RPC experience with TLD for output and energy monitoring of radiation-therapy beams.

The Radiological Physics Center (RPC) has been utilizing TLD to verify photon-beam output, and electron-beam output and energy for many years. The RPC currently monitors over 1200 institutions, monitoring 4000 photon and 3500 electron beams per year. Control TLD, irradiated on one specific Co-60 machine, are used for a performance check of our TLD system. Analysis of these data over 5 years, reveals high precision (SD =0.9%) in beam output verification. Analysis of all TLD results, since 1990, for remotely monitored photon beams (27,900) and electron beams (23,000), shows a spread (SD) of 1.9% and 2.2% respectively in beam output. The increased spread arises from the variability in beam energies, makes/models of machines, and institutional performance. In view of these variabilities, the results are extremely encouraging. Institutional performance includes uncertainties in beam-output calibration, set-up errors, and beam drifts. The Spread (SD) of individual beams varies widely from beam to beam and Institution to institution. The spread of individual beams has been used to identify "good" beams (SD < 2%) which are to receive TLD less frequently than others.

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