



The Power of Precision: Nuclear Power Plants

CONDITION ASSESSMENT SOLUTIONS FOR PRESSURE PIPELINE SYSTEMS

Proven pipeline integrity
management and monitoring
solutions for critical pressure pipes
supporting nuclear power infrastructure.

Visit our website for more information.

Condition Assessment and Mapping Solutions for Pressure Pipeline Systems in Power Generating Facilities

Many cities depend on safe, reliable power delivered from nuclear power plants that often have unique constraints that can affect the operation of their pressure pipelines.

Nuclear power plant pipeline systems often have a complex configuration to support plant operations. Scheduled inspections and regular maintenance are extremely important because of the high consequence of failure.

Pure Technologies, a Xylem brand, understands this environment very well, and has a long-proven history of providing direct and indirect inspections for both BWR and PWR nuclear plant operators throughout North America. While most of our technologies can be deployed while plant operations remain in-service, a majority of our condition assessment work is performed in coordination with shutdown periods for facility maintenance or upgrades while the pipelines are out of service.



For nuclear power plants, Pure provides condition assessment solutions for systems that include:

- Fuel Pipelines
- Service Water Systems
- Cooling Water Pipelines (Intake and Discharge)
- Make-up Water Pipelines
- Condenser Piping
- Fire Water Pipeline Systems
- Storm Drain Pipelines
- Wastewater Conveyance and Discharge Systems

Throughout our history of protecting critical infrastructure necessary for everyday life, Pure has deployed its technologies, including fatigue analysis for non-ferrous pipes, to survey thousands of miles of pipeline. This includes prestressed concrete cylinder pipe (PCCP), reinforced concrete pipe (RCP), bar-wrapped pipe (BWP), steel, ductile iron pipe (DIP), cast iron pipe (CIP), as well as PVC, asbestos cement pipe, and HDPE.

Innovative Technology Provides Actionable Data to Prolong Asset Life

Beyond simply offering technical solutions, Pure provides peace of mind by showing nuclear power plant operators the true condition of their critical infrastructure.

Our innovative technology and services portfolio provides actionable data and solutions that nuclear power plant managers need to cost effectively focus resources with precision, by prolonging asset life, improving safety and increasing reliability.

Ultimately, Pure gives nuclear power plant operators the confidence to make precise decisions about the inline integrity of their pipelines. Eliminating guesswork means dollars are not wasted replacing pipelines that are still in good condition, conserving resources for when they are really needed.



"The proactive approach we're taking [with Pure's help] allows us to predict water main breaks, which improves our reliability of service. When you locate a defect, you can schedule a repair, notify people, and get it done at the right time of day, and at a schedule of our choosing. Everybody benefits."

Randy Williams

Utility Services Manager, Flower Mound Public Works (FMPW) District

Assess & Address™

Through assessing more than 14,000 miles of pipe, Pure Technologies has found that 96% of all PCCP pipelines are in good condition. Through our four-step **Assess & Address™** approach, you can identify the exact location of deterioration, helping you maximize capital budgets and resources.



UNDERSTAND

Collect
Prioritize
Plan



ASSESS

Inspection
Analysis
Risk Evaluation



ADDRESS

Risk Mitigation
Remediation Strategies



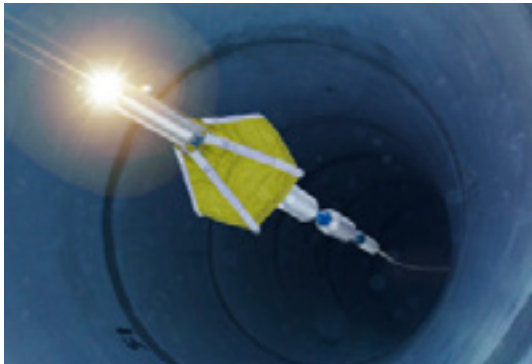
MANAGE

Condition Monitoring
Asset Management
Capital Planning

Condition Assessment Tools and Platforms

To help determine the condition of critical lines, nuclear power plant operators have utilized a variety of innovative inspection tools and technologies developed by Pure Technologies.

These industry-recognized inspection platforms include:



Sahara® leak inspection

Pure's proprietary **Sahara** inspection platform centers on this tethered, multi-sensor tool that can identify acoustic-based leaks and provide a variety of pipeline condition information in real time, with no disruption to service.

The Sahara tool uses product flow to draw the sensor through the water while it remains tethered to the surface. This allows greater control during inspections, as it can be winched back and forth to confirm the anomaly, and the precise location.



SmartBall® leak detection and mapping platform

SmartBall is a free-swimming, multi-sensor tool used to identify a variety of conditions in pressurized pipelines. It is easy to deploy and travels untethered with the product flow, collecting information. The tool's highly sensitive acoustic sensor can locate small leaks and gas pockets, with typical location accuracy within six feet.

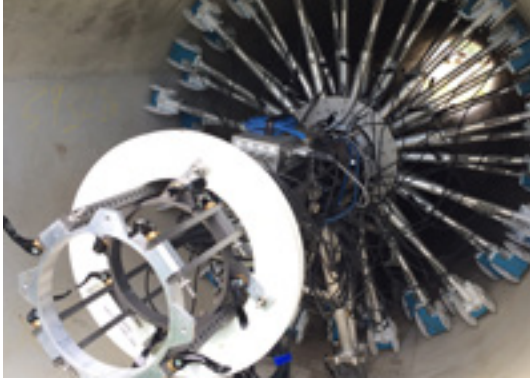
SmartBall mapping utilizes the latest accelerometer and gyroscope technology and advanced locations algorithms to calculate directional data. Combined with field-collected GPS points and pipeline bearing data, it creates a field generated X and Y map helping managers better understand the alignment relative to other critical assets.



PureRobotics® pipeline inspection

PureRobotics is a powerful robotic pipeline inspection system that can be configured to inspect pipes 24-inches and larger. Tethered by a high-strength fiber optic cable, the robotic crawler is capable of performing multi-sensor inspections. The crawler features HD digital CCTV, and can be equipped with electromagnetics, Inertial Mapping (depth, lateral and horizontal measurements), 3-D LIDAR, LASER, SONAR and other tools upon request.

Condition Assessment Tools and Platforms (cont'd)



PipeWalker™ electromagnetic inspection

The PipeWalker electromagnetic manned inspection provides high quality condition assessment data for understanding the structural integrity of large-diameter metallic and concrete pressure pipeline.

Through the use of electromagnetic technology, operators can effectively determine the baseline condition of several pipe materials, (PCCP, BWP, ductile iron, steel) allowing for prioritized renewal, re-inspection and ongoing monitoring program.

A high-angle, top-down photograph of two workers on a construction site. Both workers are wearing bright yellow-green high-visibility safety vests with reflective silver stripes and white hard hats. The worker at the top is wearing a harness and has a rope attached to it. The worker at the bottom is also wearing a harness. The background shows industrial structures and yellow safety tape. A semi-transparent blue rectangular box is overlaid in the center of the image, containing white text.

Deep market experience combined with a demonstrated commitment to research and development have enabled Xylem to build a strong portfolio of patented technology solutions designed to help power infrastructure owners around the world manage their critical pressure pipe infrastructure.

PIPELINE CONDITION ASSESSMENT
INLINE LEAK DETECTION
MONITORING SERVICES

Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xylem.com



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