

RADIATION SAFETY NEWSLETTER

UK EH&S, Radiation Safety Office

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RSO Column

Potential Health Hazards from Lead Shielding

A study conducted by Brookhaven National Laboratory shows that uncoated metallic lead, as widely used in radiation shielding, might be a source of occupational lead exposure. The study confirmed that lead is readily removed from the surface of bare metallic lead. Visibly oxidized surfaces produce the most easily removed concentrations of lead. The lead may be airborne (under severe conditions), transferred to the skin or clothing, or accumulate as dust on floors.

The study did show that short-term (< 1 hour/day), infrequent (< daily) contact or handling would not be expected to result in exposures exceeding the OSHA action level of 20 ug/m³. Some of the recommendations made in the study are pertinent to exposure prevention measures however. Some of these have already been put into use by some labs. Recommendations include:

- Wear gloves whenever handling metallic lead.
- Purchase or prepare coated or encapsulated lead whenever practicable. Some suppliers do provide coated lead. There are some coating application products available.

- A simple, durable method used by some is to cover the lead (bricks, lead sheeting) with the omnipresent duct tape.
- Clean work areas around lead shielding regularly, including the floors.



Radiation Safety Awards, Year 2000

Forty-five radioactive material authorized users were presented with Outstanding Safety Achievement Commendations by the UK Environmental Health and Safety Committee. These active Authorized Users did not receive a single adverse inspection citation throughout Year 2000. We can all readily appreciate this special achievement.

- Bob Wilson



Characteristics of Radioactive Materials, Part II

By: Gerald Schlenker, Senior Health Physicist

Physical, Chemical, and Biological Properties of Radionuclides

The fact that a material is radioactive seldom changes its other physical, chemical, or biological properties. For example, a volatile iodine solution remains volatile if it is iodine-131; carbon-14 - labeled methane burns like methane; and ³H labeled glucose is metabolized like glucose. This property is what makes radionuclides so useful for biological tracer studies. Knowledge of this property can be used to the advantage of a radiation protection program.

Some sources are stored in containers that are meant to be opened, to permit the material to be removed. These are called "unsealed" sources. Other types of sources, not designed to be opened, and are appropriately called "sealed" sources. Working with unsealed sources presents a much higher risk of contamination than working with sealed sources. Special precautions must, therefore, be observed.

Sources of Radioactive Material

Radioactive material can be:

- A reactor-produced ("by-product") material,
- B accelerator-produced material, or
- C naturally occurring material.

Radioactive material produced in nuclear reactors (i.e., by the fission process itself or by the neutrons emitted) is called reactor-produced or “by-product” material. By-product material is regulated by the United States Regulatory Commission or an agreement state. Many of the radionuclides commonly used in biological research, ³H, ¹⁴C, ³⁵S, ³²P, ¹²⁵I, ³³P, and ¹³¹I, are by-product materials. Radioactive materials produced by charged particle accelerators are called accelerator-produced materials, e.g., ⁶⁷Ga, ²⁰¹Tl, and ⁵⁷Co.

A naturally occurring radioactive material is any radioactive material that occurs naturally on earth. All naturally-occurring radioactive material is regulated by each state, with the exception of the following which are regulated by the United States Nuclear Regulatory Commission: “source” material (uranium and thorium, and ores that contain greater than 0.05% uranium or thorium by weight) and “special nuclear materials” (uranium enriched in ²³⁵U or ²³³U). A good example of state-regulated naturally occurring radioactive material is radium-226.

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When Shipping Radioactive Materials Contact the Radiation Safety Office

The Radiation Safety Office has trained staff members in current regulations to assist researchers with any shipment of radioactive materials. Failure to meet all the requirements can



result in substantial fines from the U.S. Department of Transportation or Nuclear Regulatory Commission.

In May of this year, a Texas university received notice of a potential fine. A shipping container containing short-lived radionuclides was not properly secured and closed. Any actual fine the university may receive will be minor compared to the associated negative publicity, loss of credibility and potential liability in the future.

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Radiation Fun Facts

By: Fred Rawlings, Assistant Director

The exposure rate at the Security Gate of the Crystal River (F1) Nuclear Power plant is **lower** than the exposure rate at the Security Gate of the Coal Fired Unit at the same site. Natural Isotopes found in the Coal in the huge storage pile give off more radiation to the public than the shielded containment building (Also, the familiar cooling tower is only for the Coal Fired Unit. The Nuke unit uses a heat transfer unit along a canal, which is not as photogenic. Whenever a local TV crew films, they inevitably set up with the **COAL** unit cooling tower in the background).

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Licensed Operations Inspections

We expect state radiation safety inspections for sure this year, possibly during the summer months. The inspections will include many of the labs. Please be alert to the following key points:

Security – Keep labs locked whenever unattended. Challenge strangers as to business.

Food Items – No food items permitted in labs.

Attire – Wear lab coat, eye protection, closed-toe shoes, gloves (when using radioactivity)



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Meter Surveys

Our training classes have always stressed the importance of meeting the License requirement for a documented Swipe survey every Calendar month. This is not meant to minimize the requirement to document the METER survey each month. Required information includes:

- Background exposure rate in millirem/hour
- Survey Meter Model
- Survey Meter Serial #
- Radiation levels recorded in specific areas (Mapped)
- Person performing the survey

A routine meter survey is the easiest way to maintain good hygiene in the Radiation Lab (except for you Tritium users).

Check Your Meters

All Geiger meters in your lab should be checked prior to each use to make sure that the batteries have adequate voltage. There should be a battery check feature, and it only takes a few seconds to make sure that your meter is OK to use. If the batteries are “dead” or the meter is not working for another reason, the meter must be tagged as “OUT OF SERVICE” to prevent anyone from using it under the assumption that it works.



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Humor

These are actual excuse notes from parents [including original spelling] collected by Nisheeth Parekh, University Texas Medical Branch at Galveston:

- ☺ My son is under a doctor’s care and should not take P.E. today. Please execute him.
- ☺ Dear School: Please ekscuse John being absent on Jan. 28, 29, 30, 31, John has been absent because he had two teeth taken out of his face.
- ☺ Sally won’t be in school week from Friday. We have to attend her funeral.



- ☺ Please excuse Jimmy for being. It was his father’s fault.
- ☺ Please excuse Jennifer for missing school yesterday. We forgot to get the Sunday paper off the porch, and when we found it Monday, we thought it was Sunday.



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