

Re-evaluation of Dose System 86 (DS86)

W-VI-1 Residual activity ^{152}Eu and ^{60}Co in Hiroshima and Nagasaki

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(1) Residual activity data in Hiroshima and Nagasaki: Measured ^{152}Eu , ^{60}Co and ^{36}Cl data show a systematic discrepancy from the neutron activation calculation in Hiroshima. In Nagasaki, ^{60}Co data by Hashizume showed a discrepancy, but ^{152}Eu data by Nakanishi et al and Okajima et al. showed scattering and hard to judge whether the discrepancy exist or not. Nagasaki ^{36}Cl by Straume show agreement and recently, Nakanishi et al. reported ^{152}Eu data obtained at 1100-1200m from epicenter. Although their data show some scattering, they are in consistent with the calculation. (2) ^{152}Eu and ^{60}Co measurement in Nagasaki: We have reported ^{60}Co in iron samples and ^{152}Eu in rocks. Since number of samples were small, it is necessary to accumulate more data. In 1998, we have collected 13 samples within 1 km from the epicenter. Measurements are in progress. (3)Prospects: In Hiroshima, residual activity data as a function of distance and depth profile data must be explained consistently. A key to solve the problem is to ensure whether such discrepancy exists in Nagasaki or not. Therefore more data are needed in Nagasaki. Fast neutron fluence data provided from the ^{63}Ni will play an important role to solve the problem.

W-VI-2 **Specific Radioactivity of Eu-152 in Samples Exposed to Nagasaki Atomic Bomb**

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Specific radioactivities of residual Eu-152 induced through $^{151}\text{Eu}(n, \gamma)^{152}\text{Eu}$ reaction were measured in samples, such as roof tile and rock, that were exposed to the Nagasaki atomic bomb. The samples were obtained at locations from 500 m to 1170 m in slant distance from the explosion point. Each sample exposed at slant distance from 500 m to 1000 m was pulverized, and low background photon spectrometry using major aliquot of the powder and neutron activation analysis using minor aliquot were carried out to determine Eu-152/Eu. For each sample exposed at slant distance >1000 m, in order to obtain reliable data, Eu-enriched specimen was prepared by separating lanthanoids from the sample, and Eu-152/Eu measurement was carried out in a similar manner as above.

Results of the measured specific radioactivity (Eu-152/Eu, Bq mg⁻¹) corrected to the time of bombing were compared with the values calculated by DS86 methodology. Although some of the measured values showed large deviation from the calculated values, most of the measured values are moderately consistent with the calculated values. Therefore, it may be concluded that DS86 methodology for Eu-152 induced by thermal (and resonance) neutrons from the Nagasaki atomic bomb can reproduce the measured values.