Performance of an Active Well Coincidence Counter for HEU samples

Abstract:
Neutron coincidence counting is the reference NDA technique used in nuclear safeguards to measure the mass of nuclear material in samples. For high-enriched uranium (HEU) samples active neutron interrogation is generally performed and the most common device used by nuclear inspectors is the Active Well Coincidence Counter (AWCC). Within her master thesis at the Polytechnic of Milan, the first author performed an intensive study on the characteristics and performances of the AWCC in order to assess the 235U mass in HEU oxide samples at the PERLA laboratory of JRC. The work has been summarised in this paper that starts with the optimisation of the use of AWCC for nuclear safeguards, describing the calibration procedure, reporting results of a series of verification measurements, summarising the performances that can be obtained with this instruments during inspections at fuel production plants and concluding with the discussion of uncertainties related to these measurements.

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