



# RADIATION REVIEW



UW - Madison Safety Department  
103 N. Lake St. 262-8769

Radiation Safety Program  
August 1994

## Training

Radiation Worker Training is conducted weekly at the dates and times indicated below. The class is 4 hours long with a comprehensive exam based on the *Radiation Safety for Radiation Workers* booklet given during the last hour. All training is conducted in Biochemistry Rm. 1B. Please call Radiation Safety at 2-8769 or 5-5241 to receive a copy of the booklet.

Date	Time	Date	Time
2 Aug	12:30	21 Oct	12:30
10 Aug	12:30	28 Oct	12:30
18 Aug	12:30	3 Nov	1:30
24 Aug	12:30	9 Nov	8:00
31 Aug	12:30	17 Nov	1:30
8 Sep	1:30	21 Nov	8:00
16 Sep	12:30	2 Dec	12:30
23 Sep	12:30	8 Dec	1:30
29 Sep	1:30	13 Dec	12:30
5 Oct	8:00	20 Dec	12:30
13 Oct	1:30	28 Dec	12:30

## Security of Radioactive Materials

Most of you have by now received our memo requiring you to be responsible for security of your radioactive materials and specifically radioactive waste. Please note that this is not a new requirement. Security of radioactive materials has always been the responsibility of the authorized user as stated in Chapter VII of the University Radiation Safety Regulations.

The requirement to secure waste from inadvertant removal is the goal of the corrective action that we informed the Nuclear Regulatory Commission we would take after a custodian reportedly removed some radioactive waste from a labelled plexiglass container in a laboratory at the Clinical Sciences Center. The waste was in a red "Biohazard" bag, which may have added to the custodian's confusion. This is the reason we will be initially supplying 4000 yellow bags for disposal of radio- active waste. By the time we run out of yellow bags, UW Stores will have them available for purchase. We also have several types of signs and labels available. Please call 2- 8769 to obtain some.



## Radioactive Waste

To many users, radioactive material is only important when it contributes to whatever they are investigating. The residue of their work, the radioactive waste, is often perceived as undesirable and useless, similar to the rest of the lab's waste. However, to the Nuclear Regulatory Commission (NRC), the Federal agency that regulates use of by-product radioactive material at the University, **all** radioactive material, regardless of usefulness, must be treated with care. Furthermore, the University is liable for all of its radioactive material, even that material that has been accepted and interned in a radioactive waste burial site.

The University Radiation Safety Regulations (URSR), Section XIX, Disposal of Radioactive Material, and Appendix I, Radioactive Waste Disposal Guidelines detail the requirements for processing radioactive waste. The purpose of this newsletter is to provide you with information that might make sense out of these procedures.

## Disposal

After using unsealed radioisotopes in a laboratory procedure, the radioactivity remains and the material must be properly disposed to protect workers, staff, and the environment. Several radioactive materials disposal methods are possible: collection by Radiation Safety (preferred), natural decay, release to the sanitary sewer, and release to the atmosphere.

## Collection by Radiation Safety

The preferred disposal method is to contact UW Safety Department (262-8769) and schedule a pick-up of properly packaged radioactive wastes. Specific instructions for packaging

waste can be found in Section XIX of the URSR; however the basic concept is to provide a strong, tight container to hold the waste until ultimate disposal. For solids that means taped in a plastic bag and sealed in a cardboard box. Place liquids in an unbreakable container, insure the cap is tightly fastened, attach a properly completed *Radioactive Liquid Waste* tag, place the container upright in a larger box, place packing material around the jug to prevent tipping or shattering. 5 gallon carboys may be used for large volumes of  $^3\text{H}$ ,  $^{14}\text{C}$ , and  $^{35}\text{S}$ .

## Natural Decay

Although we would prefer to collect all radioactive waste generated on campus, if a lab has a radioisotope with a short half-life (e.g.,  $^{32}\text{P}$ ), it may be convenient to wait until the natural decay

process removes most of the radioactivity. It is crucial for disposal by natural decay to: (1) hold the material for at

**least** 10 half-lives and (2) survey for detectable radiation and/or radioactivity before disposal via normal trash. The survey should show less than 100 cpm (essentially background) or less than 0.05 mR/hr (x-/()) when surveyed with a thin window GM survey meter in contact with the trash. When using natural decay to dispose of radioactive waste, insure that you properly log the decay on the Radioactive Material Record form, the results of the survey (e.g., "less than 25 cpm background, E-120/HP-

Meter Decayed Waste  
and Document Results...



...Before Disposing to Normal Trash

190, SN. 1234"), and the date of the survey. Deface or remove all radiation symbols from box **and** the box's contents before disposal to normal trash. Report decays at least quarterly to CORD via a *Radioactive Waste Disposal* (RWD) form.

### Release to Sanitary Sewer

Because of the myriad of Federal and State regulations only small quantities (# 2 mCi/yr) of readily soluble, aqueous, not-hazardous (e.g., non-flammable, not infectious, etc.) material may be disposed of in laboratory sinks. Records of disposal must be maintained by date, type and amount of radioactive material disposed. Maintain a "hot" sink and clean after disposal. See URSR Section XIX for permissible concentrations. Report all releases to CORD (via a RWD form) the sanitary sewer within the calendar month of the release. Under no circumstances can flammable solvents be discharged into the sewer system.

### Release to the Atmosphere

Nuclear Regulatory Commission regulations allow the University to release specific concentrations of radioactivity to the outside air. When desiring to use release to the atmosphere as a disposal mechanism, the user must first obtain approval from Radiation Safety. A Health Physicist will evaluate the radionuclide quantity and concentration to be released and insure that all releases will be through an approved hood and/or exhaust system. Report releases via the RWD form.

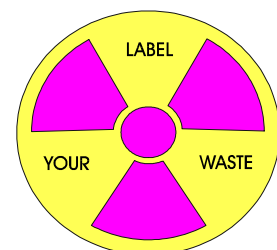
### Disposal Process

The primary reason we would like to collect all radioactive waste is to better manage its ultimate disposal. For the waste generator, radiation safety collection

should be the least burdensome from both paperwork and manpower. All waste disposals, whether by Safety pickup, decay, or release, must be reported to CORD on a *Radioactive Waste Disposal* form to insure that the user's inventory is adjusted and to allow us to track University releases. Waste stored in the lab is both a potential source of radiation exposure and a potential accident (loss, fire, etc.) which could jeopardize our research license.

Waste managed by Safety is first stored for decay. Aqueous liquid waste is analyzed prior to disposal through laboratory sinks via the sanitary sewer to insure that the disposal will not cause us to exceed our concentration limits. Solid waste is segregated by isotope, decayed, and incinerated. The ash is collected and analyzed to determine how (e.g., sanitary landfill, low-level radioactive waste dump) it will be ultimately disposed. Disposal costs for low-level radioactive waste is \$200 per cubic foot. The benefits of incineration are that it obliterates all radioactive labels and reduces the volume by a factor of 80 - 95%.

During the year 1993, the Safety Department collected and disposed of approximately 6000 cubic feet of solid waste (radioactive disposal costs would be \$1,200,000) and 12,000 pounds of animals. We sent about 155 cubic feet of waste to a low-level waste site at a cost of \$126,000. We have now lost access to that site (Barnwell, SC) and will be without a disposal site until another becomes available. We also disposed of approximately 10,000 liters of various aqueous radioactive materials. Because of our commitment to ALARA, which includes an aggressive decay-prior-to- disposal program,



the University is able to keep effluents from the incinerator to 10% of our allowed levels (about 1.4% of regulatory limits) and aqueous effluents to 10% or less (depending on isotope) of regulatory limits.

***ACTION ITEMS FOR AUTHORIZED USERS***

- 1) **Secure and Label all Radioactive Materials**
- 2) **Contact Radiation Safety at 2-8769 to pick up radioactive waste.**
- 3) **Maintain accurate records.**
- 4) **Notify Radiation Safety of all disposals via the Radioactive Waste Disposal Form**

## **Chemical Safety Documents**

The Chemical and Environmental Safety Program has several useful documents available. The LabScan is a newsletter providing information about the Chemical and Environmental Safety Program, as well as listing chemicals available for redistribution. These chemicals are free of charge and will be delivered to your laboratory. Call Dennis Silbaugh at 3-8986 if you have questions. The Chemical Safety & Disposal Guide provides information regarding the safe and proper use and disposal of many chemicals used at the University of Wisconsin. Any laboratory that uses chemicals should have a copy of the Chemical Safety & Disposal Guide. Call 2-8769 for a copy.

**UW-Safety Dept.**

**103 N. Lake St. 53715-1212  
(608)262-8769**

