

fume hood. DRS must be notified at least 24 hours in advance for this and the baseline tritium bioassay.

Additional bioassays may be required for personnel on a case-by-case basis as determined by DRS.

### **7.7 Personnel Exposure Records**

DRS maintains exposure records for all monitored personnel. Annual reports of exposure are sent to personnel *required* to wear dosimetry in accordance with Section 7.5.

At the request of a worker, DRS shall furnish his or her exposure report. The report is furnished within 30 days from the time the request is made, within 30 days of termination of employment, or within 30 days after the individual's dose has been determined, whichever is later.

### **7.8 ALARA (As Low As Reasonably Achievable)**

The university is committed to maintaining radiation exposures to faculty, staff, students, and the public resulting from the use of radiation sources in teaching and research As Low As Reasonably Achievable (ALARA). The Radiation and Laser Safety Committee and DRS advise and assist faculty, staff, and students in all matters regarding radiation safety. The committee recommends to the campus administration, through DRS, policies and procedures for maintaining ALARA radiation exposures through the safe handling, storage, use, transport and disposal of radiation sources. It will assist in the interpretation of the rules and regulations of the U.S. Nuclear Regulatory Commission, the IEMA, the U.S. Environmental Protection Agency, the U.S. Center for Devices and Radiological Health, and others that pertain to protection against radiation.

Sources of radiation include materials or equipment that are capable of emitting either ionizing or non-ionizing radiation. Ionizing radiation sources include radioactive materials, nuclear reactors, particle accelerators, X-ray machines, and electron microscopes. Non-ionizing radiation sources include lasers, high-intensity sources of ultraviolet light, microwave transmitters and other devices that produce high intensity radio-frequency radiation. Both types of radiation are of concern and are under the purview of the Radiation and Laser Safety Committee and DRS.

## 7.9 Exposure Reduction Practices

Use the concepts of time, distance, and shielding to minimize personnel exposure.

To prevent accidental entry of radioactive materials into the body, high standards of cleanliness and good housekeeping must be maintained in all laboratories where radioactive material is present. Wash hands and arms thoroughly before handling any object that goes into the mouth, nose or eyes (e.g., cosmetics, foods, contact lenses). Keep fingernails short and clean. **Never** pipette by mouth; instead use rubber bulbs, syringes or mechanical devices.

Clean up minor spills immediately. For major spills, follow emergency procedures.

Visitors are not allowed into the lab without approval of the PI.

Smoking, eating, drinking, and applying cosmetics in radioisotope laboratories are not allowed. Refrigerators shall not be used jointly for foods and radioactive materials.

For new procedures and new personnel, one or more trial runs beforehand with non-radioactive materials are recommended to test the effectiveness of procedures, training, and equipment.

Use appropriate shielding. Do *not* use lead shielding for beta-emitting nuclides.

Always use gloves when handling unsealed radioactive materials. Wear protective clothing (lab coats, eye protection, shoe covers) as needed. Do not work with unsealed radioactive materials if there is a break in the skin below the wrist.

Tritium users: Change gloves every hour when working with 50 mCi or more.

Whenever possible, operations with radioactive materials should be conducted in a hood, dry box, or some other type of closed system. Operations with materials susceptible to atmospheric distribution, such as boiling, evaporating, distilling, or burning, must be done in a fume hood with airflow of approximately 100 linear feet per minute. Fume hoods in radioactive material laboratories are checked periodically for airflow and the proper sash height is indicated on the fume hood. Work with radionuclides with half-lives of more than a few hours should be done within containment to prevent the spread of contamination in the event of a spill. Work with radioactive materials in powder form should be done in an enclosed system.

Table and bench tops should be of a non-porous, chemical-resistant material. Working surfaces should be covered with absorbent paper regardless of the type of surface.

When work is completed, each user should clean up his/her own work area and arrange for disposition of all radioactive materials and equipment.

Vacuum pumps used in systems containing radioisotopes should be used in fume hoods with proper flow rates.

External exhaust stacks must not be vented towards windows or building air intake vents.

Laboratories shall provide non-leaking radioactive waste containers bearing the words "Caution: Radioactive Materials."

University cleaning crews are permitted to clean floors and windows only. Laboratory personnel are responsible for the remainder of the housekeeping, including proper management of their radioactive waste, as outlined in Section 8.0 of this manual, "Radioactive Waste)

Repairs on potentially radioactive systems such as sink drains and fume hoods should not be undertaken unless DRS personnel have released the area or item from radiological control.