1-1-2007

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>
<td></td>
</tr>
</tbody>
</table>
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>CO</td>
</tr>
<tr>
<td>IG</td>
<td></td>
<td>Safety Advisory Committees</td>
<td>Pre-Award</td>
<td>COTR</td>
</tr>
<tr>
<td>OMB</td>
<td></td>
<td>Gov/Industry R&amp;D Forum</td>
<td>Post-Award</td>
<td>Technology Demonstrations</td>
</tr>
<tr>
<td>Congress</td>
<td></td>
<td>Interagency Coordination Mgrs</td>
<td>Interagency 5-Yr R&amp;D Plan</td>
<td>Submit Results to Public Events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pre-Solicitation R&amp;D Forum &amp; Blue Ribbon Panel</td>
<td>R&amp;D Program Logic Model</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pre-Award Joint Rev of White Papers &amp; Proposals</td>
<td>R&amp;D Program Strategic Plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post-Award Annual Panel Peer Review of Projects</td>
<td>R&amp;D Program Performance Plan</td>
</tr>
</tbody>
</table>

Systematic Evaluation Process

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

Finding the Best Research Contractors
- Peer Review Process
- Cost Share 50/50

Applying Program Outputs
- Systematic Process Features
  - NMS
  - COTR

Assuring Good Contractor Performance
- NMS
- COTR
- FAR

Assuring High Quality Outputs
- Peer Review Process
- DOT/RITA
- R&D Forum
1. External Stakeholder Involvement

“Elements of Implementation”

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 reviewer page

Proposal Review Meeting Module
1. Review Scoresheet page

Post-Award

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

Transparent & documented process for awarding competitive contracts…

Yes!
2. Merit Review of Proposals

“Indicators of Implementation”

Public announcement of contracts on FedBizOpps.gov…

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**

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>Pipeline Safety Elements &amp; Possible Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Elements</strong></td>
</tr>
</tbody>
</table>
| 1. Damage Prevention | • Subsurface mapping technology  
* Pipe detection technology for HDD  
* ROW monitoring technology |
| 2. Pipeline Assessment and Leak Detection | • Expanded use of Direct Assessment  
* New & more powerful inspection technology  
* Robotic inspection platforms |
| 3. Defect Characterization and Mitigation | • New models to characterize damage  
* New protocols to streamline repairs |
| 4. Improved Design, Construction, and Materials | • Strain based design standards  
* New construction methods  
* Better pipeline coating  
* Expanded use of composites |
| 5. Systems for Pipeline Mapping and Information Management | • Aerial mapping systems  
* GPS integration into aerial mapping |
| 6. Enhanced Operation Controls and Human Factors Management | • New human factor protocols for pipeline monitoring and control operations |
| 7. Risk Management & Communications | • New models to assess risk  
* Improved knowledge for first responders |
| 8. Safety Issues for Emerging Technologies | • New knowledge of hydrogen economy impacts  
* New knowledge of LNG safety |
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*
Pipeline Safety R&D Mission

“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

<table>
<thead>
<tr>
<th>Desired Impact Performance Measures</th>
<th>Fostering Development of New Technologies</th>
<th>Strengthening Regulatory Requirements and Consensus Standards</th>
<th>Promoting Knowledge for Decision Makers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of projects contributing to objectives</td>
<td>54</td>
<td>Number of projects contributing to new or revised industry standards</td>
<td>52</td>
</tr>
<tr>
<td>Number of projects demonstrating new technologies</td>
<td>27</td>
<td>Number of projects addressing PHMSA regulations</td>
<td>48</td>
</tr>
<tr>
<td>Number of projects filing for U.S. Patents</td>
<td>11</td>
<td>Number of projects addressing NTSB Recommendations</td>
<td>5</td>
</tr>
</tbody>
</table>

Process Features

<table>
<thead>
<tr>
<th>Categorizing projects for mission relevance</th>
<th>Categorizing projects for mission relevance</th>
<th>Categorizing projects for mission relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology transfer process</td>
<td>Consensus standard integration process</td>
<td>Peer review process for qualifying output quality</td>
</tr>
<tr>
<td>Peer review process for qualifying output quality</td>
<td>PHMSA regulatory program integration process</td>
<td>Monitoring projects for contractual performance</td>
</tr>
<tr>
<td>Monitoring projects for contractual performance</td>
<td>Peer review process for qualifying output quality</td>
<td>Contractual requirement for submitting conference papers</td>
</tr>
<tr>
<td>Contractual requirement to notify PHMSA of U.S. patent</td>
<td>Monitoring projects for contractual performance</td>
<td></td>
</tr>
</tbody>
</table>

5. RD&T Coordination

“Elements of Implementation”
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.
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

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

• 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:

Robert Smith
Pipeline Safety
1200 New Jersey Ave. S.E.
Room E22-321 (East Bldg.)
Washington D.C. 20590
P(202) 366-3814
F(202) 366-4566
Email robert.w.smith@dot.gov

Joseph Nicklous
Hazardous Materials Safety
1200 New Jersey Ave. S.E.
Washington D.C. 20590
P(202) 366-0067
F(202) 366-3650
Email joseph.nicklous@dot.gov