

Spent fuel assay with thermally stabilised bubble detectors

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Abstract: Neutron emission from spent fuel assemblies was investigated with BD-100R bubble detectors stabilised at 200°C in a container using Peltier elements, at 35-450°C external temperature in the vicinity of spent fuel assemblies. The intensity of fast neutrons was found to fall exponentially with a 0.13 cm^{-1} attenuation constant, with increasing vertical distance from the assemblies. The fast neutron emission rate was measured as a function of cooling time and it was seen that only fast neutrons emitted from the top end of the assemblies were detected. The near-neighbour effect (i.e, the effect of first neighbours) was also measured. If an assembly is stored in a hexagonal lattice of 160 or 225 mm storage distance, 70-80% or 10-20% of neutrons, respectively, were found to come from neighbours. The results obtained are discussed for determining burnup of spent fuel assemblies.

Index Keywords: fuel; conference paper; controlled study; cooling; dosimetry; neutron; temperature; thermostability

Year: 1996

Source title: Radiation Protection Dosimetry

Volume: 65

Issue: 4-Jan

Page : 417-420

Cited by: 3

Link: Scopus Link

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ISSN: 1448420

CODEN: RPDOD

Language of Original Document: English

Abbreviated Source Title: Radiation Protection Dosimetry

Document Type: Conference Paper

Source: Scopus

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