

Buried Pipe Tool

By Ed Cooper, GE Hitachi Nuclear Energy.

Ed Cooper

Ed Cooper is the Buried Pipe Integrity Group Projects Manager for GE Hitachi Nuclear Energy (GEH) working in the Asset Management Services Division of GEH. He has spent most of his career interfacing directly with utilities to identify and provide solutions to utility issues. Mr. Cooper has more than 29 years of experience in the nuclear industry.

Ed Cooper graduated from Michigan State University in 1980 with a BS in Electrical Engineering.



As the global commercial nuclear reactor fleet ages, preventing the loss of tritium and other radionuclides from buried piping in both BWRs and PWRs is a priority for licensees as well as regulators. Licensees have committed to inspect buried assets, assess conditions, and take proactive steps to remediate buried degraded piping before it begins to leak, but until now there has been limited technology for inspections of buried assets.

GE Hitachi Nuclear Energy (GEH) and General Electric's Industrial Solutions (GEIS) have collaborated to develop a piping inspection tool, called Surveyor[®], to fill the technology gap. Surveyor[®] was launched in September 2012 to offer this technology solution to the oil and gas industry and shortly thereafter, GEH secured

the first nuclear industry customer in November 2012.

"Having the ability to leverage this great tool from an existing GE business was a major benefit for GE Hitachi to better serve customers," said Kevin Walsh, SVP Nuclear Fuels and Services. "We can offer this to both PWR and BWR customers and we are taking advantage of GE Industrial Solutions' experience to serve the industry. With Surveyor[®] technology, we can offer a proven and effective solution to inspecting internal pipes in nuclear plants."

Prior to GE's introduction of Surveyor[®], customers relied on inspection technologies that required costly and high risk excavations to inspect piping from the outside diameter. Surveyor[®] is a self-propelled solution that robotically crawls the length of the pipe, gathering wall thickness data from the pipe internal diameter eliminating the need for excavation. The tool is multi-directional, requires only a single entry point into the pipe and is capable of vertical travel. Pipes that are filled with liquid, partially filled with liquid or dry can be inspected.

Surveyor's inspection data is used to assess the integrity of the pipeline and



Launching Surveyor[®]: Robotic Inspection Tool

develop an asset management plan that provides for proactive countermeasures to prevent failures, helping to ensure continuous service. To introduce the tool to the unique nuclear environment, a blind Performance Assessment was performed at the Electric Power Research Institute (EPRI) in April 2012.

The test mockup consisted of three sections of 24-inch pipe. Two sections of

Surveyor tools are available to inspect pipe diameters from six to thirty inches. The tool designs have been proven through actual field applications in Europe. Ultrasonic inspection technology will be available from six-inch to 12-inch diameters and Saturated Low Frequency Eddy Current SLOFEC inspection technology will be available from 12-inch to 30-inch diameters.



EPRI Performance Assessment, April 10-13, 2012.

the test pipe were 40 feet long, and the third was 60 feet long with a 90-degree 1.5 diameter elbow. In order to simulate field conditions, the entire test pipe was covered so that all of the testing was completed blind.

Results from the testing in the three 24-inch pipe sections at EPRI showed the following:

1. The tool is capable of propelling itself through 1.5 diameter radius bends.
2. The tool is consistent in recording data from the pipe defects.
3. Ninety percent (90%) of all internal and external defects were detected.
4. Defect sizing average accuracy was greater than 80 percent of actual defect depth.

Surveyor® has reduced the technology gap and the need for costly, high risk excavations. Additionally, inspection data is used to assess the integrity of the pipeline and develop an asset management plan to address the utility's buried assets.

The U.S. Nuclear Regulatory Commission is concerned with uncontrolled releases of even very low levels of radionuclides. GE's Surveyor tool enables utilities to inspect buried piping and proactively remediate degraded piping before it leaks

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