**Virginia Commonwealth University**


# RADIATION SAFETY GUIDE For VCU and VCU Health

**November 2025**

## TABLE OF CONTENTS

## A. Purpose

This safety guide has been developed to provide students, staff and faculty at VCU with the information necessary to protect them and the surrounding community from possible hazards associated with the use of radioactive materials and/or radiation producing devices. It also provides guidelines for ensuring that radiation doses are kept as low as reasonably achievable (ALARA).

This manual is an overview of general radiation safety policies for Virginia Commonwealth University and the VCU Health System. Policies and standard operating procedures for specific programs are available on-line or at the Radiation Safety Division's office.

## B. Responsibility

There are four levels of group and individual responsibility in the total radiation safety program.

1. **Radiation Safety Committee (RSC)**

   This committee reports to the office of the Vice President for Research and Innovation and is composed of representatives of departments and divisions of the University and Health System that use or have management oversight over the use of radioactive material and radiation producing equipment. The committee reviews and approves applications for the human and non-human uses of radionuclides and radiation producing devices. The committee is charged with ensuring that the ALARA philosophy is applied in all areas of radiation use. The Associate Vice President for Occupational Health & Safety has the executive responsibility for all licenses and certificates of registration held by the University.

   The Committee meets at least once each calendar quarter to review issues of importance to radiation safety. The RSC functions to provide guidance and information on the radiation safety program to executive management, ensures that adequate resources are provided by license management and assists the Radiation Safety Officer (RSO) in the development, implementation and maintenance of the radiation safety program. The RSC can require cessation of any operation involving radiation upon a determination of inadequate safety procedures.

2. **Radiation Safety Section (RSS)**

   This office advises and assists the Radiation Safety Committee to ensure that all radiation safety regulations set forth by the Commonwealth of Virginia, the Nuclear Regulatory Commission, and VCU are observed by both VCU and VCU Health.. The responsibilities include but are not limited to:

   a. Maintaining all pertinent records.

   b. Placing orders for radioactive material.

   c. Conducting periodic surveys of all laboratories and other areas where radioactive materials are used or stored.

d. Conducting special area surveys when appropriate.

e. Conducting periodic surveys on VCU radiation producing devices.

f. Administering a personnel and environmental radiation monitoring program.

g. Receiving incoming shipments of radioactive material, inspecting for damage and/or leakage, providing appropriate monitoring and storage.

h. Disposing of radioactive waste in accordance with state and federal regulations.

I. Maintaining a liaison with the Commonwealth of Virginia, the NRC, and other regulators concerning all licensing matters.

j. Assisting Responsible Investigators in technical and administrative radiation safety problems.

k. Ordering the immediate shut-down of an operation that is considered a major safety hazard because of violations of safety regulations. Such actions will be reported to the RSC chairman. The Responsible Investigator may appeal the decision to the chairman of the RSC.

3. **Responsible Investigator**

This individual is responsible for the safe handling of all radiation sources under his/her authorization. This includes:

a. Adequate planning. Before performing an experiment, the Responsible Investigator should determine the types and amounts of radiation or radioactive material to be used. The procedure involved should be rehearsed without radiation to avoid unseen problems or unexpected circumstances. In instances where there is a significant radiation hazard, the Radiation Safety Section should be consulted before proceeding with the procedure.

b. Instructing employees and students under their authorization in appropriate radiation safety practices. Consult with the Radiation Safety Section before allowing individuals under the age of 18 to work with radioactive material or radiation sources.

c. Ensuring that all additional users read the VCU Radiation Safety Guide and complete the SciShield (BioRAFT) on-line radiation safety orientation and training test before working with radiation.

d. Furnishing the Radiation Safety Section with information concerning personnel changes and changes in radioisotope work areas.

e. Complying with the regulations governing the use of radioactive materials and radiation producing devices, as established by the Commonwealth of Virginia, the NRC, and the RSC.

f. Maintaining records of the receipt, use, monitoring and disposal of radioactive materials, and supplying a current inventory of radioactive materials in their possession each calendar quarter.

g. Complying with the proper procedure for termination of any authorization through the Radiation Safety Section. Should an investigator separate from the university, it is his/her responsibility to make certain that all radioactive

materials are disposed of properly or transferred to another authorized individual. A termination survey of all work areas will be performed by the Radiation Safety staff. Also, if the Responsible Investigator goes on an extended leave from VCU, prior arrangements for supervision of the authorization must be made with the Radiation Safety Section.

4. **Radiation Worker**

Each person who uses radiation is responsible for:

a. Reading the VCU Radiation Safety Guide and completing the SciShield (BioRAFT) radiation safety orientation training and test before beginning work with radiation.

b. Keeping his/her radiation exposure as low as reasonably achievable (ALARA)

c. Wearing appropriate personnel monitoring devices when deemed necessary by Radiation Safety.

d. Wearing lab coats and gloves when handling radioactive material other than sealed sources.

e. Ensuring that required records are maintained.

f. Performing swipe surveys of areas where radioactive materials are used. Geiger counter surveys are recommended when appropriate, but cannot be substituted for swipe surveys.

g. Appropriately labeling all radioisotope work areas, equipment, and radioactive waste.

h. Reporting all incidents of accidental contamination to the Radiation Safety Section.

i. Complying with requests by the Radiation Safety Section to have bioassays, either by thyroid count or urinalysis.

## C. Radioisotope Authorizations

1. **Qualifications**:

**a. VCU -Full time faculty**

An applicant for non-human radioisotope use shall be a full-time member of the faculty and have both training and experience commensurate with the types and quantities of radioactive material for which application is being made. “Full time member of the faculty” generally means such positions including, but not necessarily limited to, the following: Professor, Associate Professor, and Assistant Professor; Research Professor, Associate Research Professor, and Assistant Research Professor; and Associate and Assistant Professors. Individuals holding full time positions such as “Research Scientist” or the equivalent may also be eligible for Authorized User Status, depending upon their qualifications. Faculty ranks not eligible for Authorized User Status include Lecturer, Instructor, Associate, Research Associate, and all ranks qualified by terms such as “Adjunct”, “Consulting”, “Visiting”, or “Emeritus”.

**b. Adjunct, consulting, visiting or emeritus Faculty or faculty with Primary Academic Appointments at Other Institutions:**

An applicant with an "Adjunct" faculty appointment at VCU who has a primary appointment at another institution can work under a primary full time VCU faculty authorized user.

**c. Waiving of Faculty Status for Certain Authorizations:**

The Radiation Safety Officer may accept the qualifications of non faculty individuals as Authorized Users for those Authorizations that are solely operational in function.

a. "Operational" means that the radioactivity possessed under the Authorization is not used for biomedical or basic science research purposes, but for storage or analytical applications not related to research. Examples include the oversight of radioactive waste for decay in storage and off-site transfer, or the use of lead content analyzers for industrial hygiene purposes, and so forth.

b. Operational Authorizations are subject to the approval of and oversight by the applicable Radiation Safety Committee.

**PRECEPTORS**

The following requirements shall apply to an individual acting as a preceptor for the radioisotope program when the applicant does not meet the requirements stipulated above:

a. The preceptor shall be an active-status Authorized User.

b. The preceptor shall have such professional relationships with the applicant as would permit real knowledge of the day-to-day course of the use of radioisotopes. The preceptor shall have a relationship with the applicant which would give him/her veto power over the applicant's use of radioisotopes. Having this power, the preceptor must be willing to accept accountability for proper radioactive material usage.

**AUTHORIZATION FOR MEDICAL USE OF RADIOACTIVE MATERIAL IN HUMANS: PHYSICIANS, MEDICAL PHYSICISTS AND NUCLEAR PHARMACISTS**

The administration of radioactive material or therapeutic radiation to patients or research subjects at VCU is regulated by US NRC, the US Food and Drug Administration (FDA) the Virginia Department of Health and the VCU Radiation Safety Committee. In order to participate in the human use of radioactive material or accelerators, the applicant must provide evidence of training and experience that reflect those set forth in 10 CFR 35 and equivalent Virginia regulations. These requirements generally involve (1) training in basic radioisotope handling techniques, (2) supervised clinical training in an institutional radiology, nuclear medicine or radiation oncology program, and (3) relevant experience.

The Physician applicant for clinical use of radioactive material or accelerators must fulfill all of the following conditions:

1. Hold an active license to practice medicine in the State of Virginia as issued by the Virginia Board of Medicine and be a full time VCU or VCU Health employee.

2. Have training and experience commensurate with the types and amounts of radioactive material applied for, as set forth in 12VAC5-481. Applicants may demonstrate fulfillment of the requirements either by (a) a combination of specialty board certification, documentation of alternative training and experience and by preceptor attestation; or (b) by having previously been named as an Authorized User on an NRC or Agreement State license for the clinical use of radioactive material.

3. Have contacted the Radiation Safety Officer, through his/her Departmental Chair or other individual designated by the Department. The applicant should submit a copy of the licensee's registration certificate issued by the Virginia Board of Medicine documenting current active licensure, a curriculum vitae, a copy of the applicant's specialty board certificate, or letter of intent to certify from the specialty board and a letter of attestation (if applicable). If Authorization is sought through preceptor attestation in lieu of board certification, a preceptor attestation form as provided by the Virginia Department of Radiological Health.

The Medical Physicist applicant must fulfill all of the following conditions:

1. Have training and experience commensurate with the clinical activities applied for, as set forth in 12VAC5-481. Applicants may demonstrate fulfillment of the requirements either by specialty board certification, or by preceptor attestation.

2. Apply to the Radiation Safety Officer through his/her Departmental Chair or other individuals designated by the Department. The application must be accompanied by a curriculum vitae and a copy of the applicant's specialty board certificate, or letter of intent to certify from the specialty board. If Authorization is sought through preceptor attestation, a complete, signed preceptor attestation form is required.

The Nuclear Pharmacist applicant for clinical use of radioactive material must fulfill all of the following conditions:

1. Hold an active license to practice pharmacy in Virginia as issued by the Virginia Board of Pharmacy.

2. Have training and experience commensurate with the types and amounts of radioactive material applied for, as set forth in 12VAC5-481. Applicants may demonstrate fulfillment of the requirements either by specialty board certification, or by preceptor attestation.

3. Submit an application to the Radiation Safety Officer. The application must be accompanied by a copy of the licensee's registration certificate issued by the Virginia Board of Pharmacy as documentation of current active licensure, a curriculum vitae and a copy of the applicant's specialty board.

## BASIC HUMAN RESEARCH AND THE RADIOACTIVE DRUG RESEARCH COMMITTEE

"Basic human research" means research intended to obtain basic information regarding the metabolism (including kinetics, distribution and localization) of a radioactively labeled drug or regarding human physiology, pathophysiology or biochemistry; but not intended for immediate therapeutic, diagnostic or similar benefit. For such studies, an application must be made to the VCU Radioactive Drug Research Committee (RDRC). The RDRC reports to the US Food and Drug Administration (FDA) and to the VCU RSC. Investigators who wish to conduct basic human research on radioactive drugs shall make an application to the RDRC, consistent with the requirements of 21 CFR 361. Requirements include, but are not limited to, the following:

a. "Basic human research" means research intended to obtain basic information regarding the metabolism (including kinetics, distribution and localization) of a radioactively labeled drug or regarding human physiology, pathophysiology or biochemistry; but not intended for immediate therapeutic, diagnostic or similar benefit

b. The amount of active pharmaceutical ingredient or combination of pharmaceutical ingredients to be administered shall be known not to cause any clinically detectable pharmacological effect in human beings, and

c. The radiation dose shall be the smallest practical to perform the study. Under no circumstances shall the whole-body effective dose equivalent exceed a yearly cumulative value of 5 rem (50 mSv), or a single-exposure value of 3 rem (30 mSv). The total critical organ dose shall not exceed 15 rem (150 mSv) annually. For research subjects who have not reached 18 years of age, the maximum permissible whole body and critical organ exposure limits are 10 percent of the foregoing. A female research subject of childbearing potential shall state in writing that she is not pregnant, or shall be given a pregnancy test before participating in any study. d. Approval of a protocol by the RDRC does not relieve the applicant of obtaining the approval of other entities, including the VCU Institutional Review Board, prior to conducting research in humans.

## INFORMED CONSENT FOR PROCEDURES INVOLVING IONIZING RADIATION IN CLINICAL INVESTIGATIONS

Investigators supervising clinical trials that are subject to oversight by the VCU Institutional Review Board (IRB) must inform research subjects of any exposure to ionizing radiation consequential to participation in a clinical study (a) where the exposure exceeds the standard of care for the condition that is the subject of the study, or (b) as a normal volunteer. The IRB requires that such protocols undergo "Specialty Committee" review and approval. The Radiation Safety Committee acts as the Specialty Committee for protocols involving ionizing radiation. The Committee has adopted the following requirements relative to expressing radiation dosage to patients or research subjects who are participating in clinical or basic human research.

a. The investigator or his/her designee shall determine the types and numbers of radiological or nuclear medicine examinations that are required for participation in the clinical trial, which are beyond the "standard of care" based on the current guidelines (i.e. NCCN guidelines for cancer care or VCUHS standards of care and confirmation from the Principal Investigator). The PI should also seek assistance in estimating effective dose equivalent (EDE) from a Medical Physicist in the VCU Health Systems or from the Department of Radiology/Clinical Radiation Safety office responsible for

the diagnostic areas of interest.

b. The investigator or his/her designee must submit an application to the Radiation Safety officer. Application for the use of Ionizing Radiation in Human Research

c. Guidelines for IRB protocols involving the Use of Ionizing Radiation can be found in the Occupational Health and Safety (OHS) website.

2. **Authorization**: Before radioactive materials or radiation producing devices may be used in a laboratory or clinical setting, the following procedures must be performed:
    a. Obtain proper authorization forms from the Radiation Safety Section website.
    b. Complete, sign and date all forms.
    c. Return the completed forms to the Radiation Safety Section for review. The investigator will be notified within 10 business days, depending on the type and complexity of the requested authorization.
3. **Amendments**: Authorizations may be amended to increase possession limits, add a different radionuclide or chemical form to an experimental protocol, and add or delete rooms designated for radioisotope use or storage. A Responsible Investigator can amend an authorization by submitting an authorization amendment request to the Radiation Safety Section.
4. **Change in protocol:** If a new experiment with radionuclides involves a major change in protocol, a new application must be submitted to the Radiation Safety Section prior to the start of the experiment.
5. **Status of Authorizations**: An authorization is active as long as they have radioactive materials inventory. If an authorized user has chosen not to perform experiments using unsealed radioactive material for over 5 years, their authorization status will be revisited and labs may be closed out based on AU interviews and research needs. Laboratories may be reauthorized if a new protocol and application is submitted for approval.
6. **Animals**: Authorizations which utilize animals must include training, special handling and storage procedures for the animal facility personnel when applicable. This authorization is in addition to IACUC approval.
7. **Eating and Drinking in Laboratories/Laboratory Clean Area:** Investigators may apply for a laboratory "clean area" with Occupational Health & Safety. The proposed area will be evaluated based on all hazards within the lab, then approved or denied on a case-by-case basis.

## D. Procurement of Radioactive Materials

1. **Orders:** All radioisotopes used at VCU, regardless of the activity, must be ordered and received by the Radiation Safety Section. This ensures that both the institution and the Responsible Investigator are authorized to use the material requested, and that license limits are not exceeded for the specified materials.
    a. All radionuclide orders must include a completed radionuclide ordering form (available on the OHS website HERE).

b. Orders for radioactive materials are placed Monday through Friday (except holidays) by the Radiation Safety Section. Since cutoff times for ordering and shipping vary among the radionuclide companies, check with the Radiation Safety Section for information on ordering times and delivery dates. It is the responsibility of the purchaser to supply accurate information on the ordering forms. Radionuclides are ordered by the catalog number provided on the ordering form and unless otherwise specified, the lot currently in stock will be ordered.

c. Laboratories will be notified when the order is received.

2. **Transfer of Radionuclides:**

a. Transfer of radionuclides within the institution is subject to approval by the Radiation Safety Section. A transfer form may be required where applicable. Contact Radiation Safety for instruction.

b. In cases where radionuclides are to be transferred into or out of the University, the Radiation Safety Section must be contacted so that proper packaging and shipping papers can be prepared and license conditions met.

## E. Policies and Procedures for Radionuclide Areas

The following policies and procedures shall apply to all areas where radionuclides are used or stored:

1. **Proper posting and labeling of laboratory areas and equipment:**

a. All laboratories using radioactive materials shall display the appropriate sign outside the laboratory entrance. The Radiation Safety Section will post the necessary signs.

b. Label radioactive waste containers, radioisotope storage areas, radioisotope work areas and any equipment routinely used for radioisotope work with "Caution Radioactive Materials" labels. Some of these labels are available from the Radiation Safety Section.

c. The current NRC-3 form (Standards For Protection Against Radiation), the notice to employees concerning Reporting of Defects and Noncompliance, and emergency spill procedures are posted in all laboratories using radioisotopes by Radiation Safety staff.

2. **Security of radioactive material in research laboratories:**

Commonwealth of Virginia regulations require that licensed radioactive material is secured from unauthorized removal or access. VDH regulations also require control and constant surveillance of licensed material in unrestricted areas. To comply with these regulations, radioactive materials must be locked up unless the licensed material is under constant surveillance by an authorized individual. If an unauthorized individual enters a lab containing radioactive material, they should be confronted or acknowledged without delay.

3. **Shielding of sources:**

Radioactive sources or stock solutions in the laboratory must be shielded

appropriately to minimize radiation exposure to laboratory workers. Recommended shielding materials for some radioisotopes are found under General Safety Measures in this manual (Section G).

4. **Protection of work surfaces:**

   All radioisotope work areas (bench tops, hood floors, etc.) as well as storage areas must be covered at all times with plastic-backed absorbent paper. When working with large volumes of liquid, trays lined with protective paper are recommended. The protective paper should be replaced routinely to prevent a build-up of radioactive contamination.

5. **Laboratory records:**

   a. All laboratories using radioactive materials are required to maintain records of authorizations, receipt and use of radioisotopes, copies of waste disposal records, results of routine lab monitoring, copies of radionuclide inventory reports, and correspondence with the Radiation Safety Section. A set of preprinted forms and dividers designed to maintain these records are furnished by the Radiation Safety Section.

   b. An inventory report of all radioactive materials possessed by each Responsible Investigator is required at least each calendar quarter. Radiation Safety will supply an inventory form after the laboratory surveys.

   c. Control numbers are assigned to each container of radioactive material when received in Radiation Safety. Shipments of radioactive material are tracked from receipt to disposal with this control number. It is important that each control number is entered on a separate receipt/use/disposal form and on waste disposal forms.

   d. All records pertaining to the receipt, use, monitoring and disposal of radioisotopes must be kept for three (3) years. After that time, they may be discarded.

6. **Routine monitoring of work areas:**

   a. Routine monitoring for radioactive contamination is a necessary part of the laboratory program and is required in areas where radioactive materials are used and stored. A labeled diagram of these areas must be kept in the monitoring section of the radioisotope log book. Monitoring is accomplished by conducting swipe tests, also called wipe or smear tests. In some cases, monitoring with survey instruments is recommended but cannot be substituted for swipe monitoring.

   b. The purpose of swipe monitoring is to determine the presence of removable radioactive contamination on a surface. The test is done by wiping, with slight pressure, a piece of filter paper, parafilm, or commercially prepared swipe paper over the surface area of countertops, laboratory furniture, equipment, handles, floors, etc. Each swipe should cover an area of about 100 square centimeters. A conservative 10% swipe efficiency is assumed for research labs.

   c. Count each swipe sample in the appropriate analyzer (ie. liquid scintillation counter, gamma counter, etc.) for one minute. Use a window wide enough to detect all isotopes in use.

d. Count a background swipe with each group of swipes assayed for contamination.

e. **Investigate and decontaminate areas with swipe results greater than 200 counts per minute above background.** Then re-swipe the area, and enter all results in the monitoring section of the radioisotope log book. The initial swipe print-out showing contamination as well as the print-out showing swipe results after decontamination should be kept in the record book with appropriate notations.

f. **Perform a swipe survey once during each calendar week that radioactive material is used.** Records must include both positive and negative results, the count time, and the date of the survey. Label the printout from the liquid scintillation or gamma counter with the corresponding location numbers from the room diagram and file the print-out in the monitoring section of the radioisotope log book.

g. After use of gamma or high energy beta emitters, the user should perform an immediate survey of hands, feet, clothing and use areas for gross contamination. The Responsible Investigator must purchase an instrument or handheld detector for surveys. Recommendations for survey meters are available by the Radiation Safety Section.

7. **Radioactive contamination:**

a. An action level for radioactive contamination is the level that requires investigation, decontamination, and re-swiping. The action level for areas approved for use and storage of radioactive materials is 200 cpm. .

Wipe Test Decontamination Action Levels

| Net **DPM** on Wipe* | | Action to be Taken by Laboratory Personnel |
|---|---|---|
| Alpha, gamma and high energy (>250 keV) beta emitting radionuclides (e.g. I-131, P-32, Cr-51, Ac-225) | Low energy (< 250 keV) beta emitting radionuclides (e.g. H-3, C-14, S-35) | |
| Less than 220 | Less than 2,200 | No action required |
| 220 – 11,000 | 2,200 – 11,000 | Clean area (see “Decontamination” below); repeat wipe(s) |
| 11,000 – 110,000 | | Clean area, repeat wipe(s); notify Radiation Safety Office to verify clean-up. |

| | |
|---|---|
| > 110,000 | Cease radioactive material use and notify the Radiation Safety Office. Commence immediate cleanup under Radiation Safety supervision. |

* Wipe area 100 $cm^2$ minimum.

**Decontamination**

Preparations for decontamination shall begin promptly. The user will determine the extent and hazard of contamination prior to commencing clean up. The individual responsible for the contamination is expected to perform the necessary clean up. The AU shall inform the RSO of all contamination incidents exceeding the notification level specified in Table 2 above. The Radiation safety office will oversee the associated decontamination process.

b. To prevent personnel contamination, laboratories that are approved for radioactive material should keep unprotected, unlabeled surfaces such as desks and computer workstations free of contamination. Exceptions include specified protected work areas and equipment which are frequently used for radioisotope work and which are clearly labeled with the standard radiation caution signs or stickers.

a. When contamination above the trigger level is found, begin decontamination immediately. Contain all spills with absorbent material or paper towels and wipe from the outside of the area toward the center.

b. Determine the extent and hazard of the contamination. The Radiation Safety Section can assist in this evaluation if needed.

c. Clean the contaminated area with a soap solution. Perform a swipe survey for removable contamination. Continue decontamination efforts until swipe surveys show less than 200 cpm removable contamination.

d. In general, the individual responsible for the contamination will be expected to do the cleanup.

e. After decontamination, the area or equipment should be considered still contaminated until proven otherwise by a swipe survey.

9. **Decontamination of personnel:**

   a. Notify your supervisor or Responsible Investigator and notify the Radiation Safety Section immediately.

   b. Remove contaminated clothing and flush contaminated skin with lukewarm water and then wash with mild soap. If contamination remains, induce perspiration by covering the area with plastic. Then wash the affected area again to remove any contamination that was released by the perspiration.

   c. Consult with Radiation Safety for any additional steps that may be deemed necessary.

10. **Laboratory surveys:**

    a. The Radiation Safety Section is required to conduct inspections of all

laboratories using radioactive materials. The inspections include a review of the laboratory records, security of radioactive material, personnel monitoring requirements, safety equipment and procedures, waste disposal techniques and a survey of radiation and contamination levels.

b. Any questions or problems involving radioactive materials or laboratory safety should be directed to the Radiation Safety staff member at the time of the survey. Following the inspection, a report will be sent to the Responsible Investigator in SciShield (BioRaft). The Responsible Investigator is responsible for reviewing this report in SciShield (BioRaft) and responding accordingly.

*c.* If violations are noted during a survey, there will be a follow-up to determine if the violation(s) are corrected. If the problem is not corrected by the time of the follow-up, a written explanation to the Radiation Safety Officer will be required from the Responsible Investigator. Multiple violations also require a written explanation to the Radiation Safety Officer/Assistant Radiation Safety Officer. An unacceptable response or recurring violations will result in retraining of the Responsible Investigator and staff. If there is no response, the Radiation Safety Committee will review the Responsible Investigator's authorization to determine if the investigator's authorization to use radioactive material should be withdrawn. See page 25 for the Radiation Safety Committee's *Procedures For Correcting Violations.*

11. **Calibration of Geiger Counters**:

Investigators are responsible for purchasing a Geiger counter to monitor personnel and surface contamination if radionuclides other than $^{3}H$ are used. The Radiation Safety Section can recommend an appropriate instrument for the desired range of use. Annual calibration is required and the investigator is responsible for coordinating with Radiation Safety for this calibration which the Radiation Safety Section performs at no charge. All Geiger counters must be registered with the Radiation Safety Section to ensure timely calibration.

## F. Laboratory Rules For the Safe Use of Radioactive Material in Research Areas

1. Make workers aware of existing and potential hazards, such as radionuclide packages, waste containers, work and storage areas, by marking them with appropriate warning signs. For posting requirements and warning signs, contact the Radiation Safety Section.
2. Perform a swipe survey of surfaces and floors once during each calendar week that radioactive material is used.
3. Contact the Radiation Safety Section to schedule leak testing of beta and gamma sealed sources subject to Commonwealth or Virginia or NRC control.
4. Maintain a log book containing records for radionuclide receipt, use, disposal, swipe tests and area monitoring results. Keep these records current, and include up-to-date radionuclide authorizations. The log book is subject to inspection by the Radiation Safety Office or Commonwealth of Virginia personnel.
5. Make shielding and monitoring equipment available where applicable.
6. Order and dispose of all radioactive material according to University policy in

this guide.

7. Minimize opportunities for personnel contamination. Food and drink should not be consumed and associated utensils stored in areas where radioactive materials are used. Do not use cosmetics or hand lotions in laboratories designated for use of radioactive materials. Solutions should not be pipetted by mouth.

8. Maintain security of radioactive materials by locking areas where radioactive materials are kept when the area is unoccupied. Immediately acknowledge or confront unknown individuals who enter rooms where radioactive material is used or stored.

9. Store radioactive sources in a shielded enclosure when not in use. Ensure that radiation levels at accessible places are less than 2mR/hr.

10. Hands should be washed before leaving the radionuclide lab. Hands, clothes, and shoes should be monitored on a routine basis.

11. Radionuclides which can exist in a volatile state must be handled in a glove box or exhaust hood fitted with an appropriate filter unless exempted by the Radiation Safety Section. Functional glove boxes or exhaust hoods must meet OHS requirements.

12. Perform procedures over absorbent paper, preferably placed in the bottom of a tray.

13. Notify the Radiation Safety Section if you want to transfer radioactive material to another investigator or outside VCU.

14. Report any personnel contamination or major radionuclide spillage immediately to the Radiation Safety Section.

15. Use protective clothing: Gloves and lab coats are required when handling radioactive material in any form other than sealed sources or sealed stock vials. Protective clothing should not be taken out of the authorized space for radiation work in which they are used unless monitored and determined to be free of contamination. Shoes and clothes that leave the skin exposed to contamination (such as sandals and shorts) are not appropriate when working with or transporting radioactive material.

16. Tweezers, tongs, or other suitable devices should be used as needed to handle sources with significant surface dose rates. Maintaining a distance of even a few inches with tweezers or tongs can cut down the exposure rate by orders of magnitude relative to handling small sources directly with the fingers.

## G. General Safety Measures

1. **Time:** exposure is proportional to time.

2. **Distance:** exposure decreases rapidly with distance due to the inverse square law. Doubling the distance between you and the radiation source will decrease the dose rate by a factor of four.

3. **Shielding**: Plexi Glass for beta, lead for gamma. Following are recommended shielding thickness for some commonly used radioisotopes.

| Radioisotope | Shielding |
|---|---|

| | |
|---|---|
| $^{125}I$ | .0008 inches lead |
| $^{22}Na$ | 0.16 inches lead |
| $^{51}Cr$ | 0.07 inch lead |
| $^{32}P$, $^{14}C$, $^{35}S$ and $^{45}Ca$ | 3/8 inch plexiglass |

4. **Contamination control:** Good housekeeping habits reduce internal and skin contamination.

## H. Radioactive Waste Disposal

1. **Disposal Policy**:

   a. All radioactive waste must be disposed of either through the Radiation Safety Section or by procedures approved by the Radiation Safety Section. Do not discard radioactive waste in conventional waste containers that are emptied by the housekeeping staff, or pour liquids down drains in the lab unless an exemption has been granted by the Radiation Safety office.

   b. Autoclave or deactivate waste containing potentially infectious or carcinogenic agents prior to disposal. Radioactive waste which is hazardous for other reasons should be marked and clearly identified when presented for disposal. Since red bags denote infectious waste destined for incineration, they may not be used for radioactive waste.

   c. Do not allow radioactive waste to accumulate in the laboratories. Labs are required to make regular waste pickups with Radiation Safety following the radioactive waste disposal guidelines.

2. **Solid Dry Waste**:

   a. A can with a foot-operated lid is ideal, but any sturdy container with a securely fitted cover is acceptable for solid waste. Solid waste must be stored in a rigid waste container at all times, and each container must be fitted with a disposable polyethylene liner. **There can be no liquid whatsoever in the solid waste.** If solid waste is found to contain liquid, the waste will be returned to the lab for repackaging.

   b. Minimize waste generation at the source. Do not discard items known to be free of contamination in the radioactive waste. Monitor potentially contaminated materials whenever possible and dispose of non-contaminated items in the regular trash.

   c. Waste containing $^{3}H$ and $^{14}C$ can be mixed. **Separate all other waste by isotope**. Label each bag with isotope, activity, and date.

   d. Place all sharp objects in puncture proof containers.

   e. Do not place lead pigs in the solid waste. If lead is found in the solid waste, it will be returned to the lab for repackaging. Segregate contaminated lead pigs from other solid waste and bring to the Radiation Safety Section to be held for decay.

3. **Liquid Waste:**

   a. Polyethylene containers are recommended for liquid waste. In cases where

polyethylene cannot be used, glass containers are acceptable provided they are stored and transported in protective polyethylene holders. Do not fill containers with more than 8 liters. Over-filling can cause spillage and contamination of personnel and equipment. Containers should be tightly sealed.

b. Separate organic based liquid waste from water-soluble liquid waste when possible. Small volumes of aqueous liquid must be poured out of tubes or vials into a bulk radioactive liquid waste container, and the empty tubes or vials should be disposed of as solid radioactive waste.

4. **Liquid Scintillation Vials**:

a. Dispose of all vials containing scintillation cocktail as radioactive waste. The vials may be delivered to the Radiation Safety Section for disposal in either the original trays or in double bags of strong polyethylene. Do not overfill bags (no more than 500 vials per bag). Always make sure that all vials are tightly capped to prevent spillage of the contents.

b. The amount of radioactivity in the scintillation vials should be calculated based on actual counting results rather than estimated. The amount of radioactivity can be calculated by using the following formulas:

$$\text{Disintegrations per minute} = \frac{\text{counts per minute}}{\text{Counter efficiency}}$$

$$\text{\# of microcuries} = \frac{\text{disintegrations per minute}}{2.22 \times 10^6 \text{ DPM/microcurie}}$$

c. Separate vials containing $^{3}H$ and $^{14}C$ from vials containing other radioisotopes. Contact Radiation Safety for guidance if this is not possible.

d. Use biodegradable liquid scintillation cocktail and mini-vials for sample counting when possible to minimize waste.

e. Gamma emitters should not be counted in liquid scintillation cocktail unless specific approval is given by the Radiation Safety Section.

5. **Biological Waste**:

a. Waste containing $^{3}H$ and $^{14}C$ can be packaged together. **Separate all other waste by isotope unless prior approval is obtained from Radiation Safety.** Label each bag with isotope, activity, and date.

b. Place radioactive animals in doubled polyethylene bags. There must be no other form of waste in the bags with the carcasses. As with solid waste, do not place biological waste in red bags.

c. Place bedding, feces, and urine in a separate container for disposal.

d. Liquid biological waste must be separated from solid biological waste and labeled with isotope, activity, and date.

6. **Procedure for disposal:**

a. Waste is accepted by appointment on Monday, Wednesday, and Friday mornings at the Radiation Safety Section (B2 level of Sanger Hall) or scheduled pickup. Radioactive waste generated on the Monroe Park Campus

or in MCV Campus buildings other than Sanger Hall will be picked up by the Radiation Safety Section.

b. No more than 20 liters of liquid or 10 trays of scintillation vials may be brought for disposal at one time. There is no limit to the amount of solid waste that may be brought for disposal.

c. Ensure that all bags are tied securely and that all liquid waste containers are tightly capped before the waste is transported to or picked up by the Radiation Safety Section. Carts used for the transport of radioactive waste should not be overloaded. Waste should be transported on freight elevators or low-traffic elevators whenever possible.

d. Enter the waste pickup request via RedCap Waste Form. A copy of the container swipes must be uploaded into the request. Do not calculate radioactive decay for waste totals. Keep a copy of each disposal record in the laboratory log book.

## I. Personnel Monitoring

Any occupationally exposed individual who is likely to receive a dose in excess of 10 percent of the annual limit will be monitored for radiation dose.

1. **Personnel Dosimeter**:

   Only personnel working with radiation producing devices or significant gamma emitters are generally issued personnel dosimeters. Individuals using millicurie quantities of high energy gamma or beta emitters are usually issued a ring monitor to assess radiation exposure.

   a. Dosimeters are issued either on the first of the month or the first of each calendar quarter. Return used dosimeters by the tenth of the month following the wear period to Radiation Safety through campus mail (Box 980112) or delivered to Radiation Safety (Grant House, Room 202) or in drop boxes located on the medical campus.

   b. All personnel using x-ray equipment are required by law to wear their badge at collar level and on the outside of their lead apron. Other personnel should wear their badge at the location receiving the highest exposure. Virginia law requires the position at which the dosimeter is worn not be changed during any calendar quarter.

   c. VCU badges should not be worn while working at other facilities. The only exceptions to this rule are for students and residents on rotation at the McGuire VA Medical Center in Richmond.

   d. Once included in the University's radiation monitoring program, do not work with or around radiation without a current monitor. Lost, damaged or accidentally exposed monitors should be reported to the Radiation Safety Section at once so a replacement monitor can be issued. Missing doses from dosimeters that are lost or damaged must be estimated and added to your permanent record.

   e. Never wear a monitor issued to another person.

f. Notify Radiation Safety if you are exposed to occupational radiation at any other facilities while also working at VCU Health or VCU. Regulations require that **all** occupational radiation dose is taken into account to ensure the 5 rem/year limit is not exceeded.

g. Complete records of dosimetry reports are available in the Radiation Safety Section in Grant House, Room 202, and sent to each participant via email.

h. When terminating employment at VCU, leave a forwarding address with Radiation Safety. A termination report of exposure history will be sent to the individual or new employer.

*Note on Workers under the Age of 18 and Members of the Public*: The annual limits for minor radiation workers are 10% of the applicable adult worker limits. The annual limit (effective dose equivalent) for any member of the public is 100 millirem (1 mSv).

2. **Bioassays:**

Personnel using radioactive materials may be required to participate in a bioassay program. Bioassays are done by uptake measurements or by urinalyses.

a. **Radioiodine**:

Radioiodine can be classified as unbound or bound. It is considered unbound if there is a significant possibility of potential release into the atmosphere (i.e., during an oxidation or reduction reaction). Any radioiodine attached to a non- volatile agent is considered bound.

1. **Recommendations for personnel performing radioiodinations:**

Any process which may result in the possible escape of radioiodine should be carried out in a fume hood or glove box. Routine use of radioiodine in an open room or bench is discouraged. The Radiation Safety Section should be contacted to check fume hood air flow before initiating work with radioiodine and must meet OHS requirements.

Laboratory personnel working with radioiodine should wear double gloves (outer pair should be changed frequently), and should position the fume hood sash at a level which results in a linear air flow of 80-100 feet per minute. Higher velocities may create turbulence which may cause backflow and loss of protection. The procedure should be set up at least 6 inches into the hood.

2. **Bioassay Participation Requirements for Radioiodine**:

Individuals will be required to participate in the bioassay program if an internal dose is likely to exceed 10% of the allowable intake limits. Based on bioassay results over a number of years, individuals working in the research areas are not likely to exceed 10% of the allowable limits. However, bioassay monitoring is recommended at the intervals listed below for individuals who work with unbound radioiodine to

monitor safe work practices.

a. Baseline: Prior to beginning work with radioiodine.
b. Post-iodination: Within 72 hours of the iodination procedure, but at least 6 hours post-iodination to allow for distribution of the iodine to the thyroid.
c. Post-operational: When termination work with radioiodine.

b. **Tritium**:

Processes which may result in possible escape of tritium should be carried out in a fume hood or glove box. Routine use of large quantities of tritium in an open room or bench is discouraged. The Radiation Safety Section should be contacted to check fume hood air flow before initiating work with large quantities of tritium and must meet OHS requirements.

The fume hood sash should be positioned at a level which results in a linear air flow of 80-100 feet per minute. Higher velocities create turbulence which may cause backflow and loss of protection. Laboratory personnel working with tritium should wear double gloves (outer pair should be changed frequently).

1. **Bioassay Requirements for Tritium**:

Individuals involved in operations that utilize more than 100 millicuries of hydrogen-3 (tritium) in a non-contained form (excluding metallic foil), within a 30 day period, shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations.

2. **Urinalyses:**

Contact the Radiation Safety Section within two days of any single operation to bring urine samples for assay. The Radiation Safety Section will advise employees as to the necessity and frequency of urinalyses.

## J. Emergency Procedures

1. **Minor Spills of Liquids and Solids:** Less than 1 mCi and less than 5 milliliters of liquid confined to a small area

a. Notify persons in the area that a spill has occurred.

b. Prevent the spread of contamination by covering the spill with absorbent paper.

c. Clean up the spill wearing disposable gloves and using absorbent paper. Carefully fold the absorbent paper with the clean side out and place in a plastic bag for transfer to a radioactive waste container. Also put contaminated gloves and any other contaminated disposable material in the bag.

d. Survey the area with a GM survey meter. Check the area around the spill. Also check your hands, clothing, and shoes for contamination.

e. Decontaminate the area with a soap solution and work from the outside of the spill to the center. Perform a swipe survey of areas where contamination is possible. Continue decontamination efforts until swipe surveys show less than

200 cpm removable contamination. Keep swipe results in the monitoring section of the radioisotope notebook.

f. Report the incident to the Radiation Safety Section at 804-828-9131.

2. **Major Spills of Liquids and Solids:** Greater than 1 mCi and greater than 5 milliliters of liquid, or a smaller volume of liquid spread over a large area.

   a. Clear the area. Notify all persons not involved in the spill to vacate the room.

   b. Prevent the spread of contamination by covering the spill with absorbent paper, but do not attempt to clean it up. To prevent the spread of contamination, limit the movement of all personnel who may be contaminated.

   c. Shield the source if possible without further contamination or significant increase in radiation exposure.

   d. Close the room and lock or otherwise secure the area to prevent entry.

   e. Notify the Radiation Safety Office immediately at 804-828-9131 or 804-828-9834 (Emergency Number).

   f. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water and then washing with mild soap. If contamination remains, induce perspiration by covering the area with plastic. Then wash the affected area again to remove any contamination that was released by the perspiration.

## K. The ALARA Concept

The **ALARA** concept means keeping radiation exposure **A**s **L**ow **A**s **R**easonably **A**chievable. The University management, the Radiation Safety Committee and the Radiation Safety Section are committed to implementing the **ALARA** concept.

1. Work should be planned so that unnecessary exposure to radiation is minimized to the individual worker and to the worker population.

2. Radiation workers are encouraged to participate in the development of the **ALARA** procedures that they will be required to follow.

3. Suggestions for improving health physics practices are encouraged from individual radiation workers. These suggestions should be given to a member of the Radiation Safety Section.

4. The Responsible Investigator will ensure that supervised individuals who are subject to occupational radiation exposure are trained and educated in good health physics practices for their specific work procedures and in maintaining exposures **ALARA**

5. If an individual feels that **ALARA** is not being promoted on the job, one of the following individuals should be promptly notified:

   VCU Radiation Safety Officer (RSO) 804-828-9131

   or the Chairperson, Radiation Safety Committee

   or any member of the Radiation Safety Committee

   or any member of the Occupational Health and Safety staff.

## L. Procedures for the Use of Radioactive Materials in Animals

1. To use radioactive materials in animals, authorized users must submit procedures to the Radiation Safety Committee. Approval is coordinated with the Institutional Animal Care and Use Committee (IACUC). The following information should be included:
   a. A description of the area in which the animal is to be housed during the experiment.
   b. Instructions for animal caretakers or technicians handling animals, animal wastes, and carcasses.
   c. Instructions for cleaning and decontaminating animal cages.
   d. Refer to Section E, 6 of this document for routine monitoring requirements.

2. In general, small animals used in terminal experiments will be housed within hoods located in the investigator's lab. Chronic animals or large animals will be housed in special areas set aside by the Division of Animal Resources.

## M. Risk from Radiation Exposure

Exposure to high levels of radiation, much higher levels than permitted occupationally, have been associated with cancer, birth defects and cataracts. Studies have not shown a cause and effect relationship between health effects and the current levels of occupational radiation exposure (on average, 500 millirem/year for hospital radiation workers); however, it is prudent to assume that some health effects do occur at lower exposure levels. In general, the risks associated with occupational exposures are smaller than the risks associated with most day-to-day activities. The NRC Regulatory Guide 8.29, Instruction Concerning Risks From Occupational Radiation Exposure contains more information on radiation risk.

## N. Contact the Radiation Safety Section for the following:

1. If contaminated with radioactive material.
2. For personnel exposure records and bioassay results.
3. For Commonwealth of Virginia license, license conditions, Commonwealth of Virginia regulations, and for inspection reports.
4. If problems are suspected.
5. If there are questions.

## O. Medical Events and Other Patient Care Related Incidents

1. Immediately contact the RSO or designee to report any instance of a significant deviation of a dosage of radioactive material to a patient or research subject, or delivery of a radiation dose to a patient or research subject via brachytherapy or medical accelerator, that significantly differs from the prescribed dosage or dose. The

RSO or designee shall determine if a reportable medical event has occurred, and will manage incident reporting according to the **12VAC5-481-2080**

2. Immediately contact the RSO or designee if an unintended radiation exposure has occurred to a pregnant patient from radioactive material or x-rays, or to a breast-feeding infant from radioactivity administered to the mother.

**P.**

# Procedures for Correcting Violations

## Radiation Safety Committee

The following procedures outline the process that will be followed by the Radiation Safety Committee to monitor compliance with the requirements that radiation is used in a safe manner. Persons who may have occasion to be cited or sanctioned under these procedures may exercise their right to appeal such citation or sanctions to the appropriate authority (Radiation Safety Committee or Vice President for Research).

**Violation Identified**

VI. First Incident - Follow-Up Survey Required
- A. No Additional Violations Confirmed - No Further Action
- B. Additional Violation Confirmed - see II.

VII. Multiple*, Repeat†, or Recurrent‡ Violations in Last 12 Months
- **A.** Written Response to Radiation Safety Officer (required within 10 working days).
  1. Response Accepted - Follow-Up Survey Required
     a. No Additional Violations Confirmed - No Further Action
     b. Additional Violation Confirmed

        a. Retraining of all research personnel required (see B. below).
  2. Response Not Accepted

     a. Referral to Radiation Safety Committee (see C. below).
  3. No Response

     a. Referral to Radiation Safety Committee (see C. below).
- B. Retraining of All research personnel Required within 90 days.
  1. Retraining completed in 90 Days - No Further Action
  2. Retraining not completed in 90 Days

     a. Referral to Radiation Safety Committee (see C. below).
- C. Referral to Radiation Safety Committee
  1. Explanation by Responsible Investigator Accepted - No Further Action
  2. Explanation by Responsible Investigator Not Accepted - Probation (see D. below).
- D. Probation (3 to 6 months, length to be determined by the RSC).
  1. Random Inspection of Lab by Radiation Safety
  2. No Further Violations - Removed From Probation by RSC
  3. Further Violation Identified
     a. Three Month Suspension of the Use of All Radioactive Materials And/or Radiation Sources.
     b. Reinstatement on appeal to RSC.

***Multiple**: more than one violation in the same survey
†**Repeat**: the same violation in two consecutive surveys
‡**Recurrent**: the same violation in two or more surveys in a twelve-month period

**Note**: ***Security Violations,*** labs that have significant problems with unsecured materials as determined by the RSC will be required to install an automatic door closer. It may be further recommended that a combo-lock be installed to eliminate the keyed entry or keyed entry only system.

**Q.**

## DECLARATION OF PREGNANCY

**Name (print):_____V# or VCU Health #:_____**

**Date of Conception (month, year):_____**

**Department:_____Position:_ _____**

By providing this information in writing to my immediate supervisor, I am declaring myself to be pregnant as of the date shown above. I understand that under the provision of 10CFR Part 20.1208, the exposure to my unborn child from occupational exposure to radiation will not be allowed to exceed 5 mSv (500 mrem) during the entire pregnancy. The dose to my unborn child shall be taken as the sum of my deep-dose equivalent and the dose resulting from the intake of any radionucides. I also understand that this limit includes any exposures I have received since conception, and that if the dose to my unborn child has already exceeded 5 mSv (500 mrem), the dose for the remainder of my pregnancy must be limited to 0.5 mSv (50 mrem). (For dose information, contact Radiation Safety at 89131.) I further understand that if I should find out that I am not pregnant, or if for any reason my pregnancy is terminated, I should inform my supervisor as soon as practical.

**Signature:_____ Date:_____**

### Supervisor's Receipt of Pregnancy Declaration

By signing this statement, I acknowledge receipt of the declaration of pregnancy for the above individual; have provided her with an outline of the potential risks from exposure to the unborn child from the information provided in Regulatory Guide 8.13 (located in the Radiation Safety Guide); and have evaluated her prior exposure (internal and external) to establish appropriate limits to control the dose to her unborn child in accordance with the above stated limitations and the ALARA program. I understand it is my responsibility to forward this form to the Radiation Safety Officer.

**Name (print):_____Phone #:_____**

**Signature:_____Date:_____**

* A response from the supervisor is required in the next section. Please outline any specific controls that are being applied to limit dose to the unborn child. If no specific controls are required, please indicate below.

### * Specific Controls Being Applied to Limit Dose to the Unborn Child

This section is to be completed by the supervisor. Consult with the RSO if necessary. This section must be initialed by the employee to document assessment of exposure and her understanding of specific controls if applied, or the lack of specific controls, if deemed not necessary. Use the back of this form if more space is needed.

Employee Initials:_____ Date:_____

### Radiation Safety Officer's Receipt Of Pregnancy Declaration

By signing this statement, I acknowledge receipt of the declaration of pregnancy for the above individual. I have evaluated her prior exposure (internal and external) to ensure appropriate limits to control the dose to her unborn child have been established and are in accordance with above stated limitations and the ALARA program, and that appropriate monitoring is being provided.

**Signature: Date:**

R. *Prenatal Radiation Exposure Information*

S. *Instruction Concerning Risks From Occupational Radiation Exposure*

T. Code of Federal Regulations, Title 10, Part 20: *Standards for Protection Against Radiation*

**U.**

## Radioisotope Records

The work involving radioactive materials at VCU covers a broad spectrum of applications. Although it would be virtually impossible to devise a single format for radioisotope record keeping that is right for every investigator, the enclosed logbook index set for radioisotope records should facilitate the record keeping requirements for most investigators. You are asked to familiarize yourself with the system and then initiate its use in your own radioisotope work. Each section of the logbook is explained below.

### Authorizations

This section of the logbook should include copies of the responsible investigator's authorizations to use radioactive materials, and amendments to these authorizations.

### Radioisotope Receipt/Use/Disposal

This form is used to track radioactive material in the laboratory from receipt to disposal and denotes the changing status of the material from stock to active use to waste. Each container of radioactive material is assigned a control number when it is received in Radiation Safety. A separate receipt/use/disposal form should be used for each control number. Receipt information should be entered at the top of the form. The use section on the left of the page should be filled in each time the radioisotope with that particular control number is used. When a radioisotope is assigned to in-laboratory waste, record the amount in microcuries in the appropriate column of the “Waste in Lab” section. When radioactive material is brought to Radiation Safety for disposal, record the amount in the column titled “Waste Disposed to RSO” and record the total microcuries left in the lab. Transfer waste entries to the “Radioactive Waste Disposal” form that is used when waste is brought to Radiation Safety for disposal.

### Waste Disposal

See Section H for radioactive waste disposal information.

### Monitoring

Monitoring records consist of the **actual numerical results** of swipe tests performed to detect removable radioactive contamination within the lab. The test is performed by wiping a piece of parafilm, filter paper, or a commercial swipe over a surface, and counting the sample in a suitable analyzer (liquid scintillation counter or a gamma well counter). A room diagram is necessary to show swipe locations. The printout from the counter, labeled with the appropriate location numbers or designation, should be placed in the “Monitoring” section of the log book. A blank or background sample is required with each set of swipes for a background measurement. Any result showing 200 cpm above background is considered contaminated. A contaminated area should be cleaned, then re-swiped to ensure that removable radioactive contamination is less than 200 cpm. Label re-swipe

require swipe monitoring once each calendar week, or after each use of radioactive materials if the use is at greater intervals than weekly. Swipe monitoring records must include the date.

**Survey Reports**

The Radiation Safety staff performs at least quarterly surveys of laboratories using radioactive material. The inspection includes a review of radioisotope records, waste disposal procedures, security, personnel monitoring requirements, safety procedures, and an evaluation of contamination levels in the laboratory. A "Quarterly Radioisotope Inventory" form is left during the survey. A completed inventory form should be sent to the Radiation Safety Office at Box 980112 within two weeks or returned via email to the inspector. Following the inspection, a survey report is sent to the responsible investigator via BioRAFT. File the survey report and a copy of the completed inventory form in the "Survey Report" section in the log book.

**Miscellaneous RSO Correspondence**

Any memos or notices sent to or received from the Radiation Safety Section should be kept in this section.

All records concerning receipt, use, monitoring, transfer and disposal of radioactive materials must be kept for three (3) years. After that time, the records may be discarded.

Please contact the Radiation Safety Section if you have any questions concerning your radioisotope record book.