



The
University of Oklahoma

Oklahoma City Campus-Health Sciences Center

DEPARTMENT OF RADIOLOGICAL SCIENCES
College of Medicine

Chief
Division of Material Licensing
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 70612

Dear Sir:

With reference to the NRC Teletherapy, Education, and Training Unit, License No. 35-03176-06, for the Co-60 unit located at the College of Health, the unit has been installed and is being released for use.

Reports related to survey, calibration, certificate of calibration of survey meter, and pertinent leak test are attached.

This unit was acquired from Oklahoma University Norman Campus. The electrical installation was performed by Mr. Dick Gavin, Merkel X-ray of Oklahoma City.

Caution Sign, Electrical Interlocks, and Audible Signal

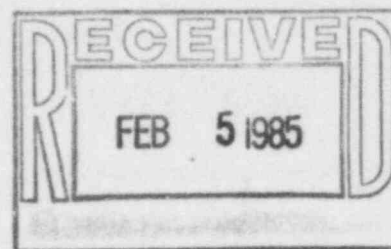
There is a "Caution High Radiation Area" sign, size 8 1/2 x 11, on the outside door which leads to the control area. The door inbetween the control room and the room where the Co-60 machine is located, has an electrical micro switch which when opened terminates the exposure and retracts the source. An audible signal is automatically turned on when the exposure starts and signal terminates at the termination of exposure. The description of this instrument is provided below:

Victoreen Model #496, Sr. #651
Prime Alert Teletherapy
Radiation Monitor.

Training of Personnel
Accessability to the Machine, and Personnel Monitoring

1. The key for the Co-60 is retained by the Department of Radiological Technology.
2. Only persons authorized by Prof. Carole Sullivan or Prof. Lana Andrews will be allowed access to the area. They will be properly trained as far as machine operation and safety aspects are concerned.
3. All the personnel and students under training are required to wear the film badge dosimeter while working in the radiation area.

8506110632 850416
REG4 LIC30
35-03176-06 PDR



U.S. N. R. C.
FEE EXEMPT

January 29, 1985

85 FEB -8 AM 10:31

RECEIVED

RECEIVED BY LFMB	
Date	2/8/85
Leg.	Jan 7 IV
By	Brown
Orig. To	2/8/85
Action Compl	

State
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Chief, Division of Material Licensing
January 29, 1985

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4. Source wipe testing will be performed every six months and calibration will be conducted on a yearly basis.

Please let me know if any other information is required.

Sincerely yours,

B. Ahluwalia, Ph.D.

B. Wally Ahluwalia, Ph.D.
Radiological Physicist
Diplomate ABR and ABSNM

BA/db
Attachments

REPORT OF TELETHERAPY TESTS AND SURVEYS

Licensee University of Oklahoma Health Sciences Center
Address P. O. Box 26901, Oklahoma City, Oklahoma 73190
License # 35-03176-C6

TELETHERAPY TESTS

Yes ☒ The interlock on the door(s) to the teletherapy room was tested and found to function properly. When a door was opened with the source "ON", the source returned to the "OFF" position and could not be turned "ON" again until the door was closed and the system reset at the control panel.

Yes ☒ The teletherapy source "ON-OFF" indicators, both at the source housing and on the teletherapy machine control panel, were tested and found to function properly.

Yes ☒ The teletherapy treatment timing device was tested and found to be accurate and to return the source to the "OFF" position when the preset time elapsed.

Yes ☒ Electrical and/or mechanical stops installed to limit the orientation of the teletherapy head with the source "ON" were tested and found to function properly. The limitations are:

The head can rotate 90° towards the north wall direction and
exposure can be made. Exposure in this direction will never
be done. This machine will be used exclusively for the training
of Radiological Technology students.

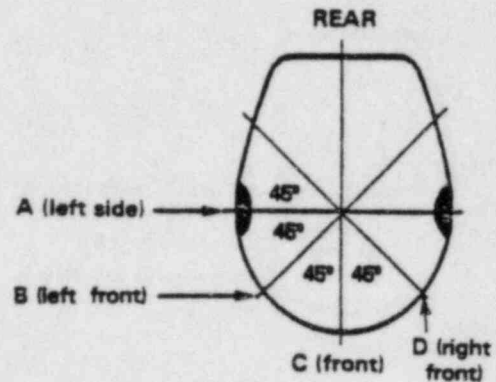
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Figure F-1 TELETHERAPY HEAD SURVEY

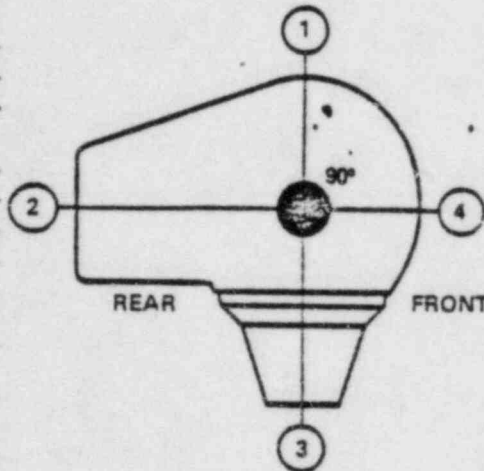
(Source in "OFF" position.
Measurements taken one meter
from source)

Top View-Showing
orientation
of Views A through D

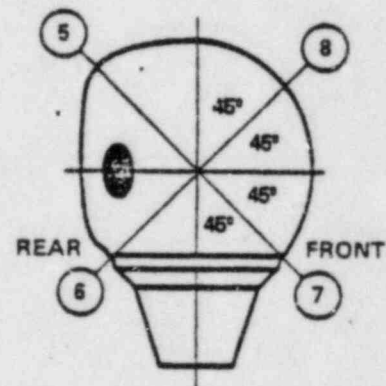
Position No.	Radiation Level (mr/hr)
View A	
1	0.1
2	0.1
3	0.5
4	0.2
View B	
5	0.1
6	0.1
7	0.2
8	0.2
View C	
9	0.05
10	0.05
View D	
11	0.1
12	0.1
13	0.1
14	0.1
Average value	0.15
Maximum value	0.2



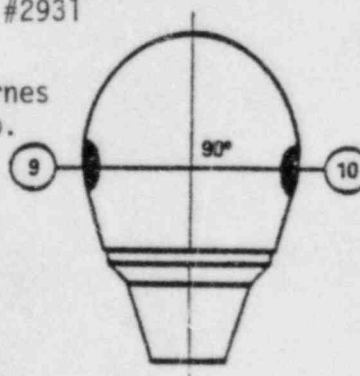
View A-Vertical
from left side



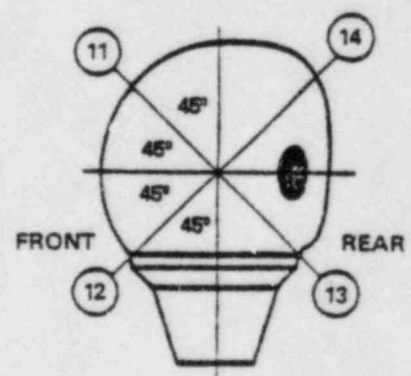
View B-Vertical
from left front



View C-Vertical
from front



View D-Vertical
from right front



Date of survey Nov. 15, 1984

Instrument used Victoreen
Model #470A, Sr. #2931

Manufacturer's Keleket
name & model number W. F. John Barnes
of teletherapy source and Co.

Date of installation Nov. 1, 1984

OUTPUT 62.7 ☒ RHM
☐ RMM

Date of output Nov. 15, 1984
measurement

TELETHERAPY FACILITY SURVEY AND BEAM CALIBRATION

* Position (keyed to sketches)	** Maximum Radiation Level (mR/hr)	Restricted Area?	Beam Orienta- tion	Maximum Field Size at a Specified Distance	Beam Catcher Used?	Phantom in Beam?	Beam Calibration		
							Distance	Field Size	rads R/min
A	0.07	Yes Control Panel	Vertical Down	6 x 6 @ 50 cm	None	30 x 30 cm	50 cm	6 x 6 cm	3.94
B	0.13	No East Side Housekeeping	"	"	"	"			
C	0.05	No East Side Housekeeping	"	"	"	"			
D	0.05	No Housekeeping Dept.	"	"	"	"			
E	0.05	No West Side Lockers	"	"	"	"			
F	0.05	No North Outside	"	"	"	"			
G	4.5	Yes Room Door	"	"	"	"			
H	0.5	No Roof	"	"	"	"			
Instrument used: Victoreen 470A Sr. #2931							RHM 62.7	On 10/4/64 Curies 785	

*Vertical and horizontal cross section sketches of the facility and adjoining areas must be submitted with this report unless "Positions" are keyed to sketches already on file with the Commission.

**If the radiation level in an unrestricted area exceeds 2 mR/hr, it must be shown that, in keeping with Section 20.105(b) of 10 CFR 20, an individual continuously present in the area would not receive more than 2 millirems in any one hour or 100 millirems in any seven consecutive days. (If your license authorizes Section 20.105(a) limits, the radiation levels should be equal or less than the values specified in your application. If the radiation levels are higher they should be justified pursuant to Section 20.105(a).)

DATES OF MEASUREMENTS:

Radiation Level: November 15, 1984

Beam Calibration: December 13, 1984;
January 24, 1985

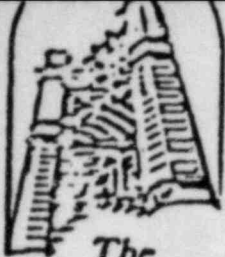
Date: January 28, 1985

Signature:

B. Wally Aduwaha, Ph.D.

Surveyor Radiological Physicist
Clayton Rich, M.D.
(licensee) Clayton Rich, M.D.
Provost
Univ. Of Oklahoma
Health Sciences Center

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The
University of Oklahoma
Health Sciences Center

Post Office Box 26901 Oklahoma City, Oklahoma 73190

Department of Radiological Sciences

B. Ahluwalia, Ph.D.
Radiological Physicist

CALIBRATION REPORT

Instrument : Survey Meter Range: 0.02 MR/Hr - 10³ MR/Hr
 Make : Victoreen Cate Pie Panoramic
 Serial Number: Model 470 A Serial #2931
 Laboratory : Nuclear Medicine
 Institution : V.A. Medical Center, Oklahoma City OK
 Source used for calibration: 25.32 mg Radium-226
 Net Exposure at 1 cm 189.9 R/hr

Calibrated at response setting: Slow (), Medium (), Fast ()
 Fixed (X)

Point	1	2	3	4	5	6	7	8	9	10	11	12
Distance: meters	0.218	0.45	0.31	0.44	0.52	0.80	0.97	1.38	1.64	2.52	3.08	4.36
Calculated exp. from Ra-226, R/h												
mR/h	400	700	200	100	70	30	20	10	7	3	2	1
Scale	1000 →		300 →		100 →		30 →		10 →		3	
Reading	400	685	208	110	73	33	22	11	7.5	3.3	2.2	1.1
Calib. Factor	1.0	0.98	1.04	1.1	1.04	1.1	1.1	1.1	1.07	1.1	1.1	1.1

Divide a reading by the calibration factor to get the true exposure.

Remarks:

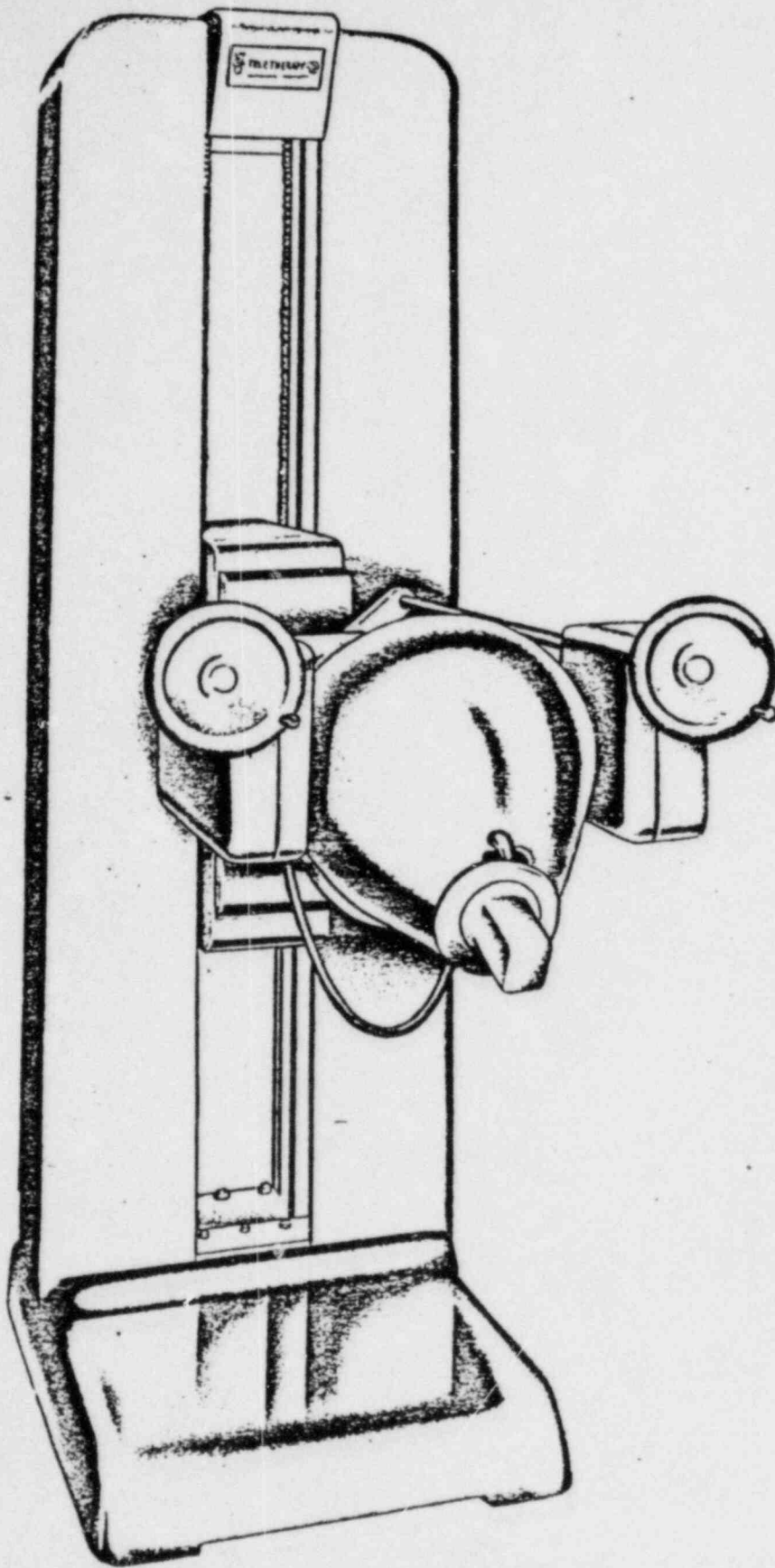
All expected readings are within 10% of the expected calculated values.

Date of Calibration: 10/26/1984

Record Book Page: _____

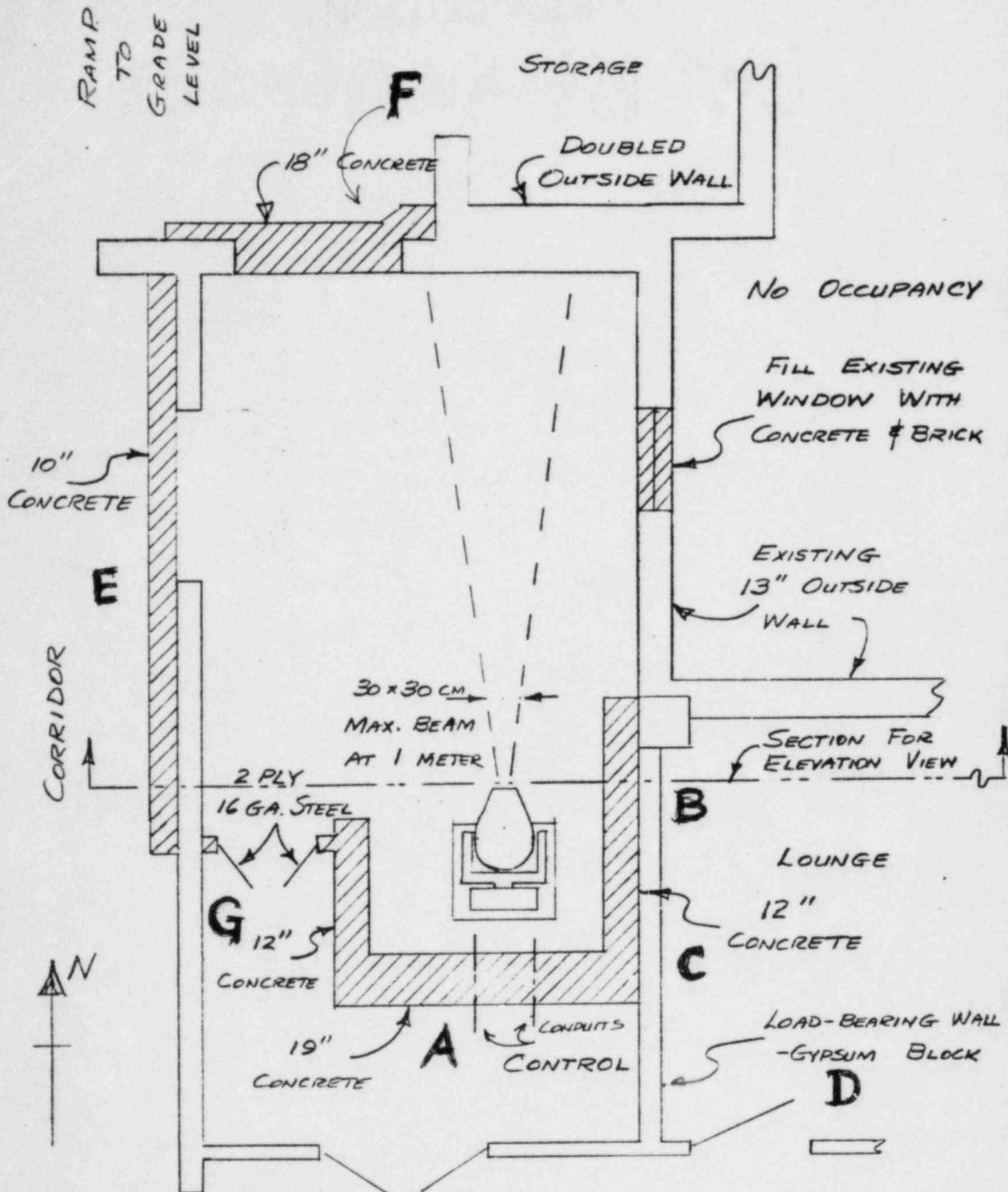
B. Ahluwalia, Ph.D.

B. Ahluwalia, Ph.D.
Radiological Physicist



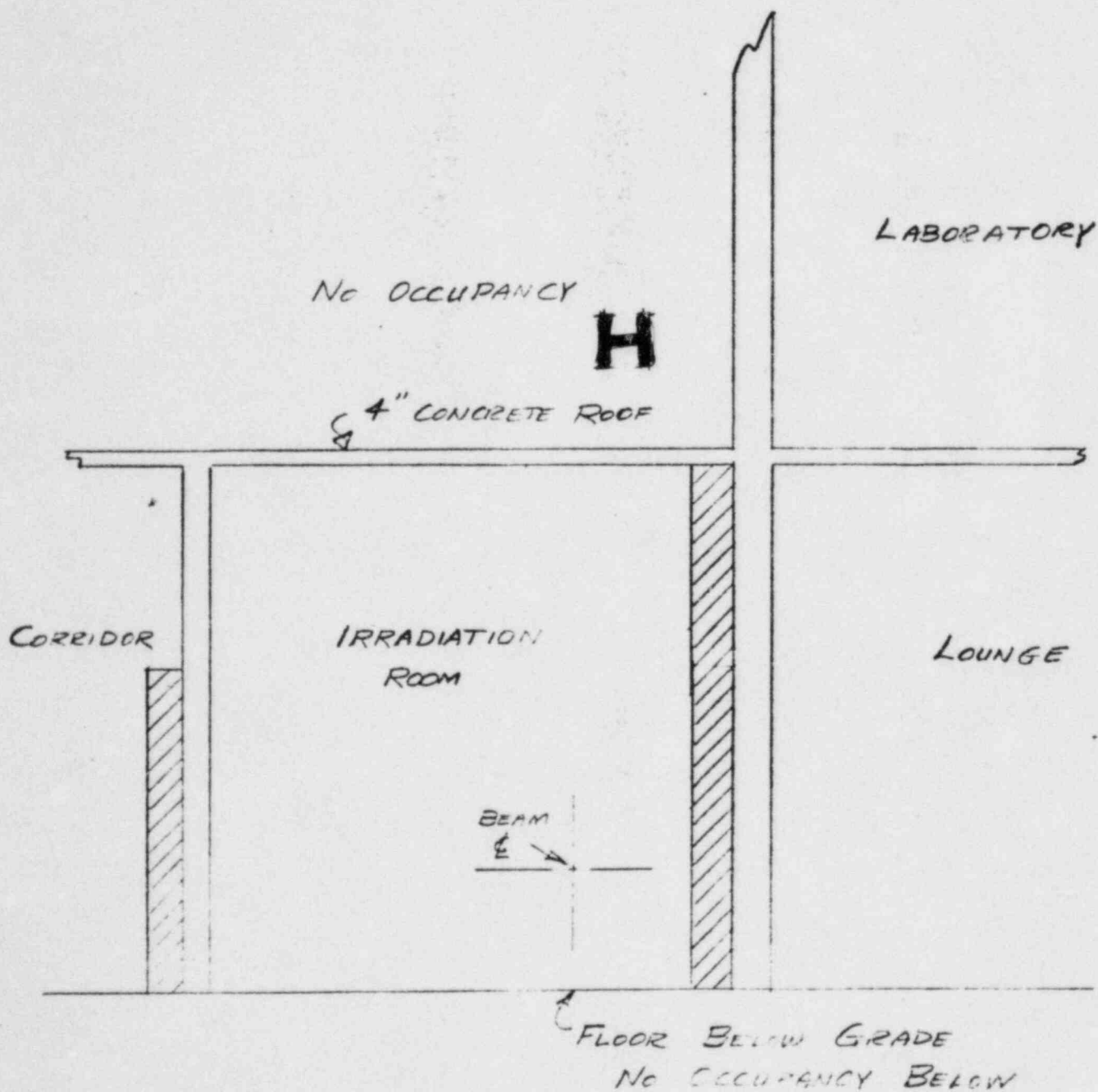
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CHB RM 49
 SCALE: $\frac{1}{4}'' = 1'0''$

CORRIDOR



CHB RM 49 ELEVATION
SCALE: $\frac{1}{4}" = 1'0"$

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Keleket - Barnes

Cobalt Unit Data

Holt-Krock Clinic
Ft. Smith, Arkansas

Unit Number FE - 1520

License Number ARK-071-BP-7-69 (ORNL Source)

File Number 3 - 1924 - 1

Amended to Picker Source P-3802A
On August 24, 1964

Catalog Number KK-109773 On Tube Stand

Serial Number TT-16 " " "

Sticker On Head As Follows:

785 Curies
October 4, 1964

THE UNIVERSITY OF OKLAHOMA INTEROFFICE COMMUNICATION

To Dr. Gail Adams, Radiation Safety Officer Date May 1, 1980

From Johnny James, Health Physicist *JJ* Subject Co-60 Teletherapy Unit

All the information I had concerning the Keleket-Barnes teletherapy unit was given to Carol Sullivan quite some time ago. I have looked through all my files and can not locate any information that would be of any help to you. I cannot even find the inspection report (1971) they refer to in the letter. Dr. Nelson maintained the records at that time, plus that was before I took over the job as Health Physicist.

I wish you luck on your response to the NRC. Hope they can understand what you are trying to do with the unit.

Please let me know if you hear anything about the waste disposal problem.

JJ:bg



The
University of Oklahoma
Oklahoma City Campus - Health Sciences Center

DEPARTMENT OF RADIOLOGICAL SCIENCES
College of Medicine

M E M O R A N D U M

TO: Radiation Safety Committee

FROM: B. Wally Ahluwalia, Ph.D. *BAH*
Radiation Safety Officer

DATE: August 10, 1984

SUBJECT: Semi Annual Wipe Test of Sealed Sources

The NRC required wipe tests were performed on the following sealed sources during August 2, 3, and 6, 1984.

All gamma wipe tests were measured in the OUHSC Packard Autogamma counter with 124 Channel Analyzer and 3x3 with NaI (Tl) well counting system. All beta wipe counting was measured with Linlog Eberline Instrument Corporation Serial #671; PAC 5G α, β counter.

<u>ISOTOPE</u>	<u>SOURCE AND LOCATION</u>	<u>SENSITIVITY, pCi</u>	<u>WIPE, pCi ABOVE BACKGROUND</u>
<u>University of Oklahoma Health Sciences Center</u>			
Co-60	Teletherapy, College of Health	87	---
Cs-137	Nuclear Pharmacy (100 mCi, 6/8/77)	33	---
Cs-137	Nuclear Pharmacy (#3600878B-12) (207 uCi, 8/30/78)	33	---
Cs-137	Nuclear Pharmacy (#88340E) (9.1 uCi, 7/1/77)	33	---
Co-57	Nuclear Pharmacy (#3520382A-07) (258 uCi, 3/8/82)	24	---
Ni-63	College of Pharmacy A1857 (Drug Res. Lab)	12	---
Ni-63	College of Pharmacy F208 (Drug Res. Lab)	12	---
<u>State of Oklahoma, Chief Medical Examiner</u>			
Ni-63	Gas Chromatograph, 801 N. Stonewall	12	---

The following other spot checks for the teletherapy units were performed and found satisfactory: 1) interlock operation, 2) room monitor operation, 3) timer termination, and 4) exposure interruption and re-initiation.

BA/db

xc: Dave Gilliland, D. Ph.
L. V. Allen, Ph.D.
Richard Prouty

*Rec'd & approved
9-7-84
APK*

EMERGENCY PROCEDURES

- I. Should the Cobalt 60 source fail to retract while student/faculty are completing an experiment the following steps must be taken:
 1. The student/faculty will note the exact time the unit's timer shut off and the source failed to retract.
 2. UNDER NO CIRCUMSTANCES SHOULD YOU ENTER THE ROOM.
 3. The room should be kept closed.
 4. One of the following individuals, in this order, should be contacted immediately:

A. B. Wally Ahluwalia, Ph.D.	ext. 6121
B. Carole A. Sullivan, R.T.T.	ext. 6477 or ext. 5641
C. Lana Andrews, R.T.T.	ext. 6477
D. C. R. Bogardus, Jr., M.D.	ext. 5641
 5. Note the exact time the source was retracted.
- II. Any other malfunction of this unit should be reported immediately to Ms. Sullivan or Mrs. Andrews.

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Item 15. Radiation Protection Program

- A. General responsibility by Radiation Safety Committee and RSO, described in Radiation Safety Manual.
- B. Operating responsibility by College of Health personnel, described in "Educational Activities" document, attached, pp. 1-8.
- C. Emergency Procedures, attached, to be posted at Control Panel.
- D. Film Badge surveillance of user faculty and students. Service provided from Radiation Safety Office; badges supplied by Landauer, changed monthly. RSO reviews all monthly reports, institutes any action needed pursuant to ALARA and radiation action guides.
- E. Sealed sources, on available surfaces, are wiped semi-annually by RSO and counted in radiation safety or nuclear medicine laboratory using a gamma well crystal and pulse height analysis. Sensitivity (Co-60) is commonly less than 30 pCi (0.000 030 uCi).
- F. Survey meters are calibrated annually in the radiation safety laboratory. A Radium Standard with certificate is used; calculations are used to achieve exposure rates to test two points on each scale. We were recently inspected and the methods approved ("by the book").
- G. Policy for access to keys to area door and also to control panel is attached.

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