



KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

College of Petroleum  
Engineering & Geosciences

**CPG-OHS**

# Chemical Hazardous Waste Handling and Disposal



Environment, Health and Safety Department, KFUPM

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## **INTRODUCTION**

Disposal of chemical waste not suitable for drain or trash disposal must be collected and managed as chemical waste. The dumping of hazardous substances poses a significant threat to the environment. These wastes could be corrosive, inflammable, explosive, or react when exposed to other materials. Some hazardous wastes are highly toxic to environment including humans, animals, and plants. Unless hazardous substances are properly treated and applying special techniques of handling, storage, transportation, treatment, and disposal of hazardous wastes, it will continue to do great harm to living things that contact them, now and in the future. Because of the seriousness of the safety and health hazards related to hazardous waste operations. The objective of this is to ensure that all hazardous waste is properly and safely managed, from its generation through handling, storage, and preparation for transportation. This policy covers the procedures for both waste collection and disposal of hazardous substances.

## **PROCEDURE**

The whole procedure for handling and disposal of chemical waste material is summarized as below:

### **IDENTIFICATION OF HAZARDOUS MATERIAL**

Any chemical waste material is considered hazardous if it is on the list of specific chemical substances developed by the Federal Environmental Protection Agency (EPA). General categories are described as below:

- Most commonly used organic solvents (e.g. acetone, methanol, toluene, xylene, methylene chloride etc.)
- Nonspecific sources that includes a broad range of spent halogenated solvents
- If it exhibits any of the following characteristics as defined by the Environmental Protection Agency (EPA).

### ***Ignitable***

- A liquid with a flash point less than 60 degrees Centigrade or it's a not a liquid but capable of causing fire through friction, absorption of moisture or spontaneous chemical changes
- an ignitable compressed gas
- an oxidizer

### ***Corrosive***

It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5. It is a liquid and corrodes steel at a rate greater than 0.250 inches per year at 55 degrees Centigrade

### ***Reactive***

- It is normally unstable; it reacts violently with water.
- It forms potentially explosive mixtures with water.
- It generates toxic gases, vapors or fumes when mixed with water. (e.g. cyanide or sulfide waste generate toxic gases, vapors or fumes at pH conditions between 2 and 12.5).
- It is capable of detonation or explosive decomposition if subjected to strong initiation or under standard temperature and pressure

### ***Toxicity***

A chemical waste material is considered toxic if it contains certain metals, pesticides or selected organics above specified levels. It is capable of causing environmental or health damage if improperly disposed.

## **DESIGNATION OF PROPER STORAGE AREA FOR CHEMICAL WASTE**

A storage area of chemical waste should be selected very carefully. This area should meet following safety requirements:

- It should be a separate designated area in the facility where this chemical waste is generated.
- It should be under control and surveillance of laboratory in-charge.
- It should be away from the normal lab activities.
- Area should be labeled as “HAZARDOUS WASTE”

## **SELECTION OF COMPATIBLE CONTAINER FOR CHEMICAL WASTE**

The selection of proper container for storage of hazardous chemical waste material is very important. workers should consider following precaution during selection of chemical waste container:

### ***Chemical Compatibility***

- It should be chemically compatible with the material it will hold. Chemical waste material should not react with it, weaken it, or dissolve it or its lid.
- Following basic guide lines should be considered:
  - Do not store acids or base in a metallic container
  - Do not store Hydrofluoric acid in a glass container
  - Organic solvents should not be stored in light weight polyethylene containers.

### ***Caps and Closure***

- All chemical waste containers should have leak-proof, screw-on caps, so that contents should not leak if container is over turned.

- Corks or parafilm should not be used in place of proper caps
- A container should be closed except when adding waste material to it.

#### *Size*

- A container should be selected of appropriate size.
- Smaller quantities should be stored in smaller containers.
- Containers should be placed in a secondary container to capture spills or leakage.
- A secondary container should also be chemically compatible. Generally, lab trays or dish-pans are used as secondary containers.

#### **LABELLING OF EACH CHEMICAL WASTE CONTAINER**

- Attach a complete hazardous waste tag or label on the container before using it.
- All other labels on the container should be crossed out.
- Write down the date, when chemical waste was stored in the container.
- The label should be visible.
- Make sure the container label is filled out with all hazard waste.
- It should be labeled properly as “DANGER! HAZARDOUS CHEMICAL WASTE”

#### **HANDLING OF LIQUID CHEMICAL WASTE MATERIAL**

- **Do not** overfill liquid waste containers. Leave a sizable amount of head space in the container to allow for expansion and safe transportation — 10% head space is a good rule of thumb.
- Do not mix solids with liquid waste.

- Collect and store chemical waste in closed containers.
- Keep organic solvents in separate containers.
- Do not mix organic solvents with toxic metal solutions.

## **HANDLING OF SOLID CHEMICAL WASTE MATERIAL**

Chemically contaminated solid waste can be divided into following three categories:

- **Lab trash:**
  - Examples include absorbent paper products, Kim Wipes, gloves, and other lab supplies packed in proper bags.
  - These bags should be labelled with accurate contents and chemical constituents.
- **Dry chemicals:**
  - Use proper compatible containers for solid chemical waste material.
  - Label the container with a hazardous waste tag.
- **Sharps:**
  - Sharps are items capable of puncturing, piercing, or tearing regular waste bags. Examples include pipettes, pipette tips, needles, scalpels, razor blades, and broken glass.
  - Sharps require special packaging with proper labels.

## **DISPOSAL OF EMPTY CONTAINERS**

Empty containers that once held extremely hazardous waste must be labeled with a hazardous waste tag and should be disposed of properly.

## **CHEMICAL SPILLS**

Chemical spill is the uncontrolled release of a hazardous chemical waste, and here what we should do:

- Assure that large chemical spills are immediately reported.
- Evacuate the area if needed and Call for help.
- Seek medical attention for all chemical splashes to the eyes or body.
- Spill kits must be present in each lab.

### *Cleaning Up Spills*

- If the substance is volatile or can produce airborne dusts, close the laboratory door and increase ventilation.
- Control the spread of the liquid. Make a dike around the outside edges of the spill, with spill kit material.
- Decontaminate the area and affected equipment. Ventilating the spill area may be necessary.
- Dispose of the wastes. Keep cleanup materials separate from normal trash. Promptly place cleanup wastes in an appropriate hazardous waste receptacle.

## **REQUEST FOR REMOVAL OF HAZARDOUS WASTE**

The lab in-charge of each lab should fill the chemical waste disposal form and submit to the safety community chairman.

The chemical waste disposal form attached as appendix should contain following information.

- The name and department of the person submitting the form.
- Contact number for the requestor



- Building name and lab name and number
- Type of chemical waste material or chemical name
- Nature of hazards i.e. toxic, flammable etc.
- Container label information i.e. number of containers of waste, nature of material, hazards, collection date etc.
- Capacity of the container

It is responsibility of Chairman of safety community of your department to call the lab technical support office (LTSO) department. for removal of chemical waste material from your department.

**CHEMICAL WASTE DISPOSAL FORM**

**Name of Host Unit:** \_\_\_\_\_

**Lab Number:** \_\_\_\_\_

**Description of Waste:**

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If mixture, proportions (approx.) :

Organic \_\_\_\_\_%, Inorganic \_\_\_\_\_%, Oil \_\_\_\_\_%, Other \_\_\_\_\_%

**Quantity** \_\_\_\_\_ Liters/Kg

**Nature of Hazard:** Toxic  Flammable  Explosive  Corrosive  Unknown

**Type of the container:**

Glass  Metal  Plastic  Others

**Submitter:**

Name \_\_\_\_\_ Tel: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Comments by Safety Coordinator of host unit:**

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Name \_\_\_\_\_ Tel: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**CONTAINER LABEL**

*Host Unit:* \_\_\_\_\_

*College Division:* \_\_\_\_\_

*Lab:* \_\_\_\_\_

*Nature of Material* \_\_\_\_\_

*Date Collected* \_\_\_\_\_

*Date Submitted* \_\_\_\_\_

*Analyses:* Peroxides Halogens  
Organic Aqueous Acidic Basic

*Hazards:* Flammable

Carcinogenic Explosive Corrosive

Poison Toxic

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