

RADIATION SAFETY POLICY

1. **PURPOSE:** Provide ionizing radiation protection guidance for staff patients and visitors in VAMHCS facilities.

2. **POLICY:** The VA Maryland Healthcare System (VAMHCS) management is committed to maintaining an effective ionizing radiation safety program that adheres to all applicable regulations, and strives to maintain radiation exposure in accordance with the As Low As is Reasonably Achievable (ALARA) philosophy. The Radiation Safety Committee (RSC) and the Radiation Safety Officer (RSO) are granted the authority, organizational freedom and management support to administer the radiation safety program.

3. **RESPONSIBILITIES:**

a. **Medical Center Director:** Have ultimate responsibility for the radiation safety program to include the appointment of the Radiation Safety Committee (RSC) Chairperson, the Radiation Safety Officer (RSO) and all RSC members. The Director or a designated executive manager will be briefed at least annually on the status of the radiation safety program.

b. **The Radiation Safety Committee:** Directs the radiation safety program in accordance with VAMHCS policy memorandum 512-00-108, subject: Radiation Safety Committee, and ensures that personnel adhere to all applicable policies and or regulations.

c. **Radiation Safety Officer:**

(1) Responsible for the day-to-day operation of the radiation safety program. He/she will ensure that radiation safety activities are being performed safely and in accordance with approved policies and or regulatory requirements. The RSO should have full access to all activities involving the use of byproduct material and the authority to terminate any activity in which health and safety appear to be compromised without consulting with executive management or the RSC.

(2) Performs preliminary review of research investigators radioactive material usage protocols prior to formally discussing the proposals with the RSC. Is responsible for the performance of the quarterly audits of radioactive material usage areas and ensuring that authorized individuals use byproduct material in accordance with the VHA permit requirements, applicable regulations and VAMHCS permit conditions.

(3) Manages the personnel radiation-dosimetry program, review the dosimetry records at least quarterly and report the findings at the quarterly RSC meetings. He/she will develop corrective action for those exposures approaching maximum permissible limits and maintain dosimetry and other radiation safety related records. The RSO shall investigate and respond to radiation related incidents and or emergencies.

(4) Ensure radioactive material inventories, source leak test, instrument calibrations, nuclear medicine quality assurance test, radioactive waste disposals, and effluent releases are performed in accordance with the VHA permit conditions.

(5) Provides annual radiation safety training to radiation workers and ancillary staff, oversee and approve purchasing, shipping, labeling, receipt, and delivery of byproduct material. He/she shall train and or assist the staff in the decontamination of any contaminated packages or usage areas and perform appropriate regulatory notifications when applicable.

(6) Approves all radioactive material receipts or transfers to or from the medical center beforehand.

d. Principal Investigator (PI)/ Authorized User (AU):

(1) Obtains Radiation Authorization Permit (RAP) from the RSC or get approval to perform the study under the supervision of another authorized user prior to purchasing using or conducting any studies with radioactive material. He/she will ensure that personnel working under their permit complete all required training, to include the use of safety devices and have appropriate personnel protective equipment to include dosimeters. Experiments or procedures should be adequately planned to assure proper radiation safety precautions are taken.

(2) Ensures the required records and reports to include periodic surveys, radioactive usage logs, hot-sink disposal log and radioactive material inventory records are completed and/or forwarded to the RSO.

(3) Ensures the RSO is notified of new techniques, changes in personnel, changes in operational procedures, and/or changes in physical location that might lead to increased personnel radiation exposure or increased contamination levels in the laboratory or surrounding environment.

(4) Ensures staff remains in compliance with Federal, State and local regulations and/or policies for the safe use and handling of radioactive materials, maintain a current copy of the radiation safety manual, and be thoroughly familiar with its contents. He/she should direct personnel under his/her supervision to comply with recommendations designed to control and reduce their radiation exposure.

e. Radioactive material users:

(1) Shall be aware of, and work in compliance with Federal, State and local regulations and/or policies pertaining to the safe use and handling of radioactive material, and notify the RSO and management of any health and safety concerns resulting from these activities.

(2) Complies with recommended radiation safety protective measures to include the appropriate use of personnel protective equipment designed to minimize radiation exposure, and wear radiation monitors to document their dose is kept below the maximum permissible limits.

(3) Survey his/her person for radioactive contamination after each procedure and before leaving the laboratory and maintain good housekeeping practices in the laboratory or work area.

(4) Shall not smoke, eat, drink, pipette by mouth or apply cosmetics in laboratories where radioactive material is used or stored.

(5) Immediately reports spills or incidents involving radioactive material to the RSO.

(6) Conduct decontamination procedures as required, with and/or without supervision of the RSO or designated representative. He/she must maintain records of the periodic surveys, radioactive material receipt, usage, storage, and disposal for review by the RSO or external auditing body.

(7) Female radiation workers of child bearing age are responsible to notify the RSO of possible pregnancy to ensure they receive appropriated information about the hazards of fetal exposure to radiation. A formal written pregnancy declaration statement is required if they intend to apply for inclusion in the fetal dose monitoring program.

4. ACTIONS:

a. Radiation Authorization:

(1) Investigators are required to obtain a Radiation Authorization Permit (RAP) from the RSC or get approval to perform the study under the supervision an authorized user prior to purchasing using or conducting any studies with radioactive material. The initial RAP application must include the investigator's training experience with the radionuclide of interest, along with an explanation of the proposed procedures, radionuclide activities, laboratory equipment, and whether they expect to dispose of radionuclide via the sanitary sewer system. The RSC shall review the application and determine whether it should be forwarded to the NHPP along with a request to add the investigator to the VHA permit, or approve/disapprove the request locally for those Research Service investigators requesting to use radionuclide **for in-vitro studies only**.

(2) Approved investigators requesting to perform other studies with radionuclide not covered in the initial permit must submit a new request with the information demonstrating adequate expertise using the radionuclide of interest. The investigator is then responsible for assuring that additional training is given to their laboratory assistants, or personnel working under his/her supervision.

b. Protocol Review and Approval

(1) Research protocols utilizing ionizing radiation in VAMHCS controlled areas shall be reviewed and approved by the RSC/RSO beforehand.

(2) Protocols requesting authorization to administer radiation by performing standard of care procedures, Dual Energy X-ray Absorptiometry (DEXA) only, and annual protocol updates with no changes will be reviewed and approved or disapproved by the RSO without the need for further review and approval by the full RSC membership.

c. ALARA Program:

(1) A review of the radiation safety program will be conducted at least annually, to include reviews of operating procedures, personnel exposure records, surveys/audits radiation safety training, effluent releases, leak test results, radioactive material inventory, disposal and other elements required to maintain an effective radiation safety program.

(2) Radioactive material users shall be designated as radiation workers and may be required to wear personnel radiation monitoring devices. Dosimeters will be issued to individuals working in radioactive material usage or storage areas and likely to receive greater than 10% of the regulatory exposure limits. They shall not be worn when an individual is undergoing a diagnostic or therapeutic procedure. Should be issued at least quarterly and must be returned to the RSO or designee one week after receiving new badges. When not in use, the dosimeter should be stored in a location away from radiation producing devices. New radiation workers must contact the RSO to obtain initial radiation safety training before receiving a personnel dosimeter. The RSO will ensure that staff wearing dosimeters, other radiation workers and ancillary personnel receive annual radiation safety refresher training. Training should include the identification of radiation producing sources and notification to appropriate authorities if an unsecured radioactive source or device is discovered.

(3) Female employees using radioactive material shall be made aware of their rights and responsibilities to inform the RSO of pregnancy or suspected pregnancy. Prompt notification will allow the RSO to assign fetal badges to monitor dose levels to the embryo/fetus. Pregnant workers shall have access to instructions concerning prenatal radiation exposure (NRC Regulatory Guide 8.13).

(4) Current personnel exposure records will be maintained on Form NRC-5 or equivalent and will be kept and reviewed in accordance with Title 10, Code of Federal Regulation, and Part 20.2106.

(5) All VAMHCS facilities will strive to maintain personnel radiation exposure in accordance with the ALARA philosophy and the internal investigational limits in Table 1 below. In the event a workers dosimeter results exceeds these limits, an investigation should be conducted by the RSO to determine if it is a true occupational exposure, the result of a medical procedure or other non occupational related activities. The RSO may assign an administrative dose if it is determined that the dose did not result in an occupational exposure to the worker.

Table I
Investigational Levels

Investigational Levels (mRem per quarter)	Investigational Levels	
	Level I	Level II
Whole body	250/500*	375/750*
Extremities and skin	1,250	3,750
Lens of eye	375/750*	1,125

* ALARA investigation limits for angiography physician

(6) The RSO will review the reports of those individuals whose quarterly dose equal or exceeds the ALARA Investigational Level I and report the results at the next RSC meeting. If the dose does not equal or exceed the ALARA Investigational Level II, no other action related to

the exposure is required unless deemed appropriate by the Committee.

(7) The RSO will investigate in a timely manner the causes of all personnel doses equaling or exceeding the ALARA Investigational Level II and take appropriate action to try and keep doses ALARA. A report of the investigation, any actions taken, and a copy of the individual's Form NRC-5 or its equivalent will be presented to the RSC at the next meeting following the completion of the investigation. The detailed report will be included as an attachment to the minutes.

(8) In cases where a worker's dose or a group of workers' doses routinely exceed the ALARA investigational level, a new higher investigational level may be established for that individual or group. The RSC must first review the justification and approve the increased limits only if it determines that the increased exposure is consistent with good ALARA practices.

(9) In cases of internal radioactive material ingestion, bioassay may be recommended to accurately determine the individual dose. A specimen of the individual bodily fluid may be analyzed or a scan performed of the target organ. Bioassays include, but are not limited to, urinalysis and thyroid uptakes. Bioassays will be conducted in accordance with guidance in applicable Regulatory Guides, and the VAMHCS permit requirements.

d. Ionizing Radiation Work Area Design:

(1) Successful work with ionizing radiation requires work areas and equipment specifically designed for that purpose. The RSO should be consulted for assistance prior to construction or modification new and/or existing radiation use areas.

(2) Construction staff shall obtain a shielding evaluation from the RSO or a consultant approved by the RSO before beginning construction of radiation usage and or storage facility. The RSO or a consultant approved by the RSO shall conduct a radiation acceptance survey prior to the facility's use with ionizing radiation.

(3) Laboratories floors should be constructed with smooth and continuous surfaces. Walls and countertops should have washable non-porous surfaces with no sharp corners. Hoods shall be operated in accordance with applicable manufacturer, American National Standard Institute (ANSI) and American Industrial Hygiene Association (AIHA) standards.

(4) Equipment should be suitable for type, and level of activity being conducted (Plexiglas shield for betas and lead shielding for gamma emitters). Use of absorbent paper and strippable paint is recommended to facilitate decontamination.

e. Radionuclide Purchase: When ordering new or replacement radionuclide, the purchase request form will be conspicuously marked to indicate the request is for radioactive material. Requesting individual shall forward the appropriate VA or University of Maryland at Baltimore (UMAB) form to the RSO or designee for approval. The form should indicate the radionuclide activity (amount), name of PI, expected delivery date and a note to deliver the package to 1B-132. Any request received by the ordering official that has not been pre-approved by the RSO, will be returned without action to the requesting department. A written directive (WD) shall be prepared and signed by the Authorized User (AU) in accordance with VAMHCS memorandum

512-138-009, prior to ordering any radiopharmaceutical for therapeutic administration, or quantities of sodium iodide I-125 or I-131 greater than thirty 30microcuries (μCi). The RSO must be informed if there are unusual storage requirements or special handling procedures.

f. **Receiving Radioactive material:**

(1) All radioactive material shipments must be delivered to the Nuclear Medicine department (1B-132). The technologist will receive the package and notify the RSO, or designee, who will perform the initial visual inspection and meter survey.

(2) The RSO or designee will deliver the package to the user with instructions to verify the contents and complete the receipt process by wipe testing the outer containers within 2 hours of receipt. Users must notify the RSO immediately if surface contamination on outer package exceeds $200 \text{ dpm}/100\text{cm}^2$ so appropriate notifications can be initiated in accordance with VA permit requirements and Department of Transportation (DOT) regulations.

(3) Radioactive material shipments should be received from 8 a.m. to 4 p.m. Monday through Friday, excluding holidays. No shipments of radioactive materials will be received any other time unless previous arrangements have been made with the RSO or designee.

(4) VA employees will not transfer, or request the transfer of radionuclide to or from this institution without RSO approval. If a shipment is accepted in error, the shipment will be promptly returned to the manufacturer or authorized licensee. A copy of the gaining organization's license may be required to verify the licensee authorization to possess or transfer the radionuclide in question.

g. **Radioactive Material Usage:**

(1) Radioactive material users must review the necessary safety precautions, and outline the procedures (degree of detail should be commensurate with the hazard) before working with radioactive material.

(2) Laboratories authorized to use radioactive materials shall be designated as restricted areas to prevent entrance by unauthorized personnel. Appropriate radiation or radioactive materials signs shall be posted on laboratories doors, storage containers and other areas where radiation producing devices or radioactive material is used or stored.

(3) Usage areas must be non-porous, surfaces must be covered with absorbent paper with plastic backing to protect furniture and facilitate cleanup. Area should be labeled with "Caution Radioactive Material" tape, and workers should use disposable supplies whenever possible and/or stainless steel or plastic trays to help confine liquids if spilled.

(4) Workers must protect their clothes and skin by wearing a lab coat and disposable gloves when working with radioactive material. To avoid spreading contamination, they should remove gloves and laboratory coat at work area, wash hand thoroughly and monitor with appropriate survey instrument before leaving the laboratory. They should also wear radiation monitoring dosimeters (if required), have adequate protective equipment, warning tags/labels, survey instruments, and necessary forms to document radiation usage requirements before working with radiation sources. Extreme caution should be used to avoid cuts or puncture wounds, especially

when working with materials of high radio toxicity and/or high radioactivity. Protect wounds (e.g., use water proof bandage) to prevent entry of radioactive material into the body. Exercise care to avoid skin contact with radioactive materials when using organic solvents since such solvents may make the skin more permeable. Personnel must have appropriate, remote handling devices, automatic pipettes or dispensers, tongs, etc., for the manipulation and transfer of radioactive preparations.

(5) Laboratory personnel are responsible for labeling containers, or equipment used to perform studies or store radioactive materials, and keep contaminated equipment separated from radioactive waste and other equipment to avoid cross contamination. Radioactive material containers/samples shall be conspicuously marked with radioactive labels when unattended.

(6) Use auxiliary containers, blotters and covers whenever there is a possibility of a spill or contamination. Reduce the risk of spills by double bagging material; use protective covering/lids, and unbreakable containers to store radionuclide. Conduct a dry run before employing radioactive materials. If contamination is suspected, halt work immediately and contact the RSO. Isolate contaminated equipment in a designated laboratory or storage area and monitor before removal.

(7) Telephones, reports, or other items not needed as an integral part of the procedure involving radioactive material, should not be handled while wearing potentially contaminated gloves.

(8) Radiation levels will be measured in work, storage and adjacent non-controlled areas, with appropriately calibrated detector. A Geiger-Mueller or scintillation probe is useful to detect "hot spots" even if not calibrated for that particular energy. Sufficient shielding should be provided to keep radiation exposures below established limits and ALARA.

(9) Keep radioactive materials out of ordinary trash containers. Do not mix contaminated tools or equipment with clean or non-contaminated objects.

h. Storing Radioactive Material:

(1) Radioactive materials users shall be responsible to ensure that only authorized personnel have access to the radiation or radioactive material. Doors to radioactive usage or storage areas should be closed when unattended, to prevent unauthorized access, this includes refrigerators or freezers used to store radioactive material.

(2) Prohibited to store food in refrigerators or freezer designated to store radioactive material.

(3) Radioactive material shall be kept in a designated secure and labeled storage area when not in use.

i. Quality Assurance: The radiation safety Quality Assurance (QA) program ensures radiopharmaceutical and x-ray producing equipment are used in a manner that provides the highest quality medical care for patients while making certain staff and visitor's radiation dose is kept within regulatory limits, and As Low As Reasonably Achievable (ALARA).

(1) Ionizing radiation Inventory testing: VAMHCS radioactive material permit allows staff to possess specific quantities of certain radionuclide. The RSO shall ensure staff members strictly adhere to those limits or risk citation and possible permit termination for non-compliance. He/she shall pre-approved purchases and maintains a database of sealed and unsealed radioactive material. Physical inventories shall be conducted at least quarterly, and leak performed in accordance with the requirements in Title 10 of the Code of Federal Regulations and license/permit conditions. Purchase and installation of x-ray producing equipment shall be pre-approved by the RSC. Quality assurance procedures for x-ray producing equipment are documented in VAMHCS Policy Memorandum 512-138/ENG002.

(2) Nuclear medicine dose calibrator: Dose calibrators are used to ensure the quantity (dose) of a radiopharmaceutical administered to the patient is within $\pm 20\%$ of the prescribed dosage. Calibration procedures shall be conducted in accordance with the requirements in ANSI N42.13 or the instrument manufacturer specification. Records shall be maintained to demonstrate that the following quality control testing procedures were performed to ensure the dose calibrator is functioning properly:

(a) Constancy test: This test shall be conducted at the beginning of each day of use, upon adjustments, repair or relocation of the dose calibrator. Test shall be conducted with a long lived reference source such as Cs-137. The result of the test shall not exceed $\pm 10\%$ of the indicated value. If values obtained are outside the $\pm 10\%$ limits, the technologist will not use the calibrator and notify the chief technologist and Radiation Safety Officer as soon as possible.

(b) Linearity test: This test shall be performed upon installation, after repair or relocation, and at least quarterly thereafter. The test is conducted with Tc-99m source with an activity as large as the maximum activity normally assayed. Decay method may be used to determine linearity. However, if equipment is available, the shielded method (lineator) should be used. The result of the test shall not exceed $\pm 10\%$ of the indicated value. If values obtained are outside the $\pm 10\%$ limits, the technologist will not use the calibrator and notify the chief technologist and Radiation Safety Officer as soon as possible.

(c) Accuracy test: This test shall be conducted upon installation, after repair and at least semi-annually thereafter. Technologist shall use at least two National Institute of Standards and Technology (NIST) traceable sources with different principal photon energies between 100 and 500 keV and within the range of activities normally assayed. The average value shall be within $\pm 5\%$ of the value mathematically corrected due to decay. If values obtained are outside the $\pm 5\%$ limits, the technologist will not use the calibrator and notify the chief technologist and Radiation Safety Officer as soon as possible.

(d) Geometry test: This test shall be performed at installation, after major repair or equipment relocation. The test is performed using Tc-99m in a syringe size normally use to administer radiopharmaceuticals. If the calculated correction factors are greater than $\pm 5\%$, a correction table or graph shall be prepared to help the users convert from indicated activity to true activity.

(3) Survey Instruments: Instruments used for monitoring radioactivity and contamination control shall be calibrated before first use, annually, and after repair. Calibration procedures shall be performed in accordance with the requirement in ANSI N323. Survey instruments shall not be used without valid calibration documents or if the difference between the indicated

exposure rate and the calculated exposure rate is more than 20 percent. Users shall check the calibration sticker before use and inform the RSO if the calibration date is older than 12 months. Calibration records shall be maintained for review by internal and/or external auditors and the following issues clearly documented:

(e) All scales with readings up to 10 mSv (1000 mrem) per hour shall be calibrated with a radiation source.

(f) Calibrate two separated readings on each scale or decade that will be used to show compliance.

(g) Conspicuously attach a sticker on the instrument with the calibration date.

(4) Radiation exposure monitoring: Thermoluminescent dosimeters are used to monitor personnel exposure to ionizing radiation. Quality assurance procedures are detailed in paragraph 4c.

j. X-ray Machines:

(1) A complete x-ray compliance test in accordance with Title 21 of the Code of Federal Regulations (CFR), subchapter J, shall be conducted annually on all x-ray machines used by VAMHCS staff to x-ray patients. If compliance test is not done by radiation safety staff, the results shall be reviewed and approved by the RSO. Biomedical staff or their contracted representative shall correct deficiencies identified during the annual compliance testing, and a re-test completed to document compliance.

(2) Biomedical staff shall inform the RSO in a timely manner of x-ray equipment malfunctions, calibrations, or maintenance procedures that may affect any compliance parameter. They shall ensure x-ray equipment remains in compliance after any repair or maintenance done by staff or contracted representatives. Those affected compliance parameters shall be re-tested by biomedical staff or their contracted representatives and the results provided to the RSO.

(2) Whenever biomedical staff identifies or is informed of an equipment malfunction (error message) that may result in unintended radiation exposure, they shall notify the RSO or his designated representative before the x-ray machine is used on another patient. If the RSO or a designated representative cannot be reached, the biomedical shop staff shall contact the safety manager or the Chief, Imaging Service for advice. If the malfunction (error message) occurs during a procedure, the decision to terminate the procedure is the responsibility of the radiologist/physician in charge.

(3) X-ray technician shall ensure that only the intended patient is exposed to the direct beam. Other staff members, patients and visitors should be at least eight feet away from the x-ray source or outside the room if possible.

(4) Fluoroscopic x-ray equipment should be used only in designated rooms in Radiology Service, Cardiac Catheterization lab, Operating Room, and the Gastro-intestinal lab. The RSC may approve exceptions on a case by case basis. Staff members should not routinely hold patient during x-ray procedures. When required to hold patient, the staff member should wear appropriate protective equipment (lead apron).

(5) Personnel protective equipment such as lead aprons, thyroid collars, and lead gloves shall be checked at least annually for cracks or tears in the protective lead lining. Equipment with holes in the lead lining should be removed from service and **not used for personnel protection.**

(7) The participation of every staff member is needed to maintain an effective radiation safety program. As a result, management encourages everyone to be proactive and report to the RSO any incident resulting or having the potential result in unnecessary radiation exposure.

k. Audits, Reports and Notification:

(1) The RSO shall ensure that at least quarterly laboratory audits are conducted and the reports are maintained for review by external agencies. Users shall conduct at least monthly surveys if they use less than 200 μCi at any one-time and weekly surveys when using greater than 200 μCi at any one time. Survey results shall be readily available for review by the RSO or external auditors and include the following information:

- (a) Area surveyed (room/laboratory #)
- (b) Name or initial of individual performing the survey
- (c) Date survey was conducted
- (d) Survey instrument model, serial # and calibration due date
- (e) Survey instrument background reading
- (f) Counting instrument model and serial #
- (g) Counting instrument background reading
- (h) Net sample results in $\text{dpm}/100\text{cm}^2$
- (i) Trigger limits and RSO notification
- (j) Nuclides of interest

(2) Theft or loss of byproduct materials shall be immediately reported to the RSO. VAMHCS employees are required to immediately report any incident or suspected incident involving radioactive materials that may cause personnel overexposure or the release of radioactive material in a manner contrary to established regulations.

(3) Radioactive material users are required to report conditions, which causes or threatens to cause increased personnel exposure, or airborne radioactive material concentrations above regulatory limits. Management shall be notified of the existence of a condition requiring NRC notification. The RSO will notify management and the NRC within the allotted time and institute adequate controls to minimize the hazard.

1. **Radioactive Waste Disposal:**

(1) **The RSO** shall maintain a consolidated liquid and solid radioactive waste log. Hot sink disposal logs shall be maintained by the user, and the RSO shall review these logs monthly to ensure compliance with the monthly allowable limits in 10 CFR 20, Appendix B. These logs shall include at least the date of disposal, nuclide disposed, and activity of the material disposed.

(2) **Radioactive waste disposal** will be handled in accordance with requirements in 10 CFR, COMAR, and VA permit requirements. Radioactive waste disposal at the VAMHCS is accomplished via decay-in-storage (DIS) and discarded as hospital waste, release to the environment through the sanitary sewer, transfer to a burial site or shipped back to the manufacturer.

(3) **Radioactive material labels** must be defaced or removed from containers and packages prior to disposal. Non-radioactive waste such as leftover reagents, boxes and packing material should not be mixed with radioactive waste.

(4) **Liquid radioactive waste** may be disposed of by release to the sanitary sewer if the solution is readily soluble or dispersible in the water and complies with other regulations regarding toxic or hazardous properties. Sanitary sewer disposal will comply with monthly limits in 10 CFR 20, Appendix B. These limits are based on total sanitary sewage release at the facility (excreta from patients undergoing medical diagnostic or therapeutic procedures are exempt from the above limitations). Users shall maintain a record of the radionuclide, estimated activity released, disposal date, and the discharge site.

(5) Laboratory personnel should contact the RSO to designate and label a "hot sink" for radionuclide disposal and cleaning of contaminated glassware. Radioactive materials shall not be discharged into the sanitary sewer **without specific approval from the RSO** in consultation with the Industrial Hygienist to ensure compliance with Wastewater Discharge Permits.

(6) **Hot sink drains** should be tagged with a statement to alert maintenance personnel that the sink must be surveyed before plumbing work is done. This information should also be included on the work request for maintenance.

(7) **Vials containing biodegradable liquid scintillation cocktail (LSC)** will be collected by the RSO and disposed of separately from other liquid or solid radioactive waste.

(8) **Short-lived material (physical half-life less than or equal to 120 days)** may be disposed of by DIS. Radioactive waste should be kept in separate containers according to half-life. Users will seal container and attach an identification tag with the date sealed, the longest-lived radioisotope in the container, the total activity (amount), and the initials of the person sealing the container. The RSO will be contacted for pick-up and transport to the holding room (8D-103) when waste is appropriately packaged and labeled. Material will be monitored to ensure that exposure rate is indistinguishable from background before disposal as hospital waste. Containers that can be distinguished from background radiation levels must be returned to the storage area for further decay or transferred for burial. Along with waste manifest, a record of the container identification number, date sealed, disposal date, survey meter used to verify radiation exposure, meter calibration due date, background reading, and container exposure reading will be maintained for review by regulatory agencies.

(9) Long-lived radionuclide will be packaged in accordance with applicable Department of Transportation (DOT) regulations and transferred to an authorized radioactive material burial site. The manifest will be maintained for review by regulatory agencies.

m. **Emergency Procedures:** Personal or work area contamination shall be immediately reported to the RSO. The radioactive material user responsible for the spill should notify the RSO and initiate appropriate containment or decontamination procedures as directed by the RSO. Radioactive materials spills can be classified as major or minor spills. A minor radiation spill is one that the laboratory staff is capable of handling safely without the assistance of the RSO or emergency personnel. All other radiation spills are considered major.

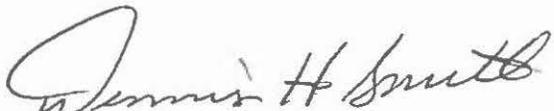
MAJOR SPILL

- TREAT INJURED Treat injured personnel, and notify those not involved to vacate the room. Making sure they do not enter the contaminated zone.
- PREVENT SPREAD Cover spill with absorbent pads; attempt to confine the spill and potentially contaminated personnel in one area until they have been monitored and determined to be free of contamination; do not attempt to decontaminate.
- SHIELD SOURCE Shield the spill only if significant contamination or increased personnel exposure is probable.
- SECURE ROOM Control access to prevent entry by unauthorized personnel.
- REPORT Immediately notify the RSO at extension 7032 or pager number (410) 447-4474.
- DECONTAMINATION Contaminated clothing shall be removed and stored in clean plastic bag. In the event the individual skin is contaminated, wash thoroughly with appropriate radiation detector to check for residual contamination. Complete decontamination procedure with RSO assistance or guidance.

MINOR SPILL

- NOTIFY PERSONNEL Notify persons in area that a spill has occurred.
- PREVENT SPREAD Cover spill with absorbent paper/pads.
- DECONTAMINATION Start by cleaning the areas of lesser contamination to areas of greater contamination with absorbent paper/pads, soap and water. Discard contaminated waste in an appropriately labeled container.
- SURVEY Check area around spill, hands, feet and clothing for contamination with appropriate survey meter, and repeat decontamination if necessary.
- REPORT Notify the RSO promptly to document the occurrence for possible inclusion in the incident file and reporting to the RSC.

5. **REFERENCES:** Title 10 Code of Federal Regulations, Parts 19, 20, and 35
U. S. Nuclear Regulatory Commission Master Material License No.
03-23853-01 VA.
U. S. Nuclear Regulatory Commission Regulatory Guide 1556, Volume
5, 7, 9, and 11
VAMHCS Policy Memorandum 512-00-108, subject: Radiation Safety
Committee
5. **RESPONSIBLE OFFICE:** The Safety and Occupational Health Manager responsible for
the contents of this memorandum.
6. **RESCISSIONS:** VAMHCS Policy Memorandum 512-138/ENG-026, subject: Radiation
Safety Manual, dated March 2013.
7. **RECERTIFICATION:** This document is scheduled for recertification on/before the last
working day of June 2017.



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