Framingham Union Hospital
115 Lincoln St., Framingham, Massachusetts 01701 • (617) 879-7111
A Community Teaching Hospital Affiliated with Boston University Medical Center

June 13, 1986

Nuclear Regulatory Commission
REgion I
Nuclear Materials Section
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Sir:

Please find enclosed the results of the pre-operational tests performed on the Picker C-9 cobolt teletherapy equipment located at 475 Franklin Street, Framingham, MA 01701 and licensed to the Framingham Union Hospital, 115 Lincoln Street Framingham, MA.

If there is need for any additional material or any questions please call me at (617) 481-1121. Thank you.

Sincerely

Harold Jennison
Director of Planning

HJ:bab

June 9, 1986

Mr. Harold Jennison
Coordinator of Planning
Framingham Union Hospital
119 Lincoln St.
Framingham, MA 01701

Reference: NRC Lic. # 20-10621-02

Subject: Tests and Measurements: Installation of new Co-60 source.

Enclosed are the results of the pre-operational tests and radiation survey performed on the Picker C-9 cobalt teletherapy facility located in 475 Franklin St., Framingham, MA.

The tests were started on May 16, 1986 immediately following the installation of the new source by AMS (Advanced Medical Systems, Inc.). Two copies of this report must be sent to the NRC (Region I, Nuclear Materials Section, 631 Park Ave., King of Prussia, Pennsylvania 19406).

Enclosures:

1. Teletherapy Unit Tests
2. Teletherapy Head Survey
3. (3) sketches of facility environs
4. Radiation Survey around facility
5. Copy of Emergency Posting at door of treatment room
6. Copy of Wipe Test by AMS
7. Copy of Certificate of Measurement by AMS
8. Copy of Receipt of old sources by AMS
9. Five Year Inspection and Preventative Maintenance Report

It is my conclusion that this cobalt facility is in compliance with the conditions of the license, in particular, conditions 13 to 26, at this time,

M M Castro, Ph.D.
Radiation Oncology Physicist, ABR-Certified

REPORT OF TELETHERAPY TESTS AND SURVEYS

Licensee Framingham Union Hospital

Address 115 Lincoln st., Framingham, MA

License # 20-10621-02

TELETHERAPY TESTS

Yes [X] No [ ] 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.

Patient viewing through door view port via mirror in room is satisfactory.

Yes [X] No [ ] 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.

An independent GM monitor is installed in the treatment room, and is functioning properly

Yes [X] No [ ] The teletherapy treatment timing device was tested and found to be accurate and to return the sourceto the "OFF" position when the preset time elapsed.

Yes [X] No [ ] 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:

(1) If beam central axis passes through the isocenter, treatment can be carried out provided that beam is not directed above the horizontal.

(2) If the central axis is off the isocenter then treatment can only be carried out as long as the beam is directed toward the floors.

(3) When the CA and the isocenter coincide, the beam stop fully intercepts the beam

Figure F-1
TELETHERAPY HEAD SURVEY

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

Position No.		Radiation Level (mR/hr)
View A	1	1.65
	2	0.76
	3	2.55
	4	1.07
View B	5	0.71
	6	1.28
	7	1.78
	8	0.46
View C	9	0.38
	10	0.51
View D	11	0.51
	12	1.63
	13	1.63
	14	0.76
Average value		1.12
Maximum value		2.55

Date of survey 5/16/86

Instrument used Victoreen #491

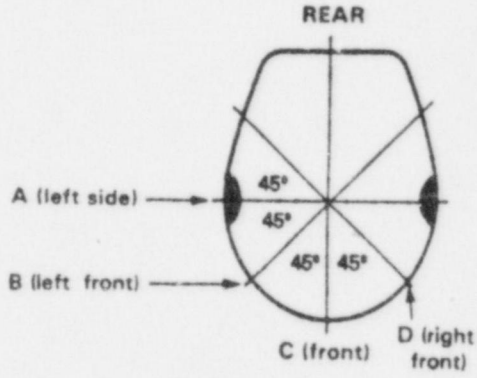
Manufacturer's name & model number of teletherapy source AMS-3801

Date of installation 5/16/86

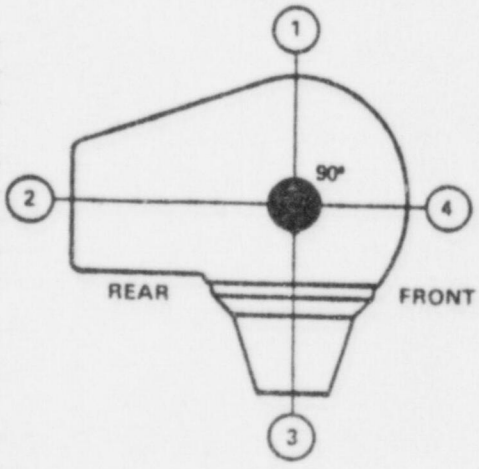
OUTPUT 1721 ☒ RHM ☐ RMM

Date of output measurement 5/16/86

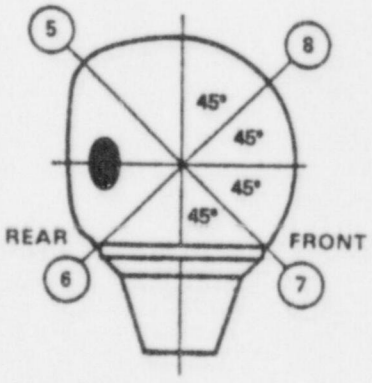
Top View-Showing orientation of Views A through D



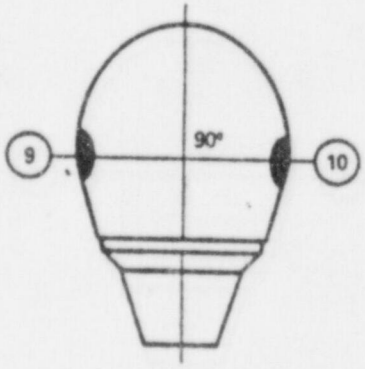
View A-Vertical from left side



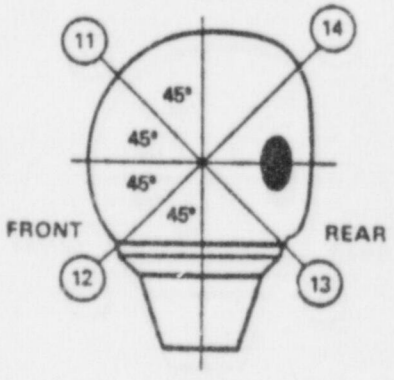
View B-Vertical from left front

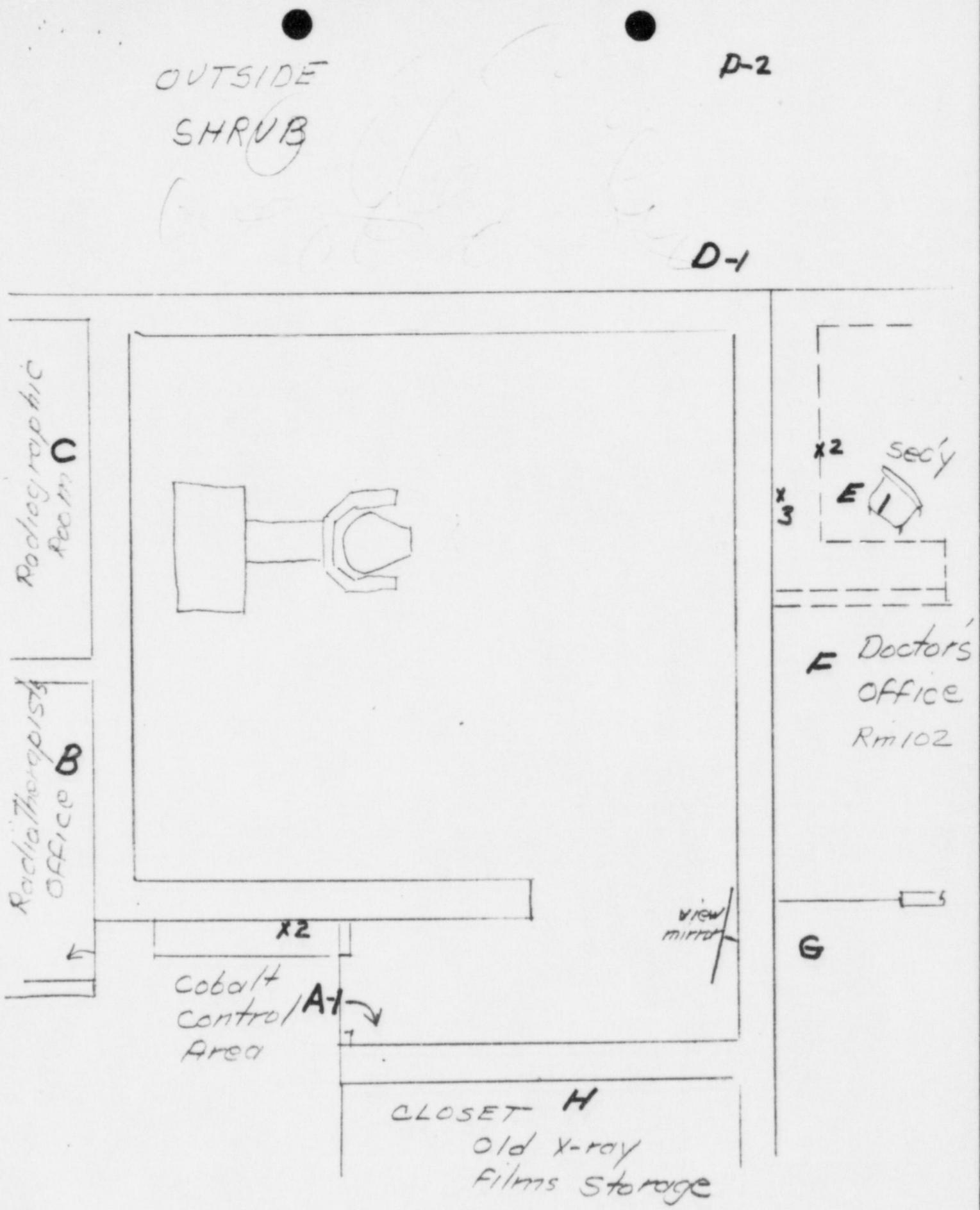


View C-Vertical from front



View D-Vertical from right front



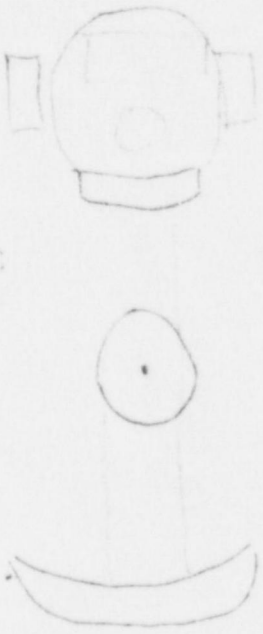

OUTSIDE
SHRUB
D-2
D-1
Radiographic Room
C
Radiotherapist Office
B
x2
Cobalt Control Area
A-1
view mirror
x2
Sec'y
x3
E
1
F
Doctor's Office
Rm 102
G
CLOSET
H
Old X-ray Films Storage

Rm 203
Doctor's
OFFICE

N

J

(UPPER LEVEL)



OUTSIDE
SHRUB

cobalt
Control
Area A

(GROUND
LEVEL)

D

(Lower
Level)

Ground

M

Pump &
Switch
Room

FILL

DIMENSIONS
approximate

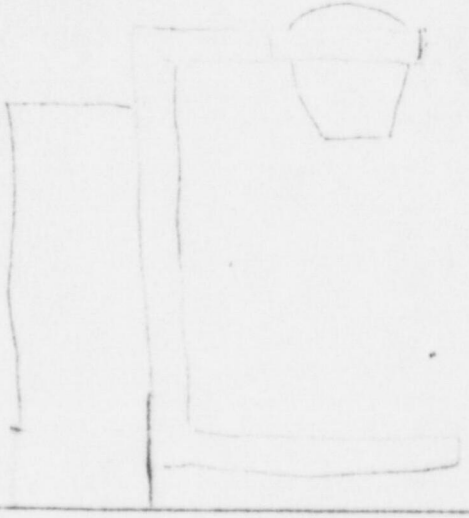
Room 203
Doctor's Office

I

J (UPPER LEVEL)

Radio-
therapist's
office

B
(Ground
Level)



Doctor's
office

E, F

(LOWER
LEVEL)

L

Rm. 950
Doctor's
office

FILL
(Dimensions
approximate)

K

Rm. 020
Doctor's
office

TELETHERAPY FACILITY SURVEY

Field Size Used: 25"X25" (Ref. # 20-1062/-02)

Phantom Used: Water

Beam catcher used? Yes Survey Meter: Victoreen 491

POSITION Refer to sketches	RESTRICTED AREA?	BEAM ANGULATION (deg)	MAXIMUM RAD'N LEVEL mR/hr	REMARKS
A-1	Yes	90	1.22	
		60	2.24	
		30	0.61	
Control / Typical / operators position		0	0.20	
		330	0.05	
		300	0.05	
		270	0.05	
A-2	Yes	90	0.82	
		60	3.77	
		30	1.22	
Control / 1' from wall		0	0.15	
		330	0.10	
		300	0.05	
		270	0.04	
B	Yes	90	0.23	
		60	0.61	
		30	0.36	
Radiotherapist's office		0	0.15	
		330	0.03	
		300	0.02	
		270	0.05	
C	Yes	90	0.46	
		60	0.41	
X-ray room		30	0.41	
		0	0.82	

TELETHERAPY FACILITY SURVEY

Field Size Used: _____ (Ref. # _____)

Phantom Used: _____

Beam catcher used? _____ Survey Meter: _____

POSITION Refer to sketches	RESTRICTED AREA?	BEAM ANGULATION (deg)	MAXIMUM RAD'N LEVEL mR/hr	REMARKS
		330	0.92	
		300	1.12	
		270	0.82	
D-1	No	90	0	1' from accessible
		60	0	wall (shrub growth
		30	0	very dense)
OUTSIDE SHRUB AREA		0	0.18	
		330	0.51	
		300	3.32	
		270	6.12	
D-2	No	90	0	at pedestrian walk
		60	0	
		30	0	
OUTSIDE SHRUB AREA		0	0	
		330	0.015	
		300	0.10	
		270	0.15	
E-1	No	90	0.20	at secretary's chair
		60	0.26	
		30	0.36	
Room 102		0	0.41	
		330	0.41	
		300	0.51	
		270	0.41	
E-2	No	90	0.41	edge of wall counter

TELETHERAPY FACILITY SURVEY

Field Size Used: _____ (Ref. # _____)

Phantom Used: _____

Beam catcher used? _____ **Survey Meter:** _____

POSITION Refer to sketches	RESTRICTED AREA?	BEAM ANGULATION (deg)	MAXIMUM RAD'N LEVEL mR/hr	REMARKS
		60	0.77	
		30	0.71	
		0	0.71	
		330	0.61	
		300	0.77	
		270	0.66	
E-3	No	90	1.22	1' from wall of
		60	1.17	secretary's area
		30	0.92	
		0	0.61	
		330	0.46	
		300	0.46	
		270	0.46	
F	No	90	1.33	1' from wall
		60	1.12	
		30	0.56	
		0	0.36	
		330	0.10	
		300	0.10	
		270	0.05	
G	No	90	0.61	1' from wall
		60	0.46	
		30	0.05	
		0	0	
		330	0	

TELETHERAPY FACILITY SURVEY

Field Size Used: _____ (Ref. # _____)

Phantom Used: _____

Beam catcher used? _____ Survey Meter: _____

POSITION Refer to sketches	RESTRICTED AREA?	BEAM ANGULATION (deg)	MAXIMUM RAD'N LEVEL mR/hr	REMARKS
		300	0	
		270	0	
H	Yes	90	2.6	occupancy = 0.
		60	6.1	
		30	1.33	
		0	0.36	
		330	0.10	
		300	0.06	
		270	0.05	
J	No	90	0.61	I, J are office 203.
		60	0.13	Max. readings are in
		30	0.02	Doctor's office.
		0	0.02	Measurements taken
Upper Level		330	—	1' from floor.
		300	0.15	
		270	0.71	
K, L	No	90	0.05	Measurements at 6'
		60	0.02	from floor. Surveyed
		30	0.01	2 offices (020 & 050),
		0	0.01	utility room and toilet.
Lower Level		330	0.01	
		300	0.01	
		270	0.01	
K, L		0°	0.013	← off beam stop.

June 12, 1986

EMERGENCY PROCEDURE

IN CASE OF

BEAM CONTROL FAILURE

If the light signals indicate that the beam control mechanism has failed to terminate the exposure at the end of the present time (for example, if the red light stays on and/or the green signal does not light up) the source may still be in the "ON" position. The following steps are to be carried out in a calm manner.

FOR THE RADIATION THERAPY TECHNICIAN

1. Open the door to the treatment room.
2. If the patient is ambulatory direct him to get off the table and leave the room.
3. If the patient is not ambulatory:
   Enter the treatment room but avoid exposure to the useful beam.
   Pull the treatment table as far away from the useful beam as possible.
   Transfer the patient to a stretcher and remove him from the room.
4. Close the door.
5. Turn off the main switch at the control panel.
6. Notify the radiation therapist and radiation protection supervisor at once.

1.	Dr. Joseph Ferrucci	872-3684
2.	Rhe Etta Plante	263-6689
3.	Dr. L. Inker	879-7111 ext.2601
4.	Harold Jennison	879-7111 ext.4012
5.	Dr. M.M. Castro	793-6550
		799-8245

FOR THE RADIATION PROTECTION SUPERVISOR

1. Secure a portable survey meter. Check to see that the meter is functioning properly.
2. Turn the power on and open the door a few inches.
3. Stand behind the door and insert the survey meter into the door opening to test whether in fact the source is still in the "ON" position.
4. If the source is still "ON" enter the room and manually turn the source "OFF" as per manufacturer's instructions. Avoid intercepting the useful beam with any part of your body.
5. Adjust the limiting diaphragms to the smallest field size.
6. Close the door to the treatment room. Turn off the power. Lock the control panel. Post a sign warning people not to enter.
7. Notify the equipment manufacturer's representative.

ATC medical group
Advanced Medical Systems, Inc.
1020 London Road
Cleveland, OH 44110
(216) 692-3268

Framingham Union Hospital
475 Franklin Street
Framingham, MA. 01701

CERTIFICATE OF WIPE-TESTING OF RADIOISOTOPE SOURCE

This is to certify that the radioisotope source identified as ADVANCED MEDICAL SYSTEMS, INC., Catalog No. AMS-3802, Serial No. AMS-2550 Cobalt-60 Therapy Source and to be installed in Picker Model No. 590-E, Serial No. 182 Therapy Unit, was wipe tested on 14th January, 1986 and found to have .00171 microcurie of removable contamination, as determined by comparison of the wipe with a standard Cobalt-60 source of .0518 microcurie in a Picker Model 2804 Welltype Scintillation Detector and a Picker Model 628433 Spectroscaler.

Signed: Josephine S. Powell
Josephine S. Powell

Dated: January 20th, 1986

Advanced Medical Systems, Inc.
1020 London Road
Cleveland, OH 44110
(216) 692-3268

Framingham Union Hospital
475 Franklin Street
Framingham, MA. 01701

CERTIFICATE OF MEASUREMENT
COBALT-60 SOURCES

CATALOG NO. AMS-3802
SERIAL NO. AMS-2550

This is to certify that the radioisotope source as identified above was measured at the Advanced Medical Systems, Inc., 1020 London Road Cleveland, Ohio, U.S.A., in such a fashion that the measurement is equivalent to that obtained when the source is installed in a Picker Corporation Catalog Number 6296 60-Cobalt Beam Therapy Treatment equipment with Catalog Number 3706 beam defining device of 25 cm by 25 cm aperture at a distance of 80 cm.

Under these conditions this source was found to have a radiation output in free air of .4932 roentgens per hour at one meter on 14th January, 1986.

The attached decay table for this radioisotope will be useful in estimating the activity at future dates.

This source contained 4681 curies on 1st. January, 1986.

Signed: Josephine S. Powell
Josephine S. Powell
Dated: January 20th, 1986.

The measurement reported is for invoicing purposes only and A.M.S. Inc, assumes no responsibility for results of exposures computed with this value.

ATC medical group
Advanced Medical Systems, Inc.
1020 London Road
Cleveland, OH 44110
(216) 692-3268

Framingham Union Hospital
475 Franklin Street
Framingham, MA. 01701

Radiation Therapy Department (Cobalt)

Received from the above-named facility as of 5-16-86
~~one~~ 60-Cobalt teletherapy source, Model Number 3802/20CM, Serial
Number 1. PX-2325 . 2.38 cm 20 cm
2. PX-687

Advanced Medical Systems, Inc., is authorized to receive the above-mentioned source under N.R.C. License number 34-19089-01.

Signed: Kenneth E. Lawrence
for Advanced Medical Systems, Inc.

Dated: 5-16-86

Advanced Medical Systems, Inc.

1020 London Road
Cleveland, Ohio 44110
(216) 692-3268

TELETHERAPY UNIT
FIVE YEAR INSPECTION & PREVENTATIVE MAINTENANCE REPORT

CUSTOMER: **Framingham Union Hospital/475 Franklin Street/Framingham, MA. 01701**
(HOSPITAL OR DOCTOR) (LOCATION)

TYPE OF UNIT: CAT. NO. **6296** HEAD **590-E** SERIAL NO. **182**
DATE OF INSPECTION: 5-15-86 LICENSED ENGINEER K.E. Jordan

The following items have been inspected and the listed action taken or recommended as indicated. None of the recommended items require that the source be removed for their correction.

I. SOURCE HEAD
- A. Check for significant radioactive contamination
  - (✓) None Detected
  - ( ) See Notes
- B. Shutter Rotor Bearings
  1. Inboard
     - ( ) Lubricated ( ) N/A
     - (✓) Replaced
  2. OutBoard
     - ( ) Lubricated ( ) N/A
     - (✓) Replaced
- C. Shutter Rotor
  - ( ) Cleaned
  - (✓) Other - See Notes - ROTAR REPLACED
- D. Shutter Rotor Cavity
  - (✓) Cleaned
  - ( ) Other - See Notes
- E. Shutter Rotor Return Spring
  - (✓) Replaced
- F. Shutter Rotor Stops
  - "ON" Position (✓) OK ( ) Adjusted ( ) Replaced
  - "OFF" Position (✓) OK ( ) Adjusted ( ) Replaced
- G. Shutter Rotor Drive Mechanism
  - (✓) Lubricated (✓) Voltage (72.0 Volts)
  - ( ) Deficiency See Notes (✓) V Belt Replaced
- H. Head Leakage Survey (16 Points at 1 meter from source)
  - Average Leakage 1.01 mrhm
  - Highest Point Reading 2.5 mrhm

II. COLLIMATING DEVICE
- A. General Condition: "GOOD" W/ X VANE LIMIT SWITCH NEEDED ADJUSTMENT - TESTED OK
  Y VANE NEEDED LUBED BADLY. TESTED OK

FIVE YEAR INSPECTION AND PREVENTATIVE MAINTENANCE REPORT

B. Field Size Indicators - Calibration

1. Distance at which calibrated
( )55cm. ( )60cm. ( )75cm. (X)80cm. ( )95cm.

2. Test Size	Dials Indicated	Light Field
4cm. x 4cm.	4 X 4	3.9 X 3.9
10cm. x 10cm.	10 X 10	10.0 X 10.0
18cm. x 18cm.	18 X 18	18.1 X 18.0
25cm. x 25cm.	25 X 25	25.1 X 25.2

C. Distance Localizer Calibration

Setting	Indicates
40cm.	40
55cm.	55
60cm.	60
75cm.	75
80cm.	80
95cm.	95

D. X-Ray film taken 80 cm. from source with actual field size of 10 X 10.
Lines scribed on film indicate edges of light field.

E. Collimator accessories

1. Front Pointer	(X)OK	( )Needs Repair	- See Notes
2. Back Pointer	(X)OK	( )Needs Repair	- See Notes
3. Pin and Arc	( )OK	( )Needs Repair	- See Notes
4. Wedge Filters	(X)OK	( )Needs Repair	- See Notes
5. Breast Cone	( )OK	( )Needs Repair	- See Notes
6. Beam Shaping Block Holder	(X)OK	( )Needs Repair	- See Notes
7. Extenders (Trimmers)	(X)OK	( )Needs Repair	- See Notes
8. Other POST	(X)OK	( )Needs Repair	- See Notes

III. UNIT IN GENERAL

A. Unit is in good working order recommend Service Contract for proper maintence of unit

B. Isocenter - The true isocenter has been determined to be at a distance of _____ cm. from the end of the collimator. The isocentric accuracy of the center of the beam was determined to be + or - _____ mm.
( ) see Notes and Recommendations which may improve accuracy.

C. Safety Modifications
(X) All modifications recommended by Picker and AMS, Inc. have been made.
( ) The following safety modifications to this unit are recommended by Picker and AMS, Inc. but have not yet been completed. Your local AMS service representative will contact you regarding the following:

1. SERVICE CONTRACT
2. _____
3. _____
4. _____

FIVE YEAR INSPECTION AND PREVENTATIVE MAINTENANCE REPORT

D. Treatment Timer Operation

Timer Set for:	Actual Time:
30 Seconds	X 30
60 Seconds	60
120 Seconds	120
( ) See Notes and Recommendations	- NONE -

E. Source Transit Time
On 2.0 Sec. Off 1.5 Sec.

F. Operational Tests

1. Shutter opens and completely closes at 0,90,180, and 270 or at maximum angles in both directions allowable for this particular installation.
(X) OK ( ) See Notes

2. Where applicable that shutter will not open beyond allowable angles for this particular installation (X)OK ( )See Notes

3. Timer switch properly closes the shutter. (X)OK ( )See Notes

4. "Shutter Closes" or "Emergency" button properly closes the shutter
(X) OK ( ) See Notes

5. Shutter closes when main power is turned off and does not reopen when power is restored. (X)OK ( )See Notes

6. Shutter closes when room door is opened and the shutter does not reopen when the door is reclosed. (X)OK ( )See Notes

7. Where applicable, back pointer, collimator and localizer lights function properly and are calibrated properly. (X)OK ( )See Notes

8. Control panel and room warning lights works properly.
(X)OK ( ) Repaired ( )See Notes

9. All control functions work properly (Rotation, Skip Scan, etc.). OK (X)

G. Mechanical Inspection

1. Structural Defects
(X) None Noted ( ) Repairs Needed-See Notes

2. Bolts
(X) All Correctly tightened
(X) Adjustments made
( ) Defective - See Notes

H. Electrical Inspection

Wiring	(X)OK	( )Replaced	- See Notes
Components	(X)OK	( )Replaced	- See Notes

I. Six (6) Rocker Switches replaced on VG8 Control (Rotational Units)
( ) Replaced (X) Not Applicable

PG. 4.

FIVE YEAR INSPECTION AND PREVENTATIVE MAINTENANCE REPORT

J. General Safety

(X) Unit is safe to operate, however, whether or not the unit is accurate enough for treatment purposes is a determination which must be made by the radiotherapist.

( ) Unit UNSAFE to operate or treat - see below for recommendations:

—NONE—

IV. Table

A. Locks

1. Transverse
   (X) OK ( ) Repaired X ( ) See Notes
2. Longitudinal
   (X) OK ( ) Repaired (X) See Notes
3. Floor
   (X) OK ( ) Repaired
   ( ) N/A ( ) See Notes

B. Vertical Drive Clutch or Motor Mount
   (X) OK ( ) Repaired ( ) See Notes

C. Chain Tension & Condition X
   (X) OK ( ) Adjusted (X) See Notes

D. General
   (X) 1. Hardware Tightened X
   ( ) 2. Lubricated as Necessary
   ( ) 3. Checked for signs of Binding and Unusual Wear.

E. Safety Service Notes X
   (X) (X) Performed ( ) See Notes

V. NOTES AND RECOMMENDATIONS

A. COLLIMATOR BRAKE PAD TO BE REPLACED. OK (X)

B.

D. LUBRICATED

X

X

X

DATE INSPECTION COMPLETED: 5-16-86

BY ADVANCED MEDICAL SYSTEMS, INC. LICENSED ENGINEER: K.E. JORDAN

REPORT EXPLAINED TO AND COPY RECEIVED BY: [signature]

NOTE: N/A - NOT APPLICABLE

X

ATC Medical Group

One Factory Row
Geneva, Ohio 44041
(216) 466-4671

SERVICE REPORT NO. 3157

CUSTOMER:	ADDRESS:	PHONE:
Framingham Union Hospital	475 Franklin Street Framingham, MA 01701	(617) 875-5919

SERVICE REQUESTED BY:	EQUIPMENT TYPE	P.O. NO.	METER READINGS
Dr. Ferrucci	C-9	JOB NO. S85-16	H/V FIL

DATE / / TIME AM ☐ PM ☐

WORK CATEGORY
☐ INSTALLATION ☐ WARRANTY ☐ REMEDIAL MAINTENANCE ☐ PURCHASE ORDER
☐ MODIFICATION ☐ SERVICE CONTRACT ☐ PREVENTIVE MAINTENANCE ☐ OTHER

SERVICED BY: Keith Jordan — EMP. NO.

FAULTS/SYMPTOMS: Source exchange Due

DATE	IN	OUT	HOURS
5/5/86	8:00	7:00	11.0
5/6/86	6:30	3:30	12.0
/ /			
/ /			
/ /			
/ /			
TOTAL			

CAUSE

WORK CARRIED OUT

SHOP HOURS

TRAVEL HOURS

TOTAL HOURS

* Replaced Rotar

Preformed all PMI checks and adjustments

CONTINUE ON BACK

CUSTOMER'S SIGNATURE:

DATE

0302891
02300
5/89

TO: William O. Miller, Chief
License Fee Management Branch
Office of Administration

John E. Glenn, Chief
Nuclear Materials Section B
Division of Engineering and
Technical Programs

LICENSE FEE TRANSMITTAL

A. REGION I Teletherapy Survey

1. APPLICATION ATTACHED

Applicant/Licensee: Framingham Union Hospital

Application Dated: 6/13/86

Control No.: 105681

License No.: 20-10621-02

2. FEE ATTACHED

Amount: 0

Check No.: 0

3. COMMENTS

Signed Brenda Pilatchak

Date 6/19/86

B. LICENSE FEE MANAGEMENT BRANCH

FEE EXEMPT

1. Fee Category and Amount: 7A II Survey

2. Correct Fee Paid. Application may be processed for:

Amendment ↘

Renewal

License

Signed Kimberley

Date 6/25/86

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