

## AbstractID: 1604 Title: Effect of Processing Time Delay on the Dose Response of Kodak EDR2 Film

Kodak EDR2 film has been embraced as an accurate 2D dosimeter with less energy dependence than traditional radiographic films. However, our clinical usage in intensity modulated radiotherapy verifications exhibited variations and uncertainties that were larger than expected, given that we perform film calibrations for every experimental measurement. We found that the length of time between film exposure and processing can affect the absolute dose response of EDR2 film by as much as 4-6%. Films were exposed to 6MV and 18MV 10x10 cm<sup>2</sup> fields with 2 minutes, 30 minutes, 1 hour, 3 hours, 6 hours, 12 hours, and 24 hours between exposure and processing. An ion chamber measured the absolute dose for all film exposures. The optical density to dose ratio stabilized after 3 hours. Compared to its stable value, the film response was 4%-6% low at two minutes and 1% low at one hour. Smaller 3x3 cm<sup>2</sup> areas were simultaneously radiated with 8 different dose levels between 45 and 330 cGy and processing delay times of 1 hour, 3 hours, and 6 hours. Energies of 6MV and 18MV were used. The behavior for all dose levels was consistent, indicating there is no change in the processing time delay effect with varying doses. The difference in the time delay effect between 6MV and 18MV measurements was negligible for every experiment. Based on these results, we recommend a minimum time of 1 hour between exposure and processing for all EDR2 film measurements.