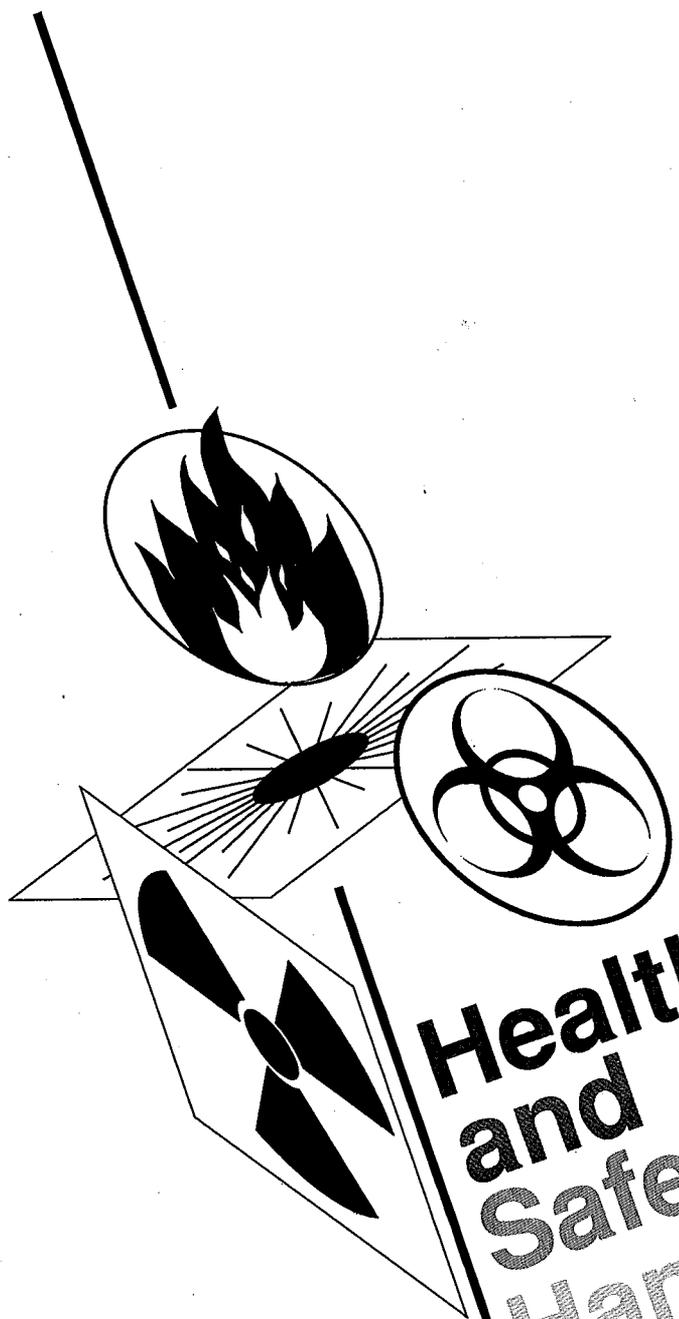


PUB-258 Rev.
May 1990



**Health
and
Safety
Handbook**
Lawrence Berkeley Laboratory

Emergency Numbers

	All Emergencies	Radioactive or Other Hazardous Spill or Leak
LBL On-Site	x7911	x7911
All LBL Off-Site Bldgs. (Donner, Calvin, 901, 934, 935, 936)	9-911	x7911
All Non-LBL Campus Bldgs.	9-911	9-911

Other numbers:

Environmental Health and Safety Department (EH&S)

- General Information x5251
- Environmental Protection x5829
- Industrial Hygiene & Toxicology x5829
- Industrial Safety x5251
- Laser Safety x5829
- Personal Dosimetry x5251
- Radioisotope Control and Transportation x7621
- x5251
- Training x5258
- Waste Disposal and Information x5251
- X-ray Safety x5256
- Medical Services** x6266
- Protective Services - police** x5472
- Fire Department - non-emergency** x6015

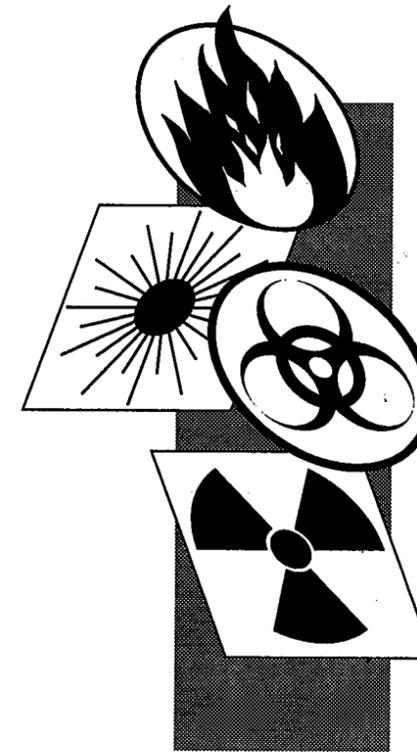
Health and Safety Handbook

Lawrence Berkeley Laboratory

Contents

	<u>Page</u>
Introduction	1
Policy	1
Employee Rights and Responsibilities	2
Training	3
Hazard Signs	4
Hazard Communication (Right to Know)	4
What are the Hazards?	6
Ionizing Radiation	6
Radiological Accidents	9
Chemical Hazards	10
Chemical Spills	12
Biological Hazards	13
Physical Hazards	13
Electrical Safety	14
VDT Workstations	15
Reproductive Hazards	16
Protective Equipment	18
Emergency Preparedness	19
Experimental Safety and Design	19
Hazardous Waste.....	20
Vehicle Safety	21
Resources for Advice and Help	22
Index	24

Introduction



Policy

Employee health and safety are major concerns in all LBL operations and a priority for all members of the LBL community. All Lab employees must be familiar with the hazards presented by their work, the protection that is necessary, safe work practices, and the health and safety resources available to them.

Health and safety hazards at Lawrence Berkeley Laboratory are as varied as the operations you will find here. They range from common industrial hazards presented by shop machinery and motor vehicles to the special hazards associated with research, such as high-voltage electricity, toxic chemicals, radioactive materials, and ionizing radiation produced by the accelerators.

This booklet is designed to give you an overview of the health and safety issues at LBL and the related resources available for your use. Use it as a guide and a resource; telephone numbers for further information or assistance are included at the front of the book, in individual sections, and at the end.

It is the Laboratory's policy to provide a safe and healthful working environment for its employees. It is also our policy to protect property from damage or loss caused by an accident and to prevent any harm to the general public or the environment as a result of the Laboratory's activities.

It is a requirement of employment and a precondition for using Laboratory facilities that every employee, guest, visiting scientist, or contractor working on or off site, must be familiar with, and implement, Laboratory safety standards. Individual divisions may have additional rules and procedures that must also be followed.

Employee Rights

What are my rights? What are my responsibilities?

Employees have the right to work in an environment free from recognized hazards likely to cause death or serious injury.

If unsafe conditions exist, you should first notify your supervisor. If that is not possible or if further help is needed, contact the Environmental Health and Safety Department (EH&S).

- You must be notified of exposures to harmful substances above legal limits.
- You must be given an opportunity to observe monitoring for hazardous substances.
- You must have access to your workplace medical and exposure records.
- You have the right to refuse to work in unsafe conditions or to perform work that would create a hazard for yourself or other workers.

You have the right to file confidential health and safety complaints with the local Department of Energy (DOE) office. You may write a letter, submit Form 5480.4 (available from EH&S), or phone in your complaint to the Environment Safety & Support Department, DOE-SAN, 1333 Broadway, Suite 650, Oakland, CA 94612; (415) 273-7963. Complaints will be investigated promptly, and all information is strictly confidential.

Employee Responsibilities

It is your responsibility to work safely and to prevent harm to the general public and environment. You must observe DOE and LBL safety standards applicable to your work and must report promptly to your supervisor or EH&S any condition that may lead to a violation of these standards. You have the obligation to stop work under unsafe conditions. You must report any injuries received on the job to your supervisor and to Medical Services. In addition, you are obligated to respond to emergencies by following emergency procedures as detailed on the back cover.

Training

Emergency numbers are also found on the back cover, as well as on the first page of this booklet.

It is the supervisor's responsibility to

- develop safety procedures to protect workers,
- correct hazardous situations in his/her areas, and
- ensure that employees are fully trained in necessary safety procedures.

Where do I get information?

The first step is safety training, which is a joint responsibility of the employee's division or department and EH&S. To assist the departments, general safety education is conducted by EH&S. Your division or department is responsible for conducting job safety, hazard communication, and skills training. The New Employee Safety Orientation is required for all new employees and participating guests within the first month of work.

A listing of EH&S courses is published in the quarterly Health and Safety Course announcement. Supervisors or others planning safety meetings or training may obtain educational materials, audio-visual aids, and advice from EH&S.

Examples of courses that are required in certain cases include

- Radiation Safety
- Respirator Use
- Laser Safety
- Forklift Safety
- Incidental Crane Operator Safety
- Hearing Conservation
- CPR
- First Aid
- Fire Extinguisher Use

Consult the Health and Safety Manual (PUB-3000) for more information on other training requirements.

Hazard Signs



Signs alert you to the nature and level of the hazard and the protection required (safety glasses, ear protection, etc.) in the area. For example, signs will indicate the presence of radioactive materials, high-voltage electricity, lasers, carcinogens, biohazards, or magnetic fields.

Danger indicates the presence of an immediate danger, requiring special precautions to ensure employee safety. For instance, high-voltage electricity requires a *Danger* sign.

Caution warns against potential hazards or indicates safety practices. These signs indicate a possible hazard for which proper precautions must be taken, for example, the *Caution* signs in an Eye Hazard Area, where safety glasses must be worn.

Notice is used to provide general instructions or information related to safety. Dosimeter areas for radiation workers are indicated by *Notice* signs.

Signs are available from both EH&S and Stores.

Hazard Communication

The Hazard Communication Standard (also known as the Right to Know law) required by DOE and the Occupational Safety and Health Administration (OSHA), mandates that all employees must be provided with health and safety information necessary to protect themselves against dangerous exposures.

A hazardous substance is any chemical or material that can harm your body either at the time of exposure or later.

LBL's required Hazard Communication Program includes these components

1. Hazard Identification

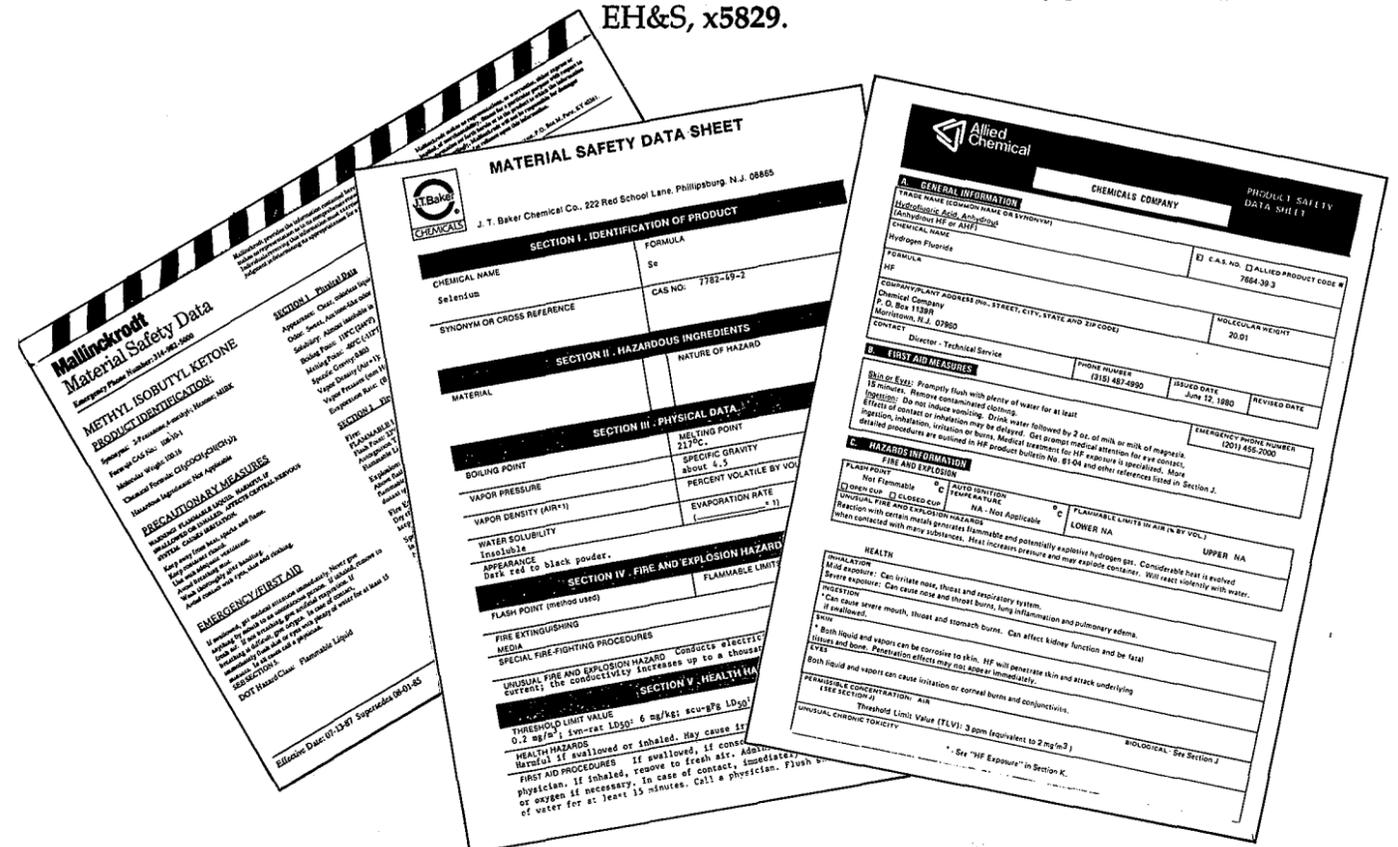
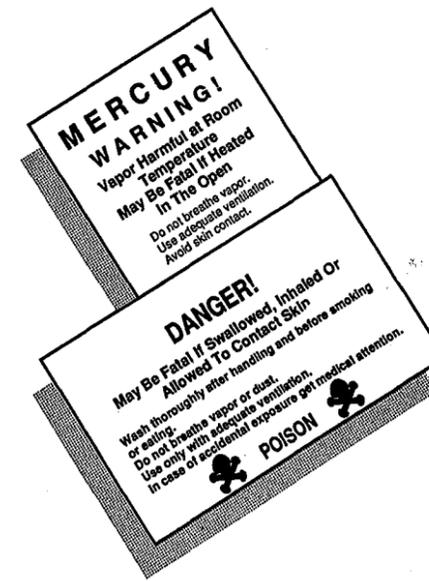
Your supervisor must identify potentially hazardous substances and processes in her/his areas and maintain a list indicating the physical, chemical, and biological hazards of each.

2. Labels

Your supervisor must ensure that all hazards are properly labeled. Labels are your first source of information for toxic substances. A label must include the name of the material and hazard warnings necessary for employee protection. You must read and understand the labels of all materials with which you work.

3. MSDSs

Material Safety Data Sheets (MSDSs) are technical bulletins that describe the physical properties and health effects of chemicals and chemical products, as well as the protective measures, safe handling, and emergency response required for their use. They are your main source of information on chemical hazards. Manufacturers of chemical products are required by law to provide MSDSs to those purchasing their products, and your supervisor must make these MSDSs available to you. Ask her/him where to find copies of MSDSs for chemicals that you use. Data sheets are also available from the Industrial Hygiene Group at EH&S, x5829.



4. Training

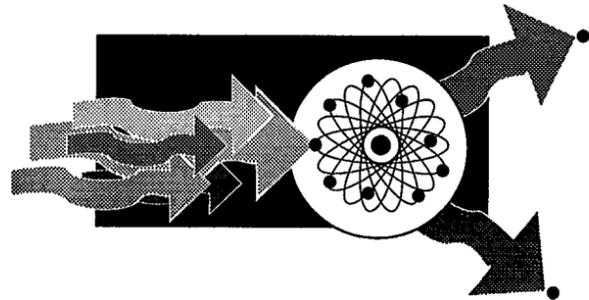
You must be given hazard-specific training that covers identification, control, and emergency procedures. Your supervisor must ensure that this training is given to all employees who work with hazardous substances and must ensure that the information is updated whenever a new hazard is introduced into the work area.

What are the hazards?

Hazards fall into the following categories: physical, chemical, or biological. In describing hazards it's important to stress that hazards are only a *potential* problem. The presence of a hazard does *not* mean you will experience adverse effects. The Lab has an excellent safety record, which we are committed to maintaining and improving.

Ionizing Radiation

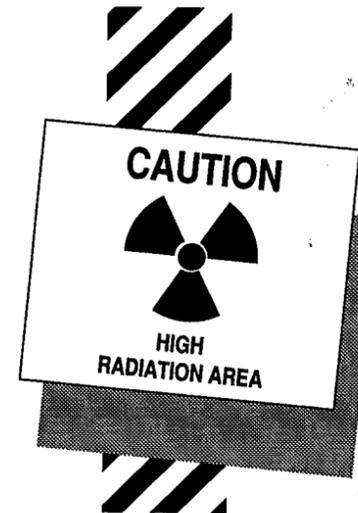
Employees often have questions about their exposure to ionizing radiation at LBL. Ionizing radiation is the high-energy waves or particles that change the structure of atoms when they interact with matter. This interaction produces ions.



are atoms or molecules that have had electrons added or removed and, consequently, are unstable and highly reactive. Ionizing radiation produces molecular changes in living tissue that can lead to cell injury or death. If the exposure is large enough to cause damage to many cells, effects can include skin burns, genetic damage, or massive acute illness. Radiation exposure can also cause cancer. The exposure limits described on page 8 have been set to minimize this risk for workers; in fact, with

these exposure limits the cancer risk for radiation workers is about the same as it is for the general public.

There are several sources of ionizing radiation at the Lab: particle accelerators, x-ray units, and, to a lesser extent, electron microscopes, all of which emit radiation when in operation. Radioactive materials such as radioactive sources, irradiators, and radionuclides used in labs, are constant sources of radiation.

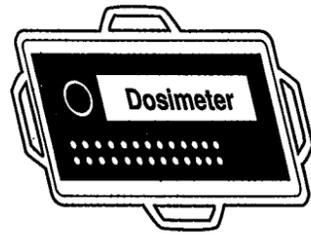


Signs are posted throughout radiological areas warning of any hazard that may exist. In *Controlled Areas* there is the potential for radiation exposure. Only those people with business in a Controlled Area should enter. Within Controlled Areas there are *Radiation Areas*, *High Radiation Areas*, and *Very High Radiation Areas*, which have increased levels of radiation hazard and increased safety features, including interlock systems, to protect personnel. Locked gates and other barriers restrict entry into both *High Radiation* and *Very High Radiation Areas*. Be sure you know the radiation level before entering radiological areas, and do not loiter; limit how often you pass through these areas and find other routes when possible. Radiological areas are clearly marked with signs, and when necessary, with flashing red lights and physical barriers to entry.

Protection From Harmful Radiation

Protection from harmful radiation centers on three principles: time, distance, and shielding. *Time* – the less time you are exposed, the lower the dose. This is why you should not loiter in Radiation Areas. Observe any time limits specified for a particular job. *Distance* – the strength of radiation decreases sharply as you move away from the source. The inverse square law says that if you double your distance from a point source you decrease your exposure to one-fourth. *Shielding* – different types of shielding are used to absorb different kinds of radiation; shielding is set up to protect those working with or near radiation. All of LBL's particle accelerators are well shielded, protecting everyone who works in the building as well as all other employees.

Exposure Limits



Federal standards limit the amount of radiation to which workers may be exposed on the job. The **annual whole-body limit for radiation workers is 5 rem, or 5000 millirem** (see below for a definition of rem). Those who are exposed to radiation at LBL are monitored in the Personal Dosimetry Program. Exposure readings at LBL have always been well below the limits. If you will be working with radioactive materials or in radiological areas, you will receive a personal dosimeter and/or you will be included in the bioassay program. In addition, you must receive radiation safety training.

All means of protection must be employed to keep exposures As Low As Reasonably Achievable. This principle, known as **ALARA**, is central to LBL's health and safety policy and is mandated by the Department of Energy. ALARA requires that we always minimize exposure to radiation because all radiation exposure carries some risk.

Radiation Dose Equivalent

Radiation dose equivalent is expressed in *rem*^{*}, or *millirem* (1/1000 of a rem). These terms stand for the dose of radiation to a person, and they take into account both the absorbed dose of radiation and type of radiation. Different types of radiation have different abilities to cause biological harm. It is important to remember that everyone on earth is exposed to natural background radiation from cosmic rays and from radioactive elements in the atmosphere, rocks, soil, and building materials. Any medical or dental x-rays add to this dose. Occupational exposures are in addition to this total background dose. As mentioned above, the yearly limit for radiation workers is 5000 millirem. The actual doses received by LBL workers are, in fact, much lower than these limits.

Radiation Dose Equivalent

	<u>millirem</u>
Yearly whole-body limit for radiation workers	5000
Limit for pregnant workers, 9 months**	500
Background radiation – yearly average in U.S.	300
Average yearly exposure at LBL	25

* rem stands for roentgen equivalent man.

** See pages 16-17 for more information on reproductive effects.

Radiological Emergencies/Accidents

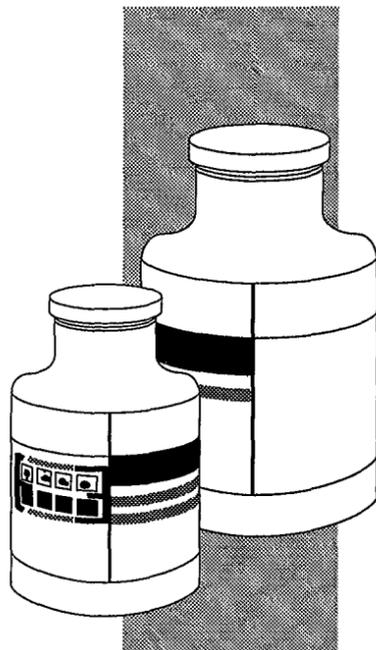
Any radiological emergency must be reported immediately by calling **x7911** from all LBL buildings or **9-911** from all other locations.

In the event of a radioactive spill

- Evacuate all personnel from the immediate area and keep involved persons in a safe area until they are monitored by EH&S.
- Quarantine the contaminated area. Prevent anyone from entering the area until emergency response personnel arrive. To avoid spreading additional contamination, prevent exposed personnel from leaving the safe area.
- Preserve the scene of the accident.
- Call EH&S at x5251 (x6015 during off-hours) and inform them of all pertinent facts of the incident.
- Assist, as requested, in the accident investigation.

In case of an accelerator beam-line accident, stop the operation and retain any exposed personnel, who must be monitored as quickly as possible. Call x7911 immediately.

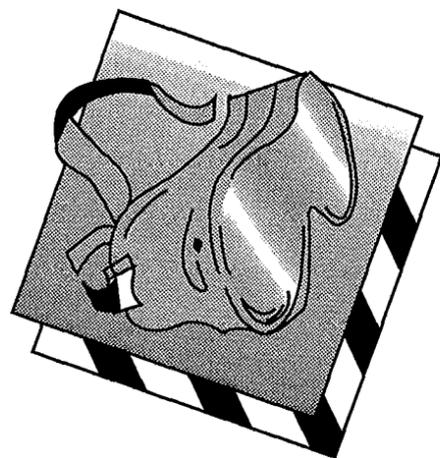
Chemical Hazards



A chemical is considered hazardous if it has flammable, corrosive, reactive, pyrophoric (ignites spontaneously on contact with air), or toxic properties. Examples are solvents, acids, and carcinogens. Labels should identify the nature of the hazard. The toxic effects of chemical exposures will depend on several factors. These factors are

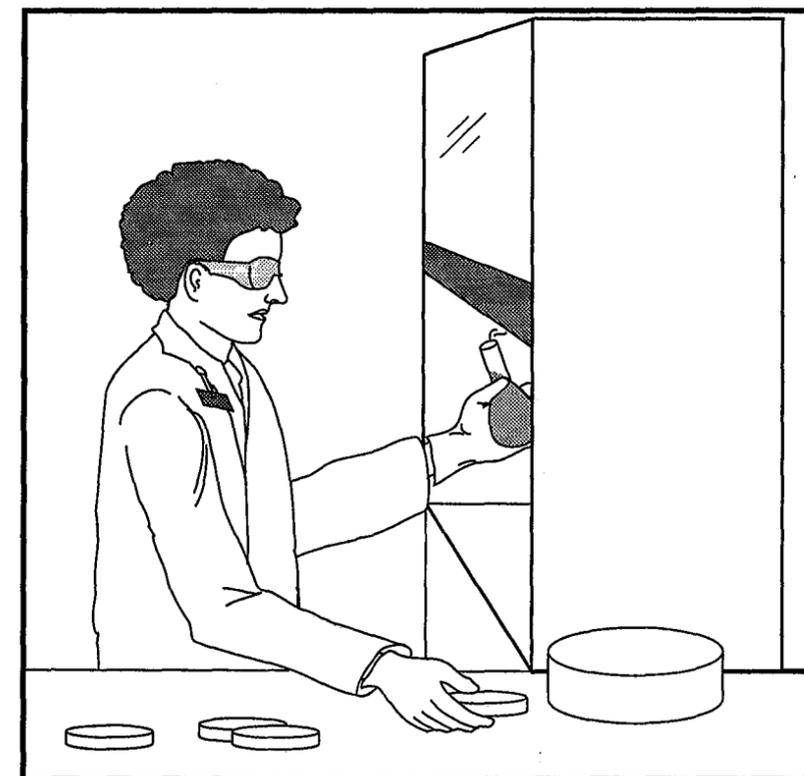
- Toxicity – the extent of harm the chemical can cause;
- Dose – the amount of the substance to which you are exposed;
- Duration - how long the exposure lasts (*acute* exposures are short and usually high-dose, whereas *chronic* exposures are long-term, usually low-dose);
- How the exposure occurs, or route of entry (inhalation, skin absorption, ingestion);
- Individual susceptibility;
- Combination of exposures – the effects of multiple exposures may be greater than any one alone. This is called *synergism*.

Guidelines for working with chemicals



1. Identify the substance and learn how to use it safely. To find out, read signs, labels, and MSDSs (see page 5), and talk to your supervisor or EH&S. Other resources are listed at the end of this booklet.
2. Always use the recommended protective clothing and equipment for the job (e.g. gloves, safety goggles, lab coats) and appropriate special safety procedures. Remember, an accident can occur at any time.
3. Prevent accidental ingestion of chemicals. Wash your hands frequently and after final use for the day. Never eat, drink, or smoke in the vicinity of chemicals.
4. Keep your workplace clean and uncluttered. Follow good housekeeping practices.

5. Store chemicals properly. Incompatible chemicals should be kept away from each other. Keep flammables in special cabinets and containers.
6. Keep a set of spill kits on hand (available from stores for flammables, acids, and caustics). Be prepared for an emergency by reading the instructions.
7. Always look for safer substitutes and use them whenever possible.
8. Never pour hazardous liquids down the drain. Arrangements for the disposal of properly labeled and packaged hazardous chemicals and chemical wastes are made through EH&S at x5251. See page 20 for information on proper waste disposal.
9. Know what to do in an emergency. See the back cover for emergency procedures. Know where the eyewash station and emergency shower are and take a class in fire extinguisher use.



Chemical Spills

Proper handling of chemical spills depends on the nature and amount of the material spilled. You may be able to clean it up yourself, or you may need to call EH&S for assistance. General guidelines are:

First, consider the potential hazards of the material. Do you have the proper protective equipment for handling it? Can you clean it up without risking a dangerous exposure?

Second, consider the amount of material spilled. Can you clean it up quickly and thoroughly?

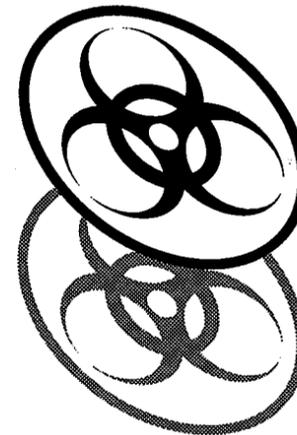
If you determine that you can clean it up safely and completely, use the appropriate spill kit, either for flammable solvents, acids, or caustics. Make sure a set of spill kits are available in your lab. Read the instructions inside the kit.

The bottom line on spills is this: if the spill has potential for environmental or personal harm, or can spread through air, water, or personal contamination, **call x7911 for assistance**. Whether you clean it up yourself or call for help, notify your supervisor.

Don't hesitate to call EH&S at x5251 with any questions regarding spills.



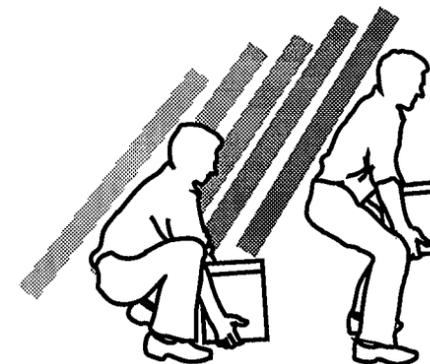
Biological Hazards



Biohazards, in the form of infectious agents, can be found in some labs on the Hill, in the Donner and Calvin labs on campus, and in Building 934. Infectious agents are those substances capable of transmitting pathogens to humans. Only authorized employees can enter areas where these agents are present. Employees who work with infectious agents must receive further information and training from their supervisors about specific infection-control precautions to follow.

Anyone working with blood or blood products must contact the Medical Services Department for inclusion in the Hepatitis B program. This program includes monitoring and immunization to protect against Hepatitis B infection.

Physical Hazards

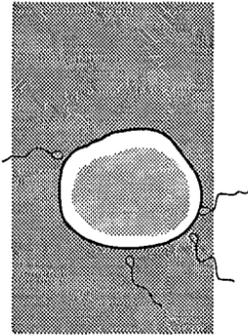


Some safety hazards are common to everyone. Slips, trips, and falls can affect any worker at the Lab, including office workers, researchers, technicians, and tradespeople. Back injuries and other strains and sprains are the major cause of injury and lost work time at all workplaces, including LBL. Lifting properly and keeping in good physical shape help to prevent debilitating back problems. Do not exceed your physical limitations. No one knows your capabilities better than you do. Ask for assistance when necessary.

Good housekeeping practices are part of a comprehensive safety program and are everyone's responsibility. Good housekeeping means keeping work areas and hallways free of clutter and arranging for prompt removal of hazardous waste, discarded chemicals, and equipment. Everyone needs to be aware of the safety risks around them and take steps to prevent injury.

Examples of other physical hazards are noise, high-pressure systems, microwaves, high-voltage electricity, and lasers. Protection from these hazards is generally provided through training, safe work practices, protective equipment, and engineering controls such as safety interlocks. For instance, where high-voltage electricity, high-pressure systems, compressed gases,

Reproductive Hazards



Exposure to some hazardous substances can pose reproductive hazards to *both men and women*. Examples include heavy metals, anesthetic gases and other organic compounds, and ionizing radiation. Such substances can affect sperm and ova (eggs). Relatively little is currently known about the specific connections between these kinds of workplace exposures and reproductive effects, including effects on the developing fetus.

Reproductive Effects in Men

Because most people think only of pregnancy when discussing reproductive hazards, men may have the impression that their reproductive health cannot be compromised by exposure to toxic substances. However, some toxic exposures can affect men's reproductive abilities. Possible problems for men include temporary or permanent sterility or reduced fertility, in addition to changes in the genetic material of the sperm that can be passed on to offspring. In addition, toxic agents can affect reproduction by reducing libido or causing impotence.

Reproductive Effects in Women

A woman's reproductive system can also be affected in several ways. An ovum (egg) can be damaged before fertilization, or hormonal changes can affect menstruation, implantation of a fertilized egg, or the development and functioning of the placenta.

Radiation and Fertility

There is no measurable effect on male or female fertility due to low-level radiation exposures such as those received at LBL. Extremely high, single-dose exposures can cause sterility, but these exposures are not a realistic risk for the LBL workforce. A developing fetus, however, may be affected by relatively low exposures; see the box on Pregnancy on the following page.

More Information on Reproductive Health

If you would like more information on reproductive health issues, two very good booklets are available from Medical Services: *Pregnancy & Radiation* and *Reproductive Health: Effects of Chemicals and Radiation on Fertility and the Unborn Child*. In addition, feel free to talk to a member of the medical staff regarding any specific questions you may have about exposure to toxic substances, either at work or at home, or other reproductive health issues. Medical Services can be reached at x6266.

Pregnancy

The developing fetus is particularly sensitive to exposure to radiation or toxic substances. If you work with ionizing radiation or toxic chemicals and you are pregnant, or planning to become pregnant, talk to the Medical Services Department as soon as possible. You can then discuss the hazards associated with your job. For instance, there are special radiation-exposure limits for pregnant women; see page 8. If necessary, changes will be implemented to avoid harmful exposures. These may include reducing the amount of time you're exposed, increasing shielding in the case of radiation, or changing job duties temporarily. LBL will make every effort to accommodate your wishes in this respect. Remember, the first three months of pregnancy are the most crucial for the developing fetus, so consult Medical Services as soon as possible.

How can I protect myself?

You must use protective equipment to guard against special hazards in many locations and for certain job assignments. The Lab provides the following equipment to employees free, or at a reduced price.

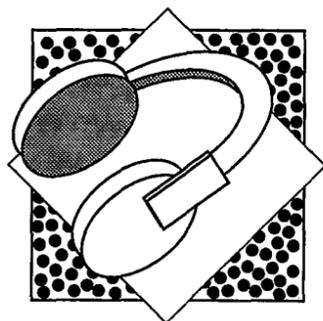
Safety Glasses

All LBL personnel are eligible for free safety glasses. Nonprescription and prescription glasses are available at Medical Services, Building 26. Call x7378 for an appointment.

Safety Shoes

The Laboratory will furnish safety shoes to employees whose jobs require foot protection. Other employees may purchase safety shoes and boots at reduced prices, which may be deducted from paychecks. Ask your supervisor for more details. Safety shoes are available from a shoemobile at the Lab once a month; you can find the schedule in the "Calendar" section of *Currents*, the Lab's weekly newspaper.

Ear Protectors

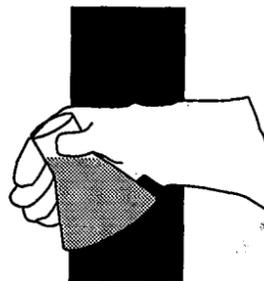


Respirators

If you are exposed to noise above harmful levels (85 decibels for an eight-hour day), you must participate in the Lab's Hearing Conservation Program. This includes the use of ear protectors, such as ear muffs or ear plugs, medical monitoring, and training. The Industrial Hygiene Group provides noise monitoring, evaluation, and training. Medical Services issues ear plugs; ear muffs are available from Stores, Building 7, x5268.

In some cases, you must use respirators to protect yourself from exposures to dust or organic vapors. The Industrial Hygiene Group conducts monitoring, helps determine when respirators are necessary, and provides respirators and required training. Call x5829.

Gloves



Other Safety Equipment

When working with chemicals, be sure to use the correct type of gloves. The material of construction should be matched to the chemical being used to ensure that you are getting the proper protection. Gloves are available from Stores. Information on different types of gloves is available from Industrial Hygiene; check with them first, since Stores may not have all glove types in stock.

Standard safety equipment such as hard hats, face shields, and ground fault interrupters is available from Stores. Some jobs may require specialized protective equipment, such as a safety harness. If you need specialized equipment, contact EH&S for assistance.

What else should I know before I start?

Emergency Preparedness

Each building has an evacuation plan and emergency response team, which is headed by the building manager. The building emergency response team will coordinate the evacuation and other primary response actions in the event of an emergency. Become familiar with evacuation routes and assembly areas for your building(s). Look around and note the location of exits, fire extinguishers, emergency showers, and eyewashes and memorize the emergency numbers listed on the back cover of this booklet.

Experimental Safety and Design

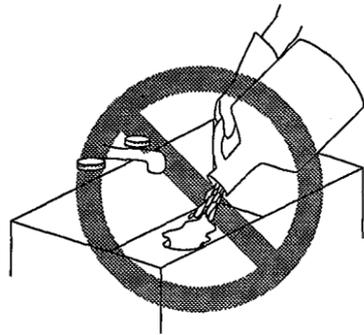
Researchers must ensure that all experiments have been evaluated for hazardous operations. Refer to the Health and Safety Manual (PUB-3000) for information on required standards and recommended practices. Consult with EH&S or the appropriate subcommittee of the Lab's Safety Review Committee to determine if an Operational Safety Procedure (OSP) must be prepared. Be certain that all quality-assurance issues have been addressed. In addition, the researcher must re-evaluate the safety aspects of the operation any time procedures or equipment are modified.

Transportation and Disposal of Hazardous Materials

Waste

Radioactive sources may not be moved between buildings or off the Hill except by EH&S. They can be reached at x5251. Check first with EH&S before transporting any other radioactive materials.

All hazardous wastes, including chemicals, radioactive materials, and contaminated equipment, must be disposed of in a way that prevents injuries to yourself, other employees, the general public, and the environment. All Laboratory employees and guests must follow EH&S guidelines for waste disposal. If you adhere to the following rules and guidelines, you'll be in compliance with EH&S, state, and federal regulations covering the disposal of waste posing physical, chemical, or biological hazards.



Never pour hazardous liquids down the drain or put hazardous materials in the trash.

- Glassware, razor blades, and other sharp materials should be sealed in protective containers such as ice cream cartons before being placed in the trash. Place large items directly in outside dumpsters. Radioactive needles and pipettes must be sealed in ice cream cartons and given to EH&S for disposal. All other needles and pipettes must be put in special red "sharps" containers, available through Stores. Sharps containers must be picked up by a licensed infectious-waste hauler for disposal.
- To discard infectious waste, including glassware used to examine or test for biological materials, autoclave or chemically disinfect it first. Remove traces of chemicals from glass or plastic containers by rinsing or neutralization. Infectious waste is not handled by EH&S; it must be picked up by a company licensed to dispose of infectious waste.

Vehicle Safety



In Case of Accident

- You must identify, label, and package hazardous waste according to guidelines available from EH&S. Make every attempt to identify waste chemicals. EH&S will accept unlabeled waste, but may charge the user for analysis.
- Radioactive waste must be placed in approved containers (available from EH&S), labeled, and identified.
- Arrange for disposal of all hazardous materials by calling EH&S. They handle chemical and radioactive waste.

Make every effort to minimize the generation of hazardous waste. Avoid accumulating chemicals. Only order necessary amounts. Use safer substitutes whenever possible and request frequent pick-up.

The maximum speed limit at LBL and on the UC Berkeley campus is 25 mph. However, the hilly terrain, wildlife, and frequent hazardous conditions such as road repair, wet weather, poor visibility, and pedestrian traffic, often require even lower speeds. Drive carefully.

Park only in designated areas and **do not** block areas needed by emergency vehicles. City of Berkeley parking and traffic tickets are issued by the LBL Protective Services Department.

All accidents involving a vehicle used on LBL business must be reported to Protective Services (x5472) by the driver or, if the driver is unable to do so, by another employee with knowledge of the accident. A printed form for accident reporting is in the glove compartment of each official vehicle. As with any insurance matter, do not admit responsibility for an accident.

Operation of Special Purpose Vehicles

Training and certification, available from EH&S, is required before operation of special-purpose vehicles, such as earth-moving equipment, forklifts, and mobile cranes.

Where can I find more information?

Environmental Health & Safety x5251

The Environmental Health and Safety Department is a multidisciplinary group that can help you with all of your health and safety needs. EH&S personnel provide oversight, technical guidance, and monitoring in the fields of radiation safety, occupational safety, industrial hygiene (which includes chemical and laser safety), hazardous waste disposal, environmental protection, and training. Resources such as videotapes, slide shows, and written materials are also available. Any time you plan to use new hazardous substances, equipment, or procedures, inform EH&S so they can verify that all safety requirements have been met.

The following resources contain necessary health and safety information. Copies of these LBL publications may be obtained from division or department heads or EH&S:

- *Health and Safety Manual* (PUB-3000), a comprehensive overview of health and safety policy and required practices at the Lab;
- *Personal Dosimetry Program* (PUB-256);
- *Pregnancy and Radiation* (PUB-105);
- *Reproductive Health: Effects of Chemicals and Radiation on Fertility and the Unborn Child*, (Lawrence Livermore National Laboratory Publication, available from Medical Services);
- *Supervisors' Guide to Hazard Communication* (PUB-3070);
- *Operational Safety Procedures* (OSPs)—required for certain hazardous equipment and operations (such as accelerators, x-ray units, and lasers). OSPs contain specific rules and procedures for hazardous experiments or equipment.

Medical Services x6266

The Medical Services Department, located in Building 26, provides occupational health services to all employees. These services include new employee physicals, periodic exams, special exams (e.g. eye exams for laser users or medical certification for respirator use), and safety glasses. A bioassay program monitors internal radiation doses for employees who work with certain radioactive materials.

Report all injuries, no matter how minor, to your supervisor and to Medical Services. In addition, you should report any work-related illness or other health conditions to Medical Services; this information will be kept confidential. If you have been absent because of illness or injury for more than five consecutive workdays, you must notify Medical Services to discuss the nature of any disability or work restriction you may have.

If you are injured on the job

- **Go to Medical Services immediately for medical attention.**
- **Be sure to notify your supervisor as soon as possible after the accident or injury; he or she must provide you with a worker's compensation form within one day. If you go to Medical Services for attention, they will give you the form.**
- **Even if your injury is minor and does not require medical attention, it is important to contact Medical Services and inform your supervisor.**

Employee Assistance Program x4300

The Employee Assistance Program (EAP) provides confidential consultation and referral for employees who are experiencing personal problems, such as marital difficulties, depression, or alcohol or drug abuse in themselves or family members. EAP also addresses and helps prevent stressful work situations. Employees can seek assistance, or supervisors can make referrals. **All services are confidential.**

Fire Department x6015

The Fire Department is the first contact in an emergency. They provide 24-hour fire protection and emergency response services, including emergency medical care. They also conduct building inspections for fire safety.

Index

ALARA, 8
Biological Hazards, 13
Chemical Hazards, 10
Chemical Spills, 12
Confidential Health and Safety
 Complaints, 2
Controlled Areas, 7
Courses, 3
Ear Protectors, 18
Electrical Safety, 14
Electron Microscopes, 7
Emergency Numbers, 1, back cover
Emergency Preparedness, 19
Emergency Procedures, back cover
Employee Assistance Program, 23
Employee Responsibilities, 2
Employee Rights, 2
Environmental Health &
 Safety, 22
Experimental Safety and
 Design, 19
Fire Department, 23
Gloves, 19
Hazard Communication, 4
Hazard Signs, 4
Hazards, 6
Health and Safety Manual,
 3, 19, 22
High-Pressure Systems, 13
High-Voltage Electricity, 13
Ionizing Radiation, 6
Irradiators, 7
Lasers, 13
Medical Services, 23
Microwaves, 13
Millirem, 8
MSDSs, 5, 10
Noise, 13
Operational Safety Procedures
 (OSPs), 19, 22
Particle Accelerators, 7
Personal Dosimetry, 22
Physical Hazards, 13
Policy, 1
Pregnancy, 17, 22
Protective Equipment, 18
PUB-3000, 3, 19, 22
Radiation Areas, 7
Radiation Dose Equivalent, 8
Radioactive Sources, 7
**Radiological Emergencies/
 Accidents, 9**
Rem, 8
Reproductive Hazards, 16
Reproductive Health, 22
Respirators, 18
Safety Equipment, 19
Safety Glasses, 14, 18
Safety Shoes, 18
Supervisors' Responsibilities,
 3, 4, 5, 22
Toxicity, 10
Training, 3, 6
VDTs, 15
Vehicle Safety, 21
Waste, 20
Worker's Compensation, 23
X-ray Units, 7

Emergency Numbers

	All Emergencies	Radioactive or Other Hazardous Spill or Leak
LBL On-Site	x7911	x7911
All LBL Off-Site Bldgs. (Donner, Calvin, 901, 934, 935, 936)	9-911	x7911
All Non-LBL Campus Bldgs.	9-911	9-911

In Case of Emergency

In case of fire, explosion, medical emergency, gas leak, or chemical or radioactive emergency, call immediately for help. On the main Laboratory site, known as "the Hill," call extension 7911. For "off-Hill" emergency phone numbers, see above or the back of the LBL Telephone Directory. Give all information requested by the dispatcher.

An injured person should not be moved by personnel unskilled in first-aid treatment unless such action is necessary to save the victim from other serious injury such as a chemical exposure. Stop any serious bleeding and, if necessary, start artificial respiration immediately, before the arrival of emergency personnel.

Evacuate personnel and notify your supervisor or line management immediately.