Background
The Westinghouse Motion Assisted Drive Exchange Assembly (MADEA™) tool provides the capability to remove and install control rod drives (CRDs) within a reactor vessel, using a more controlled process and reducing exposure to personnel. The MADEA tool can accommodate on-the-fly adjustments necessary when unforeseen changes and modifications to the under-vessel area occur.

Description
The MADEA tool is a state-of-the-art remotely operated CRD exchange tool. Using only one technician under vessel, CRDs can be exchanged in a safe, efficient manner, resulting in lower personnel exposure. Support personnel located in the reactor building operate the tooling, allowing them to be removed from higher radiation fields. Integrated audio/video systems provide continuous monitoring of exchange activities, as well as personnel under vessel and in the drywell.

Benefits
The MADEA tool supports applications in boiling water reactor (BWR) types 2 through 6, and the associated configurations of under-vessel carousels. The tool design also supports fail-safe features, providing positive capture of CRDs at all times, and its redundant features allow quick recovery in the exchange process.
Experience

The MADEA tool has been successfully used in multiple BWR plants in the United States. Training is provided in a simulated under-vessel mockup for deploying and operating the MADEA tool and associated equipment.

MADEA tool training

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