

International Conference on Management of Spent Fuel from Nuclear Power Reactors: An Integrated Approach to the Back End of the Fuel Cycle



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Increasing efficiency in waste management: from the conditioning at source to the long term disposal

Used fuel, in France, is reprocessed in order to retrieve its recyclable content. The residues are in the form of High Level Waste (HLW) or Intermediary Level Waste Long Lived (ILW-LL) and include on one hand fission products and minor actinides traces, and on the other hand metal structures of the nuclear fuel assembly (cladding, hulls and end-caps). A distinction is made between the wastes stemming from used fuel processing and related final waste conditioning, from the waste generated through the operation of nuclear power plants and fuel cycle facilities, and the waste arising from the dismantling of nuclear installations. AREVA designs and implements solutions for materials and waste management with the constant concern of improving the safety mitigating risk management and increasing overall efficiency of the routes.

This hereby paper will lay out a review of the key factors considered for a global waste management strategy from raw waste generation, with a “zero waste” ambition, to the final waste disposal. After an overview of the different types of waste stemming coming from nuclear power generation, this paper will review solutions and processes already implemented for their safe and efficient management.

It will stress how AREVA performs important efforts (i) to carry out radiological and chemical characterization, (ii) to develop suitable solution for the waste conditioning based on R&D program, (iii) to control the production and finally (iv) to pay a great attention to the long term behaviour of waste container. Concerning the CIGEO deep geological project (lead by ANDRA, the French Waste Management Agency), the primary packages must constitute the first static barrier of protection. The behavior assessment of the primary package is a very key point. For this purpose, AREVA deploys an important effort on characterization and address thanks to R&D programs for each kind of waste containers (i) the study of the release of gaseous compounds, (ii) the release of chemical species, (iii) the interaction between the content of the wastes and the conditioning matrices (with respect to the corrosion of the package, the long term behavior of the concrete and the complexation of radionuclides) and (iv) the retention capacity of the matrix itself.

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