Research Medical Center

2316 East Meyer Boulevard
Kansas City, Missouri 64132

816/276-4000

April 25, 1988

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn Illnois 60136

RE: LICENSE 24-17998-01

Gentleman:

Enclosed, please find the license renewal request for the teletherapy source license for Research Medical Center in Kansas City Missouri.

The enclosures provide the necessary information as requested in your renewal information packet.

Please address any correspondence concerning this renewal request to:

Walter J. Kopecky, Ph. D.
Department of Radiation Oncology
Research Medical Center
2316 East Meyer Blvd.
Kansas City Missouri 64132

Sincerely,

Mark Wiener

Mark Wiener, Vice President,
Clinical Services

Enclosures

Log
Remitter
Check No. 37160
Amount 350
Fee Category
Type of Fee
Date Check Rec'd
Date Completed 5/11/88
By:

RENEWAL REQUEST FOR TELETHERAPY LICENSE

Cobalt Teletherapy License #24-17998-01

Research Medical Center
Department of Radiation Oncology
2316 East Meyer Blvd.
Kansas City Missouri 64132

The teletherapy unit is located at the above street address in the Department of Radiation Oncology. The Department of Radiation Oncology is located in the west wing of the main hospital on the A level.

The location of the teletherapy unit is the same as described in previous correspondence with the NRC and from the time of the last renewal of January 28th, 1983.

There have been no changes in the radiation levels other than source decay in the surrounding areas or any changes that would effect patient viewing system.

Electrical and mechanical limit stops of the primary beam of radiation are installed and continue to operate as described in the last survey report submitted to the NRC on December 24th, 1985.

The current authorizations are for Cobalt 60 to be used in teletherapy sealed sources. Currently the source is Neutron products. Model NPI-20-6000W. A maximum source limit of 14000 curies, or two sources of not more than 7000 curies each, is authorized. The Cobalt teletherapy us used for treatment of human neoplastic diseases.

The list of authorized users is complete except for Dr. George C. Cowan whose name needs to be removed since he has retired.

The name of the Radiation Safety Officer for the teletherapy program needs to be changed to Walter J. Kopecky, Ph. D. He is also the teletherapy physicist as per amendment 9 dated 2/26/88. Dr. Kopecky has been named as the assistant radiation safety officer for the Research Medical Center by-product license 24-18625-01 in correspondence to the United Stated Nuclear Regulatory Commission dated November 28th, 1983.

Research Medical Center has adopted the training program described in Appendix D of draft regulatory guide FC414-4.

Research Medical Center has established and agrees to follow the written procedures for personnel monitoring that include as requirement the criteria specified in Items 10.1.2 of Draft regulatory guide FC414-4. The Department of Radiation Oncology at Research Medical Center, as part of its teletherapy program, will have the following radiation detection instruments in its possession or available for use:

1) a portable low range survey meter capable of detecting 0.2 milliroentgen per hr.

2) a beam on radiation monitor permanently mounted in the teletherapy room that is equiped with an emergency power supply separate from the power supply for the teletherapy unit. The beam on monitor will be capable of providing visible indication of an exposed or partially exposed source and the visible indicator must be observable by a person entering the teletherapy room.

3) a dosimetry system for making full calibration and spot check measurements.

4) a multi channel analyzer of sufficient sensitivity to count leak test samples.

5) a high range ionization type instrument capable of reading at least one roentgen per hr.

The calibration of the portable survey instrument will be performed by a commercial firm licensed to perform calibrations for others. It will be calibrated at intervals not to exceed one year or after repair. Records of each calibration will be maintained at least two years after the calibration. These records will show the date and results of the calibration and the name of the organization that provided the service.

There have been no changes in the information previously submitted to the NRC regarding other aspects of the radiation protection program or the teletherapy program. Any changes that have been made are documented through amendments and correspondence with the Nuclear Regulatory Commission.

An ALARA program was submitted at the time of the last teletherapy service license renewal (1/28/83).

RADIATION SAFETY COMMITTEE

RENEWAL REQUEST TELETHERAPY LICENSE 24-17998-01

Research Medical Center

Kansas City Missouri

Membership on the Radiation Safety Committee is consistent with 10 CFR Part 35.22.a.1. Members included in the Radiation Safety Committee are as follows:

Chairman
Radiation Safety Officer for Radiation Oncology
Nuclear Medicine Physician
Nuclear Medicine Physician
Radiology Physician
Radiation Safety Officer
Cardiology Physician
Medical Laboratory Representative
Nursing Representative
Nursing Representative
Radiation Oncology Representative
Administrative Representative

The committee's duties and responsibilities include teletherapy.

All records and membership of the Radiation Safety Committee will be maintained by the hospital until the teletherapy license is terminated. These records will demonstrate that, if committee membership is changed, the committee will continue to include the individuals as specified above and comply with the commission guidelines.

Research Medical Center

2316 East Meyer Boulevard
Kansas City, Missouri 64132

816/276-4000

February 5, 1987

License No: 24-17998-01
Control No: 80386

United States Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

ATTN: Patricia Whiston
Materials Licensing Section

Dear Ms. Whiston:

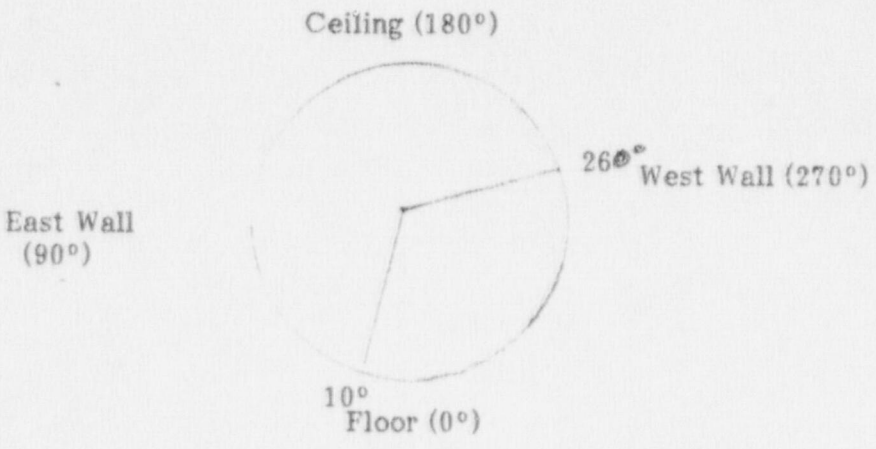
In response to your letter of December 3, 1986 please find the following:

1. Enclosure

2. 6260.25 RHM

3. Limits of beam orientation permitted by electrical interlocks installed on the teletherapy unit.

   260° horizontal towards west wall thru 10° vertical towards the floor. Only within this 110° arc is the source permitted to provide exposures.



NOT TO SCALE

4.

Measuring Points	Angle of Primary Beam
1	10°
2	10°
3	10°
4	260°
5	260°
6	260°

All angles are as specified in item 3
All readings are taken with a scattering media
Field size is maximum of 33 X 33 cm. ^{2}

5. In accordance with license amendment #6 submitted on November 28th, 1983 and approved on January 26th, 1982 the area within which point 5 lies is a restricted area. The areas in which points 1 and 2 lie is also a restricted area as per the original license.

A description of the methods and procedures used to control movement in these areas is described in the licenses. A description of the ALARA program for this hospital is described in the by-product license (USNRC #24-18625-01)

Sincerely yours,

Walter J. Kopecky, Ph. D.
Medical Physicist

WJK/lcj

TELETHERAPY SOURCE TRANSFER

This is to certify that a cobalt-60 source:

Model Number: NPI-20-6000W
Serial Number: T-761
Containing 6160 curies as of 8/1/85

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: Eldorado 8
Serial Number: 52

This source is hereby transferred from Neutron Products' Radioactive Materials License MD-31-025-03 to Research Medical Center's Radioactive Materials License 24-17998-01, Amendment #07

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

Model Number: NPI-20-4500W
Serial Number: T-426
Containing 2330 curies as of 8/1/85

has been determined by a wipe test to be leak free and has been removed from the above teletherapy unit and transferred from Research Medical Center's Radioactive Materials License 24-17998-01, Amdt. #07 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 9-8-85

Date 9-6-85

neutron PRODUCTS inc

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

This is to certify that the Atomic Energy of Canada, Ltd. (AECL) teletherapy unit, Model Eldorado 8, Serial Number 52 located at Research Medical Center, 2316 East Meyer Blvd., Kansas City, Missouri 64132 was inspected and serviced on 9-8-85 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 9-8-85

Parts: NEW NEGATOR SPRING, DETENT PIN AND FRONT RIDGE RING.

Nonstandard Service:

Facility Address:

esearch Medical Ctr.
316 East Meyer Blvd.
ansas City, Missouri 64132

Revision Date
July 25, 1983

INSPECTION CHECK LIST

Unit: Eldorado 8 Serial Number: 52

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 N/A	X N/A
9. Stand and Stretcher		X N/A
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 N/A	X N/A
18. Teletherapy Units with Rotating Shutter	X N/A	X N/A
19. Indicator 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: E H Lyon Date: 9-8-85

NEUTRON PRODUCTS INC

TELETHERAPY SOURCE CERTIFICATION

This certifies that the cobalt-60 source:

Model Number: NPI-20-6000W

Serial Number: T-761

Containing 6160 curies as of: 8/1/85

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 8-23-85. The source was wipe tested and the removable activity was .048, and .0006 microcuries from the inner and outer encapsulations, respectively.

Performed by and certified to by:

Jeffrey W. Gorun, Manager
Hot Cell Operations

Reviewed and approved by:

Marvin N. Tuckanis
Vice President

8/5/85
Date

neutron products inc

Research Medical Center
2316 E. Meyer Blvd.
Kansas City MO 64132

24-17998-01
030-14314
5/31/88
A
file drawer

CONVERSATION RECORD

TIME

DATE 12/24/85

TYPE
☑ VISIT ☐ CONFERENCE ☐ TELEPHONE ☐ INCOMING ☐ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Walter Kopecky, Ph.D.		(816) 276-4000

ROUTING

NAME/SYMBOL	INT

SUBJECT Research Medical Center
Teletherapy Lic # 24-17998-01

SUMMARY

During site inspection on 12/07/85, inspector was informed of the licensee's teletherapy source change on Sept. 9, 1985.

Radiation survey results, including hand and over surveys, are attached. (These results were not previously sent to the Commission)

ACTION REQUIRED

Process as amendment

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Wayne Slawinski		12/24/85

ACTION TAKEN

SIGNATURE	TITLE	DATE

50271-101 * GPO : 1981 O - 361-526 (7227) CONVERSATION RECORD OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

For RIII Files

ANNUAL DOSIMETRY REVIEW

RESEARCH MEDICAL CENTER

AECL ELDORADO Co^{60}

An annual dosimetry review of the Research Medical Center AECL Eldorado Co^{60} unit was performed on Sept. 9, 1985 by Walter J. Kopecky, Ph. D.

1. General Condition

   A. Start, timer on, timer set (console lights) were functional

   B. i) Machine movement is free and unobstructed

      ii) Beam limitation devices operational
      (100° counterclockwise, 80° clockwise)

      iii)Emergency "OFF" functional

   C. i) Television monitors functional

      ii) Viewport in door unobstructed

   D. Weekly checks (timer, interlocks, warning light, daily monitor check, emergency off, collinator attenuation) being performed

2. Safety

   A. Radiation hazard sign posted

   B. Employee notices posted.

   C. Door locks and interlocks functional

   D. Emergency instructions posted

   E. Warning lights functional

   F. Survey meter available (calibration traceable to NBS)

3. Accuracy of distance indicators

SSD Set	Optical (indicated)	Stick (indicated)
80 cm.	80 cm.	80 cm.

4. Agreement between light field indicated and light field projected (80 cm. SSD, trimmers at 45 cm.)

Field Size Set	Field Size Measured
5 X 5	5 X 5
10 X 10	10 X 10
20 X 20	19.9 X 19.9
30 X 30	29.8 X 29.8

5. Coincidence

a. Coincidence of the shadow of the collinator cross-hair in the light field with the mechanical isocenter when the collinator is rotated through 180° is within 2 mm.

b) Radiation field/light field

(80 cm. SSD, trimmers at 45 cm., 10 X 10 $cm.^2$ field, 0.5 cm., buildup material in place, Kodak RP/V film .4 min. exposure). coincidence within 2 mm.

6. Machine radiation output

Measurement dosimetry system
Electrometer: Capintec 192 S.N. 44988356
Chamber: Capintec PRO6C, S.N. CII65175
This electrometer and chamber was calibrated at Allegheny Research Corporation, Pittsburgh, PA on 5/10/84 (see attached report).
Battery: 300 v.

Calculation for absorbed dose in tissue at D Max, 80 cm. SSD.

Temperature: 24°C
Pressure: 740 mm Hg
$Ctp = 1.034$

Nc: .994
Aeg: .985
f: .957
I.S. (inverse square): $\left(\frac{SSD}{SSD + 0.5\ cm.}\right)^2 = .988$

D = corrected average reading X Nc Ctp X Aeg X F X I.S, X BSF
Table 1 contains the listing of absorbed doses at field sizes 5 $cm.^2$ through 33 $cm.^2$ in 1 cm. increments at 80 cm. SSD.

7. Timer Error

t = 1.5 min.
M, (average for 1.5 min. reading) = 223
M_2 (cummulative 3 X .5 min. reading) = 220

$$= \frac{t\,(M_2 - M_1}{3\ M_1 - M_2} = -0.01$$

Timer error = = -0.01 min.

RESEARCH MEDICAL CENTER

ELDORADO 8

Sept. 9, 1985

80 CM SSD

TIMER ERROR OF -0.01 NOT INCLUDED

LUCITE SHADOW TRAY IN TRIMMERS AT 45CM

SIDE OF SQUARE FIELD OR EQUIV.	RADS/MIN AT D max AT 80CM SSD	SIDE OF SQUARE FIELD OR EQUIV.	RADS/MIN AT Dmax AT 80CM SSD
5	138.9	19	156.7
6	140.3	20	157.4
7	142.0	21	158.2
8	143.7	22	158.9
9	145.3	23	159.8
10	146.7	24	160.4
11	148.1	25	161.1
12	149.3	26	161.5
13	150.8	27	162.0
14	151.9	28	162.2
15	153.1	29	162.8
16	154.3	30	163.1
17	155.1	31	163.2
18	155.9	32	163.5
		33	163.8

ACCREDITED DOSIMETRY CALIBRATION LABORATORY*

Allegheny Singer Research Corporation
Allegheny General Hospital
320 East North Avenue
Pittsburgh, PA 15212-9986

REPORT OF ADCL CALIBRATION

Report No.: 63 No. of Pages: 6 Date: May 10, 1984

INSTRUMENTS:

Submitted by: Dr. Walter Kopecky
Research Medical Center
Radiation Oncology Division
2316 E. Meyer Blvd.
Kansas City, MO 64132

Date Received: May 8, 1984 Date Calibrated: May 8, 1984

	Ionization Chamber	Electrometer
Manufacturer:	Capintec	Capintec
Model No.:	PR-06C	192
Serial No.:	.65175	44988356
Size:	0.6 CC	
Build-up Cap:	Cobalt-60	

SERVICES PERFORMED:

3A Integrated dosimeter calibration (Cobalt-60).

*Accredited by the American Association of Physicists in Medicine
August 4, 1983

****

RESPONSIBLITIES

Sensitivity of radiation measuring instruments can be altered by unsuspected trauma during routine use or transportation. Therefore, Allegheny Singer Research Corporation and its employees cannot assume the responsibility for calibration accuracy after instruments leave our calibration laboratory. To ensure reliability we suggest that the instrument user check constancy of instrument response before and after submission to the Dosimetery Calibration Laboratory and monitor it on a regular basis thereafter. In addition, the user must assume the responsibility to verify that his interpretation of information in this document is consistent with the intent of the Dosimetry Calibration Laboratory. In case of any doubt, we encourage personal communication with laboratory personnel.

****

CALIBRATION REPORT FOR INTEGRATED DOSIMETER

EXPLANATIONS:

1. Correction Factors for Integrated Dosimeters:

NBS traceable correction factor for integrated dosimeters (i.e. integrated ion chamber and electrometer systems or those which read in units other than coulombs) are given in this report as dimensionless numbers. They are quotients of the x or gamma ray exposure (R) and the reading generated by that radiation in the instrument submitted for calibration.

The exposure at the calibration position was measured with a reference class ion chamber and electrometer calibrated at the U.S. National Bureau of Standards.

The instrument reading was measured with the collection potential set to the user requested polarity and magnitude. A check was made to see that halving the collection potential did not reduce charge collection efficiency (> 5%). Leakage of the chamber with its associated electrometer was measured and, if necessary, correction was applied as reported. Chambers were tested to ensure air communication and their measurements normalized to air at 760 mm of Hg pressure and 22° C temperature.

To determine radiation exposure (R) with this instrument when the instrument is used such that air in its cavity is at some other pressure (P mm of Hg) and temperature (T° C), its reading should be multiplied by the reported correction factor and also the pressure-temperature factor F.

$$F = \frac{(273.15 + T)}{295.15} \times \frac{760}{P}$$

This procedure is strictly valid only under irradiation conditions specified in this report. Appropriate use under other radiation conditions is the responsibility of the user.

2. Atmospheric Communication:

All chambers are tested to ensure atmospheric communication. Presently we do not calibrate sealed instruments or those that fail the air communication test.

3. Leakage:

Integrated instrument leakage is checked five minutes after applying collection voltage to the collector and guard. The instrument is not calibrated if leakage effect exceeds 0.5%.

4. ADCL Exposure Conditions:

Cobalt-60 beam calibrations are normally carried out in 10 x 10 cm^2 beam with the chamber 80 cm from the source. The ion chamber is centered in the beam with its stem perpendicular to the beam direction. Stem effects are not checked unless specifically requested.

The ADCL exposure measurements are reproducible to a few tenths percent.

5. Calibration Accuracy:

Accreditation of this dosimetry calibration laboratory requires that we maintain an overall accuracy of $\pm$ 0.5% for calibration of field class instruments in Cobalt-60 beams and + 2% in x-ray beams. We have paid careful attention to be well within these limits during calibration of your instrument.

Further explanation on technical aspects of this report may be obtained by contacting Pocheng Cheng, Ph.D., at (412) 359-3189 or Homer Holloway, Ph.D., at (412) 359-4421.

P N Shrivastava

Prakash N. Shrivastava, Ph.D., Director
Dosimetry Calibration Laboratory

ACCREDITED DOSIMETRY CALIBRATION LABORATORY

Allegheny Singer Research Corporation
Allegheny General Hospital
320 East North Avenue
Pittsburgh, PA 15212-9986

RESULT OF CALIBRATION FOR INTEGRATED DOSIMETER

INSTRUMENTS:	Ionization Chamber	Electrometer
Manufacturer:	Capintec	Capintec
Model No.:	PR-06C	192
Serial No.:	.65175	44988356
Size:	0.6 CC	
Build-up Cap:	Cobalt-60	

Field Size: 10 x 10 cm @ 80 cm

Orientation: The chamber stem was perpendicular to the beam with the serial number facing the radation source.

Collection Voltage: + 315.0 V (on center electrode)

BEAM QUALITY	EXPOSURE RATE (R/min)	CORRECTION* FACTOR
^{60}Co	113.4 on 1/1/83	0.9938

*At 22° C, 760 mm Hg, and switch positions on the electrometer as follows:

Probe Selector:	A
Exposure Level:	Medium
Meter Range:	Extended
Mode:	Total
Compensation Factor:	1.00
Bias Voltage:	+ 300

1. The chamber was determined to be open to atmospheric communications.

2. Five minutes after the chamber was connected to the electrometer, the instrument leakage current was less than 0.01 R/min with the electrometer setting on A, Medium, Normal, Total, + 300 V and x 1.00.

3. 0.998 was the ratio of the charge collected at collection voltages of + 157.5 V and + 315.0 V respectively. A detailed saturation study was not carried out and no correction for lack of saturation was applied to the data.

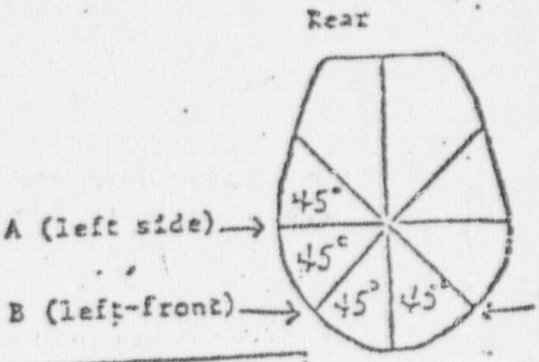
DATA BOOK NO.: 3 PAGE(s): 85 - 91

Calibration Performed By

Reviewed By

(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	1.0
	2	0.6
	3	1.4
	4	0.1
View B	5	0.7
	6	2.4
	7	0.6
	8	0.6
View C	9	0.9
	10	0.9
View D	11	0.6
	12	0.2
	13	3.5
	14	3.0

Average value 1.2

Maximum value 3.5

Instrument used LUDLUM MODEL 5

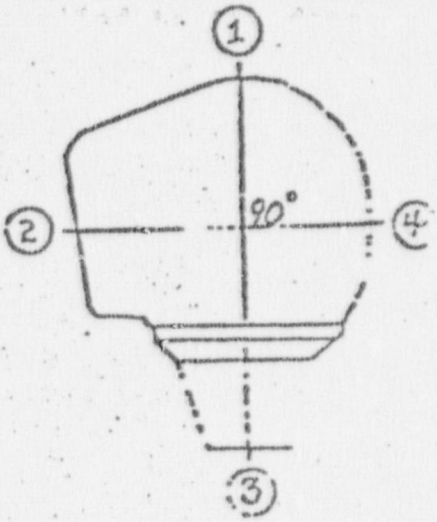
CAL: 2/8/85

Curies & Date 6/60 9/8/85

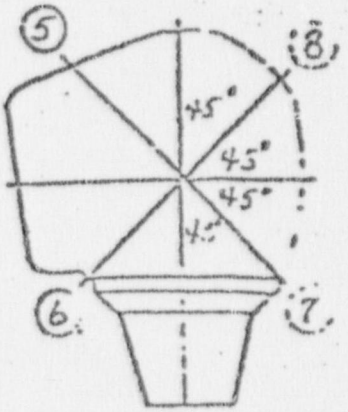
Manufacturer's name & model # of teletherapy unit AECL

EL DORADO 8

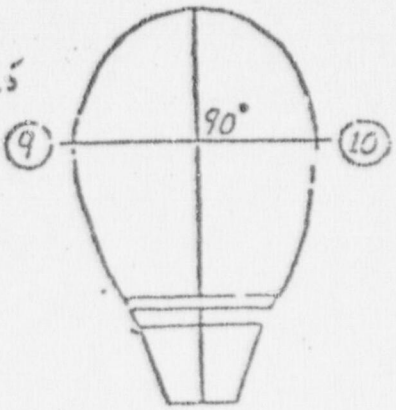
View A - Vertical from left side



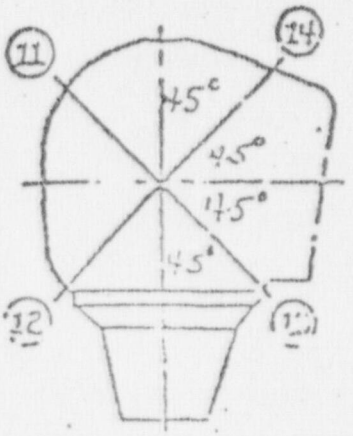
View B - Vertical from left-front



View C - Vertical from front



View D- Vertical from right-fro...



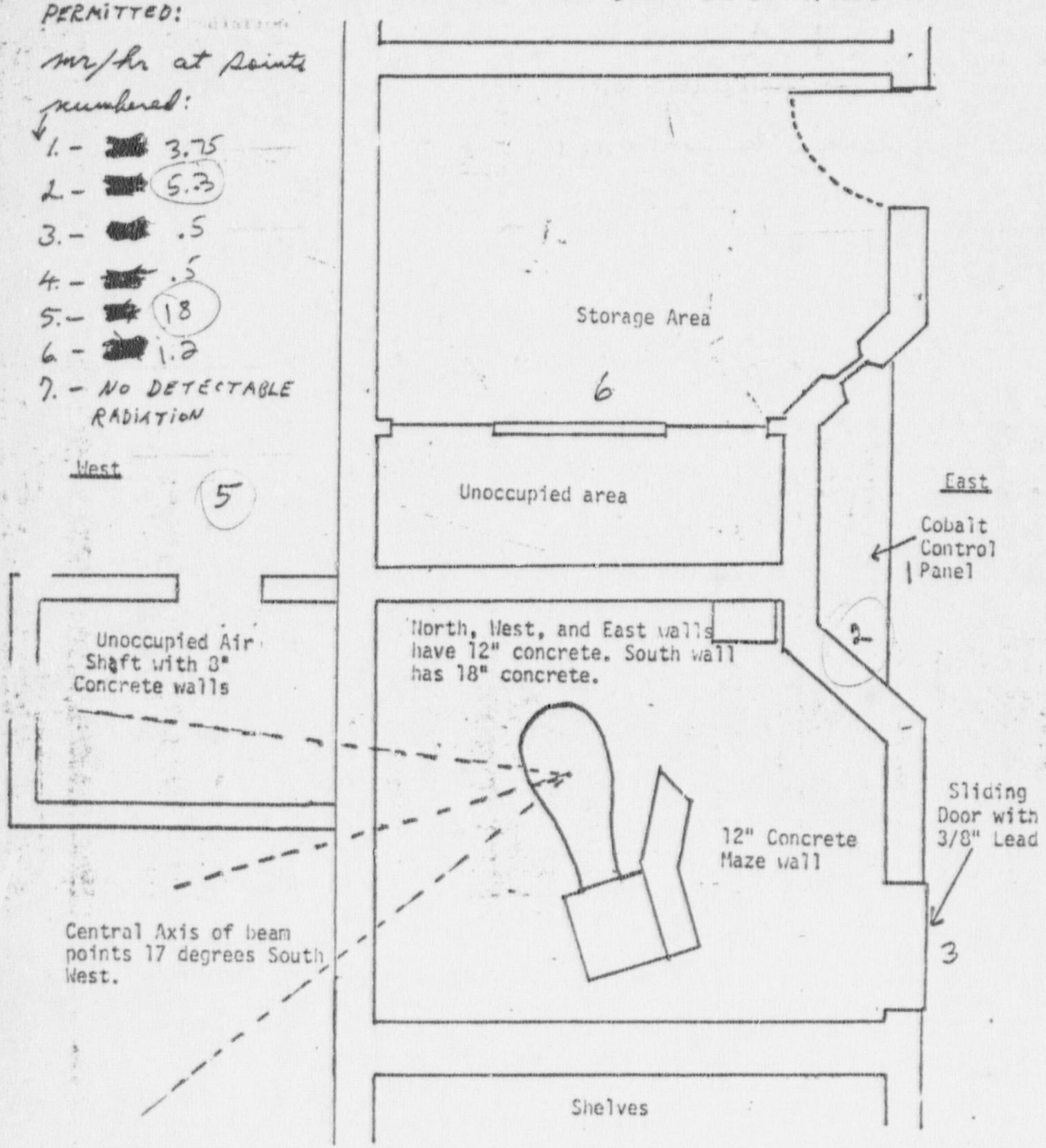
[redacted] VIEW #1

9/8/85
yK

MAXIMUM READINGS AT MOST ADVERSE BEAM ORIENTATIONS PERMITTED:

mr/hr at points numbered:

1. - [redacted] 3.75
2. - [redacted] 5.3
3. - [redacted] .5
4. - [redacted] .5
5. - [redacted] 18
6. - [redacted] 1.2
7. - NO DETECTABLE RADIATION



NRC Form 3 (6-82)
10 CFR 35

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIALS LICENSE -- TELETHERAPY

Approved by OMB
3150-0081
Expires 1-31-85

INSTRUCTIONS – Complete Items 1 through 22 if this is an initial application or an application for renewal of a license. Use supplemental sheets where necessary. Item 22 must be completed on all applications and signed. Retain one copy. Submit original and one copy of entire application to: Director, Office of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Upon approval of this application, the applicant will receive a Materials License. An NRC Materials License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Parts 19, 20, 21, and 35 and the license fee provision of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 22 and the appropriate fee enclosed.

1.a. NAME AND MAILING ADDRESS OF APPLICANT (Institution, firm, clinic, physician, etc.) INCLUDE ZIP CODE

Research Medical Center
2316 E. Meyer Blvd.
Kansas City, Missouri 64132

TELEPHONE AREA CODE (816) NUMBER 276-4161

1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED (If different from 1.a.) INCLUDE ZIP CODE

2. PERSON TO CONTACT REGARDING THIS APPLICATION

James D. Stewart, Vice President, Clinical Services

TELEPHONE AREA CODE (816) NUMBER 276-4302

3. THIS IS AN APPLICATION FOR: (Check appropriate item)

[ ] a. NEW LICENSE
[ ] b. AMENDMENT TO LICENSE NO. _____
[x] c. RENEWAL OF LICENSE NO. 24-17998-01

4. INDIVIDUAL USERS (Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)

George A.B. Cowan, M.D.
Ben J. Throne, M.D.
Jorge C. Paradelo, M.D.

5. RADIATION SAFETY OFFICER (RSO) (Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.)

Robert A. Morgan

6. SEALED SOURCES TO BE USED IN TELETHERAPY UNITS (Attach supplemental pages if necessary)

	BYPRODUCT MATERIAL (Element and Mass No.)	NAME OF SOURCE MANUFACTURER	SOURCE MODEL NUMBER	MAXIMUM ACTIVITY PER SOURCE	NUMBER OF SOURCES
A.	Cobalt 60	AECL	C-146	4800 Ci	2
B.	or Cobalt 60	AECL	C-151	4800 Ci	2
C.	or Cobalt 60	AECL	NPI-20-4500	4800 Ci	2

7. TELETHERAPY UNITS (Attach supplemental pages, if necessary)

	NAME OF MANUFACTURER (Include description, if unit is custom made)	MODEL NUMBER
A.	AECL	Eldorado 8
B.		
C.		

8. USE (Attach supplementary pages, if necessary)

A	B	C	
X	X	X	HUMAN USE ONLY
			HUMAN AND OTHER USE (Specify on separate sheet)

2/10/83
Feb 2 Renewal
Brown

194080
#370-7A
Renewal
2/10/83
Brown

9. PERSONNEL MONITORING DEVICES

	TYPE (Check and/or complete as appropriate)	SUPPLIER (Service Company)	EXCHANGE FREQUENCY
X	(1) FILM BADGE - WHOLE BODY	R.S. Landauer, Jr. & Co.	monthly
	(2) THERMOLUMINESCENT DOSIMETER (TLD) - WHOLE BODY		
X	(3) OTHER (Specify) TLD Finger Badge	R.S. Landauer, Jr. & Co.	monthly

COPIES SENT TO OFF. OF INSPECTION AND ENFORCEMENT

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U.S. NUCLEAR REGULATORY COMMISSION
NMSS
Mail Section

nw 2/7/83

13733

INFORMATION REQUIRED FOR ITEMS 10 THROUGH 21

For Items 10 through 21, check the appropriate box and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the teletherapy licensing guide will be followed, do not submit the pages, but specifiy the revision number and date of the referenced guide: Regulatory Guide 10. Rev. _____ Date: _____

10. MEDICAL ISOTOPE COMMITTEE		15. BEAM STOPS	
X	Names and specialties attached; and *(check one)*		Description of stops used to restrict beam orientation attached.
X	a. Duties as in Appendix A, or	16. SHIELDING EVALUATION	
	b. Equivalent duties attached.		Evaluation of proposed shielding attached.
11. TRAINING AND EXPERIENCE		17. OPERATING AND EMERGENCY PROCEDURES	
X	a. Supplements A & B attached for each individual user; and	X	a. Description of operating procedures attached; and
X	b. Supplement A attached for RSO.	X	b. Copy of emergency procedures attached.
12. INSTRUMENTATION *(check one)*		18. INSTRUCTION OF PERSONNEL *(check one)*	
X	a. Appendix C form attached, or	X	a. Training program and schedule in Appendix H followed, or
	b. List manufacturer's name and model number.		b. Description of instruction program for employees attached.
13. CALIBRATION OF INSTRUMENTS *(check one)*		19. LEAK TESTS OF SEALED SOURCES	
	a. Appendix D, Part 2 procedures followed for instrumentation calibration, or	X	Description of leak-test procedures attached.
	b. Description of sources, calibration frequency and equivalent procedures attached.	20. QUALIFIED EXPERT *(Use only if the individual is to meet 10 CFR 35.24 requirements.)*	
14. FACILITIES AND EQUIPMENT			Statement of qualifications of the expert who will perform teletherapy calibrations attached.
	a. Description and drawing of facilities attached; and	21. ALARA PROGRAM *(check one)*	
	b. Description of patient viewing and communicating systems attached; and	X	ALARA Program as in Appendix I, or
	c. Description of area safeguards attached.		Equivalent ALARA Program attached.

22. CERTIFICATE

(This item must be completed by the applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 1a certifies that this application is prepared in conformity with Title 10, Code of Federal Regulations, Parts 30 and 35, and that all information contained herein, including supplements attached hereto, is true and correct to the best of our knowledge and belief.

a. LICENSE FEE REQUIRED *(See section 170.31, 10 CFR 170)*	b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*
	(1) NAME *(Type or print)* James D. Stewart
(1) LICENSE FEE CATEGORY 7A	(2) TITLE Vice President, Clinical Services
(2) LICENSE FEE ENCLOSED $ 270.00	c. DATE 1/28/83

WARNING: 18 U.S.C. Section 1001; Act of June 25, 1948; 62 Stat. 749, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

RADIATION SAFETY COMMITTEE

Committee Members	Specialty
William E. White, M.D.	Nuclear Medicine
Bennie J. Throne, M.D.	Radiation Therapy
Stanley Wells, M.D.	Radiology
Robert A. Morgan, M.S.	Radiation Safety Officer
Jim Stewart	Vice President Clinical Services
Joy McKee, R.N.	Nursing Staff

The responsibilities, duties and meeting frequency will be as described in Appendix A, of A Guide for the Preparation of Applications for Licenses in Medical Teletherapy Programs, Regulatory Guide 10.

Item 10
Date: 1/28/83

TRAINING AND EXPERIENCE

Name:	Previous License Number:
George A. B. Cowen	NRC 24-17998-01
Bennie J. Throne	NRC 24-17998-01
Jorge C. Paradelo	NRC 24-17998-01
Robert A. Morgan	NRC 24-17998-01

Item No. 11
Date: 1/28/83

13733

NRC Form 313T Supplement A
(2-82)
10 CFR 35

U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
PROPOSED AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF PROPOSED AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE *(If physician)*
Robert A. Morgan, M.S.	

3. CERTIFICATION

SPECIALTY BOARD	CATEGORY	MONTH AND YEAR CERTIFIED

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES *(To be completed by institution providing training)*

FIELD OF TRAINING	LOCATION AND DATE(S) OF TRAINING	TYPE AND LENGTH OF TRAINING	
		LECTURE/LABORATORY COURSE *(Hours)*	FORMAL SUPERVISED OJT/LABORATORY EXPERIENCE *(Hours)*
RADIATION PHYSICS AND INSTRUMENTATION	University of Kansas Lawrence, Kansas 8/80-8/82	260	100
RADIATION PROTECTION	same as above	65	
MATHEMATICS PERTAINING TO THE USE, MEASUREMENT, AND SHIELDING OF RADIOACTIVE SOURCES	same as above	75	
RADIATION BIOLOGY	same as above	50	

5. EXPERIENCE WITH RADIOACTIVE MATERIALS* *(Actual use of radioisotopes or equivalent experience)*

ISOTOPE	MAXIMUM AMOUNT FOR ANY SINGLE APPLICATION	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
^{137}Cs	1150 Ci	Univ. of Kansas	8/80-8/82	Research
^{60}Co	5000 Ci	St. Francis Hosp./ Research Hosp.	6/82-present	Medical
^{226}Ra	100 mg	St. Francis Hosp., Topeka, Ks	6/82-8/82	Medical

*Experience with sealed radioactive sources under the supervision of qualified instructors should include:

1. Review of initial source calibration and periodic spot-check measurements of teletherapy units.
2. Initial source calibration of sealed sources other than teletherapy sources that are used for treatment purposes.
3. Calibration of ion chambers and survey meters.
4. Preparation of treatment plans and treatment times for intracavitary and brachytherapy.
5. Knowledge of appropriate radiation safety, quality control, and emergency procedures for handling and using sealed sources.

6. I CERTIFY THAT THE INFORMATION PRESENTED ABOVE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF *(Signature of program supervisor)*

Warren Alley, Director of Radiation Therapy

TYPED OR PRINTED NAME	DATE
Warren Alley	1/26/83

NAME OF INSTITUTION
Research Medical Center

MAILING ADDRESS
2316 E. Meyer Boulevard

CITY	STATE	ZIP CODE	RADIOACTIVE MATERIALS LICENSE NUMBER
Kansas City	Mo.	64132	24-17998-01

WARNING: 18 U.S.C. Section 1001, Act of June 25, 1948, 62 Stat. 749, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

NRC Form 313T Supplement B
(2-82)

U.S. NUCLEAR REGULATORY COMMISSION

PRECEPTOR STATEMENT

Supplement B must be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each.

1. APPLICANT PHYSICIAN'S NAME AND ADDRESS

FULL NAME

STREET ADDRESS

CITY | STATE | ZIP CODE

KEY TO COLUMN C
PERSONAL PARTICIPATION SHOULD CONSIST OF:

1. Supervised examination of patients to determine the suitability for radioisotope therapy and recommendations on dosage to be prescribed.
2. Collaboration in calculation of radiation dose, related measurement, and modification of the originally prescribed dose as warranted by patient reaction to the radiation.
3. Followup of patients when required.
4. Study and discussion with preceptor of case histories to establish the most appropriate therapy procedures, limitations, contraindications, etc.

2. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN CITED ABOVE IN USING SOURCES OR DEVICES FOR THERAPY

ISOTOPE A	TYPES OF TREATMENT B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Append additional information, if necessary)* D
Co-60	COURSES OF TELETHERAPY TREATMENT		
OR	INTERSTITIAL		
Cs-137	INTRACAVITARY		
I-125 Ir-192 OR Au-198 SEEDS	INTERSTITIAL		
Ra-226	INTRACAVITARY		
X-RAY AND ACCELERATOR THERAPY	COURSES OF THERAPY TREATMENT		
Sr-90	SUPERFICIAL EYE CONDITIONS		
OTHER			

DATES AND TOTAL NUMBER OF HOURS IN CLINICAL TRAINING USING SEALED SOURCES FOR THERAPY

3. PRECEPTOR'S CERTIFICATION

NAME OF SUPERVISOR | NAME OF INSTITUTION | RADIOACTIVE MATERIALS LICENSE NUMBER

MAILING ADDRESS | CITY | STATE | ZIP CODE

I CERTIFY THAT (a) THE INFORMATION PRESENTED ABOVE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF; AND (b) I WAS AUTHORIZED BY THE REFERENCED RADIOACTIVE MATERIALS LICENSE(S) TO PERFORM THE PROCEDURES SPECIFIED ABOVE. I FURTHER BELIEVE THAT THE APPLICANT PHYSICIAN IS COMPETENT TO PERFORM THESE PROCEDURES INDEPENDENTLY. *(Signature)* | DATE

WARNING: 18 U.S.C. Section 1001, Act of June 25, 1948, 62 Stat. 749, makes it a criminal offense to make a willfully false statement of representation to any department or agency of the United States as to any matter within its jurisdiction.

APPENDIX C

INSTRUMENTATION

1. Survey meters

   a. Manufacturer's name: Victoreen

      Manufacturer's model number: 666

      Number of instruments available: 1

      Minimum range: 0 mr/hr to 3 mr/hr

      Maximum range: 0 mr/hr to 300 mr/hr

   b. Manufacturer's name: Ludlum

      Manufacturer's model number: 05

      Number of instruments available: 1

      Ranges: 5

      Minimum range: 0 mr/hr to 0.2 mr/hr

      Maximum range: 0 mr/hr to 2000 mr/hr

2. Beam-on Monitor

   Manufacturer's name: Nuclear Associates

   Manufacturer's model number: PrimAlert 10 05-433

   Number of instruments available: 1

   Backup Battery Power Supply: Yes X No ____

3. Dosimetry System

   a. Electrometer

      Manufacturer's name: Capintec

      Manufacturer's model number: 192

   b. Probes

      Manufacturer's name: Capintec

      Manufacturer's model number: PR-06c Ps-033

      Number of probes: 2

      Ranges: 0-2000 mR 0-2000 R

Item No. 12

Date: 1/28/83

OPERATING AND EMERGENCY PROCEDURES

See Attached Procedures.

Item No. 17
Date: 1/28/83

RESEARCH MEDICAL CENTER

Kansas City, Missouri 64132

Departmental Procedures

SUBJECT: Operating and Emergency Procedures, Cobalt 60 unit

Department: Radiation Therapy

SUPERSEDES: n/a

Effective Date: 1/3/83

Revised Date:

AMENDS: n/a

PURPOSE: To provide instructions to Radiation Therapy department personnel regarding: 1) the proper operation of the cobalt 60 unit, and 2) safety precautions should an emergency involving the cobalt 60 unit occur. These instructions/procedures are designed to comply with all current, applicable Nuclear Regulatory Commission regulations.

PROCEDURE:

I. Operating Procedures

1. Safety Device Checks (see attached checklist)

The following tests shall be performed weekly by the technologist operating the cobalt 60 unit and the results recorded and kept in the department:

a) Door interlock test

If the entrance to the cobalt room is opened during the exposure when the beam is ON, as indicated by the red light on the control console outside the door, the source should return to the OFF position as indicated by the green light on the control console.

b) Source interlock test

The exposure can be terminated manually at any time during the exposure. The exposure is automatically terminated at the end of the pre-set time on the control console. The beam ON condition can be achieved only after the unit is RESET at the control console.

c) Warning interlock test

A radiation monitor is installed inside the treatment room. This monitor signals (red light) when the radiation level in the area exceeds 5 mR/hr. This system, which is electrically powered with a battery back up, warns personnel of the existence of radiation in the area; i.e. in the event the source mechanism malfunctions and the source stays out. This system can be tested by the technologist approaching the monitor with a vial of Tc - 99m.

d) Malfunction procedure

In the event the door interlock is not working properly and/or the source interlock is malfunctioning, the cobalt unit should be turned off and not used until these are returned to proper working order. If the radiation monitor inside the room malfunctions, the technologist should enter the room (if necessary) using a GM survey meter, under the physicist's supervision. Records of any such malfunctions and the action taken shall be kept in the department.

Departmental Procedures

SUBJECT: Operating and Emergency Procedures, Cobalt 60 unit
Department: Radiation Therapy

SUPERSEDES:

Effective Date: 1/3/83
Revised Date:

AMENDS:

e) Personnel dosimetry
Film badges should be worn by all department personnel either at waist level or on the collar. If a lead apron is worn, the film badge should be worn outside the apron on the collar to monitor eye exposure. If an employee wears a lead apron, the physicist should note this for consideration in interpreting dosimetry reports. TLD finger badges should be worn by all persons that do interstitial or intercavity implants. All dosimeters are changed monthly. If a person thinks he/she received an excessive exposure the person's film badge will be sent to be processed immediately and the results called to the Radiation Safety Officer. Temporary pocket dosimeters will be used and read daily as needed. All department personnel dosimetry reports shall be kept in the department.

f) Securing the teletherapy unit
During non-working hours, i.e. when the cobalt 60 unit is unattended, the key to the console will be taken out and placed in a secure drawer. The area, i.e. the entire department, shall be kept locked when it is unattended.

g) Instrument calibration
The electrometer, all chambers and probes shall be calibrated every six months by an AAPM accredited, National Bureau of Standards traceable firm. Records/certificates of such calibrations shall be maintained in the department. The Purchasing Department shall properly package and ship all such items for calibration.

h) Full Calibration of Teletherapy Unit
The cobalt 60 unit shall be calibrated according to Nuclear Regulatory Commission (NRS) regulation: section 35.21 of 10 CFR Part 35. Calibrated records/certificates shall be maintained in the department.

i) Monthly Spot Check Measurements of Teletherapy Units
Monthly spot check measurements of the cobalt 60 unit shall be performed according to NRC regulation: section 35.22 of 10 CFR Part 35. The results of the spot checks shall be recorded and kept in the department.

j) Leak Testing
Leak tests will be performed every six months. The radiation physicist will perform the leak test as per kit instructions and return the kit to the sender for analysis. The results of the tests shall be maintained in the department.

II. Emergency Procedures in Case Beam Control Fails or Malfunctions (as per Appendix G of the NRC regulation)
If the light signals or beam-on monitor indicate that the beam control mechanism has failed to terminate the exposure at the end of the preset time (e.g., if the red light stays on and the green light is off, or if both the red and the green lights stay on for more than a few seconds), the source may still be in the on position. The following steps are to be carried out promptly and in a calm manner.

For the Radiation Therapy Technologist

a. Open the door to the treatment room

b. If the patient is ambulatory, direct him to get off the table and leave the room.

c. If the patient is not ambulatory:

Enter the treatment room but avoid exposure to the direct beam. Pull the treatment table as far away from the direct beam as possible. Transfer the patient to a stretcher and remove the patient from the room.

d. Close the door and secure the area by locking the door to the treatment room or posting a guard at the entrance.

e. Turn off the main switch at the control panel.

f. Notify the radiation therapist and radiation safety officer at once.

g. Conspicuously post a sign in the area to warn others of the problem.

Radiation Therapist Dr. Ben Throne
Phone No.: On Duty 816-276-4161 Off Duty 913-649-1947

Radiation Safety Officer Mr. Robert Morgan
Phone No.: On Duty 816-276-4235 Off Duty 913-749-0782

Warren Alley
Director of Radiation Therapy

Robert C Morgan
Robert Morgan, Physicist
Radiation Safety Officer

Cobalt 60 Safety Checks

Date of test	Door Interlock	Source Interlock	Warning Monitor	Result	Signature

Note: All records of cobalt 60 safety checks shall be kept in the department.

LEAK TEST OF SEALED SOURCES

The applicant wishes to be licensed by the commission to use a commercially available leak-test kit provided by Health Physics Associates LTD, 3304 Commerical Avenue, Northbrook, Illinois 60062. The kit model number to be used is HPC-1. Leak test will be performed by the medical physicist or radiation safety officer. The smears will be evaluated by Health Physics Associates, NRC License #12-09160-01.

Item No. 19
Date: 1/28/83

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313T. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. **AUTHORITY** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).

2. **PRINCIPAL PURPOSE(S)** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30-35 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.

3. **ROUTINE USES** The information may be used: (a) to provide records to State health departments for their information and use; and (b) to provide information to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you. A copy of the license issued will routinely be placed in the NRC's Public Document Room, 1717 H Street, N.W., Washington, D.C.

4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed.

5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555