

RPV in-situ segmentation combined with off-site treatment for volume reduction and recycling

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Decommissioning of nuclear power plants generates large volumes of radioactive or potentially radioactive waste. The proper management of the large components and the dismantling waste are key success factors in a decommissioning project.

A large component of major interest is, due to its size and its span in radioactivity content, the RVP, which can be disposed as is or be segmented, treated, partially free released for recycling and conditioned for disposal in licensed packages.

To a certain extent the decommissioning program have to be led by the waste management process. The costs for the plant decommissioning can be reduced by the usage of off-site waste treatment facilities as the time needed for performing the decommissioning project will be reduced as well as the waste volumes for disposal. Long execution times and delays due to problems with on-site waste management processes are major cost drivers for decommissioning projects. This involves also the RPV.

In Sweden, the extension of the geological repository SFR plans for a potential disposal of whole RPVs. Disposal of whole RPVs is currently the main alternative but other options are considered. The target is to avoid extensive on-site waste management of RPVs to reduce the risk for delays.

This paper describes in-situ RPV segmentation followed by off-site treatment aiming for free release for recycling of a substantial amount of the material, and volume efficient conditioning of the remaining parts. Real data from existing LWR RPVs was used for this study. Proven segmentation methods are intended to be used for the in situ segmentation followed by proven methods for packaging, transportation, treatment, recycling and conditioning for disposal. The expected volume reduction for disposal can be about 90% compared to whole RPV disposal.

In this respect the in-situ segmentation of the RVPs to large pieces followed by off-site treatment is an interesting alternative that fits very well with the objective.