OFFICE
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F. X. MASSE ASSOCIATES, INC.
Health Physics Consultants
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MIDDLETON, MASS. 01949

(24 HRS.)
617-283-4888

5/15/85
May 5 I
Brown

April 29,1985

U.S. Nuclear Regulatory Commission
Materials Branch
Division of Materials and Fuel Cycle Facility Licensing
Washington, DC 20555

Gentlemen:

Following is the report on a recent teletherapy source change, in accordance with condition 18 of our license.

1. The facility is housed at St. Elizabeth's Hospital, 736 Cambridge St., Boston, MA 02135. The license number is 20-06579-02.

2. Survey was conducted by F.X. Masse, CHP and Frank Krasin, PhD, of St. Elizabeth's Hospital.

3. The teletherapy facility is an AECL Theratron 80 unit.

4. Source installation was March 29, 1985.

5. Survey was conducted on March 29, 1985 and March 30, 1985.

6. Health physics surveys were conducted with a Keithley model 36150 digital ion chamber survey meter that was calibrated in February, 1985 by F.X. Masse against an NBS certified 50 mg radium source.

7. Source strength at installation was 4030 Curie (see attached report).

8. The measured output in RHM as of 3/30/85 was 71.61 (see attached report).

9. The average and maximum radiation levels at one meter from the source in the "off" position were 1.44 and 3.1. mR/hr respectively (see attached report).

10. The room is designed for beam-stopper use except when the beam is pointed toward the floor. For any gantry settings the unit will operate whenever the beam is pointed perpendicular to the floor and for any head swivel settings within 24 degrees of the perpendicular. (see attached report).

11. The maximum radiation level in area adjacent to the facility is less than 0.1 mR/hr under all operating conditions.

12. Not applicable.

FEE EXEMPT
03774

13. The following confirmatory tests were made:

13. a. Source retracts and gantry motion stops as soon as door is opened. Reclosing door does not cause source to return to "expose" position unless console reset button is again pushed and treatment switch is turned off and back on again. Further, all emergency off switches both inside and outside the room were checked and found to be functioning properly.

13. b. The source "on-off" indicators were visually checked during the above test and found to function properly.

13. c. The teletherapy unit's fixed beam stop functions properly.

13. d. The timer was checked both for accuracy and funtion and found to be operating properly. Timer does not expose source until properly set and retracts source at the prescribed time.

The above described tests and reports should sufficiently describe the new source installation to assure the continued safe operation of this facility. Please don't hesitate to contact the undersigned if further information is required.

Yours truely,

Frank Masse

Frank Masse, CHP

FX/cr

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

Position No.		Radiation Level (mR/hr)
View A	1	1.7
	2	0.7
	3	2.6
	4	3.1
View B	5	1.6
	6	2.0
	7	1.1
	8	0.3
View C	9	1.4
	10	1.5
View D	11	0.4
	12	0.8
	13	1.8
	14	1.2

Average value 1.44

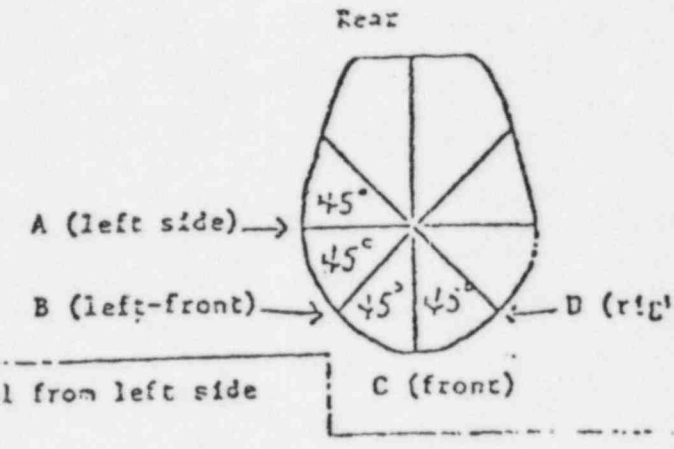
Maximum value 3.1

Instrument used

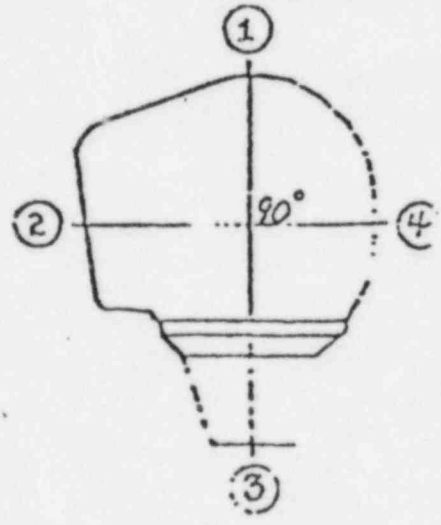
Kiethley Mod 36150
RMI 71.61
Curies 4030
& Date 3/29/85

Manufacturer's name & model # of teletherapy unit AECL Theratron-80

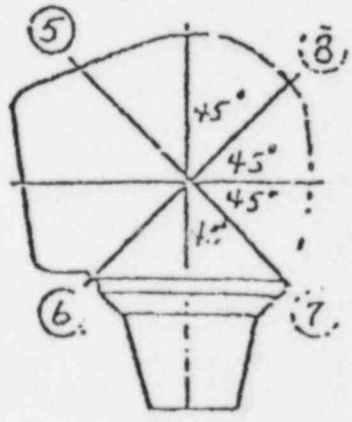
Top View - Showing orientation of Views A through D



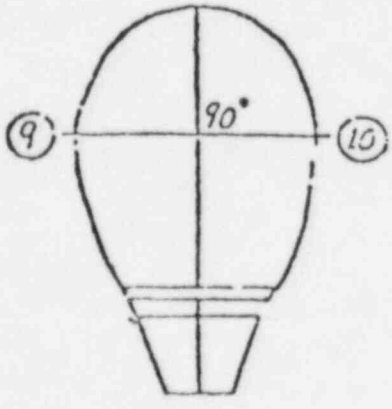
View A - Vertical from left side



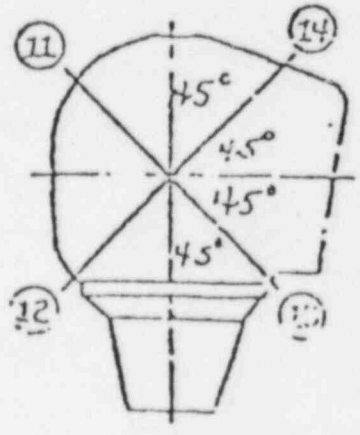
View B - Vertical from left-fro



View C - Vertical from front



View D- Vertical from right-fro



ST. ELIZABETH'S HOSPITAL OF BOSTON
736 Cambridge Street, Boston, Massachusetts 02135 (617) 782-7000

April 1, 1985

The following output measurements were taken by Andrew Wu, Ph.D. and Frank Krasin, Ph.D. on March 30, 1985.

OUTPUT MEASUREMENTS

IN AIR

Field Size:	20cm X 20cm
Source to chamber: distance	80cm
Average reading for 1 minute	18.888nC
Time error	-0.01 min.
Corrected Average Reading:	19.079nC
Chamber calibration Factor:	5.85 R/nC
Temp. & Pressure Correction:	1.0025
Exposure at 80 cm in air per min.	111.89 R
Exposure at 100 cm in air per min.	71.61 R
Exposure at 100 cm in air per hour	4296.6 R

IN WATER PHANTOM

Field size at 80 cm:	10 cm X 10 cm
Source to Surface distance	80 cm
Chamber depth in phantom	5 cm
Avg. Reading for 1 min.	14.366 nC
Chamber calibration factor	5.85 R/nC
f factor (in muscle)	0.943 $\frac{\text{rad}}{\text{R}}$

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IN WATER PHANTOM (Con't)

Timer error	-0.01 min.
Percent Depth Dose	78.5
Temp. & Pressure Correction	1.00082
Reference field (10 X 10) dose rate at 0.5 cm depth at 80 SSD	104.2 rads/min.

Electrometer

Mfgr:	Keithley
Model:	616/6169
SN:	134697/15563

Chamber

Mfgr:	PTW
Model:	N23333
SN:	A009

Water Phantom

L:	32 cm
W:	32 cm
D:	17 cm

Radiation Survey Meter

Mfgr:	Keithley
Model:	36150
SN:	15675

Last Calibration Date: February 1985

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10. LIMITS OF BEAM ORIENTATION

With the gantry set at 0 deg. and the head swivel set at 0 deg. the beam orientation is verticle and pointing directly at the floor. In this orientation the unit will beam on only at head swivel settings clockwise (CW) between 0 deg. to 24 deg. and counterclockwise (CCW) between 0 deg. to 23 deg; with the gantry set at 90 deg. the unit will beam on with the head swivel settings CW from 0 deg. to 4 deg. and CCW from 0 deg. to 3 deg; with the gantry set at 270 deg. the unit will beam on with the head swivel settings CW from 0 deg. to 3 deg. and CCW from 0 deg. to 2 deg; with the gantry at 180 deg. the unit will beam on with the head swivel settings CW from 0 deg. to 3 deg. and CCW from 0 deg. to 4 deg.

For any gantry settings the unit will beam on whenever the beam is pointed perpendicular to the floor and for any head swivel settings within $\pm$ 24 deg. of the perpendicular.

REPORT OF INSPECTION AND SERVICING
("FIVE YEAR INSPECTION" REPORT)

This is to certify that the Atomic Energy of Canada, Ltd. (AECL) teletherapy unit, Model Theratron 80, Serial Number 79 located at St. Elizabeth Hospital of Boston, 736 Cambridge Street, Boston, Massachusetts was inspected and serviced on 3-30-85 by E. F. FINN to assure the proper function of the source exposure mechanism as authorized by Maryland License MD-31-025-03.

Signed E. F. Finn Date 3-30-85

Parts: NEW DETENT PIN AND FRONT RIDER RING

Nonstandard Service:

neutron products inc

lity Address:

Elizabeth Hospital of Boston
Cambridge St.
ton, Massachusetts

Revision Date
July 25, 1983

INSPECTION CHECK LIST

Unit: AECL Th-80 Serial Number: 79

Operation	Prior to Transfer*	Subsequent to Transfer**
1. Determine Operating History	X ✓	
2. Head Movement	X ✓	X ✓
3. Electrical and Mechanical Source Condition-Indicator Check	X ✓	X ✓
4. Manual Source/Shutter Return	X ✓	X ✓
5. Timer	X ✓	X ✓
6. Source Holder/Shutter Movement Check	X ✓	X ✓
7. Pneumatic Activating System	X ✓	X ✓
8. Mercury Shutter System	X NA	X NA
9. Stand and Stretcher		X ✓
10. Protective Source Housing, Beam-Off Leakage (Confirm Measured by Medical Physicist)		X ✓
11. Source-Surface Distance (SSD)		X ✓
12. Beam Orientation	X ✓	X ✓
13. Congruence of Light and Radiation Fields		X ✓
14. Full Calibration (Confirm Performed by Medical Physicist)		X
15. Facility Door Interlock	X ✓	X ✓
16. Teletherapy Units with Moving Source Drawer	X ✓	X ✓
17. Teletherapy Units with Moving Shutter Blocks	X NA	X NA
18. Teletherapy Units with Rotating Shutter	X NA	X NA
19. Indicater Light	X ✓	X ✓
20. Emergency Shutoffs	X ✓	X ✓
21. Collimator	X ✓	X ✓

Note: *Circle all items not meeting attached criteria.
**Circle all items not meeting attached criteria after servicing.

Signed: [signature] Date: 3-30-85

TELETHERAPY SOURCE TRANSFER

This is to certify that a cobalt-60 source:

Model Number: **NPI-20-4500W**
Serial Number: **T-**766
Containing **4030** curies as of **3/29/85**

and which has been determined by helium pressure test and by wipe test to be leak free, has been installed in a teletherapy unit described as follows:

Manufacturer: **AECL**
Model Number: **Theratron 80**
Serial Number: **79**

This source is hereby transferred from Neutron Products' Radioactive Materials License MD-31-025-03 to **St. Elizabeth Hospital of Boston's Radioactive Materials License #20-06579-02.**

This will also certify that a cobalt-60 source described as follows:

Model Number: **NPI-20-4500W**
Serial Number: **T-503**
Containing **2665** curies as of **3/29/85**

has been determined by a wipe test to be leak free and has been removed from the above teletherapy unit and transferred from **St. Elizabeth Hospital of Boston's Radioactive Materials License #20-06579-02** to Neutron Products' License MD-31-025-03.

We have witnessed the inspection and operation of the above teletherapy unit after completion of the installation by Neutron Products, Inc. and have found the unit to be operating properly and safely.

_____ _____
Neutron Products, Inc.

Date _____ Date 3-30-85

neutron products inc

TELETHERAPY SOURCE CERTIFICATION

This certifies that the cobalt-60 source:

Model Number: NPI-20-4500W
Serial Number: T-766
Containing 4030 curies as of 3/29/85

was fabricated by Neutron Products, Inc. in accordance with NPI specification P-4 per Drawing Number A20005 and was leak tested by the helium pressure test and found to be leak free on 3-26-85. The source was wipe tested and the removable activity was .016, and .0008 microcuries from the inner and outer encapsulations, respectively.

Performed by and certified to by:

Jeffrey W. Corum, Manager
Hot Cell Operations

Reviewed and approved by:

Marvin M. Turkanis
Vice President

Date: 3/27/85