Background
In order to provide a complete, integrated secondary services package, Westinghouse and Rolls-Royce, formerly Brooks, work together through a Joint Cooperative Agreement (JCA) that has been in place for approximately 15 years. This partnership allows resources, equipment and internal processes to be shared and encourages the development of new technology. The JCA provides Westinghouse customers a full steam generator package that combines Westinghouse cleaning technology with Rolls-Royce inspection capabilities.

Description
Often facilities are faced with challenging steam generator inspection or retrieval tasks that are outside the capabilities of Rolls-Royce standard inspection and retrieval tooling. In such cases, Rolls-Royce offers specialty tooling engineering services, providing customers with innovative solutions to emergent issues. These services include:

- Defining inspection and retrieval requirements
- Developing and reviewing functional specification with customer
- Designing and testing tooling
- Qualification
- Training development and implementation
- Tooling field deployment

Abrasive Cutting Tool
A modification to the Brooks In-bundle Camera System (BICS), this tool was designed to enter the in-bundle region and “cut” objects that may otherwise be too large to remove; for example, a piece of wire that may stretch across many tube gaps. Utilizing the abrasive cutting tool, the wire is cut into smaller segments for removal from the in-bundle region. The tool is designed to be completely safe and have no impact on tube integrity.
The development of the now standard upper bundle in-bundle inspection system (UBIB) gave the nuclear industry the very first images of the upper in-bundle region of a steam generator. Although not originally designed with retrieval capabilities, a specialty retrieval end effector was developed to remove a washer that was discovered in an upper support plate level during a routine inspection. UBIB was deployed to the upper support plate level to retrieve the washer. The attempt was successful and the washer removed.

Benefits

Rolls-Royce has unique capabilities, specialized tooling and unmatched experience performing steam generator inspections that give customers the following exclusive benefits:

- Expertly trained, seasoned field service personnel for deployment of tooling
- Experience in many different types of steam generator models from around the world
- Decreased down time
- Forty-eight hour mobilization and response time
- Industry leading technology development capabilities
- In-house manufacturing capabilities
- Thorough design, testing and qualification procedure

Experience

Rolls-Royce has developed specialty inspection and retrieval tooling for customers around the globe. Below are some examples of steam-generator-specific tooling that has been developed:

- Central Lane Inspection Camera (CLIC) – Developed to quickly and easily inspect the central or “tube” lane of steam generators, the CLIC is expandable up to eight feet and can collapse to only 40 inches. It has been customized to reach up to 20 feet for specific applications where hand-hole access is limited. A circular opening of only 2.76 inches (70 millimeters) is needed to deploy the system.

- Articulating BICS – An adaptation to the BICS inspection probe, the new addition facilitates a consistent top down view of quatrefoils by utilizing an industry exclusive passively articulating probe head. This top down view can be used to analyze sludge buildup and assist in cleaning decisions.

- Stand alone in-bundle grinder – Developed to remove a nail from in-bundle region.

- Batwing cutting tool – Developed to remove damaged “batwings” from the stay dome region of Combustion Engineering steam generators.