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Estimation of radionuclide compositions of accumulated high level radioactive waste: features and solution method

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In the Russian Federation, more than 6,000 tons of vitrified HLW from the reprocessing of SNF have been accumulated, which are planned to be disposed of in a deep geological repository. Spent nuclear fuel composition is determined by various types of processed SNF (Russian nuclear power reactors VVER-440 and BN-600, research reactors, etc.), technological features of processing and cooling period. Accounting these factors with accuracy required for the safety assessment of the disposal both during the operation period and after the closure of the storage requires the development of special approaches, methods, etc., including a wide set of mutually agreed measurements, radiation characteristics and computational studies to predict the activity of RW and to reduce uncertainties for packages with RW, physics and chemical characteristics of vitrified RW.
To confirm the simulation results, it becomes necessary to verify and validate the code for calculating the nuclide composition of SNF based on a comparison of the calculation results and reference experiments. The international experts work on the selection and compilation of integral experiments to determine the nuclear-physical characteristics of SNF and have published their work to determine the radiation characteristics of SNF and the accumulation of fission products and actinides in it, including for the SNF from VVER-440 reactors.
The report focuses on planning and justifying work on obtaining HLW compositions (based on the analysis of experiments), information on which is the foundation for planning an activity on vitrified HLW.

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Yes

Country or International Organization

Russian Federation

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