University of California
Environmental Health and Safety Update
SPECIAL TRAINING ISSUE
San Francisco

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SPECIAL TRAINING ISSUES

EH&S is continually looking for ways to provide safety training in an effective manner. We must meet the training requirements of the various regulatory agencies, while minimally disrupting your research schedules. This year, we plan to utilize the EH&S Safety Update newsletter to support training directly. There will be two special editions focused on training - one in June and one in July. In order to comply with the regulations, each employee should read the entire newsletter and sign the back stating they have read the material. At a time convenient for your group, your Department Safety Advisor will answer any questions, provide any laboratory specific information, and assist you as needed in implementing the training concepts. We hope that this will be an effective method for providing training material, and would appreciate your feedback.

RADIATION SAFETY ISSUES

UCSF uses radioactive materials under a Broad Scope, Type A Radioactive Materials License issued by the Radiologic Health Branch of the California Department of Health Services. California is considered an "Agreement State", which means it has a written agreement with the U.S. Nuclear Regulatory Commission (NRC) to regulate the uses of radioactive materials.

The license issued to UCSF has a number of specific terms and conditions which, in essence, constitute our contract with the State regarding the uses of radioactive materials.

The basic requirements for uses of radioactive materials at UCSF are covered during the initial radiation safety training, in the Radiation Safety Training Manual and the Radiation Safety Manual.

The following is intended to be a synopsis of the important elements of the program:

Radiation Monitoring

Radiation monitoring is done to measure the exposure to individuals using radiation. This is achieved by using either Film Badge or Finger Ring dosimeters. The dosimeters are issued monthly. The need for dosimeters is determined by the type and amount of radioactivity used. Consult your Radiation Use Authorization (RUA) Summary Sheet as to whether your laboratory requires wearing dosimeters.

If you are issued a dosimeter, please wear it when working with radioactive materials, store it in a low radiation area when not in use and return it promptly to your laboratory's dosimetry coordinator at the end of each month.

Posting/Labeling

Proper warning signs (the standard magenta trefoil on a yellow background) must be placed in areas where radioactive materials are used or stored. This includes rooms, workbenches, fume hoods, equipment (e.g. incubators), cabinets, refrigerators, freezers, etc. Once the uses have been terminated all signs and labels must be removed or defaced.

Boxes used for delivery of radioactive materials are also subject to this requirement. Once the boxes are no longer needed, you must monitor them to verify that they are not contaminated. If no contamination is found, all signs and labels on the boxes must also be obliterated before being discarded as normal trash. Contaminated boxes must be discarded as radioactive waste.

Security

The State and Federal regulations clearly require that "all radioactive materials be secured from unauthorized removal at all times". This simply means that the laboratory must be kept locked when unoccupied. In addition, all refrigerators and freezers located in the hallways of the Health Sciences East and Health Sciences West buildings must be kept locked when not in use. The security requirements are perhaps the ones to which the agencies are most sensitive. The general approach by State inspectors is that if they can walk into an area and remove any radioactive materials unchallenged, you have failed the security test.

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Laboratory Monitoring

All radioactive material use areas are subject to routine monitoring to determine if there is any contamination. The monitoring is done by use of portable radiation detection instruments (survey meters), and/or wipe testing.
It is recommended that use areas be monitored after each use, the specific method and frequency of contamination monitoring is listed in the RUA. If you discover any contamination, you must immediately decontaminate the area and repeat the monitoring to verify that the area is free of contamination.

Usage Records

Regulation governing the use of radioactive materials requires strict record keeping. The records must include information on the original container, its contents, and details of each usage. At UCSF each vial is delivered with a UCSF Radioisotope Usage Form, which has all the relevant information on the vial completed. This form is to be used for maintaining records of each individual usage. Please be as accurate as you can in registering the amounts used and disposed. The records must also indicate if any radioisotopes were transferred to other laboratories. In these instances, you must also complete a Radioisotope Transfer Form. The form is available from EH&S.

Radiation Use Authorization (RUA)

Each Principal Investigator wishing to use radioactive materials must apply for, and obtain, an RUA from the Radiation Safety Committee (RSC). Upon approval, an RUA Summary Sheet is issued which lists all the authorized users, locations, types and quantities of radionuclides approved. The document also lists the specific conditions of use, such as monitoring frequency and personnel exposure monitoring requirements. Users must become familiar with the terms and conditions of the RUA and abide by them. All changes must be submitted for review and approval by the RSC / EH&S prior to their implementation.

Instruments

Portable survey meters (e.g. G-M Probe) or fixed counting equipment (e.g. Liquid Scintillation Counter (LSC)) are used for measurement and detection of radioactive materials. It is essential that users understand the limitations of each unit. As an example none of the portable survey meters used at UCSF is capable of detecting ^{3}H, therefore, when conducting contamination surveys of ^{3}H the appropriate instrument is an LSC. Similarly a NaI (sodium iodide) probe must be used for detection of ^{125}I.

Portable survey instruments must be calibrated annually, after each repair, or when there is cause to believe the unit is not operating properly. This can be done by EH&S at the Radiation Receiving Lab (L235).

In addition you may verify that the instrument is operating properly by checking against a standard known source of radioactivity.

Each time the survey meter is turned "ON" the users should check the battery level. A low battery will result in erroneously low readings (errors of 40% - 200% have been reported).

One final precaution worth mentioning is the use of saran wrap, or similar materials, to cover the probes. Although this practice reduces the chances of contaminating the probe, it also reduces the efficiency of detection by as much a 50%, thus raising the possibility of contamination going undetected.

DISASTER PREPAREDNESS

California is going to have a major earthquake. The current prediction is a 33% chance of a magnitude 7.0 earthquake hitting the Bay Area by the year 2000, and a 50% chance by the year 2010. The impact at UCSF may range from minor movement of items sitting on shelves to major structural damage to buildings. Earthquakes aren't the only disaster that might befall us - explosions, fires, major storms all are possible.

To minimize the devastating effects of such a disaster, we must plan ahead. At UCSF, each department has an Emergency Action Plan. You should be very familiar with your department's plan. Beyond that, there are many things you personally can do to prepare. We suggest some here; you can certainly think of more.

If there is a major power failure, experts say to plan on up to three days before power is restored! Should a prolonged power failure occur, what will happen to those research specimens in refrigerators, freezers, and incubators? If you keep these appliances closed, most will change temperature only slightly over three days. A full appliance is more temperature-stable than an empty one. Clean, intact door seals are critical for maintaining the interior temperature.

Computers and computer-driven equipment are particularly susceptible

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to power failure damage. Some equipment is designed to "fail safe": it shuts down in such a manner that no damage occurs when the power returns. If equipment is not "fail-safe", make certain you turn switches or circuit breakers off before leaving the laboratory, and perform the proper power-up sequence when you return. Locate switches and circuit breakers now so you can find them quickly then.

If an experiment depends on power cooling for containment of toxic vapors or flammable solvents, stop and deal with the experiment before leaving the laboratory. Make sure the hazardous chemicals are properly contained.

Each laboratory must have an EXIT sign which stays lit during power failures. There may be other emergency lights in your laboratories and offices, check them periodically by pressing the "test" button. If they don't work, they should be fixed now! If you plan to use flashlights, check regularly to see that the flashlights are in the proper place and have working batteries.

What about your research data and records? It's always a good idea to have a duplicate copy of critical data. Computer data should always be backed up. Simply making a duplicate on your hard disk isn't sufficient: if your hard disk crashes, both versions may be lost! Keeping your backup material offsite instead of in your desk drawer is a good idea: consider keeping a complete copy of records at home or at another offsite location. Paper records should be stored away from fire sources and away from chemicals. Make copies of charts, graphs, and any other critical paper data which cannot be replaced. Store copies outside the laboratory - with your computer disks or tapes, for example.

An earthquake can cause chemical containers to fall and break. When breakage occurs, the properties of that chemical become critical. If it is highly flammable or combustible, there may be a fire or explosion which can lead to the loss of the whole laboratory. Other chemicals or reactions between chemicals may give off toxic vapors, and employees may be overcome by those vapors. Improperly stored corrosives may drip onto a key piece of laboratory equipment and damage or destroy it. Segregating chemicals by reactivity, as required by local regulations, is just step one in protecting the work area. Step two requires careful analysis of the best storage location for each reactivity group. Don't store any chemicals on high shelves where they're bound to fall and break. Make certain the secondary storage containers are of sufficient size to hold the contents of the bottles, should they break. If the chemical bottles do break and escape the secondary container, make certain that no equipment or documents are close enough to be damaged. If you are unsure what chemicals should be where, contact your EH&S Department Safety Advisor.

During a disaster, the EH&S Emergency Response Team will probably be handling multiple emergencies - or you may be unable to contact them because your phone isn't working. Everyone in your laboratory should know how to handle basic emergencies. It's a good idea to have spill kits for chemicals and biological materials, and each person should know how to use them. Everyone should also know how and when to use a fire extinguisher. There should be advance agreement within your group about when it's safe to stay in the laboratory and handle an emergency, and when it's prudent to vacate the area. If you vacate the area, you must warn others in your vicinity of the hazards.

One of the most probable scenarios resulting from an earthquake, explosion, or other disaster is broken and falling glass. Windows will shatter, chemical bottles and laboratory glassware can break, computer monitors can fall and break: shards and pieces of glass everywhere! Heavy soled, closed shoes provide much better protection from glass (than sandles, for example). The laboratory coat and safety glasses that you're already wearing offer good protection. Puncture-resistant gloves are a great help in handling anything that may contain glass fragments. Even with the use of personal protective equipment, someone may get seriously cut. It's a good idea that at least one person within your group is well-trained in First Aid; it's an even better idea that everyone be trained in First Aid basics. A well-stocked First Aid kit should be available; assign someone the responsibility of keeping it stocked! Someone could be trapped by falling debris or knocked unconscious. A little training can prepare you to handle such situations. A good source for such training is San Francisco's Neighborhood Emergency Response Training (NERT). Information is available from the Campus Fire Marshal.

The worst disaster scenario that most of us can envision is being stuck at work, away from our family! There are two issues to be considered: 1) what you need to have at work for your own survival and well-being, and 2) what it will take to lessen your anxiety about your family and home!

For you, at work - sturdy shoes and gloves were mentioned before. An extra pair of glasses and a three day supply of your medications are essential. Water is the critical item: there should be adequate potable water (one gallon per person per day) to support everyone in your group for three days. Bottled water is a good solution. Food is important: remember no power means no microwave, no refrigerator, no electric can opener. It can mean no access to food service or a grocery. It's a good idea to keep a supply of canned food in your desk, just in case.

Now, what about your family? What can you do to assure their safety and well-being? Have a home disaster plan, and practice it on a regular ba-

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What's Inside:

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sis. Develop scenarios for a number of likely (and unlikely) events: agree upon where each person will go should they not be able to get home. Make certain everyone has access to emergency phone numbers, including a common point of contact for all family members. Children should know how to and when to shut off gas, power, or water. Prepare a Home Emergency Kit: include food, water, extra shoes and clothing, bedding, sanitation supplies, medications and prescriptions, extra pairs of glasses, first aid supplies, a radio and batteries, tools, and items specific to your family's needs; don't forget pet supplies.

More detailed information on preparing for a disaster, whether at work or home, can be obtained from fire and police departments, PG&E, the American Red Cross, the public library, and the Internet. Planning ahead is key to coping with disasters!

BY SIGNING HERE I CERTIFY THAT I HAVE READ AND UNDERSTAND ALL MATERIALS IN THIS NEWSLETTER:

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