

RADIATION REVIEW

UW - Madison Safety Department

Radiation Safety Program

103 N. Lake St.

262-8769

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Re: User Notes

The Safety Department audits each radioactive materials user at least annually. These audits are mandated by the University's Nuclear Regulatory Commission (NRC) license. Two items audited are (1) the lab's ability to comply with the requirement that radiation and radioactive contamination surveys be done monthly in all rooms where a researcher is authorized to use radioactive materials and (2) the completeness of inventory records for radioactive materials receipt, use, disposal, and transfer.

Audit deficiencies are often caused by a lack of emphasis by the principal investigator on survey and inventory requirements. In one lab, the lab's dishwasher was performing required surveys. When this dishwasher left for a short period, no surveys were done. Remember, the user is responsible for insuring the lab complies with all applicable regulations. We believe the person a researcher assigns responsibility for radiation surveys should have an investment in the successful use of radioactive materials in that lab's research. To that end, these guidelines for persons performing surveys should be considered crucial:

1. Surveyors must be radiation workers and have attended the training class.
2. Investigators should provide additional instruction regarding unique aspects of

radioactive materials use and exception conditions for the lab.

3. During periodic lab meetings where research progress is discussed, the investigator should also insure that all needed surveys and inventories have been performed.

Given these thoughts, a good person to have as the surveyor would be a second year graduate student. This person would be aware of research trends in the lab as well as personnel and isotopes used. It is likely that such a person may be responsible for insuring compliance in the future in their own lab. Hence, this task would be considered as part of his / her apprenticeship in research.

Sinks

Hot sinks may be used to dispose of nonhazardous aqueous liquids. With Safety's approval, users may dispose up to 2 mCi per year total activity through the sink. Concentration limits can be found in the University Radiation Safety Regulations, Section XIX. Hot sinks must be approved by Safety, a sink log must be used, disposals must be reported to Safety quarterly.

Iodine

Approximately 1/4 of all principal investigators have requested to be allowed to iodinate on campus. Because radioiodine in the form of sodium iodide (NaI) may release radioactive gases, special precautions are needed for radioiodine work. Some of these include: doing all work with high specific activity NaI in an approved fume hood, performing surveys immediately after use of NaI, and receiving a thyroid uptake count in Biochemistry Rm. 19 within 1 week after receiving the radioiodine.

The Safety Department monitors the effluents for 40 different building fume hood exhausts on campus. We have refined our sampling procedures to so we are now trapping at least 50% more radioiodine in these effluents than we were 2 years ago.

We have worked to improve our thyroid detection capabilities. Previously, the thyroid was measured at approximately 29 cm for a total time of 200 seconds. We currently measure the thyroid at a distance of approximately 15 cm for a total time of 300 seconds. Because radiation exposure varies inversely with the square of the distance and the minimum detectable activity is varies inversely with the square of the counting time, we have been able to reduce the minimum detectable activity for this test from approximately 7 nanocuries to 2 nanocuries (the thyroid dose rate is approximately 4.4 rads per microcurie absorbed in the thyroid. The maximum allowable dose to the thyroid is 50 rem/year. Dose to the thyroid is 4 rad/ μ Ci, this is 4 mrad/nCi.

The reason we sought to improve the system was that our mandated action level (i.e., the point at which a worker must come back weekly for thyroid measurements) was lower than our minimum detectable activity, causing

workers with a few counts above background to return the next week for a second count. By improving our detection ability, we were able to reduce the background level to 2 nanocuries and keep the action level at 5 nanocuries. We will work to implement a few other improvements over the next few months, all to document safe use of radioiodine.



Radiation Safety Class

Radiation Safety for Radiation Workers class will be held January 3, January 12, and January 17 at 12:30 p.m.

Winter Waste Pick-up

As winter approaches, remember that aqueous liquids can freeze rapidly in cold weather. As always, waste should not be put in cabinets before 11:30 AM on the day of the pick-up. This becomes particularly important in the winter and



should insure that no containers freeze and rupture, producing a radioactive spill that will require decontamination by the responsible user of the cabinet under very cold conditions. Other things to remember: seal the container when it is 80% full, complete a Liquid Radioactive Waste tag, place small volume containers upright in a box and surround it with packing material, and place a Radioactive LSA waste tag on the box. The Radioactive Waste Disposal Guidelines found in Chapter XIX of the Regulations or in Appendix C-4 and C-5 of the training manual can provide guidance. Other questions can be answered by Radiation Safety personnel.

Irradiator Incident

Recently we had an incident in which a worker intentionally circumvented a safety interlock on one of the sealed beam irradiators used by researchers on campus. Cycling the system with the interlock bypassed caused the area radiation alarm to be activated and, although the persons in the room only received a very small radiation exposure, this was a reportable event. The University can expect at least three license violations from this single incident: overriding a safety interlock, use of an irradiator by persons not trained as radiation workers, use of an irradiator by persons not wearing dosimeters. Safety has a 2 hour training program for radiation workers who desire to use one of the three irradiators on campus (Human Oncology, McArdle, and Zoo Research). This training program consists of:

1. A class and test
2. Hands-on use
3. Refresher training for those who do not use the irradiator at least once in a period of one year.

If you are interested in using an irradiator, call Abdul at 2-9748.

Renewals

Every 3 years an authorized user is required to renew their authorization to possess and use radioactive materials. We have assembled packets and will be sending these renewal packets out around 1 November 95. If you receive a renewal packet, complete all paperwork and return it to the Safety Department before 1 January 96. The NRC requires that every item (protocols, exceptions, etc.) be filled out again without reference to previous renewals or amendment applications.

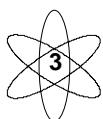
Radiation Safety Home Page

Safety is attempting to construct an Internet page. The address should be <http://www.wisc.edu/safety>. The intent will be to provide forms for communicating with Radiation Safety and CORD. For example:

1. Researchers may be able to complete an order form and send it to CORD anytime rather than just normal business hours.
2. Workers may be able to file lost badge reports directly rather than complete a form (Dosimetry Applications must be signed for us to obtain prior histories).

We hope to get it fully functional by 1 January 96. As you review the page, we would welcome suggestions to improve it.

Did you know - 1995 marks the centennial of the discovery of radiation. On Friday, November 8, 1895, Wilhelm Conrad Röntgen, working in his laboratory at the University of Wuerzburg, observed that a few crystals of barium platocyanide, which lay on the table near his Crook's tube (a primitive electron gun), gave off a fluorescent glow. He deduced that this fluorescence could only be caused by a previously unknown radiation produced when he aimed a stream of electrons at a metal target inside the Crooks tube. He named this unknown radiation x-rays.



CORD Holiday Schedule

Please record this information for the upcoming season.

CORD will be closed November 23 and 24 for Thanksgiving. Orders for Dupont and Amersham "Fresh Lots" will be called in for delivery on November 27.

CORD will also be closed December 25, 1995 through January 1, 1996 for the Christmas Holidays. Orders will not be taken for items from any vendor or for "Fresh Lot" deliveries during the time CORD is closed from either Dupont or Amersham. Please plan ahead. Orders that are received from vendors will be delivered during the time CORD is closed.

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