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PEOPLE WHO CARE

THE RADIATION ONCOLOGY CENTER FOR NORTHERN ILLINOIS

Associate Radiation Oncologists Thornton C. Kline, Jr., M.D., Chairman • Prakash J. Pedapati, M.D.

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School of Radiotherapy Technology Carol G. Lunn, R.T.T., Director

May 8, 1985

William J. Adam, Ph.D.
Materials Licensing Section
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Teletherapy License No. 12-01610-02
Control No. 78652

Dear Dr. Adam:

In your letter of May 3, 1985 you have asked for additional information in regards to my survey report of April 1, 1985. I will answer the questions in the same order as indicated in your letter.

1a.

- I. Keithley Model 36150 Ion Chamber survey meter serial No. 19443. This instrument was used to do all radiation protection survey's of the Co-60 Teletherapy room.
- II. Ludlum Model 2600 spectrometer for nuclear counting with energy discrimination. Na I (Tl) well type scintillating crystal and photomultiplier surrounded with 2" lead shield. The instrument is used for wipe testing the Co-60 unit for detection of leakage activity.

b.

- I. The Keithley Model 36150 survey meter was last calibrated on 9/25/84.
- II. Ludlum Model 2600 spectrometer was last calibrated on 3/1/85.

c.

- I. University of Wisconsin Radiation Calibration Service.
- II. Medical Physicist at the Radiation Oncology Center.

d.

- I. A copy of calibration attached for details.

SwedishAmerican Hospital
1400 Charles Street
Rockford, Illinois 61108-1257
815/968-4400 Ext. 4850

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REG3 LIC30
12-01610-02 PDR

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MAY 10 1985

REGION III

MAY 10 1985

II. A copy of calibration attached for details.

2a.

I. Test on Electrical interlocks on the teletherapy treatment room door: Door was closed and the source was turned ON. The door was opened while the source was ON. The source turned OFF. Door was closed. The source stayed OFF. The ON switch on the control console had to be pushed again to turn the source ON.

II. Room door open. Pushing the source ON switch does not turn ON the source.

b. Electrical and Mechanical 'ON-OFF' indicators at source housing and at the teletherapy unit control console were checked in the following manner.

I. Focus camera on the mechanical indicator on the source head. Green band indicates source OFF and red band indicates source ON. When green shows up the control console showed source OFF condition. The radiation alarm was indicating no radiation and the green light on the source head glowed. When the source was turned ON the red band on the source head moved in the source indicator position. The red light on the source head lighted up and the green light turned off. The radiation alarm started flashing showing radiation was present. The red light on the control console turned ON.

c. An electrical switch in the stationary gantry was provided to turn off the swing motion of the gantry. This is desirable to limit the beam direction in the plane perpendicular to the axis of rotation and passing through the isocenter. The swing motion of the head is disabled when this switch is turned off. The switch is turned on only during repairs requiring swing motion or for minute adjustments of collimator axis by physicist.

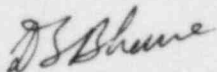
The swivel and rotational motions of head are fully operational because they restrict the beam direction in the plane described above.

d. Teletherapy treatment timing device.

Timer was set to 30 sec. Source turned ON. Red light indicating ON position turned ON and timer started. When timer reached zero time the red light turned OFF and green light indicating source OFF condition came ON. With timer still at zero pushing the ON switch does not turn the source ON.

I hope this additional information answers all your questions, however if you have any further questions please let me know.

Yours Sincerely,



D.G. Bhawe, Ph.D.

DGB:jm

UW DOSIMETRY CALIBRATION LABORATORYDEPARTMENT OF MEDICAL PHYSICSUNIVERSITY OF WISCONSIN

1530 Medical Sciences Center
1300 University Avenue
Madison, WI 53706
(608) 262-0378

CERTIFICATE OF INSTRUMENT CALIBRATION
for
EXPOSURE RATE METER

Customer:	Instrument mfr. : Keithley
D.G. Bhawe, Ph.D.	Type : Ionization chamber
Swedish American Hospital	Model No. : 36150
1400 Charles Street	Serial No. : 19443
Rockford, IL 61108-1257	

Calibration source: Radiation Nuclide : Cs-137
Activity : 1.3/130 Ci
Calibration Accuracy : +/- 10%

Scale	Exposure rate (R/hr)	Instrument reading (R/hr)	Correction factor	Exposure rate (R/hr)	Instrument reading (R/hr)	Correction factor
0-20R/hr	16.0	15.66	1.02	10.0	10.40	0.96
0-20R/hr	4.0	4.09	0.98			
0-2R/hr	1.6	1.625	0.98	1.0	1.03	0.97
0-2R/hr	0.4	0.383	1.04			
0-0.2R/hr	0.16	0.1515	1.06	0.10	0.0981	1.02
0-0.2R/hr	0.04	0.04	1.00			

Comments : The Correction Factor is a multiplicative correction factor, uncorrected for temperature and pressure. The temperature was 17.7 Centigrade and the pressure was 739.2mm at time of calibration. The above Correction Factors can be stated relative to 22° Centigrade and 760mm pressure by dividing them by approximately 1.02. The buildup cap was used.

Data Book: UW ADCL 2Pages: 64Calibration Date: September 25, 1984Report Date: September 26, 1984Calibrated by : S.J. Goetsch S.J. Goetsch, Ph.D.

September 26, 1984

D.B. Bhawe, Ph.D.
Swedish American Hospital
1400 Charles Street
Rockford, IL 61108-1257

Dear Dr. Bhawe:

Enclosed is the calibration report on your Keithley 36150 ion chamber survey meter. Our protocol, as approved by the U.S. Nuclear Regulatory Commission, does not include correction for temperature and pressure, but the Correction Factors cited in the report may be divided by 1.020 to correct them to 22°C and 760mm. I did not change the calibration of the instrument. We will adjust a survey meter to read correctly at the midpoint of each scale if the calibration pot is externally accessible. Inspection of this instrument disclosed that it is extremely difficult to achieve access to the adjustment pots. Repeated disassembly of the unit to achieve correct reading is impractical.

If you have any questions regarding this calibration please call me.

Sincerely,



Steve Goetsch
Chief Physicist
UW Accredited Dosimetry Calibration
Laboratory

SWEDISHAMERICAN HOSPITAL
RADIATION ONCOLOGY CENTER FOR NORTHERN ILLINOIS

DATE: 3-1-85 Radioisotope Leak Test of Sealed Sources

DEPARTMENT: Radiation oncology
 RADIONUCLIDE: Co-60
 MANUFACTURER: GE MODEL NO. _____ SERIAL NO. GET-15-71
 ACTIVITY: 6148 Ci DATE: 3-1-85
 ACTIVITY TODAY: 6148 Ci
 WHERE USED? Teletherapy Source
 PHYSICIST COLLECTING LEAK TEST SAMPLE: Hani Sargely
 DATE OF SAMPLE COLLECTION: 3-1-85

GAMMA SPECTROMETER CALIBRATION

STANDARD SOURCE RADIONUCLIDE:
 MANUFACTURER New England Nuclear MODEL NO. NES-1425 SERIAL NO. _____
 ACTIVITY: .146 MCi DATE: 9-23-75
 ACTIVITY TODAY: 0.042 MCi Half life = 5.26 yrs.
 PRINCIPAL GAMMA RAY ENERGIES Kev (1170 %) Kev (100 %)
 Kev (1330 %) Kev (100 %)
 HIGH VOLTAGE SETTINGS: 353 KV ENERGY MULTIPLIER: 30 WINDOW: 30 Kev
 DIAL: 353 $30 \div 3 = 10$

Baseline calibration Kev/divn = 3 0.5 min counts

Baseline (Kev)	Counts	Baseline (Kev)	Counts	Baseline (Kev)	Counts
250	327	330	247	410	307
260	315	340	235	420	275
270	352	350	210	430	355
280	438	360	239	440	434
290	324	370	FWHM 275	450	318
300	318	380	478	454	286
310	307	390	569	460	206
320	277		471	470	123

SAMPLE COUNTING

Settings

THRESHOLD SETTING: (370)(3) Kev 370WINDOW SETTING: (84)(3) Kev 84BACKGROUND COUNT FOR 10 MIN: 105STANDARD SOURCE COUNT PER MIN: 6759

Empty test tubes are first counted with Q-tips soaked in alcohol. This is background count. The sources are then wiped with these Q-tips and put back in the same test tubes (properly numbered) and the wipes counted again.

TEST TUBE NO.	BACKGROUND CTS/10min	I.D. NOS. OF SOURCES WIPED	CTS/10 min AFTER WIPES
1	105	Cobalt machine head	86

CALCULATIONS

- I. Standard Source Count per 10 min per microcurie (s) = 1.609×10^6
- II. Background counts per 10 min (B) = 105
- III. Counts per 10 min after wipe (C) = 86

$$3\sigma \text{ sensitivity} = 3\sqrt{B+C}$$

$$3\sqrt{105+86} = 41.5$$

$$A = \text{Detectable activity (upper limit)} = \frac{3\sqrt{B+C}}{s} \text{ microcuries}$$

Tube = 1 A = $\frac{41.5}{1.699 \times 10^6} = .000026 \text{ } \mu\text{Ci}$

Tube = 2 A =

Tube = 3 A =

Tube = 4 A =

Tube = 5 A =

Tube = 7 A =

Tube = 8 A =

Reviewed
D. S. Shave, Ph.D.
3-2-85