

Revised
OFFICE MEMORANDUM

A-91-011
71-4
MP-06

TO : DISTRIBUTION

DATE: July 9, 1976

713014

FROM : P. A. Berardo *PAB*

SUBJECT : Planning Treatment Planning

SYMBOL : MP-3

General

Meetings were held on 6 and 8 July 1976 to plan and coordinate actions to achieve the following objectives:

- Dose Model verification
- Part II Report on Treatment Planning
- Beam Tunes (Debug, Documentation, Development)
- Experimental program as required by first three objectives

Those in attendance included H. Amols, P. Berardo, J. Bradbury, R. Hutson, C. Kelsey, D. Laubacher, M. Paciotti, and A. Smith.

Background

Dose Model verification involves a coordinated calculational-experimental effort using the PIPLAN/BUCKET and PION-1 (ORNL) computer programs. Decisions required were what beam time(s), what pion-star properties to use (in particular, what portion of star energy goes to charged particles and what is the proton energy distribution), and what geometries (inhomogeneties) are suitable for both calculation and experiment.

The report on treatment planning involves comparisons of calculations and measurements for realistic (non-idealized) therapy beams.

Beam tunes involves determining the cause of observed centroid shifts between various measurements and models, taking wire-chamber data for the tune used for recent patient therapy, modifying that tune to reduce momentum-position correlation, and defining a large-field tune ($8 \times 10 \times 7 \text{ cm}^3$).

Dosimetry involves conventional dosimetry for experiments related to dose calculations and micro-dosimetry for parameters used in close calculations.

SCHEDULING CONSTRAINTS

Patient therapy with modified Olc tune
Part II Report Submitted
Patient Therapy with Large Field

15 August 1976
1 September 1976
October 1976

FILE BARCODE



00133397

COPIED FOR
HSPT

00133397.001

1088052

Accelerator Schedule

Cycle 5 ends	11 July 1976
Cycle 6 starts	18 July 1976
Cycle 6 ends	1 August 1976
Cycle 7 starts	15 August 1976

DECISIONS**Beam Tuning**

Cycle 5 - Investigate tune O1C (recent patient tune) to determine centroids, effects of proton beam position, attempt to improve lateral momentum dependence, and document tune that was used for patient therapy.

Cycle 6 - Investigate tune O2A with "poor" wedge as likely large-field therapy tune. Attempt to improve momentum dependence and reduce emittance.

Experiments

Construct bone and air phantoms (best tests of BUCKET approximations) sized as follows: 2 X 2 X 2 cm³, 2 X 2 X 4 cm³, and 8 X 10 X 2 cm³.

Measure dose distribution in water phantom alone and with phantoms centered-on and edged-on beam axis at three heights above stopping region. Measurements include X and Y scans at various depths around stopping region plus Z-scans on and off axis.

If possible, micro-dosimetry measurements to determine charged particle star energy and relative numbers of star products for input to PION-1. If measurements are not possible, use best data available from C. Richman.

Calculations

Send beam tape or cards to ORNL for tune Ø2A-modified as soon as available.

Select approximately four experimental cases to be modeled by ORNL (air and bone phantom at high and low positions, edged-on). Model all experimental measurements with BUCKET.

NOTE: BUCKET has been installed in PIPLAN. A few bugs are evident but should be corrected by 16 July 1976. In this case PIPLAN may be used in lieu of BUCKET for total dose distributions. Predictions of star products and components of total dose will still have to be done with BUCKET for a few weeks.

PAB:skb

DISTRIBUTION: H. Amols R. Hutson M. Paciotti
 ✓J. Bradbury M. Kligerman C. Richman A. Smith
 J. DiCello E. Knapp M. Schillaci

**COPIED FOR
HSPT**

00133397.002

1088053