Background
Westinghouse, through its subsidiary PaR Nuclear, has designed AP1000™ fuel-handling equipment to improve the safety, reliability and efficiency of moving fuel, leading to shorter outages.

Description
Refueling Machine
The refueling machine uses the Westinghouse platform with a modified design that improves the safety and reliability of the equipment.

Operator console safety features the following:

- Lower overall height and reduced footprint provides a better view of fuel-handling operations and more space to move on the platform.
- Lower-voltage, higher-maintenance items are positioned in the front of the cabinet, where they are closer to the operators and more easily accessible. The higher-voltage components are at the back of the cabinet where they are at a safer distance from the operators.
- Removable console allows it to be stored outside of containment in a less abrasive environment when not in use.
- Second- and third-level platforms allow access to hoists and other elevated components for ease of maintenance and reduced foreign material exclusion (FME) concerns.

Transfer System
The transfer cart is controlled from the fuel-handling machine. The design of the cart features a single basket to prevent potential criticality issues.

Fuel-handling Machine
The AP1000™ fuel-handling machine handles spent fuel with the main hoist, and transfers new fuel, weir gates and other miscellaneous components within a two-ton capacity with the single-failure-proof hoist. The fuel-handling machine design features the following:

- Access doors are provided on all maintenance components, including under-deck cameras, for ease of maintenance.
- Cables are enclosed in duct work to protect operators.
operator’s safety is improved by:

- Better visibility of fuel-handling operations
- Additional space on the platform for ease of movement
- Enclosed cabling on the platform
- Added safety interlocks
- Elimination of pendant control for the new fuel elevator

Reliability is an important design criterion. The high cost of unscheduled down time demands equipment that performs as expected when needed.

The AP1000™ fuel-handling equipment improves reliability with improved accessibility to maintenance items and inclusion of redundant systems. Improved accessibility also means less time required to perform maintenance activities, resulting in lower dosage for maintenance personnel.

**Experience**

The AP1000™ fuel-handling equipment design will be used in all AP1000™ plants and is available for existing equipment upgrades.