A Guide to Health, Safety and Environmental Responsibilities for Researchers

Produced by:
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Reviewed By:
Office of Research (OR)
Research Integrated Safety Committee (RISC)

Executive Summary

What is covered in this manual?

Environmental Health and Safety, in collaboration with RISC, has developed this handbook to assist laboratory faculty in complying with University policy, NIH guidelines, AAALAC accreditation and California state and Federal regulations. This handbook is designed to provide information on training requirements, inform readers of their basic responsibilities and direct them to additional information/ contacts.

Who is responsible for safety in the laboratory?

The Principal Investigator (PI) is the faculty member approved to conduct research in an assigned space. The PI has the highest level of responsibility for the safety of staff, students and visitors. When working with chemicals, it is the PI's responsibility to know where to access information about the hazards, understand them, and assure people working in their labs are informed about them.

The PI is responsible for full compliance with the policies, practices and procedures of the University, State and Federal regulations. This responsibility extends to all aspects of research involving all individuals who enter or work in the PI's lab. The PI remains accountable and legally responsible for all activities occurring in the lab even if he/ she assigns aspects of the management to other laboratory personnel or faculty. Documentation of training and compliance with appropriate policies and regulations is essential.

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I. Introduction

A. Integrated Safety and Environmental Management (ISEM)

Activities performed or directed by the University of California, Riverside involve a variety of potential health, safety and environmental hazards. UCR manages these hazards by using the ISEM system. It consists of nine guiding principles and a five step process (Follow-the-Five) that can be used for any activity or task.

ISEM Follow-the-Five Process

1. **Define scope of activity**
    a. **Identify and list activities performed**
    b. **Set expectations**
    c. **Prioritize tasks**
    d. **Allocate resources**
2. **Identify and analyze hazards**
    a. **List hazards**
    b. **Describe hazards**
    c. **Categorize hazards**
3. **Develop and implement controls**
    a. **Identify standards and requirements**
    b. **Identify controls to prevent/ mitigate hazards**
    c. **Develop procedures or processes for safe work**
4. **Perform activity within controls**
    a. **Participants trained**
    b. **Controls effective**
    c. **Safe to perform activity**
    d. **Authorized to perform activity**
5. **Provide feedback and make improvements**
    a. **Collect feedback**
    b. **Identify improvement opportunities**
    c. **Make changes to processes, procedures, behaviors**
    d. **Document changes**

B. Environmental Health and Safety (EH&S)

EH&S works to provide leadership and outstanding services to continuously reduce the risk of injury, illness, environmental damage and loss to the campus community and its neighbors. EH&S provides services in the following areas:

- Biological Safety
- Laboratory Safety
- Radiation Safety
- General workplace safety
- Hazardous materials
- Waste management
- Ergonomics
- Environmental health
- Environmental management
- Emergency preparedness

C. What safety resources are available in your department?

UCR has Safety Partners (www.ehs.ucr.edu/about/safetypartners.html) within each department to work with EH&S on general or laboratory safety and emergency preparedness at the department and building level. There are 4 safety partners with distinct yet complementary responsibilities:

1. Building Supervisor for Emergency Conditions (BSEC)

BSECs lead and coordinate all emergency program activities within their buildings. There should be one BSEC per building whose responsibilities include:

- Participating in emergency preparedness training
- Serving as the building's primary contact for emergency responders
- Gathering personnel and writing status updates from the BES during an emergency

2. Building Emergency Staff (BES)

BES helps support the BSEC with emergency preparedness activities before, during and after an incident occurs. Within a building, there should be one BES per department, per floor. BES responsibilities include:

- Participating in emergency preparedness training
- Assisting BSEC with emergency evacuations
- Communicating damage and victim information to BSEC during an emergency

3. Department Safety Coordinator (DSC)

The DSC facilitates integrated safety and environmental management program activities within a department, with assistance and guidance from EH&S. There should be one DSC per department whose responsibilities include:

- Participating in DSC training
- Coordinating safety and environmental compliance efforts for the department
- Working with BSEC/BES on department emergency preparedness activities

4. Laboratory Safety Officer (LSO)

The LSO is the departmental level point of contact for safety and environmental compliance efforts in research/ laboratories. There should be one LSO per laboratory department whose responsibilities include:

- Participating on LSO committee
- Providing guidance on laboratory safety compliance
- Working with the BSEC/BES on department emergency preparedness activities

II. General Responsibilities and Training

A. Safety Training

There are numerous regulatory requirements that the campus needs to meet to protect the health and safety of employees, students, environment and the community surrounding the campus. Those requirements include training offered by Environmental, Health and Safety (EH&S), where the type of required classes is determined by the work and activities performed.

1. What classes are offered?

All new employees need to complete the General Safety Orientation or the Laboratory Safety Orientation. Additional training is also offered in the following program areas:

- CPR/First Aid
- Ergonomics Workstation Evaluator
- Fire Extinguishers
- Food Safety
- Hazardous Waste Management
- Radiation Safety

Courses will be added throughout the year. For a list, class description and schedule of upcoming classes, please go to www.ehs.ucr.edu/services/training.

2. Where do I sign up for classes?

To register for EH&S classes online, select the “Register for a class” link on the training page: www.ehs.ucr.edu/services/training.

3. Who can I contact for more information?

If you have problems or questions contact the EH&S Training Manager at 827-6303

B. Shipping

1. Why is it important to consider shipping regulations for all shipments?

Many of the recent changes in global politics and scientific discoveries have resulted in increased safeguards and security when shipping all sorts of items. We must be especially careful to accurately identify the contents of any package being shipped from campus properties. Improperly identifying, packaging, and shipping materials can result in citation and costly fines. Materials that seem harmless or that have been shipped off-site in the past with minimal packaging or specific criteria (in some cases even directly from the departments) must now be packaged and shipped by trained personnel.

2. What qualifies as a hazardous material (HM)?

A hazardous material (HM) is any substance that could adversely affect the safety of the public, handlers or carriers during transportation (batteries, fuel containers, cleaning products). HM regulations may apply to commercial products, chemical mixtures, and newly synthesized compounds. There are nine classes of HMs:

Class	Example(s)
1. Explosives	RDX, trinitroglycerine, lead azide, *dry or contaminated* picric acid
2. Gases (flammable, compressed, toxic)	Compressed gases, phosgene, anhydrous ammonia
3. Flammable/Combustible Liquids	ethanol, hexanes, formaldehyde
4. Flammable Solids (spontaneously combustible and dangerous when wet)	pyrophoric compounds, decaborane, potassium, magnesium, sodium metals
5. Oxidizing Substances and Organic Peroxides	ammonium nitrate, sodium peroxide, bleach, potassium permanganate
6. Toxic and Infectious Substances	pesticides, phenol solutions, viruses, bacteria
7. Radioactive Material	P^{32}, C^{14}, S^{35}, I^{125}
8. Corrosives	sodium hydroxide, hydrochloric acid, formaldehyde, bromine
9. Miscellaneous Dangerous Goods	dry ice

3. Who is affected by shipping regulations?

Anyone wanting to send materials off campus is affected by HM regulations. It is critical that UCR personnel first determine if the item qualifies as hazardous. Shipping hazardous material is regulated by numerous governmental and non-governmental organizations. It is a violation of federal regulation for a person to submit a hazardous material for transportation unless it is properly described, marked, labeled, and packaged. Restrictions may also apply for HMs being moved to and from off-site facilities during research activities (depending on material, quantity and type).

4. What training is required for HM Shippers?

Training every three years is required to legally package and ship hazardous materials. All shipping of hazardous materials, as defined by regulatory agencies or shipping companies, must meet the comprehensive requirements imposed by all organizations below.

- International Air Transport Association (IATA)
- US Department of Transportation (DOT)
- International Civil Aviation Organization (ICAO)
- California Highway Patrol (CHP)
- US Postal Service (USPS)
- Federal Express (FedEx)
- United Parcel Service (UPS)

5. Why should I care?

In addition to potential public safety implications, each violation of the regulations may result in five years imprisonment and a civil penalty from **$**30,000 - $250,000. Persons who willfully violate the regulations may be subject to criminal prosecution with penalties up to $500,000 and/or five years imprisonment.

6. Who can I contact for more information?

Materiel Management and EH&S work together to provide HM shipping resources. Visit the Receiving/ Shipping web site at www.matmgmt.ucr.edu/receiving/index.php?content=hazmat/index.html

C. Emergency Procedures

An emergency can be anything that significantly disrupts daily activities (a lab fire, power outage, chemical spill, earthquake, or public disturbance).

1. What is UCR's plan for any emergency on campus?

UCR has emergency procedures at www.ehs.ucr.edu/forms/emergencyprocedures. The procedures have instructions that include but are not limited to: what to do in case of earthquakes, explosions and contamination.

2. Where can I get additional Emergency Preparedness information?

- ***Before an emergency:*** The UCR Environmental Health & Safety Emergency Management website, www.ehs.ucr.edu/services/emergency.html, contains links to the emergency preparedness websites of government agencies. There are also links to the news media, National Weather Service, fire and earthquake information sources, other useful sites, the American Red Cross and other sources from which free emergency preparedness materials may be downloaded
    - Major campus buildings have a Building Supervisor for Emergency Conditions (BSEC) and Building Emergency Staff (BES) to assist with department-level and campus emergency preparedness activities
    - For more information, contact Emergency Management at 827-2609
- ***During an emergency:*** For emergency information concerning UCR, listen to the campus radio station: KUCR 88.5 FM and monitor www.KUCR.org on the Internet. In the Riverside area, KFRG (95.1 FM) and KGGI (99.1 FM) will carry information concerning local emergencies

D. Storage in the Hallways

1. There is a lot of room in the hallway; can I store stuff there?

Contact the Office of the Campus Fire Marshal (827-5528) and obtain approval prior to relocation of materials into exit corridors.

2. For what things can I expect approval?

- No flammable or toxic materials can be stored in the hallway. Combustible materials may be stored but must be contained within metal cabinets that have tight fitting doors and can be securely locked
- All materials must be placed only on one side of a corridor and may not encroach into the required exit width as determined by current building codes
- All materials must be anchored in accordance with Policy 425-15, related to seismic bracing, to not impact emergency exiting during or after an earthquake. Departments shall contact Physical Plant and coordinate security of fixtures within 10 working days.

3. Who can I contact for more information?

Fire Marshal at 827-5528 or www.ehs.ucr.edu/fire

E. Ergonomics

1. What is ergonomics?

Ergonomics is the "science of the relationships between the worker and his/her work". It can be used to prevent injuries due to repetitive motions, unchanging and/or poor postures when seated, kneeling, or standing and forceful motions or grips on objects.

The same pro-active injury prevention precautions true in computer use in an office can be used in a lab environment. For example, purchasing a good lab stool or adjustable keyboard appropriate to the type of workstation that you have, modifying equipment such as using extendable eye tubes and/or variable height adapters or bench mounted armrests for a microscope or modernizing pipettes with more modern technology to reduce force will be helpful.

To avoid injury: change tasks frequently, keep everything close to your body to avoid excessive reaching, use good posture, avoid leaning on sharp edges, use foot support, and be aware of and apply good ergonomic practices for every activity.

2. How can I receive a workstation evaluation?

Go to www.ehs.ucr.edu/about/dsc.html to identify your Department Safety Coordinator and contact your DSC. He/she will do an initial evaluation if they have been trained. If your DSC has not been trained to perform an evaluation you can request assistance from EH&S or the Campus Disability Coordinator by completing and submitting the Workstation Evaluation Form request found at this website www.ehs.ucr.edu/services/ergonomic.html

Laboratory ergonomics information can be found at www.ehs.ucr.edu/services/ergonomic.html and www.cdc.gov/od/ohs/Ergonomics/labergo.htm (Self assessment)
www.bayoptical.com

3. Who can I contact for more information?

Ergonomics Lab at 827-6315

III. Biological Use Responsibilities

A. The Institutional Biosafety Committee

1. What is the Institutional Biosafety Committee (IBC)?

The IBC is a group of faculty and staff appointed by the Chancellor to review and approve potentially biohazardous lines of research. IBC's were originally established under the NIH Guidelines for Research Involving Recombinant DNA Molecules to provide local, institutional oversight of nearly all forms of research using recombinant DNA. The role of the IBC has been expanded to include review and oversight of a variety of experiments that involve biological materials (e.g., infectious agents) and other potentially hazardous agents.

2. What research is reviewed by the IBC?

You must have a Biological Use Authorization (BUA) approved by the IBC **before** beginning laboratory research if it involves:

- Infectious organisms (bacteria, viruses, mold, fungi, yeast, parasites, prions, etc. which may cause disease in healthy humans, or significant environmental and agricultural impact)
- Work with human, sheep and primate tissues, fluids, cells, or cell culture
- Recombinant DNA
- Transgenic plants, insects or animals
- Human gene therapy
- Select agents

- Intentional release of recombinant DNA to the environment
- Work with animals known to be potential reservoirs of zoonotic diseases
- All work at BSL2 and higher

3. Who can I contact for more information?

- Biosafety at 827-5528 or www.ehs.ucr.edu/biosafety
- Director of Research Integrity, Office of Research at 827-5535

B. Biological Use Authorization (BUA)

1. What is the BUA?

A Biological Use Authorization (BUA) describes all the work with biohazardous materials to be conducted by a principal investigator (PI), establishes the biosafety containment conditions set by the Institutional Biosafety Committee (IBC), and authorizes the PI to conduct the work.

2. Who has to fill out a BUA?

The PI must submit a BUA.

3. Why must I complete a BUA?

The National Institutes of Health (NIH) requires this authorization if you or the institution you work for receives NIH funding.

4. How do I submit a BUA and how long is it good for?

- A BUA can be submitted at or.ucr.edu/OrPortal/index.aspx
  - After submission, the BUA will be reviewed by the biosafety officer to determine if the BUA requires review by the IBC. If the BUA is exempt from IBC review, it will be approved at Biosafety Level 1 by the Chair of the IBC. All work done at Biosafety Level 2 or higher is reviewed by the IBC
- A new BUA must be submitted and reviewed by the IBC every two years

5. What if I need to change my protocol after it has been approved by the IBC?

You can make changes to your original BUA at the same location submitted and then resubmit to the IBC.

6. Who can I contact for more information?

- For assistance on completing the BUA please contact Biosafety at 827-5528 or www.ehs.ucr.edu/biosafety
- For any other questions, contact the Director of Research Integrity, Office of Research at 827-5535

C. Biological Safety Cabinets (BSCs)

Biological Safety Cabinets are designed to provide personnel, environmental and product protection when appropriate practices and procedures are followed. Three kinds of biological safety cabinets, designated as Class I, II and III have been developed to meet varying research and clinical needs.

1. How often does a BSC need to be certified?

The California Code of Regulations, Title 8, section 5154.2 states that biological safety cabinets need testing after installation, alterations, or maintenance, and at least annually.

2. Who is responsible for having a BSC cabinet certified?

It is the responsibility of the PI to have a BSC certified. Failure to have your BSC certified might result in fines that the Department and/or PI are responsible to pay.

3. How long do I have to keep records of cabinet certification?

The California Code of Regulations, Title 8, section 5154.2 states records of tests performed need to be kept for at least 5 years.

4. How do I get my cabinet certified?

Technical Safety Services has been contracted by UCR to provide this service to the campus. Please call 800-877-7742 to schedule an appointment.

5. Who can I contact for more information?

Biosafety at 827-5528 or www.ehs.ucr.edu/biosafety

D. Bloodborne Pathogens (BBP) and Training

1. What is a BBP?

BBPs are microorganisms present in human blood that can cause disease in humans.

2. Who has to receive training?

Anyone who has the potential to be exposed to BBP. If the answer to any of the following questions is "yes," the employee is at risk of occupational exposure to Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV), and other Bloodborne Pathogens. Does the employee ever:

- Work with animals, such as primates that are infected with Hepatitis B, HIV, other bloodborne pathogens or perform tasks where such animals are housed?
- Work with Hepatitis B Virus, HIV, and other bloodborne pathogens or with preparations, such as liquid solutions or powders containing the Hepatitis B Virus or HIV?
- Handle human blood products such as whole blood, plasma, serum, platelets, or white cells?
- Handle human body fluids such as semen, cerebrospinal fluid, vaginal secretions, joint fluid, pleural fluid, peritoneal fluid, pericardial fluid, or amniotic fluid?
- Handle unfixed human tissue, organs or cell lines? (Tissues and organs soaked in chemical preservatives such as alcohol or formaldehyde are "fixed")?
- Handle blood, blood products, body fluids or unfixed tissues or organs of animals infected with the Hepatitis B Virus, HIV or other bloodborne pathogens?
- Handle sharp instruments such as knives, needles, scalpels, or scissors that have been used by others working with human blood or other potentially infectious materials including human/animal organs, tissues or body fluids infected with the Hepatitis B Virus (HBV), HIV or other bloodborne pathogens?
- Enter areas where other individuals work with human or animal blood, body fluid, tissues, organs that are infected with the Hepatitis B Virus, HIV or other bloodborne pathogens and perform tasks where any of the aforementioned body substances may come in contact with the lab worker's skin, broken skin, or mucus membranes?
- Perform tasks which may potentially result in exposed skin or mucous membranes, coming in contact with human or animal blood, body fluids, organs, tissues infected with the Hepatitis B Virus, HIV or other bloodborne pathogens?
- Clean clinical areas or equipment?
- Dispose of medical waste or soiled laundry?
- Perform first aid where exposure to human blood or other potentially infectious material (OPIM) is possible?
- Clean up spills of human blood or OPIM?

3. Why do I need training?

State law (Title 8, Section 5193: www.dir.ca.gov/title8/5193.html) requires training for anyone working with possible occupational exposure to BBP.

4. How often do I have to attend training?

At the time of initial assignment to task involving the potential occupational exposure to BBP and at least annual thereafter, but only on sections of the BBP standard that have changed.

5. Where can I receive training?

Online training is being developed. Please call Biosafety if you have any questions concerning BBP training.

6. Who can I contact for more information?

Biosafety at 827-5528 or www.ehs.ucr.edu/biosafety

E. Biohazard Spills

1. What do I need to clean up a biohazard spill?

a) An appropriate chemical decontaminant -- in most cases a 10% household bleach solution is a good choice, but bleach will corrode stainless steel if left in contact with it for 30 minutes or more. For human blood and body fluids, iodophors such as wescodyne or any similar is appropriate

b) Materials to absorb liquids after decontamination -- may include paper towels, absorbent lab pads, or special materials designed to absorb large volumes of liquid. Keep in mind the volumes of liquid typically used in the laboratory area when selecting an absorbent

c) Appropriate personal protective equipment -- gloves and a long-sleeve lab coat or gown are always necessary. Facial protection should be considered for large spills and for protection against splatter of the chemical decontaminant

d) A mechanical means for handling broken glass -- may include tongs, forceps, small disposable scoops, sponges, autoclavable dust pans, or any other method that prevents direct contact with the broken glass. Broken glass represents a high cutting danger and should not be touched directly, especially if it is contaminated with a biohazardous agent

e) Biohazard bags, sharps containers, and/or other containers must be available to place the material in for further treatment and disposal

2. How do I clean a biohazard spill?

a) Place dry paper towels on spill then layer a second set of disinfectant soaked paper towels over the spill

b) Encircle the spill with additional disinfectant

c) Decontaminate all items within the spill area

d) Allow at least a minimum of 20 minutes contact time to ensure germicidal action of disinfectant

e) Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures

IV. Chemical Use Responsibilities

A. Chemical Safety

1. What is the Chemical Hygiene Plan?

The Chemical Hygiene Plan outlines the minimum health and safety requirements for the departments/ units that are engaged in the "laboratory use of hazardous chemicals."

2. How can I get a copy of my department's chemical hygiene plan?

Contact your department Laboratory Safety Officer (LSO). A list of departmental LSOs is located at www.ehs.ucr.edu/about/lso.html

3. What is the Chemical Inventory?

- The campus chemical inventory system is maintained through a vendor at http://ucriverside.ecompliance.net . Only persons with a username and password can view the campus chemical inventory or edit the chemical list for their own lab. You can obtain a username and password via the inventory page by clicking on "login", indicating you are a new user, and completing the online form
- New faculty can enter their own chemicals in this site. If you have questions or need assistance using the inventory program or generating your inventory call 827-5528

4. What are the training requirements for chemical and laboratory safety?

Each faculty member must provide people in his or her lab with information and training to ensure that they are informed of the hazards of chemicals present in their work area. As a service to the campus, EH&S offers general training on Chemical Safety, but faculty can create their own area specific training if it meets the standard of the regulatory requirements. Sign up for training at www.ehs.ucr.edu/services/training/index.html

5. What do I need to clean a chemical spill?

Please see www.ehs.ucr.edu/forms/emergencyprocedures for a list of emergency procedures.

6. What should I do when a spill occurs?

Please see www.ehs.ucr.edu/forms/emergencyprocedures for what to do in case of a spill. More specific information is provided during the Laboratory Safety Orientation course

7. How must I store my chemicals?

Chemicals must be segregated and stored by hazard class. The simplest hazard segregation scheme was developed for transportation purposes and is useful for chemical storage (9 hazard classes):

1. Explosives (Division 1)
2. Poisonous Gas (Division 2)
3. Flammable (Division 3); flammable liquid & gas; acidic, caustic & neutral
4. Flammable Solid (Division 4); flammable solid, spontaneously combustible & dangerous when wet
5. Oxidizer (Division 5); oxidizer, organic peroxides & oxidizing gas; acidic, caustic & neutral
6. Poison (Division 6) poisonous liquids, solids & gas; inhalation hazards
7. Radioactive Materials (Division 7)
8. Corrosives (Division 8): acidic, caustic (basic)
9. General Chemicals (Division 9)

It is best to store these major categories separately within the hazard storage area, with sub-categories stored in separate areas/ containers

- All flammable liquids in any single room where the quantity is greater that 10 gallons must be stored in a flammable storage cabinet
- All flammable solids and pyrophoric materials must be stored in a flammable storage cabinet
- All highly toxic and pyrophoric gases must be stored in gas cabinets
- Any flammable materials that need to be kept cold, have to be stored in a refrigeration unit design and approved to store flammables
- It is best to store hazardous liquids within a secondary container or tub

8. Who can I contact for more information?

Laboratory Safety at 827-55289 or www.ehs.ucr.edu

B. Chemical Fume Hoods and other Local Exhaust Systems

1. What is a Chemical Fume Hood?

Chemical Fume Hoods and other local exhaust hoods ("snorkels", "elephant trunks") capture and remove contaminants to prevent overexposure to personnel from chemicals generated within the lab. In addition to proper air volume and velocity for hoods to be effective, proper work practices and procedures must be followed.

2. How often does a hood need to be certified?

At a minimum, EH&S conducts annual certification of all hoods. The California Code of Regulations, Title 8, Section 5154.1 Ventilation Requirements for Laboratory-Type Hood Operations states that the ability of the hood to maintain an inward flow [100 linear feet per minute] shall be demonstrated upon initial installation, repairs or renovations of the facility/ hood/ ventilation system, or the addition of large equipment into the hood.

3. Who is responsible for having a hood certified?

EH&S is responsible for ensuring that hoods are annually certified. Newly acquired or inactive hoods that are to be activated must be reported by the PI to EH&S for inclusion or activation in the tracking database to ensure annual certification.

4. How do I know that my hood is working?

Newer hoods have digital readouts and alarms indicating low air flow. Older hoods may use simple visual indicators such as a strip of thin plastic hanging from the bottom of the sash to indicate inward face velocity. It is required that a means shall be provided at the hood to continuously indicate that air is flowing into the exhaust system during operation.

5. What do I do if my hood isn't working or I'm concerned it isn't working properly?

Contact EH&S at 827-5528 or the Physical Plant help Desk at 827-4214. EH&S works directly with Physical Plant to ensure proper repairs and re-certification as fast as possible.

6. Who can I contact for more information?

EH&S at 827-5528 or www.ehs.ucr.edu

V. Radiation Use Responsibilities

A. The Radiation Safety Committee (RSC)

1. What is the Radiation Safety Committee?

The RSC is a group of faculty and staff appointed by the Chancellor to review and approve requests to use radiation. The RSC was established under regulatory requirements associated with the broad-scope radioactive materials license issued by the California Department of Health Services, but the role of the RSC also includes oversight of other radioactive materials possessed under a general license and oversight of radiation producing machines.

2. What radiation uses are reviewed by the RSC?

If your research involves any of these:

- P32, C14, S35, I125 or any other radioisotopes
- Dental, medical, or veterinary x-ray units
- X-ray diffraction units
- Other sources of ionizing radiation
- Lasers (Class 3b or Class 4), or

- Other sources of high-intensity non-ionizing radiation (Magnets, RF antennas, Microwaves, Ultraviolet Lights)

  You must have a Radiation Use Authorization or Laser Registration Form approved by the RSC before beginning laboratory research

  Exemptions include products containing radioactive material that are exempt from licensing (balances, static eliminators, smoke detectors), products containing uranium and thorium in small quantities, and exempted lasers (pointers and barcode scanners). Small electrical appliances (hair dryers and food microwaves) as well as limited RF sources (handheld radios and cell phones) are also exempt under all normal operating circumstances.

3. Who can I contact for more information?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

B. Radiation Use Authorization (RUA)

1. What is the RUA?

a) A Radiation Use Authorization describes the work with radioactive materials and radiation machines (other than lasers) conducted by a principal investigator (PI). The RUA establishes the radiation safety conditions set by the RSC for the work and will be approved by the RSC if:

   1) The PI and other authorized users are qualified in training and experience

   2) The equipment, facilities, proposed uses and procedures will provide reasonable and adequate assurance of protection to health, life, and property

b) In some cases, the Radiation Safety Officer will provide interim approval until the full RSC is available to finalize the approval

2. Who has to fill out a RUA?

The PI must submit a RUA

3. Why must I complete a RUA?

The RUA must be completed as a condition of the broad-scope license issued to the University by the California Department of Health Services, and as a matter of consistent oversight of all radiation safety issues by the RSC.

4. How do I submit a RUA and how long is it good for?

a) A RUA must be submitted to the RSC via the Radiation Safety Officer (RSO) in Environmental Health and Safety

b) Applications are available at www.ehs.ucr.edu/radiation. After submission, the application will be reviewed by the RSO to determine whether additional information is required and to prepare an analysis and recommendation for the RSC. If interim approval is allowed by the RSO, it will be granted at that time, otherwise approval will occur only after review by members of the RSC

c) A RUA is reconfirmed by the PI in January of every year

5. What if I need to change my RUA after it has been approved by the RSC?

You can make changes to your original RUA with an amendment application from www.ehs.ucr.edu/radiation, and submit to the RSC via the Radiation Safety Officer in Environmental Health and Safety.

6. Who can I contact for more information?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

C. Laser Registration Form (LRF)

1. What is the LRF?

a) A Laser Registration Form describes work with lasers conducted by a principal investigator (PI). The LRF establishes the safety conditions set by the RSC for the work and will be approved by the RSC if:

1) The PI and other authorized users are qualified in training and experience

2) The equipment, facilities, proposed uses and procedures will provide reasonable and adequate assurance of protection to health, life, and property

b) In some cases, the Radiation Safety Officer will provide interim approval until the full RSC is available to finalize the approval

2. Who has to fill out an LRF?

The PI must submit an LRF if the research involves Class 3b or Class 4 lasers.

3. Why must I complete an LRF?

State safety regulations require formal coordination, control, inventory and review to assure safety. The LRF must be completed as a matter of consistent oversight of all radiation safety issues by the RSC.

4. How do I submit an LRF and how long is it good for?

a) An LRF must be submitted to the RSC via the Radiation Safety Officer (RSO) in Environmental Health and Safety

b) Applications are available at www.ehs.ucr.edu/radiation. After submission, the application will be reviewed by the RSO to determine whether additional information is required and to prepare an analysis and recommendation for the RSC. If interim approval is allowed by the RSO, it will be granted at that time, otherwise approval will occur only after review by a quorum of members of the RSC

c) An LRF is reconfirmed by the PI in January of every year

5. What if I need to change my LRF after it has been approved by the RSC?

You can make changes to your original LRF by resubmitting another application from www.ehs.ucr.edu/radiation, which includes only the changes, submitted to the RSC via the Radiation Safety Officer in Environmental Health and Safety.

6. Who can I contact for more information?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

D. Laboratory Requirements for Radiation

1. How do I secure my radioactive materials?

All Radioactive materials (including radioactive waste) must be either secured or under direct surveillance at all times. Security can be accomplished as follows:

a) Irradiators must have security arrangements that are approved through the RSC

b) A device which incorporates radioactive materials and is permanently fixed in place (other than irradiators) is considered secure when the building is occupied or locked

c) All other radioactive materials should be secured by means of a distinct locking device (refrigerators or cabinets that can be locked), separate from the lock on the room door, unless the room itself remains locked when authorized individuals are not present

2. What radiation related supplies do I need for my laboratory?

a) Absorbent material (for work with liquids)

b) Smear sample materials (for work with any dispersible material)

c) Cleaning supplies (moistened paper towels and scouring powder or any commercially available detergent)

d) Protective clothing (gloves, lab coat, shoe coverings)

e) Radioactive step can, sharps containers, or other containers for radioactive waste

f) "Caution – Radioactive Material" tape

g) Yellow notebook to collect radiation safety related records

3. What containment is required for unsealed or dispersible radioactive material?

Requirements for containment are evaluated during the review of the application to use radioactive materials and are based on the Hazard Guide Value (HGV) calculated for the specific procedure being considered and the potential airborne hazard. A full discussion of the containment requirements and the HGV calculation are available in the UCR Radiation Safety Manual, Appendix IV and Appendix V (www.ehs.ucr.edu/radiation/radiationsafetymanual.html & www.ehs.ucr.edu/radiation).

4. What shielding is required?

a) For high energy beta emitters such as P-32, use a material with a low atomic number such as Plexiglas. A higher atomic number material such as lead will actually produce more radiation exposure to individuals than they would have received without any shielding!

b) For gamma rays or X-rays, a high atomic number material such as lead can be used for shielding

c) For low energy beta emitters such as H-3, C-14, or S-35, no shielding is necessary

5. What type of radiation detection equipment is required?

Equipment depends on the energy and type of radiation being emitted.

a) For alpha, beta, gamma, and x-ray emitters a liquid scintillation counter (LSC) can be used

b) For mid- to high-energy beta and gamma emitters (P-32, P-33, C-14, and S-35), a portable Geiger-Mueller (G-M) detector with a pancake style probe can be used

c) For I-125 and other low energy gamma emitters, a thin crystal NaI detector can be used

d) The recommended detector selection for some specific nuclides are:

Nuclide	Detector
H-3	LSC
C-14	LSC
S-35	LSC
P-32	G-M
P-33	LSC
Ca-45	LSC
Cr-51	G-M
I-125	NaI
I-131	G-M

6. What type of personnel exposure badge is required?

a) Some radiation exposures are reduced to the point that personnel monitoring is not required. State regulations require monitoring when a worker is likely to receive (during routine operations or in an emergency) radiation exposures greater than the following:

Area of Concern	Dose
Whole body	0.5 rem/year
Skin of whole body	5 rem/year
Extremities	5 rem/year
Single organ dose (other than lens of eye)	5 rem/year
Lens of eye	1.5 rem/year
Embryo/fetus of a "declared pregnant worker"	0.05 rem/9 months
Minor (individual <18 years of age)	0.05 rem/year

b) Typical operations that require monitoring include work with:

1) X-ray diffraction units
2) Diagnostic X-ray machines
3) Moisture gauges
4) High energy beta or gamma emitters in quantities greater than 1 mCi

c) Typical operations where personnel monitoring is discouraged due to the limitations of monitoring or low potential risk include work with:

1) Electron microscopes
2) Gas chromatograph sources containing H-3 or Ni-63
3) Low energy beta emitters such as H-3, C-14, S-35, or Ca-45
4) Anything where exposure is likely to be less than 10 mrem/ month

7. How do I maintain radiation related records?

Each laboratory or closely related group of laboratories must maintain a notebook (3-ring binder, preferably yellow) containing the following information:

a) Each receipt of a radioisotope (isotope, chemical, and/or physical form, quantity and date of receipt)
b) Each withdrawal of stock from the supply bottle including date, amount, and use
c) Results of required radiation surveys for contamination and exposure rates (instrument surveys and wipe tests)
d) Documentation of training provided in the laboratory to lab personnel
e) Documentation of corrective actions taken for any incident/ accident that involves a major spill or release of a gas, powder, or volatile material
f) Each disposal of radioactive waste
g) Data necessary to demonstrate compliance with any special requirements identified in the specific authorization
h) Additional miscellaneous entries in the notebook can include the addition or deletion of personnel from the project staff, and a record of personnel dosimetry

8. Who can I contact for more information?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

E. Purchase, Receipt, or Shipment of Radioactive Materials or Radiation Machines

1. How do I purchase and receive radioactive materials or machines?

The EH&S Radiation Safety program grants approval of all orders, then each laboratory's purchasing department processes the order. All radioactive material is shipped to UCR EH&S for receipt inspection, survey and delivery to the lab.

2. How do I ship radioactive materials or machines?

The EH&S Radiation Safety program approves and assists with all shipments of ionizing sources.

3. Who can I contact for more information?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

F. Radiation Safety Training

1. Who has to receive training?

The PI and all individuals listed under the RUA or LRF.

2. Why do I have to receive training?

The State of California requires training in order to protect health, life and property. In addition, it is necessary to inform the PI and other individuals listed under an RUA or LRF, how safety functions are carried out at this University.

3. How often do I have to attend training?

a) Initial training is required before radiation may be used under an RUA or LRF

b) Refresher training is required every three years

4. Where do I receive training?

You can sign up, at no cost, for available sessions through the EH&S website: www.ehs.ucr.edu/services/training

5. Who can I contact if I have questions about radiation safety?

Radiation Safety at 827-5528 or www.ehs.ucr.edu/radiation

G. Radioactive Spills

1. What do I need to clean a radioactive spill?

a) Absorbent material

b) Monitoring equipment which is appropriate for the nuclide (e.g. pancake GM, end window NaI Scintillation, Liquid Scintillation Counter, etc.)

c) Smear sample materials

d) Cleaning supplies (moistened paper towels and scouring powder or any commercially available detergent)

e) Protective clothing (gloves, lab coat, shoe coverings)

f) Mechanical means for handling broken glass

g) Radioactive step can, sharps containers, or other containers to place the material in for further treatment and disposal

h) “Caution – Radioactive Material” tape

2. How do I clean a radioactive spill?

Please see www.ehs.ucr.edu/forms/emergencyprocedures for a list of emergency procedures.

VI. Waste Responsibilities

A. Hazardous Waste

1. What is Hazardous waste?

a) Federal and State regulations define hazardous waste as any material that its concentration, quantity, physical, infectious or chemical characteristics (ignitability, corrosivity, toxicity & reactivity) may cause/ contribute to increased mortality/ illness or pose a present/ potential hazard to human health or the environment when improperly treated, stored, disposed or managed

b) Chemical waste is considered hazardous if it is either listed as hazardous waste by Federal/ State regulations or exhibits one or more of the following four characteristics:

- Ignitable
- Corrosive
- Reactivity
- Toxicity

c) Hazardous chemicals that are stored in unlabeled/ mislabeled/ poor condition containers, abandoned or considered hazardous waste

d) Go to www.ehs.ucr.edu/resources/wastedisposalrequirements.pdf to view the Hazardous Waste Disposal Requirements poster

2. How do I collect and store hazardous waste?

At UCR, most work areas are defined as "Satellite Accumulation Areas" (SAA). Up to 55 gallons of hazardous waste or 1 quart of acutely hazardous waste can be generated and stored in SAAs for up to six months, at which point it must be picked-up be EH&S to be recycled or disposed within 90 days. To operate an SAA, your waste containers must be labeled with required information as soon as the first drop of waste is collected. Each lab must register and create labels online at: http://otp.ucop.edu

a) Containers must be in good condition and compatible with the contents

b) Container must be closed when you are not actively collecting waste

c) Do not use food containers to collect hazardous waste

3. How do I dispose of Hazardous Waste?

- The website where you create the labels allows you to select the containers that you want EH&S to pick up. http://otp.ucop.edu If you have questions call 827-5528

4. When should I request a waste pickup?

When the container is 80% full or after 180 days, which ever comes first.

5. Who needs to attend Hazardous Waste training?

Anyone using chemicals in a lab or disposing of chemical waste in any job must attend initial training.

6. Where can I sign up for training?

Register for EH&S training at: www.ehs.ucr.edu/services/training

7. Who can I contact for more information?

Integrated Waste Management at 827-5528 or www.ehs.ucr.edu

B. Biohazardous and Medical Waste

1. What is biohazardous waste?

Laboratory waste including, but not limited to, all of the following:

a) Human or animal specimen cultures from medical and pathology labs

b) Cultures and stocks of infectious agents from research and industrial labs

c) Wastes from the production of bacteria/ viruses/ spores/ discarded live and attenuated vaccines used in human health care or research, discarded animal vaccines (including Brucellosis and Contagious Ecthyma), culture dishes/ devices used to transfer/ inoculate/ and mix cultures

d) Human surgery specimens or tissues removed at surgery/ autopsy that are suspected by the physician/ surgeon/ dentist of being contaminated with infectious agents contagious to humans

e) Animal parts, tissues, fluids, or carcasses suspected by the veterinarian of being contaminated with infectious agents known to be contagious to humans

f) Waste that at the point of transport from the generator's site, at the point of disposal, or thereafter, contains recognizable fluid blood, fluid blood products, containers or equipment containing blood that is fluid, or blood from animals known to be infected with diseases highly contagious to humans

g) Waste containing discarded materials contaminated with excretion, exudate, or secretions from humans or animals that are required to be isolated by the infection control staff, physician/ surgeon, veterinarian or the local health officer to protect others from highly contagious diseases or animal diseases highly contagious to humans

h) Waste that is hazardous only because it is comprised of human surgery specimens or tissues that have been fixed in formaldehyde or other fixatives, or only because the waste is contaminated through contact with/ having previously contained, chemotherapeutic agents, including, but not limited to gloves, disposable gowns, towels, and intravenous solution bags and empty attached tubing

i) Waste that is hazardous only because it includes pharmaceuticals

2. What is medical waste?

Waste that meets the following requirements:

a) Composed of waste generated or produced as a result of any of the following actions:

1) Diagnosis, treatment, or immunization of humans or animals

2) Research pertaining to the diagnosis, treatment, or immunization of humans or animals

3) The production or testing of biologicals

4) The accumulation of properly contained home-generated sharps waste brought by a patient, a member of the patient's family, or a person authorized by the enforcement agency, to a point of consolidation approved by the enforcement agency pursuant to Section 117904 or authorized pursuant to Section 118147

b) Removal of regulated waste, as defined in Section 5193 of Title 8 of the California Code of Regulations, from a trauma scene by a trauma scene waste management practitioner

c) The waste is either of the following:

1) Biohazardous waste

2) Sharps waste

3. How do I dispose of biohazardous or medical waste?

Please see the Institutional Biosafety Committee's policy in the disposal of biohazardous waste and UCR's Medical Waste Plan:

a) Institutional Biosafety Committee's policy: www.ora.ucr.edu

b) Medical Waste Plan: www.ehs.ucr.edu or www.ehs.ucr.edu/forms/medicalwastemanagementplan.pdf

4. Who can I contact for more information?

Biosafety or Integrated Waste at 827-5528 or www.ehs.ucr.edu

C. Radioactive Waste

1. What is radioactive waste?

A type of hazardous waste that includes radioactive materials used in various processes, and supplies/ equipment contaminated with radiation:

a) Empty radioactive stock vials

b) Contaminated tools, pipettes, centrifuges and other research equipment from labs where radioactive materials are used

c) Cleaning cloths, paper towels, bench covers etc., used in an area where radioactive material are present

d) Containers, tubing and apparatus used in an area where radioactive materials are present

e) Washes and rinses of glassware that contained radioactive solutions

f) Used scintillation fluids and vials

g) Waste radioactive solutions

h) Carcasses of animals treated with radioactive materials

2. How do I collect Radioactive Waste?

Radioactive Waste must be segregated between short half-life (less than 90 days) and long half-life, and into appropriate containers at the point of generation according to type as follows:

a) Dry solid radioactive waste - use a labeled stepcan

b) Aqueous liquid radioactive waste – use a labeled plastic carboy

c) Organic/ hazardous liquid radioactive waste – use a labeled plastic carboy

d) Liquid Scintillation vials containing radioactive material – place back into original shipping tray for collection

e) Biological radioactive waste (animal carcasses and tissues) – place in a labeled, sealed plastic bag and refrigerate or freeze if held for more than 24 hours

f) Animal excreta and bedding containing radioactive materials – place in a labeled plastic bag and refrigerate or freeze if held for more than 24 hours

g) Sharps (needles, broken glass, pipette tips) contaminated with radioactive materials – use a labeled cardboard box or other suitable container that will prevent puncture injuries. Do Not Place In Stepcan

h) Source vials and vial shields – Empty source vials may be disposed of as dry solid radioactive waste but any vial shields containing lead must be disposed of as hazardous waste. Unused or partially used source vials should be placed with their vial shield in a small labeled cardboard box

i) Shipping containers and boxes that are empty and free of contamination must have all “Caution Radioactive Material” labels removed or obliterated before being disposed of as regular waste

3. How do I dispose of Radioactive Waste?

- Fill out the on-line form located at www.ehs.ucr.edu

4. When should I request a waste pickup?

Request a waste pickup when the container is 80% full.

5. Who needs to attend Hazardous Waste training?

Anyone generating radioactive waste must attend annually.

6. Where can I sign up for training?

Register for EH&S training at www.ehs.ucr.edu/services/training

7. Who can I contact for more information?

Integrated Waste Management at 827-5528

D. Mixed Waste

1. What is mixed waste?

Whenever two of the three following categories are mixed:

- Chemically hazardous waste

- Biohazardous (and/or medical) waste
- Radioactive waste

2. What are some examples of mixed waste?

a) Radioactive waste containing hazardous chemical waste:

1) Organic liquids (scintillation liquids and vials), organic lab liquids, sludge, cleaning, degreasing, and miscellaneous solvents

2) Heavy metals, such as mercury, lead, uranium, cadmium, etc

3) Acidic components where the pH is less than 5, such as hydrochloric acid, sulfuric acid, nitric acid, etc

4) Basic components where the pH is greater than 9, such as sodium hydroxide, potassium carbonate, amines, etc

5) Biohazardous (or medical) waste

b) Hazardous chemical waste containing:

1) Radioisotopes

2) Biohazards (or medical) waste, such as rodents contaminated with polychlorinated biphenyls

3. Why should I care?

a) If your lab is generating waste that crosses these categories, you must follow all of the rules for collection, storage labeling and disposal for each category. For example, if you use scintillation cocktails made from non-aqueous solvent (xylene is common), then you must label your hazardous mixed waste as a chemical waste and a radioactive waste

b) It costs significantly more to dispose of this waste

4. What can I do?

a) If possible, generate all radioisotope wastes in aqueous solutions with the pH between 5 and 9

b) Use biodegradable scintillation cocktails

c) Avoid mixing any chemically hazardous waste with radioactive waste

d) Keep a running log of the materials you discard into any radioactive waste container

5. Who can I contact for more information?

Integrated Waste Management at 827-5528 or www.ehs.ucr.edu

VII. Animal Use Responsibilities

A. The Institutional Animal Care and Use Committee (IACUC)

1. What is the IACUC and what does it do?

a) IACUC is appointed by the Chancellor to ensure the ethical/ humane care and use of animals in research, testing and teaching by reviewing all animal use protocols, ensuring compliance with federal regulations, inspecting animal facilities/ labs, and overseeing training/ educational programs

b) Institutions that receive federal funding cannot conduct animal research without an IACUC

c) For more information: www.ora.ucr.edu/ORA/Compliance/Compliance.htm#IACUC.

2. What is an animal use protocol (AUP)?

A research authorization document reviewed and approved by IACUC describing a PI's work with animals at UCR.

3. Who has to fill out an AUP?

The PI must obtain UCR IACUC approval of the AUP application prior to any animal research, teaching and breeding activities.

4. Where can I fill out an AUP?

The AUP is located online at www.ora.ucr.edu/vet/Forms/Forms.htm.

5. Who can I contact for more information?

a) Office of Research Integrity 827-4811

b) Office of the Campus Veterinarian 827-6332

B. Working with Animals Training

1. What is involved with training?

The Animal Care and Use Training, Health and Education program consists of several required activities:

a) Familiarity with the location and content of the UCR Laboratory Animal Care and Use Training Manual at www.ora.ucr.edu/vet/

b) Reviewing the specific Animal Use Protocol (AUP) for which you seek participation

c) Completing the UC Riverside animal care and use website training course and exam at www.ora.ucr.edu/vet/ResearchTraining.htm

d) Viewing a species-related training video at www.ora.ucr.edu/vet/TrainingVideos.htm

e) Enrolling in the UCR Animal Occupational Health and Safety Program at www.ora.ucr.edu/vet/ohs.htm

f) Submitting a completed training verification form to the Office of the Campus Veterinarian available at www.ora.ucr.edu/vet/VerificationForm.htm

2. Who has to receive training?

All personnel participating in animal research, training and care at UCR are required to complete training before initiating animal research activities.

3. Why do I have to be trained to work with animals?

UCR falls under the authority of the Animal Welfare Act, the US Department of Agriculture (USDA), the NIH Office of Laboratory Animal Welfare (OLAW), and the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC), which requires animal training.

4. Who can I contact for more information?

Contact the Campus Veterinarian at 827-6332 or Vetmail@ucr.edu.

VIII. Human Research

A. The Institutional Review Board (IRB)

1. What is the IRB and what does it do?

The IRB is a review body officially appointed by the Chancellor composed of faculty, clinicians, and lay people who review all proposed UCR human subjects research to ensure that the safety and welfare of subjects are protected in research involving humans or identifiable information about living humans.

2. What research is reviewed by the IRB?

a) Any research involving human subjects, including research development, testing and evaluation, that is designed to develop or contribute to general knowledge

b) Examples of human subjects research projects conducted at UCR are: ethnographic interviews, curricular evaluation studies, psychology experiments, and research involving the derivation and use of human embryonic stem cells, human embryonic germ cells, and human adult stem cells from any source, including somatic cell nuclear transplantation

3. Where can I complete an application to use human subjects?

The application is located at: www.ora.ucr.edu/ORA/Compliance/ComplianceCommitteeForms.htm.

4. Who can I contact for more information?

Director of Research Integrity at 827-5535.

IX. Field Safety

A. Planning the Trip

1. Who is responsible for field safety?

The PI is responsible for knowing the potential hazards and supervising the field safety of staff, students and visitors working outside an 'engineered environment' through instruction to prevent accidents and injuries.

2. What is a field safety plan and how can it help me in the field?

a) The laws you are required to follow in the field depend on the hazardous materials, or organisms you use and the locations, processes, methods you are undertaking. The totality of the situations one must consider is daunting, a simpler process for working safely in the field has been proposed: Integrated Safety and Environmental Management. Part of the implementation of this system is a web-based system to assist you in creating your own Field Safety Plan

b) Until this system is implemented, the general areas you need to be concerned about are:

1. The people involved

a) Who are the people who will be going?

b) Be sure they take any medication or equipment they need to act normally.

c) Consider allergies

d) Who are their 'next of kin' to contact if something goes wrong?

e) What are their technical capabilities & experiences?

f) Who has advance first aid training?

2. The place where you are going

a) How far from the emergency medical system (911) will you be?

b) What are the hazards involved at your location?

c) The weather

d) The terrain

e) The local population

f) Wild animals

g) Local plants

3. What are the hazards you are bringing with you?

a) Hazardous chemicals

b) Biohazards

c) Radioactive hazards

4. How will you transport people to and from the field location(s)?
    a) Private vehicle(s)?
    b) Adequate personal insurance?
    c) UC vehicle(s)?
    d) Commercial carriers?
    e) How will you transport people around or between the field locations?

Transport of hazardous materials have special requirements and if done incorrectly can result in significant citation, fines, and imprisonment (see HazMat Shipping section below). Contact EH&S at 827-5528 before making shipping arrangements.

1. How will you communicate with each other while in the field?
    a) What's your back-up method?
    b) What is the frequency of 'checking-in'?
    c) How will you communicate with folks back home?
    d) What is the time line for them expecting your communication?
    e) What should they do if you do not communicate on time?
2. What measure are you going to take to ensure the security of the participants?
    a) Of the equipment?
    b) Of the samples?
    c) Of the data?
    d) Write all your responses to these or other relevant concerns and make sure each of the participants have read the plan
    e) Contact the UCR risk manager (827-3095) to see what insurance and/or liability waivers may be required

3. Who can I contact for more information?

Laboratory Safety at 827-5119 or www.ehs.ucr.edu/laboratory

X. Important Phone Numbers

A.	**Biosafety:**	827-4628	www.ehs.ucr.edu/biosafety
B.	**Emergency Management:**	827-2609	www.ehs.ucr.edu/emergency
C.	**Ergonomics:**	827-6311	www.ehs.ucr.edu/ergonomics/
D.	**Environmental Programs:**	827-6303	www.ehs.ucr.edu/environmentalprograms
E.	**Fire Prevention:**	827-6309	www.ehs.ucr.edu/fire
F.	**Hazardous Materials:**	827-5538	www.ehs.ucr.edu/hazardousmaterials
G.	**Laboratory/Research Safety:**	827-5119	www.ehs.ucr.edu/laboratory
H.	**Radiation Safety:**	827-5529	www.ehs.ucr.edu/radiation
I.	**Training:**	827-6311	www.ehs.ucr.edu/services/training
J.	**Integrated Waste Management:**	827-4248	www.ehs.ucr.edu/waste
K.	**Physical Plant:**	827-3029	www.pplant.ucr.edu/ & www.pplant.ucr.edu/administrative/customer.htm
L.	**EH&S Main Office:**	827-5528	www.ehs.ucr.edu
M.	**EH&S Director:**	827-6324	
N.	**Office of Research**	827-5535	www.ora.ucr.edu/default.aspx
O.	**Director, Research Integrity**		