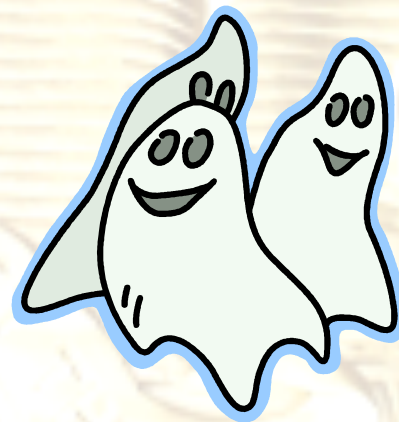


Chemistry Safety Seminar

Russell Vernon, Ph.D.

Environmental Health & Safety

10/31/2012





Agenda

- 1. UC Regents Agreement with LA DA**
- 2. Injury Response**
 - a. Preserving Evidence**
 - b. Seeking Treatment**
- 3. Common causes of laboratory fires**
- 4. Personal Protective Equipment**
- 5. Common challenges identified in lab safety inspection**
- 6. Segregation of chemicals**





1. UC Regents Agreement with LA DA

www.ehs.ucr.edu/laboratory/ucregentsagreement

Training

Policies and Procedures

Personal Protective Equipment (PPE)

Injuries / Illnesses



Training *(UC Regents Agreement)*

- **Specific elements are now included**
- **UCOP has contracted for systemwide online course**
- **UCR developed course modified in the meantime**
 - **Both on-line and in-lab portions required**
 - **www.ehs.ucr.edu/training/courses/laboratory**
- **Refresher requirement**



Policies and Procedures

(UC Regents Agreement)

- **Standard Operating Procedures required**
- **Written by the most knowledgeable person in the lab involved with the process, reviewed by a qualified person, approved and signed by the faculty, agreed to and signed off on by all users**
- **UC systemwide policies on**
 - **Laboratory Safety Training**
 - **Personal Protective Equipment**
 - **Minors in Labs**



Personal Protective Equipment

(UC Regents Agreement)

- **Regulation (www.dir.ca.gov/Title8/sb7g2a10.html)**
- **Purpose & Types**
 - **Head Protection**
 - **Eye and Face Protection**
 - **Body Protection**
 - **Hand Protection**
 - **Foot Protection**
- **Proper Selection, Fitting, Marking, Use, Care, Storage & Disposal**



Injuries / Illnesses

(UC Regents Agreement)

- **Severity of Injuries**
 - **First aid only vs reportable injury**
 - **inpatient hospitalization for > 24 hours for other than medical observation or in which an employee suffers a loss of any member of the body or suffers any serious degree of permanent disfigurement**
 - **www.dir.ca.gov/title8/330.html**
- **For reportable injuries, must preserve evidence**
 - **Call UCPD ask for their help to 'secure the scene' & contact EH&S**
 - **Contact Cal/OSHA right away**



2. Injury Response

- 1. Seek Assistance from your buddy**
- 2. If Severe, must preserve evidence**
 - Call UCPD (911 or 951-827-5222) ask for their help to 'secure the scene' & contact EH&S**
 - Have someone contact Cal/OSHA as directed on flipchart**
- Seeking Treatment – Follow the flipchart...**
 - Employees injured on the job are covered by Workers' Compensation Insurance**
 - Others need to follow own insurance guidance**



3. Common causes of lab fires

- **Electrical**
- **Oxidation/Reduction Reactions**
 - Explosive decomposition
- **Waste bottle reactions**
 - Usually redox
- **Flammable liquids & sources of ignition**
 - Open Flames
 - Stir plates
 - Static discharge
 - Furnaces



3. Personal Protective Equipment

- **Lab Coats – Standard & Flame Resistant**
 - **Buttoned up**
- **Aprons**
- **Close toed shoes**
- **Full length pants or leg coverings**
- **Eye protection**
 - **Safety Glasses; Splash Goggles; Face Shields**
- **Hand Protection**
 - **Chemical resistant gloves, disposable vs reusable**
 - **Heat/cold resistant gloves**
 - **Abrasion or cut resistant gloves...**



4. Personal Protective Equipment

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The background of the slide features a large, faded, golden seal of the University of Colorado. The seal is circular and contains the text "UNIVERSITY OF COLORADO" around the top edge and "LET THERE BE LIGHT" at the bottom. In the center, there is a stylized building with a spire and a banner.

5. Lab Audit Report Findings

Steps to correct deficiencies



Agenda

Information provided on how to correct the following common deficiencies reported in Chemistry research laboratories:

- 1. Fire extinguisher training**
- 2. Safety placard**
- 3. Chemical inventory**
- 4. Illness and injury response training**
- 5. Secondary containment**
- 6. Housekeeping**





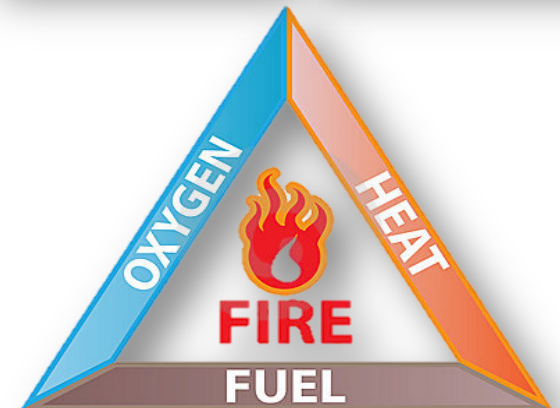
Fire extinguisher training

Cal OSHA Title 8 CCR§6151

- Where portable fire extinguishers are used in the workplace, training to familiarize researchers in the lab shall be provided
- Researchers can enroll in an online training course offered through EH&S to meet the requirement
- Training: www.ehs.ucr.edu/training



<p>1. PULL Pull the pin. This will also break the tamper seal.</p>	<p>2. AIM Aim low, pointing the extinguisher nozzle (or its horn or hose) at the base of the fire. Note: Do not touch the plastic discharge horn on CO2 extinguishers, it gets very cold and may damage skin.</p>
<p>3. SQUEEZE Squeeze the handle to release the extinguishing agent.</p>	<p>4. SWEEP Sweep from side to side at the base of the fire until it appears to be out. Watch the area. If the fire re-ignites, repeat steps 2-4.</p>





Safety placard

CA Fire Code • NFPA 704 • UCR CHP

- To aid emergency responders and comply with fire safety regulations, every entrance to an area with chemical, radioactive or biological hazards must have a placard conveying information regarding the types and degree of hazards within and emergency contacts
- Placard information is updated at least annually

SAFETY AND RESPONSE INFORMATION FOR
Vernon Facility
 ENVIRONMENTAL HEALTH & SAFETY ENVIRONMENTAL HEALTH AND SAFETY BUILDING - 0115

Room Contact Information	Room Type/Name - Room	Campus Phone	Emergency Phone
Responsible Party	Russell Vernon	[REDACTED]	[REDACTED]
Contact #2	Eduardo Trujillo	[REDACTED]	[REDACTED]
Contact #3	Darwyn Vernon	[REDACTED]	[REDACTED]

Personal Protection	Physical Hazards
SAFETY GLASSES REQUIRED Closed-toe Shoes Required Steel-toe Shoes Required	CAUTION Encumbered Aisle or Trip Hazard GHG CYLINDERS
Gloves Required NO FOOD or DRINK ALLOWED	

Radiation, Chemicals or Biohazards Stored/In-Use

	H-3;C-14;I-125;Na-22;P-32;P-33;S-35	BioHazard Level: 1

Entry procedures: Don (put on) PPE upon entry. Exit procedures: Remove PPE and wash hands prior to exiting.
 951-827-5528
<http://ehs.ucr.edu/hazardousmaterials>
 01/10/2012

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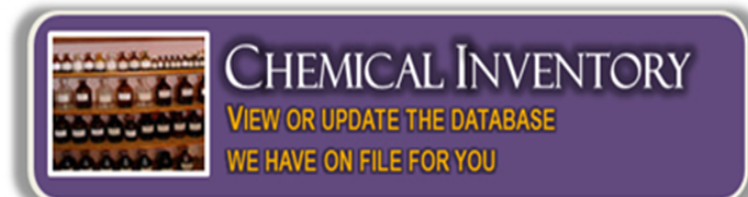


Chemical Inventory

Cal OSHA Title 8 CCR §5191 • UCR CHP

An accurate knowledge of the chemicals you have and their associated risks can be achieved by maintaining a chemical inventory at least annually. An effective chemical inventory is an essential starting point to managing chemical risks.

- Conduct a physical inventory – **Remember to wear PPE!**
- Update the chemical inventory online and include:
 - Exact location
 - Chemical name
 - Container size and contents
 - Container type
 - Chemical manufacturer
- Submit your inventory to EH&S
- Keep a copy of your inventory
- Complete the chemical inventory confirmation



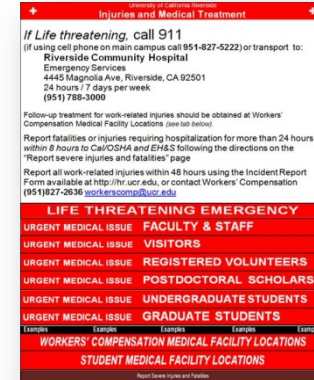


Illness and injury response training

UCR CHP

- Members of the laboratory should be trained on how to respond in the event of an injury or illness
- Use the *Injuries and Medical Treatment* flipchart as a guide
- Topics may include:
 - When to notify supervisor/PI/department administrator of any work or research-related injury or illness.
 - Where to seek treatment according to your working title (graduate student, teaching assistant, etc.)
 - How to report injuries requiring hospitalization.
 - How to report work or research-related injuries.
 - Chemistry/Biochemistry - specific procedures

Document Training



UCR Environmental Health & Safety Training

Training

Our education and training program is a valuable tool in developing awareness of safety, health responsibilities and accident prevention. Everyone needs training at one time or other. Safety education and training is most effective when immediately incorporated into standard operating procedures, workplace practices, and individual job performance requirements. For more information about Training, please contact [Janette De La Rosa Ducut, Ed.D.](mailto:Janette.DeLaRosa.Ducut@ucr.edu) (951) 827-6303.

Take a Class 	Get Records 	Learn More
Schedule of Classes List of all courses offered.	Transcripts For participants who completed training	Publications Safety handouts
Online Training Take a class anytime, anywhere	Records Request For supervisors who want to verify training	UC Learning Center For participants with a UCR Net ID
Needs Assessment Find out which courses you need to take	Missing something on your transcript? Send us an email, and we'll investigate	Videos
Resources for Diversity		
Training Plan [template] For supervisors who want to plan and track training		
Roster [class] To document training for groups of people		
Roster [individual training plan] To document training for individuals in a training plan		

Submit roster to EH&S Training by campus mail, fax 951.827.5122, or email ehstraining@ucr.edu



Secondary containment

UCR CHP

- Storage trays or secondary containment must be used to minimize the distribution of material in the event a container should leak or break. Retaining the shipping can for secondary containment is a good practice.
- Containment system should be made of chemically resistant materials and have sufficient capacity to contain 110% of the total volume of stored containers.
- Various sizes and colors available ([US Plastics](#))





Housekeeping

Cal OSHA Title 8 CCR §5191 • UCR CHP • UCR Policy

- Keep work areas and storage areas clean and uncluttered.
- Chemicals and equipment are to be properly labeled and stored. Relocate glassware stored on the edge of bench tops
- Clean up area on completion of an operation or at the end of each day. **Remember to wear PPE!**





6. Chemical segregation - **Why is it important?**



REGULATORY COMPLIANCE ILLNESS AND INJURY PREVENTION BEST PRACTICES

- ***Meet Title 8 § 5164 requirement for hazardous chemical storage***
- ***Safely record chemical inventory***
- ***Prevent any “chemistry” from occurring on the shelves***
- ***Safe disposal***
- ***Ensure proper labeling of all chemicals***



Regulation compliance

- ***Substances which, when mixed react violently or evolve toxic vapors or gases or which in combination become hazardous by reason of toxicity, oxidizing power, flammability, explosibility, or other properties shall be evaluated for compatibility before storing.***
- ***Incompatible substances shall be separated from each other in storage by distance, partitions, secondary containment or otherwise, so as to preclude accidental contact between them.***

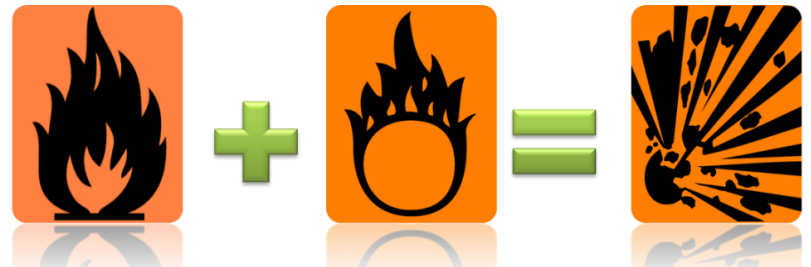




Illness and Injury Prevention

Incompatible substances:

- Oxidizers and flammables
- Acids and alkalis
- Mineral acids and oxidizing agents
- Mineral acids and cyanides
- Water reactive(s) and water and everything else containing easily extracted protons such as alcohols, acids (organic and inorganic), amines, etc.





Best Practices

Chemical Inventory

An accurate knowledge of the chemicals you have and their associated risks can be achieved by maintaining a chemical inventory at least annually. An effective chemical inventory is an essential starting point to you managing your chemical risks.

*****Always wear the appropriate PPE when performing chemical inventory***





The correct storage group for a multi-hazard substance is the group that represents the greatest storage hazard

Where do I begin?

- 1. Start with separating inorganic and organic materials**
- 2. Establish compatible storage groups and alphabetize only within compatible storage groups**
- 3. Rank chemical storage groups: most hazardous to least hazardous**

Group I:	Flammable
Group II:	Volatile poisons
Group III:	Oxidizing acids
Group IV:	Organic and mineral acids
Group V:	Liquid bases
Group VI:	Liquids oxidizers
Group VII:	Non-volatile poisons
Group VIII:	Metal hydrides
Group IX:	Dry solids



- Attention should be given to the color-coding and hazard symbols found on chemical bottles as a guide to proper storage
- Properly labeled chemical bottles allow for proper storage placement
- This same principle applies to chemical waste disposal



Flammable. Store in area segregated for flammable reagents.

RED (R)



Health Hazard. Toxic if inhaled, ingested, or absorbed through Skin. Store in secure area.

BLUE (B)



Reactive and Oxidizing Reagents. May react violently with air, water, or other substances. Store away from flammable and combustible materials

YELLOW (Y)



Corrosive. May harm skin, eyes, mucous membranes. Store away from red-, yellow-, and blue-colored reagents above.

WHITE (W)



Presents no more than moderate hazard in any of categories above. For general chemical storage.

GREY (G)

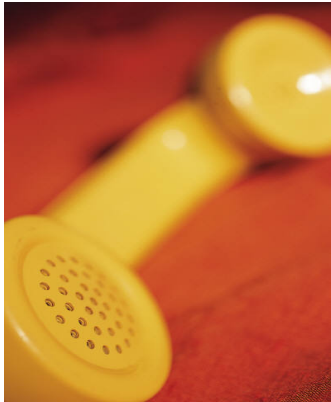




For more information



ehs.ucr.edu/laboratory/laboratory_safety_audits.html



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ehsaudits@ucr.edu