

# Pipeline Corrosion

Unprotected pipelines, whether buried in the ground, exposed to the atmosphere, or submerged in water, are susceptible to corrosion. Without proper maintenance, every pipeline system will eventually deteriorate. Corrosion can weaken the structural integrity of a pipeline and make it an unsafe vehicle for transporting potentially hazardous materials. However, technology exists to extend pipeline structural life indefinitely if applied correctly and maintained consistently.

## **How Do We Control Pipeline Corrosion?**

Four common methods used to control corrosion on pipelines are protective coatings and linings, cathodic protection, materials selection, and inhibitors.

Coatings and linings are principal tools for defending against corrosion. They are often applied in conjunction with cathodic protection systems to provide the most cost-effective protection for pipelines.

- Cathodic protection (CP) is a technology that uses direct electrical current to counteract the normal external corrosion of a metal pipeline. CP is used where all or part of a pipeline is buried underground or submerged in water. On new pipelines, CP can help prevent corrosion from starting; on existing pipelines; CP can help stop existing corrosion from getting worse.
- Materials selection refers to the selection and use of corrosion-resistant materials such as stainless steels, plastics, and special alloys to enhance the life span of a structure such as a pipeline. Materials selection personnel must consider the desired life span of the structure as well as the environment in which the structure will exist. Corrosion inhibitors are substances that, when added to a particular environment, decrease the rate of attack of that environment on a material such as metal or steel reinforced concrete.
- Corrosion inhibitors can extend the life of pipelines, prevent system shutdowns and failures, and avoid product contamination.

Evaluating the environment in which a pipeline is or will be located is very important to corrosion control, no matter which method or combination of methods is used. Modifying the environment immediately surrounding a pipeline, such as reducing moisture or improving drainage, can be a simple and effective way to reduce the potential for corrosion.

Furthermore, using persons trained in corrosion control is crucial to the success of any corrosion mitigation program. When pipeline operators assess risk, corrosion control must be an integral part of their evaluation.

## **What Is the Solution?**

Corrosion control is an ongoing, dynamic process. The keys to effective corrosion control of pipelines are quality design and installation of equipment, use of proper technologies, and ongoing maintenance and monitoring by trained professionals. An effective maintenance and monitoring program can be an operator's best insurance against preventable corrosion-related problems.

Effective corrosion control can extend the useful life of all pipelines. The increased risk of pipeline failure far outweighs the costs associated with installing, monitoring, and maintaining corrosion control systems. Preventing pipelines from deteriorating and failing will save money, preserve the environment, and protect public safety.