

MATERIALS LICENSE

Amendment No. 01

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

Licensee		In accordance with the letter dated February 7, 1997, 3. License Number 29-07470-04 is amended in its entirety to read as follows:	
1. Pascack Valley Hospital			
2. Old Hook Road Westwood, New Jersey 07675-3181		4. Expiration Date January 31, 2000	
		5. Docket or Reference No. 030-33611	
6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License	
A. Cobalt 60	A. Teletherapy sealed sources (Neutron Products, Inc. Model NPTT Series)	A. Not to exceed 10,000 curies per source and 20,000 curies total	
B. Uranium depleted in isotope U-235	B. Metal	B. 999 kilograms	
9. Authorized use			
A. One source for medical use described in 10 CFR 35.600, in a Theratronics Theratron T-780 teletherapy unit. One source in its shipping container or as necessary for replacement of the source in the teletherapy unit.			
B. Shielding in a teletherapy unit.			

CONDITIONS

10. A. Licensed material may be used only at the licensee's facilities located at Pascack Valley Hospital, Room 118, Old Hook Road, Westwood, New Jersey.
- B. The licensee may not possess and use materials authorized in Items 6, 7, and 8, until: (1) the licensee has constructed the facilities and obtained the equipment described in the application and supporting documentation; and (2) the U.S. Nuclear Regulatory Commission, Region I, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406 has been notified in writing that activities authorized by the license will be initiated.
- In accordance with the requirements set forth in 10 CFR 30.36(b), 40.42(b), and 70.38(b), the licensee shall promptly notify the Nuclear Regulatory Commission, in writing, of a decision not to complete the facility, acquire equipment, or possess and use authorized material.
11. The radiation Safety Officer for this license is Stephen Z. Kaufman, M.D.
12. The Teletherapy Physicist for this license is Jack J. Merkin, M.S.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number 29-07470-04

Docket or Reference Number 030-33611

Amendment No. 01

13. Licensed material listed in Item 6 above is only authorized for use by, or under the supervision of, the following individuals for the materials and uses indicated:

Authorized UsersMaterial and Use

Frank Gingerelli, M.D.	35.600; Depleted Uranium
Stephen Z. Kaufman, M.D.	35.600; Depleted Uranium
Daniel S. Cukier, M.D.	35.600; Depleted Uranium
Leonard S. Rosen, M.D.	35.600; Depleted Uranium

14. The licensee is exempted from decommissioning financial assurance requirements for possession of licensed material in sealed sources in quantities greater than the limits in 10 CFR 30.35(d) for the purpose of source changes only. This exemption is granted for no more than 30 days for any one source change.
15. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
16. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below, except for minor changes in the medical use radiation safety procedures as provided in 10 CFR 35.31. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated July 7, 1994
B. Letter dated November 9, 1994
C. Letter dated December 20, 1994
D. Letter dated February 7, 1997

MAR - 7 1997

Date _____

For the U.S. Nuclear Regulatory Commission

Original Signed By:

Michelle Beardsley

By _____

Nuclear Materials Safety Branch
Region I

King of Prussia, Pennsylvania 19406

MAR - 7 1997

Louis R. Ycre, Jr.
President and Chief Executive Officer
Pascack Valley Hospital
Old Hook Road
Westwood, NJ 07675-3181

Dear Mr. Ycre:

This refers to your license amendment request. Enclosed with this letter is the amended license. Please note that as part of this amendment, in accordance with 10 CFR 30.36, effective February 15, 1996, the expiration date of your license has been extended by a period of five years. Your new expiration date is stated in Item 4 of the license.

Please review the enclosed document carefully and be sure that you understand and fully implement all the conditions incorporated into the amended license. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region I Office, Licensing Assistance Team, (610) 337-5093 or 5239, so that we can provide appropriate corrections and answers.

Thank you for your cooperation.

Sincerely,

Original Signed By:
Michelle Beardsley

Michelle R. Beardsley
Division of Nuclear Materials Safety

License No. 29-07470-04
Docket No. 030-33611
Control No. 124259

Enclosure:
Amendment No. 01

DOCUMENT NAME: R:\WPS\MLTR\L2907470.04

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	<input checked="" type="checkbox"/> N	DNMS/RI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAME	Beardsley	<i>WB</i>					
DATE	02/19/97		02/ /97	02/ /97	02/ /97	02/ /97	

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**Pascack
Valley
Hospital**

Donald M. Genaro
Chairman, Board of Directors

Louis R. Ycre, Jr., CHE
President & CEO

030-33611

February 7, 1997

United States Nuclear Regulatory Commission
Region 1
Medical Licensing Section
Division of Radiation Safety and Safeguards
475 Allendale Road
King of Prussia, PA 19406-1415

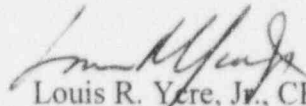
Re: License Number 29-07470-04
Radiation Survey for teletherapy
Initial Source installation

Dear Sir or Madam:

Enclosed please find our initial Radiation Survey and the output from the source for our new Cobalt teletherapy installation required by part 35.641 of the NRC rules and regulations.

Should you require any further information please do not hesitate to contact me.

Very truly yours,


Louis R. Ycre, Jr., CHE
President & CEO

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ML 10

1 2 4 2 5 9

Old Hook Road, Westwood, New Jersey 07675-3181 (201) 358-3000

FEB 12 1997

Affiliated with New York Medical College

PASCACK VALLEY HOSPITAL
RADIATION PROTECTION SURVEY
AECL/THERATRONS THERATRON T-780

JANUARY 17, 1997
to
JANUARY 21, 1997

Radiation Safety Survey
Pascack Valley Hospital
Department of Radiation Oncology
Old Hook Road
Westwood, New Jersey 07675

AECL/Theratron Theratron T-780
Serial # 323

Source Manufacturer:	Neutron Products, Inc
Model Number:	NPI-20-6000W
Serial Number:	T-1368
Source Installation Completed:	January 14, 1997
Curie Content at Installation:	4786 Curies
Date of Survey:	January 17, 1997 to January 21, 1997

I. Beam Output Calibration

The exposure rate was measured on January 17, 1997 for the range of field sizes and for the range of distances used in treatment, in compliance with 10CFR 35.632. A copy of the source calibration is appended. A Keithley Instruments Model 35040 Advanced Therapy Dosimeter and a Capintec Model PR-06C Farmer type ionization chamber was used for the calibration. The dosimeter was last calibrated at the University of Wisconsin - Madison on September 27, 1995, and the chamber on September 28, 1996.

The intensity of the primary beam was measured to be 5181 RHM in air for the maximum field size of 50x50 cm at one meter.

II. Teletherapy Head Survey - Beam "off"

The head survey was made with the source in the beam "off" position at 1 meter from the source. A Victoreen Survey Meter model 471A, Serial Number 319, was used to perform this survey. Please see attached calibration certificate specifying calibration method and date. Figure 1 specifies the maximum and average radiation levels surrounding the head. The head is in compliance with 10CFR35.641(a), since the average exposure rate at 1 meter does not exceed 2.0 mR/hr., and the maximum exposure rate at 1 meter does not exceed 10.0 mR/hr.

III. Limits of Beam Orientation

The headlock has been enabled so that the head can only be directed towards isocenter. This limits the operation of the unit to a full 360° rotational capability with the primary beam directed towards isocenter. The primary barriers are A, G, I, and J, as illustrated on the floor plan. The headlock can not be disabled.

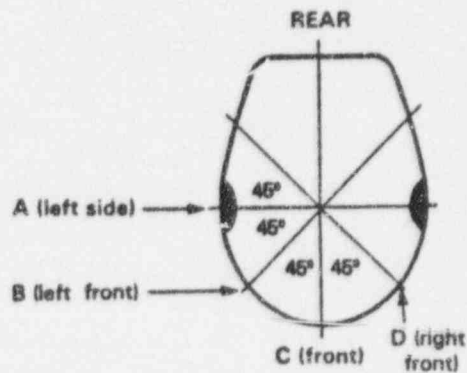
The functioning of stops and interlocks in each mode was tested with the results specified in Section VI.

Figure F-1 TELETHERAPY HEAD SURVEY

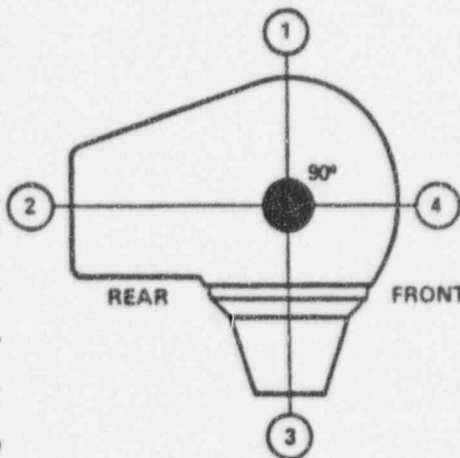
(Source in "OFF" position.
Measurements taken one meter
from source)

Top View-Showing
orientation
of Views A through D

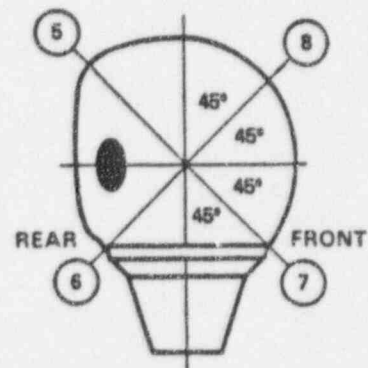
Position No.	Radiation Level (mR/hr)
View A	
1	0.4
2	0.3
3	0.7
4	1.2
View B	
5	0.2
6	1.6
7	0.1
8	0.1
View C	
9	0.4
10	0.4
View D	
11	0.1
12	0.2
13	1.5
14	0.3
Average value	0.54
Maximum value	1.6



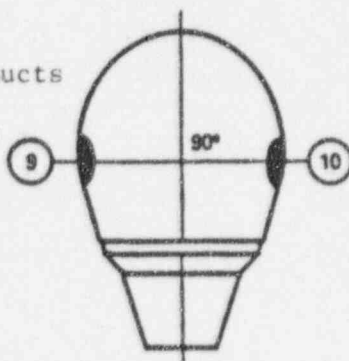
View A-Vertical
from left side



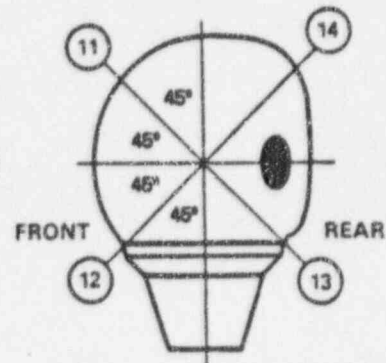
View B-Vertical
from left front



View C-Vertical
from front



View D-Vertical
from right front



Date of survey 1/17/97

Instrument used Victoreen 471A

Manufacturer's name & model number Neutron Products
of teletherapy source NPTT-Series
NPI 20 6000W

Date of installation 1/14/97

OUTPUT 4960 ☒ RHM
☐ RMM

Date of output measurement 1/17/97

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IV. Room Protection Survey

The room protection survey was made with the Victoreen model 471A survey meter described in Part II. The beam was directed against a 25cm x 25cm x 25cm polystyrene phantom with a 20cm x 20cm field size at 80cm SAD. Refer to attached floor plan illustration.

The room is located on the ground floor. The floor is located on a concrete slab with earth below.

All barriers were surveyed in the treatment mode specified in Section III. In the rotational mode, each barrier was surveyed at 30° increments of the gantry angle.

Figure II illustrates the gantry angle with respect to the room. For example, when the gantry is set on 0° the beam is directed towards the floor, when the gantry is set on 90° the beam is directed towards the wall with the operators console, A primary.

Table I specifies the maximum readings and corresponding orientation of the beam. The exposure rates were measured one foot from the barrier.

In order for the room to comply with 10CFR20.1301, the dose in any hour shall not exceed 2mR, and the dose in one year shall not exceed 100mR. NCRP report Number 33 recommends that permissible dose (corrected for occupancy and use factors) should be less than 100mR/week in restricted areas and 10mR/week in non-restricted areas.

The weekly and hourly exposure rates were calculated with the following assumptions:

Beam "on" time:

$$\frac{300 \text{ cGy}}{130.3 \text{ cGy/min.}} = 2.30 \text{ min. per patient}$$

$$30 \text{ patients/day} \times 5 \text{ days/week} \times 2.30 \text{ min./patient} = 345 \text{ min/week}$$

$$5 \text{ patients/hour} \times 2.30 \text{ min./patient} = 11.5 \text{ min/hour}$$

$$\text{mR/week} = \text{mR/hr} \times 1 \text{ hr/60min.} \times 345 \text{ min./week} \times \text{Use factor} \times \text{Occupancy factor}$$

$$\text{mR/year} = \text{mR/week} \times 50 \text{ weeks/year}$$

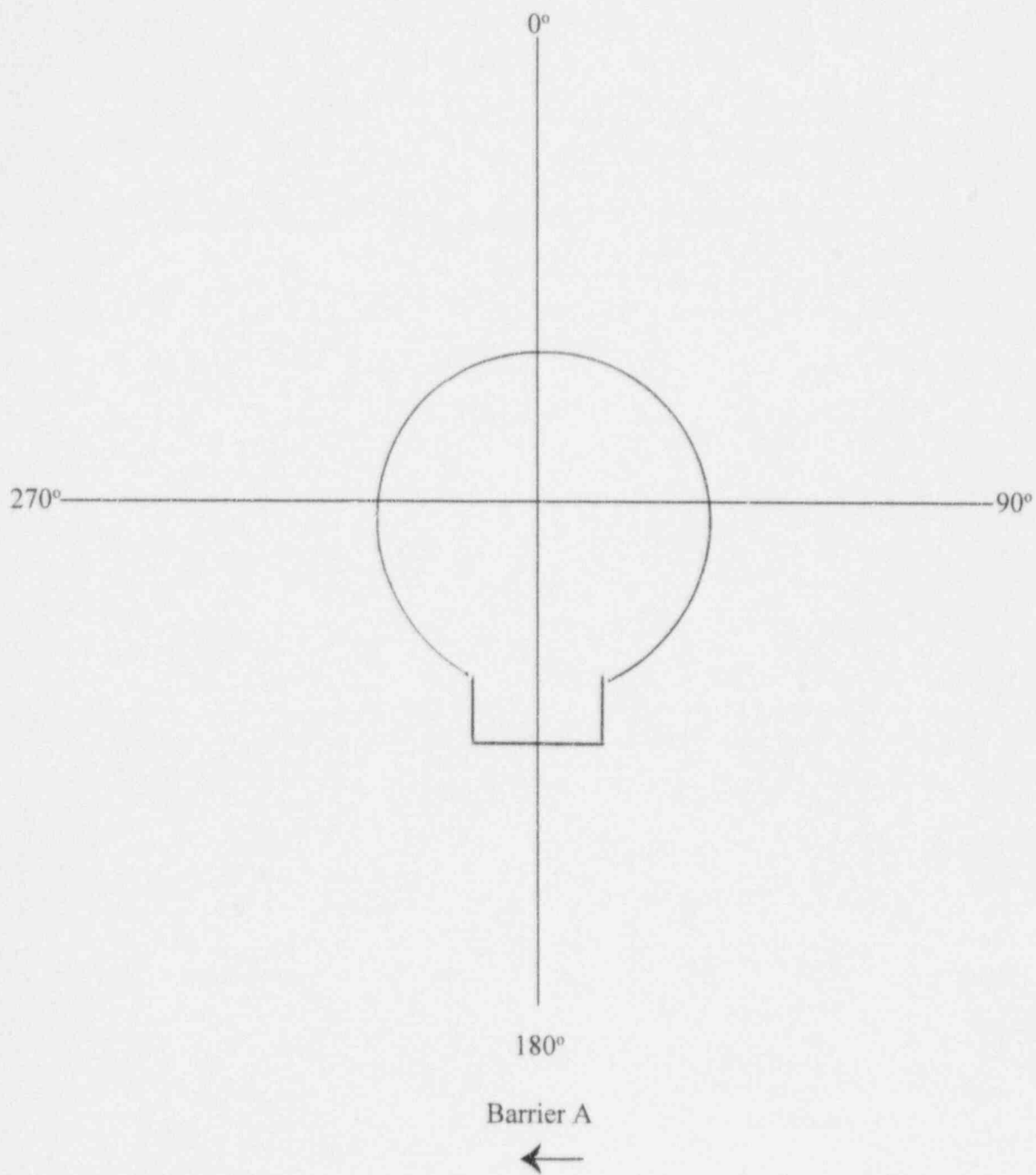
$$\text{mR in any hour} = \text{mR/hr} \times 1 \text{ hr./60 min.} \times 11.5 \text{ min/hour} \times \text{Use factor}$$

$$\text{mR/hr} = \text{maximum exposure rates from Table 1}$$

Table II presents weekly and hourly exposure rates. All area surrounding the treatment room had exposure levels in compliance with 10CFR20.1301 and NCRP Report No. 33.

FIGURE II

Beam Interlocks Diagram



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Table 1

Maximum Exposure Rates

<u>Location</u>	<u>Description</u>	<u>Area</u>	<u>Beam Orientation</u>	<u>mR/hr.</u>
A	Control Primary	Non-restricted	*	<0.05
B	Control Secondary	Non-restricted	*	<0.05
C	Door	Non-restricted	270°	0.1
D	Dressing Rooms	Non-restricted	*	<0.05
E	Bathroom	Non-restricted	*	<0.05
F	Linac Maze	Restricted	*	<0.05
G	Outside Primary	Non-restricted	270°	0.1
H	Outside Secondary	Non-restricted	270°	0.15
I	Roof Primary	Non-restricted	180°	0.1
J	Roof Secondary	Non-restricted	180°	0.1

* No detectable reading in any orientation

The maximum exposure rates were observed in the 360° rotational mode.

Note: Room is located on the ground floor with earth below, therefore, occupancy is not possible directly beneath the room.

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Table II

Weekly and Hourly Exposure Rates - Calculations

Location	Occupancy Factor	Use Factor	mR/week	Maximum mR/week*	mR in any hour*	mR/year
A	1	1	<0.3	<0.3	<0.1	<1.5
B	1	1	<0.3	<0.3	<0.1	<1.5
C	1	1	0.6	0.6	<0.1	28.8
D	1	1	<0.3	<0.3	<0.1	<1.5
E	1	1	<0.3	<0.3	<0.1	<1.5
F	1	1	<0.3	<0.3	<0.1	<1.5
G	1	1/4	0.14	0.14	<0.1	7.2
H	1	1	0.86	0.86	<0.1	43.1
I	1	1/4	0.14	0.14	<0.1	7.2
J	1	1	0.6	0.6	<0.1	28.8

* Occupancy and use factors of unity are assumed in compliance with 20.1302 (b).

Workload: 345 min./week, 11.5 min./hour

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Description of Locations

Locations A and B (Control Area)

These areas are always attended when the beam is "on" which will prevent unauthorized occupancy.

Location C (Door)

This area is always attended when the beam is "on" which will prevent unauthorized occupancy.

Location D (Dressing rooms)

This area is an area for patients to change before treatments.

Location E (Bathroom)

This area is a handicapped accessible bathroom for patients.

Location F (Linac Maze)

This area is the entrance way to the Linear Accelerator.

Location G (Outside Primary)

This area is outside the building. This is a primary barrier. It is estimated that the beam orientation producing the maximum dose at this location will occur for one quarter of the operating time of the unit ($U=1/4$).

Location H (Outside Secondary)

This area is outside the building. This is a secondary barrier.

Location I (Ceiling Primary - roof)

This area is above the treatment unit. This is a primary barrier. It is estimated that the beam orientation producing the maximum dose at this location will occur for one quarter of the operating time of the unit ($U=1/4$).

Location J (Ceiling Secondary - roof)

This area is above the treatment unit. This is a secondary barrier.

Reference: Report of Committee III on Protection against X-rays up to Energies of 3 Mev and Beta and Gamma rays from Sealed Sources, ICRP publ. 3 (New York: Pergamon Press, Inc., 1960)

PASCACK VALLEY HOSPITAL

V. Timer Accuracy

The timer on the control panel of the teletherapy unit in the control area was tested against a calibrated stop watch and found to be accurate within three tenths of a second for a trial of 60 seconds.

VI. Electrical and Mechanical Interlocks

The door to the teletherapy room was opened slightly when the machine was operating in the beam "on" mode and the interlock was found to be operational in that the source immediately moved to the "off" position. The emergency stop button on the control panel was also activated in the beam "on" mode and the source returned to the beam "off" position. In both cases, when the door was opened or the emergency stop button activated, the unit would not operate in the beam "on" position unless the control panel was reset. At the end of a preset time the source also returned to the beam "off" position.

The head lock button on the teletherapy unit was tested and could not be deactivated thus restricting the operation of the unit to only those orientations specified in Section III.

In each of the above tests the "on-off" status of the source was confirmed employing the "Primalert" room monitor described in Section VIII.

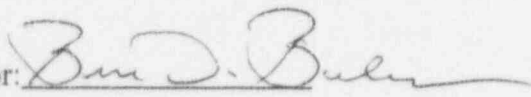
VII. Warning Signs, Indicator Lights, & NRC Posting Requirements

Beam "on-off" indicator lights on the control panel, in the treatment room, and by the treatment room door function in both beam "on" and beam "off" modes. Appropriate warning signs are posted on the treatment room door, NRC-3 and emergency instructions with phone numbers to reach Radiation Oncologists, physicists, and service personnel are posted as well. Also, posted is information where the NRC license and regulations are kept.

In each of the above tests the "on-off" status of the source was confirmed employing the "Primalert" room monitor described in Section VIII.

VIII. Radiation Monitor

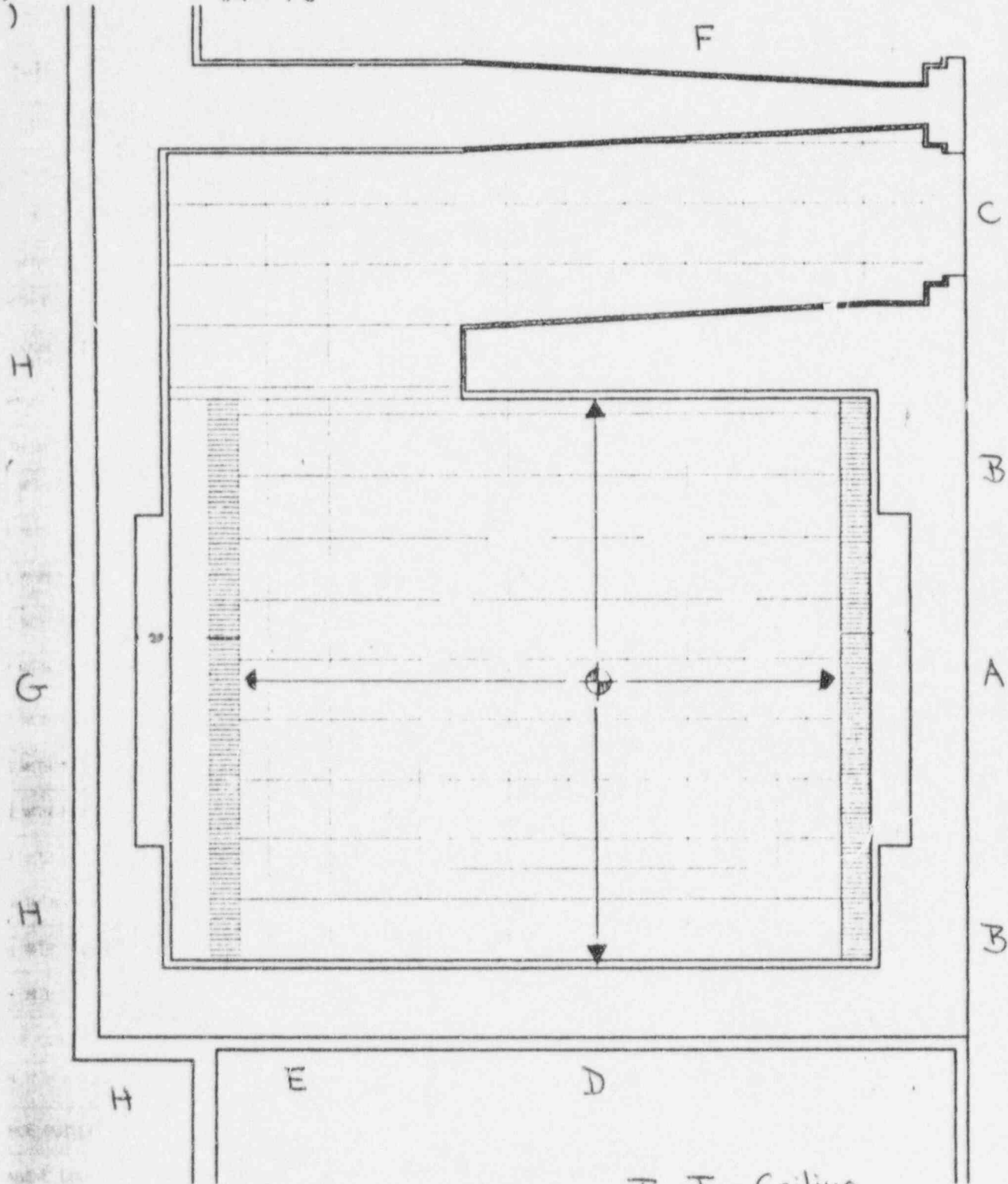
A Nuclear Associates Model 05-433 "Primalert 10" radiation monitor with a Model 05-441 "Primapak II" battery back-up unit is installed within the teletherapy room which can be viewed before entering the treatment room. The monitor was operating properly at the time of the survey, in that it indicated when the source was in the beam "on" position.

Surveyor: 

Bruce D. Bucher
Radiological Physicist
Bio-Med Associates, Inc.
4 Main Street
Flemington, New Jersey 08822

Floor Plan

1/4" = 1'-0"



I, J - Ceiling

Reflected Ceiling Plan

PASCACK VALLEY HOSPITAL

Co-60 Outputs cGy/min. in water
Month of : January 1997

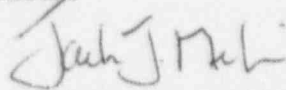
80 cm SAD

80 cm SSD*

4 x 4	117.8	118.0
5 x 5	119.6	120.2
6 x 6	120.5	121.5
7 x 7	121.5	123.0
8 x 8	122.5	124.5
9 x 9	123.1	125.6
10 x 10	124.0	126.9
11 x 11	124.7	128.1
12 x 12	125.5	129.3
13 x 13	126.2	130.4
14 x 14	127.2	131.8
15 x 15	127.7	132.7
16 x 16	128.2	133.6
17 x 17	128.7	134.4
18 x 18	129.3	135.3
19 x 19	129.8	136.0
20 x 20	130.3	136.8
21 x 21	130.6	137.3
22 x 22	130.8	137.8
23 x 23	130.9	138.2
24 x 24	131.2	138.8
25 x 25	131.4	139.3
30 x 30	131.7	140.4
35 x 35	131.7	141.0

Output = 123.99 cGy/min. at 80cm SAD on 1/15/97

* SSD Values include Backscatter factor



Jack J. Merkin, MS
Radiological Physicist

15698

Date: 10-7-96

BIO MED ASSOCIATES, INC.

4 MAIN STREET FLEMINGTON, NEW JERSEY 08822

908-788-9440

CERTIFICATE OF CALIBRATION

The instrument described below has been calibrated in accordance to BIO MED calibration procedures. All radioactive source calibrations are traceable by documented measurements with instruments calibrated by the National Bureau of Standards.

Owner: PASCACK VALLEY HOSPITAL
 Department: RADIATION ONCOLOGY
 Address: OLD HOOK RD. WESTWOOD, NJ 07675
 Instrument Description: RADIATION MEASUREMENT SURVEY INST.
 Manufacturer: VICTOREEN Model: 471A Serial No: 319

Type of Calibration: ☒ Cs-137 165 mCi on Aug. 10, 1983 ☐ Electronic ☐ Other
 Calibration geometry: ☐ Detector parallel to beam ☒ Detector perpendicular to beam ☐ Other
 Window: ☐ Open ☒ Closed ☐ Fixed
 Battery check operational: ☒ Yes ☐ No ☐ Not Applicable

Before Adjustment:

	Scale	mR/hr.	Reading	Ratio	mR/hr.	Reading	Ratio	Correction Factor
1.	1000	800	800	1.0	200	200	1.0	—
2.	300	240	240	1.0	60	60	1.0	—
3.	100	80	80	1.0	20	20	1.0	—
4.	30	24	24	1.0	6	6	1.0	—
5.	10	8	8	1.0	2	2	1.0	—
After Adjustment:	3	2.4	2.8	1.17	0.6	0.77	1.28	.82

No Adjustment Made: ☒

	Scale	mR/hr.	Reading	Ratio	mR/hr.	Reading	Ratio	Correction Factor
1.								
2.								
3.								
4.								
5.								

Check source reading: 1.0 mR/hr ☐ Not Applicable

Results: ☐ Calibration Acceptable (All correction factors less than 10%)
☒ Calibration Conditional (All correction factors less than 20%)
 Correction factors are listed on calibration sticker
☐ Calibration Rejected (Any correction factor greater than 20%)
 Service or replacement recommended

Comments:

Certified by:

Ron Halzger

January 21, 1997

PASCACK VALLEY HOSPITAL

RHM Dose Rate Determination in Air

Instrumentation:

Keithley Model 35040 Electrometer, Serial No. 68393

Calibration Factor (Kq) = 1.000 (September 27, 1995)

Capintec Model PRO6C ionization chamber, with build-up cap, Serial No. SN0.68912

Calibration Factor (Nx) = 4.821 R/10-9 C (September 28, 1995)

Temperature : 21.2 degrees centigrade

Pressure : 770.6 mm Hg

Correction Factor (Q) = 0.984

Calculations:

$$R/\text{min.} = I \times Kq \times Nx \times Q \times Aeq$$

where: I = timmer error corrected reading

$$Aeq = 0.989$$

January 21, 1997

FASCACK VALLEY HOSPITAL

Timmer Error

1 min. exposure (x 10-9 C):

1. 18.230
2. 18.223
3. 18.232

$$I1 = \text{Mean} = 18.23$$

1/2 min. exposure x 2 (x 10-9 C):

1. 18.926
2. 18.044
3. 18.058

$$I2 = \text{Mean} = 18.04$$

$$I = \text{Timmer error corrected readings} = 2I1 - I2 = 18.41$$

$$\text{Timmer error} = [(I1 - I2)/I] \times 60 \text{ seconds/minute} = 0.60497 \text{ seconds}$$

Measured Data

Field Size = 35.5cm x 35.4cm at 80cm, SDD = 45cm

Distance(cm)	1	2	3	Mean	Time Corrected	R/Min.	RHM
100 SAD	18.230	18.223	18.232	18.228	18.41	86.35	5181

Note: All reading in 10-9C

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 02300
STATUS CODE: 0
FEE CATEGORY: 7A 28
EXP. DATE: 20050131
FEE COMMENTS: -----
DECDM FIN ASSUR REQD: N
.....

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: PASCACK VALLEY HOSPITAL
RECEIVED DATE: 970212
DDCKET NO: 3033611
CONTROL NO.: 124259
LICENSE NO.: 29-07470-04
ACTION TYPE: AMENDMENT

2. FEE ATTACHED
AMOUNT: -----
CHECK NO.: -----

3. COMMENTS

SIGNED M. A. Perkins
DATE 2/12/92

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTAGE IS PAID) **FEE NOT REQUIRED**

1. FEE CATEGORY AND AMOUNT: 7A 28 the survey

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT -----
RENEWAL -----
LICENSE -----

3. OTHER -----

SIGNED -----
DATE -----

RECEIVED BY LFDCB	
Date	<u>2/28/92</u>
By	<u>BB</u>
Date Completed	<u>2/18/92</u>

1997 FEB 25 AM 10:10