

Full Mechanical Segmentation of the Reactor Pressure Vessel

Two-step dismantling toolset for segmentation of the reactor pressure vessel relying on mechanical cutting techniques

Framatome offers a cutting-edge solution based on cold-cutting techniques for the complex challenge of dismantling reactor pressure vessels in nuclear power plants.

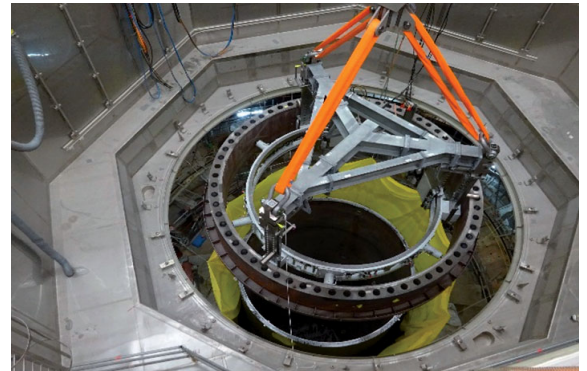
Challenge

The dismantling of a reactor pressure vessel (RPV) is a challenging and complex task that lies on the critical path of the dismantling scheme of a nuclear power plant. The main body (the RPV-head, the cylindrical part of the RPV and the RPV-bowl) including auxiliary components (e.g., control rod drive mechanism nozzles, steam- and water-nozzles, insulation etc.) need to be dismantled into small pieces, ready for disposal, while adhering to stringent safety targets.

Solution

Framatome developed a comprehensive concept for dismantling the RPV. Its core is a two-step segmentation technology based on reliable and proven cold-cutting techniques.

The pre-segmentation is performed by the multifunctional RTW-tool (Ring-chassis, Traverse, Workshop-modules), that cuts the cylindrical part of the RPV in-situ into rings. The post-segmentation is performed by the MNA-tool (Machine technology, Next-level-segmentation, Area) cutting the rings, as well as the RPV bowl into suitable pieces, ready for loading in designated waste containers for intermediate storage or repository.



Successful pre-segmentation of the RPV-flange using the RTW-tool – in the picture, the ring-chassis is fixed to the segmented RPV-ring, carried by the traverse.

Technical Information

For the pre-segmentation step, the RTW-tool is placed into the RPV and anchored using a drilling-module and bolt-insertion-module. Ring-segments are generated by the cutting module, using a horizontal disc saw. A designated traverse is placed on top of the ring-chassis, enabling to lift a generated ring-segment to the post-segmentation area.

The post-segmentation is carried out by placing the generated rings, as well as the RPV bowl on the MNA-tool: a turntable equipped with a high-performance driller and band saw. The generated waste pieces, with a clean cutting surface, are then ready to be loaded into designated waste containers.

Customer benefits

- Reliable and proven technology, for fast and easy acceptance by authorities
- No generation of carcinogenic vapors and no requirement of complex enclosures, substantially simplifying the technical setup
- Safety over the generated waste pieces, with strong optimization potential to reduce the amount of required waste packages
- Time-efficient project execution through parallel pre- and post-segmentation stations

1 week

for generation of a ring-segment and post-disassembly

0 %

Emission of carcinogenic and toxic aerosols in the process

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