

Atlas Repair of Complex Air Interface Process Lines Remediates External Corrosion

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Colombia

Summary

Owners of an energy exploration, production, and storage company in Colombia, observed damage caused by external corrosion to 30-inch diameter process lines at air/ground interfaces. Promptly responding to the issue, the process line owners requested a repair design that would structurally rehabilitate the corrosion damage to the lines. Local CSNRI partner and corrosion experts [Aplika Control Corrosión S.A.S.](#) installed a four-layer application of [Atlas™](#) to restore the lines to their original design capacity, extending service life.



Photos caption:

Inspection revealed damage from external corrosion on process lines in the injection water transport system.

Benefits

- Ideal for repair of corrosion, dents, gouges and wrinkle bends
- Engineered for permanent repair and rehabilitation with minimal disruption to pipeline operation
- Flexible repair system for complex deformities and geometries (straight, elbow, tee, welds and irregularities), including those in areas of low clearance
- No hot work (eliminates risk of auto-ignition)
- Evidence-based performance
- Installed and inspected with cost-effective field labor
- Can be installed over non-injurious hard spots and laminations without safety risk, reducing the total repair length, cost and time required compared to steel sleeves
- Fast curing, this allows the excavation to be covered in 24 hours

Challenge

Severe external corrosion was identified on each of the six elbows slated for repair, all of which were part of the injection water transport system. The wall thickness losses were up to 50% in some areas. Repair was engineered to accommodate a wall thickness of 0.375 inches with an operating pressure of 285 psi and a temperature of 60°C (140°F). Both the locations and geometries were challenging to access. Atlas is a flexible composite repair system that adapts well to complex deformations and is ideally suited to application in areas of low clearance. With no need for hot work, it was possible to keep the pipeline operational, as any interruption would incur additional costs in time and operation.

Solution

Atlas was proposed for a customized solution for the repair. Atlas is the most-tested carbon fiber composite for the repair and rehabilitation of pipelines and piping structures. It is highly engineered to permanently restore the original strength of pipelines experiencing both common and complex anomalies. The repair was designed in accordance with ASME PCC-2 and ISO 24817.



Exterior corrosion and difficult access to elbow geometry posed challenges to repair of six process lines.

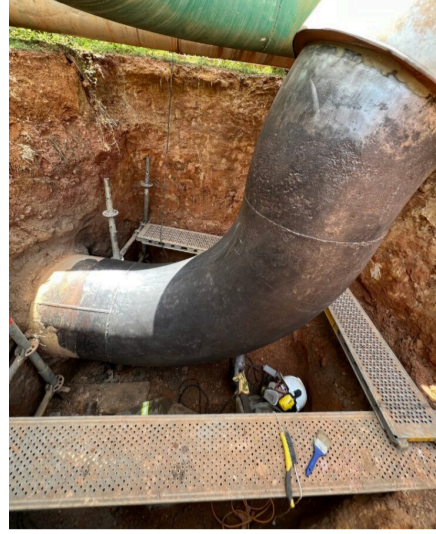
Manage consent

Surface preparation involved utilizing mechanical tools according to SSPC-SP 11 standards to achieve clean or bare metal, ensuring a minimum profile of 50 microns on the surface. Following surface blasting, the repair underwent dehumidification using an epoxy adjuster, effectively eliminating grease, contaminants and surface dirt to meet minimum permissible environmental conditions for proper installation, with relative humidity (H_R) below 90% and temperature variation no greater than 3°C (37.4°F).

EPN 242 putty was applied to smooth the surface contour and eliminate voids that could hinder uniform load transfer from the metal surface to the reinforcement. PPR 290 resin was thoroughly mixed and applied to the pipe as a corrosion inhibitor. Subsequently, the Atlas material was saturated with SFE 206, and applied in a spiral manner, maintaining constant tension during wrapping to ensure a 50% overlap, according to the design of each repair. Finally, a compression film was installed to consolidate the repair layers, allowing excess resin to be released. After curing, Shore D hardness was measured, ensuring that the repair surpassed the established minimum permissible limit of 76.

Results

The repair successfully restored the structural integrity of the process line air interfaces, reinforcing six critical segments of the 30-inch process water pipeline. The CSNRI local partner team followed strict technical and quality standards, meticulously installing the Atlas repair, ensuring a design pressure of 285 psi, with an expected service life of up to 10 years. There was no interruption to operations during the repair.



Prior to applying Atlas, the surface was prepared to SSPC-SP 11 standards on each pipe.



EPN 242 putty was applied to smooth the surface, followed by PPR 290 as a corrosion inhibitor.



Atlas is applied in a spiral fashion the full length of each repair.



Compression film is applied to the repair to accommodate the release of excess resin.