AbstractID: 6921 Title: A Quality Assurance Program for a CCD based Respiratory Gating System

A variety of treatment techniques have been used clinically to correlate radiation delivery with the respiratory cycle, including, deep inspiration breath-hold, active breathing control, and free-breathing respiratory gating. Based on the results of these preliminary studies, several commercially available systems have been developed for the delivery of breathing synchronized radiotherapy. The purpose of this work is to develop a compressive quality assurance (QA) program for a commercially available video-based respiratory gating system. Quality assurance tests were developed to evaluate the operation and stability of the system. Infrared illuminator ring operation, tracking camera operation, system noise, electronic signal drift, vertical calibration, and stability of motion tracking are tested on a monthly basis. Dosimetric stability for gated beam delivery and the CT triggering mechanism are tested on a quarterly basis. In addition to system testing, a clinical QA process was also developed. Before initiating each treatment, the radiation therapists visually inspects the computer placement of the gating thresholds. In addition, physicians review the recorded respiration cycles and gate placements on weekly basis and recommend changes. The target position is verified weekly using gated port films. Based on two years of continued monitoring, the performance characteristics of the gating system have remained stable since installation. The only required maintenance was periodic focusing of the camera lens and the replacement of two power supplies (This work was supported by Varian Medical Systems).