"SECTION COPY" 105-16
K2

Medical Center Hospital of Vermont
BURLINGTON, VERMONT 05401

August 18, 1986

Mr. Jack Davis
Nuclear Materials Safety Section A
Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Davis:

The following is in response to your letter of July 29, 1986, Mail Control # 105336.

Since Mr. Demidecki is in Portugal I am pulling together whatever materials I can find to satisfy your request, although some is somewhat dated. In response to your questions

a) a description of Mr. Demidecki's training is enclosed

b) a description of Mr. Demidecki's experience is enclosed

c) a copy of calibrations done by Mr. Demidecki is enclosed

d) Mr. Demidecki served in the Center for Radiological Physics for nine years. As such he provided technical assistance to radiotherapy groups on physics matters. I enclosed a letter signed by some big names in radiotherapy physics expressing their assessment of his expertise at the 1985 Radiation Therapy Dosimeter Intercomparison Meeting.

Sincerely,

Wayne L. Thompson
Radiation Safety Officer
NRC License #44-10187-02
Docket # 030-00509

WLT/dzc
RADD-PHYS-105336

Designated "Official Record Copy"
Date OCT 11 1989 Maura Weisenberger 105336
AUG 25 1986

8903150357 880315
REG1 LIC30
44-10187-02 PNU

15 Aug. '86

Notes for a response to the NRC letter dated 7/29/86, re: an amendment to license No. 44-10187-02 naming Mr. Andrew Demidecki as "qualified expert".

a. Specialized Training

1. Training in clinical therapeutic radiological physics - the Christie Hospital, Manchester, England, 3 months, full-time. December 1957 to February 1958.

2. Course: "High Energy Electron, X-ray and Neutron Dosimetry" - The University of Texas, M.D. Anderson Hospital and Tumor Institute, Houston, Texas, 2 weeks, February 1970 (certificate enclosed).

3. Course: "Advances in Radiotherapy Dosimetric Techniques" - by the Mideast Center for Radiological Physics, at the University of Virginia Hospital, Charlottesville, Virginia, 2 days, September 1984. (certificate enclosed).

4. Summer School: "Radiation Oncology Physics - 1986" - by the American Association of Physicists in Medicine, at the Miami University, Oxford, Ohio, 1 week, July - August 1986.

5. Various categorical refresher courses taken at the scientific meetings of the Radiological Society of North America, the American Association of Physicists in Medicine, and the American Society for Therapeutic Radiology and Oncology.

b. Relevant Experience

1. Institute of Oncology, Physics Department, Warsaw, Poland, May 1956 to April 1963 - calibration of X-ray orthvoltage machines, commissioning of the first clinical Co-60 teletherapy unit (AECL Eldorado A) in Poland, performing various dosimetric studies on this Co-60 unit resulting in a paper published in 1961 (see: Bibliography, position 4).

2. Al-Sabah Hospital, Department of Radiotherapy and Radioistopes, Kuwait, Arabian Gulf, April 1965 to July 1968 - output calibration and measurements of dose distribution for the small "head and neck" Co-60 unit (TEM, England), as well as calibration of orthovoltage machines.

3. Appointment by the International Atomic Energy Agency as Advisor in Hospital Physics to the Government of Iran, Teheran, Iran, November 1968 to May 1969 - assisting in measurement and calculation of dose for several orthovoltage machines and Co-60 units (AECL Theratron Junior), also setting up of a calibration center for clinical dosimeters.

4. Regional Medical Program, Radiation Therapy Physics and treatment Planning Center, St. Louis, Missouri, September 1969 to October 1972 - heading up the center which provided among other services, calibration measurements and/or verification of calibrations of radiotherapy machines at over 20 participating institutions in the bi-state region of Missouri and Illinois (various AECL and Picker Cobalt-60 units, a betatron as well as orthovoltage machines).

5. Mallinckrodt Institute of Radiology. Division of Radiation Oncology, St. Louis, Missouri, October 1969 to October 1972 - routine output calibrations and other dosimetric measurements of the following teletherapy machines and two Cobalt-60 units -

   25 MeV betatron (photons and electrons) and 4 MeV Clinac. Also in July - Sept. 1972, acceptance testing of the new 35 MeV Linear Accelerator at the Varian plant in Palo Alto, California, prior to installation at the M.I.R.

6. Mount Zion Hospital and Medical Center, Tumor Institute, San Francisco, California, November 1972 to May 1975 - routine output calibrations, special dosimetry and qualtiy assurance for the following radiotherapy equipment: Cesium-137 unit, Cobalt-60 unit (used also for total body irradiations), 25 MeV betatron, 8 MeV Linac (photons and electrons) and treatment simulator.

   In addition in the same period of time, providing dosimetry services on a weekly basis to two affiliated hospitals: Franklin Hospital in San Francisco (Co-60 unit, Vanguard X-ray machine) and Penninsula Hospital in Redwood City (two cobalt-60 units).

WLT/dzc
RADD-PHYS-AMENDMEN-

WASHINGTON UNIVERSITY

SCHOOL OF MEDICINE
ST. LOUIS, MISSOURI 63110

THE EDWARD MALLINCKRODT
INSTITUTE OF RADIOLOGY
DIVISION OF RADIATION THERAPY
510 SOUTH KINGSHIGHWAY

July 3, 1972

Andre J. Demidecki
Division of Radiation Therapy
Physics Section

Dear Mr. Demidecki:

I would like to invite you to serve as the Acting Head of Radiation Therapy Physics in an interim position until a full-time head of the section has been selected.

You have seen the note from Dr. Feldman regarding his desire to relinquish his job. As we discussed, I would like you to take over and would like to have a meeting with you on Wednesday to determine the extent and encompass of your duties.

Again, many thanks.

Sincerely,

William E. Powers, M.D.
Professor of Radiology

WEP/ew

cc: Dr. Evans
Dr. Perez
Dr. Terr-Pogossian
Dr. Feldman

THE UNIVERSITY OF TEXAS

GRADUATE SCHOOL OF BIOMEDICAL SCIENCES AT HOUSTON

DIVISION OF CONTINUING EDUCATION
111 Hermann Professional Building Annex
Telephone (AC 713) 524-2908

Mailing Address:
P. O. Box 20367
Houston, Texas 77025

CERTIFIES THAT

Andrzej J. Dernidecki

has attended a course on HIGH ENERGY ELECTRON, X-RAY AND NEUTRON DOSIMETRY involving eighty hours of instruction, including lectures and discussions upon the principles of high energy dosimetry, and laboratory exercises utilizing ionization chambers, proportional counters, solid state devices, thermoluminescent dosimeters and ferrous sulfate chemical dosimeter in the measurement of high energy electrons, x-rays and neutrons; also including the measurement and control of various beam parameters such as beam alignment, beam uniformity and energy for betatrons and linear accelerators, at The University of Texas M. D. Anderson Hospital and Tumor Institute at Houston, Texas Medical Center, Houston, Texas, and has satisfied his instructors in these subjects.

Grant Taylor

Grant Taylor, M. D., Dean
The University of Texas
Graduate School of Biomedical
Sciences at Houston, Division
of Continuing Education

Peter R Almond

Peter R. Almond, Ph. D.,
Department of Physics,
The University of Texas
M. D. Anderson Hospital and
Tumor Institute at Houston

February 2 through 13, 1970
Date

105336

Mideast Center for Radiological Physics*

and

The Mid-Atlantic Chapter of

AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE

hereby certify that

ANDRZEJ D. DEMIDECKI

has successfully completed a continuing education course in

Advances in Radiotherapy Dosimetric Techniques

September 21-22, 1984

Charlottesville, Virginia

John E. Burton
Associate Director, Mideast Center for Radiological Physics

Andrzej J. Demidecki
President, Mid-Atlantic Chapter AAPM

*Supported by DRCCA of National Cancer Institute

105336

Calibration of the AECL Theratron 780 Cobalt Machine

Medical Center Hospital of Vermont, Burlington, VT — 19 April, 1986
Performed by: Andrew J. Demidecki, M.Sc.

Electrometer: Keithley, Mod. 616/, Ser. No. 126698
Interface: Keithley, Mod. 6169, Ser. No. 14396
Chamber: NEL Farmer 2571 (graphite-Delrin), Ser. No. 164

^{60}Co exposure calibration factor (electrometer-chamber system): $N_x^{\odot}$ = (see below)

K & S Associates, Inc. (ADCL) calibration of the other V system (Departamental) on 17 Feb. '86:
Keithley / Keithley, 616/6169, SN 51667A/51370A, & NEL chamber 2505/3A, SN 3809 → 0.985 C/RDG × 4.778 × 10^9 R/C = 4.7063 R/RDG
(on 10^{-9} C RANGE, at 760 mm Hg and 22° C)
Revised as per letter of March 27, '86 from K & S Associates due to updating of NBS exposure rates as of 1986 Jan 01 → adjustment of −1.1%
Thus the calibration factor this system $N_x^{\odot}$ = 4.7063 × .989 = 4.6546 R/RDG

Intercomparison of the two systems on 1-28-86 by Doug Hoes (see: the yellow page) in a 10 × 10 cm field on the Theratron 780 gave the ratio $N_x^{\bullet} / N_x^{\odot} = \frac{4.725\ (\text{mean})}{4.786} = 0.98725$

Thus $N_x^{\odot} = N_x^{\bullet} \div .98725 = 4.7147$ or 4.715 R/rdg

Air pressure: P = 756.6 mm Hg
Temperature in the Co room: t = 20.4 °C

$$C_{tp} = \frac{760}{275.15} \times \frac{273.15 + 20.4}{756.6} = 2.57496 \times .38791 = 0.999$$

Exposure rates measured in air at isocenter, i.e. at 51 cm with beam-up cap.
Keithley's switches and scales: CN, FAST mode, AUTO sensitivity, BIAS TRIAX, PBS, polarizing potential (correct polarity), ~~triax~~ ~~PBS~~, background OFF, 10^{-9} C range.
Cobalt machine: C-arm at 0°, without any extenders on the collimator, chamber at ca. 16 cm above the tennis racquet, centered in the beam (pointer and lasers and disc localizing light), chamber perpendicular to the beam direction.

105336

^{60}Co Radiac Calibration - 19 April 86

Field size: 10 × 10 cm.

Readings for 1.15 min. exposure: 28.35, 28.2, 28.25, 28.2, R_1 avg. = 28.25

Readings for .15 min. exposure: 3.49, 3.475, 3.48; 3.475; R_2 avg = 3.48

Avg. corrected rate: $(28.25 - 3.48) \div 1.00 \text{ min} = 24.77 \text{ rdg. (in uC)} / 1 \text{ min}$

Timer error: $1.15 - \frac{R_1}{R_{av.}} = 1.15 - \frac{28.25}{24.77} = 0.0095 \text{ min.}$

Exposure rate: $\frac{\text{rdg}}{1\text{min}} \times N_x^{(5)} \times C_{tp} = 24.77 \frac{\text{rdg}}{\text{min}} \times 4.715 \frac{R}{\text{rdg}} \times .999 =$

$= 116.67 \text{ R/min.} \quad [X_{10\times10}]$ {Assuming Ion Recombination & Polarity Effects ≈ 1.00}

Predicted value: ~~from~~ 135.19 R/min on 16 March, 1985

adjusted for decay for 399 days $(0.5)^{\frac{399}{1921}} = .8659$

$\Rightarrow 117.06 \text{ R/min}$

% Difference: $\frac{\text{measured} - \text{predicted}}{\text{predicted}} \times 100\% = -0.34\%$

Dose rate to water at dmax in a full phantom: at 77.5 cm SSD

$D_{water,10\times10} = X_{10\times10} \times f \times A_{eq} \times BSF_{10\times10} =$

$= 116.67 \frac{R}{min} \times .967 \frac{rad}{R} \times .989 \times 1.035 = 115.48 \frac{rads}{min}$

Dose rate to a small mass of water of 0.5 cm radius at the isocenter

$D'_{water,10\times10} = X_{10\times10} \times f \times A_{eq} = 111.579 \text{ rads/min.}$

Dose rate used: 112.06 $\frac{rads}{min}$ on 16 ~~March~~ April '86, adjusted for 3 days (to 19 Apr.) $\rightarrow$ 111.94 $\frac{rad}{min}$

% Difference: $\frac{111.58 - 111.94}{111.94} \times 100\% = -0.32\%$

C.K. H.J.D.

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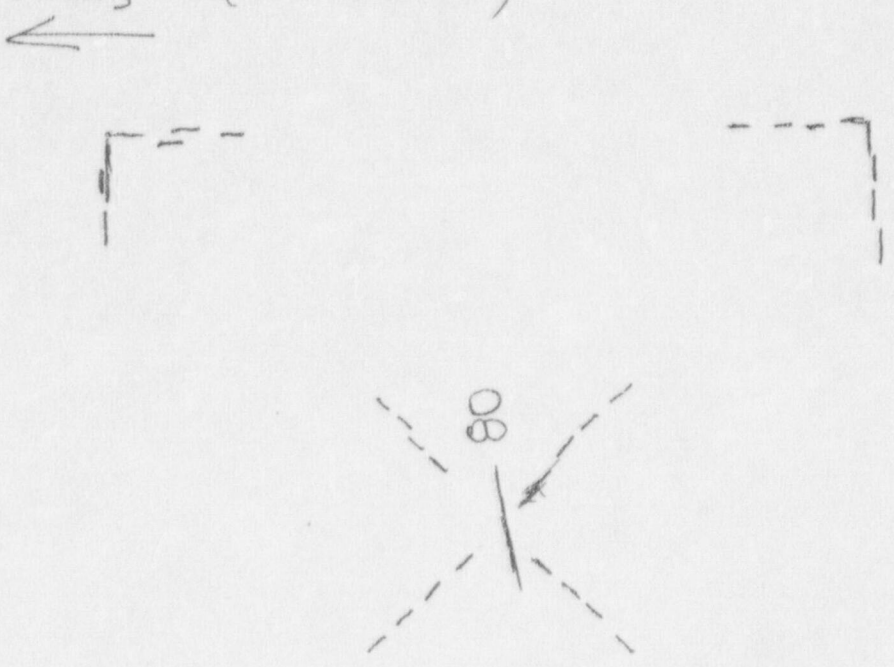
Gantry (C-arm at 0°)



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Cobalt backpointer

180°

cross bar
moved toward gantry 2+mm

90°

cross has
moved up and
toward gantry ≈ 2 mm

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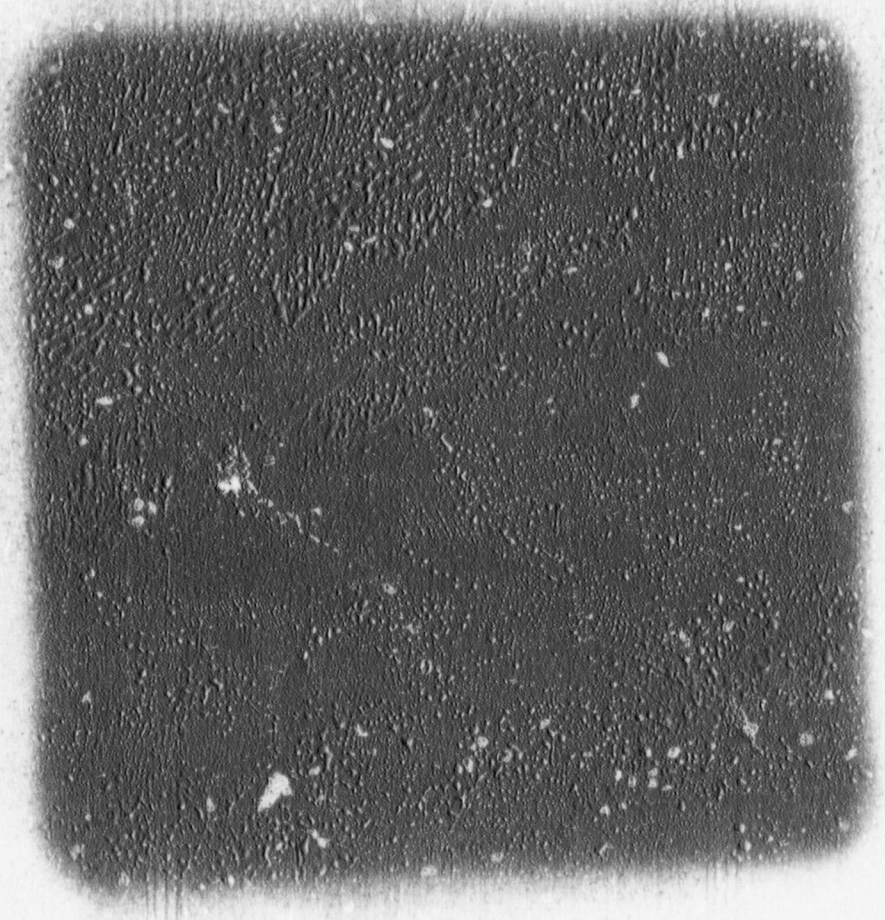
AECL Co^{60}

19 April '86

80.1 to the plate
(80.4 cm to film)

10 x 10 cm.
exp. 0.04 min

Gantry



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MCHV – Theratron 780 Cobalt Machine

Field size dependance & other factors

31 March '86

P 758.4 mm Hg 20.5°C .997

0° (C-arm) 10 × 10 cm without any extenders on the collimator chamber ~16cm over the Lucas racquet "in air"

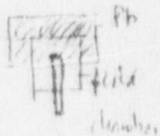
28.25 × 10^{-9} Coulomb 1.15 min

-"- 1 min.	10 × 10 cm	24.55	(corr. for 24.48)	1.000
	5 × 5 cm	23.75		.967 ✓
	15 × 15	25.20		1.026 ✓
	20 × 20	25.65		1.045 ✓
	25 × 25	25.85		1.053 ✓
	30 × 30	25.95		1.057 ✓
	max. width, x 35.8 × 36 length, y (almost max.)	25.95		-"-
	10 × 36 □ 14.1	25.25		1.029 ~
	35.8 × 10 -"-	25.25		1.029
	10 × 10	24.55 !		
	10 × 5 6.7	24.05		.980 ✓
	5 × 10 "	24.05		.980

C.K. A.J.D.

with #2 extenders on the collimator

	10 × 10	24.55 !		
"solid" tray	-"-	22.55		.919
"perforated", hole over the thimble		24.45 × .67	> 24.186	.985
-"- -"- solid over the thimble		23.65 × .33		
-"- -"- "half way"		24.15		
new thin (¼") Lexan tray		23.55		.957
breast beam splitter: under the block (totally obscured)		.999		.041
-"- "in position"		12.805		.522
-"- partly slided off the chamber is open		22.85		.931



10 × 10 cm 24.65 (Δ 100%)

10 × 10 cm 24.05 ± 4 interruptions (door ×3, emergency stop ×1)

∴ error calculated as per Padilla −0.005 min.

105336

A.J.Dennis

BCHV Cobalt Machine — continuation

1 April '86

P = 748.6 mmHg T = 20.5° C C/P 1.008 1010

C-arm 0°, 10×10 cm field with middle extenders (# 2) on the collimator, chamber ~145 cm above the tennis racquet "in air"

1 min. exposures

corr. C/P			
24.494 24.494	24.25 ; 24.25	collimator	180°
	24.25 ;	collimator	90° (knobs for field are facing North)
	12.725	beam splitter	parallel, coll. 90°
	12.515	beam splitter	perpendicular, coll. 180°
.521	11.385 , 11.285	beam splitter	parallel, coll. 270°
	11.025	"	perpendic. North coll. 0°/360°
.494	12.555	"	parallel coll. 90°
	24.25	open	

	17.40 .395	30° wedge	coll. 90°
.715	17.445	"	coll. 270°
	13.755	45° wedge	" 270°
.514	13.890	"	" 90°
	9.70	60° wedge	" 90°
.402	9.78	"	" 270°
	9.695	"	180°
	24.25		

A.J Dennis

105336

Co-60 MONTHLY "SPOT" CHECK
MEDICAL CENTER HOSPITAL OF VERMONT
AECL THERATRON 780

date: November 9, 1985.

1. Safety

a. radiation monitor batteries:
time off: 18:40 → 22:50 O.K.

b. Co-60 daily-check log: OK (missed on Th, Oct 17, Fri Oct 18 & yesterday Fri. Nov 8)

c. Co-60 daily-check: OK all 7 items (except in "5" ROT pushbutton did not spring out)

d. door interlock: OK (FIX pushbutton didn't spring out)

e. main frame emergency stops: OK

f. dose rate at console: 0.1 mrad/hr, on the bench 0.12 mrad/hr, by the door max. reading at 1ft above the floor 0.5 mrad/hr
HPI calibration checked: , 198 .

2. Timer error

0.5 min: 30 sec. 2.0 min: 2 min. 0 sec.

3. Distance measuring devices

a. range finder at 0°: 80.0 cm; at 180°: 80.0 cm.

b. 0° and 180° light field congruence: increased in size 1mm ↑ south and (the 15-30 mm ... west) center shifts by 1-1.5 mm → towards SW. 180° 0°

c. lower table ~~20~~ 15 cm; change in range-finder reading: 95.3 cm.
lateral shift of cross-hairs: 0 mm.

d. mechanical range finder: OK (needed slight extension, with 3 mm for shaft).

e.

gantry	optical range finder	light field centered	lasers
0°	80.0 cm	yes	yes OK
90°	80.0 cm	down 2mm, west 1mm	OK
180°	80.0 cm	(see above 3b same)	OK
270	80.0 cm	down 2mm, west 1mm	OK

at 180° the backpointer is shifted 3 mm SE ↖
at 0° the backpointer is OK
and at 90° & 270° is 1.5 mm off (90° down & towards gantry) (up 270°)

4. Light field/radiation field congruence

a. x-collimator: 10.0 cm
y-collimator: 10.0 cm

b. light/radiation congruence: (film at isocenter) exp. 0.06 min c̄ (two plates masonite on top and under)

105336

5. Dosimetry

a. probe: 3806 Keithley: 51667
pressure P: 757.4 mm Hg temperature T: 20.5 °C

b. 10 x 10 at iso:

	0°	90°	180°	270°	av.
timer (min)	1.15	1.15	1.15	1.15	1.15
charge (nC)	29.80	29.90	29.85	29.85	q_1 = 29.85
timer (min)	0.15	0.15	0.15	0.15	0.15
charge (nC)	3.685	3.705	3.685	3.685	q_2 = 3.690

c. exposure rate in air:

average current: $q = (q_1 - q_2) / 1.00$ = 26.16 nC/min

air density correction: $2.5745 \times \left(\frac{273.2 + T}{P} \right)$ = 0.998

calibration factor: 4.718 R/nC

constancy check factor: 1.00

measured exposure rate: 123.18 R/min

d. timer end error

$1.15 - q_1/q$ = 0.009 min

6. Dosimetry check

full calibration exposure rate 135.19 R/min

performed March 16, 1985.

n = 238 days since calibration

calibration correction = $(0.5)^{n/1921}$ = 0.917

expected exposure rate = 123.97 R/min

$100 \times \frac{(\text{expected} - \text{measured})}{\text{expected}}$ = -0.64 %

7. Wipe test

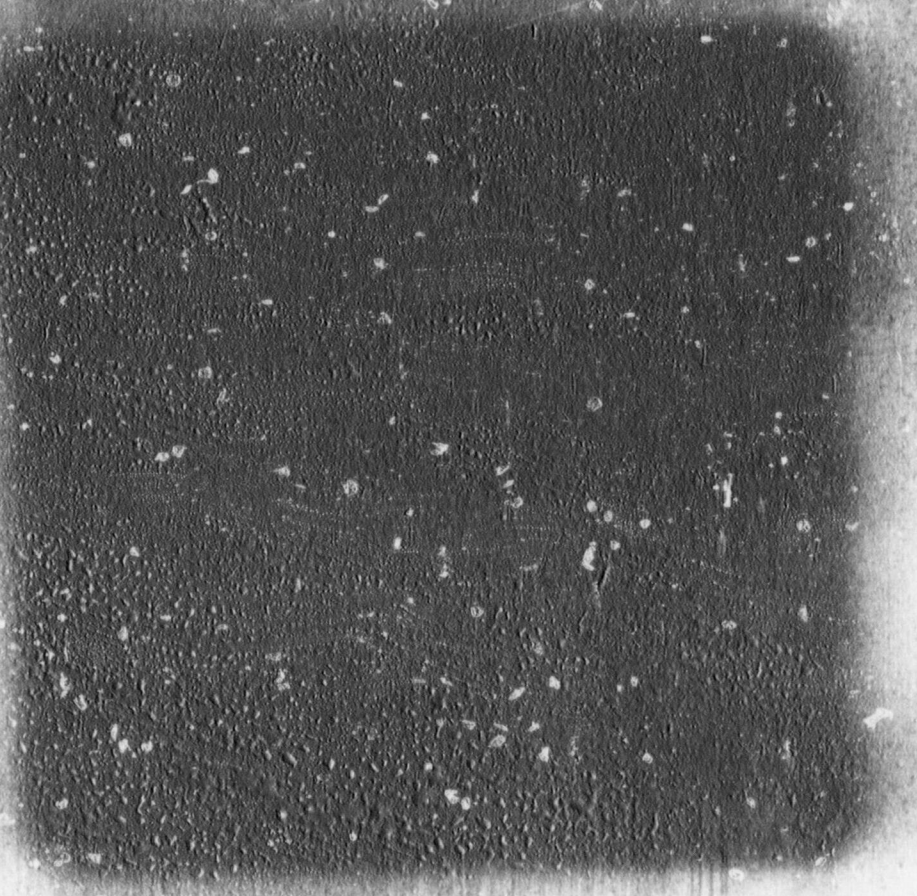
January: nCi. May: nCi. September: nCi.
background: nCi
counter calibrated on: , 198 .

Performed by: A.J. Dean on Dec. 9, 1985.
Checked by: on , 198 .

105336

AECL Co machine
Nov. 9, '85

10.0 x 10.0 cm
Exp. 0.06 min
SFD 80.0 cm
depth 1.8 - 2 cm



Gantry

North

105336

RALPH K. DAVIES MEDICAL CENTER

FRANKLIN HOSPITAL

CASTRO AND DUBOCE STREETS - SAN FRANCISCO, CALIFORNIA 94114

(415) 565-6200

DEPARTMENT OF RADIATION THERAPY
Affiliated with the University of California School of Medicine

LAWRENCE MARGOLIS, M.D., DIRECTOR
Associate Clin. Prof. Radiology
RICHARD F. EVANS, M.D., ASSOCIATE

PICKER VANGUARD 280 kVp X-ray THERAPY MACHINE

Calibration data as of June 11, 1974.

10 x 10 cm. field (VARI-CONE); 50 cm. SSD

STEP kVp/ma	HVL mm.	R/min. (air)	MONITOR ±3
1 280/5	2.35 Al	13.9	88
2 170/5	0.55 Cu	13.1	43
3 280/20	1.0 Cu	131.0	97
4 280/20	2.5 Cu	60.5	80
5 280/20	3.5 Cu	33.1	66

A J Demidecki

Andrzej J. Demidecki, M.Sc.
Radiological Physicist

105336

10 F

5 June, 74
4 - 7[5]

VANGUARD X-ray Machine - Calibration Check

Victoreen # 2192, 100R chamber "C" 131, N = (1.05 - 1.03)
temp. 21° C. press (MZ - 2.4 mm Hg) ≃ 758 mm. Hg C_{tp} = 0.999
10 x 10 cm. field as shown on the scales of the "Vari-cone"
50 cm. TSD

Step (1)

exp. 2 min. (Monitor 83) 34.1 ; 34.1 x .99 → 33.76

33.76 x 1.05 x .999 ÷ 2 = 17.71 R/min (in air)

exp. 4 min. ē 2.33 mm Al filter 34.5 → 50.6 % O.K.

Step (3) [POTENTIAL - 2° division down, CURRENT - down]

exp. ½ min. (Monitor 90) 49.8

x 1.044 x .999 x 2. = 103.9 R/min.

21% lower

Note: full potential can not be reach!
same at the step (4) & step (5)

Step (2) [POTENTIAL - 3° division down, CURRENT - down to ½ scale]

exp. ½ min (Monitor 37) 14.0 → 7 R/min

exp. 4 min. ē 0.48 mm Cu 18.0 64 %

estimated HVL ≃ .75 mm Cu ?)

so at the full potential HVL would be still bigger, perhaps .9 or 1 mm Cu.

7 June, 74

cont. (after the machine was serviced by "Picker"

Set-up as above. Temp. 22°C, press. 752 mm Hg; C_{tp} = 1.011

Step (1)

exp. 2 min (Monitor 88) ↗ ; 36.3; 36.0 x .99 → 35.79

35.79 x 1.05 x 1.011 ÷ 2 = 19.0 R/min (in air)

exp. 4 min. ē 2.33 mm Al ↗, chamber "C" leaks!

105336

cont:

· Repeat as above with 100R chamber "D" # 131

temp. 21° → C_{tp} = 1.007

Step (1)

exp. 1 min. (Monitor 88) 18.1 ; 18.8 ; 18.8 ; 18.6 × .98 → 18.2

18.2 × 1.029 × 1.007 = 18.86 R/min (in air)

exp. 2 min c̄ 2.33 mm Al filter 18.2 ; 18.4 → 49.2%

c̄ 2.07 mm " " 19.5 52.5%

∴ HVL = 2.27 mm Al.

Output (average 2 measurements "C" & "D" 18.9 R/min (in air)

Step (3)

exp. ½ min. (Monit. 98) 64.1 ; 64.1 ; 64.1

× 1.015 × 1.007 × 2 = 131.0 R/min (in air)

exp. 1 min c̄ 1.003 mm Cu filter 67.5 ; 66.3 } estimated together → 49.7% O.K.

c̄ 1.0 " " 63.8 }

Step (2)

exp. 1 min. (Monit. 43) 12.5 ; 13.2 → ~ 12.7 R/min.

exp 2 min c̄ 0.52 mm Cu 14.0 }

c̄ 0.77 " " 10.5 } HVL ~ .6 mm Cu

11 June, 74

cont.

temp. 21° press 757 mm Hg. C_p = 1.000 . chamber "D"

Step (1)

2 min. (88) 37.5 ; 37.0 → 18.97 R/min OK

Step (3) Repeat

½ min (98) 62.6 , 63.2 → 127.7 R/min -2.5%

Step (4)

exp. 1 min (80) 60.0 ; 59.8 → 59.9

× 1.011 = 60.5 R/min (in air)

(HVL check) c̄ 2.5 mm Cu filter

1 min 27.6 ; 29.8 → 29.7 × .99 ∴ 49.1% O.K.

105336

cont.

Step (5)

exp. 1 min (66) 33.4 ; 33.1 → 33.25

× .986 × 1.01 = 33.18 R/min (air)

(HVL check) ē 3.56 mm Cu filter (2 min.)

32.2 ; → 48.4% O.K.

Step (2) [POTENTIAL slightly below red bar]

exp. 2 min (43) 26.2 ; 26.2 ; 26.2 → 26.2

(1 min 13.2) × .982 × 1.02 ÷ 2 = 13.12 R/min (air)

HVL ē 0.5 mm Cu filter (2 min) 1

14.0

× .975 = 13.65 → 52.1%

18 June 74

(=) typing the "Output Table" for Vanguard X-ray Machine.

- discussion with Key.
- Problems:
  1. Check on (ē film?) the new breast splitter alignment with the beam.
  2. Check on difference (if any) between breast splitter with the central plate and without the plate and limiting bars.
  3. Calculation of output (perhaps TLD measurement?) for the breast splitter at 70 cm SSD. Compare with Ralph's curve – Key's calculations (looks O.K.) differ from the curve by up to 6%
  4. Check on (measurement?) Ralph's limitation of very small fields on the orthovoltage machine. Why? (equv. square only or one axis – should not be less than 5 cm. (?)

25 June, 74
3:30 – 6:20

1 – and routine visit

105336

23 July, 74
-73°

Vanguar X-ray Machine - calibration of cones for Step (2)

Baldwin - Farmer 2502, # 10071 temp. 20°C press. 754 mm Hg.
⅓ chamber 0.6cc, in "AIR" C_{tp} = 1.001 [or 1.00]

10 × 10 cm field on the scales of Van-Cone, 50 cm. TSD

VL 2.3 mm Al	Step 1	exp. 1'	monitor 85	17.2, 17.0	→ 17.1	× 1.054	× 1.021	= 18.04	R/min	(-4.5%)
0.55 mm Cu	" 2	1'	43	12.0; 12.2; 12.3 -	(12.17)	× 1.02		= 12.43	-"-	(-5.1%)
1.0 mm Cu	" 3	¼'	95	30.3, 30.8	30.55	× 1.022		= 125.0	-"-	(-4.6%)
2.5 "	" 4	½'	72	27.9; 28.0	27.95	× 1.029		= 57.6	-"-	(-4.8%)
3.5 mm Cu	" 5	1'	66	30.0; 30.0	30.0	× 1.032		= 31.0	-"-	(-6.4%)

Step 2

						Cone Ratio
Cone		2.0	½'	~~#3~~, 8.2, 3.2, (7.6)		1.319
	⌀	2.5	"	10.7; 10.8		1.721
TSD 38.0 cm.!		3.0	"	10.9; 10.7		1.733
(chamber at 38.4 cm.)		3.5	"	11.0; 10.8;		1.754

Cone ⌀ 3.0 Step 1 ½' 28.6; 29.0
" 3 ¼' 52.5; 52.0

Cone 2.5** ½' 10.6; 10.6; ⊥ 10.6
⌀ 3.0* " 10.9; 11.0;
TSD same as above 3.5* " 10.7; 11.0;

~~* shorter by ≈ 3 mm.~~ ~~** longer by ≈ 3 mm.~~

$\left(\frac{39.8}{39.0}\right)^2 = 1.0414$ $\left(\frac{39.9}{39.0}\right)^2 = 1.0465$

30 July, 74

Vanguard X-ray Data:
- Backscatter factors curve for .5 mm Cu (also 3.5 mm Cu, 2.5 mm Cu - correct!)
- % D.D. for 3.5 mm Cu, 2.5 mm (?) (in use BSR, 11 for 3.0 mm Cu & 2.00 mm Cu
- % D.D. for 0.5 mm Cu (Step 2) prepare!
- "Overall Factor" curve [BSF × Field size ratio × f-Factor] versus side equ. □ field

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14 May, 74
320 - 600

- check on the newly build table for under the Ra safe
- fixing Rt. wall light to the wall (Simulator)
- adjusting Rt. wall positioning light (Simulator)
- correcting Lt. wall light

- lock in the Linac room ? leakage of radiation ?
- registration of all X-ray machines ?
- check on the new breast "cone" - splitter
- removal of the Toshiba transverse tomography ?
  (Dr Phillips must give O.K.)

21 May, 74
310 - 6

Spot check on Cobalt machine output

Field: 9.5 × 10 cm. did set 10 × 10 cm.
Measured in "air" at 80 cm.

Victoreen # 2192, { 100 R Hi Energy chamber
2027, type 621

{ p. 763 mm Hg (at T.I.) = 761 mm
{ temp 22°C
{ C_{tp} = 0.999

exp 0.5 min. reading 62.8 ; 63.0 → 62.9

$$D_{80s} = 62.9 \times \frac{1}{0.5} \times 0.997 \times \left(\frac{80}{80.5}\right)^2 \times 107 \times 0.94 \times 1036 = 129.3 \text{ rads/min.}$$

Value in us: : 132.25 rads/min.

Discrepancy : +2.3 % O.K.

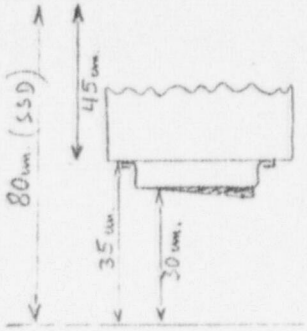
- check timer error on Cobalt machine

28 May, 74
230 - 400

Data on the "Compensator" for the Picker Co-60 machine

1. 30°
   SSD 70 cm.
   Mount at 45 cm.
   Field: 7 × 7 cm. to 25 × 25 cm.

2. 30°
   SSD 80 cm.
   Mount at 45 cm.
   Field: 7 × 7 cm. to 25 × 25 cm.



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April, 1974

SPECIFICATIONS OF THE THERAPI 400

- 4 MeV isocentric linear accelerator for the Franklin Hospital, San Francisco, California

1. Photon Beam Specifications

1.1. Photon beam energy

The nominal electron energy at the target should be 4.0 MV ± 0.2 MV. The effective energy of this 4 MV beam will be evaluated on the basis of percentage depth doses in water. The central axis percentage depth doses should agree within ± 1 percentage unit with published data (e.g. B.J.R. supplement #11).

The measurements will be done with an ion chamber in a water tank at least 30 x 30 x 30 centimeters. Surface of water will be set up 100 centimeters from the target (100 centimeters SSD). The dose rates in 5 x 5 centimeters, 10 x 10 centimeters and 20 x 20 centimeter fields (at 100 centimeters SSD) at 5 centimeters, 10 centimeters, 15 centimeters and 20 centimeters depths will be compared with the corresponding maximum dose rate found approximately at 1 centimeters depth.

Beam energy must remain constant with limits specified above throughout 360° rotation. Beam energy can be checked at specified fixed angles: 0°, 90°, 180° and 270° similarly as described above.

1.2. Field size and field size definition

Treatment field is defined as the plane figure formed by the geometrical projection of the beam-defining surface of the collimator jaws to a plane normal to the central beam axis and 100 centimeters from the photon beam converter (target).

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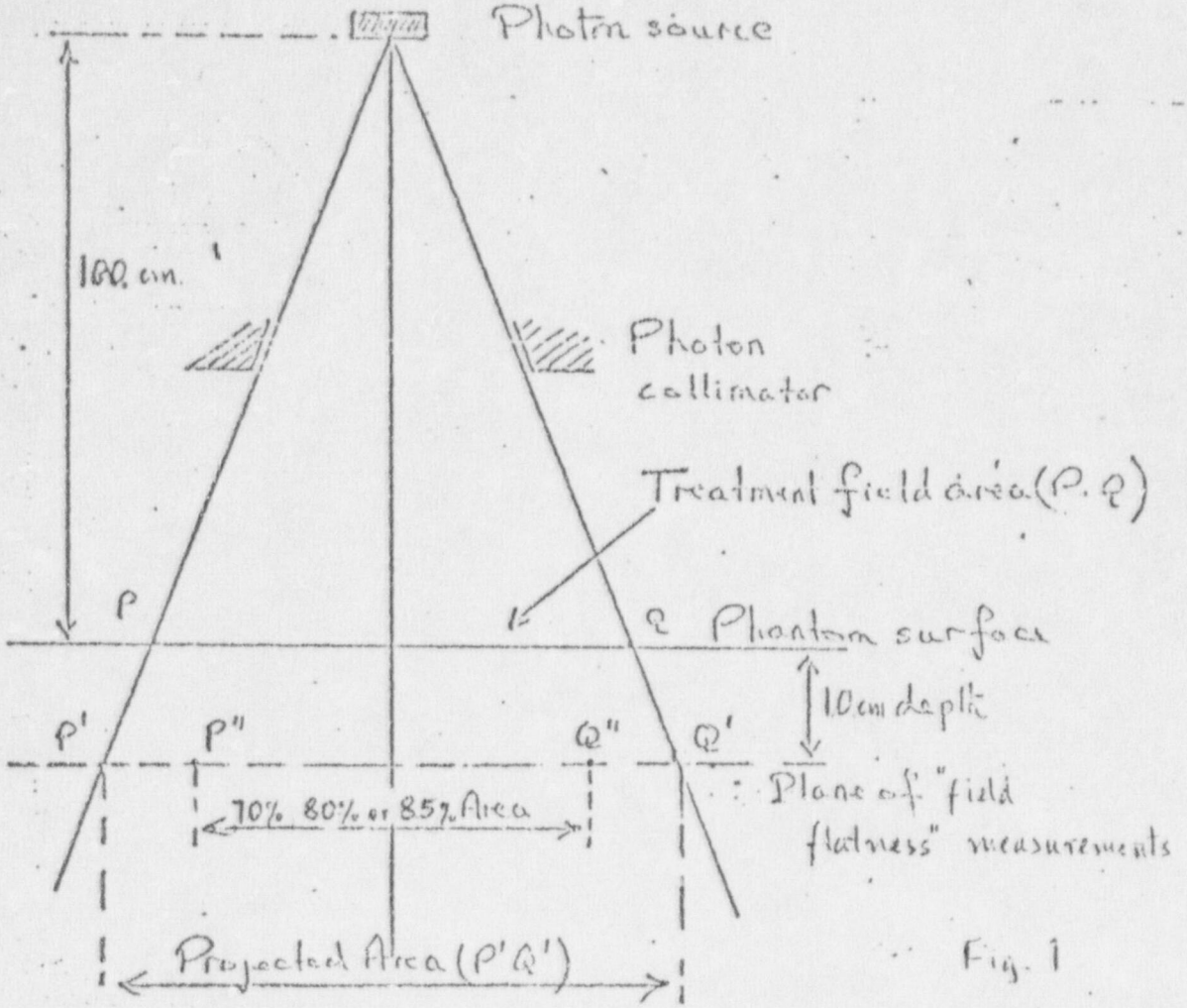

Fig. 1

The collimating system must be continously adjustable to give any field size from 2 x 2 centimeters to 40 x 40 centimeters. The collimator assembly must rotate about central axis at least $\pm$ 90°. The x-ray head must be provided with a beam defining light and control cross-hairs. The light field must coincide with the x-ray field within $\pm$ 1 millimeter. Measurements to be made for 4 x 4 centimeters, 10 x 10 centimeters and 35 x 35 centimeter fields.

1.3 Field flatness and symmetry.

The variation in dose over 70% of the area of the 10 x 10 centimeter field (as defined in Section 1.2), 80% of the area of the

20 x 20 centimeter field and 85% of the area of the 40 x 40 centimeter field, projected to 10 centimeter depth shall be less than ± 3%.

To be evaluated either by film dosimetry or by an ion chamber and scanner system 10 centimeters deep in an appropriate phantom (tissue equivalent solid phanton with film for water phantom with ion chamber) at fixed angles of 0°, 90°, 180° and 270° of the C-arm.

The integrated dose over half of the field (as defined in Section 1.2) shall not differ by more than ± 2% from the integrated dose over the remaining half when the field area is bisected by a straight line. To be evaluated by film dosimetry, film to be read out on automatic (or manual) densitometer.

1.4 Dose rate

The x-ray photon output should be at least 300 rads per minute under continous operation and flattened, as specified in 1.3. Output rate should be continously adjustable from 100 rad/min to the maximum dose rate.

To be measured with a calibrated ion chamber in water or polystyrene phantom at a depth of maximum buildup (approximately 1 centimeter) with the surface set up 100 centimeters from the target. Dose-conversion factors C_{λ} to be used: 0.94 for water, 0.93 for polystyrene.

1.5 Source size

The focal spot should be contained within a 3 millimeter diameter circle. To be checked only if a large penumbra will be observed on films exposed with build-up at 100 centimeters SSD, for small and large fields.

1.6 Electron contamination

The contribution to the absorbed dose by the primary electron beam at the surface shall be less than 3% of the photon central axis dose at the depth of maximum buildup. The surface dose will be measured with an extrapolation chamber and differential absorption by suitable filter (e.g. Al) will be used to determine the electron contamination.

D J Daniels

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Visit in Southeast Missouri Hospital.

Dr. Milton Shoss & Dr. Harold B. Rapp

Wednesday 24, June, 1970
2^{45} -

"Picker" Co^{60} teletherapy unit V4M/60 (3002 Curies on Dec. 31, 1966)

Victoreen R-meter, model 570 # 2380, with hi-energy chamber (N - 1.07 for 10 m)

(Good assortment of blocks (thickness 3.1-3.2 cm Pb !) (Kidney blocks 2.3 cm Pb)
{ wedge filter 50.0 cm. SSD 12 W x 15 (max. Field)
{ Pin & Arc device, Back pointer
(30 patients per day

Distance (light	Field size (measured)	Plastic tray	Trimmers	Exposure time	Readings	Aver. reading	Output [illegible]
70 cm.	10 x 10 cm	NO	with	1'	54,4; 54,2, 54,2	54,3	66.7
-"-	-"-	-"-	-"-	½' + ½'	54.0; 54.0; 53.8	53,9	-
-"-	5 x 5 cm	-"-	-"-	1'	52,0; 52,0; 52.0	52.0	[illegible]
-"-	20 x 20 cm	"	-"-	1'	57.5; 57.0; 56,5	57.0	[illegible]
50 cm.	10 x 10 cm	-"-	-"-	½' [illegible]	54,1, 54.0 -	54.05	121.[illegible]
100 cm.	30 x 30 cm	-"-	-"-	1,5'	44.0; 42,8; 43.0	43,3	[illegible]
100 cm.	20 x 20 cm	-"-	-"-	1.5'	41,8; 41,5;	41,6	[illegible]
120 cm.	36 x 36 cm (largest possible)	-"-	-"-	2'	40,0; 40,0;	40,0	22.0[illegible]

Pressure: 746 mm Hg
Temp: 27°C

$C_{t.p.} = 2.576 \times \frac{300}{746} = 1.036$

$\Delta = 53.9 - 54.3 = -0.4$ ⟶ [illegible] $= -0.44$ [illegible] (or [illegible] / min)

Distance indicator: light [illegible] reads 70 cm. "true" (measured) = 71 cm.

There should be installed a close circuit TV in order to [illegible] patient during the treatment.

D. J. [illegible]

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GAMMA BEAM UNIFORMITY and ALIGNMENT OF GAMMA FIELD WITH LIGHT FIELD

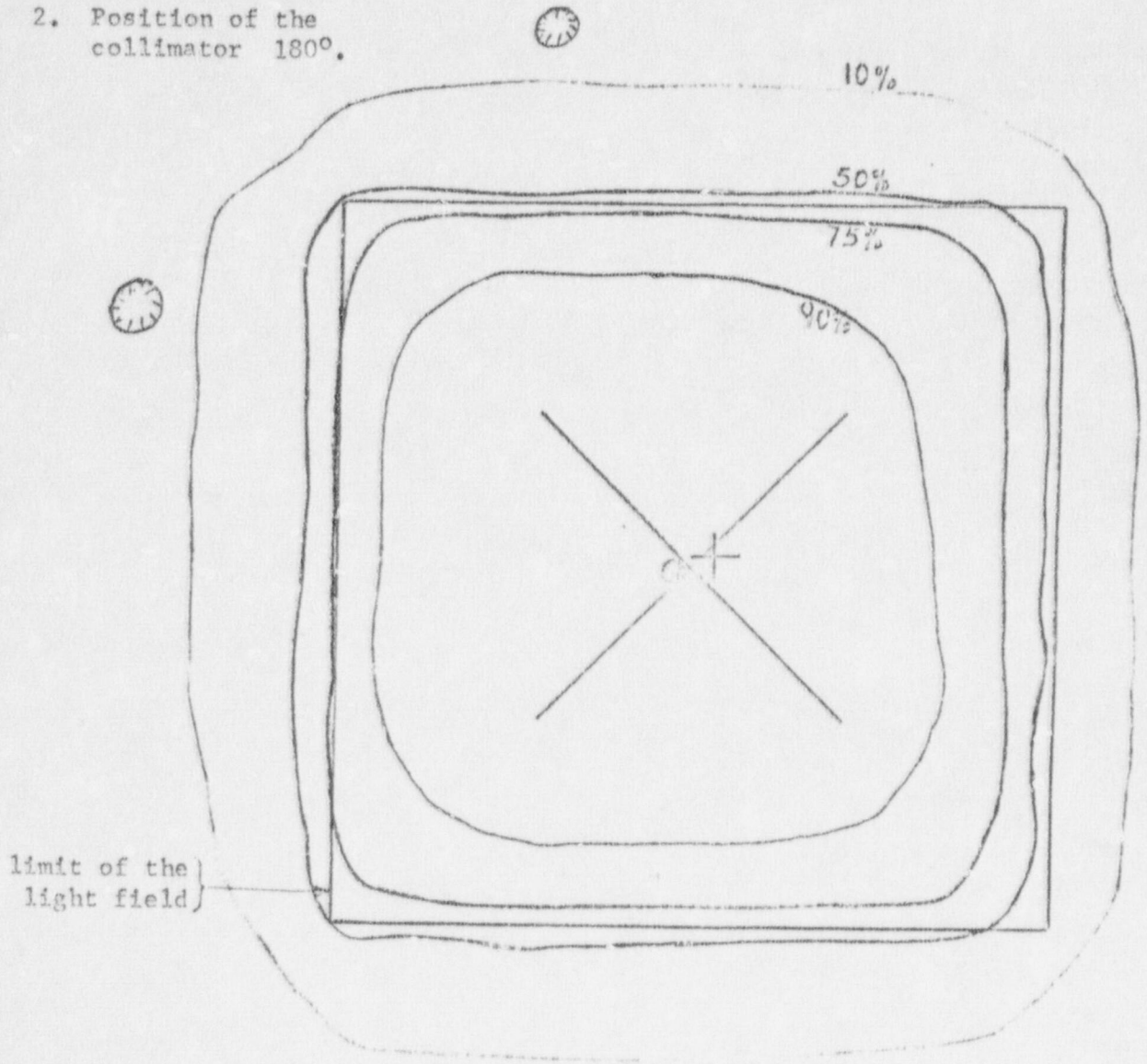
Southeast Missouri Hospital
Cape Girardeau, Mo.

24 June, 1970

Picker ^{60}Co Teletherapy Unit
SSD 70 cm. (film at 70.3 cm. with build-up)
Field size: 10 x 10 cm. (measured)

HOIST ↑

2. Position of the collimator 180°.



cross mark (light)

collimator control

o center of gamma field

+ center of light field

A.M./M.D.

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The University of Texas System Cancer Center
M. D. Anderson Hospital and Tumor Institute
Texas Medical Center • 6723 Bertner Avenue • Houston, Texas 77030

March 14, 1985

Mr. Andrzej J. Demidecki
CRP Coordination Program
6900 Wisconsin Avenue
Chevy Chase, MD 20815

Dear Andrzej,

The participants of the 1985 Intercomparison Meeting wish to express our gratitude for your large contribution to the success of the CRP program. You provided an accountability and discipline which we greatly needed. You did this in such a persuasive and professional manner that we did not realize that we were being disciplined. We also appreciated your comments and advice on many problems and questions.

We wish you continued success and the best in your personal life. We look forward to seeing you at meetings.

With best regards,

Larry DeWerd
Thomas Kwiatkowski
Jiri Zeman
Harvey Cassou
Devaah K. Novack* (Devaah Novack)
John Burton
Marilyn Stovall
B. F. Sholek* (Bob Sholek)

* = certified by American Board of Radiology in Radiological Physics

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1836-1986