RADIATION REVIEW

UW - Madison Safety Department
262-8769

Radiation Safety Program
February 1992

We Goofed!

There is an error in the "Radioactive Material Specifications and Handling Guide" for Chlorine 36. This is the little yellow folder distributed by the Safety Department. In it we state that the half life of Cl-36 is 12.35 years. The actual half life is 3.01×10^5 years. We apologize for any inconvenience this may have caused.

Recordkeeping

In an effort to help us keep track of your radionuclide inventories, and to minimize discrepancies between our records and yours, please keep in mind the following things:

- ✔ If principal investigators wish to share material, have one PI order it, aliquot it for the others, and call CORD to do a transfer. Keep waste separated by nuclide and authorized user, and be sure to have only one principal investigator per disposal form.
- ✔ When a Health Physics Technician presents you with an inventory form, please do an accurate physical inventory, correct any discrepancies, sign the form and return promptly. Do not use the inventory form for decay corrections for nuclides with short half lives. There is a section on the bottom right corner of the pumpkin-colored Radioactive Waste Disposal Form for reporting decay. If you are accounting for decay only, you can send us pumpkin forms through campus mail or include them with a waste pickup.
- ✔ When you call CORD to place an order for radioactive materials, it is important that you tell us the name of the person ordering the material. In addition, for iodine to be used for an iodination procedure or when ordering ten or more millicuries of tritium, we need to know the names of everyone using the material.

Thank you for your assistance in these matters.

Helping CORD

If you are expecting a delivery of radionuclides to your lab and are unable to be there to receive it, please leave a note for the CORD van driver stating where they can find another radiation worker to sign for the order. Also, at your discretion, please instruct lab personnel that it is okay for them to sign for these orders and what to do with the material once it is received. Signing for a CORD delivery is not assenting to the correctness and quality of the order. It is merely a paper trail confirming the delivery of the material.

Please help us document the use of this newsletter as part of our continuing training. Have everyone who reads Radiation Review initial it. Then keep the initialed copy in your files. Thanks.

Health Physics Corner

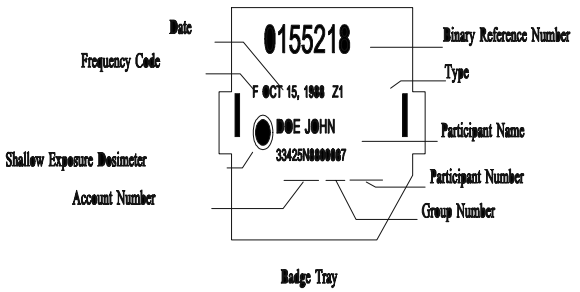
NEW 10 CFR PART 20

The Final Rule for Standards for Protection Against Radiation was released May 21, 1991. This is one of the federal regulations UW Radiation Safety must follow. Noncompliance can and will result in penalties against the University. As a licensee in a non-Agreement state we are required to be in compliance with the new part 20 by January 1, 1993. We will pass these changes on to you in the form of a new University Radiation Safety Regulations notebook, which we expect to distribute early this spring pending approval by the University Radiation Safety Committee. We have emphasized the parts of the regulations that have changed with a pointing finger (L). Please let us know if you haven't received a copy by the May 1, 1992.

PERSONNEL RADIATION MONITORING

✠ THERMOLUMINESCENT DOSIMETERS (TLD)

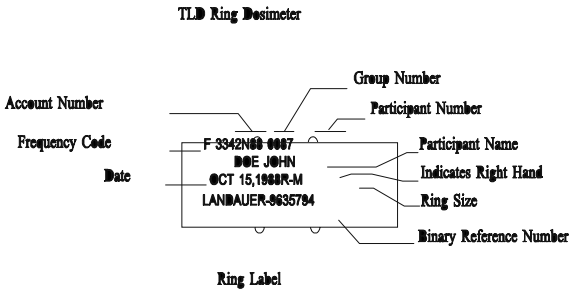
Many crystalline compounds, if properly spiked with impurities, will emit thermoluminescence photons (ie light) if they are heated after having been exposed to radiation. The energy absorbed from radiation knocks electrons into higher energy orbits where they are "trapped" by the impurities in the crystalline lattice. Heating the compound causes these electrons to return to ground state, accompanied by the release of a light photon. The total amount of light released



is proportional to the number of electrons excited to a higher state which is proportional to the amount of radiation encountered. The light released is therefore proportional to the amount of radiation absorbed, the dose. This is the basic principle by which the dosimeter issued to you by the Safety Department works. It is called a TLD or thermoluminescent dosimeter. After you turn your TLD in, it is heated and the amount of light that is given off is measured with a TLD reader. Thermoluminescent dosimeters are sensitive to beta particles, gamma photons, X-rays, and neutrons. The phosphor in the TLDs we supply is lithium fluoride (LiF), a good choice for several reasons - 1) A good approximate tissue equivalence 2) Quantitative response in a range from about 10 mrad to about 10^5 rad
3) Energy-independent sensitivity and
4) Low fading rate

Here are some general handling guidelines for using your TLD:

1) Never wear anyone else's badge. Never let anyone else wear your badge. If there is a high reading we won't know who was exposed.



2) Wear your body badge between your collar and your waist in the place where exposure is likely to be the highest. If you must wear a lead

apron(ie. Radiology Department personnel), wear the badge on the collar outside the apron.

3) Wear the ring badge inside your glove on the hand that is likely to receive the most exposure. Wear it with the label towards the radiation source. Take care when removing gloves that the ring doesn't get pulled off with the glove.

4) Putting your dosimeter through the washer won't normally affect the reading.

5) Never intentionally expose your badge to a radiation source. We test the badges regularly and they work.

6) Exposure to high temperatures can result in reduced readings. Don't store your dosimeter near a source of intense heat or run it through a clothes dryer.

7) Chalk is a natural phosphor that could invalidate your exposure reading. Keep your badge away from excessive chalk dust when possible.

WASTE WATCHERS

SOURCE REDUCTION

The most important tool we have for managing waste in general, and radioactive waste in particular, is source reduction or waste minimization. This means reducing the volume of waste from each laboratory that is generated as radioactive waste. At the cost of a little extra work and a little extra bookkeeping, the savings in money and environmental impact can be significant. We ask each laboratory to inspect their own program and determine ways to reduce the amount of radioactive waste generated. Following are some simple suggestions to reduce your waste. Please call Ralph at 2-8769 if you have any questions or suggestions.

1) If you are using minute amounts of uranium for electron microscopy, wash it down the drain with an excess of water after each use. Please don't collect the waste in large containers.

2) Solutions of less than 20% methanol in water generated by HPLC work can go directly to the sanitary sewer providing you remain within the activity limits set forth in the University Radiation Safety Regulations. Flush with an excess of water to ensure that these chemicals don't remain in the traps. Report the quantity of radioactive material disposed in the bottom right corner of the pumpkin colored "Radioactive Waste Disposal Form". In general, the greater degree to which you can separate chemical constituents, the easier they are to dispose. Also, since the chemical characteristics of radioactive chemicals are the same as those of their non- radioactive counterparts, use the "Disposal Guide" prepared by the Chemical Safety Program as a guide as to what can be flushed down the sanitary sewer. Call a Safety Department Chemist if you have questions. Also, keep in mind your 2 millicurie per year combined limit for disposal to the sanitary sewer. Refer to URSR section XIX for more information.

3) When using gamma emitters or high energy beta emitters, use your meter to determine what is contaminated and what is normal trash. Our biggest solid waste problem is hard plastic trays because they don't incinerate well. It would help us if you could rinse these off, and check for contamination with a GM meter or LEG probe. If there is no contamination, remove or deface all "RADIOACTIVE" tape and stickers and discard in the trash.

4) Periodically review your protocols to determine if a more soluble or more biodegradable or perhaps even nonradioactive alternative can be used without affecting results.

*** WORD HUNT ***

ALPHA	ION CHAMBER
ATOMIC	IONIZATION
BARNS	ISOTOPE
BECQUEREL	MILLIREM
BETA	NEUTRON
CURIE	NUCLEAR
DECAY	NUCLEUS
DISINTEGRATION	NUCLIDE
DOSE RATE	PROTON
DOSIMETER	RADIATION
ELECTRON	RADIOACTIVE
FISSION	ROENTGEN
FUSION	SCINTILLATION
GAMMA	SHIELDING
HALF LIFE	SURVEY METER

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K H R E T E M X Y E V R U S L D U O L R V X H
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V M Q Z Z J A Z U O X X Y E E S Y L M A I X F
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THE WORDS HIDDEN IN THIS GRID MAY RUN:

HORIZONTALLY FROM LEFT TO RIGHT AND VERTICALLY FROM TOP TO BOTTOM
HORIZONTALLY FROM RIGHT TO LEFT AND VERTICALLY FROM BOTTOM TO TOP
DIAGONALLY IN ALL DIRECTIONS. TWO WORD CLUES HAVE A LETTER BETWEEN WORDS

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