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Determination of $^{238,239,240,241}\text{Pu}$, ^{241}Am , $^{242,243,244}\text{Cm}$, ^{90}Sr , ^{55}Fe and ^{63}Ni in low and intermediate level operational radwaste

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Radioanalytical method for the determination of radionuclides so called “difficult to determine” has been developed to characterize liquid and solid operational low and intermediate level radioactive waste. The main steps of the method involve digestion of sample of various matrixes, primary separation of radionuclides from matrix with the aim to reduce high gamma; activities and final purification of radionuclides using extraction chromatography. The commercially available Eichrom resins (UTEVA, TEVA, TRU, Sr Resin and Ni Resin) have been applied. The method enables the simultaneous determination of ^{238}Pu , $^{239,240}\text{Pu}$, ^{241}Pu , ^{241}Am , ^{242}Cm , $^{243,244}\text{Cm}$, ^{90}Sr , ^{55}Fe and ^{63}Ni from a single sample. Radionuclides were measured by means of alpha; spectrometry and liquid scintillation. After measurements of ^{238}Pu and $^{239,240}\text{Pu}$, plutonium isotopes were removed from the stain steel disc and following additional purification ^{241}Pu was measured using liquid scintillation. The method was applied for determination of radionuclides in samples of different matrixes derived from Ignalina NPP e.g. reactor water, spent fuel pool water, evaporated concentrate, spent resins, dust, graphite etc. Accuracy and precision of Pu, Am and Cm analysis were tested in intercomparison runs organized by the Risø National Laboratory, Denmark and in proficiency test organized by National Physical Laboratory, UK.

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