Background

Westinghouse has developed the wet annular burnable assembly handling tool (WABAHT), an innovative tool designed to eliminate the problems associated with handling a wet annular burnable assembly (WABA) with a burnable poison rod assembly (BPRA) handling tool. The WABAHT transfers WABAs between fuel assemblies, as well as fuel rack inserts, by raising the WABA out of one location, into the handling tool, and then lowering it out of the tool into another location. The WABAHT is suspended from the fuel-handling machine hoist and is operated from the bridge walkway. A training tool is available at the Westinghouse Waltz Mill Service Center facility in Madison, Pennsylvania (USA).

Description

The WABAHT is a telescoping tool, consisting of an upper support tube and main frame assembly. The support tube comprises the insert gripper, gripper shaft, lift bail and gripper latch. The frame assembly consists of the cage, comb assemblies, comb tracks, cable/pulley system and latch. Relative movement of these two assemblies is controlled by the tool latch.

The latch locks the tool in the extended or collapsed position during movement within the spent fuel pool. The track-mounted comb assemblies position the rods during insertion and withdrawal.

The WABAHT is moved in the collapsed locked position when it is empty, i.e., without a WABA. In this position, the comb assemblies are withdrawn from the fuel assembly and the gripper is near the bottom of the cage. The tool is placed on the fuel assembly top nozzle to withdraw a WABA. The tool is unlocked and the gripper lowered onto the WABA hold-down assembly. The gripper is latched and then lifted with the overhead hoist, raising the WABA into the cage assembly. As the gripper and WABA are raised, the comb assemblies are lowered to align the WABA rods. The gripper is raised, withdrawing the WABA fully inside the cage. The tool automatically locks in position and the WABA can be relocated.

The WABAHT is moved in the extended locked condition when latched onto a WABA. In this condition, the comb assemblies are inserted into the cage and the gripper is in the full-up position. The tool is then placed on the top nozzle of a fuel assembly to insert the WABA. The tool is unlocked and the gripper and WABA lowered with the fuel-handling machine overhead hoist. Once the WABA rods have entered the fuel assembly, the comb assemblies are raised and withdrawn from the cage. This allows the gripper to reach a full-down position and the WABA is fully inserted into the fuel assembly. The gripper is disengaged and withdrawn into the housing and the tool is locked in the collapsed condition, ready for another transport.
Benefits

The WABAHT patented technology provides improved features over the BPRA handling tool. Handling issues are eliminated by locating comb assemblies closer to the fuel assembly, improving WABA rod alignment with the top nozzle. The winch is eliminated and the WABA is lifted with the fuel-handling machine hoist, providing a shortened insert handling sequence.

Deliverables

The WABAHT and related services are provided in accordance with the Westinghouse Quality Management System, which is in compliance with ISO 9001 requirements.

Westinghouse Scope

• One WABA handling tool
• Technical manual, including assembly drawings, operating and maintenance procedure
• Data package, including Certificate of Compliance to customer order requirements

As an option, Westinghouse can, upon request, provide on-site assistance acquiring required measurements for the design and fabrication of a custom tool storage bracket. Westinghouse can also provide on-site assembly and operation advisory services.

Customer Scope

In order to tailor the WABAHT to plant-specific conditions, the following are required from the utility.

• Interface dimensions in the spent fuel pool, including:
  - Maximum fuel-handling machine hoist hook height (with load-measuring device installed)
  - Elevations of fuel-handling machine handrail, walkway and bottom of bridge (for clearance with bail of tool when stored)
  - Spent fuel rack and weir gate openings
  - Elevations of the top of the fuel assemblies, spent fuel racks floor of weir gate opening, spent fuel pool floor, bottom of fuel-handling machine, and pool water level

Experience

Eleven nuclear power plants currently use the Westinghouse WABAHT, with five additional tools in fabrication.

Delivery lead time is approximately six months.