

Full Mechanical Segmentation of Nozzles in the Control Rod Drive Room

Streamlined removal of control rod drive nozzles, neutron flux measurement nozzles and auxillary systems

Framatome enables safe, efficient, and cost-effective removal of components in the control rod drive room, reducing radiation exposure, and ensuring a predictable and streamlined dismantling schedule.

Challenge

Decommissioning activities in the area of control rod drives are crucial, as 80 to 250 Control Rod Drive Nozzles (CRDN) and Neutron Flux Measurement Nozzles (NFMN) need to be removed before the reactor pressure vessel (RPV) bowl in boiling water reactors (BWRs) can be dismantled. These tasks are critical to the dismantling schedule. Elevated dose rates beneath the RPV require a well-designed dismantling approach and an ALARA concept to ensure safe removal.

Solution

Framatome designed an advanced dismantling concept to efficiently remove auxiliary nozzles of the RPV. Specialized tooling is used for the removal of the control rod drive nozzles and neutron flux measurement nozzles. This approach not only reduces the collective dose rate during work execution but also enhances operational safety.

Our safe procedure can be done prior to the RPV segmentation, therefore relaxing the critical path of the project timeline, saving lead-time, reducing costs and enable resource allocation.



Schematic snap of a BWR-calotte and control rod drive nozzles. The RIS (Rod Internal Segmenter) is inserted from below, cutting the nozzles closely to the calotte.

Technical information

The process for cutting the CRDN and NFMN is divided into pre- and post-cutting stages. The pre-cutting is performed using the Rod Internal Segmenter (RIS).

- For CRDN cutting, the RIS is inserted into the nozzle from the inside, just below the bowl.
- For NFMN cutting, the nozzle is first secured by the RIS and then cut from the outside.

Once cut, the segmented nozzle is removed from the control rod drive room and transported to a designated post-cutting area, where it is further segmented into appropriate lengths for disposal.

Customer benefits

- **Reduced radiation exposure:** Minimizes the collective dose rate for personnel during the dismantling process, enhancing safety.
- **Optimized project timeline:** Enables parallel execution of tasks, reducing the lead-time for the overall dismantling schedule.
- **Cost efficiency:** Streamlined processes lead to lower operational costs and resource optimization.
- **Improved predictability:** A well-defined dismantling concept ensures a more predictable schedule and smoother project execution.

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