

In-vessel Visual Inspection (IVVI) Service – Double-up Inspection Tool (DUIT™)

Background

The double-up inspection tool (DUIT™) was developed to address the need to conduct in-vessel visual inspections in parallel with fuel movement and reactor maintenance activities without interfering with the other operations that require the refueling or auxiliary platforms. The first generation of the DUIT was introduced in 2004 and successfully used in several outages; however, there were some access limitations in some units driving the need for redesign. The second generation of the DUIT can be deployed in all boiling water reactor (BWR), BWR-3 through BWR-6 plants.

The DUIT system optimizes examination coverage and reduces dose to personnel while providing significant critical path savings by minimizing installation and examination time.

Description

The DUIT consists of a robotic camera delivery system that is controlled from a remote video control console in a clean area on the refuel floor. The DUIT provides controlled visual images through a pair of highly maneuverable camera manipulators.

The tool is capable of 360-degree horizontal motion and has a vertical span of 33 feet (from baffle plate to feedwater spargers) to access hundreds of reactor internals inspection points. The steam dam is utilized as a track to eliminate crane time needed to install a separate track.

The DUIT requires only two technicians to operate it and a smaller total crew size than competing methods of 24-hour coverage. This results in labor and as-low-as-reasonably-achievable (ALARA) savings.



3-D model of the DUIT in use

Benefits

The DUIT offers the following benefits to Westinghouse customers:

- Potential critical path savings
- Scheduling flexibility for in-vessel maintenance and refueling
- High-quality inspection images and data
- More cost-effective use of manpower
- Reduced amount of radiation exposure during deployment and operation, helping to meet ALARA goals
- Flexible design that accommodates numerous BWR plant configurations
- Built-in contingencies to minimize potential failure mode



DUIT in mockup reactor performing inspections