

Selection of strategy and technology for segmentation of pressure vessel and internals at Zorita NPP

Wednesday, 25 May 2016 11:30 (30 minutes)

In 1964, construction started on the José Cabrera Nuclear Power Plant, located in Almonacid de Zorita, 43 miles east of Madrid, Spain. The José Cabrera Nuclear Power Plant is a single-loop pressurized water reactor with 160 MWe of power installed. The main components, particularly the vessel and vessel internals, were manufactured and supplied by Westinghouse. The plant operated between 1968 and 2006. It is the first light water reactor being dismantled in Spain.

In mid-2010, the Empresa Nacional de Residuos Radiactivos (ENRESA), the Spanish Radioactive Waste Management Agency, within the works of the Plan de Desmantelamiento y Clausura (Dismantling and Closure Plan) for the José Cabrera Nuclear Power Plant, awarded the segmentation of the vessel internals at Zorita, a project that was finalized in fall of 2013.

ENRESA awarded the segmentation work for the reactor vessel in September 2013, and the work was completed in the beginning of April 2015. The underwater mechanical cutting technology used in the segmentation of the reactor internals demonstrated safety and efficacy in cutting materials that are stronger and harder than those of the vessel, and with more complex geometries. Same technology was used for cutting the vessel internals as well.

The main conclusions and lessons learned that ENRESA has derived from these projects are:

- Mechanical cutting has proven effective for cutting complex geometry and radiation induced hardness components.
- Although slightly slower than other alternatives, this technology has shown many advantages, such as: easy implementation, very low radiological burden and much reduced generation of secondary wastes.
- The decision to use fuel-type containers, with modified canisters, for the interim storage of the non-LILW primary and secondary wastes, has been proven as a straightforward solution for their management.
- The reuse of some of the equipment utilized previously for the segmentation of the reactor internals helped the vessel segmentation project to be also cost effective and time saving.
- The use of CE-2B baskets for interim storage in the Reactor Cavity greatly facilitated the waste packaging operations, making them independent of the cutting sequence. However, this required an extensive effort of identification and tracking of individual pieces.
- The use of "Inserts" greatly facilitated the final non-LILW Waste Container (GWC) loading, also allowing the optimization of weight and activity distribution, at GWC level and between them.
- The use of the "Chip Boxes" for secondary waste was shown to be an effective way to contain and dry them, in the case of those introduced in the GWC.
- Special attention has been drawn at minimization of the collective dose and reduction of the waste volume via an optimum pattern cutting
- Visibility problems were solved with the installation of an additional high flow water filtration system.

Country or International Organization

Spain

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YES

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Session Classification: Session 4A - 2

Track Classification: Technical and Technological Aspects of Implementing Decommissioning Programmes