

# RADIATION SAFETY SURVEY

## INFORMATION SHEETS

A routine radiation safety survey has been conducted in your laboratory(ies). Attached are information sheets indicating how to correct items which were found to be out of compliance with the requirements of the NIH radiation safety program. The Radiation Safety Branch (RSB) has developed these information sheets to assist you in implementing corrective measures in a timely manner when problems are identified in your laboratories. Note that the numbers in the left margin of each information sheet correspond to the compliance items on the Radiation Survey Report.

Please take a few minutes to review the information sheet(s). If corrective actions are necessary, please implement them as soon as possible. Be sure to discuss the corrective actions with all individuals who work in your laboratory. If you require additional information or assistance, please contact your Area Health Physicist by calling 496-5774 (x8123 at the Gerontology Research Center).

If you have any comments or suggestions about this system of providing you with the results of routine surveys, please contact RSB with your suggestions.

**Your cooperation with RSB in maintaining your laboratories in compliance with the NIH radiation safety program is greatly appreciated!**

## POSTING AND LABELING REQUIREMENTS

- (1) Each area in which radioactive materials are used or stored must be posted with a "Caution Radioactive Materials" sign at the entrance and the NRC Form 3, "Notice to Employees" in a conspicuous location. The required signage was not present at the time of the survey. **The surveyor corrected this violation. If additional signs are needed, please contact your Health Physicist by calling 496-5774 (x8123 at GRC).**
- (2) Refrigerators and freezers in which radioactive materials are stored must be labeled "Caution Radioactive Material". At the time of the survey, a refrigerator or freezer containing radioactive materials was not properly labeled. **The surveyor corrected this; however, if additional signs are needed, contact your Health Physicist at 496-5774 (x8123 at GRC).**
- (2) Any equipment which contains or is contaminated with radioactive materials (pipettors, microfuges, etc.), must be labeled "Caution Radioactive Material". During the survey, unlabeled contaminated items were found. **The surveyor labeled them. In future, please use "Caution Radioactive Material" tape (available in self-service stores) to label such equipment.**
- (3) Cardboard trays containing used liquid scintillation or gamma vials must be labeled "Caution Radioactive Material," with the radionuclide and activity indicated. At the time of the survey, one or more trays of used vials were unlabeled. **The surveyor corrected this violation. In future, please use "Caution Radioactive Material" tape (available in NIH self-service stores) to label trays of used vials.**
- (4) Source vials and other containers of radioactive material must be clearly labeled "Caution Radioactive Material," with the radionuclide, activity and date indicated. The surveyor identified unlabeled containers of radioactive material. **The surveyor corrected this violation. In future, please use "Caution Radioactive Material" tape (available in NIH self-service stores) to label such containers if they are not already labeled.**
- (5) All containers intended for the collection of radioactive waste must first be labeled "Caution Radioactive Material". A radioactive waste container was unlabeled at the time of the survey. **The surveyor corrected this violation. In future, please use "Caution Radioactive Material" tape (available in NIH self-service stores) to label radwaste containers.**

## CONTAMINATION CONTROL

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(6) Absorbent paper must be used on work benches and other work areas where radioactive materials are being used. Contamination found underneath absorbent paper or on an uncovered work surface indicates that absorbent paper has not been used properly. **Please decontaminate contaminated work surfaces immediately and ensure that absorbent paper is used properly in the future to prevent re-contamination.**
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(10) Gloves must be worn by individuals whenever they are handling any type or quantity of radioactive material or are touching potentially-contaminated items or areas. The surveyor observed an individual working with radioactive material or touching potentially-contaminated items without wearing gloves. **Please ensure that all individuals who work under your Authorization wear gloves when handling any type or quantity of radioactive material and when touching potentially-contaminated items or areas (e.g., when conducting monthly surveys).**
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(10) A buttoned-up lab coat (or comparable protective clothing) must be worn by each individual handling any type or quantity of radioactive material. The surveyor observed an individual handling radioactive materials without wearing a lab coat. **Please ensure that all individuals who work under your Authorization wear protective clothing when handling any type or quantity of radioactive material and when conducting monthly surveys.**
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(20) Removable contamination in excess of 2200 dpm (220 dpm for alphas) per 100 cm<sup>2</sup> was found in the area(s) indicated on the attached diagram. **Please decontaminate and re-smear the indicated areas until removable contamination is less than 2200 dpm (220 dpm for alphas) per 100 cm<sup>2</sup>.**
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(20) Removable contamination in excess of 220 dpm (22 dpm for alphas) per 100 cm<sup>2</sup> was found in the unrestricted area(s) indicated on the attached diagram. **Please decontaminate and re-smear the indicated areas until removable contamination is less than 220 dpm (22 dpm for alphas) per 100 cm<sup>2</sup>.**
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(20,24) Multiple spots of contamination were identified. This indicates a failure to perform adequate surveys after using radioactive materials. **Decontaminate the affected areas, and ensure that individuals working under your Authorization monitor themselves and their work areas for contamination frequently, at least daily after using radioactive materials.**
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(24) Absorbent paper in the area marked on the diagram was found to be contaminated. **Please dispose of the contaminated paper as radioactive waste, and line the area with clean absorbent paper.**

## PREVENTION OF INHALATION AND INGESTION OF RADIOACTIVE MATERIAL

- (7) Chemical fume hoods in which volatile (or airborne) radioactive materials are used must have an average air flow of at least 100 linear feet per minute. The chemical fume hood in your laboratory **did** not have sufficient air flow when measured by the surveyor. **Call 496-3457 to arrange for repair of the hood so that the average air flow is at least 100 linear feet per minute. In the meantime, do not use the hood for iodinations or other work with volatile radioactive materials.**
- (8) The Occupational Safety and Health Branch (OSHB) requires all chemical fume hoods to be calibrated annually. The hood in your lab is either overdue for calibration, or the surveyor was unable to determine when it was last calibrated. **No volatile or airborne radioactive materials may be used in the hood until it has been re-calibrated or re-stickered. To schedule a calibration, call 496-3457.**
- (13) Eating, drinking, smoking, and preparing food and beverages are prohibited in laboratories in which radioactive materials are used or stored. The surveyor observed an individual eating, drinking, smoking, or preparing foodstuffs in your posted laboratory. **Please remind all individuals working in your laboratory of the rules, and enforce the prohibition on eating, drinking, smoking, and preparing foodstuffs in the laboratory.**
- (13) Food and beverages are not permitted in refrigerators, freezers, or cold rooms in which radioactive materials are stored. **Please remove any improperly-stored foodstuffs and remind all individuals working in your laboratory that food and beverages cannot be stored in refrigerators, freezers, or cold rooms labeled for the storage of radioactive material. Also, spot-check your lab periodically for violations of this rule.**

## SECURITY/STORAGE OF RADIOACTIVE MATERIAL

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(9) All radioactive materials must be **secured** to prevent unnecessary radiation exposure to personnel and to control access to the materials. When not in use, radioactive source vials must be kept in locked storage. Also, when unoccupied, radioactive materials laboratories are to be secured if radioactive material in experiments in progress or unsecured radioactive waste is present. **Please review proper security/storage procedures with your lab staff, and spot-check your lab periodically to ensure that radioactive materials are properly secured.**

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(16) At the Gerontology Research Center and in Building 49 of the main campus, the use or storage of radioactive materials in corridors and other unrestricted areas is strictly prohibited. **Please ensure that radioactive materials associated with your Authorization are never used or stored in corridors or other unrestricted areas.**

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(16) At NIH facilities other than those listed above, the use or storage of radioactive materials in corridors and other unrestricted areas is prohibited, with the following exceptions:

- 1) Liquid scintillation and gamma counters may be used in a corridor or other unrestricted area. However, trays of used vials may not be stored on top of the counter or anywhere else in the unrestricted area.
- 2) Film cassettes are allowed to be stored in the corridor in freezers, provided that the freezer is locked and labeled.

**Please review the above corridor storage policy with your lab staff and ensure that all radioactive materials associated with your Authorization are used and stored in accordance with this policy.**

## SHIELDING

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(11,19) Shielding may be required for work involving gamma emitters or high-energy beta emitters to reduce the exposure rate at 10 centimeters to less than 2.5 mR/hr. The surveyor determined that shielding was inadequate. **If you have shielding, be sure that it is positioned properly around source vials and waste containers. If you do not have appropriate shielding, contact your Health Physicist at 496-5774 (x8123 at GRC) for assistance.**

<u>Radionuclides</u>	<u>Shielding</u>
H-3, C-14, S-35, P-33, Cl-36, Ca-45	None
P-32	3/8 inch lucite
I-125	1/32 inch lead or equivalent
Tc-99m (up to 30 mCi)	1/16 inch lead or equivalent
Cr-51 (up to 10 mCi) In-111 (up to 15 mCi)	1/4 inch lead or equivalent
I-131 (up to 5 mCi)	1/2 inch lead or equivalent
Na-22, Fe-59 (up to 1 mCi)	2 inch lead or equivalent
Rb-86 (up to 5 mCi)	1 1/4 inch lead or equivalent
F-18 (up to 15 mCi) C-11, N-13, Rb-82 (up to 20 mCi) O-15 (up to 25 mCi)	1 1/2 inch lead or equivalent

## RADIOACTIVE WASTE DISPOSAL

- (5) If radionuclides with both short (less than 100 days) and long (greater than 100 days) are in the lab, separate waste containers shall be used and labeled to indicate which radionuclides go into which containers. At the time of the survey, radioactive waste was not segregated in this manner. **Please remind all personnel of proper waste segregation by half-life procedures.**
- (12) Contaminated items destined for disposal should be placed in appropriate radwaste containers immediately rather than being left on benches or elsewhere in work areas. Radioactive waste should not be permitted to accumulate in the lab such that stepcans are overflowing or carboys are overfilled. **Radioactive waste pickups can be scheduled, and additional carboys (5-gallon or 2-gallon) and stepcans can be ordered by calling 496-4451.**
- (12) Contamination on the floor around radwaste containers is indicative of improper waste management; either people are not disposing of radioactive waste in the containers carefully enough, or the containers are overfilled. **Please remind your staff to dispose of contaminated items or liquids carefully in the appropriate labeled containers. You may want to place absorbent paper underneath radioactive waste containers to prevent floor contamination. Additional carboys or stepcans can be ordered by calling 496-4451.**
- (12) No radioactive waste may be disposed of via the laboratory sink drains. However, the surveyor found contamination in the sink drain, which is indicative of improper disposal of radioactive waste. **Please remind your lab personnel of proper disposal procedures, and ensure that liquid used to decontaminate items is collected, poured into a carboy and disposed of as radioactive waste.**
- (12) No radioactive waste or labeled items may be disposed of in regular trash containers. If uncontaminated, boxes in which radioactive materials were packaged may be disposed of in regular trash after all "Caution Radioactive Material" labels have been removed or obliterated. Potentially-contaminated items should be disposed of as radioactive waste unless proven to be free of contamination. **Please remind your lab personnel of proper radwaste disposal procedures as described in the document "Radioactive Waste Procedures for NIH Laboratories", which is available from your Health Physicist at 496-5774 (x8123 at GRC). Periodically spot-check the regular trash in your lab for violations.**

**PERSONNEL DOSIMETERS**  
**(“Badges”)**

- (14) When working with certain types and quantities of gamma emitters and/or high-energy beta emitters (P-32, Y-90), individuals are required to wear personnel dosimeters. Each person working with radioactive materials is required to be evaluated for dosimetry. The surveyor observed an individual handling radioactive material without wearing appropriate personnel dosimetry, or the surveyor found someone who has not been evaluated for dosimetry. **Please ensure that all individuals working with radioactive materials under your Authorization have (and use) dosimeters if appropriate. To determine whether or not a dosimeter is needed, submit a "Personnel Dosimeter Registration Form" signed by the Authorized User to Building 21, Room 139, or fax to 301-496-3544. A dosimeter can be issued immediately if the form is submitted in person Monday through Friday from 8 a.m. to 4 p.m.). If you have any questions about dosimetry requirements, call 496-9757.**

## ORIENTATION/TRAINING

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(15) A minor under the age of 16 was working with radioactive materials. **This must be stopped IMMEDIATELY. NIH prohibits the use of radioactive materials by minors under the age of 16.**
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(15) Minors who are 16 or 17 years of age are prohibited from handling source vials and must have special permission from the Radiation Safety Officer to work with other radioactive materials. **A minor 16 or 17 years of age was handling source vials or working with radioactive materials without the requisite approval from the Radiation Safety Officer. This must be stopped IMMEDIATELY.**
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(15) Minors 16 or 17 years of age who have permission from the Radiation Safety Officer to work with radioactive materials (but not source vials) must be directly supervised by an adult NIH staff member at all times. **A minor who had approval to work with radioactive materials was not being directly supervised as required. The approval for this minor to work with radioactive materials has been rescinded effective IMMEDIATELY.**
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(15) An individual in your laboratory who uses radioactive materials has not satisfied the radiation safety requirements listed below. **Please remedy this immediately for the individual identified by the surveyor; in future, ensure that all individuals satisfy these requirements before using radioactive materials at NIH.**

The individual must be registered with the Radiation Safety Branch and must register for and complete the first available Radiation Safety in the Laboratory (RSL) course. **Call 496-5774.**

If an individual needs to begin work with radioactive materials before completing the RSL course, the Authorized User must provide interim radiation safety training (“Orientation”) and submit Form NIH 88-37 to document this orientation. Note, however, that the orientation training does not substitute for the RSL and that the individual cannot use volatile radioiodines or protocol quantities of radioactive material before completing the RSL. **Call 496-2255 to obtain information on the mandatory topics which must be covered during the interim training, or perform and document the training on line via <http://www.nih.gov/od/ors/ds/rsb/rso/index.htm>.**

The Authorized User must provide the necessary oversight to ensure that each individual using radioactive materials under his/her Authorization complies with all radiation safety requirements. **This is particularly important for new staff.**

## UTILIZATION/DISPOSAL RECORDS

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(17) A radioactive material utilization and disposal record must be maintained for each shipment of radioactive material received. These records must be saved for 3 years and must be readily accessible to surveyors. **The surveyor was unable to locate the required records. Please ensure that the records are being maintained as required and that they are readily accessible. Yellow "Records" binders may be obtained via the Radioactive Waste Service at 301-496-4451.**

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(17) Each shipment of radioactive material must have a corresponding radioactive material utilization and disposal record documenting each usage of the material, the date, and the manner of disposal associated with each usage. When the vial is empty or no longer in use, the final disposition should be noted on the record. **The records reviewed by the surveyor were incomplete or inadequate. Please review the above requirements and ensure that your records are maintained properly in the future. Call 496-5774 (x8123 at GRC) for further information.**

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(17) One or more persons who used radioactive material were not designated as users on the radioactive material utilization and disposal record. Each potential user must be listed on the NIH 88-1 form or in the RAMOS user section for the order so that the name is pre-printed on the utilization and disposal form. **Please add each person's name to the pre-printed list of designated users on the radioactive materials utilization and disposal record for that order, initial each entry, and FAX the form to RSB (480-9708).**

## MONTHLY SURVEYS

(18) Each month, a survey form (NIH 88-12) must be filled out for every area posted for the use or storage of radioactive materials. A copy of each form must be kept in the laboratory in a readily accessible location for 3 years. The surveyor was unable to locate the monthly survey records for your laboratory. **Please ensure that the records are being maintained as required and that they are readily accessible. Yellow "Records" binders are available via the Radioactive Waste Service at 301-496-4451). If you wish, you may arrange for the RSB contractor to perform these monthly surveys by calling 435-7953.**

(18) During each calendar month, a thorough contamination survey, including smears, must be performed in each area in which radioactive materials have been used or stored. This survey must be documented on form NIH 88-12, which is available only on-line at [http://www.nih.gov/od/ors/ds/forms/nih\\_8812.pdf](http://www.nih.gov/od/ors/ds/forms/nih_8812.pdf). One copy of the survey form must be kept in the laboratory in a readily accessible location; the other is to be sent to the Radiation Safety Branch at Building 21, Room 116 (Room 1D20 at GRC) or faxed to 496-3544. If no radioactive materials have been used during the entire month, a smear survey is not required; however, a survey form must still be filled out (top portion, statement in the upper middle, and signature) and submitted. **The surveyor noted that one or more monthly surveys were missing.**

- **If radioactive materials were not used during the missing month(s), fill out a survey form for each missing month with today's date and indicate that "nuclides were not used MM/YY." The surveyor may have asked you or your laboratory staff to do this at the time of the survey. If this was performed, no further action is necessary.**
- **If radioactive materials were used during the missing month(s), DO NOT fill out a survey for that month, as this would constitute falsification of records which, according to the U.S. Nuclear Regulatory Commission, is a criminal offense. If NO smear survey has been performed since the missing month with nuclide use (even if you've submitted "no-use" surveys in the meantime), perform a smear survey *today* and submit it to RSB. Indicate in the "Remarks" section that a survey was missed and the smear survey is to show there is no contamination present in the lab.**

**Please review the above requirements and ensure that the monthly survey records for your laboratory are maintained properly in the future. For further clarification, contact your Health Physicist by calling 496-5774 (x8123 at GRC).**

(18) The contractor reviews monthly surveys and checks them for clerical accuracy and validity. Examples of items they look at include (but are not limited to): printout inclusion, LSC settings, compliance with contamination limits, and the number and appropriateness of the smear locations. **The contractor found an item on your monthly survey that needs correction or clarification. Please make the necessary corrections on the cited survey and/or adjust your survey procedures for performing surveys, as appropriate. If this was an item previously cited by the RSB around the time of its submittal, please remember to correct your copy as well as the one**

returned to the RSB on future surveys. For further clarification, contact your Health Physicist by calling 496-5774 (x8123 at GRC).

### SURVEY METER REQUIREMENTS

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(21) To facilitate contamination monitoring, a survey meter must be available to individuals using gamma emitters (other than I-125) or high-energy beta emitters. The surveyor was unable to locate an appropriate meter for the radionuclides used in the lab. **Contact your Health Physicist at 496-5774 (x8123 at GRC) to find out how to obtain an appropriate survey meter.**

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(22) Your survey meter (serial # \_\_\_\_\_) was inoperable at the time of the survey and has been tagged as such. **Please remove this meter from service and ensure that individuals working with gamma emitters (other than I-125) or high-energy beta emitters have access to a functional survey meter.**

To arrange for repair of the meter, call 435-7953. Your meter will be evaluated and an estimate of the repair cost given. If you authorize the repair and the meter needs to be taken off-site, a loaner will be provided to you.

To surplus a meter, verify that it is not contaminated, remove the check source affixed to the side of the meter, and then attach a "Certification that Equipment is Free from Hazards" tag (form NIH 2683) to the meter. Note that the check source must be returned to the Radiation Safety Branch. Contact your Health Physicist at 496-5774 (x8123 at GRC) to arrange for pickup of the source. Do not attempt to send the source via interoffice mail.

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(23) Survey meters must be calibrated initially and annually thereafter. These routine calibrations are performed by contract staff and are paid for by the Radiation Safety Branch. The contractor uses a computerized database to track meters. The database is updated based on information obtained during routine surveys. When the contractor locates a meter that needs to be calibrated, the meter will be calibrated within one hour. **If you obtain a new meter or if you have a meter that has not been calibrated within the last year, e.g., one that the contractor was unable to locate, please call 435-7953 to schedule a calibration.**