

AbstractID: 2055 Title: Response of Kodak EDR2 and GafChromic MD55-2 Films to a Very High Dose Rate Electron Beam

There has been a significant amount of research on the biological response to very high dose rates from certain accelerators. At higher dose rates TLD-based dosimetry is often used since TLDs are relatively insensitive to dose rate. It is important to determine if more expedient methods such as film dosimetry can be appropriately used. We have investigated the dose rate sensitivity of Kodak EDR2 film and GafChromic MD55-2 film. The films were exposed to a range of dose rates from a 6 MeV electron beam. An extended dose rate range was obtained by operating a Varian Saturne SL-42 accelerator in 6 MV photon mode with the target, flattening filter, and monitor chambers removed. Hence, the raw electron beam normally used to generate an X-ray beam passed only through the vacuum window before leaving the accelerator toward isocenter. Profile measurements with EDR2 film indicated that the vacuum window provided sufficient scatter to broaden the electron beam. The "average" dose rate could be extended up to about 2000 cGy/second. Since the beam is actually pulsed, the maximum instantaneous dose rate during a single "hyperfine" pulse is 4 or 5 orders of magnitude higher than this average. Exposure to the film at a depth of  $d_{\max}$  in solid water was compared to the dose determined by TLDs placed next to the film. The response of EDR2 film was determined to be about 27% higher than lower dose rates. The same tests indicated little or no change in sensitivity for MD55-2 GafChromic film.