

# RADIATION REVIEW



**UW - Madison Safety Department**

**Radiation Safety Program**

**30 N. Murray St.**

**262-8769**

**October 1996**

**<http://www.wisc.edu/safety>**

## Meter Recommendation

If you are buying a meter to detect low energy betas (e.g., S-35, C-14, P-33), you need to get a pancake probe rather than an end-window probe because the system is twice as sensitive to these particles.



We recommend the following GM survey meter: Ludlum Model 3 with a dial #202-2 (\$360) and a Model 44-9 pancake GM detector (\$175). There is a 4% UW discount from the following vendor: Peter D. Johnson,

Contemporary Science, Inc., 840 Seventh Avenue, Marion Iowa 52302-5747, Phone: (800)379-4274, FAX: (800)CSI-FAX1. Email

and internet addresses are listed on our home page: (<http://www.wisc.edu/safety>).



## CORD Holiday Hours

CORD will be closed for business the following days in November and December:  
November 28, 29;  
December 24, 1996 through January 1, 1997. Our Web site (<http://www.wisc.edu/safety>) will remain operational and you may order materials from that page for delivery during this period if the vendor ships.



## Winter weather and liquids

Radioactive waste collection is Monday and Wednesday afternoons. When the temperatures drop below freezing (32EF or 0EC), aqueous liquids freeze rapidly. During cold weather, do **not** place liquids out for routine pick-ups before 11:30 AM on the day of the scheduled pick-up.

### S-35 Volatility

As most of you are aware, there have been questions about the volatility of S-35 products. I saw one reference which investigated this question. It was a short letter by Jill Meisenhelder and Tony Hunter, Molecular Biology & Virology Lab, The Salk Institute (Meisenhelder, J & Hunter, T (1988) Nature 335:120). I would like to summarize that letter and note recommendations.

Sulfur-35 labelled amino acids (methionine, cysteine) are frequently used to label proteins for further study. The authors found what appeared to be a volatile radioactive component. There was some indication that the volatility was amino acid dependent with the volatility of <sup>35</sup>S-cysteine being **less** than the volatility of <sup>35</sup>S-methionine.

They noted that when a fresh (8 mCi) vial is thawed without a lid in a large open container, approximately 1 :Ci was released (about 0.0125%). This may be due to product breakdown during freezing (a physicochemical breakdown). Because there appeared to be some volatilization when <sup>35</sup>S-amino acids were initially added to cell culture medium at 37EC, they reasoned it was not metabolic.

The article was written in 1988 and the authors suggested that if the volatilization were due to chemical/physical causes, then if the vendors added a stabilizer to the amino acids they may decrease the volatility. Perhaps that has been done. However, they noted the manufacturer believed the <sup>35</sup>S contamination due to either SO<sub>2</sub> or CH<sub>3</sub>SH. The volatile component was very water soluble and contributed to

contaminating equipment. Using LSC counting, they recovered 300,000 cpm from 500 ml of water after 2.5 mCi of <sup>35</sup>S-methionine was incubated for 6 hours (0.00635% volatilizes). In such an incubator the water evaporating, recondensing, running down the inside, etc., all surfaces (e.g., trays, side walls, door, outsides of other dishes, rubber door gasket, metal fan for air circulation, etc.) would experience some contamination (. 1000 - 2000 cpm per 10 cm<sup>2</sup>).

They recommended PIs take the following precautions:

1. Thaw <sup>35</sup>S-amino acid vials in a fume hood using a needle through the rubber septum to vent the vial (or better, a syringe packed with charcoal attached to the needle).
2. They found that activated charcoal adsorbs the <sup>35</sup>S and that a 16" x 16" pressed charcoal filter of honeycomb-type design on the top shelf of an incubator (investigators did **not** note an effect on the CO<sub>2</sub> equilibrium) decreased the contamination in the air. For infrequent use, they recommended putting activated charcoal in a tray or wrapped in tissue to make a small bag.
3. Change the incubator water after each labelling.

How does Radiation Safety see this article?

There appears to be some risk of contamination from using <sup>35</sup>S-amino acids, both in thawing and heating operations. Two precautions (#1 and #3) of thawing these products in a fume hood and changing incubator water frequently appear to be well founded. While activated charcoal appears to be effective it is an added expense for the labs and would need to be treated as contaminated waste. (Continued on next page)



### S-35 Volatility (continued)

The small quantities of contamination involved can perhaps be better dealt with by diligent surveying with a GM survey meter. While the activities volatilized are small (approximately 0.01%), the activities are easily detectable. PIs should use a thin-window GM to check the walls and work surfaces of hoods and incubators immediately after use. While a pancake probe is about 50% more efficient for  $^{35}\text{S}$  than an end-window detector, at 1 cm the minimum efficiency you will obtain should be approximately 2% - 5%. Remember that the action limit with a survey meter is 650 cpm or approximately 30,000 dpm - 13,000 dpm for  $^{35}\text{S}$ ; removable contamination limits are 770 cpm/100  $\text{cm}^2$ .

### Vial Disposal

Safety charges a processing fee for cases of LSC vials. Currently this fee is \$6 for sewerable cocktails (e.g., Biosafe) and \$30 for organic cocktails. The UW Purchasing requires PIs use a CORD account which specifies vial disposal (perhaps in addition to radioactive materials). When the lab disposes LSC vials, remember to include the requisition number on the disposal form which is valid for vial disposal.



### Safety Will Supply Bottles

Beginning soon, UW Radiation Safety will supply containers for you to use to dispose of radioactive liquids. Nalgene bottles of various sizes will be in a box in your disposal area (cabinet or room). Help yourself, but please take only what you need for liquid radioactive waste.

Disposal procedures will not change (Chapter XIX of the UW Radiation Safety Regulations). As always, for large volume, low concentration  $^3\text{H}$ ,  $^{14}\text{C}$  and  $^{35}\text{S}$  waste, call Safety and request a carboy. Contact Ralph (2-1524) or email (ralph.north@mail.admin.wisc.edu) at any time for questions, comments or suggestions.

### Lead Pig Disposal

Dispose of lead pigs by removing the stock vial, placing all lead pigs in a sturdy cardboard box, seal box, write "Lead Pigs" on box and place with the rest of your radioactive waste for pick-up. Note our "Radioactive Waste Disposal Guidelines" found in Appendix C-4 and C-5 of our training manual addresses nearly all types of disposal.



**Training**

The training schedule for January - June 1997 is below. The training schedule for October to December 1996 is posted on the Radiation Safety Home Page. The 4-hour training class begins at 12:30 and is at Union South. Check the "Today in the Union" notice upon entry to find the exact room for the training class.

Date	Date	Date	Date	Date	Date
9 Jan	7 Feb	3 Mar	3 Apr	2 May	6 Jun
15 Jan	13 Feb	14 Mar	9 Apr	8 May	12 Jun
21 Jan	19 Feb	20 Mar	15 Apr	14 May	18 Jun
27 Jan	25 Feb	26 Mar	21 Apr	20 May	24 Jun
				27 May	



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