

Exponential Experiment for the Determination of Neutron Effective Multiplication Factor of PWR Spent Fuel

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Abstract

An exponential experiment system composed of neutron detector, signal analysis system and neutron source ($Cf-252$, 4×10^7 n/s) has been installed in the storage pool of PIEF at KAERI in order to experimentally determining neutron multiplication factors of PWR spent fuel assemblies. The neutron detector and source are inserted in the control rod guide tube of the C15 assembly in Kori unit 1 which was loaded in PIEF storage pool for the measurement of axial neutron flux distributions. The measurements are carried out when the detector or the neutron source is scanned in the axial direction and other one is fixed at 180 cm from the bottom end of the assembly. Both of the measured neutron distributions appeared in the similar exponential decay form and the exponential decay constants(γ) are determined to be 0.152 the for detector scanning and 1.65 for the source scanning, respectively. The neutron effective multiplication factor for the assembly is estimated to be 0.480 and 0.441 for both exponential decay constants, respectively.