

R&D Forum Working Groups

1. Rehabilitation of Aging Cast Iron Pipelines

In support of Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, this working group will explore R&D topics that would advance technological solutions to rehabilitate aging cast iron pipelines which are prone to leaks and are located in socially vulnerable communities or urban areas. PHMSA envisions that the workgroup will develop 4-5 research topics that focus on technology solutions and data tools to assess potential risk profiles and to rehabilitate aging cast iron pipelines.

2. Integrity of Underground Natural Gas/Hydrogen Storage

In support of Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, PHMSA is seeking solutions that will reduce methane releases from PHMSA regulated infrastructure. Furthermore, PHMSA plans to expand its research portfolio in the safe underground storage of hydrogen gas and/or hydrogen gas blended with natural gas (hydrogen/blends), including within Underground Natural Gas Storage (UNGS) facilities. This workgroup will explore a wide array of topics such as:

- Reducing the release of small leaks of hydrogen/blends from underground storage facilities and exploring current and new technologies to mitigate leaks within storage facilities.
- Evaluating the degree and consequences of hydrogen mixing with cushion gas in underground storage systems.
- Determining the compatibility of hydrogen gas with underground storage environments, including the impact of microbes on hydrogen gas and diffusion, and chemical reactions of hydrogen gas with ambient rocks.

PHMSA envisions that the workgroup will develop 4-5 research topics that focus on advancing knowledge and technology while maintaining the integrity of the underground storage for hydrogen and hydrogen/blends.

3. Utilization of Inspection tools on Hydrogen Pipelines

Due to the importance of inline inspection (ILI) tools to characterize the integrity of pipeline facilities, it is critical to study their reliability in the assessment of pipelines transporting hydrogen gas and/or hydrogen gas blended with natural gas (hydrogen/blends). PHMSA envisions that the workgroup will develop 4-5 research topics that could provide knowledge on the impact of hydrogen and hydrogen/blends concentrations on ILI tool reliability.

4. Hydrogen Network Components

To advance the safe transportation of hydrogen gas and/or hydrogen gas blended with natural gas (hydrogen/blends) through the Nation's pipeline network, additional research is necessary. This workgroup would explore topics related to transmission and distribution pipeline networks that include:

- The effects of hydrogen and hydrogen/blends on polyethylene, polyvinyl chloride, and steel pipes to determine the suitability of the materials for transporting hydrogen and hydrogen/blends in distribution networks.
- The impact of different levels of hydrogen concentrations on aboveground facilities such as, compressor station equipment, meter stations, piping, etc. or other critical facilities in the transmission/distribution network.

PHMSA envisions that the workgroup will develop 4-5 research topics that focus on advancing knowledge and technologies to enhance the safe transportation of hydrogen gas.

5. Methane Mitigation – Construction and Operations

In support of Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, PHMSA is seeking solutions to reduce methane releases from PHMSA regulated infrastructure. The research topics recommended by this workgroup would also support congressional mandates on preventing and mitigating methane leaks on PHMSA regulated facilities. This workgroup would review best practices to reduce methane emissions. Areas that will be evaluated are:

- Reduction in methane releases during construction and maintenance activities, such as when a pipeline is purged prior to putting it into operation and after a line is taken out of service for repair.
- Design, installation, and operation of separators, compressors, controllers, regulators, overpressure protections, launchers/receivers, station emergency shutdowns, liquid storage tanks, valve actuators, and other equipment that use gas as a power driver.
- Minimization of pipeline segment blowdown pressures and segment lengths for pipe replacement or relocation.
- Installation of additional mainline valves.
- Operational practices to minimize gas loss during operational testing.
- Integrity management of natural gas and hazardous liquids pipeline to include carbon dioxide lines.

PHMSA envisions that the workgroup will develop 4-5 research topics that focus on advancing knowledge and technology to reduce methane emissions from PHMSA jurisdictional pipeline systems.

6. Breakout Tanks – Methods to Prevent Corrosion of Tank Bottoms

In support of the Joint Explanatory Statement of the Consolidated Appropriations Act of 2021, PHMSA is seeking solutions on new corrosion control techniques that may be used to improve leak prevention of regulated aboveground storage tanks (i.e., breakout tanks). One major threat to the integrity of breakout tanks is corrosion of the bottom of the tank that can lead to a leak of the product stored in the tank. To reduce this risk, Federal pipeline safety regulations require cathodic protection (CP) be applied to each tank. While CP is largely effective in protecting pipelines and breakout tanks, it is difficult to protect some tanks with CP due to soil conditions, tank design, electrical interference, or other issues.

PHMSA is interested in solutions of supplementary or alternative techniques to cathodic protection systems and the application of such techniques to aboveground storage tanks. This workgroup will discuss topics related to breakout tanks such as:

- Performance and effectiveness of new CP technologies (vapor corrosion inhibitors (VCI)).
- Tank designs on concrete pads (steel in contact with concrete).
- Tank designs with high density polyethylene (HDPE) liner.
- Tank designs with concrete pads placed on top on HDPE liner.
- Tank designs for double bottom tank (e.g., El Segundo tank).

PHMSA envisions that the workgroup will develop 4-5 research topics that focus on advancing knowledge of designs to prevent corrosion of breakout tank bottoms.