

# Westinghouse Boiling Water Reactor Training Services

## Background

Westinghouse has provided training services for boiling water reactor (BWR) plants since 1980. These training programs combine formal classroom instruction with hands-on lab exercises to maximize student learning and skills development.

## Description

Westinghouse has a full-depth wet vessel mockup at the Chattanooga, Tennessee (USA), BWR Service Center, complete with a fully operational fuel-handling platform. The service center mockup also includes a mock spent fuel pool (SFP).

The reactor vessel mockup has the following components:

- One-eighth section full-scale in-vessel mockup
- Actual reactor components
  - Top guide
  - Fuel supports
  - Control rod
  - Jet pumps
  - In-core instruments
  - Control rod blade guides
- Dummy fuel assemblies
- Fuel-handling platform
  - Vessel-servicing aids, grapples and cameras

The Chattanooga BWR Service Center includes a full-size, under-vessel mockup complete with a carousel, a leveling tray, a control rod drive (CRD) travel path and an A-frame for loading and unloading mock CRDs.

Westinghouse also has a fully equipped and mobile BWR trailer for hands-on CRD training.

The Westinghouse mobile CRD mockup trailer is a self-contained mockup of the CRD and under-vessel area of the BWR (two through six) reactor vessel. It is designed so that it can be easily transported and set up at the customer's facility. Westinghouse trainers can use the Westinghouse Model 2 CRD exchange equipment or the customer-supplied non-contaminated exchange equipment.



Westinghouse's BWR Service Center features a full-scale BWR cavity with vessel, internals, SFP and refueling bridge, two 33-ton cranes and an under-vessel mockup.

## Deliverables

Westinghouse BWR Training Services offers the following courses:

- Fuel Handling
  - Fuel movement
  - Fuel channel installation and inspection
  - Core verification
- In-vessel Inspections
  - Jet pumps
  - Core spray spargers and pipe
  - Feedwater spargers
- In-vessel Maintenance
  - Cell disassembly and assembly
  - Control blade exchange or replacement
  - Local power range monitor (LPRM) replacement
  - Jet pump servicing
  - Nozzle flushing
- Under-vessel Maintenance
  - CRD removal and replacement
  - CRD rebuild
  - Hydraulic control unit maintenance
- Instrumentation & Control (I&C) Maintenance
  - Source range monitor and intermediate range monitor maintenance
  - LPRM exchange
  - Traversing incore probe (TIP) maintenance
- CRD Rebuild Maintenance
  - CRD rebuild
  - CRD leak testing
  - CRD lay-up (long-term storage)



BWR nuclear instrumentation system training equipment located at Westinghouse Waltz Mill facility

The Westinghouse Waltz Mill, Pennsylvania (USA), facility offers BWR I&C training for the following two systems:

- Nuclear instrumentation system
- TIP probe system

The system hardware can be shipped to the customer's site, which allows for on-site training. The BWR I&C courses use classroom and hands-on teaching techniques to better train plant maintenance, systems engineering and operations personnel.

The Westinghouse training staff includes engineers and education specialists, certified senior reactor operators, expert I&C trainers and support personnel. Westinghouse uses the Instructional Systems Design concept, comprising education by objectives. This training program meets Institute of Nuclear Power Operations guidelines, as well as the latest student-centered learning and online education methods.