Radiation Review

UW - Madison Safety Department **Radiation Safety Program**

30 N. Murray St. **262-8769** **August 1996**

http://www.wisc.edu/safety

Communications

Communication, "the imparting ... of ... information by speech, writing, ..." is just as essential now as ever. Each of us communicates at several different levels. On a professional level, you must provide direction to your personnel, discuss results with both peers and workers, apply for grants, etc. The form of com- munication you employ is often dictated by the situation. Guidance to workers may be oral or written. Requests for information may be electronic (eMail), written, or oral. Regardless of the form, good com- munication should be economical.

Of necessity, some of your communications at the UW may be with the Radiation Safety Office. Our assets are just as stretched by day-to-day activities as are your assets stretched. Most of our people are on campus working rather than sitting in the office doing paperwork. Thus, while the telephone may be con- venient, it may not put you in touch with the person you want to talk to and is only useful during normal business hours.

This newsletter will be used to describe the contents of our World Wide Web page and the ways you can use it to communicate with Safety.

WORLD WIDE WEB (WWW)

The Internet is a great place to explore. It abounds with volumes of essentially unsorted information. If you are familiar with the Web, you probably have favorite sites for work and play. We hope you bookmark our site, http://www.wisc.edu/safety. Among the pages you can find:

CORD order form - You can order radioactive materials any time day or night. CORD is open for telephone orders only between 8 - 11:30 AM and 12:30 - 2:00 PM. However, an order can be placed using this CORD order form just as easily.

Dosimetry - Report lost badges and estimate doses for those lost badges.

Waste - You can request radioactive and chemical waste pickups. Instead of calling Safety for a waste pick-up, complete and send the waste pick-up form, package the waste and complete associated forms as you normally would. Your properly packaged waste will be picked up from your building during the regular pick-up run.

Meters - We listed several makes of acceptable Geiger counters for beta detection and gamma systems for gamma-ray detection, the approx -imate prices, and vendors who supply these meters. If you do not find a meter you want to buy on this page, email Safety; the meter you want may not be approved for radiation work at the UW.

Training - Pages include the training schedule through 31 Dec. 1996, all newsletters and the entire training manual (hard copies can be picked up at our Annex in Biochemistry Room B19 between 11 AM - 3 PM).

Radiation Use Amendment - You can request changes in your autho-rization (e.g., new/change in isotopes; personnel; rooms) or protocols by printing the appropriate form, com- pleting form and either FAX (2-6767) or send it through Campus Mail to Safety. We are using this method because actions involving a PI's authorization should be signed by the PI. Some radiation sites have initiated passwords and other elaborate security measures. While we are aware of these security issues and solutions, the Safety Department has neither the assets nor the expertise to devise elaborate security measures.

Email Addresses - A listing of all Radiation Safety email addresses enables you to send an email to any person you desire in Radiation Safety. Simply locate the person or section (HP, tech, CORD, dosimetry), click on the hypertext and the email form will appear, properly addressed. We normally verify any communication with the sender (e.g., on-site visit for a room add, exception request, etc.) and the issues involved in email are usually not extremely complex.

Future pages may include forms useful for making changes to your authorization (e.g., the full authorization or animal form, amendment form, etc.), product catalogs, CORD inventories and radiation dosimetry information. We are open to feedback from you about our pages, send your comments to Leola DeKock.

Bremsstrahlung

For ^{32}P users: Bremsstrahlung is X-rays emitted when high-energy beta particles (e.g., ^{32}P) interact with matter. These x-rays are emitted at all energies up to the maximum energy of the beta particle. The fraction of x-rays produced per beta decay is:

$$f = 3.5 \times 10^{-4} Z E$$

where Z is the atomic number of the material and E the energy of the beta particle.

Practically speaking, the brem - sstrahlung dose rate at 10 cm from an aqueous solution of 1 mCi of ^{32}P in 25 ml is approximately 0.1 mrem/hr.

The thin window Geiger counter used to detect beta particles will not detect these x-rays. Thus, if you have 1 mCi of ^{32}P behind a plastic shield ($Z \approx 6$), approximately 7,900,000 ($3.5 \times 10^{-4} \times 6 \times 1.7 \times 2.22 \times 10^{9}$) x-rays are produced.

While bremsstrahlung will always be present when ^{32}P is used, for the quantities of ^{32}P used at the UW, it is not a hazard. Also, the radiation dosimeters (TLDs) used to monitor ^{32}P users will measure this ex- posure.

Uses Requiring Special Training

Several uses of radioactive materials require special training over-and-above the 4-hour Radiation Safety Class either because special equipment is used or because use also involves other regulatory agencies. Three such uses at UW are:

1. Irradiators - The UW has 3 high activity irradiators which are routinely used by researchers. Training on these devices is conducted once each month. The UW received an NRC violation when an untrained worker improperly used one of these systems. If you want to learn how to use irradiators, call/email Abdul for a class date and read Chapter 9 (Irradiators) in the Radiation Safety training manual.

2. Transportation - When radioactive material leaves the UW campus, Dept. of Transportation rules and regulations apply. Persons transporting or preparing a package for transport to places like Trout Lake, White Sands Missile Range, etc. must be "trained" by reviewing Chapter 8 (Transportation) in the Radiation Safety training Manual and requesting an exam from Ralph North. Refresher training is required every two years thereafter.

3. Density gages usually emit neutrons and are used to measure the density/moisture content of soil. Although they employ sealed sources and are adequately shielded when properly used in field work, if improperly used, high exposures are possible. Additionally, DOT rules apply in both the transport of these gages and the storage. If you desire to use one of these gages, call/email Leola DeKock and Ralph North.

Pregnancy Surveillance

Because the embryo/fetus is more sensitive to effects from high (> 10 rem) radiation doses, lower radiation dose limits apply to the fetus than the adult worker; 500 mrem for the fetus vs. 5000 mrem for the adult.

The Pregnancy Surveillance Program is a voluntary program. Together with the pregnant worker, the Safety Department will review her radiation exposure history, her lab's workload (type and quantity of radionuclides), and, if appropriate, provide sug- gestions to reduce exposure to below the 500 mrem limit or provide encouragement to keep radiation dose to the fetus low.

To inquire into this program call or email Leola or Sharon.

UW-Safety Dept.
30 N. Murray St. 53715-2609

(608)262-8769