

AbstractID: 7109 Title: Variability of EDR2 dose calibration films taken for IMRT dose verification

**Purpose**

To report the consistency of EDR2 calibration films taken for IMRT absolute dose verification.

**Method and Materials**

180 sets of dose-optical (OD) calibration films for IMRT dose validation were taken on 4 Linacs on two campuses using Kodak EDR2 film from Nov. 2005 to Dec. 2006. Each calibration datum contained at least 5 dose points (i.e. 0 cGy, 60 cGy, 120 cGy, 180 cGy and 240 cGy). All calibration films were processed on the same Kodak film processor, were scanned with the same Vidar 1600Pro film scanner, and analyzed using RIT dosimetry software. A second order polynomial function was applied to create the H-D curve using averaged dose-OD data from each Linac separately. The range of dose variation (maximum, minimum and standard deviation) was determined.

**Results**

Overall, one standard deviation of the OD corresponded to  $\pm 5.3$  cGy at 60 cGy,  $\pm 8.1$  cGy at 120 cGy,  $\pm 11.1$  cGy at 180 cGy, and  $\pm 11.7$  cGy at 240 cGy. The maximum and minimum recorded OD numbers of 180 cGy dose point corresponded to 221.4 cGy and 152.5 cGy respectively. Variability was greater for the films taken at one campus and transported (usually overnight) to the main campus for processing and analysis. Had a single dose point film (e.g. 180 cGy) been taken, dose errors (2 SD) of  $\pm 24.4$  cGy at 240 cGy and  $\pm 16.5$  cGy at 120 cGy would have occurred. There was no correlation of consistency with processor service.

**Conclusions**

The OD calibration curves with EDR2 film varied significantly, not only in absolute OD value but also in curvature. In order to achieve  $\pm 3\%$  accuracy for IMRT dose verification films, EDR2 calibration films must be taken for each set of IMRT films.