

BWXT SG Services - Tube Inspection & Repair

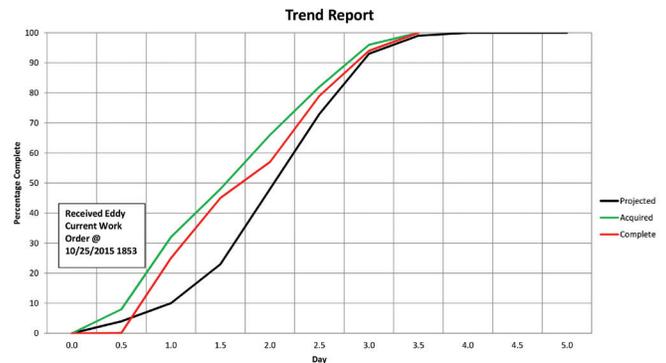
Revolutionary Acquisition System

BWXT Nuclear Energy, Inc. (BWXT) serves the commercial U.S. steam generator (SG) inspection market by providing state-of-the-art industry inspection and analysis technology and a best-in-class teaming approach, delivering predictable outage performance and exceptional quality and value. Our fresh approach has proven results in reducing cost, schedule, dose, exposure to safety incidents and human performance variances.



Automated data acquisition

BWXT has successfully utilized the patented ZR-100 intelligent robot as the delivery platform for our inspection and repair processes in both RSG and OTSG designs. The ZR-100 is capable of automatically executing complex inspection campaigns, using knowledge of its environment coupled with inspection planning to map its movements in the most efficient manner. Onboard Machine Vision and other independent position verification methods provide accurate encoding, and enable rapid, single tube calibration of the robot. The ZR-100 can access over 200 tubes from a single stance, and can traverse the tube sheet at speeds of 5 feet per minute.



Base scope, 100% bobbin testing of 31,208 tubes was completed in 69.5 hours, or just under six shifts

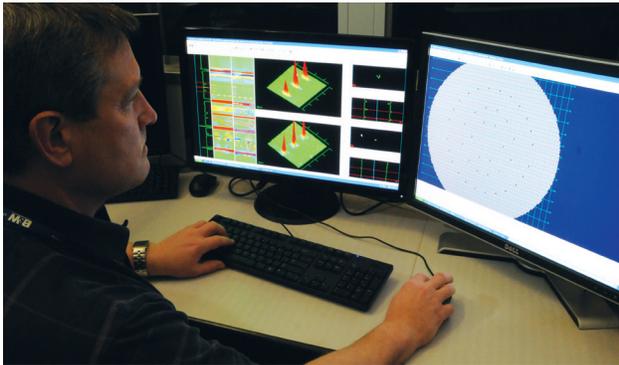
Prior to the inspection, planning and acquisition sequencing are carried out by software simulations to derive the optimal path with consideration for variables such as plugs, stays, the number of moves, and schedule time. Entire inspections can be simulated ahead of time to facilitate scheduling. During the outage, programmed inspections are conducted entirely by the robot, with only human monitoring instead of dedicated operation. Additionally, system network integration provides a new degree of robot awareness to avoid other robots and probe activity in opposite channel heads, and defines working zones for each robot.

To take full advantage of the ZR-100's automation features, the ECT Dual Guide Tube (DGT) tool head was redesigned to further optimize the inspection process, enhancing efficiency and data quality. The guide tubes skip one pitch to eliminate probe cross-talk and associated re-tests. System accuracy and proximity of the tool head to the tube sheet has provided superior probe life.

Analysis Resources

BWXT has resources and experience to deliver superior analysis quality and impressive accuracy and schedule. BWXT is aligned with key vendors and can provide more than 180 professional nondestructive examination (NDE) personnel specializing in SG inspections. BWXT has a number of highly experienced personnel with specific expertise in developing, qualifying and implementing existing and emergent techniques and equipment, including site qualification. BWXT also has personnel who are experienced with oversight of acquisition, analysis and data management processes.

BWXT can provide typical manual and automated analysis with personnel who have extensive experience with SG tube inspections. In addition, BWXT can deliver a revolutionary new model for dual analysis using Zetec's RevospECT® automated analysis product. The RevospECT® system is fully capable of performing multiple path analysis, applying any combination of probe technologies, to exceed the key performance indices of current dual analysis concepts, with additional capability



Superior data analysis with experienced personnel

to assess a signal's change over time and apply rule-based logic for final reporting of an indication. The key benefits of such an approach are increased probability of detection (POD), accuracy and consistency, with fewer personnel and considerably less equipment and logistical effort.

Tube Plugging

BWXT has developed mechanical rolled plugs as the primary means for tube plugging. The plugs are designed to remain in place during all operating conditions for the life of the SGs. Plug design and test requirements were built around the new requirements of the 2004 Code that require a plug not to eject after a "dioidic" leak condition.



Key Characteristics of the BWXT Roll Plug

- Designed for use with a stabilizer
- Can be ECT and visually inspected
- Easily removable
- Minimal stick-out beyond the tube end
- Nickel band for enhanced leak tightness
- Material is thermally treated Alloy 690

NUCLEAR ENERGY

GOVERNMENT SERVICES

ADVANCED TECHNOLOGIES

Headquartered in Lynchburg, Va., BWX Technologies, Inc. (BWXT) is a leading supplier of nuclear components and fuel to the U.S. government; provides technical, management and site services to support governments in the operation of complex facilities and environmental remediation activities; and supplies precision manufactured components and services for the commercial nuclear power industry. BWXT has more than 5100 employees and significant operations in Lynchburg, Va.; Erwin, Tenn.; Mount Vernon, Ind.; Euclid, Ohio; Barberton, Ohio; and Cambridge, Ontario, as well as more than a dozen U.S. Department of Energy sites around the country. Follow us on Twitter @BWXTech and learn more at www.bwxt.com.

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www.bwxt.com



BWXT Nuclear Energy, Inc.

107 Vista Centre Drive
Forest, VA USA 24551
t: +1 434.385.2510
f: +1 434.385.2557