

THERMOLUMINESCENCE MEASUREMENT OF GAMMA RAYS

REPORT ON UNIVERSITY OF UTAH ANALYSES

Edwin H. Haskell, Prasad L. Kaipa, and McDonald E. Wrenn

University of Utah

This report describes results of thermoluminescence (TL) measurements concerning the estimation of gamma-ray doses delivered to bricks and tiles in Hiroshima and Nagasaki as a result of the A-bomb detonations in those cities. Included are results of analyses of:

1. NBS-irradiated samples: quartz removed from the Nagasaki Ieno-cho wall bricks, annealed, and irradiated at the National Bureau of Standards (NBS) with doses unknown to the laboratories performing the analyses.
2. High dose-rate exposed samples: quartz irradiated at high (70,000 rad/s) and low (50 rad/min) dose rates at the Armed Forces Radiobiology Research Institute (AFRRI) as a check on possible dose-rate effects.
3. Oxford-irradiated samples: quartz irradiated with a dose of 400 rad and distributed by the Oxford laboratory to all of the participating laboratories as a check on source calibration.
4. Preparation stressed samples: annealed and irradiated tiles exposed to standard preparation procedures as a check for spurious effects induced during sample preparation.
5. Nagasaki samples (Ieno-cho): bricks from Nagasaki Ieno-cho wall, also analyzed by the laboratories mentioned above, with the exception of Nara University (NARA).
6. Hiroshima samples (floor tiles): floor tiles from the Faculty of Sciences building at the University of Hiroshima (UHFSFT samples) which were removed in late 1984 and analyzed using TL techniques at this laboratory and at the TL laboratories at Oxford, Durham, National Institute of Radiological Sciences (NIRS), and NARA.
7. Hiroshima samples (railing tiles): quartz removed from railing tiles from the roof the Faculty of Sciences building at the University of Hiroshima.
8. Beta-particle background samples: measurement of background beta-particle dose rate