

March 26, 1979

RECEIVED  
Sam J. Merenda, M.D.  
Radiotherapy Department  
6651 Chippewa  
St. Louis, MO 63109

License Management Branch  
Division of Fuel Cycle and Material  
Safety  
United States Nuclear Regulatory  
Commission  
Washington, D.C. 20555

REC-  
CTION

Applicant	
Check No.	5325
Amount/Fee Category	4270 (7A)
Type of Fee	Renewal
Date Check Received	APR 2 1979
Received By	Orain

SUBJECT: Renewal of Teletherapy License Number 24-04992-01

The following is a response to the appropriate items from Information Required for Renewal of Teletherapy Licenses Guide received from NRC dated 02/06/79.

Item:

- #1 Sam J. Merenda, M.D.  
Radiotherapy Department  
6651 Chippewa  
St. Louis, MO 63109
- #2 License Number 24-04992-01
- #3 Individual user: Sam J. Merenda, M.D.
- #4 No change
- #5 No change
- #6 Interlocks prevent the initiation of radiation with head angle of greater than 60° clockwise or greater than 20° counterclockwise, with respect to vertical down, gantry at 0° (vertical).
- #7 Continuous patient monitoring is accomplished using a television viewing system. There is no backup system, therefore patient treatment will be suspended during system malfunctions until such time that the system is repaired and functioning.
- #8 Personnel monitoring is accomplished by using Guardray film badges provided by R. S. Landauer Jr. and Company. Badges are exchanged monthly.
- #9 There is one radiological survey meter available, an OCDM CD-V-700 Model 6 used for monitoring. The window thickness is unknown. The useful range is 0.5 to 5 mr per hour and up to 50 mr per hour. The meter is capable of detecting both beta and gamma radiation.

RECEIVED BY LFMB	
Date	APR 2 1979
Log	Apr 06 / Renewal
By	Orain
Orig. To	
Action Compl.	4/3/79

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INSPECTION AND ENFORCEMENT

7pp  
7905030324  
3/22/79

#10 Not applicable

#11 The survey meter will be calibrated by a physicist from Mallinckrodt Institute of Radiology, St. Louis, MO 63110, or other qualified expert. The procedures used will be those indicated on Enclosure #1, or the procedures indicated in Appendix J, Section 1 of Methods for Calibration of Survey Meters, Including Procedures, Standards and Frequency with the following change: Under A. Number 4, change "Each scale of the instrument..." to Each useful scale of the instrument...".

When calibrated at Mallinckrodt Institute of Radiology, the survey meter is calibrated using a 10.17 mg Radium-226 standard, certificate number 31653, needle number 33496.

#12 The semi-annual leak test will be performed by a physicist from Mallinckrodt Institute of Radiology, St. Louis, MO or other qualified expert. The physicist from Mallinckrodt Institute will use the procedures indicated on Enclosure #2 for the wipe test kit HPC-1 obtained from Health Physics Associates Ltd. of Northbrook, IL.

#13 Enclosure #3 is a copy of the emergency procedures.

#14 No change

#15 No change

If you have any further questions, please contact me.

Sincerely,

  
Sam J. Merenda, M.D.

Enclosures: (1) Administrative Policy  
(2) Wipe Test Instructions  
(3) Emergency Procedures

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ADMINISTRATIVE POLICY

ILLINOIS DEPARTMENT OF PUBLIC HEALTH  
Division of Radiological Health

Calibration of Radiation Survey Instruments

Radiation survey instruments are required to be calibrated at annual intervals and after each instrument servicing to insure proper function and reliability. When radioactive material is used to calibrate survey instruments, the person performing the calibration must be specifically authorized to do so by the Department, the U.S. Atomic Energy Commission, or another Licensing State.

The small check source which is incorporated into several models of survey instruments is not acceptable for calibration purposes. To properly calibrate a survey instrument, its response must be checked at two or more points on each scale with a source of gamma radiation of an appropriate energy. This cannot normally be accomplished with a "built-in" source.

An application for a license to perform instrument calibration should contain the following:

1. The type (Radioisotope, manufacturer's name, and source model number) and strength of the sealed source(s) to be used.
2. A description of the facilities to be used.
3. The name and pertinent experience of each individual who will perform the calibrations.
4. Calculations pertinent to the calibration procedure.
5. Calibration procedures. These procedures should assure a safe and accurate calibration of each instrument.

The following items cover calibration essentials, but do not constitute instructions necessary to a safe instrument calibration program.

1. Determine source activity and radiation level at one foot from the source. The following formulas may be used to determine the radiation levels:

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For Iridium 192

- Output at one foot (R/hr.) = 5.9 X source strength in Curies.

For Cobalt 60

- Output at one foot (R/hr.) = 14 X source strength in Curies.

For Cesium 137

- Output at one foot (R/hr.) = 3.3 X source strength in Curies.

For Radium

- Output at one foot (R/hr.) = 9.0 X source strength in Curies.

When the radiation output has been determined at one foot (or any other known distance) from a source the inverse square law for reduction of radiation intensity may be used to determine the intensity at any desired distance from the source. (In the calibration procedure it will be necessary to vary the radiation intensity to which the instrument is exposed.) The inverse square law states that radiation intensity from a point source varies inversely as the square of the distance from the source. The law is expressed in the following formula:

$$I_1 = I_2 \frac{(D_2)^2}{(D_1)^2}$$

Where  $I_1$  is the radiation intensity at distance  $D_1$  from the source and  $I_2$  is the radiation intensity at distance  $D_2$  from the source.

2. Check each instrument at two or more points on each scale. The highest and lowest points on each scale should be separated by at least 50 percent of the scale. If the instrument's readings correspond to calculated values within a range of plus or minus 10 percent, it can be considered to be properly calibrated. Minor adjustments can often be made which will bring the instrument within the desired range.
3. Record the date of calibration.
4. If an instrument cannot be adjusted so that the readings fall within the calculated range, send it to the manufacturer or a qualified instrument repair laboratory for repair and calibration.

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The following Table lists recommended minimum source strengths for the proper calibration of survey instruments.

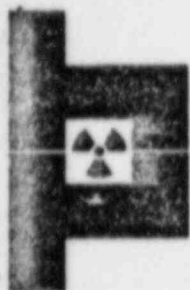
RECOMMENDED MINIMUM SOURCE STRENGTH  
FOR CALIBRATION

Isotope	Amount Millicuries
Cobalt 60 .....	10
Iridium 192 .....	25
Cesium 137 .....	40
Radium .....	15

NOTE: If instrument calibration will be performed by an organization other than your own, we will need the following information:

1. The name and address of the organization.
2. The type of source (radioisotope and quantity) to be used.
3. A description of the calibration procedure.
4. A description of the qualification of its personnel related to the performance of instrument calibration.
5. Its Atomic Energy Commission or Licensing State license number, if any.

If the necessary descriptive information has been previously furnished by the group who is to do the instrument calibrations, a reference to this information (e.g., the name, address and Atomic Energy Commission or Licensing State license number of the organization) will be sufficient.



Wipe Test Instructions for  
Medical Teletherapy Users  
Kit HPC-1

NEW ADDRESS:  
3304 Commercial Ave.  
Northbrook, IL 60062  
312/564 3330

HEALTH PHYSICS ASSOCIATES LTD. CONSULTANTS IN RADIATION SAFETY

2356 SKOKIE VALLEY ROAD / HIGHLAND PARK, ILL. / PHONE: AREA (312) 433-3330  
60035

Materials:

- 1 - Tube containing wetting agent
- 1 Pair - Polyethylene gloves in bag
- 3 Sets - Wipe sticks in plastic test tubes
- 1 Set - Wipe test instructions and information sheet
- 1 - Returnable shipping container

Radiation Safety Precautions:

The operator should wear a film badge or dosimeter and the disposable gloves provided while taking the wipes. The gloves are removed after the wipes are placed into the test tubes by a sterile technique (i.e. by grasping inner surface at wrist). The gloves are placed in the bag provided and returned to Health Physics Associates. Wash hands when through.

Always ascertain that the source is in "OFF" and shielded position before beginning test.

Wipe procedure:

1. Pour several cc of water into test tube containing a wetting agent. Each wipe stick is to be moistened in this solution prior to making each wipe.
2. Moisten #1 stick, squeeze off excess and wipe inside of source head on collimating leaves, or inside of collimating cone holder, or outside of plastic window on collimator, whichever of above is available without dismantling unit. Insert wipe into #1 tube and attach cap to tube.
3. Moisten #2 wipe stick, squeeze off excess and wipe area around opening through which source has been inserted into the housing (loading screw).
4. Moisten #3 wipe stick, squeeze off excess and wipe crevices and cracks about exterior surface of source housing. If extra collimating cones are used, wipe inside of all cones with same wipe stick. Insert wipe into #3 tube and attach cap to tube.
5. Insert all tubes and gloves into shipping container with completed information sheet for return to Health Physics Associates using shipping label enclosed.
6. Use Survey meter to determine that level of radiation on external surface of shipping container is less than 0.4 mr/hr. If survey meter is unavailable, contact Health Physics Associates. If reading is greater, do not send wipes and phone Health Physics Associates immediately for further instructions.

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EMERGENCY PLAN OF ACTION  
(To Be placed at the Control Panel)

Enclosure #3

1. If the Beam does NOT turn "OFF" in the normal time, do this:

1. PRESS EMERGENCY "OFF" BUTTON ON CONTROL. IF BEAM DOES NOT TURN "OFF":

- A. REMOVE PATIENT FROM ROOM QUICKLY  
(CAUTION! STAY OUT OF DIRECT BEAM)
- B. DO NOT STAY IN ROOM ANY LONGER THAN NECESSARY WITH BEAM "ON".
- C. LEAVE ROOM, LOCK DOOR, OR POST GUARD TO PREVENT UNAUTHORIZED ENTRY.
- D. CALL DR. MERENDA OR OTHER APPOINTED RADIATION SAFETY OFFICER.

2. If the Patient Cannot be removed, do this:

A. ON EARLY C-1000 UNITS, LOOSEN RED KNOB ON TOP OF HEAD AT THE REAR. GRASP THIS AND PROJECTIONS UNDERNEATH, ONE IN EACH HAND AND SWIVEL IN DIRECTION INDICATED ON NAME PLATE.

B. ON LATE C-1000 and all C-2000 UNITS, GRASP HANDLE ON FRONT OF HEAD AND TURN CLOCKWISE UNTIL POINTER POINTS TO GREEN RADIATION "OFF" EMBLEM.

3. IF SHUTTER DOES NOT CLOSE, MOVE THE MACHINE SO THAT THE BEAM IS NOT ON PATIENT.

4. LEAVE ROOM, CLOSE DOOR, POST A GUARD TO PREVENT UNAUTHORIZED ENTRY, NOTIFY DR. MERENDA AND CALL PICKER X-RAY SERVICE AT 993-2590. OR DR. MERENDA 727-6300 EXT 593

5. IF THERE IS FAILURE OF THE SOURCE TO RETURN TO THE FULLY-SHIELDED POSITION OR IF THERE IS ANY MALFUNCTION OF THE MACHINE DETECTED, THE THERAPY PERSONELL SHALL NOTIFY DR. MERENDA IMMEDIATELY AND RESTRICT THE USE OF THE UNIT UNTIL THE CONDITION HAS BEEN CORRECTED.

*Dr. Merenda*

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