

Expro Excellence

Transforming Hydrogen Pipeline Inspections with Velonix®

Well Flow Management | Pipeline Integrity



Objectives and background

- Performing smart tool integrity pigging in hydrogen service pipelines is extremely challenging, as hydrogen is far more compressible than natural gas or nitrogen and can create significantly larger, less predictable pig speed excursions
- The primary issue was the inability to reliably complete ILI runs in hydrogen service, with excessive speed excursions creating risk to tool integrity, inspection data quality, and overall run success
- Previous attempts to complete these runs without Velonix® control were unsuccessful due to the inability to effectively manage speed fluctuations and maintain tool velocity within acceptable limits
- Expro had previously deployed the Velonix® system on an earlier project, successfully demonstrating its ability to control pig speed in challenging conditions and giving the client confidence in the technology

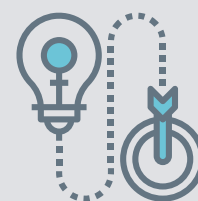
Expro Excellence

- Expro deployed Velonix® to actively manage and stabilize pig velocity during hydrogen ILI operations
- The system reduced and controlled flow velocity in real time, continuously monitoring conditions and responding instantly to developing speed excursions to suppress or eliminate them before they could escalate
- Unlike traditional approaches that rely on passive flow control, Expro provided active, real-time velocity control. Velonix® continuously adjusted flow conditions based on live feedback, allowing precise management of pig speed in a service environment where conventional methods had already proven ineffective
- The team successfully tested and confirmed that the non-intrusive pipeline velocity measurement system could operate reliably in hydrogen service—something not previously proven
- The digital flow skid, valves, materials, and sealing systems were reconfigured to meet hydrogen compatibility requirements. The team overcame the inherent instability caused by hydrogen's high compressibility, enabling consistent velocity control where prior efforts had failed
- In a previous attempt without Velonix®, an uncontrolled speed excursion destroyed the multi-million-dollar ILI tool, resulting in a complete loss of inspection data

Value to the client

- Expro enabled the safe and successful completion of multiple ILI runs in hydrogen service—something the customer had previously been unable to achieve
- This delivered high-quality integrity data while eliminating the significant safety and financial risks associated with uncontrolled speed excursions
- Multiple successful runs in a service environment where prior attempts had failed
- Significantly improved data quality through stable tool velocity
- Real-time, automated control, enabling immediate response to changing conditions
- Live data visibility via Expro's Data-to-Desk platform, allowing stakeholders to monitor operations and make faster, informed decisions
- Expro transformed an operation that was previously high-risk and unreliable into a controlled, repeatable process
- By stabilizing pig speed and eliminating uncontrolled speed excursions, we protected critical inspection assets, ensured data integrity, and gave the customer confidence to validate pipeline mechanical integrity in hydrogen service, safely and efficiently

Innovative solution



Environment

