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PAPER TITLE Leakage Radiation from Various Co-60 Units of Type Theratron

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ABSTRACT (See instructions overleaf)

To study the complex backgrounds of leakage-scattering-radiation of CO-60 units an area near the source loading-slot was examined, where the radiation passes through deep narrow slits producing "Hot Spots" in the thick lead-tungsten composed shielding-case of the instrument. Using a new approach, developed at the clinic in Vienna, these needle-like radiation was investigated in 3 phases: 1) photon-energy-determination of the leakage-radiation, 2) TLD-expositions to proof average absolute-doserate and 3) high- resolution-filmdensitometric determination of spikes in the 2D-dose distribution of the "Hot Spot-areas" combined with a calibration-procedure to get the correct maximum absolute doserate. Due to the results some constructive supplements had to be done to satisfy the German and Austrian regulations for radiation protection. This will be discussed in detail.

HVL and energy of the leakage radiation was determined using a calibrated ionisation-chamber. Films, exposed for a longer period, showed several well defined narrow "Hot Spots" embedded in a circular string-shaped radiation field. They were used as a positioning-aid for the arrangement of LiF-TLD-crystals. The TLDs were Co-60-calibrated with known doserate and good exposition-homogeneity. Even these results show a medium doserate caused by an integration-effect over the Hot Spot- exposed TLD-volume. A good approach to the maximum pointdoserate inside a Hot Spot was obtained by exposition of KODAK-OG-films using CAWO-U cassettes with OG8 intensifier foils. After the microdensitometric analysis of different time-exposed films the TLD-values and the optical density values were connected. The result was a calibration in relation to absolute energy-doserate.