



ALBERTA INNOVATES

CLEAN ENERGY

CLEAN TECHNOLOGY

HYDROGEN CENTER OF EXCELLENCE

FUNDING DETAILS

Ground-Breaking Advancements: Establishing An Innovative In-Situ Installation Process for Envirolock Systems to Enable Hydrogen Pipeline Conversions

Envirolock® is a portfolio of innovative, composite secondary containment and pipeline reinforcement systems designed to prevent and mitigate all types of pipeline leaks, including powerful ruptures from natural gas and hydrogen pipelines. Concurrently, the containment system also enhances remote detection through its unique ability to concentrate even very small leaks around sensors. Taken together, Envirolock interrupts or neutralizes nearly every pipeline integrity challenge that operators face. Envirolock has already achieved a technological breakthrough, completely containing a ~4600 psi pipe rupture in a laboratory setting during its first ASME PCC-2 certification testing; what remains is to bring this performance to the field.

Consequently, the purpose of this 18-month project is to create and validate an innovative in-situ process to install Envirolock on an existing pipeline without shutting it down. Pioneering this capability is essential for enabling Envirolock's use in hydrogen conversion/blending projects as well as other applications throughout the energy industry. Broadly speaking, the project will be developed and executed in two phases – a foundational engineering phase (January 2025 – December 2025) and a full demonstration phase (January 2026 – June 2026).



RECIPIENT:

**Total Containment
Inc.**



TOTAL BUDGET:

\$3,016,595



PROJECT DATES:

**JAN 2025 –
JUN 2026**



PARTNERS:

**Alberta Pipeline
Operator, C-FER
Technologies, &
Others**



AI FUNDING:

\$750,000



PROJECT TRL:

**Start: 5
End: 9**

APPLICATION

One of Envirolock's key potential use cases is facilitating hydrogen blending/conversions within existing infrastructure by reducing operational risks and satisfying regulatory requirements. For example, TCI's containment system protects pipelines from external threats, suppresses leaks and rupture hazards, and speeds leak detection. Complimenting this is TCI's reinforcement system, designed specifically to arrest cracks and restore a pipeline's full strength. Both solutions decrease the cost of shifting to hydrogen service while still protecting safety and the environment.

PROJECT GOALS

- Use the demonstration winder to begin developing in-situ installation protocols. Validate the use of these new procedures by using them to construct and test new Envirolock Containment System spools in accordance with ASME PCC-2 criteria.
- Use the demonstration winder to finish the prototype testing for TCI's Envirolock Pipeline Reinforcement System. Validate the use of this design configuration by constructing and testing Envirolock Reinforcement System spools in accordance with ASME PCC-2 criteria.
- Design a customized version of the winder and create an in-trench assembly to move it along the pipeline. Procure, assemble, and test this speciality equipment.
- Conduct impact testing on Envirolock and complete a full Engineering Assessment for its use in a Class Location Change project, which would be submitted to AER to request approval for Envirolock's first experimental license.
- Install Envirolock for the first time on an operational pipeline in Alberta.

BENEFITS TO ALBERTA

At a high level, there are three key outcomes to focus on:

- Creation of a completely novel in-situ carbon fibre winding method that exists nowhere else in the world, which will enhance the competitiveness of the province and its industries.
- Envirolock's use would be authorized under an AER experimental license for the first time, enabling its faster deployment in other pipeline integrity applications and settings across the province.
- This project would transition TCI from start-up to scale-up, directly resulting in the expansion of its Alberta workforce, operations, and investments.

**2 Patents****8 Project Jobs****30-50 Future Jobs****3 New
Products/Services****35+ kt/yr Future
GHGs Reduced**

CURRENT STATUS

MAY 2025

The demonstration winder has been received and is currently being used to develop in-situ installation protocols. The engineering assessment is also underway.