

# Westinghouse Multi-lift Tool

## Background

The patented Westinghouse multi-lift tool (MLT) increases the efficiency of control rod blade exchanges and shuffling, which results in considerably shorter outage critical-path time and reduced radiation exposure.

## Description

The MLT operates from the existing refuel bridge hoist. The savings are realized because the tool can pick up the control rod blade, the fuel support piece and the double-blade guide as a single unit and in a single operation. Recent use of the first commercial unit reduced the control rod blade exchange from more than two hours to an average of less than one hour, with a best time of 35 minutes. This included the trip to and from the spent fuel pool.

## Benefits

- The MLT has a generic design so it can be used in most plants without modification. It can lift the control rod blade, fuel support piece or double-blade guide individually or in any combination. It can also grapple the control rod blade in the inserted or withdrawn position.
- The MLT is set into the cell with all components present after fuel has been removed. The blade can be inserted or withdrawn because the blade grapple is on a trolley. The rest of the MLT and the other two components of the cell are lifted as the trolley comes to the top of the MLT frame. The MLT and the lifted components are underwater at all times.
- The MLT has integral camera tubes – two guide tubes that extend from the top guide to the fuel support piece. Each tube can accept a 1.6-inch-diameter camera. By positioning the camera at the bottom of the tube over the fuel support piece guide pin, the operator is instantly informed of the pin engagement status and seating of the fuel support piece.
- The MLT construction is largely hard-coated aluminum for weight reduction, and is designed to NUREG-0612 specifications. The combination of rugged construction and underwater camera access allows the MLT to remove some stuck fuel support pieces.
- Because the fuel support piece and the doubleblade guide are lifted with the control rod blade, all components are in the correct orientation and verified instantly. Crossed double-blade guide legs are prevented because the legs never leave the fuel support piece. The double-blade guide actually provides additional guidance for the control rod blade upon entry into the top guide.

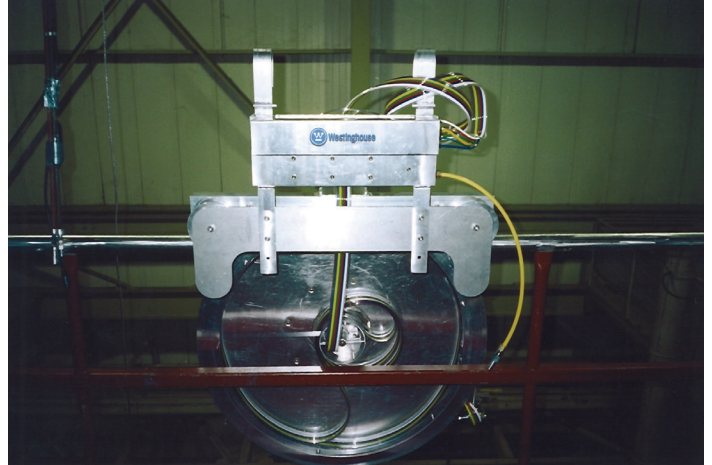
## Deliverables

- A telescoping anti-rotation pole is included to allow easy entry into the top guide and storage racks. The pole provides excellent feel, as well as accurate rotational positioning. Between the hoist cable and the pole, the operators can get significant feedback on the MLT operation and can avert potential problems.
- The MLT comes with grapple position indicators that mechanically rotate 90 degrees to give a clear, unambiguous visual indication of closed or open grapples. These are easily seen from the operator position, even when the MLT is in the core.
- A special reel that operates up to four air cylinders (eight lines) is provided with an integral control panel. This provides the MLT with three individually operated grapples and a control rod blade unlatching device. This assembly is generic because it can be used for any underwater tooling that needs eight air lines and four valves.





Multi-lift tool



Reel and control panel