

*INDIANA UNIVERSITY  
OFFICE OF  
ENVIRONMENTAL, HEALTH &  
SAFETY MANAGEMENT*



# Darkroom Safety and Waste Management Plan

Prior to beginning photo-developing operations,  
read the following plan and keep a copy in a visible area of  
the darkroom.

February 2008

**IN CASE OF EMERGENCY DIAL 9-911**

**CONTACTS****Chemical Hygiene and Laboratory Safety**

Chris Kohler, Laboratory Safety Manager 5-5454  
[cekohler@indian.edu](mailto:cekohler@indian.edu)

Trever Boehm, Environmental, Health and Safety Specialist 5-3233  
[taboehm@indiana.edu](mailto:taboehm@indiana.edu)

**Environmental and Waste Management**

Dan Derheimer, Environmental Safety Manager 5-3234  
[dderheim@indiana.edu](mailto:dderheim@indiana.edu)

Rex Howard, Environmental, Health and Safety Specialist 5-7907  
[rehoward@indiana.edu](mailto:rehoward@indiana.edu)

Susan Howard, Environmental, Health and Safety Specialist 5-2351  
[suhoward@indiana.edu](mailto:suhoward@indiana.edu)

**Occupational Safety and Health**

Ray Ruark, Occupational Health and Safety Manager 6-4759  
[wruark@indiana.edu](mailto:wruark@indiana.edu)

Dian Tollinger, Training Coordinator 5-4477  
[ctolling@indiana.edu](mailto:ctolling@indiana.edu)

Jami Bennett, Environmental, Health and Safety Specialist 6-3108  
[jalbenne@indiana.edu](mailto:jalbenne@indiana.edu)

Lisa Potts, Environmental, Health and Safety Specialist 5-7546  
[cooperlm@indiana.edu](mailto:cooperlm@indiana.edu)

## CONTENTS

<i>GENERAL SAFETY</i>	1
<i>TRAINING REQUIREMENTS</i>	2
<i>SAFETY EQUIPMENT</i>	2
<i>CHEMICAL STORAGE</i>	4
<i>CHEMICAL DISPOSAL</i>	5
<i>EMERGENCY CHEMICAL SPILL PROCEDURES</i>	6
<i>DARKROOM LAB CLOSE-OUT PROCEDURES</i>	8
<i>ADDITIONAL TIPS FOR HANDLING CHEMICALS</i>	8
<i>APPENDIX A</i>	9
<i>EMERGENCY INFORMATION SIGN</i>	10

*This guide contains valuable information that will help you run your darkroom safely and efficiently. As a darkroom supervisor/ safety officer/ manager, it is your responsibility to read and understand this guide and to make sure that your employees and students have read and understand it as well. If you have any questions regarding any of the information covered in this guide, please contact EH&S (x5-6311).*

*You can also refer to the regulatory guide for further information.*

<http://www.ehs.indiana.edu/resources/REGULATORY%20GUIDE%202005.pdf>

## **GENERAL SAFETY RULES**

- Limit access to the darkroom. Only approved persons with safety training should be allowed to work in the room.
- Read the MSDS prior to working with a chemical.
- Practice good housekeeping. Keep the work area clean and uncluttered to prevent tripping hazards.
- Wet and dry areas should be clearly separated.
- Always segregate chemicals. (Don't store acids near reducer—see chemical segregation chart [http://www.ehs.indiana.edu/lab\\_safety.html](http://www.ehs.indiana.edu/lab_safety.html) ).
- Use the least toxic chemicals available. Avoid cyanides, heavy metals and developers containing pyrocatechol or pyrogallol when possible.
- Do not store chemicals on the floor.
- Do not eat, drink or smoke in the darkroom.
- The darkroom should be well ventilated (10 – 20 air changes per hour).
- Always wear appropriate Personal Protective Equipment (PPE) (Gloves, Goggles, etc.)
- Always wash hands with soap and warm water after working with chemicals.
- Know how to use emergency equipment prior to an actual emergency.
- **Always Add Acid** to water, never water to acid. (Remember 'AAA')
- Keep a spill kit in the darkroom.
- Do not use paper towels or saw dust to clean up acid spills as this may cause a fire.
- Pregnant women should not be exposed to powdered developer.
- Store all chemicals in locations that will minimize the chance of breakage and splashing.
- Label all containers.
- Keep all containers and trays closed or covered when not in use to prevent the release of toxic gases.

- Do not wash any chemicals down the sink (exceptions noted below).
- All spent chemicals should be placed into an appropriate waste container. (A container the same as the one the chemical was originally shipped in is best).
- Call EH&S for waste pickup when container is full.

## **TRAINING REQUIREMENTS**

State and federal regulations require that anyone who comes into contact with potentially hazardous substances must receive specific training. Indiana University requires darkroom users to attend either Hazard Communication or Laboratory Safety training offered through the EH&S department. Talk to your supervisor or contact EH&S to find out which training session you need. To attend a training session, you can sign up on-line through the EH&S website. <http://www.ehs.indiana.edu/training.html>

## **SAFETY EQUIPMENT**

At a minimum, you should have the following items:

- *Fire extinguisher (within 75ft.)*
- ***Eyewash*** (in each room where smaller amounts of chemicals are used)
- ***Shower /drench hose*** (in each room where larger amounts of chemicals are used or mixed)
- *Waste container for each chemical*
- *Safety glasses / goggles for each person in the darkroom*
- *Gloves*
- *Tongs*
- *HazWaste pickup schedule (posted on wall)*
- *Darkroom safety guide*

### **Eye Protection**

All persons in the darkroom (including visitors) must wear safety glasses / goggles at all times, even when not performing a chemical operation. Contact lenses should not be worn in the darkroom because of the possibility of trapping foreign materials against the cornea and their difficulty to remove in the case of a splash. Safety goggles, not safety glasses shall be worn whenever chemicals are being poured.

## Gloves

Gloves should be worn at all times when working with or near chemicals. Check to ensure the absence of cracks or small holes in the gloves before each use. Prior to leaving the work area, gloves should be removed to prevent the spread of chemicals. Only gloves approved for the use with darkroom chemicals shall be used.

In general, nitrile gloves work well with many chemicals and are a good all-purpose glove. However, no glove is compatible with all chemicals and glove compatibility should be verified prior to the start of chemical handling. Contact EH&S for glove compatibility information, check the MSDS or try the following link <http://www.labsafety.com/refinfo/ezfacts/EZ166.pdf> .

## Clothing

Clothing in the darkroom should offer protection from splashes and spills. The clothing should be easily removable in case of accident and should be fire resistant. Aprons or lab coats are recommended. High-heeled, sandals, open-toed shoes or shoes made of woven material should not be worn. Shorts and miniskirts are also inappropriate.

## Material Safety Data Sheets (MSDS)

As part of the OSHA Hazard Communications Standard, Indiana University is required to have Material Safety Data Sheets (MSDS) available to any individual working with hazardous chemicals. The regulations state that faculty, staff and students "have both a need and a right to know the hazards and identities of the chemicals they are exposed to when working. They also need to know what protective measures are available to prevent adverse effects from occurring."

Information that can be found in a MSDS includes:

- The identity of the chemical substance
- Physical and chemical characteristics
- Physical and health hazards
- Primary routes of entry
- OSHA Permissible Exposure Limits (PEL's)
- Carcinogenic status
- Precautions for safe handling and use (including personal protective equipment)
- Spill response
- Emergency and first aid procedures
- Date of the MSDS

Any chemical shipment received should be accompanied by an MSDS. If you do not receive an MSDS with a shipment contact the vendor right away.

### **MSDS sites on the Internet**

There are many sites on the internet that list darkroom related MSDS. Below is a list of web sites that either contains actual MSDS databases or links to databases.

- <http://www.kodak.com/US/en/corp/hse/prodSearchMSDS.shtml>
- <http://www.siri.org/>
- <http://www.ilpi.com/msds/index.html>
- <http://www.ehs.indiana.edu/msds/html>

## **CHEMICAL STORAGE**

### **APPROPRIATE STORAGE PRACTICES**

All chemicals must be stored appropriately. This includes proper labeling, proper placement (*off the floor*) and compatible storage containers. Improperly stored chemicals can result in the following dangerous conditions:

- Release of potentially toxic vapors
- Degraded containers that allow chemicals to become contaminated.
- Degraded containers releasing vapors that can affect the integrity of nearby containers.
- Degraded labels that result in generation of unknowns.

Proper chemical storage includes the following practices:

- All chemicals **MUST** be labeled.

[Link to labeling templates](#)

*(Deteriorating labels must be replaced before the chemical becomes an unknown.)*

- Containers must be dated when they arrive.
- Older chemicals should be used first.
- Chemicals must be properly segregated.
- All containers must have lids on at all times (except when pouring).

### **Chemical Inventory**

Maintaining a chemical inventory will help reduce waste and costs by allowing all users to determine which chemicals should be used first and thereby preventing old chemicals from becoming unusable or unknowns. Determine exactly what chemicals are present in your darkroom and make a list to post for all users to view and update as needed.

### **Order Only What You Need**

Before ordering new chemicals, review your current inventory and use those chemicals first. It may also be possible to borrow small amounts of chemicals from other darkrooms. Please take the time to check with your colleagues. While chemicals are usually cheaper when purchased in large quantities, factor in the actual usage, storage and disposal, and the cost savings usually diminish significantly. In addition, chemicals in large containers that are not used frequently can be rendered useless in time by contamination or degradation.

### **Chemical Alternatives**

There are less-hazardous substitutes for hazardous chemicals used in darkrooms that can be substituted satisfactorily in many cases. A few examples of chemical substitutes can be found in **Appendix A** or use the following website links. You can also contact EH&S (x5-6311) to discuss specific chemicals.

[http://silvergrain.org/wiki/Nontoxic\\_darkroom\\_chemicals](http://silvergrain.org/wiki/Nontoxic_darkroom_chemicals)

<http://www.acminet.org/CPList.pdf>

<http://scphoto.com/html/chemicals.html>

## **CHEMICAL DISPOSAL**

As a chemical user, YOU have a legal and moral responsibility to ensure the proper disposal of any hazardous waste you generate. There are various state and federal penalties that can result from improper disposal of these wastes. In addition to potential citations, fines and imprisonment, improper waste disposal can also result in national media attention and damage to the University's reputation.

### **YOU CAN BE PERSONALLY HELD LIABLE FOR "WILLFULLY AND KNOWINGLY" VIOLATING THESE REGULATIONS.**

You also have a moral responsibility to properly dispose of chemicals that can pose a present or potential hazard to human health or the environment which

includes avoiding accidents and injuries to students, faculty, staff and the campus community.

If you have any further questions as to what defines a “hazardous waste” or how to treat specific waste chemicals, refer to the Hazardous Waste Management Guide (revised December 2005) for the IU Bloomington campus. ([Link to Haz waste mgmt guide](#))

### **Hazardous Waste Disposal Procedures**

When chemicals are no longer in use, the following steps should be followed to properly dispose of them.

- Place spent chemical into appropriate container. (*Empty bottles that the chemical was originally stored in are best*). **DO NOT MIX CHEMICALS**
- Label the container as “hazardous waste” and include the chemical name and the date on the container.
- As soon as the container is full, e-mail EH&S for a waste pick up by going to the link located on the EH&S homepage and completing an online request form: <http://www.ehs.indiana.edu/waste/main/cfm> .
- Place a completed waste tag on the container. (*If you are unsure of any information, do not guess. An EH&S staff member will contact you if there are any questions.*)
- The chemical will be picked up at your darkroom on a scheduled pickup day.

**\*You do not need to be at the darkroom at the time of waste pickup unless access is limited.**

### **Non-Hazardous Waste Disposal**

**Developer** (*Hydroquinone solutions*) may be poured down the sink; although pure hydroquinone should never be released into the environment.

**Stop Bath** (*Acetic Acid solutions*) may be poured down the sink with running water.

## **EMERGENCY CHEMICAL SPILL PROCEDURES**

**For *MINOR* spills that are known to be of limited danger:**

In the event of a spill involving the release of a type or quantity of chemical that does not pose an immediate risk to health, and does not have the potential to become a major emergency within a short time period:

1. Notify other darkroom personnel of the accident.
2. Isolate the area. Close darkroom doors and evacuate the immediate area if necessary.
3. Remove all ignition sources and establish exhaust ventilation if possible. Vent vapors to the outside of the building by opening windows and/or turning on a fume hood.
4. Choose the appropriate personal protective equipment (PPE) such as gloves, goggles, lab coat etc.
5. Utilizing your spill kit and spill guide provided by EH&S, confine and contain the spill with absorbent material. Collect the solid material into the dustpan and place into the 5 gallon bucket or other appropriate container. Call UOEHSM (5-6311) for pick up or request online <http://www.ehs.indiana.edu/waste/main/cfm> .

**In the event of a MAJOR chemical spill:**

IF THE SPILL INVOLVES ONE OF THE FOLLOWING SITUATIONS:

- A large quantity of chemicals.
- An unknown chemical.
- A small quantity of a high hazard chemical.
- An uncontrollable fire or explosion.
- Serious personal injury.

The following procedures should be followed:

1. Evacuate the room
2. Evacuate the floor and/or building as necessary
3. Report the spill (**DIAL 9- 911**)
4. Limit access to the area
5. Stand by from a safe place until help arrives

**When reporting a spill, you will be asked for the following information:**

- Where the spill occurred (building and room number)
- The materials involved (SPELL CLEARLY and SLOWLY)
- The amount spilled

- Any immediate actions you took
- How the spill occurred (if you know or can guess)
- Who first observed the spill and at what time
- Are there any injuries
- A call back number (if available)

Further information can be found at:

<http://www.ehs.indiana.edu/em/spilweb.pdf>

## **DARKROOM LAB CLOSE-OUT PROCEDURES**

In the event of a room use or personnel change, please refer to the laboratory close-out procedures found at:

[http://www.ehs.indiana.edu/lab\\_closeout\\_chem\\_transport.html](http://www.ehs.indiana.edu/lab_closeout_chem_transport.html)

and contact the EH&S office (Chris Kohler @ 5-5454 or Trever Boehm @ 5-3233) to schedule a lab clearance inspection. Proper disposal of hazardous materials is required whenever a responsible individual leaves the University or transfers to a different laboratory. ("Responsible individual" can include, but is not limited to: faculty, staff, post-doctoral, and graduate students.)

## **ADDITIONAL TIPS FOR HANDLING CHEMICALS**

- ALWAYS use a water rinse between developer and stop bath (*or else sulfur dioxide gas will form*).
- ALWAYS discard stop bath solutions contaminated with developer.
- ALWAYS add acids to water, not water to acids.
- ALWAYS cover all baths when not in use (*to prevent release of toxic vapors*).

**APPENDIX A**

Chemical	Alternative Chemical(s)
<i>Developer</i> —Hydroquinone	Phenidone
<i>Developer</i> —Metol	Dimezone S
<i>Developer</i> —Borates	Buffering agents: alkanolamines and carbonates
<i>Stop Bath</i> —Glacial Acetic Acid	Dilute solutions of acetic acid, white distilled vinegar, or citric acid and water OR just plain water.
<i>Fixer</i> —Ammonium Thiosulfate	Sodium Thiosulphate
<i>Intensifier</i> —Mercuric (II) chloride	Chromium Intensifier
<i>Reducer</i> --xylenes	Farmer's Reducer—hypo potassium ferricyanide
<i>Toner</i>	All known to be highly toxic.

### **EMERGENCY INFORMATION SIGN**

All darkrooms must fill out and post the following sign outside the door. This sign allows workers, visitors, and emergency responders to know what types of hazards are within the room so that they may don the appropriate PPE.

<b>EMERGENCY INFORMATION</b>			
Department/Building: _____		Room #: _____	
PI/Supervisor: _____		Office: _____	
Office Phone: _____		Cell/ Home/ Other Phone: _____	
Dept. Laboratory Chemical Safety Officer: _____			
Office Phone: _____		Cell/Home/ Other Phone: _____	
Laboratory Occupants		Contact Phone	
_____		_____	
_____		_____	
_____		_____	
_____		_____	
_____		_____	
<b>SPECIAL HAZARDS:</b> (check all that apply)			
<input type="checkbox"/> Water-Reactive Chemicals	<input type="checkbox"/> Corrosives	<input type="checkbox"/> Carcinogens/Reproductive Toxins	
<input type="checkbox"/> Air-Reactive Chemicals	<input type="checkbox"/> Biohazards	<input type="checkbox"/> Flammable Liquids/Explosives	
<input type="checkbox"/> Acutely Toxic Chemicals	<input type="checkbox"/> Radioisotopes	<input type="checkbox"/> X-ray/UV/Laser, High Voltage.	
<input type="checkbox"/> Other _____		<input type="checkbox"/> NONE	
<b>NON-HAZARDOUS:</b> <input type="checkbox"/> Media <input type="checkbox"/> Sample Storage <input type="checkbox"/> Dyes			
Environmental Health and Safety   Phone: <u>855-6311</u>		Biosafety Office   Phone: <u>856-3638</u>	
IU Police Department   Phone: <u>9+911/ 855-4111</u>		Chemical Safety   Phone: <u>855-5454</u>	
Radiation Safety Office   Phone: <u>855-3230</u>			