PHMSA Pipeline Safety Research and Development Awards under Research Announcement 693JK320RA0001 (RA-6)
October 5, 2020

List of Awardees

Priority Area – Damage/Threat Prevention

- Bakhtar Research and Engineering, LLC – "Forced Resonance Imaging for 3-D Mapping of Buried Gas Pipes" ($1,519,094)
  - The project will field-test and fine-tune the technology and develop the software used to detect buried plastic gas pipelines, collect three-dimensional (3-D) location information with increased accuracy, and provide additional information on pipe diameter by 3-D mapping or volumetric image reconstructions. Field testing will be performed at the Pacific Gas and Electric Company (PG&E) facility. This project supports the Senate FY 19 appropriations for unlocatable plastic pipe.

- Gas Technology Institute – "Procedures for Retrofitting Indoor Gas Service Regulators" ($290,000)
  - The project will provide natural gas local distribution companies with best practices and guidelines for the inspection and retrofitting of inside gas service regulators and associated piping to provide an equivalent level of safety to regulators installed outdoors. This research project will address the NTSB recommendations (P-19-001).

- Colorado State University – "Tools for Predicting the Development of Underground Leaks with Significant Flow Rates and Mitigating its Occurrence/ Consequence" ($1,136,046)
  - The project will continue the ongoing work funded by PHMSA in this area by advancing methods to characterize gas migration behavior and detect and repair leaks. The project will also provide decision guidance for stakeholders and first responders to incorporate into their response protocols. Field testing will be performed at CSU's Methane Emission Technology Evaluation Center and, as an option, at DOT's Transportation Technology Center in Pueblo, Colorado.

Priority Area – Leak Detection

- Northeast Gas Association – "Pre-Commercial Development and Field Testing of a Portable Mercaptan Sensing Device for Gas Industry Applications" ($427,052)
  - The project will develop and validate pre-commercial portable technology that will detect and measure the concentration of mercaptans (odorants) at the 1 parts

per billion level in gas industry field applications. NGA will partner with University of California, Davis, the developer of the mercaptan sensor, to perform extensive field-testing by several NYSEARCH members in their customer territories.

- BMT Fleet Technology Limited – "Improve Pipeline Leak Rate Estimation" ($561,000)
    - The project will improve existing leak rate models to develop tools that can estimate the expected leak rates for pipelines with through wall cracks of various orientations and morphologies and corrosion features of various sizes. These enhanced tools will support evaluating the consequence of developing a through wall crack, operational responses when incidents occur, and remedial action strategies and timelines. Additionally, the technology will serve as a key linkage between inspection capability and leak detection technology specifications.

Priority Area – Anomaly Detection/Characterization

- Northeast Gas Association – "Feasibility Study for a Robotic Platform and Suite of Sensors to Identify Degradation in Non-Conforming Driscopipe ® 8000" ($802,000)
    - The project will conduct a feasibility study to identify robotic technologies equipped with sensors capable to detect degradation/delamination in non-conforming Driscopipe ®8000 (NCDP) through live in-line inspection of such pipes in the field. Strategies for integrating these into a robotic inspection platform with a sensor to detect such delamination will also be evaluated. This project would help address PHMSA's Advisory Bulletin ADB-2012-03 notifying operators using NCDP of potential material degradation that was identified in such pipes installed between 1978 and 1999 in desert-like environments in the southwestern United States, namely Arizona and Nevada.

- DNV GL USA, Inc. – "Stress Corrosion Cracking Threats Prioritization and Decision Making Using a Bayesian Network Approach" ($1,057,797)
    - The project will develop and validate a holistic, flexible machine-learning model to predict stress corrosion cracking (SCC) location and severity. The SCC model will be validated using field data by four pipeline operators and industry partners. The research results will help pipeline operators prioritize inspections effectively. This project will support the Executive Order (EO) on Maintaining American Leadership in Artificial Intelligence.

Priority Area – Liquefied Natural Gas (LNG)

- Blue Engineering and Consulting Company – "Vapor Cloud Explosion at Nil Wind" ($134,704)
    - The project will develop criteria to define "nil wind" (low or no wind) conditions and to determine whether such conditions should be included in the siting requirements for LNG facilities. Computational fluid dynamic modeling will be performed to measure the severity of consequences from accidental hazardous fluid releases under "nil wind" conditions as compared with the current regulatory

requirements.

- DNV GL USA, Inc. – "Development of Guidance on Potential Cascading Effects from Flammable Vapor Cloud Explosions" ($1,232,520)
    - o The project will provide guidance on the potential cascading effects from flammable vapor cloud explosions (VCE) and damaging pressures that may cause structural damage to an LNG facility. The project scope will review a range of LNG facility types, assess the initial blast capacities of targets, define the VCE potential of the explosion sources, conduct detailed simulations of the explosion events, and develop guidance on the response of structures to the explosion pressures for various LNG facility types.

Priority Area – Other/Materials

- Engineering Mechanics Corporation of Columbus – "Hydrostatic Retesting Optimization for Older Liquid Pipelines" ($650,000)
    - o The project will determine the minimum number of pressure cycles after a hydrotest for a liquid pipeline so that any surviving postulated surface cracks will not become a rupture. For an older liquid pipeline that high hydrotest pressure could induce several leaks during the hydrotest that are costly and potentially dangerous in a more populated area. The project will develop an approach to optimize hydrotest pressure of lower operating pressure (liquid) pipelines to avoid unnecessary repairs when using hydrotest guidelines for gas lines, to define a rupture-free fatigue life for liquid lines that experience pressure cycling.