



## **DEPARTMENT OF PETROCHEMICAL ENGINEERING**

### **STANDARD OPERATING PROCEDURE FOR THE DISPOSAL OF CHEMICAL WASTE FROM CHEMISTRY LABORATORY**

The chemicals (Halogenated solvents, Non — halogenated solvents, Acids, Organic and Inorganic salts) used for doing experiments in the chemistry laboratory are properly handled and disposed by neutralizing the chemicals to the plastic containers (10 Litres).

The various salts used for analysis purpose are Carbohydrates (Sucrose, Glucose, Fructose, and Maltose), Urea, Aniline, Benzophenone, Nitrobenzene, ammonia and Aldehydes (Benzaldehyde, acetaldehyde, Salicylaldehyde and Cinnamaldehyde), Amide groups (Urea, acetamide, Benzamide) . These salts used for experiments are only in smaller amount (in 1 to 2 grams). The salts are dissolved mostly by solvents especially in water and alcohol as well as with acids and reagents. But, the acids and reagents are used only in drops (maximum of 1 to 2 ml).

Total amount of solvent used in the last one year irrespective of the compounds for the utilization of doing experiments in the chemistry laboratory is about 5 litres. Similarly, the organic and inorganic salts used were about 500 grams.

After the completion of each experiment the left over chemicals were poured into the 10 litre plastic bottle by adding more amount of tap water in to it. At the end of every semester the collected disposed chemicals were sending to the water treatment plant.

#### **Liquid Chemicals**

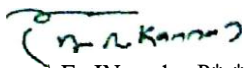
#### **Procedure**

- The used and unused liquid chemicals both (Halogenated and non-halogenated) are completely neutralized.
- All neutralizations were performed within a Polyethylene bucket while wearing nitrile rubber gloves, a lab coat, and eye protection.
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#### Neutralization Procedure for Acids

- Take tap water pour it into 1 or 2 gallon polyethylene bucket.
- Dilute the acid at least 1:10 (1 part acid to 9 parts of water) by slowly pouring and stirring the acid into the water.
- Add basic solution (sodium hydroxide) into diluted acid with stirring.
- Monitor pH with pH meter.

  
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- \\lien pl4 i. • beti'celi 6 and 9. dispose in a drain followed with excess water. A pFI near 7 is preferred tt reduce tlic possibility of plumbng damage.
- 11' j ou ii'isli to diliite an nci d with water before neutralizing it xvitli a base (e.g., sodium hydroxide. potassium hydroxide or sodium bicarbonate), always add acid to water; never add water to acid.

### Itj drochloric .4citI

- Slo 'li add hi drochloric acid to a container of tap water to fomi a 1:10 dilution of acid io water.
- Slo» ly add a 1M potassium hydroxide, sodium hydroxide. or sodium carbonate solution until the pH is in the range of 6.0 to 8.0.
- Flush doc n the drain with an excess of tap water.

### Sulfuric Acid

- S1o»'ly add sitlliiric acid to a container of tap water to form a 1:10 dilution of acid to is'ater.
- Slowly add sodium carbonate until the pH is in the range of 6.0 to 8.0.
- » Flush doom the drain with an excess of lap water.

### Acetic Acid

- Slowly add acetic acid to a container of tap n'ater to form a 1:10 diliition of acid to water.
- Sloii'ly add a 1M solution of sodium hydroxide or sodium carbonate until the pH is in the range of 6.0 to S.O.
- Flush down the drain with an excess of tap water.

### Phosphoric Acid

- Slowly add phosphoric acid to a container of tap water to fomi a 1:10 dilution of acid to water.
- While stirring, slowly add sodium carbonate until the pH is in the range of 6.0 lo 8.0.
- Flush down the drain with an excess ol''tap n'ater.

### Bases

#### Potassium Hydroxide

  
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- While stirring, slowly add potassium hydroxide into a container of ice water to form a 1:10 dilution of base to water.
- Slowly add 1M hydrochloric acid about 1 ml at a time until the pH is between 6.0 and 8.0.
- Flush down the drain with an excess of cold water

### Sodium Hydroxide

- While stirring, slowly add sodium hydroxide into a container of ice water to form a 1:10 dilution of base to water.
- Slowly add 1M hydrochloric acid about 1 ml at a time until the pH is between 6.0 and 8.0.
- Flush down the drain with an excess of cold water

### Calcium Hydroxide

- While stirring, slowly add calcium hydroxide into a container of ice water to form a 1:10 dilution of base to water.
- Slowly add 1M hydrochloric acid about 1 ml at a time until the pH is between 6.0 and 8.0.
- Flush down the drain with an excess of cold water.

Finally all the neutralized solvents are sent to the effluent treatment area for further treatment.

  
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