Veterans Administration

Memorandum

Date: August 20, 1985

To: Helen Malaskiewicz

From: Radiation Safety Officer, Boston

Subj: Telephone request of August 19

Enclosed please find 2 copies each of the BVAMC application for amendment of our NRC Materials License and the response to the NRC letter of July 15, 1985.

Please contact me if any further information is required.

James C. Harrington
Radiation Safety Officer

James J. Smith M.D.

JAMES J. SMITH, M. D. (115)
Director, Nuclear Medicine Service
VA Central Office
Washington, D.C. 20420

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"OFFICIAL RECORD COPY"

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MAY 1983
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Response to NRC letter of July 15, 1985

Item 1.q.162

1. Action Item:

A medical center memorandum reorganizing the 2 existing committees (Radiation Safety Committee and Medical Isotope Committee) and merging them into 1 committee (RSC) with duties as outlined in Regulatory Guide 10.8 has been prepared. The structure of the proposed new committee is detailed in attachment A.

2. Schedule for Completion:

The committee reorganization specified in part 1 will be officially enacted upon approval of the BVAMC material license application by the NRC. The 2 existing committees are currently meeting jointly and functioning as the 1 proposed committee.

3. System for Monitoring:

The reorganization of the committee is a directive from the hospital administration and, therefore, the administrative monitoring requirement is met.

Item 1.q.364

1. Action Item:

The attached application form for internal licensing of radioisotope users is in use. All proposed uses of radioisotopes are submitted to the RSO on this form. After review and interaction between the RSO and the laboratory personnel to recommend specific conditions for approval and to verify information, procedures, training, etc., the application form is forwarded to the committee for review, addition of any further conditions, and final approval.

2. Schedule for Completion:

All current users of radioisotopes have either (a) already received committee authorization through the above process, or (b) already submitted the application for use and are undergoing committee review. Committee review of these applications will be completed by September 1, 1985.

3. System for Monitoring:

The RSO and another representative of the hospital administration are required members of the RSC through which all applications must be approved. Minutes of all meetings are forwarded to the hospital administration and are subject to NRC review thereby meeting the administrative monitoring requirement.

Item 1.g.5

1. Action Item:

All authorizations issued under the Medical Isotopes Committee prior to the use of the new application process described in item 1.g.364, part 1, will automatically expire upon approval of the BVAMC material license application by the NRC. All users must have new applications approved prior to such action by the NRC in order to avoid interruption of their authorization to use radioactive material. Upon committee approval, new applications become authorized for a period of 2 years.

2. Schedule for Completion:

As stated in item 1.g.364, part 2, all current uers of radioisotopes have submitted an application for renewal of authorization. Committee review of these applications will be completed by September 1, 1985.

3. System for Monitoring:

The RSO will prepare a list of active authorized users with expiration dates and present it quarterly to the RSC for review and any appropriate action. Minutes of all meetings are forwarded to the hospital administration and are subject to NRC review thereby meeting the administrative monitoring requirement.

Item 2.c.

1. Action Item:

A health physicist with formal training in radiation protection has been retained as a full-time replacement RSO , and the former RSO has returned to his full-time nuclear medicine position. NRC form 313M Supplement A, describing the training and experience of the new RSO, and a curriculum vitae are attached.

2. Schedule for Completion:

This transition was completed in March.

3. System for Monitoring:

The hospital administration authorized the employment of the new RSO who functions through the Chief of Staff s Office, therefore, the administrative monitoring requirement is met.

Item 3.e.1

1. Action Item:

The training and experience of all prospective supervisors of radioisotope use will be reviewed by the RSC to assure that the requirements of 10 CFR 33.15 (b) are met. No application

will be approved otherwise.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:
This action item is part of the application review process discussed in item 1.g.364. Monitoring is accomplished through RSC review of all applications with appropriate record made in the RSC minutes.

Item 3.e.2

1. Action Item:
An outline of the specific personnel training program for radioisotope users and ancillary personnel is attached.

2. Schedule for Completion:
All current radioisotope users have completed the required training. As new employees who will use radioisotopes are hired, an appointment is arranged with the RSO for training as soon as practicable. Annual training for ancillary personnel is completed. Monthly training is held for all new nursing staff.

3. System for Monitoring:
The RSO will annually report to the committee the status of the training program. The administrative monitoring requirement is, therefore, met as in item 1.g.364, part 3 by appropriate record in the RSC minutes.

Item 3.e.365

1. Action Item:
A written exam designed to assure adequate knowledge of radiation protection appropriate to the proposed uses has been prepared. New supervisors are encouraged to take this exam as soon as practicable and will be required to pass it within 6 months of conditional authorization by the committee. Failure to do so will result in immediate suspension of the authorization and all uses of radioisotopes will cease until this requirement has been met. This requirement is waived for persons (a previously specified by name in an NRC or Agreement State license, (b) Board Certified in Nuclear Medicine, or (c) 'grandfathered' by prior BVAMC authorization.

2. Schedule for Completion:
This action item has been completed.

3. System for Monitoring:
The RSO will note in his quarterly report to the RSC (see item 1.g.5, part3) those users with the exam requirement pending.

Monitoring is therefore accomplished, as in item 1.g.3&4, part 3 by appropriate record in the RSC minutes.

Item 3.e.4

1. Action Item:
The training and experience of all prospective supervisors of medical uses of radioisotopes will be reviewed by the committee to assure that the requirements specified in Regulatory Guide 10.8 are met. No application will be approved otherwise.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:
This action item is part of the application review process discussed in item 1.g.3&4, part 3. Monitoring is accomplished through RSC review of all applications with appropriate record made in the RSC minutes.

Item 4.1.1

1. Action Item:
Possession limits are issued to authorized users upon approval of the application for use. Records verifying compliance with these possession limits are kept by each authorized user.

2. Schedule for Completion:
Issuance of possession limits to current users will be completed by September 1, 1985 concurrent with committee review of all applications for use.

3. System for Monitoring:
Monitoring is accomplished by RSO review of all purchase orders before they are placed and by routine RSC audits of laboratory inventory records. Any suspected irregularities in maintaining possession limits by individual users will be brought to the attention of the RSC in the quarterly RSC report and reflected in the RSC minutes.

Item 4.1.2,3,&4

1. Action Item:
The RSO controls the purchase and receipt of all radioactive material according to the attached procedures.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:

The RSO will annually report the status of the purchase and receipt controls to the administration thereby meeting the monitoring requirement.

Item 4.1.5

1. Action Item:

Security has been improved in all areas. All laboratory doors are kept locked when users are not in attendance, and locks are being placed on storage areas within the laboratories.

In the Nuclear Medicine Department a remote opening door has been installed in the corridor which alerts personnel of anyone entering the premises. Doors to the walk-in refrigerator and the hot room are kept locked when personnel are not in attendance, and a new push button combination lock has been ordered for the hot room door.

2. Schedule for Completion:

This action item will be completed by October 1, 1985.

3. System for Monitoring:

Radioisotope security will be routinely audited by the RSO and reported at least annually to the hospital administration.

Item 4.1.6

1. Action Item:

All radioactive material leaving the institution is transferred via the RSO.

2. Schedule for Completion:

This action item is completed.

3. System for Monitoring:

Waste shipment records and laboratory inventory records are subject to NRC review. Laboratory records are also subject to routine RSO audit. Suspected irregularities are reported to the RSC as in item 4.1.1, part 3.

Item 4.1.7

1. Action Item:

Nine Ludlum model 3 survey meters each with an end-window G-M probe and a NaI probe have been purchased and distributed. Personnel have been given instruction on their use and care by the RSO. Upon application for use, the availability of appropriate radiation monitoring equipment must be demonstrated

for approval. No application will be approved otherwise.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:
Application approval recorded in the RSC minutes fulfills the monitoring requirement as in item 1.g.364, part3.

Item 4.1.8

1. Action Item:
The procedure for area surveys is attached.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:
The RSO routinely audits the survey records of all radioisotope users and conducts independent surveys as outlined in the attached procedure. All such records are maintained and subject to NRC review.

Item 4.1.9

1. Action Item:
All radioisotope users are required to complete the attached registration form. Those likely to receive an external dose in any calendar quarter in excess of 25% of the applicable limits specified in 10 CRF 20.101 (a) will be required to use personnel monitoring devices as specified in 10 CFR 20.202. Bioassay requirements are attached.

2. Schedule for Completion:
This action item is completed.

3. System for Monitoring:
RSC review of personnel dosimetry reports will verify proper usage of these devices. The RSO will report quarterly to the RSC any irregular exposures (external or internal) with appropriate record made in the RSC minutes.

Item 4.1.10

1. Action Item:
The waste management program has been formalized under the RSC according to the attached procedures. The BVAMC material license application includes an amendment to allow the incineration of animal carcasses (proposal attached). An

appropriate radioactive waste compactor has been ordered. Proper waste management training is included in the user training program conducted by the RSO.

2. Schedule for Completion:

The incineration of animal carcasses will be completed upon the approval of the BVAMC material license application by the NRC. Solid waste compaction will commence upon delivery of the compactor (expected by September 1, 1985). RSO control and user training are completed.

3. System for Monitoring:

All laboratory waste disposal records are subject to routine RSO audit. These and all RSO waste disposal records are subject to NRC review.

Item 1.g.162

Attachment A

RADIATION SAFETY COMMITTEE

The membership of this committee will consist of at least seven members and will include:

- The radiation safety officer,
- The hospital administrator, or other administrative official directly responsible to the hospital administrator in the hospital's internal chain of command,
- A representative of Diagnostic Radiology;
- A representative of Radiation Therapy;
- A representative of Research Service,
- A representative of Nuclear Medicine;
- A representative of Nursing Service
- Others at the discretion of the Medical Center Director

The names and qualifications of the current committee members are on file in the VA RSO. Changes in committee membership will be documented in the committee's records, and will be available for inspection by the NRC.

The committee contains two subcommittees, one covering human use, the other covering in vitro and animal research uses. These subcommittees will be used as necessary to review applications in their respective areas subject to final ratification by the full committee at its quarterly meetings. Applications reviewed and approved by the appropriate subcommittee may be granted temporary approval to proceed pending full committee ratification.

The chairman of the committee will be appointed by the Medical Center Director.

Authorization No._____
Expiration Date_____

VETERANS ADMINISTRATION HOSPITAL/BOSTON, MASSACHUSETTS
Application to Possess and Use Radioactive Material

INSTRUCTIONS: Complete section I and forward to the Radiation Safety Officer. When approved, a copy of the application, with a designat Authorization number will be returned to the Principal Supervisor. To place a purchase order call the Radiation Safety Office.

Section I

1. Identification of persons(a)who will use and (b)who will supervise the use of radioactive material:

(a) Name of person(s) who will use the material:(List principal user first)

NAME	DEPARTMENT	VA TITLE	ROOM NO.	TEL.NO.

(b) Name of person who will supervise the use of the material:

NAME	DEPARTMENT	VA TITLE	ROOM NO.	TEL.NO.

2. Rooms where material will be handled:
   Material stored in_____
   Material used in_____

3. Description of material to be procured:

Radionuclide	Amount of Activity To be possessed*	In use/expt	Chemical&Physical Form of Material to be procured	Comments

*Maximum amount to be possessed by project at any one time

4. Is any of the radioactive material used as a label for potentially biohazardous material, toxic chemicals, or carcinogenic/mutagenic material? Yes____No____. If answer is "yes", explain on a supplementary page.

5. To be procured from: Commercial Supplier____Other____

6. Type of investigation for which the material will be used:

7. Principal procedures involved in the use of the material: Include procedures important to the consideration of contamination control, such as: evaporation, transfer of powder, etc.

NUCLIDES	ACTIVITY mCi	ROOM USED	EXHAUST VENTILLATION USED(Y/N)	PROCEDURE DESCRIPTION

If Item 7 is continued on a supplementary page, check here_____

8. Radiation safety: Check special equipment that will be used to control external and internal radiation exposure.(If Item 8 is continued on a supplementary page, check here____.)

__Shielded storage container
__Transportation container
__Handling Tongs
___Shielding
__Radiation Signs/Labels
__Glove box
___Protective Gloves
___Lab-coat
___Shoe covers
___Trays
___Mechanical Pipette
___Fume Hood
___Ion-chamber survey meter
___Scintillation-survey meter
___G.M. Survey Meter
___Dosimeter
___Badges
Monitoring Body___
Wrist___
Finger___

9. Radioactive Waste Disposal:

Type of Waste	Method of Disposal
Solid	Into RSO collection container in room#_____
Liquid	Into RSO collection container in room#_____
	Into sink in room#_____
Scintillation Fluid	Into RSO collection container in room#_____
Animal Tissue	To be stored(for RSO collection in freezer in room#_____
Special Waste*	Described on attached sheet(check)_____

*Waste in form of gas, pyrophoric or pathogenic material are to be considered special wastes.

10. Name of person completing Items 1 through 9_____

11. Principal Supervisor's approval(Signature)_____

Principal Supervisor's name(Please print)_____

SECTION II(This section to be completed by the Radiation Safety Officer.)

A. Comments relating to the application:

B. Following are the specific conditions of approval concerning work with radioactive materials under this authorization:

C. This application is approved with the following general conditions:

1. The proposed work with radioactive material shall be performed in the manner specified in Sections I and II-B,C,D. There shall be no changes in the approved procedures without the prior approval of the Radiation Safety Committee. The Radiation Safety Officer shall be notified prior to a change in place of use or storage of radioactive material.
2. The use, storage, and disposal of the radioactive material shall be in conformity with (a)the provisions of the Code of Federal Regulations Title 10, Part 20 "Standards for Protection Against Radiation" and (b)the provisions of "Regulations for Use of Radioisotopes at BVAMC".

D. In addition the following conditions of approval are emphasized:

__ The project supervisor's responsibilities must be transferred to another person(with supervisory qualifications)during any extended leaves from UVAMC(a month or longer). The RSO approval of any such changes must be secured in advance.

__ No transfer of powdered radioactive material is allowed under this authorization. If powdered or crystalline material is purchased, it will be put into solution in the original shipping container.

__ All procedures which may result in airborne contamination of radioactive materials will be performed in a hood which is approved for work with radioactive material.

__ All unattended containers of radioactive material or any apparatus containing radioactive material must be labeled with a properly completed "Caution Radioactive Material" tape or label.

__ Radioactive material will be doubly contained in a shatterproof container when transported between laboratories and/or through corridors.

__ There will be no mouth pipetting of radioactive solutions.

__ Radioactive wastes will be disposed of in RSO approved radioactive waste containers and/or in RSO approved laboratory drains. A record of waste disposal will be kept by recording the experimenter's name, nuclide, amount, and date on the appropriate RSO forms.

__ An appropriate, functional survey instrument will be readily available for contamination control monitoring in all laboratories in which millicurie(mCi)quantities of beta/gamma emmiters are being handled(purchase of 1 mCi or more of stock solution constitutes such handling). An exception to the above will be for radionuclides which are not protein bound. In such cases an appropriate, functional survey instrument is required if equal to or greater than 100 uCi is handled. Alpha emitters shall have the same 100 uCi limit. The beta emitter Tritium will be controlled by wipe testing as needed.

__ The project will ensure that their radiation survey instruments are in proper working condition. If calibrations are required, the project will deliver the instruments to the Radiation Safety Office. Calibration of the instruments will not exceed six month intervals.

__ Liquid scintillation waste and animal carcasses that are exempt from radioactive waste disposal regulations will be packaged in accordance with RSO regulations.

__ Packages of radioactive material received by the project will be opened in accordance with RSO instructions that are attached to each package.

E. Signature of reviewer _____ Date _____

Approved by _____ Date _____

For BVAMC Radiation Safety Committee

F. Termination of this authorization:

1. Work with radioactive material terminated(date)_____
2. Disposition of:
   - Radioactive material_____
   - Waste containers_____
   - Survey meter(s)_____
3. Residual contamination:
   - Hood(s)_____
   - Sink(s)_____
   - Laboratory surfaces_____
4. Lab are checked out by_____Date:_____
5. Approved for termination _____Date:_____

...SUPPLEMENT A — U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

... AUTHORIZED USER OR RADIATION SAFETY OFFICER		7. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
... INTENT		

CERTIFICATE

A. NAME OF BOARD	B. CATEGORY	C. MONTH AND YEAR CERTIFIED

9. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

A. FIELD OF TRAINING	B. LOCATION AND DATE(S) OF TRAINING	TYPE AND LENGTH OF TRAINING	
		C. LECTURE/LABORATORY COURSE (HOURS)	D. SUPERVISED LABORATORY EXPERIENCE (HOURS)
a. RADIATION PHYSICS AND INSTRUMENTATION	University of Lowell 9/83 - 5/85	159	57
b. RADIATION PROTECTION	"	132	3
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Northeastern University 9/83 - 5/85	144	11
d. RADIOPHARMACEUTICAL CHEMISTRY	University of Lowell 9/83 - 5/85	81	9
e. CLINICAL RADIOISOTOPE MEDICINE	University of Lowell 9/83 - 5/85	6	9

10. EXPERIENCE WITH RADIATION (Actual or Supervised Equivalent Experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
See attached sheet				

5. EXPERIENCE

[illegible]	[illegible]	Type [illegible]
	1 Ci	1
	500 mCi	1
	5 mCi	1
	100 mCi	1
	100 mCi	1
	1 mCi	1
	10 mCi	1
	4 mCi	1
	50 mCi	1
	1 mCi	1
	uCi	1
	uCi	2
[illegible]	uCi	4
[illegible]	20 mCi	1
[illegible]	1 mCi	1
[illegible]	uCi	2
[illegible]	uCi	2
Nb-95	2 mCi	1+2
Mo-99	2 Ci	1+2
Tc-99m	2 Ci	1+2
Ru-103	2 mCi	1-2
In-111	1 mCi	1
I-124	uCi	2
Sm-153	2 mCi	1+2
I-123	5 mCi	1
[illegible]	200 mCi	1+2
I-125	uCi	4
I-131	60 mCi	1+2
[illegible]	uCi	2
[illegible]	uCi	4+2
Cs-137	~1 Ci	4
Ce-141	2 mCi	1
Au-198	1 Ci	4
Ir-192	~100 mCi	1+3
Ra-226	~100 mCi	1+3
[illegible]	10 mCi	1+2
Am-241	5 mCi	1 5
[illegible]	~10 lbs	1 1

* 1=Tufts-New England Medical Center. Duration of Experience = 9 mo
2=Boston V. A. Medical Center. Duration of Experience = 3 mo +
3=University of Lowell. Duration of Experience = 2 yr

**1=Receipt, unpackaging, monitoring, decontamination, calibration sources, and waste processing
2=Research study
3=Calibrated as theran, implant
4=Irradiators and other sealed sources
5=Calibration source

Membership in Professional and Scientific Organizations:

American Association of Physicists in Medicine

Health Physics Society

New England Chapter Health Physics Society

Relevant Professional Experience:

Radiation Safety Officer (3/85 - Present)
Boston Veterans Administration Medical Center

Health Physics Technician (6/84 - 3/85)
Tufts New England Medical Center

Physics Teaching Assistant (9/83 - 6/84)
University of Lowell

Relevant Professional Presentations:

"A Computer Algorithm for the Determination of Airborne Activity Concentrations of Thoron and Radon Particulate Daughters by Repetitive Alpha Counting"
Presented at the University of Lowell (4/85)

PERSONNEL TRAINING PROGRAM

I. Individuals who work in or frequent restricted areas will be instructed in the items specified in 10 CFR 19.12 at the time of initial employment and at least annually thereafter.

The instruction will include:

a. All terms of the license pertinent to radiation safety.

b. Areas where radioactive material is used or stored.

c. Potential hazards associated with radioactive material.

d. Radiological safety procedures appropriate to their respective duties.

e. Pertinent NRC regulations.

f. Rules and regulations of the license.

g. Obligation to report unsafe conditions to the radiation safety officer.

h. Appropriate response to emergencies or unsafe conditions.

i. Right to be informed of their radiation exposure and bioassay results.

j. Locations where the licensee has posted or made available notices, copies of pertinent regulations, and copies of pertinent licenses and license conditions (including applications and applicable correspondence), as required by 10 CFR Part 19.

II. Individuals whose duties may require them to work in the vicinity of licensed material will be informed about radiation hazards and appropriate precautions at the time of initial employment and at least annually thereafter. This information will be provided initially at hospital employee orientation sessions and annually thereafter at in-service meetings.

PROCEDURES FOR ORDERING AND RECEIPT OF DELIVERY

OF RADIOACTIVE MATERIALS

a. The Radiation Safety Officer will review all orders for radioactive materials to assure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

b. The procedures for ordering and receiving radioactive materials will be established and maintained. The system shall consist minimally of the following:

(1) Ordering of routinely used materials

(a) Written records that identify the isotope, compound, activity levels, and supplier, etc., will be used.

(b) The written records will be referenced when opening and storing radioactive shipment.

b. Ordering of specially used materials (e.g., therapeutic uses)

(1) A written request will be obtained from the physician who will perform the procedure.

(2) Persons ordering the materials will reference the physician's written request when placing the order. The physician's request will indicate isotope compound, activity level, etc.

(3) The physician's written request will be referenced when receiving, opening, or storing the radioactive material.

c. It is essential that written records be maintained for all ordering and receipt procedures.

d. During normal working hours all radioactive packages will be received by the Radiation Safety Officer or his alternative.

e. During off-duty hours, security personnel or other designated individuals will accept delivery of radioactive packages in accordance with the procedures outlined in the sample memorandum attached.

PROCEDURES FOR ORDERING AND ACCEPTING DELIVERY

OF RADIOACTIVE MATERIAL

1. The Radiation Safety Officer will review all orders for radioactive materials and will ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

2. A system for ordering and receiving radioactive materials will be established and maintained. The system will consist minimally of the following:

   a. Ordering of routinely used materials

      (1) Written records that identify the isotope, compound, activity levels, and supplier, etc., will be used.

      (2) The written records will be referenced when opening and storing radioactive shipment.

   b. Ordering of specially used materials (e.g., therapeutic uses)

      (1) A written request will be obtained from the physician who will perform the procedure.

      (2) Persons ordering the materials will reference the physician's written request when placing the order. The physician's request will indicate isotope compound, activity level, etc.

      (3) The physician's written request will be referenced when receiving, opening, or storing the radioactive material.

   c. It is essential that written records be maintained for all ordering and receipt procedures.

3. During normal working hours all radioactive packages will be received by the Radiation Safety Officer or his alternative.

4. During off-duty hours, security personnel or other designated individuals will accept delivery of radioactive packages in accordance with the procedures outlined in the sample memorandum attached.

Veterans Administration

Memorandum

July 24, 1995

Chief, Security Service (132)

Radiation Safety Officer

Receipt of Packages Containing Radioactive Material

1. Any package containing radioactive material that arrives during off duty hours (i.e. between 4:30 p.m. and 8:00 a.m. on weekdays and on weekends and holidays) shall be signed for by a member of the VA Police and taken expediently to the walk-in refrigerator located in the Nuclear Medicine Department (DB-101).

2. The refrigerator door is to be unlocked, the package placed inside, the door relocked, and an entry made in the log attached to the outside of the refrigerator door.

3. If the package is wet or appears to be damaged, immediately contact the Radiation Safety Officer or his alternate. Ask the carrier to remain until it can be determined that neither he nor the delivery vehicle is contaminated.

RADIATION SAFETY OFFICER:_____James C. Harrington_____

OFFICE TEL #:_____X3834_____PAGER:_____1-250_____

EMERGENCY TEL #:_____X3333_____to reach RSO or alternate at home.

4. This memorandum is an update of and supersedes an earlier memorandum dated May 13, 1995.

JAMES C. HARRINGTON
Radiation Safety Officer

c.c.: Chairman, Radiation Safety Committee (114)
Chief of Staff (11)
Associate Medical Center Director (001)
Chief, Medical Administration Service (136)

VA FORM 2105
MAY 1983

APPENDIX F

PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

1. Special requirements will be followed for packages containing quantities of radioactive material in excess of the Type A quantity limits as specified in paragraphs 20.205(a)(1) and (c)(1) of 10 CFR Part 20 (more than 20 Ci for Mo-99 and Tc-99m). They will be monitored for surface contamination and external radiation levels within 3 hours after receipt if received during working hours, or within 18 hours if received after working hours, in accordance with the requirements of paragraphs 20.205(a) through (c). All shipments of liquids greater than exempt quantities will be tested for leakage. The NRC Regional Office will be notified in accordance with the regulations if removable contamination exceeds 0.01 μCi/100 cm^2 or if external radiation levels exceed 200 mR/hr at the package surface or 10 mR/hr at 3 feet (or 1 m).

2. For all packages, the following additional procedures for opening packages will be carried out:

   a. Put on gloves to prevent hand contamination.

   b. Visually inspect package for any sign of damage (e.g., wetness, crushed). If damage is noted, stop procedure and notify Radiation Safety Officer.

   c. Measure exposure rate at 3 feet (or 1 m) from package surface and record. If >10 mR/hr, stop procedure and notify Radiation Safety Officer.

   d. Measure surface exposure rate and record. If >200 mR/hr, stop procedure and notify Radiation Safety Officer.

   e. Open the package with the following precautionary steps:

      (1) Open the outer package (following manufacturer's directions, if supplied) and remove packing slip.

      (2) Open inner package and verify that contents agree with those on packing slip. Compare requisition,* packing slip, and label on bottle.

      (3) Check integrity of final source container (i.e., inspect for breakage of seals or vials, loss of liquid, and discoloration of packaging material).

      (4) Check also that shipment does not exceed possession limits.

   f. Wipe external surface of final source container shield and remove wipe to low background area. Check wipes with a thin-end-window G-M survey meter, and take precaution against the spread of contamination as necessary.

   g. Monitor the packing material and packages for contamination before discarding.

      (1) If contaminated, treat as radioactive waste.

      (2) If not contaminated, obliterate radiation labels before discarding as regular trash.

3. Maintain records of the results of checking each package, using "Radioactive Shipment Receipt Record" (see next page) or a form containing the same information.

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* In the case of special orders (e.g., therapy doses), also compare with physician's written request.

ORDERING AND RECEIVING OF RADIONUCLIDES

for Research Uses

1. All Radioactive materials are ordered after review by the Radiation Safety Officer. Individuals desiring such materials must request same of the Radiation Safety Officer. Each authorized user will maintain an inventory record which must be checked before additional material is ordered. The Radiation Safety Officer must also check to ascertain that the supervisor requesting the material has been properly trained and registered to supervise this material.

2. The Radiation Safety Officer or his alternate will receive all incoming shipments of radionuclides and will be responsible for assuring that they are contamination free before releasing them for active use within the facilities. Such monitoring will include measurement of the dose rate at the surface and at 3 ft. from the surface of the package, a wipe test on the surface (results must be less than 2000 d/m/100 cm^2), monitoring of packing material upon opening; and a wipe test on the inside container (again, contamination must be less than 2000 d/m/100 cm^2). Gloves and a lab coat must be worn during this procedure, and an appropriate record kept of all such receipts. Therefore, the procedures listed under Item 14 of the medical section of this application will be used for all incoming shipments.

3. Upon release of the approved shipment to the authorized user, the Radiation Safety Officer will instruct the user in any special precautions to be employed (e.g. due to unusual conditions of the shipment), and of any additional monitoring and/or handling care necessary when handling the primary container.

AREA SURVEY PROGRAM FOR RADIOISOTOPE USERS

A. Individual users of unsealed radioactive materials are expected to perform routine area surveys of the work places and laboratories to insure that working surfaces, floor, equipment, etc., are free of removable contamination and that external radiation exposure is maintained at a minimum.

B. In addition to self-evaluation, the Radiation Safety Officer will perform area surveys of radiation work areas at appropriate intervals to insure that external and internal exposure of personnel to radiation is maintained as low as reasonably achievable.

AREA SURVEY PROCEDURES

1. All areas where less than 200 microcuries of radioactive material are used or stored shall be surveyed monthly.

2. All other areas where radioactive material is used or where radioactive waste is stored shall be surveyed weekly.

3. All areas where 1 millicurie or more of beta/gamma emitting radioactive material is used (i.e. elutions, preparations, injections, etc.) shall be surveyed daily with an appropriate survey meter and decontaminated if necessary. For radioiodine that is not protein bound or for alpha emitters, a 100 microcurie limit applies. The radioisotope, tritium (H-3), shall be controlled with wipe tests as needed.

4. Weekly and monthly surveys shall consist of:
   a) A meter survey with an instrument sufficiently sensitive to detect 0.1 mR/hr.*
   b) A series of wipe tests sufficiently sensitive to detect 200 dpm/100 cm2 for the contaminant involved. For beta emitters such as P-32 or C-14, wipes may be measured by placing them in close proximity to the thin window of a G-M survey meter. A reading of 0.05 mR/hr is approximately equivalent to 200 dpm on the wipe. Wipes of preparation areas or other "high background" areas will be removed to a low background area for measurement.

5. A permanent record shall be kept of all survey results**, including negative results. The record shall include:
   a) Location of area surveyed
   b) Date of survey
   c) Name of person conducting survey
   d) Drawing of area surveyed
   e) Meter exposure rates keyed to locations on the drawing
   f) Wipe test contamination levels keyed to locations on the drawing
   g) Any appropriate comments including corrective action taken whenever the limits in 4a or 4b are detected and survey results following corrective action.

6. The Radiation Safety Officer or his alternate will survey laboratories using less than 1 mCi at monthly intervals and all other laboratories at weekly intervals. This survey will include a review of the laboratory monitoring records plus independent measurements of radiation and contamination levels.

* The radioisotope, tritium (H-3), is exempt from meter survey requirements.

** Daily survey records need only consist of 5a, b, c, and the survey results if no abnormal exposures are found.

Boston VA Medical Center — Radiation Safety Office

REGISTRATION FORM FOR PERSONNEL OCCUPATIONALLY EXPOSED TO IONIZING RADIATION

1. Name_____ Date_____
   Last First Middle
2. Date of Birth_____ 3. Social Security Number_____
4. Department_____ 5. Position_____
6. Office_____ Office phone_____
   Bldg. Floor/Room
   Laboratory_____ Laboratory phone_____
   Bldg. Floor/Room
7. Supervisor (if applicable)_____ Phone_____

Training and Experience with Radiation

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (circle answer)	FORMAL COURSE (circle answer)
Principles and practices of radiation protection			Yes No	Yes No
Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No

9. Experience with Radiation. (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

10. Description of work involving ionizing radiation:

REGISTRATION FORM FOR PERSONNEL OCCUPATIONALLY EXPOSED TO IONIZING RADIATION

11. Principal sources of ionizing radiation to be handled:

    a. Radionuclides_____/_____/_____/_____/_____
    b. Quantities_____/_____/_____/_____/_____
    c. Other sources (for example X-ray machines)

12. Summary of past occupational radiation exposure:

    a. External (in Rems)_____
    b. Internal (in Rems)_____

13. Signature_____Date_____

This section to be completed by BVAMC Radiation Safety Office

1. BVAMC training: Lecture_____Course_____Interview_____
   Date Date Date
2. Instruction material supplied:
3. Personnel dosimetry assigned: Body_____Wrist_____Ring_____
4. Bioassays required: (type and frequency)

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5. Medical examinations required and/or requested:

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6. Comments on past occupational exposure and history:

7. Requests for past records (Name, address, and date)

8. Signature of R.S.O. Interviewer_____Date_____

Termination Data

1. Summary of radiation exposure during employment at BVAMC_____

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2. Comments:

3. Signature of R.S.O. Interviewer_____Date_____

BIOASSAY PROGRAM FOR INTERNAL RADIATION MONITORING

I. General

Appropriate internal radiation monitoring shall be conducted on any individual working with unsealed radioactive materials where a potential exists for receiving radiation doses and/or body burdens in excess of 20% of the limits established in 10 CFR 20. All records of such bioassays will be maintained by the Radiation Safety Office.

II. Iodine-125 In-Vivo Thyroid Counting

A. All individuals routinely working with greater than 1 millicurie quantities of iodine-125 shall participate in the in-vivo thyroid counting program conducted by the Radiation Safety Officer.

B. The Radiation Safety Officer will arrange for routine monthly thyroid measurements for persons exposed as in (A) above. If the quantity handled exceeds 10 mCi, measurements will be performed weekly.

C. In addition to routine monthly thyroid monitoring, personnel involved in so-called "iodination" procedures will receive thyroid measurement preferably within 48 hours of performing the iodination procedure but in any case within one work-week.

D. If a thyroid measurement indicates an increase of greater than 0.05 microcuries of iodine-125 in the thyroid, (based upon the 40 hour maximum permissible air concentration) the Radiation Safety Officer shall initiate an immediate investigation of the work place, local exhaust system, work practices, procedures, etc., to determine the cause of the increased iodine uptake. The investigation may include area and personal air monitoring and wipe testing of surfaces as well as visual observation of techniques. Depending on the actual thyroid level of radioiodine, the individual may also be temporarily restricted from further radioiodine work.

III. Hydrogen-3 Urinalysis

A. All individuals routinely working with unsealed quantities of ^{3}H in excess of 10 mCi will participate in the urinalysis program conducted by the Radiation Safety Officer.

B. The Radiation Safety Officer will arrange for routine monthly urinalysis on all such individuals, the first measurement to be conducted within one week of the first use.

C. If radioassay indicates the presence of greater than 10% of the maximum permissible body burden (>3 uCi/liter) the Radiation Safety Office will initiate an immediate investigation of the work place, local exhaust system, work practices, procedures, etc., to determine the cause of increased H-3 uptake. Where appropriate, air samples and wipe tests of surfaces will be taken. Depending on the actual level of H-3 in the urine, the individual also may be temporarily restricted from further exposure.

Radioactive Waste Disposal Procedures

Radioactive waste generated in BVAMC laboratories will be disposed of according to the following procedures:

1. Dry solid waste will be placed in the laboratory waste can as specified in the licensee's authorization. This waste can will be plainly marked, "Caution, Radioactive Waste". When full or when radiation levels may exceed 0.2 mR/hr at a work station, laboratory personnel will contact the RSO to arrange for disposal. The waste will be packaged in a sealed bag, labelled with the isotopes, their respective activities, date of disposal, and generator's name, and will then be transported to the central waste processing site to be turned over to the RSO.

2. Liquid waste which is water soluble and/or water dispersible can be disposed of into the public sewage system via the labelled sinks specified in the licensee's authorization. It is essential that isotopes disposed of in this manner are properly diluted. Dilution factors for commonly used isotopes are found in Table I. (Contact the RSO for any questions before disposal).

3. Liquid Scintillation Vials (LSV)

A. Deregulated LSV, those containing Tritium (H-3) or C-14 only in concentrations averaging less than 0.05 microcuries/ml, will be disposed of in the black barrels designated for this use and located in the research building. (The barrel must be lined with a heavy plastic bag and contain several inches of absorbent). Under No Circumstances shall solid waste or LSV containing ANY other isotope be put into these barrels!

B. All LSV not included in 3A (eg. those containing I-125, S-35, P-32, etc.) will be kept in trays in the generator's laboratory and periodically disposed of via the RSO.

4. Animal tissues will be doubly bagged, and the outside bag will be labelled with the isotopes, their respective activities, date of disposal, and generator's name. The animals will then be kept in the authorized cold storage location for eventual disposal by the RSO.

5. Special waste (including gases, pathogenic or toxic materials, etc.) will be disposed of by procedures determined on an individual basis at the time of authorization.

TABLE I

Isotope	Concentration (uCi/liter)	Yearly Limit (mCi)
^{3}H	1000	500
^{14}C	200	100
^{22}Na	10	*
^{32}P	5	*
^{35}S	20	*
^{45}Ca	3	*
^{51}Cr	500	*
^{86}Rb	20	*
^{99m}Tc	2000	*
^{125}I	0.4	*
^{131}I	0.6	*
^{201}Tl	90	*

* Sum of all other isotopes may not exceed 100mCi per year.

INCINERATION OF RADIOACTIVE WASTES

BVAMC proposes to utilize an existing pathological incinerator located on the top floor of the hospital building for the incineration of animal carcasses and tissues containing small quantities of radioactive materials. In addition to the incineration of animals containing less than 0.05 microcurie of carbon-14 or tritium per gram of tissue, we also plan to incinerate animal carcasses containing other and more concentrated radionuclides, provided the calculated stack discharge concentrations do not exceed the limits specified in 10CFR20 Appendix B, table II, Column I. All such incineration will be under the direct control of the RSO. The general presumption will be made that all radioactive material placed in the incinerator will be released in the discharged air for air concentration calculation purposes. It will further be presumed that radionuclides other than carbon-14 and tritium remain in the ash and the ashes from such combustions will be monitored with an end-window G-M survey meter and collected as radioactive waste if any radioactivity above .05 mr/hr is detected.

As specified in the accompanying approval letters from the Massachusetts Dept. of Environmental Quality Engineering, the stack discharge on this incinerator is 294 feet above ground level, 20 feet above the roof of the hospital building, and the effluent exhausts at 25.5 ft. per second at 400°F. The hospital building is the highest building in the neighborhood, with the nearest higher building being more than 500 yards distant. The incinerator is equipped with an impingement plate scrubber with a direct discharge of scrubber water to the sanitary sewer. The incinerator is a two-stage, gas-fired unit, capable of incinerating up to 300 pound of wet tissue per hour.

The RSO will control all such incineration of radioactive animals and tissues and will maintain all records of such waste treatment. The actual radioative waste treatment program is expected to represent less than one percent of the current workload of this operating incinerator. Arrangements will be made in advance of any radioactive waste treatment. The incinerator ash pit will be emptied prior to such treatment and the ashes from the radioactive waste collected and monitored after treatment. Ashes with measurable activity will be disposed as radioactive waste. It will be conservatively assumed that all radioactivity administered to the animal is discharged via the stack during incineration of the carcass. Since this incinerator normally operates continuously for 6 hours per day, discharging more than 25 ft³ per second, the average air concentrations resultant from this incineration program will in fact be a very small fraction of the Appendix B, Table II discharge limits.