

APPENDIX A

RADIATION SAFETY COMMITTEE

Responsibility

The committee is responsible for:

1. Ensuring that all individuals who work with or in the vicinity of the particle accelerator(s) have sufficient training and experience to enable them to perform their duties safely and in accordance with Arkansas Department of Health regulations and the conditions of the license.
2. Ensuring that all use of the particle accelerator(s) is conducted in a safe manner and in accordance with Department regulation and the conditions of the license.

Duties

The committee shall:

1. Be familiar with all pertinent Arkansas Department of Health regulations, the terms of the license, and information submitted in support of the request for the license and its amendments.
2. Review the training and experience of all individuals who use the particle accelerator (including physicians, technologists, and physicists) and determine that their qualifications are sufficient to enable them to perform their duties safely and in accordance with Arkansas Department of Health regulations and the conditions of the license.
3. Establish a program to ensure that all individuals whose duties may require them to work in the vicinity of the particle accelerator (e.g., nursing, security, and housekeeping personnel) are properly instructed as required by Part N of the Arkansas State Health Department's Rules and Regulations for Control of Sources of Ionizing Radiation.
4. Review the entire radiation safety program at least annually to determine that all activities are being conducted safely and in accordance with Department regulations and the conditions of the license. The review shall include an examination of all records, reports from the radiation safety officer, results of Department inspection, written safety procedures and the adequacy of the institution's management control system.
5. Recommend remedial action to correct any deficiencies identified in the radiation safety program.

6. Maintain written reports of all committee meetings, actions, recommendations, and decisions.
7. Ensure that the particle accelerator license is amended, when necessary, prior to any changes in facilities, equipment, policies, procedures, and personnel, as specified in the license.

Meeting Frequency

The radiation safety committee shall meet as often as necessary to conduct its business but not less than every six (6) months.

APPENDIX B

SUGGESTED TRAINING FOR THERAPY PROCEDURES INVOLVING PARTICLE ACCELERATORS

In the context of this application “physician” means any individual possessing a valid physician’s and surgeon’s certificate issued by this state (See Paragraph RH-200(ak)).

To qualify as adequately trained, a physician should have:

1. Training in basic radiation safety techniques (200 hours) applicable to the use of particle accelerators for therapy procedures, consisting of lectures, laboratory sessions, discussion groups, or supervised experience in the following areas:
 - a. Radiation physics and instrumentation (110 hours)
 - b. Radiation protection (40 hours)
 - c. Mathematics pertaining to the use and measurement of radioactivity (25 hours)
 - d. Radiation biology (25 hours)

(The hours listed next to each of the four (4) subjects above are suggested values and should not be interpreted as specific requirements.)

2. Experience with the energies and modalities of the particle accelerator for which the application is made, or equivalent (500 hours).
3. Clinical training procedures:
Active practice in therapeutic radiology with a minimum of three (3) years experience in a formal training program accredited by the Residency Review Committee of Radiology and Liaison Committee on Graduate Medical Education.

APPENDIX B FORM

AUTHORIZED USER (PHYSICIAN) / RADIATION SAFETY OFFICER TRAINING AND EXPERIENCE

For the use of medical particle accelerators for human use

1. Name of Authorized User (Physician) / Radiation Safety Officer (RSO)

2. The Authorized User (Physician) current Arkansas State Medical License number

3. Certification

American Board of Radiology
Date Certified _____

Therapeutic Radiology
Date Certified _____

4. Authorized User (Physician) / RSO Training and Experience (check the appropriate box)

A statement of the using physician's / RSO's clinical training and experience, signed by preceptor, is submitted in support of the application

The using physician/RSO is currently authorized as a user of Medical Particle Accelerators for human use under License No. _____

Not applicable - (explain)

Field of Training	Location of Training	Hours of Training	Dates of Training
Radiation Physics & Instrumentation			
Radiation Protection			
Mathematics Pertaining to the use and measurement of Radioactivity			
Radiation Biology			
Clinical Training			
Particle Accelerator Experience			

APPENDIX C

INSTRUMENTATION

1. Survey Meters

- a. Manufacturer's name: _____
Manufacturer's model number: _____
Number of instruments available: _____
Ranges: _____
Minimum range: _____ mr/hr to _____ mr/hr
Maximum range: _____ mr/hr to _____ mr/hr
- b. Manufacturer's name: _____
Manufacturer's model number: _____
Number of instruments available: _____
Ranges: _____
Minimum range: _____ mr/hr to _____ mr/hr
Maximum range: _____ mr/hr to _____ mr/hr

2. Area Monitor

Manufacturer's name: _____
Manufacturer's model number: _____
Number of instruments available: _____
Backup battery power supply: Yes _____ No _____

3. Dose Measurement System

- a. Electrometer
Manufacturer's name: _____
Manufacturer's model number: _____
- b. Probes
Manufacturer's name: _____
Manufacturer's model number: _____
Number of probes: _____
Ranges: _____

APPENDIX D

CALIBRATION OF INSTRUMENTS

METHODS FOR CALIBRATION OF (X- AND GAMMA-RAY) SURVEY METERS,
INCLUDING PROCEDURES, STANDARDS, AND FREQUENCY

- A. Calibration of survey meters shall be performed with radionuclide sources.
1. The sources shall be approximate point sources.
 2. The source activities or exposure rates at given distances shall be traceable by documented measurements to a standard source certified within 5% accuracy to the U.S. National Bureau of Standards (NBS) calibrations.
 3. The frequency shall be at least annually and after servicing.
 4. Each scale of the instrument shall be calibrated at least at two (2) points located at approximately 1/3 and 2/3 of full scale.
 5. The exposure rate measured by the instrument shall differ from the true exposure rate by less than 10% at the two (2) points on each scale (read appropriate section of the instrument manual to determine how to make necessary adjustments to bring instrument into calibration).

NOTE:

Sources of Cs-137, Ra-226, or Co-60* are appropriate for use in calibrations. The activity of the calibration standard should be sufficient to calibrate the survey meters on each scale to be used for radiation protection purposes. Scales up to 1 R/hr should be calibrated, but higher-range scales above 1 R/hr need not be calibrated when they will not be needed for radiation protection surveys. If there are higher ranges, they should at least be checked for operation and approximately correct response to radiation. Otherwise, a cautionary note that they have not been checked should be placed on the instrument.

**Minimum activities of typical sources are 85 mCi of Cs-137, 21 mCi of Co-60, and 34 mCi of Ra-226 (to give at least 700 mR/hr at 20 cm).*

B. A reference check source of long half-life, (e.g., Cs-137 or Ra D and E) shall also be read at the time of the above calibration or as soon as the instrument is received from a calibration laboratory. The readings shall be taken with the check source placed in specific geometry relative to the detector. A reading of this reference check source should be taken:

1. Before each use and also after each survey to ensure that the instrument was operational during the survey.
2. After each maintenance and/or battery change.
3. At least quarterly.

If any reading with the same geometry is not within +/- 20 % of the reading measured immediately after calibration, the instrument should be recalibrated (See Item A).

C. Records of the above Items A and B-2 must be maintained.

D. An adequate calibration of survey instruments cannot be performed with built-in check sources. Electronic calibrations that do not involve a source of radiation are also not adequate to determine proper functioning and response of all components of an instrument.

CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items.

- 1. Survey instruments will be calibrated at least annually and following repair.
- 2. Calibration will be performed at two (2) points on each scale used for radiation protection purposes (i.e., at least up to 1 R/hr).

The two (2) points will be approximately 1/3 and 2/3 of full scale. A survey instrument may be considered properly calibrated when the instrument readings are within +/- 10% of the calculated or known values for each point checked. When higher scales are not checked or calibrated, an appropriate precautionary note will be posted on the instrument.

- 3. Survey instruments will be calibrated:
 - a. By the manufacturer
 - b. At the licensee's facility
 - (1) Calibration source
 - Isotope (element and mass number) _____
 - Manufacturer's name _____
 - Model Number _____
 - Activity in millicuries _____
 - or
 - Exposure rate at a specified distance _____
 - Accuracy _____
 - Traceability to primary standard _____
 - (2) The calibration procedures in Appendix D will be used.
 - or
 - (3) The step-by-step procedures, including radiation safety procedures, are attached.
 - c. By a consultant or outside firm
 - (1) Name _____
 - (2) Location _____
 - (3) Registration number* _____
 - (4) The consultant's report will contain the information on
 - the attached "Certificate of Instrument Calibration".
 - the consultant's reporting form as attached.

*Persons performing survey meter calibrations for Arkansas Licensees must be registered with the Arkansas Department of Health.

APPENDIX E

SPECIAL CONSIDERATIONS

Each paragraph of the Arkansas Rules and Regulations for Control of Sources of Ionizing Radiation referred to below must be read and understood. Completion of the application implies agreement to abide by, and comply with the regulations. Indicate that these particular paragraphs have been read and will be complied with by checking the box in front of each reference.

- 1. Paragraph RH-1305, Instruction of Personnel; Posting of Notice to Employees
- 2. Part F, Paragraphs RH-1500 through RH-1505, Records, Reports, and Notification
- 3. Part N, Paragraphs RH-2801 through RH 2808, Notices, Instructions and Reports to Workers Inspections
- 4. Paragraph RH-5210, Inalienability of Licenses
- 5. Paragraph RH-5601, Additional Requirements