



# Baystate Medical Center

Member, Baystate Health Systems  
Springfield, Massachusetts 01199  
(413) 784-0000

### Department of Radiology

Eckart Sachse, M.D.,  
Chairman  
(413) 784-4644

### CT/MRI/Special Procedures

J. Robert Kirkwood, M.D., Chief  
(413) 784-4661

### General Diagnosis

W. Max Cloud, M.D., Chief  
(413) 784-3333

### Medical Physics

Suresh M. Brahmavar, Ph.D.,  
Chief  
(413) 784-5405

### Nuclear Medicine

Said M. Zu'bi, M.D., Chief  
(413) 784-4660

### Radiation Oncology

Won C. Park, M.D., Chief  
(413) 784-5437

### Ultrasound

Frederick E. Hampf, Jr., M.D.,  
Chief  
(413) 784-4640

030-00230

John E. Glenn, Ph.D., Chief  
Nuclear Material Safety  
U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA. 19604

September 28, 1988

**SUBJECT:** Amendments to Teletherapy Licenses (Co-60)

**REFERENCE:** NRC License # 20-01412-06: WMU: Docket # 030-12375  
NRC License # 20-01412-03: SHU: Docket # 030-230

Dear Dr. Glenn:

I would like to request following amendments to our above two Co-60 licenses. This request is sent to you after approval by the Radiation Safety Committee at its meeting on September 8, 1988.

- Delete the following two physicians as they no longer use Co-60 units at Baystate Medical Center, Inc.
  - \* Robert A. Grugan, M.D.
  - \* Robert A. Stein, M.D.
- Include Margaret S. Kranyak, M.D. as the new physician user of Co-60 units at Baystate Medical Center, Inc. A copy of her curriculum vitae is enclosed. She was certified by American Board of Therapeutic Radiology in June, 1988.
- Include Martha LaFrance, B.S. as a teletherapy physicist in addition to Suresh M. Brahmavar, Ph.D. A copy of her curriculum vitae is enclosed. She is completing her MS program at University of Lowell in Radiological Physics. She has eight (8) years of experience in teletherapy physics under a teletherapy physicist, Suresh M. Brahmavar, Ph.D. She passed the first certification examination given by the American Association of Medical Dosimetrists in June, 1988. A copy of the certification is enclosed. As evidence of her knowledge and experience, a copy of the comprehensive annual calibrations of a Co-60 unit done by her is enclosed.

-continued-

9002160176 890114  
REG1 LIC30  
20-01412-03 PDR

OFFICIAL RECORD COPY ML10

The Western Campus of Tufts University School of Medicine

109767

OCT 24 1988

LOG *Oct 29-5*

Remitter \_\_\_\_\_

Check No. *117575*

Amount *8440 - \$230 applied see 109767*

Fee Category *7A*

Type of Fee *and*

Check Rec'd *10/27/88*

Check Completed *10/28/88*

By: *mesmer*

John E. Glenn, Ph.D.  
September 28, 1988  
Page 2

4. Include Suresh M. Brahmavar, Ph.D. as Radiation Safety Officer and Teletherapy Physicist on NRC license # 20-01412-03. These details are missing on our recent amendment.

A check for \$460.00 is enclosed for amendments to our two licenses. For more information call Suresh M. Brahmavar, Ph.D. at 413-784-5405.

Thank you.

Sincerely,



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Suresh M. Brahmavar, Ph.D.  
Director, Medical Physics and Radiation Safety  
Radiation Safety Officer

encl.

cc: James P. Polga, M.D. (memo only)  
Eckart Sachsse, M.D.  
Alex Szafran

SMB/mek

CURRICULUM VITAE

MARGARET S. KRANYAK, M.D.

27 Field Road  
Longmeadow, MA 01106  
(413)567-2272

Baystate Medical Center  
759 Chestnut Street  
Springfield, MA 01199  
(413)784-5437

EDUCATION: University of Virginia Medical Center, Charlottesville, Virginia  
Resident, Division of Radiation Oncology, 1984-1988

University of Cincinnati College of Medicine, Cincinnati, Ohio  
Doctorate of Medicine, 1980-1984

University of Cincinnati, Cincinnati, Ohio  
Full-Time Premedical Student, 1977-1979

University of Cincinnati, Cincinnati, Ohio  
Bachelor of Social Work, Magna Cum Laude, 1971-1975

WORK

EXPERIENCE: St. Augustine's Manor Extended Care Facility, Cleveland, Ohio  
Medical Social Worker, Director of Social Services, 1975 and 1976

TRAINING

EXPERIENCE: Simulator, computerized dosimetry for all beam directed treatments

Units: 100 KV, 300 KV,  $60_{CO}$ , 6 MV, 15 MV, electrons

Brachytherapy:  $137_{Cs}$ ,  $192_{Ir}$ ,  $198_{Au}$ ,  $125_{I}$ ,  $226_{Ra}$ ,  $90_{Sr}$ ,  $32_{P}$

HONORS: Chief Resident Dept. of Radiation Oncology, 7/87-6/88  
American Cancer Society Fellowship, 7/87-6/88  
Administrative Resident, 7/86-6/87

PRESENTATIONS: 1987 MASRO meeting: Resident Award for Best Paper  
"Esthesioneuroblastoma". Pending publication in "Journal of  
Radiation Oncology, Biology and Physics"

1986 MASRO meeting: "Hyperfractionation of Head and Neck  
Cancer: Radiobiologic Considerations and Clinical Experience"

CERTIFICATION: American Board of Therapeutic Radiology (1988).



## CURRICULUM VITAE

Martha LaFrance  
83 McDonald Drive  
Chicopee, MA 01020  
(413) 592-0729

### EDUCATION

1986 - Present University at Lowell	Masters: Radiological Science (at present have 27 credits)
1984 University of Massachusetts	Bachelors in Science: Medical Physics
1972 - 1975 Springfield Technical Community College	Associates in Science: RTT, ARRT Radiation Therapy

### PROFESSIONAL EXPERIENCE

BAYSTATE MEDICAL CENTER  
759 Chestnut Street  
Springfield, MA 01199

Dosimetry Physicist: (2/83 - Present) Technical maintenance dosimetry/therapy equipment (Co-60, 4MV, etc.). Calibration of therapy units. Obtain physics data using isodose plotter. TLD system. Maintain radioactive sources. Instruction in radiation safety. Computer programs, procedure manuals. Brachytherapy planning and dosimetry.

Dosimetrist: (7/80 - 2/83) Prepare manual and computerized treatment plans. Quality control for teletherapy equipment. Develop special immobilizing devices. Design and create special shielding devices. Ensure accuracy of all chart entries. Prepare output charts for therapy units.

Radiation Therapy Technologist: 12/75 - 7/80 Treatment of patients with radioactive teletherapy equipment. Record all data concerning the treatment. Proper treatment set-up. Instruction of students. Patient scheduling. Ensure safety procedures are followed.

### PROFESSIONAL ORGANIZATIONS

- American Association of Medical Dosimetrists
- Member, American Association of Physicists in Medicine
- New Jersey Society of Medical Physicists

CERTIFICATIONS, COMMITTEES

- Registered Medical Dosimetrist - American Association of Medical Dosimetry
- Evidence of Continuing Education Certification by the American Association of Radiologic Technologists
- Computer training - AECL
- Continuing education courses in Radiological Physics for residents in Radiology
- Advisory committee for training of Radiation Therapy Technologists program

EXHIBITS

- 1982      Quality Assurance of Computerized Therapy Planning Systems.  
M. LaFrance, Suresh M. Brahmavar and Won C. Park. AAPM  
Annual Meeting in New Orleans.
- 1982      Verification of Radiation Dose: TLD B-Blocks and DPD-5  
Probes. M. LaFrance, Suresh M. Brahmavar, A. Tidwell and C.  
Vanderlick. AAPM Annual Meeting in New Orleans.
- 1985      Screw-Cap Pressure Lock Angiocath Afterloading Interstitial  
Radiation Therapy. Suresh M. Brahmavar, M. LaFrance, S.  
Majka and Won C. Park. AAPM Annual Meeting in Seattle.

PAPERS

- 1982      "Quality Assurance of Computerized Therapy Planning System."  
Suresh M. Brahmavar, M. LaFrance and Won C. Park. Medical  
Physics, Vol. 9, No. 4.
- 1982      "Verification of Radiation Dose: TLD B-blocks and DPD-5  
Probes." Suresh M. Brahmavar, M. LaFrance, A. Tidwell and  
C. Vanderlick. Medical Physics, Vol. 9, No. 4.
- 1982      "Centralized Quality Assurance and Control Program in  
Radiology." S.M. Brahmavar, A. Tidwell, C. Vanderlick, M.  
LaFrance and R.S. Grugan. Medical Physics, Vol. 10, 507.
- 1983      "A New Cassette Holder for Orthogonal X-ray Films in Brachy-  
therapy." S.M. Brahmavar, M. LaFrance, A.J. Stark and W.C.  
Park. Medical Physics, Vol. 10, 553.

- 1984 "Personnel Exposures in X-ray Special Procedures and in Radionuclide Therapy: A Five Year Study." Suresh M. Brahmavar, M. LaFrance, A. Tidwell and C. Vanderlick. Medical Physics, Vol. 11, No. 3, 399.
- 1985 "B-Xero Technique for Localization of Seed Implants in Brachytherapy." S.M. Brahmavar, M. LaFrance, W.C. Park, S. Majka and A. Tidwell. Proceedings of XIV ICMBE and VII ICMP, Finland.
- 1986 "Design of CT Table-Top Insert for Computerized Treatment Planning." Suresh M. Brahmavar, M. LaFrance, Kevin Maroney and Won C. Park. Medical Physics, Vol. 13, 611.
- 1986 "Improvement of Localization and Identification of Brachytherapy Implants Using Xeroradiography." M. LaFrance, Suresh M. Brahmavar, Susan Majka, Won C. Park and Robert A. Grugan. Medical Physics, Vol. 13, 580.
- 1987 "Measurements of Surface Dose for Delclose Dome/Tandem System in Brachytherapy." Martha LaFrance, Suresh M. Brahmavar, Won C. Park and Alan J. Stark. Medical Physics, Vol 14, 477.
- 1988 "3D Magnetic Field Mapping and Confirmation of Hazard Zones for Clinical MRI." Suresh M. Brahmavar, Susan Majka, Martha LaFrance and J. Robert Kirkwood. Medical Physics, Vol. 15, 472.



Issued on: 08-23-1988  
Issued by: Credentialing Services, Inc., P.O. Box 1498, Galesburg, IL 61401, (309) 343-1202  
Examination: 6-26-88 Certification Examination for Medical Dosimetrists

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Candidate: I.D.# 1-106-122-101  
Martha LaFrance  
83 McDonald Drive  
Chicopee, MA 01020

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You PASSED the examination.

OUTPUT MEASUREMENT  
 THERATRON 780-C  
 SEMI-ANNUAL CALIBRATION  
 JANUARY 16, 1988

1. METHOD: The output measurements were made with the Keithley 35 x 35 x 30 cm<sup>3</sup> water phantom. The ionization chamber was inserted into the center of the tank 5 cm beneath the top surface of the water.

Meter: Keithley 35614  
 Chamber 2571 SN 813

Calibrated: 9-10-87 (RCL, NY)

CCF: 4.71x10<sup>9</sup> R/C

Temperature: 30° C

Pressure: 756 mm/Hg CTP= 1.016

C<sub>x</sub> = 0.95

Distance= 80 cm SSD

Time of each exposure: 1 minute

OUTPUT AT 80 CM SSD			
FIELD SIZE	MEASURED DECAYED rads/min (MD) 1/15/88	COMPUTER CALCULATED (CC) rads/min 1/15/88	% VARIATION (MD/CC)
5 x 5	121.3	122.7	-1.2
7 x 7	124.8	125.2	-0.3
10 x 10	129.2	129.4	-0.2
12 x 12	131.9	132.4	-0.4
15 x 15	135.7	136.0	-0.2
17 x 17	137.8	137.8	0.0
20 x 20	140.3	140.3	0.0
25 x 25	142.7	142.6	+0.1
30 x 30	143.4	143.5	-0.1
35 x 35	142.9*	144.1	-0.8

\* Insufficient phantom size.

All values are within acceptable ± 3% variation



OUTPUT AT 100 cm SSD

COLLIMATOR SIZE	FIELD SIZE	MEASURED/DECAY (MD) 1/15/88	COMPUTER CALCULATED (CC) 1/15/88	$\frac{MD}{CC}$
4.4 x 4.4	5 x 5	76.1	77.3	-1.5
5.6 x 5.6	7 x 7	78.1	77.7	+1.0
8 x 8	10 x 10	80.3	80.2	+0.1
9.6 x 9.6	12 x 12	82.1	81.9	+0.2
12 x 12	15 x 15	84.3	83.9	+0.5
13.6 x 13.6	17 x 17	86.5	86.4	+0.1
16 x 16	20 x 20	87.2	86.8	+0.5
20 x 20	25 x 25	91.2	88.5	+3.0
24 x 24	30 x 30	90.1	89.7	+0.4
28 x 28	35 x 35	91.2	90.2	+1.1

ALL VALUES ARE WITHIN ACCEPTABLE  $\pm 3\%$  VARIATION

3. TIMER ERROR  $V_1 = 2.248$   $V_2 = 4.464$   $T_1 = 1$  min  $T_2 = 2$  min

$$\frac{V_1 (t_2) - V_2 (t_1)}{V_2 - V_1} = \frac{2.248 (2) - 4.464 (1)}{4.464 - 2.248} = \frac{0.032^2}{2.216} = 0.014 \text{ min}$$

4. COLLIMATOR/LIGHT FIELD

COLLIMATOR FIELD SIZE	90° FIELD SIZE	0° FIELD SIZE	270° FIELD SIZE
5 x 5	4.9 x 5.0	4.9 x 5.0	4.7 x 5.0
10 x 10	10 x 10	9.9 x 10.0	9.9 x 5.0
20 x 20	19.9 x 20	19.9 x 20	19.9 x 20

COLLIMATOR OFF BY 3 mm @ 270° for 5.0 x 5.0

ALL OTHER LIGHT FIELDS WITHIN THE ACCEPTABLE 2mm LIMIT

5. Field size/Radiation Field

10.0 x 10.0 cm<sup>2</sup> at 80 cm SSD to top of film

Light field: 9.9 x 10.0

Radiation field: 10.1 x 10.2

Within  $\pm 3$  mm limit.

6. Percentage Depth Dose Verification

80 SSD =  $\pm 3$  mm acceptable variation

7. UNIFORMITY OF BEAM:

GANTRY

3
2 1 4
5

The chamber was placed perpendicular to the center ray at 80 cm SSD. A field of 20 x 20 cm<sup>2</sup> was used. Measurements were made at 10 cm beneath surface of water

LOCATION	1 CENTER	2 LEFT	3 TOP	4 RIGHT	5 BOTTOM
CM FROM CENTER	0,0	0,-8	8,0	0.8	0,-8
METER READING	1.962	1.936	1.936	1.935	1.939
RATIO TO CENTER	1.00	0.987	0.987	1.986	0.988
% DIFF	0.0	1.3	1.3	1.4	1.2

MEASUREMENTS WITHIN ACCEPTABLE ± 3% VARIATION

8. CROSSHAIRS: 10 x 10 cm<sup>2</sup> field set at 80 cm SSD. Collimator rotated to 270° and 90°. The diameter of the circle measured 1.0 min. acceptable.

9. WEDGE FACTORS: All wedges tested with a 10 x 10 cm<sup>2</sup> field at 80 cm SSD. Ionization chamber 1 cm beneath the surface of the water.

WEDGE	WEDGE CORRECTION FACTOR (W.F.)	PREVIOUS (P.W.F.) WEDGE C.F.	% VAR W.F. P.W.
15	0.677	0.676	0.1%
30	0.640	0.640	0.0%
45	0.492	0.492	0.0%

ALL LESS THAN 1.0%. No change will be made.

Tray factors

Solid 1.07 1.07  
 Slogger 1.04 1.05 1.0%

The reset values have been posted.

10. MECHANICAL DISTANCE INDICATOR/OPTICAL DISTANCE CHECK

DISTANCE	MECHANICAL DISTANCE INDICATOR	OPTICAL DISTANCE INDICATOR
80 cm	80 cm	80 cm
100 cm	100 cm	100 cm

OPTICAL DISTANCE/MECHANICAL DISTANCE WITHIN ± 3 mm VARIATION

11. ISOCENTRIC CHECK:

75 cm SSD to top of plexiglass and gantry rotated 90° and 270°. The depth was measured to 5.0 cm beyond the top surface. When gantry was at 270° the depth read 5.0 cm. At 90° the depth read 4.5 cm. This is not acceptable. AECL notified to repair on next visit.

12. BLOCK TRANSMISSION:

Acceptable

Measurements by:

Terry LaFrance

*Terry LaFrance*

Reviewed by:

Suresh M. Brahmavar, Ph.D.

*Suresh M. Brahmavar*

Date:

*March 2, 1988*



Worksheet (2) for calculating the dose to water at  $d_{max}$  from photon beams

Name: Co-60 SHU Date: 1/16/88

1. Radiation source: \_\_\_\_\_; Stated energy: 1.17 MeV  
 Ionization ratio: \_\_\_\_\_ Nominal accelerating potential: 1.17 MV  
 (Sec. IV B) (Fig. 3)

2. Phantom material (med): Water SSD: 80 cm  
 Collimator field size: 10 x 10 cm<sup>2</sup>; Depth of measurement: 5 cm

3.1. Dose to phantom material per monitor unit [Eq. (9)]:

$$D_{med}/U = (M/U) \cdot N_{gas} (\bar{L}/\rho)_{air}^{med} P_{wall} P_{ion} P_{repl}$$

where  $U$  refers to accelerator monitor units, or time for a <sup>60</sup>Co unit.

3.2. The chamber temperature  $T =$  30 °C and pressure  $P =$  768 mmHg  
 at the time of measurement. The chamber signal  $M$  is normalized to 22 °C and 1 atmosphere using the factor:

$$\frac{T + 273 \text{ °C}}{295 \text{ °C}} \times \frac{760 \text{ mmHg}}{P} = \underline{1.016}$$

3.3. Mean chamber signal per monitor unit (at the higher collecting potential, and normalized to 22 °C and 760 mmHg)

$$2.248 \times 1.016 \quad (M/U) = \frac{2.3 \times 10^{-8}}{2.284} \text{ C/monitor unit}$$

or  $(M/U) =$  \_\_\_\_\_ scale division/  
 monitor unit

3.4. Cavity-gas calibration factor: 813

Chamber model: Keithly 2571 Wall material: Graphite

Inner diameter: 6.3 mm Wall thickness: 0.065 g/cm<sup>2</sup>

$$N_{gas} = \underline{3.992 \times 10^7} \text{ Gy/C or Gy/scale division.}$$

3.5. Stopping-power ratio (Fig. 2, Table IV):

$$(\bar{L}/\rho)_{air}^{med} = \underline{1.134}$$

3.6. Wall correction factor [Eq. (10)]:

$$P_{wall} = \frac{[\alpha(\bar{L}/\rho)_{air}^{wall} (\bar{\mu}_{en}/\rho)_{air}^{med} - (1 - \alpha)(\bar{L}/\rho)_{air}^{med}]}{(\bar{L}/\rho)_{air}^{med}} = \underline{0.993}$$

Fraction of ionization from chamber wall (Fig. 7):

$$\alpha = \underline{0.53}$$

If  $\alpha > 0.25$ , enter  $\alpha$  and  $(1 - \alpha)$ .

$$(1 - \alpha) = \underline{0.47}$$

If  $\alpha < 0.25$ , enter  $\alpha = 0$  and proceed to 4.

Stopping-power ratio (Fig. 2, Table IV):

$$(\bar{L}/\rho)_{air}^{wall} = \underline{1.012}$$

Energy-absorption coefficient ratio (Table IX):

$$(\bar{\mu}_{en}/\rho)_{air}^{med} \underline{1.111} + (\bar{\mu}_{en}/\rho)_{air}^{wall} \underline{1.0} = (\bar{\mu}_{en}/\rho)_{air}^{med} \underline{1.111}$$

4. Ionization recombination correction (Sec. IV C and Fig. 4):

$$P_{ion} = \underline{1.001}$$

5. Replacement (gradient) correction (Fig. 5):

$$P_{repl} = \underline{0.992}$$

6. Dose to phantom material per monitor unit or per unit time,<sup>11</sup>  
 at point of measurement:

$$D_{med}/U = \underline{1.0195} \text{ Gy/monitor unit}$$

7.1. Dose to water per monitor unit, at  $d_{max}$  [Eq. (17)]:

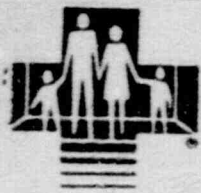
$$D_{water}(at d_{max})/U = \frac{(D_{med}/U) \times ESC \times (\bar{\mu}_{en}/\rho)_{air}^{water}}{P/100} \quad \text{SCRAD} = \underline{129.2} \quad 0.4\%$$

7.2. Correction for excess scatter from acrylic phantoms (Table XIV): ESC = TG-21 128.7

7.3. Energy-absorption coefficient ratio (Table XIII):  $(\bar{\mu}_{en}/\rho)_{air}^{water} =$  \_\_\_\_\_

7.4. Percent depth dose at depth of measurement:  $P =$  79.2 %





SEMI-ANNUAL CALIBRATION FORM FOR HIGH ENERGY

Date: 1 / 16 / 88

Equipment

Room#: CO-60 SHU

Treatment

Unit: T780C

Identification

Model: 780C

SN: 2

Instrumentation

Meter: Keithley

Chamber: 2571 SN 813

Calibrated: 10 / 29 / 87

CCF:  $4.71 \times 10^9$  R/c

Method

35 x 35 x 30 cm<sup>3</sup> water

phantom

SSD 99 to top surface I.S.L. = 0.99

Depth of Probe: 5 cm

Depth Equivalent in water: 5 cm

Temp: 30° Pressure: 768 C.F. 1.016

C<sub>x</sub>: 0.95 Total C.F.: 45.5 x 0.99 = 45.1

Time of each Exposure: 1 minute

Dose Dmax = (MR) (TCF) / TDD in water

Field Size	Collimator	Meter Reading	Avg Meter Reading	Corrected Meter Reading	% Depth Dose	Dose Dmax	Previous Output	% Variation
x 5	4.4 x 4.0	1.344						
	4.4 x 4.4	1.314	1.329	59.9	78.7	76.1	77.3	-1.5
7x7	5.6 x 5.6	1.394	1.394	62.9	80.5	78.1	77.7	+1.0
x10	8.0 x 8.0	1.455	1.455	65.6	81.7	80.3	80.2	+0.1
2x12	9.6 x 9.6	1.492	1.492	67.3	82.0	82.1	81.9	+0.2
5x15	12 x 12	1.540	1.540	69.5	82.4	84.3	83.9	+0.5
7x17	12.6 x 13.6	1.583	1.583	71.4	82.5	86.5	86.4	+0.1
0x20	16 x 16	1.601	1.601	72.2	82.8	87.2	86.8	+0.5
5x25	20 x 20	1.688	1.688	76.1	83.4	91.2	88.5	+3.0
0x30	24 x 24	1.677	1.677	75.6	83.9	90.1	89.7	+0.4
5x35	28 x 28	1.708	1.708	77.0	84.4	91.2	90.2	+1.1





NUCLEAR CENTER

SEMI-ANNUAL CALIBRATION FORM FOR HIGH ENERGY

Date: 1/16/88

Equipment

Room#: Co-60 SHU

Treatment

Unit: T780C

Identification

Model: 780C

SN: 2

Instrumentation

Meter: Keithley

Chamber: 2571 SN 813

Calibrated: 10 / 29/87

CCF:  $4.71 \times 10^9$  R/c

Method

35 x 35 cm<sup>3</sup> water

phantom

SSD 99 to top surface I.S.L. = 0.99

Depth of Probe: 5 cm

Depth Equivalent in water: 5 cm

Temp: 30° Pressure: 768 C.F. 1.016

C<sub>γ</sub>: 0.95 Total C.F.: 45.5 x 0.99 = 45.1

Time of each Exposure: 1 minute

Dose Dmax = (MR) (TCF) / %DD in water

Field Size	Meter Reading	Avg Meter Reading	Corrected Meter Reading	% Depth Dose	Dose Dmax	Previous Output	% Variation
4.4 x 4.0	1.344						
4.4 x 4.4	1.314	1.329	59.9	78.7	76.1	77.3	-1.5
5.6 x 5.6	1.394	1.394	62.9	80.5	78.1	77.9	+1.0
8 x 8	1.455	1.455	65.6	81.7	80.3	80.2	+0.1
9.6 x 9.6	1.492	1.492	67.3	82.0	82.1	81.9	+0.2
12 x 12	1.540	1.540	69.5	82.4	84.3	83.9	+0.5
13.6 x 13.6	1.583	1.583	71.4	82.5	86.5	86.4	+0.1
16 x 16	1.601	1.601	72.2	82.8	87.2	86.8	+0.5
20 x 20	1.688	1.688	76.1	83.4	91.2	88.5	+3.0
24 x 24	1.677	1.677	75.6	83.9	90.1	89.7	+0.4
28 x 28	1.708	1.708	77.0	84.4	91.2	90.2	+1.1

1.5  
2.0  
3.0  
4.0  
5.0  
6.0  
7.0  
8.0  
9.0  
10.0  
12.0  
15.0  
17.0  
20.0  
25.0  
30.0  
35.0



SEMI-ANNUAL CALIBRATION FORM FOR HIGH ENERGY

Date: 1 / 16 / 88

Equipment

Room#: Co-60 SHU

Treatment

Unit: 780C

Identification

Model: 780C

SN: 2

Instrumentation

Meter: Keithley

Chamber: 2571 SN813

Calibrated: 10 / 29 / 87

CCF: 4.710 x 10<sup>9</sup> R/c

Method

35 x 35 x 30 cm<sup>3</sup> water

phantom

SSD 80 to top surface

Depth of Probe: 5 cm

Depth Equivalent in water: 5

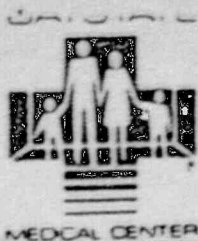
Temp: 30° Pressure: 768 C.F. 1.016

C<sub>x</sub>: 0.95 Total C.F.: 45.5

Time of each Exposure: 1 minute

Dose Dmax = (MR) (TCF) / %DD in water

Field Size	Meter Reading	Avg Meter Reading	Corrected Meter Reading	% Depth Dose	Dose Dmax	Previous Output	% Variation
5 x 5	2.026	2.026	92.2	76.0	121.3	122.7	-1.2
7 x 7	2.134	2.134	97.1	77.8	124.8	125.2	-0.3
10 x 10	2.250 2.248 2.247	2.248	102.3	79.2	129.2	129.4	-0.2
12 x 12	2.305	2.305	104.9	79.5	131.9	132.4	-0.4
15 x 15	2.360	2.380	108.3	79.8	135.7	136.0	-0.2
17 x 17	2.421	2.421	110.2	80.0	137.8	137.8	0.0
20 x 20	2.477	2.477	112.7	80.3	140.3	140.3	0.0
25 x 25	2.533	2.533	115.3	80.8	142.7	142.6	+0.1
30 x 30	2.562	2.562	116.6	81.3	143.4	143.5	-0.1
35 x 35	2.570	2.570	116.9	81.8	142.9	144.1	-0.8



PERCENTAGE DEPTH DOSE VERIFICATION

80 cm SSD

Date: 1 / 16 / 88

Treatment Unit:  / Linac  Co-60 ~~XXXXXXXXXX~~

SHU T780-C

Meter: Keithley

Chamber: 2571 813 SN

Date Calibrated: 10/29/87

Field Size	Depth	Avg. mR	Corrected mR	% Depth Dose	Dose Dmax (rads/min)	Decay to 12/15/84 Dose (rads/min)	Calc. Computer Dose Dmax	% Var.
5 x 5	3	2.354	107.1	87.2	122.8	122.8	122.7	+0.1
	5	2.026	92.2	76.0	121.3	121.3	122.7	-1.2
	7	1.748	79.5	65.3	121.7	121.7	122.7	-0.9
	10	1.380	62.8	52.0	120.8	120.8	122.7	-1.6
7 x 7	3							
	5							
	7							
	10							
10 x 10	3	2.556	116.3	88.8	131.0	131.0	129.4	
	5	2.248	102.3	79.2	129.2	129.2	129.4	-0.2
	7	1.989	90.5	69.2	130.8	130.8	129.4	+1.1
	10	1.613	73.4	56.6	129.7	129.7	129.4	+0.2
12 x 12	3	2.305	104.9	79.4				
	5							
	7							
	10							





PERCENTAGE DEPTH DOSE VERIFICATION

Date: 1 / 16 /

Treatment Unit: / / Linac /x/ Co-60 ~~xxxxxxx~~ SHU T780C 80 cm SSD

Meter: Keithley

Chamber: 2571 SN813

Date Calibrated: 10 / 29 / 87

Field Size	Depth	Avg. mR	Corrected mR	% Depth Dose	Dose Dmax (rads/min)	Decay to 12/15/84 Dose (rads/min)	Calc. Computer Dose Dmax	% Var.
15 x 15	3	2.679	121.9	89.1	136.8	136.8	136.0	+0.6
	5	2.389	108.3	79.8	135.7	135.7	136.0	-0.2
	7	2.123	96.6	60.8	136.4	136.4	136.0	+0.3
	10	1.770	80.5	58.9	136.7	136.7	136.0	+0.5
17 x 17	3							
	5	2.421	110.2					
	7							
	10							
20 x 20	3	2.767	125.9	89.4	140.8	140.8	140.3	+0.4
	5	2.477	112.7	80.3	140.3	140.3	140.8	0.0
	7	2.215	100.8	71.8	140.4	140.4	140.3	+0.1
	10	1.868	85.0	60.3	141.0	141.0	140.3	+0.5
25 x 25	3	2.822	128.4	89.6	143.3	143.3	142.6	+0.5
	5	2.533	115.3	80.8	142.7	142.7	142.6	+0.1
	7	2.274	103.5	72.8	142.2	142.2	142.6	-0.3
	10	1.921	87.4	61.5	152.1	142.1	142.6	-0.4



# AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE

## RADIOLOGICAL PHYSICS CENTER

The University of Texas System Cancer Center  
M. D. Anderson Hospital and Tumor Institute  
1515 Holcombe Boulevard  
Houston, Texas 77050  
Telephone (713) 792-5226



### RESULTS OF TLD CHECK OF PHOTON BEAM OUTPUT

Date of irradiation: 7/14/88  
Institution: Baystate Medical Center; Springfield, IL  
Person irradiating dosimeters: Terry LaFrance  
Radiation machine: Eldorado 6  
Radiation quality: Cobalt-60 gamma rays  
Distance from source to reference point: 80.5 cm  
Dose stated by institution at reference point: 300 cGy to water  
Dose measured by RPC (+/- 3%) at reference point: 305 cGy to muscle

.....  
Ratio of absorbed dose measured by RPC to  
absorbed dose stated by institution: 1.02  
.....

The RPC calculation of dose is based on the AAPM TG-21 protocol (Med Phys 10, 741 (1983)).

This information should be used only as a check of machine operation and not as a machine calibration, nor should it be used as an alternative to frequent calibrations by a qualified physicist. Agreement to within 5% is considered a satisfactory check.

TLD read on: 8/23/88

TLD read by: Irene T. Harris

Checked by: Carter B. Schroy CBS

*William F. Hanson*  
William F. Hanson



# AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE

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### RESULTS OF TLD CHECK OF PHOTON BEAM OUTPUT

Date of irradiation:	7/12/88
Institution:	Baystate Medical Center; Springfield, IL
Person irradiating dosimeters:	Terry LaFrance
Radiation machine:	Theratron 780C
Radiation quality:	Cobalt-60 gamma rays
Distance from source to reference point:	80.5 cm
Dose stated by institution at reference point:	300 cGy to water
Dose measured by RPC (+/- 3%) at reference point:	301 cGy to muscle
.....	
Ratio of absorbed dose measured by RPC to absorbed dose stated by institution:	1.00
.....	

The RPC calculation of dose is based on the AAPM TG-21 protocol (Med Phys 10, 741 (1983)).

This information should be used only as a check of machine operation and not as a machine calibration, nor should it be used as an alternative to frequent calibrations by a qualified physicist. Agreement to within 5% is considered a satisfactory check.

TLD read on: 8/23/88

TLD read by: Irene T. Harris

Checked by: Carter B. Schroy *CBS*

*William F. Hanson*  
William F. Hanson

OFFICIAL RECORD COPY ML10

109767

(FOR LFMS USE)  
INFORMATION FROM LTS  
-----

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 02300  
STATUS CODE: 0  
FEE CATEGORY: 7A  
EXP. DATE: 19891231  
FEE COMMENTS: -----  
.....

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: BAYSTATE MEDICAL CTR., INC.  
RECEIVED DATE: 881024  
DOCKET NO: 3000230  
CONTROL NO.: 109767  
LICENSE NO.: 20-01412-03  
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: -----  
CHECK NO.: -----

3. COMMENTS

SEE C/N 109766  
FOR CHECK AMOUNT &  
CHECK NO

SIGNED EMW  
DATE 10-25-88

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1-1)

1. FEE CATEGORY AND AMOUNT: 7A (\$30)

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT -----  
RENEWAL -----  
LICENSE -----

3. OTHER -----  
-----

SIGNED W. Pessier  
DATE 10/25/88