

Radiation Safety Newsletter

The Spring semester is over and many of you are planning your summer research activities. I thought it would be appropriate to periodically pass along information to you about Risk Management & Safety (RMS), and radiation safety practices and procedures. We recommend that each lab / research group include a discussion of safety during some of their group meetings. If you have any questions or want assistance from Radiation Safety, please give us a call.

Introduction

I am the new Radiation Safety Officer (RSO). As you know, there are 3 Radiation Safety Staff members. Their contact information is in the table. I arrived in March after spending 13 years as the

Radiation and Chemical Safety Officer at the University of Wisconsin, Madison. I received my Masters degree from Georgia Tech in 1972 and served in the US Army for 20 years, first as a nuclear reactor operator and then in the medical department for 15 years, primarily as a radiation safety officer at medical research facilities in Washington, DC; San Francisco, Denver, San Antonio as well as 5 years in Korea and Japan.

The Auburn University Radiation Safety Office oversees all radiation sources at Auburn including radioactive material, x-rays, and lasers. Radioactive materials and x-ray are regulated by the Alabama Department of Public Health (ADPH) and lasers, depending upon use, by the Department of Labor and/or Public Health.

Radioactive Materials

The University has a license of broad scope which allows faculty, and associated staff, to conduct research using small amounts of radioactive

		
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material. Professors who want to use radioactive material complete a license application (see <http://www.auburn.edu/administration/rms/radiological.html>) which is reviewed and approved by the Radiation Safety Committee. The Radiation Safety Office facilitates the process of working with radioactive material. They receive all incoming packages of radioactive material, provide radiation monitors (if needed), collect radioactive waste, perform semi-annual audits, etc.

This program is regulated by the ADPH. They visit the campus approximately every two years. The inspectors review the Radiation Safety Office paperwork and visit labs. Normally they check on security (i.e., is radioactive material secured or is someone present in un-locked rooms), monthly surveys, inventories, dosimeters, etc.

ADPH lab inspections are normally performance based. That is, the inspector will ask a worker if they have been trained, they will ask if the worker knows where inventories / surveys are kept in the lab, ask if the workers know what to do in the event of an emergency, etc. Often they will have the worker demonstrate how they would use a survey meter / Geiger counter to perform a survey. If that is the case, the normal routine is to turn the meter and speaker on. First check the batteries to make sure they are still good. Next, on the lowest range setting, measure the background count rate in a low-background area. For Geiger counters, this should be in the region of 20 - 40 cpm. Lastly, perform the survey by holding the detector about 1 cm from the surface you are surveying and move the meter at a rate of about 1 - 2 inches per second, listening for high count rates. If you find high counts, hold the meter still and measure the spot. While Appendix C of the Radiation Safety Manual (<http://web6.duc.auburn.edu/administration/rms/rso/rsm.pdf>) has action levels, a good rule of thumb is to consider decontaminating at about twice background (meter efficiency is complicated by radiation energy, surface material, distance, type detector, etc.).

X-rays

Another radiation source found on campus is x-rays. These can be produced by x-ray machines in the Veterinary School as well as by analytical x-ray diffraction machines in research labs. These x-ray sources are also licensed by the ADPH and faculty who want to acquire or use these machines must submit application forms (<http://web6.duc.auburn.edu/administration/rms/rso/rpma.pdf>) for review by the Radiation Safety Committee. The Radiation Safety Office surveys analytical x-ray units quarterly and provides radiation dosimeters for some x-ray workers.

Lasers

The third type of radiation routinely found in labs on campus comes from lasers. As you know, there are many kinds of lasers from the kind found in checkout counters and laser printers to those used by surveyors and carpenters to very high powered lasers. Every laser comes with a warning sign. Most lasers which are deemed to be non-hazardous to only slightly hazardous come with a "Caution" label. More powerful lasers have a "Danger" label.

While the class of hazard from a laser depends upon such factors as frequency, power, beam diameter, etc., the Radiation Safety Office is primarily concerned with high powered lasers that are Class 3b or 4. Again, with this source of radiation, use requires review of the applicants training and experience by the Radiation Safety Committee, insuring that the laser work site has appropriate safety interlocks and protective devices, and that, if necessary, laser workers receive periodic eye exams.

Radioactive Waste

A couple of quick notes about radioactive waste and it's processing. Even though it's trash to you, it's still radiation safety's job. After we pick the short half-life waste up from your lab, we seal the barrel up and leave it sit for ten half-lives in our lovely storage facility on Camp Auburn Rd. This takes between 3 months and 2 ½ years depending on the isotope, then our job begins. We pull the waste bag out of the barrel on a big metal encased table and monitor it for radiation. Then the waste is sorted by hand to

make sure all radiation signs and symbols are obscured, and that glass and other sharps items have been removed. Finally, after this, your trash is disposed of as regular waste. The long half-life material, mainly H-3 and C-14, are treated a bit differently. After a considerable amount has been collected, it is sorted as burnable (paper, gloves, etc) and non-burnable (everything else). The burnable waste is burned in the University incinerator on Wire Rd. There is no reason to be concerned about burning as both H-3 and C-14 are naturally occurring isotopes, and enter the exhaust plume as water and carbon-dioxide, respectively. The non-burnable waste is held for shipment to an authorized storage site at some future point. For particularly nasty isotopes, you know who you are, and trans-uranics, we seal them as they arrive in our storage facility and store them for shipment.

Remember to separate waste by isotope. Liquids are collected in nalgene bottles, again separated by isotope. Contaminated glass must be segregated in some manner. If your lab generates enough, use sharps containers. If you have a small amount of glass, put it in a zip-lock bag, conspicuously mark it as glass, and place it on the top portion of the waste container prior to pick-up.

Liquid Scintillation Vials **should not** be emptied, we have a machine that performs that task, and the liquid is regulated separately from regular liquid radioactive waste. Also, please put **only** the vials - and the liquid in them - in LSV waste, as the separator machine will clog on a pair of gloves or a plastic cup.

Also, it does no good to tear the radiation symbols off of the package, and then drop them into the trash too. Just mark the symbols out with a black Sharpie, or the equivalent, or tear the symbols into confetti. Make it so that it is “obvious to the most casual of observers” that the radioactive material is not in the container.

Dosimeters

Risk Management and Safety (RMS) currently supplies radiation dosimetry services campus-wide to users of radioactive materials and radiation-producing equipment at no charge. Dosimeters are being

exchanged quarterly or semiannually according to monitoring needs. We use four types of dosimeters;

- 1- P, Pa : Luxel +- (x or gamma ray), beta
- 2- J, Ja : Luxel +- Photon (x or gamma ray), beta, fast neutron
- 3- T, Ta : Luxel +- Photon (x or gamma ray), beta, fast / thermal neutron
- 4- U : Ring TLD – Photon (x or gamma ray), beta

We have about 500 semiannual, 100 quarterly badges in campus. A large portion of the badges are supplied to students. Historically, there has been a problem with students not returning their badges at the end of monitoring period. In addition to the problems caused by the loss of personnel dose data, the dosimetry vendor also charges the university for the replacement dosimeters and/or holders. Dosimeters need to be returned within two weeks of the close of the period. At the end of each period, dosimeters returned to Radiation Safety are sent to our vendor for analyzing, and a dosimetry report for each account is printed and mailed to us.

Monthly Laboratory Contamination Surveys

We would like to thank you all for letting us know about your radioactive material use monthly and sending in your lab surveys and Radioactive Materials Inventories in a timely manner. We would like to know your radioactive material use before the 5th of each month for the previous month. Don't forget!!! Your radioactive material will be listed in your inventory until we get the Isotope Use Record back with your usage recorded when you are done with it

If you need our help for getting done any of these monthly chores, please don't hesitate to call us. We are here to help you.