"*	
1:30 PM	Brainstorming Sessions: *How do we systematically conduct…?*	
	1. Benefits from Research *(tangible vs. intangible)*	TBA
	2. Road Mapping	TBA
	3. Technology Demonstrations & Transfer	TBA
	4. Peer Reviews	TBA
	5. Standards Development	TBA
3:30 PM	Break	
4:00 PM	Brainstorming Sessions Report-Outs	

5:00 PM	Adjourn	
6:00 PM	Reception	

Day 2 Wednesday March 23, 2005

8:00 AM	Opening Remarks/Direction on Technical Track Sessions	
8:30 AM	Technical Track Sessions:	
	1. Damage Prevention	TBA
	2. Direct Assessment	TBA
	3. Inspection/Repair/Leak Detection	TBA
	4. Design/Construction/Materials/Welding	TBA
	5. Facilities/Compression/LNG	TBA
	6. Environmental Risk Assessment & Impact	TBA
12:00 PM	Luncheon Speaker	TBA
1:30 PM	Technical Track Sessions:	
	1. Damage Prevention	TBA
	2. Direct Assessment	TBA
	3. Inspection/Repair/Leak Detection	TBA
	4. Design/Construction/Materials/Welding	TBA
	5. Facilities/Compression/LNG	TBA
	6. Environmental Risk Assessment & Impact	TBA
5:00 PM	Adjourn	

Day 3 Thursday March 24, 2005

8:00 AM	Technical Track Sessions:	
	1. Damage Prevention	TBA
	2. Direct Assessment	TBA
	3. Inspection/Repair/Leak Detection	TBA
	4. Design/Construction/Materials/Welding	TBA
	5. Facilities/Compression/LNG	TBA
	6. Environmental Risk Assessment & Impact	TBA
9:45 AM	Break	
10:00 AM	Technical Track Sessions Report-Outs	
11:30 AM	Final Remarks and Next Steps	
12:00 PM	Adjourn	

A.5. Working Members of the Participating Agencies

Department of Transportation, Pipeline and Hazardous Materials Administration, Office of Pipeline Safety

James Merritt
R&D Program Manager
Office: (303) 683-3117
Fax: (303) 346-9192
Email: james.merritt@dot.gov

Robert Smith
R&D Manager
Office: (202) 366-3814
Fax: (202) 366-4566
Email: robert.w.smith@dot.gov

Department of Energy, National Energy Technology Laboratory

Christopher Freitas
R&D Program Manager
Natural Delivery Reliability, Storage, and LNG
Office: (202) 586-1657
Fax: (202) 586-6221
Email: christopher.freitas@hq.doe.gov

Rodney Anderson
Technology Manager
Natural Gas Delivery Reliability, Storage and LNG
Office: (304) 285-4709
Email: rodney.anderson@netl.doe.gov

Department of Commerce, National Institute of Standards and Technology

Carol Handwerker
Chief, Metallurgy Division
Office: (301) 975-6158
Fax: (301) 975-4553
Email: carol.handwerker@nist.gov

Frank Gayle
Deputy Chief, Metallurgy Division
Office: (301) 975-6162
Fax: (301) 975-4553
Email: frank.gayle@nist.gov

Department of the Interior, Minerals Management Service

Michael Else
Pipeline Research Team Leader
Office: (703) 787-1769
Fax: (703) 787-1549
Email: michael.else@mms.gov

Julie McNeil
Research Specialist
Office: (703) 787-1562
Fax: (703) 787-1549
Email: julie.McNeil@mms.gov