

AUTHORIZED PRINCIPAL INVESTIGATOR RESPONSIBILITIES

Authorized Principal Investigators are responsible for ensuring that laboratory personnel follow the Individual User Responsibilities listed on page 10. Principal Investigators have the further responsibility to:

1. Plan adequately for experiments and accurately determine the type and quantity of radiation or radioactive material to be used. This determination will generally be a good indication of the safety measures that should be employed. Experimental procedures must be well outlined to allow adequate review of safety precautions at the time of authorization by the Radiation Safety Section and Radiation Safety Committee. Where possible, a cold run using the planned procedures or tracer quantities of radioactive material is recommended to avoid unforeseen safety problems. In any situation where there is an appreciable quantity of radioactive material used which varies from the authorized protocol, Radiation Safety must be consulted before proceeding.
2. Provide specific radiation safety training to those employees for whom they are responsible. Instruct employees in the use of safe techniques and in the application of approved radiation safety practices, and assure that no employee is permitted to work with radioactive materials until he or she has attended a radiation safety orientation seminar presented by the Radiation Safety Section.
3. Provide for direct supervision of inexperienced personnel handling radioactive materials during their initial experiments. Initial experiments by inexperienced personnel should be performed with as minimal amounts of radioactivity as possible.
4. Furnish Radiation Safety with information concerning individuals and activities in their areas, particularly pertinent changes in their personnel rosters. Individuals under the age of 18 ARE NOT PERMITTED to be employed in areas where they may be exposed to radiation. (See page 15 for more information on the use of RAM by minors.)
5. Contact Radiation Safety when:
 - a. There are major changes in operational procedures, new techniques, or use of different isotopes;
 - b. There are renovations, alterations, or radioactive use equipment maintenance functions that need to be performed by Physical Plant or outside vendors (for example, the removal of a radiochemical fume hood); Note: See Appendix IX: Laboratory and Equipment Decommissioning information;
 - c. New operations are anticipated which might lead to personnel exposures;
 - d. Changing location, planning long absences from the University or leaving the University.
 - e. Contamination is detected on laboratory personnel or their clothing.

- f. Yale students under the age of 18 are involved with experiments using radioactive material in approved courses.
6. Comply with the regulations governing the use of radioactive materials as established by the United States Nuclear Regulatory Commission (NRC) and the Yale Radiation Safety Committee. These regulations cover general areas, some of which are mentioned here, which dictate that Principal Investigators:
 - a. Use proper procurement and transfer procedures. (See appropriate appendices to this manual);
 - b. Follow transportation procedures outlined in Appendix VII. These include, the transport of radioactive materials between areas within Yale, including cross campus transfers involving public streets;
 - c. Properly post areas where radioisotopes are stored or used, or where radiation fields may exist;
 - d. Secure radioisotopes in their possession from unauthorized use;
 - e. Record the receipt, transfer and disposal of radioactive materials in their area. The Principal Investigator should submit radioactive material inventory data on a regular basis as requested by the Radiation Safety Section.
 - f. Assure that all radioactive waste materials are handled in accordance with NRC regulations and are transferred properly to the Environmental Services Section for disposal. Comply with Radiation Safety Section requirements pertaining to documentation of all radioactive waste disposal actions within the laboratory. The Principal Investigator is responsible for safe and proper storage of all radioactive waste until it is removed from the laboratory by Environmental Services personnel.
 - g. Assure that appropriate records of radioactive waste are maintained and are reported to the Radiation Safety Section as requested.
 - h. Provide adequate instrumentation for assessing potential radiation exposures in their area and performing routine surveys of the work area as necessary, and as required. Suggested routine procedures are outlined in Appendix V.

- i. Take steps to prevent the transfer of radioactive materials to unauthorized individuals. This includes the proper disposition of radioactive materials possessed by terminating employees and/or students.
 - j. Ensure the prompt distribution and return of all dosimetry devices (badges) issued by the Radiation Safety Section.
7. Keep all employee exposures to radiation As Low As Reasonably Achievable (ALARA), and specifically below the maximum permissible exposures listed in Table 1.

TABLE 1

NUCLEAR REGULATORY COMMISSION
OCCUPATIONAL EXPOSURE LIMITS*

	YEARLY LIMIT (mrem)
WHOLE BODY	5000
SKIN OF THE WHOLE BODY	50000
EXTREMITY	50000
LENS OF EYE	15000
MINORS (PERSONS UNDER THE AGE OF 18)	500
FETAL EXPOSURE	500/Nine months

*Note: State of Connecticut exposure limits vary slightly. For more information contact the Radiation Safety Section.

- 8. Keep the stock of stored, radioactive materials to a minimum within laboratory areas. Authorized users should utilize Radiation Safety storage facilities for large quantities of radioactive material not needed in current research.
- 9. Ensure that service personnel are not permitted to work on equipment, hoods, sinks or vacuum lines in areas where radioactive materials are used, without the presence of a member of the laboratory staff to provide specific information. Contact the Radiation Safety Section prior to allowing Physical Plant or service personnel to work in certain areas such as radioisotope hoods, ductwork, sinks or vacuum lines where radioactive material may be present, or such other areas or equipment that may have significant contamination. See Appendix IX for information on laboratory and equipment decommissioning.

10. Comply with proper procedures for termination of employment or termination of any experiment using radioactive materials. The Principal Investigator must return to the Environmental Services Section all radioactive materials, including waste, assigned to him under the license. An alternative would be to transfer radioactive material to another authorized Principal Investigator with prior approval from the Radiation Safety Section. Particular care should be exercised to see that specialized equipment such as personnel monitoring devices (namely, film badges and TLDs) are returned to Radiation Safety. Exit thyroid scans should also be obtained for ^{125}I users. A final laboratory decommission survey is also necessary prior to leaving the University. Contact Radiation Safety well in advance to schedule a decommission survey. See Appendix IX.
11. Assure that radioactive materials are not transferred within or outside of the University without first notifying Radiation Safety.
12. Inform Radiation Safety of all declared pregnancies as soon as possible. The University's "Policy Regarding the Safe Use of Radioactive Materials by Pregnant Personnel" may be found in Appendix II.
13. Ensure that radioactive material releases to the environment (sewer disposal, airborne releases, etc.) are maintained within current University guidelines.
14. Maintain compliance with University regulations on eating, drinking and smoking restrictions in isotope areas. Prohibit the use of mouth pipettes.
15. Keep lab staff members informed of current radiation safety issues, new policies, and changes in requirements.
16. Familiarize himself/herself and his/her laboratory personnel with the contents of this Radiation Safety Manual.