GENERAL LABORATORY SAFETY PROCEDURES

DEPARTMENT OF CHEMISTRY, IISER BHOPAL

(1) Rules:

1. Work areas should be kept free from obstruction.
2. Access to exits, emergency exits, aisles, and controls should never be blocked.
3. Emergency exits should be kept unlocked from the inside.
4. Stairways and hallways should not be used as storage areas.
5. All the accidents, even if they do not result in injury, SHOULD be reported to the PI and safety committee immediately. The committee will try to ensure that recurrence of such accidents can be avoided.
6. Goggles and shoes are mandatory for students in synthetic labs. Use of labcoats will be relaxes till we have working AC's.
7. Gas cylinders should be fastened with chain in the lab and carried only with the aid of cylinder trolley. Solvent drums and waste solvent cans should be carried only in lab cart. One trolley and cart will be provided at every floor near freight elevator. Implementation of this rule will be done once the elevators are functional.
8. Contact details of group members should be placed at a visible place on or near exit door of the lab.
9. Emergency telephone numbers of Security, Health center, Ambulance, Fire guard and IWD should be placed on noticeboard in the Lab.

Points for department: Exit map/Location of fire extinguishers/water hoses/chart of hazard symbols and their meaning for each lab should be provided.

(2) Guidelines and Recommendations:

Basic Precautions

Awareness is the most fundamental rule of chemical safety. Take time to understand the safety and health hazards of the chemicals in the workplace. Every laboratory worker should take the following precautions:

1. Assume that unfamiliar chemicals are hazardous.
2. Review the safety and health hazard data of all chemicals used in the laboratory. Know the signs and symptoms of over exposure and the physical and sensory characteristics (odor, appearance) of these chemicals.
3. Know appropriate procedures for emergencies, including the location and operation of all emergency equipment.
4. Avoid distracting or startling others.
5. When working with hazardous materials inform your principal investigator (PI), have a second person nearby.
6. Avoid leaving experiments unattended.
7. Never use unlabeled chemicals or a chemical who's labeling is suspect.
8. Always order the least amount of chemical required.
9. Use appropriate personal protective equipment at all times.
10. Use hazardous chemicals in a chemical fume hood, whenever possible.

11. Maintain equipment and inspect it regularly for proper function.
12. Use guards and shields where possible. All mechanical equipment should have adequate guarding.
13. Use safety shields when there is a possibility for explosion or implosion.
14. Store and handle chemicals in accordance with the guidelines in the MSDS or consult your PI.
15. Store hazardous waste in a closed, labeled container in as designated satellite accumulation area.
16. Dispose of hazardous waste properly
17. Avoid pouring chemical waste materials into the sink.
18. Do not eat, drink, smoke, chew gum or apply cosmetics in the laboratory.
19. Do not store food or beverages in the laboratory or in a chemical refrigerator.
20. Do not mouth pipette. Use a mechanical pipette or aspirator.
21. Do not use broken or cracked glassware.
22. Eye wash and safety showers should be checked periodically (once in a week)

Housekeeping/Hygiene

The following housekeeping and hygiene practices should be implemented at all times to reduce the likelihood of accident or chemical exposure:

1. Work areas should be kept clean.
2. Hands should be washed after every experiment, before touching any non-contaminated area or object, and before leaving the laboratory area.
3. Work areas should be cleaned at the end of the experiment and at the end of the day.

Chemical Storage and Handling

Many potential hazards are associated with the storage and handling of laboratory chemicals. These hazards may be minimized by understanding the properties of the chemicals and by developing procedures by which they may be handled safely. Simply storing chemicals alphabetically is not prudent. Flammable, corrosive, explosive, and peroxide forming agents require special precautions. Storing incompatible chemicals together may have disastrous results.

The following guidelines are prudent for all chemical storage and handling:

Chemical handling: Use bottle carriers to transport chemicals. Close caps securely. Transfer chemicals carefully. Add acid to water, not water to acid.

Labels: Be sure all labels are securely attached and legible. Keep chemicals in their original containers if possible. Label all secondary containers to avoid unknown chemicals and/or inadvertent reaction. Date all chemicals, which may become unstable over time or are peroxidizable.

Shelves: Do not store chemicals on hard-to-reach shelves. Labels on stored chemicals should be able to be read easily. Shelves should be made of a chemically resistant material and should have a 2-inch lip or side rails.

Incompatible chemicals: Incompatible chemicals should not be stored together. For each chemical, the hazardous nature must be considered individually and in relation to other chemicals in the area.

Excessive storage: Avoid stockpiling chemicals. Purchase only what is needed. Use older stock first. Discard chemicals that are no longer needed or that have expired.

Fume hoods: In general, fume hoods should not be used for storage of chemicals, unless the chemicals are part of the experiment being conducted in the fume hood at that time. The exception is storage in a fume hood, which is specifically designed for that storage, and where experimental procedures are not carried out.

Hazardous Waste Storage and Disposal

Regulations require that hazardous wastes be accumulated and stored in properly managed containers on sufficiently impervious surfaces (free of cracks, gaps, etc.).

Storage: Hazardous waste in laboratories must be stored in satellite accumulation areas. Chlorinated and Non-chlorinated solvents should be stored separately. Heavy metals and other toxic waste should be stored separately and disposed carefully.

Disposal: Once a satellite accumulation area container is filled, it should be disposed carefully. Waste disposal agency will pick up the containers. Disposal of hazardous wastes and chemicals in laboratory sinks is prohibited.

Labeling: Containers that accumulate and store hazardous waste must be labeled with the following information:

The words "Hazardous Waste"
The waste type in words (Non-halogenated Solvents, Waste Oil, etc.);
The associated hazard in words (i.e. ignitable, toxic, etc.); and
The date upon which the container became filled.

Containers must be labeled and situated so that labels are clearly visible.

Closure: Containers must be closed at all times, unless waste is being added or removed. Open-top funnels may not be left in open containers.

Condition: Containers must be in good condition. There may not be severe rusting, dents or other conditions that could cause leaks, etc.
Compatibility: Containers must be compatible with hazardous waste stored within them. When in doubt, use the original shipping container.

Hazardous Waste Minimization

Laboratory waste minimization techniques include:
Process/equipment adjustment or modification;
Toxic material substitution;
Waste segregation and separation; and
Recycling

Where possible, microchemistry will reduce waste volume and has the added benefit of minimizing health and safety concerns. The exercise of prudence in ordering new chemicals will also ensure that excess chemical does not become subject to disposal has hazardous waste.

Emergencies

Be sure you know the location and method of operation of the nearest:
Eye wash; Safety shower; Fire extinguisher; Spill kit
Fire alarm pull station (need installation in the chemistry building)

Spill

. If flammables are involved, extinguish ignition sources.
Clean the spill, only if the spill is manageable, you have been trained and you have appropriate cleanup materials
If you are unable or do not attempt to clean the spill, prevent the spread if possible, evacuate the area, close the lab door, and alert others or sound alarm.
Communicate with your supervisor, security etc.

Fire

Extinguish the fire if it is small, contained, you have been trained and you have an appropriate fire extinguisher available.
If you are unable or do not attempt to extinguish the fire, pull the nearest fire alarm and evacuate the building via the nearest exit.
If you are unable to sound the building fire alarm, contact the Security immediately.
Communicate with your supervisor.

Chemical Exposure

Splash to Skin or Eyes: flush with water at least 15 minutes using a safety shower or eye wash and seek immediate medical attention.
Injection: control bleeding, wash with soap and water and seek immediate medical attention.
Ingestion: call Poison Control and seek immediate medical attention.
Inhalation: stop emission if possible, alert others or sound alarm, get fresh air and seek immediate medical attention.
Communicate with your supervisor, Security as soon as possible.