Background
Westinghouse has combined years of service and engineering expertise in a joint cooperative agreement with R. Brooks Associates Inc. Brooks is a world leader in remote visual inspections, integrated robotic systems and audio visual equipment. The Westinghouse/Brooks team offers the following steam generator (SG) secondary side inspection services.

Description
What’s New:
- **Improved Foreign Object Search and Retrieval (FOSAR) Tooling**
  
  We have combined our years of experience and expertise with traditional FOSAR tooling to develop more robust and efficient retrieval tooling for both square pitch and tri-pitch SGs. These improvements have significantly reduced dose and schedule.

What’s Coming:
- **Primary-Secondary Side Data Management Link**
  
  Based on existing primary and secondary side datamanagement systems, a new module is being developed for the Component Information System (CIS™) that will electronically link the primary side and secondary side inspection data.

- **SWATS™ PT**
  
  A new version of SWATS delivers a pan-and-tilt camera to provide limitless coverage of the annulus region all the way up to the flow distribution baffle while continuing to provide the high-quality inspection of SWATS 4.

- **Remote Tubesheet System (RTS™)**
  
  The RTS is under development for remote visual inspection and retrieval of foreign objects from the in-bundle region on the top of the tubesheet.

Existing Inspection Services:
- **Component Information System (CIS)**
  
  CIS allows you to organize information about any type of component. There is no limit to the number of components that can be created. Currently SGs, reactor heads and fuel bundles are available.

- **Shell Wrapper Annulus Transport System (SWATS 4)**
  
  SWATS 4 improves wide annulus and in-bundle viewing. This system exceeds the EPRI Chapter 10 Maintenance of Secondary Side Integrity Guidelines.

- **Universal F Upper Bundle/In-Bundle Inspection (F-UBIB™)**
  
  The F-UBIB is under development to support upper bundle inspection of Westinghouse Model F SGs.

- **Foreign Object Search and Retrieval (FOSAR)**
  
  FOSAR is a specialized service throughout the energy industry. FOSAR is performed in any plant utilizing enclosed vessels where unwanted items could become lost and create mechanical damage.

- **Abrasive Cutting Tool (ACT)**
• **Foreign Object Search and Retrieval (FOSAR)**
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• **Abrasive Cutting Tool (ACT)**
  This unique tool is designed to cut in-bundle foreign objects so that standard retrieval tooling can remove the objects.

• **Manual In-Bundle Inspection**
  In-bundle inspections are critical for determining SG tubesheet cleanliness. This inspection not only validates the performance of sludge lancing, but also verifies any hard sludge that may exist and locate the position of any hazardous foreign objects that are in-bundle.

• **Eggcrate Lattice Visual Inspection System**
  Brooks has developed a remotely operated Eggcrate Lattice Visual Inspection System. The tool will perform visual inspection in the periphery region at all elevations on the secondary side of Combustion Engineering (CE) SGs.

• **Alternate Plugging Criteria Inspections**
  Verifying structural integrity is paramount for SG life cycle management. These inspections will confirm that support plates and support plate structures are intact.

• **Top-Down Inspection**
  Top-down inspections are manual visual inspections of lower SG internals performed by utilizing access areas located in the steam drum. Typical points of interest are the top of the tube bundle, anti-vibration bars (AVBs) and the top visible surface of the upper support plate. These inspections can be performed in conjunction with each other or separately.

  Top-down visual inspections include:
  - AVBs/top-of-bundle - Manual visual inspection of the tube bundle, AVB and the top support plate outer periphery in the SG
  - Wrapper-to-shell - General area video inspection of the SG outer periphery
  - Wrapper support blocks - Video inspection of the support blocks and welds
  - Top-down support-plate - Manual visual inspection of the top support plate and accessible lower support plates

• **Upper Internals Inspection**
  These services can be performed in conjunction with each other, or separately. The upper internals visual inspections include:
  - J-nozzle - Video inspection of the J-nozzle to feedring welds
  - Feedring - Video inspection of the Feedwater ring and welds
  - Steam drum - General area video inspection of the upper steam drum