

The Kodak ECL film has improved portal localization images with better contrast and improved distinction of bony structures and air-tissue interfaces. Cassettes with slower speed screens were used with ECL film to image the treatment portal during the entire course of treatment (verification) instead of taking separate films after treatment. Measurements of film density vs. Source to Film Distance (SFD) were made using 15 and 25 cm thick water phantoms with both 6 and 18 MV photons from 1 to 40 cm past the phantom. A characteristic (H&D) curve was measured in air to compare dose to film density. Results show the reduction in radiation between patient and cassette actually follows an "inverse cube law" rather than an inverse square law. Formulas to calculate radiation exposure to the film, and the desired SFD were based on patient tumor dose, calculation of the exit dose, and the inverse cube relationship. A table of exposure techniques based on the SFD for a given tumor dose was evaluated and compared to conventional techniques. Although the film has a high contrast, there is enough latitude that excellent films can be achieved using a fixed SFD based simply on the tumor dose and beam energy. Patient diameter has a smaller effect. The benefits of imaging portal films during the entire treatment are more reliability in the accuracy of the portal image, ability to detect patient motion, and reduction in the time it takes to take portal images. This research is supported by Eastman Kodak Co.