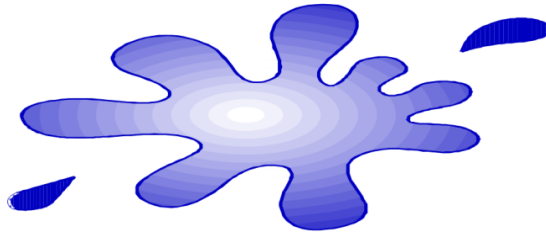


# **Chemical Spill Response Guide**



**INDIANA UNIVERSITY**  
Office of Environmental, Health, and Safety

## **EMERGENCY PHONE NUMBERS**

Police Department (IUPD) ..... 911  
Fire Department ..... 911  
Ambulance ..... 911

## **NON-EMERGENCY PHONE NUMBERS**

IUB ..... 812-855-2004  
IUPUI ..... 317-274-2005  
IUE ..... 765-973-8429  
IUK ..... 765-455-9432  
IUN ..... 219-980-6501  
IUS ..... 812-941-2400  
IUSB ..... 574-520-4499

## **FOR FURTHER INFORMATION**

### **Environmental Health and Safety:**

<https://protect.iu.edu/environmental-health>

### **Laboratory Safety & Chemical Hygiene Plan:**

<https://protect.iu.edu/environmental-health/laboratory-safety>

### **Waste Management Guide:**

<https://protect.iu.edu/environmental-health/environmental-management>

### **Biological, Chemical, Radiological Spill Reporting and Response Program**

<https://protect.iu.edu/environmental-health/environmental-management/chemical-spill.html>

## **INTRODUCTION**

### **CHEMICAL SPILL RESPONSE**

Despite the best efforts of researchers to practice safe science in the laboratory, accidents resulting in the release of chemicals will occur. For this reason, it is essential that all laboratory personnel have a spill response plan which includes appropriate procedures and materials to adequately contain and clean up a chemical spill.

The following procedures should be used as a guide to help laboratory personnel design an effective spill control plan for their laboratory. These procedures tell you how to prepare your own spill kit, give you step-by-step instructions for spill cleanup, and provide instructions for who and when to call for assistance.

Spill kits are also available commercially and from EHS.

## SPILL RESPONSE PROCEDURES

If the spill poses an **immediate risk to life and health** because of the type or quantity of the chemical or involves an **uncontrolled fire or explosion**:

- Evacuate the immediate area and keep others from entering the area until assistance arrives. If building evacuation is necessary activate the nearest fire alarm.
- Call 911 and EHS and give details of the accident including location, types and quantities of hazardous materials involved, and if there is personal injury. Stay on-site until assistance arrives.

If the accident involves personal injury or chemical contamination, follow the above steps as appropriate and at the same time:

- Move the victim from the immediate area of fire, explosion, or spill (if this can be done without further injury to the victim or you).
- Locate nearest emergency eyewash or safety shower. Remove any contaminated clothing from the victim and flush all areas of the body contacted by chemicals with copious amounts of water for 15 minutes.

- Administer first aid as appropriate and seek medical attention.

If the accident involves a release of sprinkler water or flooding, be aware of electrical shock hazards. Spills involving fires may activate the sprinkler systems.

- Do not enter flooded areas until it has been cleared for electrical safety purposes or the electricity has been shut off to the affected area at a breaker panel by a qualified employee.
- Avoid contact with flood waters that may be contaminated with sewage, asbestos, chemicals, biological materials or radioactive substances.

The following guidelines should be used for any spill that does not meet the exceptions in the Biological, Chemical, Radiological Spill Reporting and Response Program ([protect.iu.edu/environmental-health/environmental-management/chemical-spill.html](http://protect.iu.edu/environmental-health/environmental-management/chemical-spill.html)).

- Call EHS (or 911 after hours) to report the spill.
- Remove ignition sources and unplug nearby electrical equipment.
- Establish exhaust ventilation to the outside of building only by opening windows or setting the fume hood control to “purge” or its highest setting.

## SPILL RESPONSE PROCEDURES

- An EHS representative will respond to determine a course of action for the spill.

If EHS determines that you can clean up the spill then:

1. Locate spill kit.
2. Choose the appropriate personal protective equipment for the chemical spilled (goggles, face shield, impervious gloves, lab coat, apron, etc.).
3. Confine and contain the spill. Cover with a 1:1 mixture of clay and sodium bicarbonate or other appropriate absorbent material (refer to the *Chemical Spill Kit Contents* section of this guide). If noxious vapors or acrid fumes evolve, leave the area and call for assistance.

Note: Acid and base spills should be fully neutralized prior to collecting spilled materials. Sweep all solid materials, absorbent, broken glass, etc. into the plastic dust pan and place in a sealed 5 gallon container.

4. Wet mop the spill area. Decontaminate broom and dustpan or discard with spilled materials. Put all contaminated items (gloves, clothing, etc.) into a sealed 5 gallon container or plastic bag. Bring all waste to the next chemical waste collection or call

EHS or your regional campus contact for a pickup.

In the event of a spill involving the release of a type or quantity of a chemical which meets the exceptions in the Chemical, Biological, and Radiological Spill Response and Reporting Program and does not pose an immediate risk to health (such as those with an NFPA health hazard rating of 0, 1, or the GHS “Exclamation” pictogram) and does not involve chemical contamination to the body:



- **The Spill Reporting and Response Program including a spill report form** are found at: <https://protect.iu.edu/environmental-health/environmental-management/chemical-spill.html>.
- **All spills must be reported.** You can report using the spill report form, or e-mail your EHS campus representative or the main EHS e-mail box at [iuehs@iu.edu](mailto:iuehs@iu.edu).
- **EHS assistance** is available if needed by calling your EHS office or your regional campus representative.

## **SPILLS REQUIRING SPECIAL PROCEDURES**

### **Acid Chlorides (Acyl Chlorides: R-CO-Cl)**

- Evacuate and call EHS or your regional campus representative.

### **Alkali Metals (lithium, sodium, magnesium, potassium)**

- Smother with dry sand or cover with contents from a Type "D" fire extinguisher. Use of a Type "D" fire extinguisher is the preferred extinguishing method.
- Avoid contact with water. Do not try to quench.

### **White or Yellow Phosphorus**

- Blanket with wet sand or wet absorbent.

### **Bromine**

- Evacuate and call EHS.



## **Hydrofluoric Acid**

- Neutralize with soda ash (sodium carbonate,  $\text{Na}_2\text{CO}_3$ ) or lime (calcium oxide,  $\text{CaO}$ ) or absorb the spill with special HF spill pillow. Note: Avoid hazardous effervescence and spatter.
- Absorb with inert absorbent material.

## **Mercury**

- Use aspirator bulb or suction device to collect mercury beads (Do not use a broom and do not use a vacuum cleaner.)
- Collect mercury with the mercury (amalgamating) decontamination powder found in mercury spill kits (available from commercial vendors).
- Call EHS or your regional campus representative and ask for assistance if you are unable to accomplish an adequate clean up.

**Label the waste container with a “HAZARDOUS CHEMICAL WASTE TAG” and deliver it to EHS during chemical waste collection, or schedule a waste pick-up, or contact your regional campus representative for waste removal.**

**FOR ASSISTANCE CALL EHS**

## SPECIAL EMERGENCY TREATMENT

### Hydrofluoric Acid Contamination

- *First aid must be started immediately in the event of contact in any form.*
- Flush the affected area with cold water for 5 minutes and remove all contaminated clothing.
- For skin contamination, apply calcium gluconate gel (2.5%) *while wearing clean impervious gloves*. (If calcium gluconate gel is not available, continue to flush skin until medical attention is received).
- For eye contamination, continue flushing eyes with water until medical attention is obtained.
- For inhalation, remove victim to fresh air and get medical attention immediately.
- Have someone seek medical attention while victim continues to flush the affected area with water. Inform medical personnel that injury involves hydrofluoric acid.

## CHEMICAL SPILL KIT CONTENTS

Every laboratory that uses chemicals must have access to a spill control kit. The keys to an effective spill kit are location and content. Spill kits should be strategically located around work areas in fixed locations so they will be visible and easily accessible. Label the spill kit and, if it is placed in a cabinet, closet, or drawer, label the location. Although most spill kit contents are common items which may be found throughout the lab, they must be consolidated for emergency use.

Spill kits can be purchased through most supply vendors that sell chemicals or safety supplies. In addition, spill kits are available at no charge from EHS.

The following is a list of recommended items that should be contained in a chemical spill kit. However, it is important that spill kits be tailored to meet the specific spill control needs of each laboratory.

### **Absorbents:**

- Universal Spill Absorbent - 1:1 mixture of Flor-Dri (or unscented kitty litter) and sodium bicarbonate (baking soda). This all purpose absorbent is good for most chemical spills including solvents, acids (not good for hydrofluoric acid), and bases.

- Acid Spill Neutralizer - sodium bicarbonate, sodium carbonate, or calcium carbonate.
- Alkali (Base) Neutralizer - sodium bisulfate.
- Solvents/Organic Liquids - Inert absorbents such as vermiculite, clay, sand, Flor-Dri, and Oil-Dri.
- Hydrofluoric Acid - HF compatible spill pillow or neutralize with either soda ash (sodium carbonate,  $\text{Na}_2\text{CO}_3$ ) or lime (calcium oxide,  $\text{CaO}$ ) and transfer to a polyethylene container.

#### **Personal Protective Equipment (PPE)**

- Goggles and face shield.
- Heavy neoprene gloves.
- Disposable lab coat and corrosive resistant apron.
- Plastic vinyl booties.
- Dust mask (This will NOT protect you from chemical exposure but will minimize exposure to respirable dust created from absorbents during clean up.)

Note: Respirators are not available for laboratory personnel except in special circumstances and approval by EHS. Spill cleanups that require respiratory protection must be performed by EHS or trained emergency response personnel.

Volatile substances that are toxic, highly toxic, or generate noxious gases during neutralization must be handled using respiratory protection during a spill cleanup. Evacuate and call EHS or your regional campus representative.

**Clean-Up Material**

- Plastic dust pan and scoop.
- Plastic bags (30 Gallon, 3 mil thickness) for contaminated PPE.
- One plastic bucket (5 gallon polyethylene) with lid for spill and absorbent residues.

**Other**

- Hydrofluoric acid neutralizing antidote - Calcium gluconate gel (available commercially). Call EHS for more information.
- Mercury spill kit - Aspirator bulb and mercury decontaminating powder.
- Alkali metals - Type “D” fire extinguisher or dry sand.

## **“REPORTABLE QUANTITIES”**

The Reportable Quantity (RQ) of a spilled hazardous material is one (1) pound for many chemicals. The university is legally obligated to report certain spills to the Federal EPA and to the State IDEM within twenty-four (24) hours of the spill. To comply with this requirement, always report any spill of a hazardous material to EHS or your regional campus representative.

There are no legal consequences for a person that spills a chemical or who reports the spill unless a Reportable Quantity is not reported.

## **CHEMICAL STORAGE**

The following general guidelines should be used to manage chemical storage areas in laboratories:

- Inspect chemical storage areas daily for unknown chemical spills and container leaks or failures.
- Only keep on hand chemicals for which there is adequate storage space.
- Separate incompatible chemicals by hazard class - flammables, corrosives (acids & bases), oxidizers, poisons, carcinogens, explosives, water reactives and air reactives.

- Use secondary containers, such as tubs or trays, to store separated chemicals whenever necessary.
- Acids are incompatible with bases, flammable liquids, and oxidizers.
- Oxidizers are incompatible with reducers and organic materials, such as flammable liquids.
- Cyanide salts must be stored away from acids.
- Flammable liquids must be stored in a flammable liquids cabinet if there are greater than 10 gallons in the laboratory.
- Peroxide-forming chemicals, and other time-sensitive substances, must be dated when opened and disposed of by the expiration date.
- Store solid oxidizers together in a secondary container separated from solid organic chemicals.
- Nitric acid (oxidizing) should be separated from organic acids using a secondary container.
- Water reactive or hygroscopic chemicals should be stored separately, in closed containers, and away from moisture or humidity.

## REMEMBER

### You should call EHS for help if:

- You need assistance.
- The spill is greater than 500 ml.
- The spill poses a fire hazard.
- The spill is very toxic.
- The spill is outside of a fume hood or you are unable to ventilate the spill area and need respiratory protection.

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