

Large Southern Water Utility

PREVENTING MAIN BREAKS WITH ADVANCED INSPECTION TECHNOLOGIES THAT IDENTIFY STRAY CURRENTS, CORROSIVE SOILS, AND WALL LOSS

This proactive wholesale drinking water supplier services a large growing population in the southern region of the United States. With a humid climate and a statewide annual rainfall of 51 inches, periodic water shortages have become a way of life for residents, triggered not only by occasional droughts, but by uncertain aquifer supplies and a dwindling number of new surface waters. As a result, the utility has developed innovative water efficiency and conservation programs for managing the 156 million gallons of water supplied to customers each day.

Challenge

Aware of previous failures along one of its high-value transmission mains, the utility developed a proactive program to better understand the condition of their critical pipes. The main is a 36-inch ductile iron pipe that supplies water to many thousands of customers and facilities.

Corrosion is the primary cause of failure in metallic pipelines. Because the only structural component is the pipe wall itself, any loss due to corrosion has an immediate impact on the overall strength of the pipe, a reason why properly **managing a metallic pipeline** is critical to system resilience. The main runs parallel to gas lines, high voltage electrical lines, and has had previous failures. While cathodic protection (CP) had been installed years ago to protect the line against corrosion, the utility wanted information on the system's current condition.

Solution

Since 2013, this large utility has partnered with Xylem to apply its Decision Intelligence approach to address its most critical water challenges. When the utility identified the main for priority inspection, they welcomed the strategy of combining a **SmartBall®** leak detection inspection with a pilot run of Xylem's cutting-edge **PipeDiver Ultra®**, an advanced condition assessment platform that analyzes ultrasonic data to deliver actionable insights on the physical integrity of the pipeline. The tool is **the industry's first high-resolution, free-swimming ultrasonic condition assessment tool for identifying and characterizing the depth of wall loss on metallic pipes.**



PROGRAM HIGHLIGHTS

- PipeDiver Ultra® identified 9 pipe sections with wall loss, pinpointing a section with 72% wall loss that eventually failed
- Engineering analysis and cathodic protection survey confirmed stray currents and corrosive soil as contributing factors to the catastrophic main break
- The utility now has actionable data regarding the condition of the pipeline and powerful new insights to prioritize investment

SERVICES PROVIDED

- PipeDiver Ultra® condition assessment
- SmartBall® leak detection
- Structural engineering evaluation
- Cathodic protection survey

Pipe Material: Ductile Iron

Length: 0.81 miles

Diameter: 36-inch

Transmission Type: Water

Outcome

The inspection took place over two weeks in June 2018, starting with the free-flowing SmartBall technology, recommended for its acoustic sensitivity to small leaks and its ability to inspect long distances in one deployment. While the SmartBall inspection identified no leaks, the PipeDiver Ultra identified nine pipes with wall loss, with one area indicating a significant wall loss of 72 percent. The inspection also identified disruptive signals along the line, leading to the suspected presence of stray electrical currents related to the close proximity to a power plant, a potential factor affecting pipe corrosion. Xylem assembled a team of specialists to examine the line with **Spectrum XLI™**, an above-ground inspection technology, used to investigate and pinpoint interference locations. High levels of alternating current (AC) discharge were identified and pinpointed at two locations.

“We were impressed with the results the PipeDiver Ultra delivered, and the inspection gave us the confidence to search our system for similar corrosive soil conditions to reduce the risk of further outages.”

Director of Operations, Large Southern U.S Utility

Xylem’s field testing and analysis determined that the CP system was not functioning as designed, confirming what the utility suspected – the main was a problematic pipe.

Because of this and the pipe’s significant wall loss, the Xylem team recommended replacing the pipeline and adding suitable new cathodic protection.

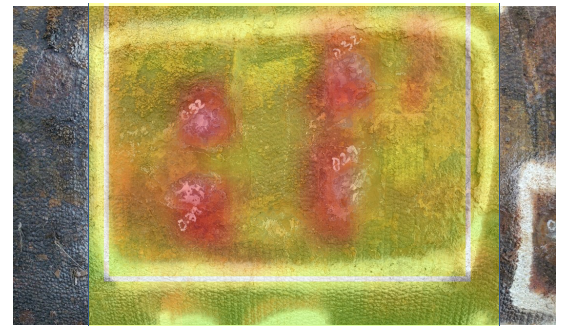
As the utility began preparing the pipeline for replacement, the main suffered a catastrophic failure at the precise location where the ultrasonic analysis determined the 72 percent wall loss.

Forensic analysis confirmed that stray currents and corrosive soils were contributing factors to the failure. Based on the results and newly acquired data, the utility intends to use additional decision intelligence solutions to monitor the main line and to identify other lines in their system with similar corrosive soil conditions. **The utility is now bolstered with powerful new insights (and reliable, innovative solutions like PipeDiver Ultra) to prioritize investment and reduce the incidence of dangerous, expensive, and unplanned water outage events.**

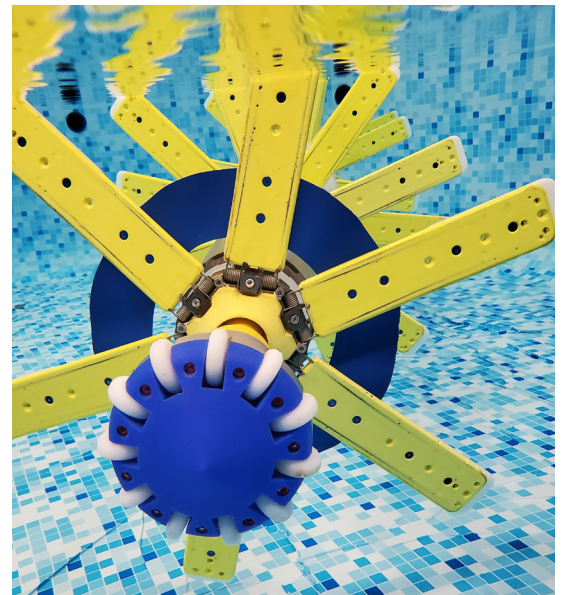
That’s the power of decision intelligence.



Validated pipe defect.



Validated defect with thickness map overlaid.



Xylem's PipeDiver Ultra pipeline condition assessment tool.