Thesis Title The Accuracy Assessment of Computer Planning System

Name Pornpan Yongvithisatid

Degree Master of Science (Medical Physics)

Thesis Supervisory Committee

Chirapha Tannanonta , M.S.

Paisarn Suwannakorn , M.Sc.

Ratana Pirabul , M.Sc.

Date of Graduation 30 April B.E. 2540 (1997)

ABSTRACT

Before using a computer planning system for routine radiation treatment plans, the process of acceptance testing for both dose distribution and monitor unit (or treatment time) calculations have to be done. An experiment was setup to verify a treatment planning system, FOCUS release 1.3 of Ramathibodi hospital for 10 MV x-ray beam.

The comparisons of beam data generated by FOCUS and RFA-300 scanning system show acceptable different values within 2% for isodose inside 80% of beam width and 2 mm for penumbral region except 10% isodose calculation that shows 3 mm, 4 mm and 5 mm differences for 10x10, 20x20 cm^2 respectively.

Dose measurement in Rando phantom using TLD-100 was made to verify the calculation of the planning system for both dose distribution and treatment monitor unit in single-field, two-field, three-field and four-field techniques of chest and pelvic irradiations. The calculated doses for single beam are within 5% of the measured doses except the doses at the interface of lung and soft tissue, and penumbral region of 10% isodose that have up to 13.39% and 15.94% differences respectively. For multiple beam techniques, the discrepancies of the dose at the inhomogenity interface are

within 5%. The differences of the doses in soft tissue inside the beams and in penumbral regions are less than 5% and within 10% respectively and up to 29.28% at the junction of two oblique beam edges. The discrepancy is high, up to 52.57%, at the curvature of the phantom if it is the exit point of the beam.