Laboratory Self-Inspection Checklist

Last Revised 7Apr10

Date of Inspection: 8/24/10 Building(s): Elings labs

EH&S inspects all labs on campus at least annually. However, **lab supervisors should initiate regular self-inspections** (recommend minimum of twice-a-year) for the following reasons:

- By memos of understanding between UCSB, SB County Fire and the State Fire Marshal., EH&S is allowed to perform safety surveys on their behalves. Without these agreements, these agencies would conduct their own inspections. However, to continue these agreements, their expectations are that regular self-inspections and corrections are done by every lab.
- Under California law (OSHA), supervisors (PIs) are required to: *"… include procedures for identifying and evaluating work place hazards including scheduled periodic inspections to identify unsafe conditions and work practices."*
- Beyond any regulatory requirements, doing regular self-inspections will clearly increase the level of safety in your area.

To aid you in your surveys, a Self-Inspection Checklist follows, this is not a list of every possible safety issue, but are guidelines. Most items are based on applicable regulations or campus policy. Radiation and biohazard issues are not addressed here because they are highly specialized and these labs receive targeted EH&S visits. More information is also available at http://ehs.ucsb.edu. The links (underlined) noted below lead to further information.

Hazardous Waste

1. Are personnel generating chemical waste trained with waste disposal procedures? Individuals who have not taken the UCSB Lab Safety course (live or on the EH&S website) must take this course before generating hazardous waste for disposal **Online Hazardous Waste Course*** (EH09)
   (*This course meets the waste management training requirements enforced by Santa Barbara County Fire Department)

2. Is the illegal disposal of hazardous substances down the drain prevented?

3. Are all hazardous waste containers labeled with the official UCSB Hazardous Waste label?
   ☐ Is there a supply of UCSB waste labels handy (available in all campus storerooms)?
   ☐ Are labels attached when the **first drop** of waste goes into the container?
   ☐ Are all constituents in mixtures identified, as well as their concentrations?
   Do not use generic names like "*Waste or Organic waste*" instead use proper chemical name(s).
   ☐ Are chemically incompatible wastes segregated?
   ☐ Is there a designated area for storage of hazardous waste and labeled as such?

4. Are lab personnel instructed not to dispose of chemicals by fume hood evaporation?
   By law, waste containers must be capped when not in use.

5. Is chemical waste disposed of within **9 months** of their accumulation, *regardless how much material remains inside the container*? Contact EH&S for waste disposal.

6. Are all "sharps" (syringes, razor blades, etc.) disposed in puncture resistant, leak-resistant containers and sealed tightly to preclude loss of contents? Is there a designated glass disposal container in the lab? Lab personnel are designated to empty these into their bldg. dumpster – custodial staff will not do so.

Chemical Safety

1. Is your lab's legally-required (Cal-OSHA) Lab-specific *Chemical Hygiene Plan* (CHP) completed and shared with all workers? Does your CHP address your use of OSHA *Particularly Hazardous Substances* (human carcinogens, acute toxins, reproductive toxins, and pyrophorics)?

2. Are Cal-OSHA regulated carcinogens such as formaldehyde/formalin, dichloromethane, and benzene always used in a fume hood and with appropriate gloves/eyewear?

3. Are chemical containers properly labeled with chemical name and hazard type of the material? (e.g., repackaged materials and lab-synthesized materials)

4. Are stored chemicals segregated according to hazard classification/compatibility (acids, bases, flammables, oxidizers, water reactives, etc.)? Compatibility Chemical Storage Chart

5. Are all containers of peroxide-forming chemicals (e.g., ethers) dated upon receipt and disposed of within the prescribed time period (contact EH&S for prompt disposal)? Peroxides can be explosively unstable.

6. Are flammable liquids kept inside approved flammable storage cabinets whenever possible?

   ☐ Are flammable liquids always stored in approved flammable cabinets when in excess of 10 gallons?

   ☐ Do you have large volumes of flammable solvents (e.g., multiple cases or drums) in storage that are above what is reasonably needed? The quantities of flammables that can legally be stored are regulated by CA Fire Code. Please don't stockpile large quantities of these materials.

   ☐ Are flammable liquids stored away from sources of heat, ignition, electrical equipment or sources of static electricity?

   ☐ **Static Electricity** - Electrically ground all containers/equipment involved in pumping flammable liquids to prevent buildup of static electricity as an ignition source.

7. Are acid volumes greater than 10 gallons stored in an approved storage cabinet?

8. Is there a catch pan beneath manometers, barometers, etc. which contain large quantities of mercury?

9. It is highly recommended chemical spill cleanup materials be available.
   Are all lab workers familiar with the location of spill cleanup kits?
   Note: Some lab buildings have a designated "spill closet" – generally keyed to graduate master key.

Laboratory Equipment

1. Are the eyewash and emergency shower stations free of any obstructions which would prevent ready access? These units are tested by FM regularly. It is recommended that labs run their eyewash units monthly to maintain clean water in the lines.

2. Have fume hoods been EH&S tested within the year (check label)?
   - ☐ Is **air flow indicator** present and operational?
   - ☐ Is lab **equipment or chemicals** within the hood minimized? **Keep only items in use.**
   - ☐ Are air entry slots at back of hood kept clear of obstructions? ***Cluttered hoods interfere with proper air flow.***
   - ☐ Is the front **sash lowered** to the appropriate level "red arrow mark" when hood is in use? If the low flow alarm engages, lower the sash until the alarm stops. If the alarm continues when the sash is lowered to the "red arrow mark" please contact EH&S at x3743. **DO NOT** over-ride the safety alarm by permanently engaging the "Mute" or "Emergency" button (e.g., with tape, paper clips, etc.).
   - ☐ Has everyone using a fume hood been properly trained to use their fume hood? *General fume hood use is covered in the Lab Safety training course. The training however, does not cover lab specific hood use. Ensure lab members have documented their fume hood training.*

3. Are biological safety cabinets certified annually or when moved (check sticker) and are they the proper types for the work being conducted?

4. Do labs using non-ionizing radiation equipment, such as lasers, microwaves, and ultraviolet light sources, have properly posted warning signs and shielded work areas?

5. Compressed gas cylinders
   - · Are cylinders dated upon arrival and contents clearly identified?
   - · Inspect regularly for defects, i.e., excessive rust, dents, bulging, corrosion, etc.
   - · Unidentified cylinders should be marked, “CONTENTS UNKNOWN” and returned to the manufacturer.
   - · Non-lecture bottles ≥ 5 years old must be returned to the manufacturer to ensure they are safety/pressure tested as required by law (“hydostatic testing”) Check stamped date on cylinder when it was last tested.
   - · Corrosive gases (e.g. **HF, HBr, HCl, H_2S**) can degrade the cylinder over time and/or produce dangerously high pressures of hydrogen. Dispose of within 2 years.
   - · Are cylinders secured upright with welded chains and brackets bolted to a wall, bench or other secure object (no type C-clamps)?
   - · Are protective caps in place while cylinders are not in use?
   - · Flammable gases (e.g. hydrogen, methane) tubing should be equipped with a **flash arrestor** to prevent flame flashback to cylinder. Available from gas vendors.
   - · Use of large cylinders of highly toxic gases must be reviewed/approved (contact EH&S, x-4899)
   - · Highly toxic gas cylinders should be equipped with a **reduced flow orifice** (RFO) connection to prevent rapid discharge of cylinder contents. Available from gas vendors.
   - · Gas cabinets with toxic or flammable gas delivery manifolds often have an **excessive flow detection and auto-shutoff valve** built-in. Verify that this safety feature is functional.

6. ☐ Are refrigerators for storing flammables clearly posted with signage indicating they are safe for such storage? (e.g. “desparked”, “lab-safe”, “explosion-proof”, “flammable storage”).
   - ☐ Are refrigerators that are **NOT** designed for flammables storage clearly marked as such? (this is very important to prevent a potential explosion)
   - ☐ Are all chemical storage refrigerators marked with “*No Food*” labels?
   - ☐ Refrigerators in labs utilized for food or drinks should be marked “*Food Only/No Chemicals*?”
   - ☐ Laboratory refrigerators/freezers and other sensitive equipment, preferably should be connected to emergency back-up power.

7. Is the location of manuals/instructions for each piece of equipment known?

8. Are the belt guards in place on all pumps, etc?

9. **Solvent stills with water-reactive drying agents**

- Are solvent stills clearly labeled with the solvent name and drying reagent?

- Ensure water-flow monitor are installed that would automatically shut off the heating mantles in the event of cooling water loss (pic with arrow). Periodically test monitors by shutting down the water flow to verify the system is functioning properly. They are available commercially and less-expensively from the Chemistry Electronics Shop.
We strongly recommend this important safety device be adopted. Fires associated with stills are not uncommon, including the $3M fire at UCI in 2001.

- Ensure secondary containment pans are beneath the stills. In the event of a system leak this should capture any leakage and prevent the solvent from spreading out and finding an ignition source.

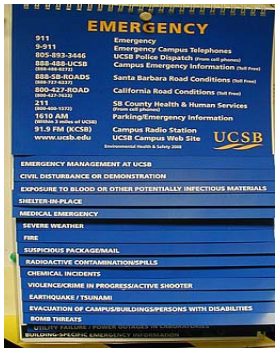
- **Quenching Solvent Stills -**The quenching of used still-pots is potentially dangerous but can be done safely if appropriate precautions are taken. "See EH&S Fact Sheet on still quenching"

· ***Pressurized Systems*** - Inspect and test all high pressure vessels regularly per the owner's manual requirements. Each vessel should have a use-log of: experiment conditions, dates of runs, testing/maintenance history, etc. in order to track the vessel's life-expectancy. Pressure vessels must include a functional over-pressurization rupture disk to prevent a catastrophic vessel failure.

General Safety Concerns

1. Has EH&S posted outside the lab an emergency information contact sign, indicating the hazards within, responsible persons and phone numbers? Is the information correct? Call EH&S to update (x-8243).

2. Has the **UCSB Campus Emergency Flip Chart** been posted in the work area? Has the, *Building-Specific Emergency Information* section page has been completed?



3. Are rooms containing regulated hazardous substances, such as infectious and radioactive materials, posted with warning/caution signs and appropriate authorizations?

4. Are aisles free of obstructions? Minimum clearance for lab aisles is 2 ft.

5. Do work areas have adequate ventilation and illumination? To prevent suffocation, verify that fresh air is supplied to cold/hot rooms that are used as work areas. Check emergency door release and alarm mechanisms.

6. Are fire extinguishers functional (plastic seal and metal pin intact and dry powder units show pressure)?
   Are the extinguishers located on their wall hooks?
   Is the area in front of the extinguishers accessible?

7. Are food and beverages kept out of chemical work areas and out of laboratory refrigerators?

8. Is the appropriate personal protective equipment (PPE) required for the lab available, in good condition and used?

□ Safety glasses/goggles: must be approved safety eyewear as indicated by the "Z-87" stamp on the eyewear. Normal reading glasses are not safety eyewear and must be augmented by goggles, or replaced with Prescription safety glasses.

□ Gloves: must be impermeable to the particular chemical in use. Consult a glove reference chart.

□ **Lab coats**: Lab coats: It is strongly recommended when working with flammable liquids, particularly pyrophorics, acute skin- contact hazards, e.g., acids/bases, highly toxics, etc. Cotton or cotton/polyester coats do not offer good fire resistance. Flame-resistant (treated) cotton or "Nomex" brand coats are more expensive, but offer a high level of fire resistance. Many types of "street clothes" burn readily and are not appropriate without lab coat/apron protection.

□ Other PPE: □ Aprons □ Closed-toe footwear □ Face shield

For more information, including glove reference charts, click on the "personal protective equipment" link above.

9. Have all respirator users been certified through the UCSB Respiratory Protection Program as run by EH&S?

10. Is the level of housekeeping in the lab satisfactory?
    - No hazardous materials stored on floor
    - Aisles and corridors kept clear
    - Lack of clutter

11. Lab doors are fire-rated and therefore can not be propped open with a wedge or other device. Discontinue use of these, or SB County Fire may confiscate them and cite the University.

12. Secure your highly hazardous materials, e.g. highly toxic gas, radiation, select biological agents. Ensure the lab door(s), freezers, refrigerators, storage cabinets, etc. with these materials are locked whenever the lab is left unattended.

Electrical Safety

1. Check electrical equipment and inspect for frayed cords and damaged connections? Electrical tape is prohibited.

2. Multiple outlet strips plugged directly into a wall outlet? Does the power strip have a circuit breaker? Extension cords are not to be permanently used with power strips.

3. Are employees instructed **not** to use extension cords in place of permanent wiring (use allowed if only on a temporary, immediate, basis)? Have permanent receptacles installed for long-term electricity needs.

- Ensure extension cords are 14-gauge (heavy duty) at a minimum, and **temporarily** servicing only one appliance or fixture?
- Ensure extension cord is plugged directly into receptacle. Extension cords should never be used plugged end-to-end; use the proper length cord.

- If extension cords are used, ensure cords are not running through walls, ceiling or doors?

4. Are cord guards provided across an aisle or other passageway to prevent tripping?

5. Is all electrical equipment grounded (three-prong plugs) or double insulated?
   – Are 3-prong plugs only used for 3-prong receptacles, and never altered to fit into an outlet?

6. Are Ground Fault Circuit Interrupters in place where electrical outlets are in use within 6 feet of water? Ensure GFCI's are working properly by using the "test" button.

7. Are all electrical boxes, panels and receptacles covered to protect against electrocution?

8. Are control switches, circuit breakers and electrical panels free of obstructions? These items must be accessible at all times.

9. Are high voltage control panels and access doors posted?

Seismic Safety

1. Do shelves used for chemical storage have seismic restraining devices (e.g. lip, wire or bungee cord) installed to prevent chemicals from falling? Is all valuable or hazardous equipment seismically anchored?

   Visit web links for securing lab instruments & appliances:

   Seismic Protection Methods for Lab Instruments and Appliances

   Earthquake Restraint System for Optical Tables

   Securing Your Stuff

2. Are cabinets, chemical shelves and furniture over 42 inches in height braced against walls to prevent their falling over in the event of an earthquake?

3. Is overhead storage of heavy objects minimized and restrained?

Administrative

(Note: these training requirements must be met by supervisors to satisfy their personal regulatory obligations and reduce their liability)

1. All lab workers are required to complete the UCSB Lab Safety Orientation to satisfy numerous regulatory training requirements. Verify everyone has attended either the live class for grad students & staff (LS01), or completed the appropriate online course for undergrads and postdocs (LS04). Visit our training history link, to view personnel that have completed the course.

2. Are safety training records generated from the class maintained (Lab Safety Training Checklist) and available for review by employees, EH&S and outside agencies?

3. Are all employees aware of the following:

   ☐ How to access Material Safety Data Sheets (MSDS)?
   ☐ Know the location of the emergency eyewash/shower station?
   ☐ The Emergency Assembly Point for your building?
   ☐ The location of the nearest fire alarm pull station?
   ☐ The three basic types of fire extinguishers and their applicability?
   ☐ The location/availability of first aid kits within the building?
   ☐ The location of the Automated External Defibrillator (AED), available in some departments?
   ☐ The location of the circuit breaker box?
   ☐ The location/purpose of your building's Safety Corner bulletin board?
   ☐ The identity of your Department Safety Rep?
   ☐ The availability/purpose of the UCSB Hazard Reporting Form?

Any questions, please call X-8243.