

PHMSA Research, Technical and Policy Perspectives



Working Group #4

Underground Gas Storage Facilities

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USDOT / PHMSA

Pipeline Research and Development Forum

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Program Area: Underground Gas Storage

- Program Objective: To support refinement of integrity requirements for UGS in order to prevent incidents such as the 2015 Aliso Canyon gas storage well release. This area further supports the development of new policy for the safe operation of these types of facilities and for the reduction of environmental impact due to uncontrolled releases.
 - Solutions are sought both in technology and knowledge to decision makers
- Most of this research portfolio is active but completed projects have informed policy development



Ongoing UGS Research

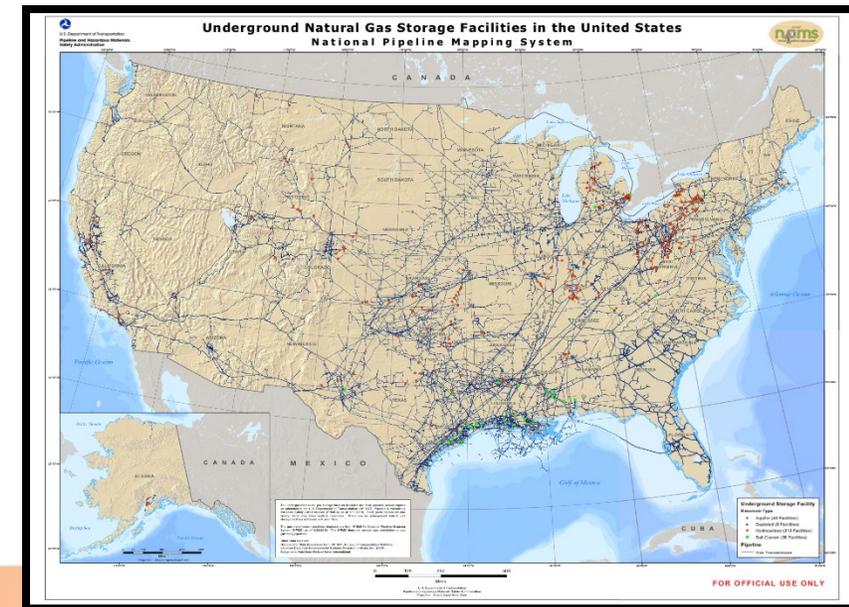
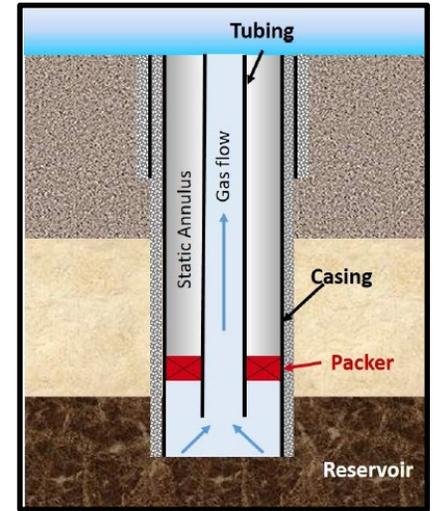
Researcher	Title	PHMSA	Cost Share	Start	Months	% Comp.
Pipeline Research Council International	<i>"Evaluation of Well Casing Integrity Management for Underground Storage Wells"</i>	\$207,955	\$207,955	Sep 2018	21	70
Battelle Memorial Institute	<i>"Tubing and Packers Life-Cycle Analysis for Underground Gas Storage Applications"</i>	\$785,513	N/A	Sep 2018	24	67
Battelle Memorial Institute	<i>"Reliability of Subsurface Safety Valves"</i>	\$749,080	N/A	Sep 2018	24	67
*C-FER Technologies	<i>"Risk Assessment and Treatment of Wells"</i>	\$394,396	N/A	Sep 2018	18	96
Total:		\$2,136,944	\$207,955			

*Modification pending to add 4 months



Research Portfolio Observations

- Comprehensively addressing recommendations from the Interagency Task Force on Natural Gas Storage Safety on well casings and safety valves
- Results can support policy development and potential changes to standards
- The research portfolio is relatively new leaving other facility operations open for gap analysis
- More investment can be achieved based on this group suggestions



Suggestions on Research Gaps/ Ideas

- Well design studies:
 1. Design safety factors for burst and collapse pressures.
 2. Determination of maximum well operating pressure—well casing and reservoir, and integrity tests (logging and pressure).
 3. Surface & subsurface safety valves.
 4. Reviewing and evaluation of well-bore simulation tools.
 5. Casing- wall thickness assessment tools.



Suggestions on Research Gaps/ Ideas

- Risk management that includes assessments, remediation, and reassessment intervals to maintain safe maximum well operating pressures.
- Corrosion and leak monitoring—internal, external, produced fluids, casing, wellhead and surrounding surface area;
- Site Security and Safety, Site Inspections, and Emergency Preparedness and Response
- Recordkeeping—reservoir properties and well -conductor, casing, tubing, and wellhead



National Pipeline Research and Innovation Test Site

At
U.S. DOT Transportation Technology Center
Pueblo, Colorado

CONCEPTUAL VIEW

Seismic and Land Shift Stress Test Site

Pipe under Rail Stress Test Site

Underground Leak Detection Test Site

Underground Pipe Detection and Excavation Test Site

Low & High Pressure Gas Distribution Test Site

Small Diameter Pipe Test Loop w/ Launcher

Large Diameter Pipe Test Loop w/ Launcher

Small Scale LNG Facility Test Site

Corrosion and Cathodic Protection Test Area

Pipeline Firefighter Training Site

Metallurgy Lab
Dynamics Lab

Office & Control Room

Additional Study Areas Identified by Industry

- Fiber optics technology
- Pipeline material aging
- Welds on specialty materials
- Compressor emissions
- Pressure cycling for fatigue
- Physical & cyber security

Considerations for projects at TTC

- What project(s) would lend itself well to being conducted at TTC?
 - Near real-world scenarios, can't be performed elsewhere, and/or could benefit from TTC intermodal capabilities
- What are examples of challenges associated with project that would need to be addressed?
 - Confidentiality of data for some aspects, overall security
 - Equipment needs
 - Building and infrastructure needs
- Who would be good to provide input for conceptual, types of equipment, and operational needs for launching and maintaining a world class research and test facility
- Other considerations?



Submitting Research Gap Ideas

Anyone, Anywhere and Anytime via <https://primis.phmsa.dot.gov/matrix/>

PHMSA
U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

Pipeline Technical Resources
[Return to Pipeline Safety Community](#)

Home	Alt MAOP	Cased Crossings and GWUT	Class Location	CRM	DIMP	GT IM	HL IM	High Volume EFV
Low Strength Pipe	LNG Facility Siting	OQ	Pipeline Construction	Public Meetings	R&D	RMWG	Underground Natural Gas Storage	

Research & Development: Identifying Pipeline Safety Research Gaps

Submit Research Gap Suggestions by [following this link](#).

R&D Menu

- Home
- Program Strategy
- Program Performance
- Technology Demonstrations
- Technology Success Stories
- Congressional Mandates
- University Partnerships
- R&D Database
- R&D Project Map
- Meetings/Events
- Links
- Contacts
- Feedback
- Submit R&D Idea

1. BACKGROUND

The Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) sponsors Research & Development (R&D) projects focused on providing technological and knowledge solutions that will increase the safety and reliability of the Nation's pipelines. Historically, research gaps are identified and road mapped at public events, held periodically as funding and program actions allow. Although hundreds of attendees usually participate at each event, many stakeholders cannot attend since they either don't have the means or availability.

PHMSA is using this Special Notice to solicit research ideas on a year-round basis to reach the widest set of stakeholders and identify a larger more diverse portfolio of research. The input from this Special Notice will also generate a pool of research ideas for potential future research solicitations.

PHMSA will use submitted research gaps to formulate a research strategy for its Pipeline Safety Research Program.

2. RESEARCH PROGRAMMATIC AREAS/ELEMENTS

The Pipeline Safety Research Program organizes program planning, execution, and tracking around the following subject areas.

Threat Prevention

This area addresses excavation activity damage prevention to all pipeline types and improving sub-surface locating/mapping. Research also addresses preventing or monitoring for other threats whether they are coming from corrosion, outside force damage, etc.

Leak Detection

Research in this area addresses leak detection or monitoring on hazardous liquid and natural gas pipelines, including sub-surface, surface, and airborne-based sensors and deployment platforms. Research also addresses approaches to lessen release volumes from leak/rupture incidents.

Anomaly Detection/Characterization

This area aims to improve the capability to identify and locate critical pipeline defects, and to characterize the severity or interacting nature of such defects. Research in this area includes solutions from within or outside the pipe.

- Regulations
- Advisory Bulletins
- Interpretations

Research & Development Program
Server Version: 3.00.112 Server Time: 01/29/2020 03:04 PM UTC User: Robert Smith

Research Gap Suggestions

Pipeline Safety Gap Suggestion Form

Name of Person Submitting: Email of Person Submitting:

Email address will be used by PHMSA only for verification and follow-up purposes, and will not be released to the public or any other organization.

Stakeholder Type:
[select from choices below]

Gap/Project Title (required):

Main Objective Statement (required):

Identify Major Scope Items for Investigation:

Identify Relevant Subject Matter Experts, Stakeholders, or End User Involvement suggested in Project Scope:

Cost Estimate: Time Estimate (months):

PHMSA Program Element:
[select from choices below]



Thank You!/Research Contacts

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Visit us at <https://www.phmsa.dot.gov/> and search “Research”

