



The Evolution of Pipeline Top of the Line Corrosion Management: Leveraging VCIs for Pipeline Longevity

Suchada Punpruk

Senior Engineer, Quality Assurance and Quality Control

PTT Exploration and Production Public Company Ltd.

Top-of-the-line corrosion (TLC) remains one of the most challenging integrity threats in wet gas pipelines, primarily driven by condensation and localized corrosive environments. Traditional mitigation strategies—such as material selection, coatings, and operational adjustments—often fall short in addressing TLC under dynamic flow and temperature conditions.

This paper explores the evolution of TLC management, emphasizing the role of Vapor Phase Corrosion Inhibitors (VCIs) as a transformative solution for pipeline longevity. VCIs offer a unique mechanism by forming protective molecular layers on steel surfaces in vapor spaces and under condensed water films, reducing corrosion rates without requiring continuous liquid-phase dosing. The discussion includes advancements in VCI chemistry, deployment techniques, and performance monitoring, supported by field applications and laboratory studies.

By leveraging VCIs, operators can achieve cost-effective, environmentally responsible corrosion control, extending asset life and enhancing reliability in complex pipeline systems.