

Flux Thimble Tube Replacement

Background

During the course of plant operations, flux thimble tubes of the in-core flux mapping system can become worn due to vibration and the corrosive environment within the reactor vessel. A worn thimble can begin to leak, resulting in an expensive clean-up operation. Through the replacement process, worn thimbles are removed and replaced with new thimbles to prevent the isolation of the affected flux thimble and loss-of-a-flux mapping location.

Description

Flux thimble replacement has three separate phases. The site crew is augmented by the refueling crew and performs other outage-related activities between each portion of the site effort.

Phase I: Installation of push rods and low-pressure seals at seal table

Prior to core off-load, with the reactor at water level below the seal table, thimble tubes are placed in their retractable position and those to be removed are cut off at the seal table.

Phase II: Removal and cut-up of existing thimble tubes

When the core is unloaded and the cavity flooded, site crews push the thimbles above the lower core plate. Using special tooling provided by Westinghouse, the thimble tube is pulled out of the reactor vessel. The highly irradiated portion of each is cut up underwater in a special debris basket. After the tubes are pulled from the water, they are cut up on the operating deck and disposed of in waste canisters.

Phase III: Installation of new flux thimble tubes

After core reload, when the reactor water level is drained down below the seal table, crews remove the push rods and special seals. The flux thimbles are uncoiled and inspected outside containment. New flux thimbles are transported into containment and inserted into their predetermined locations at the seal table.

Benefits

Westinghouse can replace flux thimbles based on results of the flux eddy current inspection. This replacement prevents the isolation of the affected flux thimble and loss-of-afflux mapping location.

Deliverables

Following installation, Westinghouse performs functional checks of the new flux thimbles for operability.