

U.S. Department of Transportation, Research and Special Programs Administration (RSPA),
Office of Contracts and Procurement, DMA-30, 400 7th Street, SW, Room 7104, Washington,
DC 20590

Pipeline Safety Research and Development – Damage Prevention; Leak Detection; Enhanced Pipeline Operations, Controls, and Monitoring (includes Human Factors issues); Improved Materials Performance; and Other Safety Improvements (includes needs related to Crack Detection Technologies, Pipeline Inspection Technologies, and Risk Assessment Methods)

DTRS56-04-BAA-0002, due February 20, 2004, POC Warren D. Osterberg, Contracting Officer,
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CONTACT INFORMATION: Through this Broad Agency Announcement (BAA), the U.S. Department of Transportation (DOT), Research and Special Programs Administration (RSPA) is soliciting information on cost-shared activities that offer practical solutions to improve the safety and integrity of the Nation's pipeline infrastructure. Interested parties must submit separate white papers for each proposed project. Multiple projects are not to be combined into a single white paper. Each white paper must not exceed five pages and must include a description of the state-of-the-art in the area being proposed, actions proposed to advance that state with a quantifiable method to measure the improvement anticipated upon completion of the project. In addition, each white paper must include the offeror's contact information: point of contact, telephone number, fax number and e-mail address.

On April 23 and April 25, 2002, RSPA's Office of Pipeline Safety (RSPA/OPS) held two (2) briefings to provide additional information on the BAA process. Interested parties may obtain more details on these briefings via the Pipeline Safety Research and Development (R&D) Internet Web site <http://primis.rspa.dot.gov/rd/index.htm>. The Internet Web site contains the presentation from the briefings, questions and answers from the briefings, and a list of potential bidders and others who requested that their contact information be made public.

On December 11-12, 2003, the RSPA Office of Pipeline Safety (OPS) co-hosted a Research and Development (R&D) Forum on the Role of the Pipeline Safety Improvement Act of 2002 in the development of Energy Pipeline Technology. The meeting objective was to identify impacts, opportunities, and needs arising from R&D provisions of the Pipeline Safety Improvement Act of 2002 (PSIA) based on the perspective of relevant government agencies, industry, and pipeline R&D funding organizations. The meeting outcome identified current research efforts, key challenges facing government and industry, plus potential research that can help to meet these challenges. To obtain the downloadable report listing identified challenges and research needs visit: http://primis.rspa.dot.gov/rd/mtg_121103.htm

SPECIAL NOTE: This announcement will be open through February 20, 2004, unless otherwise amended. The purpose of the BAA is to solicit research projects to assure the long-term integrity and security of the nation's gas and hazardous liquid pipeline network. A team of experts will review the white papers submitted in response to this announcement and offerors will be advised of the outcome and anticipated follow-up from this review as it is completed.

SCOPE: In November 2001, a RSPA/OPS Research & Development workshop brought together government agencies (Federal, State, local and international), research institutions, pipeline companies and their associations, standards organizations, and public representatives to begin development of a national pipeline safety research agenda. The workshop description, speaker notes, and other documents of interest are on the Pipeline Safety R&D Internet Web site: <http://primis.rspa.dot.gov/rd/index.htm>. On March 28, 2002, RSPA set out on the path by issuing the first of three BAAs to solicit white papers for Damage Prevention and Leak Detection research and development. This resulted in RSPA awarding \$1.6 million for seven research agreements. On June 5, 2002, RSPA issued a second BAA to solicit white papers for Enhanced Pipeline Operations, Controls, and Monitoring and awarded \$1.18 million for six research agreements as a result. On December 30, 2002, RSPA completed the first cycle of the process by issuing the third and final BAA requesting white papers for Improved Materials Performance and Other Pipeline Safety Improvements. This resulted in RSPA awarding \$1.92 million for eight research agreements related to this BAA. Additional information on these agreements can be found on the Pipeline Safety R&D Internet Web site referenced above.

On December 17, 2002, the President signed the Pipeline Safety Improvement Act of 2002 (PSIA 2002). This act identified ten focus areas that Congress and the Administration felt were critical to an effective pipeline safety and integrity R&D Program. The PSIA 2002 also identified RSPA/OPS as having lead responsibility for near-term research, development and demonstration in eight of the ten focus areas. While RSPA/OPS had initiated R&D projects in most of the areas identified in the PSIA 2002, several areas were under-represented in project awards based on the first three BAAs.

On June 17, 2003, in preparation for the next phase of its R&D Program, RSPA/OPS conducted a meeting of its R&D Blue Ribbon Panel. Membership of the Panel consisted of representatives of pipeline operators, trade associations and other Federal Agencies. The Panel reviewed the progress made to date and OPS's plans for future R&D efforts.

This BAA has been developed to incorporate the direction provided in the PSIA 2002 as well as input from the Blue Ribbon Panel. This BAA solicits white papers for both individual R&D projects and consolidated R&D programs. The topical areas around which this BAA has been structured include those stipulated in the PSIA 2002 and the topical areas included in the initial three BAAs that were not completely addressed by awards issued under those BAAs. A white paper developed in response to this BAA must identify the focus area of interest and describe how the proposed work supports Pipeline Safety Improvements. The topic areas of interest are: Damage Prevention; Leak Detection; Enhanced Pipeline Operations, Controls, and Monitoring; Improved Materials Performance; and Other Safety Improvements. The area "Enhanced Pipeline Operations, Controls and Monitoring" includes developmental needs related to improved human factors. The area "Other Safety Improvements" includes developmental needs related to Crack Detection Technologies, Pipeline Inspection Technologies and Risk Assessment methods.

OPS is seeking white papers on individual projects from independent pipeline industry members and white papers on consolidated R&D program in support of Pipeline Safety Improvements. To support selection of organizations to manage consolidated R&D Programs, RSPA is seeking white papers to identify and qualify organizations to coordinate, conduct, and effectively manage a portfolio of interrelated R&D projects in focused areas of interest to OPS. Program Areas being considered for Consolidated R&D programs include research, development and demonstration that will improve pipeline safety and integrity or reduce the cost of state-of-the-art

pipeline safety activities. A consolidated R&D program white paper from the team lead organization should identify opportunities for integrated R&D that could involve contributions from several organizations whose combined expertise will contribute greater efficiency and effectiveness to R&D in the proposed program areas. These white papers will be judged on both the merits of the suggested approach to managing a program area and the capability of the proposing organizations to carry out the proposed program.

Examples of focus programs and Projects within the desired program areas include the following:

Damage Prevention

- *Focus on the detection and prevention of excavation damage.* A project could identify several technologies for preventing encroachment and detecting excavation damage, evaluate the potential of each alternative (or complementary technique), select technique(s) for further development based on the risk averted by each, and demonstrate the effectiveness of the selected technique(s).

Leak Detection

- *Detection of small leaks* – Ecological and drinking water resources can be impacted by small pipeline leaks that are not quickly detected. Examples of projects of interest include monitoring technologies that can quickly detect the release of a small fraction of the total product being transported, leak detection equipment for very small leaks, identifying of airborne chemicals using aerial surveillance, and research that will reduce the cost of current leak detection equipment.

Enhanced Pipeline Operations, Controls, and Monitoring

- *Human factors* – The effectiveness of operators in performing safety and integrity-related activities is affected by diverse factors such as the level of operator fatigue and the quality of information accessible to them to guide their response. Managing change of pipeline controller shifts, restricting duty hours to control human fatigue, and the improved interaction between operator personnel and pipeline machinery can contribute to reduction of pipeline accidents. Research topics of interest include technologies and procedures designed to minimize operator error, research on the effects of managing pipeline controller shift change and potential solutions for minimizing those effects, human interface in incident/accident management, and other portions of the pipeline operating system.
- *Airborne chemical mapping and pipeline encroachment monitoring* – Approaches using aerial surveillance with technologies for right-of way monitoring and leak detection. Examples of projects of potential interest include the use of unmanned or other aerial vehicles to monitor pipeline conditions and small leaks; and innovative approaches to preempt third party damage to pipelines by detecting encroachment on pipelines and their rights-of-way.

- *Improved directional drilling* – Directional drilling can usually safely and effectively place an underground utility beneath roads, rivers, and other difficult areas but recent accidents have shown problems may occur during the process. Examples of projects of interest include new drilling techniques that can prevent accidental damage to existing underground utilities or the utility being installed, and technologies that will detect underground utilities in the path of the directional drill.

Improved Materials Performance

- *Evaluation and development of promising new pipe materials* – Numerous opportunities exist to address known threats to pipeline integrity through the development of new materials. A project in which the available materials technologies are surveyed, the potential of each known material technology is evaluated against its potential to address known threats including extreme arctic-like cold and development is pursued on the new materials judged to represent the best potential materials for future pipelines. Technologies that might be considered would include composite materials, damage and defect resistant materials, and high grade/high strength steels capable of operation at considerable higher pressures.
- *Pipe coatings* - Properly applied coatings, whether applied in the factory or in the field, can be one of the most significant factors in insuring pipeline integrity. Examples of projects of interest include test methodologies to predict long-term performance, developing decision methodologies to improve coating choices, developing field-applied coatings with the cost and performance of factory-applied coatings, and intelligent coatings that monitor their conditions.

Other Pipeline Safety Improvements

- *Strengthening and validating direct assessment (DA) practices* – Assessing the integrity of pipelines that cannot be assessed using In-Line Inspections (ILI) or hydro testing currently depends on direct assessment. While many of the tools used in direct assessment have been demonstrated through long use, the demonstration of the effectiveness of the integrated DA process has not been completed for all threats and conditions in which it might be needed. An integrating task might be proposed to advance the current state-of-the art of DA by strengthening and validating the areas, such as stress corrosion cracking DA or External Corrosion Direct Assessment (ECDA) for bare pipes, in which development and validation is not yet complete. Examples of sub-projects of interest could include research to enhance ultrasonic technology, guided waves, and development of pigs that will fit in currently un-piggable pipelines.
- *Mathematical pipeline modeling enhancements or computational pipeline modeling enhancements* – Improved in-line-inspection devices are allowing more defects to be identified and more features of these defects to be revealed. As the knowledge from ILI runs increases, the tools to support decisions on the appropriate action to take in remediation or monitoring these defects are needed. Examples of projects of interest include better modeling of growth defects; mathematical algorithms that will improve pipeline modeling; and improved pipeline-operating data to better detect small leaks.

- *(ILI) for damage or defects* - A variety of "smart" pigs and other in-line inspection technologies are needed to monitor for, detect, and measure corrosion, cracks, and other forms of damage to pipe walls. Examples might include ILI for mechanical damage or corrosion, use of "magnetic telescopes" to identify corrosion areas, use of sensing coils that wrap around pipes to map corroded surface areas, use of ultrasound or guided waves to inspect "unpiggable" pipeline, etc.
- *Crack detection and Stress Corrosion Cracking (SCC)* Methods for detecting and characterizing cracks in pipelines are needed to better identify and understand the significance of cracks associated with Stress Corrosion Cracking and cracks associated with low-frequency pre-1970 ERW piping and lap welded seams. Crack detection for pre-1970 low-frequency ERW is needed to characterize problems endemic to the welding processes practiced by certain pipe mills. Prevention of time-dependent growth of defects to critical size and subsequent failure requires periodic non-destructive inspection and integrity evaluations. The non-destructive inspection tools must be able to provide a reliable indication of the presence of defects within a very narrow weld zone. The defects potentially present in these pipelines include: selective seam corrosion, fatigue cracks, lack of fusion, stitch welds, cracks from hard spots, surface breaking hook cracks near the weld, and pitting corrosion.
- *Design and Safety technology enhancements for LNG facilities* The recent emphasis on R&D related to pipeline integrity has largely excluded LNG facilities. Recent increases in demand and anticipated future increases in demand for LNG seem to justify renewed emphasis in LNG-related R&D. Examples of proposed R&D activities might include non-destructive inspection tools able to reliably indicate very small leaks, material defects, internal corrosion or faulty operation of automatic control systems. Other examples might include development and application of analytical models to characterize accident consequences from a spectrum of fire scenarios.

WHITE PAPERS: RSPA is soliciting white papers on individual projects as well as consolidated R&D programs in support of pipeline safety improvements. Each proposal must include a cost sharing contribution of at least fifty percent of the proposed project's cost in order to be considered. Each white paper must not exceed five pages including appendices and backup materials, include contact information previously described, and include sufficient information to evaluate the following areas:

1. Offeror's understanding, and description, of the "state of the art" in the research area the offeror is proposing to address;
2. The scientific and technical merit of the proposal to advance pipeline safety;
3. The adequacy and feasibility of the technical approach and realism of cost estimate;
4. Technical experience and capabilities of the offeror in federal research programs, and
5. Time line to implement the proposed technologies and concepts into practice in the pipeline industry (one to three years preferable)
6. As appropriate, information on capabilities of the lead company and other collaborators expected to participate in consolidated R&D Programs.

All evaluation factors are of equal importance.

GENERAL INFORMATION: This BAA can be downloaded via the Internet at: <http://www.rspa.dot.gov> under Procurement Opportunities. In all correspondence to the RSPA Office of Contracts and Procurement, please reference the BAA No. DTRS56-04-BAA-0002. Early submission of white papers responding to this BAA is strongly encouraged. All white papers (hard copies) must be submitted via overnight mail (e.g., Federal Express, UPS) to Warren D. Osterberg, Contracting Officer, Research and Special Programs Administration, ATTN: DMA-30, 400 Seventh Street SW, Room 7104, Washington, D.C., 20590. Because of continued security concerns, do not send white papers via regular mail. Please submit ten (10) hard copies and one (1) electronic copy of each white paper. The above office must receive white papers not later than February 20, 2004, at 4:00 PM, EST. NOTE: All inquiries concerning this announcement, and the electronic copy of each white paper, shall be directed to the RSPA Office of Contracts and Procurement, ATTN: Mr. Warren D. Osterberg, Contracting Officer, telephone: (202) 366-6942; e-mail: warren.osterberg@rspa.dot.gov.

BROAD AGENCY ANNOUNCEMENT: This FedBizOps notice, in conjunction with further announcement details available from the RSPA procurement site Internet address identified above, constitutes the BAA as contemplated by FAR 6.102(d)(2). A formal Request for Proposals (RFP) for other type of solicitation regarding this announcement will not be issued. No more than \$500,000 in funding is expected to be awarded to any single research project. No more than \$4,000,000 in funding is expected to be awarded over the life of the program (three years) for Consolidated R&D programs. We anticipate awarding projects totaling not more than \$3,000,000 as a result of this announcement. The remaining funds are contingent upon Congressional approval. A technical evaluation panel will review all white papers received for responsiveness to the evaluation areas stated in this BAA. Offerors providing white papers deemed worthy of further consideration and meeting the criteria of this BAA will be notified with possible suggestions for change in scope and detailed guidelines for submitting full proposals. As noted earlier in this announcement, each proposal must include a cost sharing contribution of at least fifty percent of the proposed project's cost in order to be considered. No discussions will be held between an offeror and the Government's technical staff after submission of a white paper without the Contracting Officer's prior approval. It is DOT/RSPA's desire to encourage the widest participation, particularly the involvement with universities and other academic institutions, as well as with individuals, corporations, non-profit organizations, small and small disadvantaged businesses, and State or local governments or other entities.