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Calibration of Neutron Personnel Dosimeters in a D_2O Moderated ^{252}Cf Neutron Field

Sang Woon Shin, Hua Jin, Chan Hee Cho, Joong Kwon Son, and Myung Jae Song

Korea Electric Power Research Institute
103-16 Munji-dong, Yusong-gu
Taejon, Korea 305-380

Abstract

The calibration of Harshaw 8806 type, and Panasonic UD-802A and UD-809P type neutron personnel dosimeters have been made in a D_2O moderated ^{252}Cf neutron field in Korean Atomic Energy Research Institute. From the readings of dosimeters exposed in the calibration neutron field, calibration factors, linearities and the effect of phantom size were analyzed. Calibration factors for Harshaw 8806 type dosimeters calculated from a fit response function showed good agreement within 18% difference with the measured values in the calibration neutron field. Fitted calibration factors from the linear relationship between TLD readings and personal dose equivalents also showed no substantial difference from the measured values. Two types of phantoms of $30\times30\times15$ cm^3 and $40\times40\times15$ cm^3 were used, and no significant difference was found. The results showed that the calibration in a D_2O moderated ^{252}Cf neutron field can be used as a useful measure to assure the performance of neutron personnel dosimeters used in nuclear power plants by checking any significant change in the calibration factors obtained in the calibration neutron field.