NRC FORM 313
(1-84)
10 CFR 30, 32, 33, 34, 35 and 40

EXHIBIT A
APPLICATION FOR MATERIAL LICENSE

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires: 5-31-87

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

[X] A. NEW LICENSE
[ ] B. AMENDMENT TO LICENSE NUMBER _____
[ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*

Southwestern Indiana Cancer Center
906 S. Hebron P.O. Box 15040
Evansville, IN 47716-0040

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Southwestern Indiana Cancer Center
700 North Burkhardt Road
Evansville, IN 47716

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION — TELEPHONE NUMBER

Saiyid M. Shah, Ph.D. — (812) 476-1367

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY — AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

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.

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
Al Korba	Al Korba, M.D.	Radiation Oncologist	

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS
[ ] <$250K [ ] $1M–3.5M
[ ] $250K–500K [ ] $3.5M–7M
[ ] $500K–750K [ ] $7M–10M
[ ] $750K–1M [ ] >$10M

b. NUMBER OF EMPLOYEES *(Total for entire facility excluding outside contractors)*

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(Dollar and/or staff hours)* ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? *(NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)*
[ ] YES [ ] NO

RECEIVED
SEP 1988
REGION III

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
A20	CY 2	7A	CONTROL NO. 8979 0	
AMOUNT RECEIVED	NUMBER			DATE
$180	004618			8/1/88

PRIVACY ACT STATEMENT ON THE REVERSE

Southwest Indiana Cancer Center
Evansville, IN
July, 1988

DESCRIPTION OF SEALED SOURCES, TELETHERAPY UNITS,
AND PROPOSED USES

Item 5.1 SEALED SOURCES TO BE USED IN TELETHERAPY UNITS

Radionuclide (Element and Mass No.)	Name of Source Manufacturer	Maximum Activity Model Number	Output per Source (in curies)	Number of Source (in RHM)	Number of Sources
(A) Cobalt-60	Neutron Products or AECL	NPTT-Series C146 or C151	7000 Ci	7000	
(B)					
(C)					

The total amount of radioactive material to be possessed at any one time is 14,000 Ci. The second source to be stored at the facility during source change only.

Item 5.2 TELETHERAPY UNITS

NAME OF MANUFACTURER (include description is unit is custom made.	Model Name and Number	Beam Catcher (check one of these)	Counter-Weight
(A) AECL	Theratron 78	XX	
(B)			
(C)			

Item 6 PROPOSED USES

A	B	C	Check as appropriate
XX			Treatment of Patients Only
			Treatment of Patients and Other Use (as described below)

ITEM 7

7.1 Authorized Users

	License No.
1. Alvin Korba, M.D.	NRC 13-03226-03*
2. Aly Razek, M.D.	NRC 13-03226-03*
3. Shannon Lamb, M.D.	NRC 13-03226-03*
4. Amr Aref, M.D.	NRC 13-03226-03*
5. Devdas Sheth, M.D.	NRC 13-24760-01**
6. Tristan Briones, M.D.	Kentucky 202-180-31***
7. Moises Domingo, M.D.	NRC 13-24760-01**
8. Thomas Hayes, M.D.	NRC 13-03226-03*
9. Manju Gupta, M.D.	NRC 13-24627-01

All the physicians are licensed to practice medicine in Indiana.

7.2 Radiation Safety Officer

Saiyid M. Shah will be the Radiation Safety Officer. He is a Diplomate of the American Board of Radiology in Therapeutic Radiological Physics. He is currently the R.S.O. at St. Mary's Medical Center, Evansville, IN, NRC License No. 13-03226-03. Saiyid M. Shah and Arnold Sorensen are the contact persons for this application and this facility. Their mailing address is:

Therapy Associates, Inc.
906 S. Hebron Ave., Unit #4
P.O. Box 15040
Evansville, IN 47716-0040
Phone 812-476-1367

7.3 Teletherapy Expert

The teletherapy calibrations will be performed by:
Arnold Sorensen, Certified Radiological Physicist (Therapeutic) by the American Board of Radiology--NRC License 13-24760-02.**

or

Saiyid M. Shah, Ph.D., Certified Radiological Physicist (Therapeutic) by the American Board of Radiology--NRC License 13-03226-03*

* St. Mary's Medical Center
Evansville, IN 47750

** Tri-State Cancer Center
Princeton, IN

*** Cumberland Valley Oncology Center
Corbin, KY

**** Harrisburg Cancer Center
Harrisburg, IL
(Illinois License after 6/1/87)

ITEM 8

TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

The training program as described in Appendix D of the NRC Draft Regulatory Guide FC 414-4, dated December, 1985 will be adopted.

ITEM 9

FACILITIES AND EQUIPMENT

9.1 Annotated plans and elevation drawings are attached. The facility is a free-standing one-story building without a basement or crawlspace. The building is surrounded by a parking lot, and it is more than 50 feet from other buildings, so there are no areas adjacent to the Cobalt room with an occupancy factor of greater than 1/16. The Cobalt room is No. 128.

9.2 Patient Viewing System
The facility will have a closed circuit TV camera/monitor for continuous patient observation from the control. Treatments will be discontinued in case of TV system failure. The facility will also have an intercom for teletherapy operator-patient voice communication.

9.3 Warning System and Access Controls
The teletherapy room door will be provided with a RADIOACTIVE MATERIALS/HIGH RADIATION AREA sign. The door will also be provided with an interlock to control the "ON-OFF" mechanism of the teletherapy unit. The interlock will cause the source to move to the "OFF" position if the door is opened while the source is exposed. The mechanism will be wired so that the source cannot be returned to the "ON" condition until the door is closed again, and the system is reset at the control. The teletherapy room door will be kept locked after working hours with only the authorized personnel having access to the key.

A red warning light indicating radiation is "ON" will be installed above the door, and will operate only when the source is in the "ON" position.

9.4 Beam Stops
A beam stop allowing only 1.0% transmission will be intercepting the beam for all treatment position except:

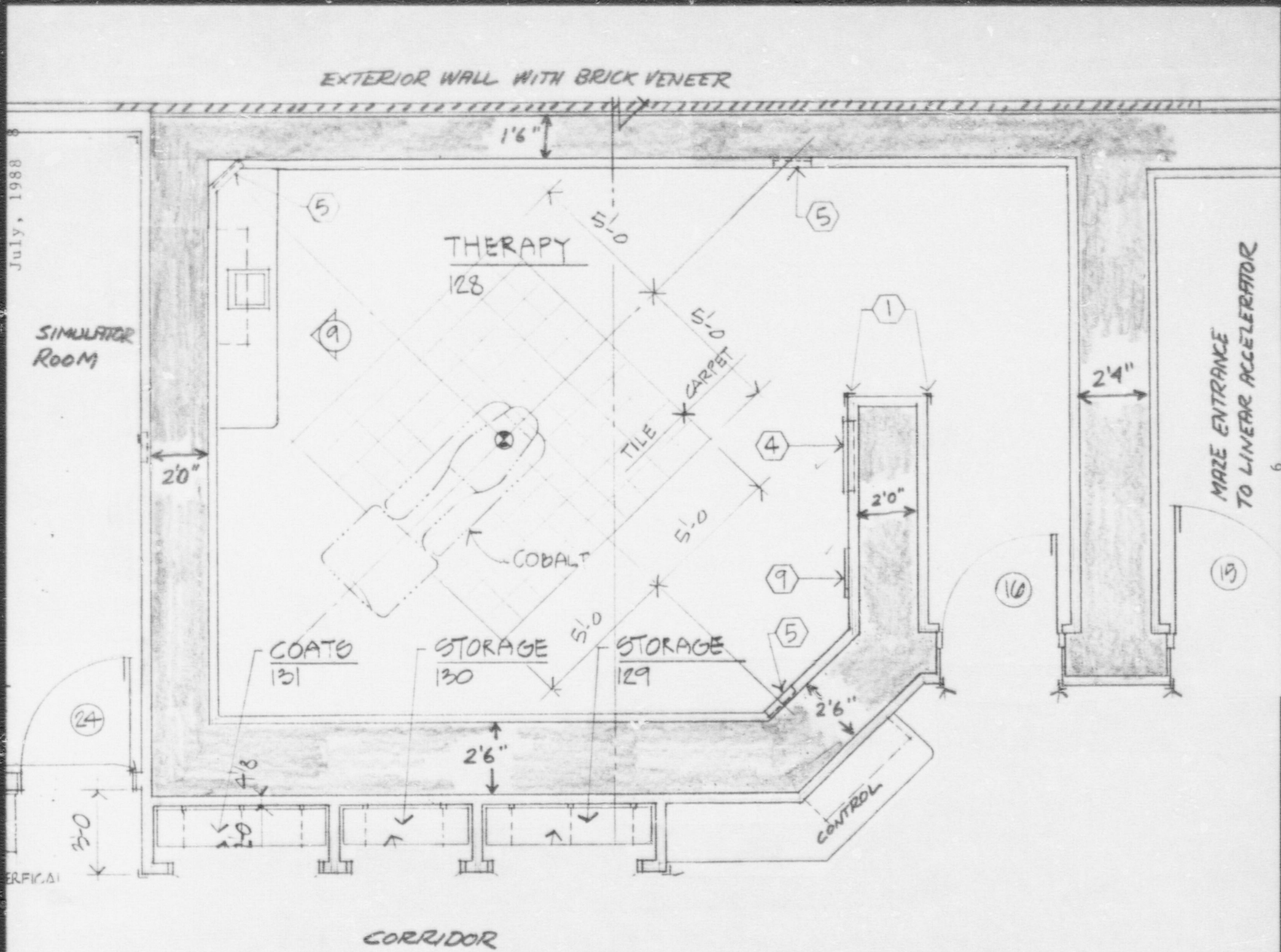
A. When the beam is aimed into the floor
B. When the beam is aimed at the outside wall (East)

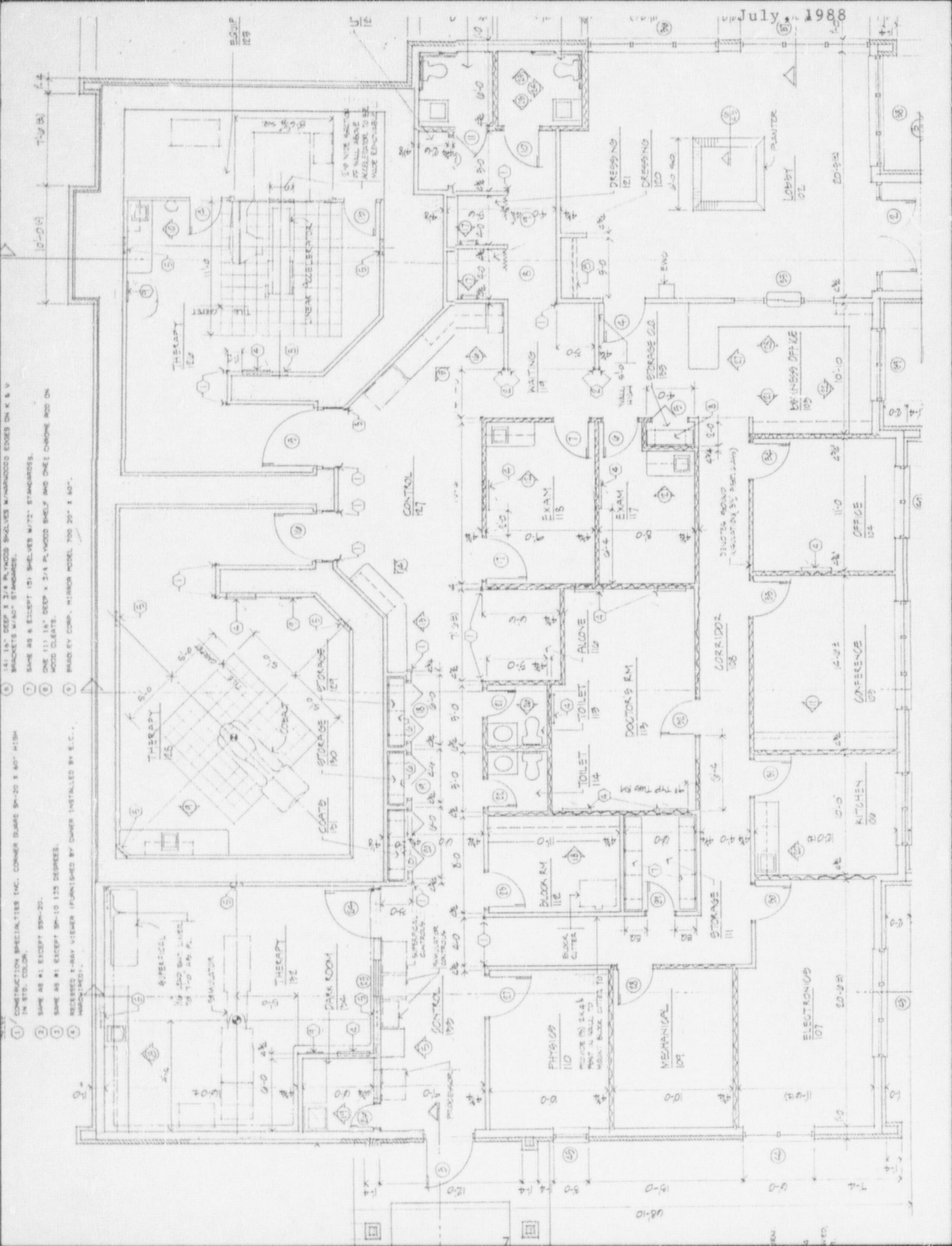
Mechanical/electrical interlocks will be set to allow the above described treatment conditions.

9.5 The calculations demonstrating the adequacy of the shielding are based upon the following:

We are anticipating a maximum of 24 patients/day, the average number of patients treated per hour being three, with a maximum of four. The weekly workload (W) used is 4×10^4 R/week. (NCRP Report 49, Appendix C, Table 2, page 64).

Unless otherwise specified, the Use Factor U=1, and the Occupancy Factor T=1 are used.


EXTERIOR WALL WITH BRICK VENEER
July, 1988
1'6"
5'-0
THERAPY
128
SIMULATOR ROOM
5'-0
CARPET
TILE
2'0"
COBALT
5'-0
5'-0
COATS
131
STORAGE
130
STORAGE
129
2'6"
2'6"
4'8
3'-0
CONTROL
2'4"
MAZE ENTRANCE TO LINEAR ACCELERATOR
CORRIDOR



1. CONSTRUCTION SPECIALTIES INC. CORNER GUARD SP-20 X 60" HIGH IN STD. COLOR.
2. SAME AS #1 EXCEPT SSM-20.
3. SAME AS #1 EXCEPT SM-10 135 DEGREES.
4. RECESSED X-RAY VIEWER (FURNISHED BY OWNER INSTALLED BY G.C., HARRINGTON).
5. (4) 18" DEEP X 3/4 PLYWOOD SHELVES W/HARDWOOD EDGES ON K & V BRACKETS W/ADJ. STANDARDS.
6. SAME AS 5 EXCEPT (5) SHELVES W/72" STANDARDS.
7. ONE (1) 18" DEEP x 3/4 PLYWOOD SHELF AND ONE CHROME ROD ON WOOD CLEATS.
8. BRADLEY CORP. MIRROR MODEL 700 20" X 60".

The following factors are also incorporated in the calculations:

a. The maximum field size for a Theratron 780 is 35 cm
b. The Beam Stop Factor (B.S.) is 1×10^{-2}
c. The worst case scatter is for a 30 degree angle.
d. The Head Leakage Factor (H.L.F.) is 1×10^{-3}

The following equations were used:

PRIMARY RADIATION

$$\text{Exposure} = \frac{(\text{WUT}) \times (\text{BS}) \times (\text{Barrier Transmission Fact})}{(\text{Distance})^2}$$

LEAKAGE RADIATION

$$\text{Exposure} = \frac{(\text{WUT}) \times (1 \times 10^{-3})(\text{Barrier Transmission Fact})}{(\text{Distance})^2}$$

SCATTERED RADIATION

$$\text{Exposure} = \frac{(\text{WUT}) \times (\text{Fract Scattered}) \times (\text{Barrier Transmission Fact})(35)^2}{(\text{Distance})^2 \, (\text{D-Scatter})^2 \times 400}$$

CALCULATIONS

A. CONTROL STATION -PRIMARY/SECONDARY BARRIER - WALL "A"
Concrete Thickness = 30"
Barrier Transmission = 3.8×10^{-4} for Primary/leakage
Barrier Transmission (30 degrees) = 2.8×10^{-4}
Scatter Fract. = 6×10^{-3}
Distance = 5.5m

$$\text{Primary Exp.} = \frac{(4 \times 10^4)(3.8 \times 10^{-4})(1 \times 10^{-2})}{(5.5)^2} = 5 \text{ mR/week}$$

$$\text{Leakage Exp.} = \frac{(4 \times 10^4)(3.8 \times 10^{-4})(1 \times 10^{-3})}{(5.5)^2} = 0.5 \text{ mR/week}$$

$$\text{Scatter Exp.} = \frac{(4 \times 10^4)(2.8 \times 10^{-4})(6 \times 10^{-3})(35)^2}{(5.5)^2 \times (0.8)^2 \times 400} = 10.6 \text{ mR/week}$$

Total Exposure = 5 + 0.5 + 10.6 = 16.1 mR/week
= 0.4 mR/hr

B. INSIDE WALL - PRIMARY/SECONDARY BARRIER - WALL "B"
Concrete Thickness = 30"
Barrier Transm. = 3.8×10^{-4} for Primary/leakage
Barrier Transm. (30 degrees) = 2.8×10^{-4}
Scatter Fraction = 6×10^{-3}
Distance = 5m

$$\text{Primary Exp.} = \frac{(4 \times 10^4)(3.8 \times 10^{-4})(1 \times 10^{-2})}{(5)^2} = 6 \text{ mR/week}$$

$$\text{Leakage Exp.} = \frac{(4 \times 10^4)(3.8 \times 10^{-4})(1 \times 10^{-3})}{(5)^2} = 0.6 \text{ mR/week}$$

$$\text{Scatter Exp.} = \frac{(4 \times 10^4)(2.8 \times 10^{-4})(6 \times 10^{-3})(35)^2}{(5)^2 \times (0.8)^2 \times 400} = 12.8 \text{ mR/week}$$

Total Exposure = 6 + 0.6 + 12.8 = 19.4 mR/week
= 0.5 mR/hr

C. INSIDE WALL - SECONDARY BARRIER WALL "C"
Concrete Thickness = 24"
Barrier Transmission = 1.9×10^{-3} for Primary/leakage
Barrier Transmission = (90 degrees) = 1.0×10^{-4}
Scatter Fract. = 0.9×10^{-3}
Distance = 4.6m

$$\text{Leakage Exp.} = \frac{(4 \times 10^4)(1.9 \times 10^{-3})(1 \times 10^{-3})}{(4.6)^2} = 3.6 \text{ mR/week}$$

$$\text{Scatter Exp.} = \frac{(4 \times 10^4)(1.0 \times 10^{-4})(0.9 \times 10^{-3})(35)^2}{(4.6)^2 \times (0.8)^2 \times (400)} = 1.0 \text{ mR/week}$$

Total Exposure = 3.6 + 1.0 = 4.6 mR/week
= 0.1 mR/hr

D. OUTSIDE WALL - PRIMARY/SECONDARY BARRIER WALL "D"
This wall can be used as a primary barrier without beam stop interception. The maximum use factor (U) is 1/64 without beam stop.

Concrete Thickness = 18"
Barrier Transmission = 1×10^{-2} for Primary/leakage
Barrier Transm. (30 degrees) = 6.8×10^{-3}
Scatter Fraction = 6×10^{-3}
Distance = 5.0
Occupancy = 1/16

Use Factor Primary Protective Barrier = 1/4 (NCRP Report No. 49, Appendix C, Table 3)

Primary Exp. with beam stop $= \dfrac{(4 \times 10^4)(1 \times 10^{-2})(1 \times 10^{-2})}{4 \times 16 \times (5.0)^2} = 3$ mR/week

Without beam stop $= \dfrac{(4 \times 10^4)(1 \times 10^{-2})}{16 \times 64 \times (5.0)^2} = 16$ mR/week

Leakage Exp. $= \dfrac{(4 \times 10^4)(1 \times 10^{-2})(1 \times 10^{-3})}{16 \times (5.0)^2} = 1$ mR/week

Scatter Exp. $= \dfrac{(4 \times 10^4)(6.8 \times 10^{-3})(6 \times 10^{-3})(35)^2}{16 \times (5.0)^2 \times (0.8)^2 \times (400)} = 19$ mR/week

Total exposure with beam stop $3 + 1 + 19 = 23$ mR/week
$= 0.6$ mR/hr

Total exposure without beam stop $3 + 16 + 1 + 19 = 39$ mR/week
$= 0.5$ mR/hr

NOTE: THE SHIELDING VALUE OF THE BRICK VENEER EXTERIOR HAS BEEN NEGLECTED.

E. FAR WALL - SECONDARY BARRIER NEXT TO ACCELERATOR ROOM
Concrete Thickness = 28"
Barrier Transm. (90 degrees) = $<1.0 \times 10^{-4}$
Barrier Transm. = 6.4×10^{-4} for leakage
Scatter Fraction = 0.9×10^{-3}
Distance = 8.0m
Occupancy = 1

$$\text{Leakage Exp.} = \frac{(4 \times 10^4)(1 \times 10^{-3})(6 \times 10^{-4})}{(8.0)^2} = 0.1 \text{ mR/week}$$

$$\text{Scatter Exp.} \frac{(4 \times 10^4)(0.9 \times 10^{-3})(1.0 \times 10^{-4})(35)^2}{(8.0)^2 \times (0.8)^2 \times (400)} = 0.3 \text{ mR/week}$$

Total Exposure = 0.1 + 0.3 = 0.4 mR/week
= 0.01 mR/hr

*NOTE: THE SHIELDING IN THE MAZE WALL HAS NOT BEEN INCLUDED IN THE CALCULATION.

F. CEILING
The roof can only be accessed via ladder. It has a very low occupancy and T = 1/16 is used.

Concrete Thickness = 24"
Barrier Transm. = 2.2×10^{-3} (leakage and primary)
Barrier Transm. = 1.5×10^{-3} (30 degree scatter)
Scatter Transm. = 6×10^{-3}
Distance = 3m
Occupancy = 1/16

$$\text{Primary Exp.} = \frac{(4 \times 10^4)(2.2 \times 10^{-3})(1 \times 10^{-2})}{16(3)^2} = 6 \text{ mR/week}$$

$$\text{Leakage Exp.} = \frac{(4 \times 10^4)(2.2 \times 10^{-3})(1 \times 10^{-3})}{16(3)^2} = 0.6 \text{ mR/week}$$

$$\text{Scatter Exp.} = \frac{(4 \times 10^4)(1.5 \times 10^{-3})(6 \times 10^{-3})(35)^2}{16(3)^2 \times (0.8)^2 \times (400)} = 12 \text{ mR/week}$$

Total Exposure = 6 + 0.6 + 12 = 18.8 mR/week
= 0.5 mR/hr

G. DOOR
Lead Thickness = 1/8"
Barrier Trans. (90 degree scatter) = 0.8
Scatter Fraction = 9×10^{-4}

Consider two 90 degrees scatter paths:

First - From patient to the outside wall
Distance = 3m

Second - From wall to the door
Distance = 5m

Occupancy = 1

$$\text{Scatter Exp.} = \frac{(4 \times 10^{4})(0.8)(9 \times 10^{-4})(9 \times 10^{-4})(35)^{2})}{(3)^{2} \times (5)^{2} \times (0.8)^{2} \times (400)} = 0.6 \text{ mR/week} = 0.02 \text{ mR/hr}$$

ITEM 10

RADIATION SAFETY PROGRAM

10.1 Personnel Monitoring

All facility staff will be issued a whole body film dosimeter supplied by a commercial company, preferably one accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). Film badges must be worn by staff, and will be exchanged monthly. Film badge reports, or copies of, will be kept on permanent file at the facility, and will be available to staff.

10.2 Instrumentation

Survey Meter

We will keep, on site, a portable survey meter capable of detecting from a minimum of 0.2 mR/hr to at least 1 R/hr. The survey meter will be calibrated annually and/or after major repair, and the calibration certificates will be maintained on file for at least two years. The calibrations will be performed by a commercial company and we will maintain on record their NRC or Agreement State License Number. At this time, we will be utilizing the services of Health Physics Associates, Ltd., 3304 Commercial Ave., Northbrook, IL 60062.

Radiation Monitor

We will mount a radiation detector on the wall facing the teletherapy room door. It will be equipped with a separate emergency power supply. The beam-on monitor will provide a visible indication of an exposed or partially exposed source. The monitor will be checked daily with a low-activity Cs-137 source. In case of radiation monitor failure, the operator will use the portable survey meter when entering the treatment room.

Dosimetry System

The facility will have access to a dosimetry system for full calibration and spot check measurements. The instruments will be calibrated in accordance with 10CFR 35.632 and 35.634 published in the Federal Register, Vol. 51, No. 200, pgs. 36961-62. We will maintain records at the facility verifying that the instruments are calibrated in accordance with the above.

10.4 Leak Test Program

Leak test will be performed every six months using the QT-1 leak test kit supplied by Siemens Gammasonics, Inc., 2000 Nuclear Drive, Des Plaines, IL., or an equivalent commercial firm authorized by NRC/ Agreement State to provide this service. We will follow their procedures. The results of the leak tests will be maintained for at least two years. The record will include the date of test, activity measured and the name of the person performing the wipe test.

10.5 Operation Procedures

Safety devices will be checked for proper operation by both the technologist and the physicist. The technologist will daily, prior to patient treatment, check the following safety items for proper operation.

1. Source "ON", source "OFF" indicator lights on the control console.

2. Warning light above the door to teletherapy room.

3. Area Monitor: If the area monitor is not functioning, a survey meter will be used any time the technologist or physician enters the room after a patient treatment has been completed.

4. Beam defining light.

5. Patient monitoring systems.

Records of the above checks will be maintained and abnormal operation will immediately be reported to the radiation safety officer for correction. We have attached a copy of the form used for daily safety checks.

The monthly checks will incorporate all of the above plus the following:

1. All items required for the monthly spot check.

2. Survey meter.

3. Source "ON", source "OFF" indicators on teletherapy head.

4. Door interlocks.

Records will be maintained for at least two years including abnormal operation and dates of correction.

Monthly checks will be performed by a teletherapy physicist or trained deputy. The spot checks will be in accordance with 35.634 of 10 CFR Part 35, using a form and procedure designed by a Teletherapy Physicist.

10.6 Emergency Procedures

The emergency procedures described in Appendix I of Draft Regulatory Guide F 414-4 will be observed.

10.7 ALARA Program

The Model ALARA Program described in Appendix J of Draft Regulatory Guide 414-4 will be observed.

ITEM 11

WASTE MANAGEMENT

The following will only be performed by persons specifically authorized by the NRC or an Agreement State to perform such services:

1. Installation, relocation, or removal of teletherapy units containing sources.

2. Source exchange.

3. Any maintenance or repair procedures involving work on the source drawer, the shutter or other mechanisms that could expose the source, reduce the shielding around the source, or compromise the safety of the unit and result in increased radiation levels.

4. Licensed materials such as unneeded teletherapy source will only be transferred to persons specifically licensed by the NRC or an Agreement State to receive them in accordance with the requirements of 10 CFR Part 20 (NRC) or an equivalent Agreement State requirement.

In case of relocation of the teletherapy unit, a proper amendment in the license will be obtained prior to relocation.

ADDITIONAL INFORMATION

1. The control will have a digital timer which will count the actual treatment time given. This timer is in addition to the timer used to set the treatment time.

2. Patient dose and treatment time calculations will be double checked for accuracy weekly and new calculation times and doses will be checked within 48 hours of first treatment.

3. The RSO is based in Evansville, IN approximately 15 minutes from the facility.

4. All records and regulations required for the operation of a Teletherapy License will be maintained at the center in a looseleaf notebook. The technologists will have access to the book and be instructed in the importance of the documents and safety requirements for the operation of the facility and teletherapy machine. The teletherapy physicist will verify that safety checks are performed as scheduled, and that records of checks are maintained, and will continuously verify that operators are kept up to date with pertinent regulation changes, NRC notices, etc.

TELETHERAPY OPERATOR INSTRUCTIONS

1. The teletherapy unit will be operated by a technologist under the strict guidance of the authorized user(s). The unit is capable of being used in fixed, arc, skip and rotation mode. The teletherapy unit will be used for the treatments of humans only.

2. The operator of teletherapy unit will make sure that no person other than the patient is present in the room when the primary beam is turned on.

   The following procedures will be followed to operate the teletherapy machine:

   a. MASTER KEY SWITCH
      The master key switch controls the power supply to the control console and the unit, and must be turned fully in clockwise direction and released before any operation can commence. The unit will then be ready for treatment set up. The air compressor will start and the beam condition lights illuminate. The pressure in the air storage tank will then reach the correct operating level within approximately two minutes.

   b. HEAD CONTROL
      The sourcehead can be swivelled about its own axis through 350 degrees (180 degrees clockwise and 170 degrees counter-clockwise) and controls for this are located in the hand control at the treatment stretcher. If the head is not set on swivel zero, the curved arm can only be rotated with the hand control. Accurate head swivel zero is obtained by using the swivel angulation scale and pointer.

      Curved arm rotation can be controlled from the control console or manually with the hand control. A choice of four treatment methods is provided, as follows:

      1. ARC - if arc therapy is selected and the cycling contacts are arranged at the desired angulation limits, the curved arms will oscillate within that sector of the full cycle.

      2. SKIP - if skip therapy is selected the curved arm will rotate continuously but the cycling contacts will restrict the radiation beam to the desired sector throughout each full cycle.

      3. ROTATE - if rotational therapy is selected the curved arm will rotate with the rotation beam on continuously for the allotted treatment time.

4. FIXED - if fixed therapy is selected, curved arm movement is controlled with the hand control only. It should be noted that the cycling contacts will have no effect when the unit is manually controlled.

c. STRETCHER ASSEMBLY CONTROL

Stretcher controls are provided as follows:

1. Pedestal swivel motion foot lock - located at the base of the pedestal.

2. Elevation control - a three position rocker switch with a center off position and two momentary positions for raising and lowering the stretcher top.

3. Rotational brake control - two position rocker switch with a ROT. (rotation) position and a LOCK position.

4. Longitudinal brake control - a two position rocker switch with a LONG (longitudinal) position and a LOCK position.

5. Lateral control - handwheels are provided to move the stretcher top laterally through 15 cm (7.5 either side of centre).

d. OPERATING PROCEDURE

The sequence of operation is as follows:

1. Turn the master key switch fully clockwise.

2. Enter the treatment room.

3. With the patient in position, raise the stretcher top to the desired level.

4. Lock the pedestal in the desired position.

5. Lock the stretcher top in the desired rotational position.

6. Lock the stretcher top in the desired longitudinal position.

7. Locate the stretcher top in the desired lateral position. If fixed therapy is prescribed for the patient, move the source-head to the correct orbital location by means of the hand control. Adjust the head swivel angulation as required.

If rotational or multiportal therapy is prescribed, carefully rotate the curved arm over the full treatment range to ensure no interference at any point.

NOTE: In order that the collision circuitry should not operate unnecessarily, the patient should be instructed to remain as immobile as possible during set up and treatment.

8. Using the field size indicators, beam defining light system, and optical distance indicator, adjust the collimator until the desired opening and orientation is obtained. The collimator rotation lock should then be secured.

9. If rotational or segmental therapy is to be used, move the sourcehead with the hand control to the desired orbital starting point.

10. Using the control on the main frame, select the desired rotation speed.

11. Choose the type of treatment required with the selector switch on the control console. If skip or arc therapy is to be used, set the cycling contacts on the arm rotation scale to the desired limits. For arc treatment commence rotation within the selected treatment angle. For skip treatment start rotation outside the source-on angle. If rotation is stopped during skip treatment the curved arm should be moved to a position outside the source-on angle before restarting treatment.

12. Select the direction of rotation.

13. Close the therapy room door and check that the timer is off.

14. Depress the reset button.

15. Set the desired treatment period on the timer.

16. To start the treatment, turn on the timer switch. The red BEAM ON light will illuminate, and the green BEAM OFF light will extinguish when the drawer reaches the fully on position.

When the allotted treatment time has expired the unit will stop and the drawer will close.

NOTE: If the timer is turned off, or the emergency bar is actuated, the drawer will be returned automatically by the double acting cylinder to the safe position. Also the drawer will close, rotation will stop, and the machine must be reset with the RE-SET button if the therapy room door is opened during treatment.

3. The teletherapy personnel will be required to wear radiation monitoring badges. Whole body badges will be worn at waist or chest level during all working hours. During non-working hours the badges will be left in the facility at a preassigned location (i.e. the block room).

4. DO NOT TREAT PATIENTS:

   1. If a person other than the patient is in the room.
   2. If the close circuit TV system is not functioning.
   3. If the door interlock is not functioning.

5. During unattended hours:

   1. The teletherapy room must be locked.
   2. The console key switch must be "OFF" and the key removed.

DAILY SAFETY PRECAUTIONS

Each day prior to patient treatments, the Cobalt teletherapy operator must perform the following safety checks:

1. Use the dedicated Cs-137 check source to verify that the Primalert radiation monitor is functioning correctly.
   In Case of Failure:
   1. Notify Arnold Sorensen or Saiyid Shah (812) 476-1367 immediately.
   2. You must use the survey meter whenever you enter to treatment room after Beam-On conditions.
   3. You must verify survey meter operation daily (prior to first use) with its dedicated check source.

2. Check that "Beam-On" and "Beam-Off" indicator lights on a) Control console, b) Above door, and c) "Beam-Off" on gantry are functioning. Check that patient monitor systems are functioning.

Your initials on this form indicates that the results were satisfactory.

DATE	INITIALS	COMMENTS	DATE	INITIALS	COMMENTS