



"Safety Comes First"

Case Department of Occupational and Environmental Safety

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On December 29, 2008, a chemistry/biochemistry research assistant at UCLA, Sheharbano (Sheri) Sangji was drawing approximately 20 mL of 1.7 mol/L tert-butyl lithium (t-BuLi) in pentane into a 60 mL syringe when the chemical ignited and she caught fire. She sustained third degree burns over 43% of her body. After several weeks of treatment, Sangji died from her wounds on January 16, 2009. Though Sangji had safety glasses on during the accident, she was not wearing a laboratory coat. Subsequent investigations by Cal/OSHA indicated multiple regulatory violations and led to fines of \$31,875 in May 2009.

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However, UCLA's problem did not end here. The Department of Chemistry and Biochemistry was assessed new penalties in both August 2009 and again in December 2009. Cal/OSHA assessed penalties totaling \$67,720 for health and safety violations identified in chemistry research labs, and an additional \$29,300 for an unnamed student who was burned in a 2007. Fines were also assessed by Cal/OSHA for numerous violations including failure to notify the agency of the accident, lack of protocol to respond to unsafe working conditions, and failure to ensure that all lab workers use protective safety wear. Neal Langerman (founder of Advanced Chemical Safety) noted that the UCLA Chemistry and Biochemistry department was becoming an "embarrassment" and "an unsafe environment in which to be a student" (Kemsley, 2009). Potential criminal charges are now being considered by local authorities.

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The saddest part about this event is that Sangji's painful injuries and death could have been avoided. Had Sangji been wearing all of the Cal/OSHA required safety gear, her injuries would have been much less severe and it is highly doubtful she would have died. Here at Case Western, we can avoid serious accidents, costly fines and "embarrassment" by simply following some basic safety procedures in the labs.

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Proper Chemical Labeling: The Essentials

“Unclear labels, missing labels, and/or use of abbreviation, formulas, or chemical structures on labels can lead to potential exposure to hazardous chemicals.”

Proper chemical labeling is essential for a safe laboratory work environment. Unclear labels, missing labels, and/or use of abbreviations, formulas, or chemical structures on labels can lead to potential exposure to hazardous chemicals. Unlabeled or mislabeled chemicals not only present potential hazards but are expensive to dispose. Quite simply, it is relatively easy for labels to be misinterpreted if a protocol is not followed.

“Unlabeled chemicals” are classified in the following ways: bottles without a label, containers labeled with only codes, generic process labels that do not specifically list chemicals contained, and obviously mislabeled chemicals such as waste bottles that still have the original product label. Of particular importance is the distinction between the labeling of laboratory chemical products and the labeling of laboratory chemical waste.

The Occupational Safety and Health Administration (OSHA) has established guidelines for the labeling of chemical products used in the laboratory, and the Environmental Protection Agency (EPA) regulates the labeling of chemical waste generated in the Laboratory. Moreover, state and local regulations and/or university policies may exceed the minimum requirements established by OSHA and the EPA. While a detailed summary of these guidelines can be found in the Case DOES Laboratory Safety Manual (see <https://www.case.edu/finadmin/does/ChemSafety/>), enclosed below are a few essentials to keep in mind.

Procedures for Labeling of Chemical Containers

- ◆ Inspect incoming containers to ensure that they have legible labels.
- ◆ Manufacturer chemical labels should never be removed or defaced until the chemical is completely used. Empty containers that are saved for re-use must have the original label removed or marked out and obliterated. Empty containers that are used for waste or chemical products must have a new label affixed or have the information written directly on the bottle.
- ◆ Label all containers in English to identify the contents with the full chemical name(s) and appropriate hazard warning information. The identity on the label should correspond to a chemical name, trade name, or abbreviation found on the MSDS. No abbreviations, formulas, or chemical structures may be used unless it is otherwise labeled appropriately.
- ◆ Small containers that are difficult to label such as 1-10 ml vials and test tubes can be labeled as a group and stored together. A log or laboratory notebook with corresponding sample numbers on the bottles or group may be used to identify the contents.
- ◆ Unattended beakers, flasks, and other laboratory equipment containing chemicals used during an experiment should be labeled as described above...

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Summer Safety Reminder: Proper Attire in the Laboratory

As the season changes from spring to summer, the warmer weather makes this the ideal time to review what is considered proper lab attire. In short, when working in the lab, ideally all skin should be protected from exposure. Most lab workers are aware of the benefits of proper PPE in the form of lab coats, gloves, and safety glasses, but did you know your personal clothing is actually your last line of defense against chemical or biological exposure? Long pants and closed toed shoes cover areas of the body that lab coats do not protect.

In the event of a dropped and broken bottle, your clothing may provide your only protection against exposure. Shorts, sandals and other open toed shoes (or clogs) are not allowed in the lab for this reason. Ideally, shoes should be of an impermeable substance (e.g., leather) instead of cloth. Skirts should not be worn in the lab unless they are long enough to cover the legs completely (NOTE: tights and pantyhose are not considered adequate leg covering).

If you have any questions on appropriate attire in the labs, please contact DOES.

Fume Hood Safety: A Quick Refresher Tutorial

Take a moment to visit the University of Memphis Office of Environmental Health and Safety's website (<http://www.memphis.edu/ehs/training.php>) for a short online tutorial. This tutorial demonstrates the operation of the VAV fume hood exhaust systems with the phoenix monitor and zone presence sensor. The VAV (Variable Air Volume) fume hood maintains constant face velocity by adjusting the exhaust air flow as the sash position changes. If you have any additional questions or concerns, please contact DOES directly at x. 2906.

Source: The University of Memphis Office of Environmental Health and Safety



"In short, when working in the lab, ideally all skin should be protected from exposure."



Proper Chemical Labeling: The Essentials (continued from page 2)

"If a chemical or mixture in the lab is unknown then it is assumed to be hazardous."

- ◆ ...Beakers, flasks, syringes prepared and used immediately or by the end of the shift may be unlabeled.
- ◆ Secondary containers must be labeled with the chemical name and hazard when the substance is transferred from the labeled primary container to a secondary container.
- ◆ If a chemical or mixture is produced or synthesized in the laboratory and is intended for outside use, the provisions of 1910.1200 apply which requires the preparation of a Material Safety Data Sheet (MSDS). (Call DOES for assistance x. 2906).
- ◆ Synthesized chemicals must be labeled as accurately as possible until the chemical name is known, either with the chemical group or hazard class.
- ◆ If a chemical or mixture in the lab is unknown then it is assumed to be hazardous.
- ◆ All chemical storage areas such as cabinets, shelves and refrigerators should be labeled to identify the hazardous nature of the chemicals stored within the area (e.g., flammables, corrosives, oxidizers, water reactives, toxics, carcinogens, reproductive toxins, and general storage (non-reactive, non-hazardous). All signs should be legible and conspicuously placed.
- ◆ Food items used in the lab for demonstration or experimental purposes should be labeled "For Lab Use Only." Food for consumption is NEVER allowed in the lab.

It is important to remember that this list is intended to serve as a reminder. For a complete list of procedures including OSHA and EPA regulations, please consult the

References

- Kohler, C. *Indiana University Office of Environmental, Health, and Safety Management Laboratory Safety Guidelines*, 2009. <www.ehs.indiana.edu>
- Title 29, Code of Federal Regulations, Part 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories.
- Title 29, Code of Federal Regulations, Part 1910.1200, Hazard Communication.
- Title 40, Code of Federal Regulation, Part 262.34, Standards Applicable to Generators of Hazardous Waste.



12 Safety Tips for Using an Autoclave

An *autoclave* is a large pressure cooker that operates by using steam under pressure as the sterilizing agent. Autoclaves are widely used at Case Western Reserve University in research laboratories and clinical areas as the principle physical method to sterilize clinical and laboratory equipment before and after use as well as biohazardous waste prior to disposal. The increased pressure in the autoclave enables steam to reach high temperatures, thus increasing its heat content and sterilizing power. The autoclave is an effective sterilizer because moist heat is thought to kill microorganisms by causing coagulation of essential proteins.

However, the high temperatures associated with autoclaves present physical hazards involving heat, steam, and pressure as well as biological hazards involving potential exposure to viable human pathogens. It is important that personnel know of these hazards and aware of the proper operating procedures before using this potentially dangerous tool. Below are some key safety practices to observe when using autoclaves. Please read them carefully and keep them close by your autoclave.

Important Safety Practices

- ◆ Ensure that ALL personnel receive proper training prior to using an autoclave.
- ◆ Be sure to clean the drain strainer before loading the autoclave.
- ◆ Before loading containers of liquids into the autoclave, caps must be loosened to avoid having the bottles shatter during pressurization.
- ◆ Load the autoclave according to the manufacturer recommendations.
- ◆ Use a tray with a solid bottom and walls to contain bottles and catch spills.
- ◆ Add 1/4 to 1/2 inch of water so the bottles will heat evenly
- ◆ DO NOT load plastic materials that are not compatible with the autoclave.
- ◆ Place individual glassware pieces within a heat resistant plastic tray on a shelf or rack. NEVER place them directly on the autoclave bottom or floor.
- ◆ Make sure the door of the autoclave is fully closed and the correct cycle has been selected before starting.
- ◆ Wear heat-resistant gloves when cracking the autoclave door open after a cleaning cycle has been completed.

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“The high temperatures associated with autoclaves present physical hazards involving heat, steam, and pressure as well as biological hazards involving potential exposure to viable human pathogens.”

12 Safety Tips for Using an Autoclave (continued from page 5)

"ALWAYS wear a rubber apron, rubber sleeve protectors, heat resistant mitts and a face shield when removing items from the autoclave."

- ◆ Before removing autoclaved items, wait 5 minutes for loads containing only dry glassware, and 10 minutes for autoclaved liquid loads.
- ◆ ALWAYS wear a rubber apron, rubber sleeve protectors, heat resistant mitts and a face shield when removing items from the autoclave. Remove the load and let the glassware cool for 15 minutes before touching it with ungloved hands.
- ◆ Be alert for autoclaved liquid bottles which are still bubbling. Let liquid loads stand in an out-of-the-way place for a full hour before touching with ungloved hands. **CAUTION:** Hot glassware and scalding liquids cause burns and serious bodily harm.

Again, it is very important that ALL personnel receive proper training prior to using an autoclave. Some veteran researchers may take everyday tasks, such as using an autoclave, for granted. This is a dangerous habit. DO NOT ASSUME that any researcher may have used such a device. Make sure that any one using an autoclave is properly trained. Remember we all have a responsibility to ensure that Case Western Reserve University is a safe environment.

Revisiting UCLA (con. from page 1)

Here are a few simple reminders:

- * Take time to understand the nature of the chemicals in your laboratory
 - ◆ Read Material Safety Data Sheets
 - ◆ Talk to researchers who have worked with the chemical you are using
 - ◆ Ask the DOES office if there are any safety procedures that are recommended
- * Wear the appropriate personal protective equipment
 - ◆ Check glove compatibility charts to ensure that the glove you are using will be an appropriate barrier
 - ◆ Wear a laboratory coat whenever you are in the laboratory; remember you are not the only one working in the laboratory who may have an accident
 - ◆ Contact the Safety office and ask what personal protective equipment is recommended

NEVER be embarrassed to ask questions. If you don't know, ASK.



Radioactive Material Incident Response / Reporting—Reminders

When do I need to call the RSOF?

Each AU is responsible for making certain that the RSOF (x 2906) during office hours (8:30 a.m. – 5:00 p.m.) or Security (x 3333) after hours, weekends, and holidays is called immediately in any of the following events:

- ◆ A major spill, theft or loss of radioactive material (RAM);
- ◆ Personnel contamination;
- ◆ Contamination outside a restricted area;
- ◆ Accidental ingestion of radioactive material (RAM); or
- ◆ Accidental disposal of radioactive material (RAM) to the normal trash.

All of the incidents listed above **MUST** be reported to the RSOF. An “Incident Report Form” must be completed by the AU and sent to the RSOF as soon as possible after the incident. The Incident Report Form can be found on the DOES website under the “Radiation Safety” link.

If the incident involved contamination of an area, personnel, or equipment, a copy of the contamination survey should be attached. This survey should include a diagram of the affected area or equipment and the results of meter and wipe tests indicating contamination levels in ‘dpm’ or ‘mCi’. The original survey should be placed in the AU’s file with laboratory survey records. The ‘Incident Report Form’ can be found on the DOES website <https://www.case.edu/finadmin/does/> under the ‘Radiation Safety’ link.

How do I know if it is a major or minor spill and how do I make this determination?

Spill assessment considerations:

- ◆ Isotope emission characteristics
- ◆ Radioactive material (RAM) volatility
- ◆ Quantity of radioactive material (RAM) involved
- ◆ Size of contaminated area
- ◆ Potential for spreading contamination
- ◆ Potential dose – external and internal

Minor Spill

A spill that remains contained, that can easily and effectively be cleaned up without assistance from the RSOF, and that does not involve personnel contamination.

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“A minor spill is a spill that remains contained, that can easily and effectively be cleaned up without assistance from the RSOF, and that does not involve personnel contamination.”

Radioactive Material Incident Response/Reporting—Reminders



“A major spill is defined as a spill that involves contamination of personnel or results in contamination outside of the intended work area, and that cannot be promptly cleaned up.”

Major Spill

A spill that involves contamination of personnel or results in contamination outside of the intended work area, and that cannot be promptly cleaned up.

What if I determine that it is a minor spill?

1. Survey clothing, hands and shoes for potential personnel contamination.
2. Notify others in the area of a minor radiological spill.
3. Remove contaminated bench paper and/or gloves, and dispose of as radioactive waste.
4. Decontaminate the work area and survey to verify all contamination has been removed.
5. Document incident, attach decontamination results, and place report in the laboratory’s Radiation recordkeeping binder for future RSOF compliance reviews.

What if I determine that it is a major spill?

1. Survey clothing, hands and shoes for potential personnel contamination.
2. Notify others in the area of a major radiological spill.
3. During business hours (weekdays 8:30 a.m. - 5:00 p.m.) call the RSOF at x. 2906.
4. After hours (weekdays 5 p.m. - 8:30 a.m., weekends and holidays) call Security at x 3333 and indicate there is “A Radiation Spill.”
5. Give Safety or Security your name, the AUs name, location, and telephone number.
6. Establish a secure boundary to prevent spreading of contamination.
7. Do not leave the area (unless in immediate danger) until initial investigations by Safety have been completed.

What if there is a fire or a medical emergency?

In the case of a fire

Evacuate the area and immediately call Security at x. 3333. Give them your name, your AUs name, and the location of the fire.

In the case of a medical emergency

Immediately call Security at x 3333. If radioactive material (RAM) is involved, call the RSOF (x 2906) AFTER Security has been contacted. Give security and safety your name, the AUs name, location, phone number, and type of emergency. Do not leave area (unless in immediate danger) until initial investigations by Safety have been completed.

NOTE: These are only reminders. Consult (www.case.edu/finadmin/does/RadSafety/RA_DMAN.pdf) for a full summary of Radioactive Material Incident Response procedures.

Upcoming Training Sessions*

NOTE: While all laboratories must attend training at DOES, labs must hold specific training in the CHP and ECP as it pertains to the actual work they do. Labs will also need an outline of the CHP and ECP training and a sign in sheet to accompany. Store the sign-in sheet and outline with the CHP and ECP. It will be asked for during lab inspections.

New Hazard Communication (Right-to-Know) Training

Retraining is required annually.
DOES Small Meeting Room - Service Building 1st Floor
PREREGISTRATION IS REQUIRED - Please call 368-2907

New Radiation Safety Training

Retraining is required annually.
DOES conference room - Service Building 1st Floor
PREREGISTRATION IS REQUIRED - Please call 368-2906

New Laser Safety Training

Retraining is required annually.
DOES conference room - Service Building 1st Floor
PREREGISTRATION IS REQUIRED - Please call 368-2906

FOR THE FOLLOWING CLASSES:

Laboratory Safety Retraining
Regulated Chemical Retraining
Hazard Communication (Right-to-Know) Retraining
Bloodborne Pathogen Retraining
Radiation Safety Retraining
Laser Safety Retraining
Respirator Safety Retraining

Please retrain on the Internet at <<http://does.case.edu>> and click on Training.
Print test and fax or mail it to the DOES office.
If your training is more that one year overdue, then you must attend the training class in person and cannot retrain online.

FOR THE FOLLOWING CLASSES:

New Laboratory Safety Training
New Regulated Chemical Training (Formaldehyde, Benzene, Methylene Chloride, Vinyl Chloride, etc.)
New Bloodborne Pathogen Training
New Respirator Safety Training
New BSL-3 Safety Training

Retraining is required annually.
DOES Conference Room - Service Building 1st Floor
PREREGISTRATION IS REQUIRED - Please call 368-2907



Please remember that our updated DOES website provides many resources to meet your safety needs. The DOES website (<http://does.case.edu/>) includes all of the following resources:

- Safety Services Manuals and Forms
- Archived DOES Newsletters
- Training Class Schedules
- Staff Information
- MSDS
- Important Safety Links
- Our Mission Statement
- Contact Information

If you have any questions about our website, please feel free to contact us at ext. 2906/2907

*THIS IS A TRUNCATED LIST OF OUR OFFERINGS. As always, consult our website (<http://does.case.edu>) for a full schedule of training sessions.

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Remember, all back issues of the DOES Newsletter can be found online at <http://does.case.edu>. Simply click on the "Newsletter" link in the left-hand column!

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