2007

RD&T Program Overview 2007

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RD&T Program Overview
Pipeline and Hazardous Materials Safety Administration

PHMSA FY2007 RD&T Program Review Meeting
May 23, 2007
Has public responsibility for safe and secure movement of hazardous materials to industry and consumers by all transportation modes, including highway, rail, air, water, and the nation's pipelines.
# PHMSA Supports DOT Goals

<table>
<thead>
<tr>
<th>DOT Strategic Goal</th>
<th>Pipeline</th>
<th>HAZMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reduced Congestion</td>
<td>Indirect</td>
<td>X</td>
</tr>
<tr>
<td>Global Connectivity</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Environmental Stewardship</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Security</td>
<td>Indirect</td>
<td>X</td>
</tr>
<tr>
<td>Organizational Excellence</td>
<td></td>
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</tbody>
</table>
RD&T Overview

Pipeline Safety RD&T Program Mission:

To sponsor research and development projects focused on providing near-term solutions that will improve the safety, reduce environmental impact, and enhance the reliability of the Nation’s pipeline transportation system.

Hazardous Materials Safety RD&T Program Mission:

To conduct technical and analytical studies, evaluations, and testing that provide the foundation for hazardous materials transportation regulations, enforcement, and emergency response.
# PHMSA RD&T Program Appropriations

<table>
<thead>
<tr>
<th>Budget Category</th>
<th>FY-2007 Thousands of Dollars (CR - Enacted)</th>
<th>FY-2008 Thousands of Dollars (Proposed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage Prevention &amp; Leak Detection</td>
<td>$3,794</td>
<td>$1,105</td>
</tr>
<tr>
<td>Enhanced Operations &amp; Controls</td>
<td>$1,931</td>
<td>$734</td>
</tr>
<tr>
<td>Improved Materials Performance</td>
<td>$2,133</td>
<td>$649</td>
</tr>
<tr>
<td>Mapping &amp; Information Systems</td>
<td>$1,235</td>
<td>$1,262</td>
</tr>
<tr>
<td><strong>Pipeline Safety Totals:</strong></td>
<td><strong>$9,093</strong></td>
<td><strong>$3,750</strong></td>
</tr>
<tr>
<td>Research and Analysis</td>
<td>$638</td>
<td>$262</td>
</tr>
<tr>
<td>Research and Development</td>
<td>$1,829</td>
<td>$1,761</td>
</tr>
<tr>
<td>Cooperative Research (Hwy Trust Fund)</td>
<td>$968</td>
<td>$915</td>
</tr>
<tr>
<td><strong>HAZMAT Safety Totals:</strong></td>
<td><strong>$3,435</strong></td>
<td><strong>$2,938</strong></td>
</tr>
<tr>
<td><strong>PHMSA Totals:</strong></td>
<td><strong>$12,528</strong></td>
<td><strong>$6,688</strong></td>
</tr>
</tbody>
</table>
Pipeline Safety RD&T
1. External Stakeholder Involvement In Developing Research Agendas

PHMSA Pipeline Safety R&D Program
Internal, External, Stakeholder, & Peer Reviews

<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
<th>Stakeholder</th>
<th>Peer</th>
<th>Other Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT/RITA</td>
<td>GAO</td>
<td>Blue Ribbon Panel</td>
<td>Pre-Solicitation</td>
<td>Other Items</td>
</tr>
<tr>
<td>IG</td>
<td>Safety Advisory Committee</td>
<td>R&amp;D Forum &amp; Blue Ribbon Panel</td>
<td>CO</td>
<td>CO</td>
</tr>
<tr>
<td>OMB</td>
<td>Gov/Industry R&amp;D Forum</td>
<td>Pre-Award</td>
<td>COTR</td>
<td></td>
</tr>
<tr>
<td>Congress</td>
<td>Interagency Coordination</td>
<td>Post-Award</td>
<td>Technology Demonstrations</td>
<td></td>
</tr>
</tbody>
</table>

Identifying the Right Priorities
- R&D Forum
- Blue Ribbon Panel
- OPS Inspectors
- NAPSR

Finding the Best Research Contractors
- Merit Review Process
- Cost Share 80/20

Assuring Good Contractor Performance
- MIS
- COTRs
- FAR

Applying Program Outputs
- Systematic Process Features
  - MIS
  - COTRs

Assuring High Quality Outputs
- Peer Review Process
  - DOT/RITA
  - R&D Forum

Systematic Evaluation Process
1. External Stakeholder Involvement

“Elements of Implementation”

Identifying the Right Priorities
- R&D Forum
- Blue Ribbon Panel
- OPS Inspectors
- NAPS

Finding the Best Research Contractors
- Merit Review Process
- Cost Share 40%90

Assuring Good Contractor Performance
- MIS
- DOT/R
- FARS

Assuring High Quality Outputs
- Peer Review Process
- DOT/RTA
- R&D Forum

Applying Program Outputs
- Systematic Process Features
- MIS
- C/ITRS

Systematic Evaluation Process

Transparent & consistent process for involving external stakeholders in the development of program agendas and priorities...

Yes, steps 1 & 2 of this process identify the right priorities and find the best researchers with complete stakeholder collaboration.
1. External Stakeholder Involvement

“Elements of Implementation”

Process for responding to stakeholder recommendations...

Yes, all public events are run by steering committee, integrate consensus comments, post reports, presentations and proceedings and survey feedback from attendees.
1. External Stakeholder Involvement

“Indicators of Implementation”

- Public announcement of upcoming reviews/events. 
- Posting proceedings, recommendations & reports. 
- Posting OA’s response to stakeholder recommendations.
2. Merit Review of Proposals

“Elements of Implementation”

Pre-Award

BAA Notice
- Posted on:
  1. Fed BizOps
  2. PHMSA
  3. OPS R&D

BAA Home Page
- 1. Vendor Registration
- 2. BAA Notice
- 3. FAQ
- 4. Contact Information

White Paper Submission Module
- 1. Vendor Upload page
- 2. Vendor listing page
- 3. WP listing page

White Paper Review Module
- 1. Individual reviewer page

White Paper Review Meeting Module
- 1. Review Scoresheet page

Proposal Submission Module
- 1. Vendor Upload page
- 2. Vendor listing page
- 3. Proposal listing page

Proposal Review Module
- 1. Individual review page

Proposal Review Meeting Module
- 1. Review Scoresheet page

Contract Award Module
- 1. Project Creator Page

Contracting Officer’s Module
- 1. Project home Page
- 1a. Accounting & deliverables page
- 1b. Project File Cabinet page
- 1c. Project Chronology page
- 2. Query page

Contracting Officer’s Technical Representative Module
- 1. Project home Page
- a. Accounting & deliverables page
- b. Project File Cabinet page
- c. Project Chronology page

Research Vendor Module
- 1. Project home Page

Program Management Module
- 1. Strategy & Performance
- 2. Inventory & Status
- 3. Appropriations & Spend Plan
- 4. Peer Reviews
- 5. National Science Foundation
- 6. Monthly/Annual Reports
- 7. Custom Queries

Post-Award

PRIMIS Website program & matrix
- 1. Project page
- 2. Logic Model
- 3. Annual Performance Report

Transparent & documented process for awarding competitive contracts…

Yes!
2. Merit Review of Proposals

“Indicators of Implementation”

Yes, PHMSA Procurement posts solicitations on FedBizOpps.gov. We insert web link in public announcement, sending submissions to automated paperless system.
3. Independent Evaluation of Research

“Elements & Indicators of Implementation”

Adherence to OMB guidelines… **Yes**
Systematic/independent/expert review process… **Yes**
Process to use results for future decisions...

Yes, formal contract modifications, closure for convenience and further expert review
4. Performance Measurement
“Elements of Implementation”

Single or multi-year objectives (outcome measures)...

No, a different approach utilized

<table>
<thead>
<tr>
<th>Program Elements</th>
<th>Possible Products &lt; 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Damage Prevention</td>
<td>• Subsurface mapping technology</td>
</tr>
<tr>
<td></td>
<td>• Pipe detection technology for HDD</td>
</tr>
<tr>
<td>2. Pipeline Assessment and Leak Detection</td>
<td>• Expanded use of Direct Assessment</td>
</tr>
<tr>
<td></td>
<td>• New &amp; more powerful inspection technology</td>
</tr>
<tr>
<td>3. Defect Characterization and Mitigation</td>
<td>• New models to characterize damage</td>
</tr>
<tr>
<td></td>
<td>• New protocols to streamline repairs</td>
</tr>
<tr>
<td>4. Improved Design, Construction, and Materials</td>
<td>• Strain based design standards</td>
</tr>
<tr>
<td></td>
<td>• New construction methods</td>
</tr>
<tr>
<td>5. Systems for Pipeline Mapping and Information</td>
<td>• Aerial mapping systems</td>
</tr>
<tr>
<td>Management</td>
<td>• GPS integration into aerial mapping</td>
</tr>
<tr>
<td>6. Enhanced Operation Controls and Human Factors</td>
<td>• New human factor protocols for pipeline monitoring and control operations</td>
</tr>
<tr>
<td></td>
<td>• New models to assess risk</td>
</tr>
<tr>
<td></td>
<td>• Improved knowledge for first responders</td>
</tr>
<tr>
<td></td>
<td>• New knowledge of hydrogen economy impacts</td>
</tr>
<tr>
<td></td>
<td>• New knowledge of LNG safety</td>
</tr>
</tbody>
</table>
4. Performance Measurement

“Elements of Implementation”

Measurable annual milestones (outputs)...

Yes, reportable retrospectively and for future

Technology:
  • Projects addressing (status/funding & links to public project page)
  • Demonstrated (yes or no with link to public report)
  • Commercialized (yes or no with company name and contact)

Consensus Standards:
  • Projects addressing (status/funding & links to public project page)
  • Standard Developing Organization (SDO) Name
  • Consensus Standard Name and Number
  • Used in whole or in part (yes or no with pdf letter documenting from SDO)

Promoting Knowledge:
  • Projects addressing (status/funding & links to public project page)
  • Number of U.S. Patents filings
  • Number of submitted Conference Papers/Journal Articles
  • Number of Public Events Stakeholders Reached
  • Number of Website Hits/Visits
4. Performance Measurement

“Indicators of Implementation”

Documentation of outcome measures in performance plans/reports...

RD&T Performance report in final draft and to be posted on Website http://primis.phmsa.dot.gov/rd/performance.htm

Documentation of annual output measures in performance plans/reports...

Via the website, 3 sets of interactive program objective tables will provide real-time and or annual
5. RD&T Coordination
“Elements of Implementation”

<table>
<thead>
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<th>Pipeline Safety R&amp;D Mission</th>
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| Research Program Goals     | “To drive improvements in”  
  - Pipeline Damage Prevention and Leak Detection  
  - Pipeline Operations, Controls, and Monitoring  
  - Material Performance and Other Pipeline Safety Improvements |
| Research Program Objectives| Fostering Development of New Technologies  
  Strengthening Regulatory Requirements and Consensus Standards  
  Promoting Knowledge for Decision Makers |
| Desired Impact Performance Measures | Number of projects contributing to objectives 54  
  Number of projects demonstrating new technologies 27  
  Number of projects filing for U.S. Patents 11  
  Number of projects contributing to new or revised industry standards 52  
  Number of projects addressing PHMSA regulations 48  
  Number of final reports publicly available 23  
  Number of projects addressing NTSB Recommendations 5  
  Number of conference papers presented 25 |
| Process Features            | Categorizing projects for mission relevance  
  Technology transfer process  
  Peer review process for qualifying output quality  
  Monitoring projects for contractual performance  
  Contractual requirement to notify PHMSA of U.S. patent  
  Monitoring projects for contractual performance |

DOT – Safety & Environment Goals

5. RD&T Coordination
“Elements of Implementation”

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5. RD&T Coordination
“Elements of Implementation”

Consistency with RD&T strategies identified in the DOT Strategic & RD&T Plan.

Yes

Coordination with relevant OA’s agencies and partners.

Yes, Full participation with RITA and one on one communication with relevant OAs when issues arise. Pipeline Safety Improvement Act of 2002 mandated interagency coordination with DOC/NIST and DOE/NETL. DOI/MMS also incorporated and interagency coordination meetings held quarterly.

DOT Goals

<table>
<thead>
<tr>
<th>DOT Goals</th>
<th>RD&amp;T Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>• Conduct and support research to understand and address the causal factors and risks in accidents and to anticipate future safety risks in all transportation modes</td>
</tr>
<tr>
<td></td>
<td>• Conduct and support research to determine the most effective ways of mitigating the consequences of transportation accidents and incidents in all modes</td>
</tr>
<tr>
<td></td>
<td>• Support safety rulemaking by assessing the potential safety impacts of new transportation technologies, vehicles, concepts, designs, and procedures</td>
</tr>
<tr>
<td>Environmental Stewardship</td>
<td>• Conduct and support research to understand the various impacts of transportation activities on the natural and built environment and communities and to advance technologies and concepts to mitigate those impacts</td>
</tr>
<tr>
<td></td>
<td>• Conduct and support research on ways to improve the environmental review process to achieve the timely delivery of transportation projects</td>
</tr>
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</table>
5. RD&T Coordination

“Indicators of Implementation”

Identification of the RD&T strategies supported

*Yes, Safety 1.1 & 1.2 and Environment 1.1, Participation with RITA & OST data calls to procurement offices*

Documentation of coordination efforts in program budgets, plans, reports, or briefings

*Yes, EXHIBIT V-2, RD&T Budget Request, EXHIBIT V-3, Support for Secretarial and Administration RD&T Priorities, EXHIBIT V-3, Adherence to OMB R&D Investment Criteria. Program website documents all federal/state/local/foreign coordination and posts all PSIA 2002 reports to Congress (FY 2002-2008).*
Hazardous Materials Safety RD&T
## Hazmat Elements & Possible Products

<table>
<thead>
<tr>
<th>Program Elements</th>
<th>Possible Products &lt; 5 years</th>
</tr>
</thead>
</table>
                          • Development of AEGLs in support of the ERG. |
| 2. Incident Database Design and Analysis | • Examination of trends, costs, and root-cause analysis to provide a basis for regulatory changes. |
| 3. Packaging Design | • Development of nondestructive testing techniques and failure analysis. |
| 4. Performance Packaging Testing | • Continued testing of performance packaging to ensure regulatory requirements are met. |
| 5. Hazard Identification | • Lithium battery (primary and secondary) testing. |
| 6. Risk Assessment / Risk Management | • Examination of procedures for selecting routes for spent nuclear fuel.  
                                         • Risk characterization and risk communication studies. |
| 7. Consequence Modeling | • Studies and analyses for specific hazardous materials. |
| 8. Security | • Development of tools for this evolving area. |
2007 Key Projects

• 2008 Emergency Response Guidebook
  – $90,000 funded in 2007

• American Exposure Guideline Levels (AEGL) Support
  – $95,000 funded in 2007

• Cylinder Testing
  – $12,000 funded in 2007

• Loading/Unloading Workshop
  – $25,000 funded in 2007

• Information Technology (including Intermodal Database)
  – $589,000

• Hazardous Materials Fusion Center – Cooperative Agreement
  – Pending funding for 2007
Hazardous Materials Transportation Cooperative Research Program

• SAFETEA-LU requires PHMSA to enter into a contract with the National Academy of Sciences to carry out the 9 research projects called for in Special Report 283.

• Funding of $1,250,000 for each of fiscal years 2006 through 2009 is authorized from the Highway Trust Fund for these purposes.

• Our intent is to conduct specific research projects while testing the viability of a cooperative hazmat transportation research program.

• Stakeholder interest, involvement, and feedback is vital during the pilot
  – Participation on stakeholder oversight board (met 11/30 to 12/01/06)
  – Participation on project panels (formed for initial projects)
Hazardous Materials Transportation Cooperative Research Program

• Four projects selected by a stakeholder oversight board as research topics funded by the first two years of the pilot program

• 1. HM-02, Hazardous Materials Transportation Incident Data for Root Cause Analysis
  – $300,000
  – 15 months with work expected to begin around October 1, 2007
  – Objective:
    • The objectives of this research are to (1) develop a set of practical recommendations for methods to improve the availability and quality of hazardous materials transportation incident data, (2) identify gaps and redundancies in reporting requirements, and (3) provide an estimate of the under-reporting of serious incidents.
Hazardous Materials Transportation Cooperative Research Program

  - $350,000
  - 18 months with work expected to begin around October 1, 2007
  - Objective:
    - The objective of this project is to develop a guide for conducting assessments of emergency response needs and capabilities for hazardous materials releases. The guide shall address four elements: (a) conducting state, regional, and local hazardous material emergency response needs assessments; (b) developing, maintaining, and sharing capability assessments; (c) aligning assessed needs with various levels of capability; and (d) identifying shortfalls where additional/different capabilities are warranted. The guide will include recommended methods for monitoring and recording changes in response capability over time, in order to avoid a static snapshot. In cases where there are gaps in existing techniques or necessary data for the needs or capability assessments, this research will identify research needs to address them.
Hazardous Materials Transportation Cooperative Research Program

• 3. HM-04, Emerging Technologies Applicable to Hazardous Materials Transportation Safety and Security
  – $350,000
  – 15 months with work expected to begin around October 1, 2007
  – Objective:
    • The objectives of this project are to (1) develop a list of near-term (less than 5 years) and longer-term (5–10 years) technologies that are candidates for use in enhancing the safety and security of hazardous materials transportation, as applied by shippers, carriers, emergency responders, or government regulatory and enforcement agencies; (2) identify emerging technologies that hold the greatest promise of being introduced during these near- and longer-term spans; and (3) identify potential impediments to and opportunities for their development, deployment, and maintenance (e.g., technical, economic, legal, and institutional). This research will review generic technologies and will not evaluate specific name-brand products.
4. HM-01, Hazardous Materials Commodity Flow Data and Analysis

- $300,000
- 18 months with starting date to be determined at release of RFP
- Objective:
  - The main objective of this project is to produce a guidebook for conducting hazardous materials commodity flow surveys to support local risk assessment, emergency response preparedness, and resource allocation and to support analyses across jurisdictional boundaries. This guidebook should be targeted at transportation planning and operations staff at the local and regional levels, as well as local and regional personnel involved in hazardous materials training, and emergency response. All relevant modes of transportation, all relevant classes of divisions of hazardous materials, and the effects of seasonality on hazardous materials movements should be discussed.
Program Review Areas

• External Stakeholder Involvement
  – HMCRP, AEGL, Loading/Unloading, ERG

• Merit Review of Proposals
  – All research goes through a competitive process
    • HMCRP, AEGL

• Independent Evaluation of Research
  – Most research goes through a peer review process
    • HMCRP

• Performance Measurement
  – Results used in development of program performance measures

• RD&T Coordination
  – HMCRP, Loading/Unloading
    • Website RD&T Outreach under development
PHMSA RD&T Contacts

Additional project information is available by contacting:

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