FAMU ENVIRONMENTAL HEALTH & SAFETY
LAB SAFETY MANUAL

INTRODUCTION

This Laboratory Safety Manual was composed and distributed to serve as a source of general safety guidelines to be followed in teaching and research laboratories in Florida Agricultural and Mechanical University. Serious accidents resulting in severe injury and death occur at an alarmingly frequent rate in university teaching and research laboratories across the country. Most disturbing, is the fact that the vast majority of these accidents could have been prevented, or at least minimized in severity, had common laboratory safety precautions been followed. This document is meant to serve as the source from which these necessary precautions originate.

Proper use of fume hoods and person a protective equipment, proper storage of chemicals, timely disposal of dangerous chemicals, etc. are all incremental components of a chemical hygiene plan that will significantly reduce the likelihood of accidents and injuries in your science laboratory. The following chapters of Standard Operating Procedures, Hazardous Chemical Waste Management, Handling Chemical Wastes, Control Measures, ad the Appendices contain guidelines that **must be routinely followed**, if your laboratory is to be a reasonable safe environment for work and study. In the Appendices you will find FAMU's Hazard Communication Policy, Biohazardous Waste Policy, and Bloodborne Pathogen Exposure Control Plan. The University's Policy and Procedures Manual for Use of Radioactive materials is available from the Environmental Health and Safety Department.

Due to the multitude of hazardous chemical compounds used, and the endless variety of procedures utilized in science laboratories, this document is not, and cannot be comprehensive. It is the responsibility of each principal investigator and faculty member to address safety as a fist priority in all endeavors in the science laboratory and provide the additional measures of safety that cannot be provided by an institutional document. Of primary importance, the specific hazards presented by chemicals used in the laboratory must be identified by the principal investigator of faculty member, **and clearly disseminated to all who will work with or may potentially be exposed to** those chemicals. This is the primary purpose of the Hazard Communication Policy found the Appendices. It is the responsibility of the principal investigator of faculty member to insure that all personnel so involved or affected, clearly understand the hazards, precaution, and emergency procedures specific to the chemicals that will be used in his/her laboratory.

Become familiar with the guidelines offered within, and aggressively integrate these procedures and practices into the daily activities of your laboratory.

PURPOSE

The purpose of this document is to provide general safety guidelines for use in the research and teaching laboratories at Florida A&M University. The handling of hazardous materials commonly used in science laboratories dictates that safety precautions must be given a high priority. This document is not intended to be a comprehensive set of guidelines to address all laboratory safety issues.

It is the responsibility of every principal investigator, lab instructor and supervisor to ensure that all personnel working in FAMU Science laboratories are familiar with the guidelines set forth in this document.

For additional information concerning laboratory safety contact the Environmental Health and Safety Department at 599-3442, Plant Operations Building, Suite 120.

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I. STANDARD OPERATING PROCEDURES

GENERAL

1. Smoking is prohibited in laboratories, and in any other part of University buildings.
2. A burning cigarette is an ignition source of flammable solvents in a laboratory, and the handling of cigarettes is a route of hand-to-mouth exposure for both bacterial and certain toxic substances.
3. Eating and drinks are prohibited in laboratories. These are dangerous laboratory practices and a source of hand-to-mouth contamination.
4. Food is not permitted in laboratory refrigerators. Biological specimens containing variety of pathogens and toxic chemical products may contaminate food. Chemical and Biological material may only be stored in properly labeled laboratory refrigerators.
5. The application of cosmetics is prohibited in laboratories.
6. Wearing proper Personal Protective Equipment (PPE) is mandatory when it is stipulated by policy, procedure, standard or Material Safety Data Sheets (MSDS's)
    a) Gloves should be worn whenever handling chemical that can cause harm to the skin or can be absorbed through the skin, and for protection under Universal Precaution requirements.
    b) Approved eye protection (goggles or safety glasses with side shields) specific to biological or chemical product being used must be worn when handling materials, such as acids or caustics, which may be splashed. Safety glasses are to be worn following Universal Precaution requirements.
    c) Contact lenses are not to be worn in the laboratory. Contact lenses, especially the soft ones, will absorb certain solvent vapors, offer no protection during a splash or spill, may concentrate caustic agents against the cornea, and may prevent tears from washing chemicals from the eye.
    d) Protective clothing must be worn whenever there is the potential for splashes. Do not wear lab coats with high percentages of acetate or other highly combustible materials. Lab coats must be worn in the lab and removed when leaving the lab. If disposable aprons are worn, they must be worn over lab coats or disposable isolation gowns.
    e) Shoes should be comfortable, rubber soled, and cover the entire foot (laced or loafer type). Shoes with open toes, open heels, or open weave fabric are not permitted.
7. Hair is to be secured back and off the shoulder in a way that prevents it from coming into contact with contaminated materials or surfaces and to prevent shedding of organisms into the work area. Keeping hair out of moving machinery and instrumentation is also important.
8. Men with beards must observe similar precautions.
9. Hands should be washed frequently during the day before leaving the laboratory, before and after handling specimens, and before eating smoking.
10. Pipetting by mouth of any specimens or chemicals is prohibited. Pipetting aids are available for every task.

11. All chemical containers must be labeled according to 29 CFR 1910.1200 Hazard Communication Standard. See FAMU Communication Policy in Appendices. Each investigator and professor is responsible for ensuring compliance with FAMU's Hazards Communication Program Policy.
12. Material Safety Data Sheets are to be available in each laboratory (or group of laboratories) for the products used within those areas.
13. Exits and aisles must not be obstructed in any way. No equipment, chairs, supplies, or trash is permitted in exit routes or areas. Laboratory doors are to be kept closed; however, exit doors must never be blocked, bolted, or obstructed in any way that might prevent egress.

HOUSEKEEPING – Rules of good housekeeping must be followed:

1. Rags and/of flammable solvents are to be disposed of in approved self-closing mental containers.
2. Do not hang clothing on or near radiators, steam pipes, heating instruments, or open flames.
3. Do not allow trash to accumulate in any area. Trash should be disposed of daily.
4. Needles and syringes must be disposed of in impervious sharps containers that are conspicuously labeled to ensure safe handling and disposal following the University's Biohazardous Waste Management Program.

GLASSWARE – Glassware must be handled appropriately.

1. Do not use chipped or broken glassware. Discard of it properly.
2. Glass and sharp objects must be disposed of in properly labeled impervious containers to prevent accidental cuts and punctures. Disposal of broken glass along with paper and trash is hazard to the Housekeeping and Custodial Staff.
3. Do not leave pipettes sticking out of bottles, flasks, or beakers.
4. Do not attempt to remove stoppers on glass tubing by forcing if they are stuck carefully cut them off.
5. Glass blowing and other artistic endeavors are prohibited.
6. Decontaminate glassware exposed to infectious substances, by either autoclave or chemical agent.
7. Chemical bottles must be completely emptied, rinsed with an appropriate solvent (usually water), and have the labels crossed out before disposal in impervious containers as general refuse.
8. Heated glass and containers should be handled with special heat-resistant gloves. Contact the Department of Environmental Health and Safety to discard of asbestos gloves properly; these should no longer be in service.

ELECTRICAL EQUIPMENT – Care should be exercised when using electrical equipment:

1. All instruments must be grounded, including household type appliances, such as microwave ovens.

2. All electrical shocks, including small tingles, must be reported to the laboratory supervisor immediately. Small shocks often precede major shocks and even a small tingle may suggest a potential problem.
3. Do not attempt to use an instrument that is causing shocks. Shut off current to the instrument and/or unplug it. Know the location of the circuit breakers for each lab area.
4. Do not work on or attempt to repair any instrument while it is energized. An exception to this is when instrument adjustments have to be made which require the instrument to be on. In this case, be sure hands are dry, remove all jewelry, and continue with caution.
5. Repairs or additions to the electrical system (switches, outlets, circuit boxes) area prohibited. Such work must be referred to FAMU Plant Operations.
6. Extension cords should be avoided. If used, they must be properly grounded 3-wire type. The only multiple adapters permitted are those equipped with an overload protecting fuse.

COMRPESSED GAS TANKS

1. A **compressed gas** is any material with a gauge pressure exceeding 25 p.s.i. at 70 degrees f, or nay liquid flammable material having a vapor pressure exceeding 40 p.s.i. absolute at 100 degrees F.
2. A flammable gas is one for which the United States Department of Transportation (DOT) requires their red flammable gas label. This type of gas would have a flashpoint less than 100 degrees F.
3. A toxic gas is one for which the DOT requires the white poison gas label. Toxic chemicals will produce acute or chronic health effects in those who have been improperly exposed.
4. All compressed gases received, used, or stored, must be labeled according to the DOT's regulations. In addition, each cylinder must be marked by label or tag with the name of its contents.
5. Employees should be familiar with the particular characteristics of the gases, I.e.m flammability, reactivity, toxicity, etc.
6. Cylinders must be stored and used upright (valve end up), and must be securely fastened to prevent their falling or being knocked over.
7. Cylinder valves are to be protected with a standard cap whenever not in use (empty or full). Refrigerators are to be protected with covers where there is likelihood of damage.
8. Cylinders are not to be exposed to temperature extremes nor stored close to combustibles.
9. Cylinders must be exposed to excessive dampness or to corrosive chemicals or fumes.
10. Gases are not to be transferred from one vessel to another (except dry ice and cryogenic material). Do not try to refill compressed gas cylinders.
11. Nor repair or alterations are to be made to cylinders or accessories.
12. Before using a cylinder, slowly "crack" the valve to clear dust or dirt, being sure the opening is not pointed at anyone. Suitable precautions should be taken when toxic or

flammable gases are involved. Do not stand in front of the regulator gauge glass when opening the valve.

13. Never use a cylinder with a regulator.
14. After attaching the regulator, and before the cylinder is opened, see that the adjusting screw of the regulator is released. Never permit the gas to enter the regulator suddenly.
15. Never try to stop a leak between the cylinder and regulator by tightening the union nut unless the valve has been closed first.
16. Never strike an electric arc on a cylinder.
17. Never use a damaged cylinder.
18. Valves must be closed when returning empty cylinders.
19. Empty cylinders must be marked **EMPTY** or **MT** and stored apart from full cylinders while waiting to be removed.
20. When transporting cylinders, whether empty or full:
    a. The protective cap must be in place.
    b. Use a cradle for hoisting, never a lifting magnet or sling.
    c. Avoid dropping and striking cylinders together.
    d. Use a suitable hand truck with cylinder firmly secured. Avoid dragging, sliding or rolling cylinders.
    e. Cylinders must be secured with straps or chains while be transported to, and when in, motor vehicles.

21. Special procedures, interests and emergencies:
    a. "Flow experiments with flammable gases are not to be left unattended.
    b. Consideration is to be given for the need of electrically bonding cylinders containing flammables.
    c. Acetylene should not be utilized in lines or hoses at a pressure exceeding 15 p.s.i.
    d. Safety plugs in the valves of chlorine cylinders fuse at 157 degrees F. Care must be exercised to see that they are not exposed to steam, hot water, etc., which could produce this temperature. Chlorine leaks may be located using a cloth wet with aqua-ammonia, which will produce white fumes (ammonium chloride) in the presence of chlorine. In order to perform this task, the appropriate respiratory protection must be worn.
    e. All connections in a set-up employing flammable or toxic gases are to be leak tested with Leaktec or equivalent.
    f. Oil, grease or other flammable material is not to be permitted to come into contact with the valves, regulators, gauges or any fitting of an oxygen cylinder. Oil and grease in the presence of oxygen under pressure may ignite violently. Such cylinder must never be handled with oily hands or gloves. Oxygen must never be used as a substitute for compressed air.
    g. In the even of a leak or suspected leak of a toxic of flammable gas, evacuate the building or area by pulling the fire alarm box. Activation of the fire alarm summons help and **automatically shuts off the ventilation to prevent spreading of the gas**. A follow-up call to Environmental Health and Safety at 599-3442 is to be made.

FLAMMABLE CHEMICALS

1. Shall be stored in cabinets, not in fume hoods, on floor or edge of lab benches.
2. Shall be labeled clearly to identify the contents.
3. Containers shall be kept closed.
4. Quantities of one gallon or more of a flammable must be stored in an approved safety container. If a reagent must be stored in glass for purity, the glass container should be placed in a rubber bottle carrier or other carrying device when being move to reduce the danger of breakage.
5. Small quantities (one day working amounts) of flammables may be stored on open shelves. Bulk storage (more than one day's supply or >10 gallons) must be stored in an approved flammable safety cabinet or flammable storage room. Fume hoods are not for bulk storage of flammables.
6. Do not store ether or flammable liquid in a closed are, such a refrigerator, unless the refrigerator is rated as explosion proof.
7. Flammables should always be kept away from fire, sparks, and reactive chemicals.
8. Flammables should be used and store in well ventilated areas.
9. Never smoke near Flammables.
10. Check storage containers for leaks.
11. Store Flammables separately from Oxidizers.
12. Dispose of Flammables as chemical waste in approved, properly labeled containers in accordance with the University's Hazardous Waste Management Program. Contact FAMU Environmental Health and Safety at 599-3442 for assistance and pick-ups

CORROSIVE CHEMICALS

1. Store acids and bases separately.
2. Separate containers to facilitate handling. Organic acids (e.g., acetic or sulfuric, nitric or perchloric acid) to prevent corrosion of storage cabinets due to fume interaction.
3. If moderate to large quantities or acids or alkali's are being used, employ a shield or barrier, or work in a sink so that spills or breaks can be controlled.
4. Store caustic and corrosive materials near the floor to minimize the danger of bottles falling from high shelves.
5. Safety bottle carriers should be used for containers over one quart in size.
6. Wear appropriate aprons, gloves, and eye protection when handling highly corrosive materials.
7. Do not pipette by mouth.
8. Do not "sniff" reagents.
9. Use great care when diluting acids. Always add the acid to the water and allow the acid to slowly run down the sides of the mixing vessels. Mix by rotating slowly and avoid over heating.
10. Corrosives should be kept separate from flammable and combustible liquids.

11. Check containers for leaks.
12. Dispose of Corrosives as chemical waste in properly labeled containers in accordance with the University's Hazardous Waste Management Program.

REACTIVE CHEMCIALS

1. Reactives should be kept away from heat, sparks, fire, and flammables.
2. Never smoke, cut, weld, or create friction near Reactives.
3. Check storage containers for leaks.
4. Keep incompatible chemicals separate.
5. Keep Oxidizers away from flammable materials.
6. Protect Reactives from sudden shock or trauma.
7. Work in well ventilated areas.
8. Wear personal protective equipment, such as safety glasses or chemical splash goggles, plus a face shield, proper gloves, and a lab coat.
9. Be aware of polymerization, which is a chemical reaction resulting in a release of energy.
10. Precautions for working with peroxides and other explosive chemicals include;
    a) Working quantities should be limited to the minimum amount required.
    b) Spills should be cleaned up immediately.
    c) Perform work in a way that minimizes vaporization.
    d) Do not use metal spatulas, use ceramic or wood.
    e) Smoking, open flames, and other sources of ignition should not be permitted near these chemicals.
    f) Store peroxides at the lowest possible temperatures to minimize the rate of decomposition.
    g) Pure peroxides should never be disposed of directly. Peroxides must be diluted with water and a reducing agent (such as ferrous sulfate or sodium bisulfate) before disposal as chemical waste.

1. Know the hazards and reactive traits of chemicals, such as:
    a. Hydrogen and chlorine will react to cause a fire or an explosion.
    b. Acetyl aldehydes, azides, organic nitrates, nitro compounds, diazos, and many peroxides are heat and/or shock sensitive, especially when in a crystallized form.
    c. Many metal compounds catalyze the violent decomposition of hydrogen peroxide.
    d. Organic peroxides are highly flammable.
    e. Aldehydes, ethers, compounds containing benzylic hydrogen atoms, compounds containing the allyic structure, and vinyl and vinylidene compounds all form peroxides.

TOXIC CHEMICALS

A toxic chemical is defined as any substance which is listed in the latest printed edition of the **National Institute for Occupational Safety and Health (NIOSH)** *Registry of Toxic Effects of Chemical Substances (RTECS), the* **International Agency for Research in Cancer's (IARC)** *Monographs,* the **National Toxicology Program's (NTP)** *Annual Report on Carcinogens*, the **American Conference of Governmental Industrial Hygienist's (ACGIH)** *Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment*, or the **Occupational Safety and Health Administration's (OSHA)** 29 CFR part 1910: Subpart Z Toxic and Hazardous Substances List, or has yielded evidence of acute or chronic health hazards in human, animal or other biological testing.

1. Employees must avoid skin contact by wearing the appropriate gloves, lab coats, or aprons and not wearing open toe, open heel, or open weave fabric shoes.
2. Toxic substances procedures that generate aerosols or fume release should be performed in a fume hood or other suitable containment device.
3. After working with Toxic substances, employees must wash hands and arms immediately.
4. Dispose of Toxic chemicals in an approved properly labeled container in accordance with the University's Hazardous Waste Management Program.

PROVISIONS FOR WORKING WITH CARCINOGENS OR POTENTIAL CARCINOGENS

Designated Areas will be established and properly posted in those laboratories using carcinogens or suspected carcinogens. A Regulated Area is an area in which the Permissible Expose Limit (PEL) for specific substances is met or exceeded. Another value, known as the Action Level is equivalent to one-half of a substance's PEL. The FAMU Department of Environmental Health and Safety can provide advice on monitoring to determine actual exposure levels where necessary.

All work requiring the use of carcinogens or suspected carcinogens is to take place in a properly functioning hood, closed system, or other device of equal protection. A "closed system" would include a glove box or other system which physically encloses an operation or procedure, is constructed and maintained to provide a physical separation between the employee and the substance, is designed to prevent the escape of vapors in to the laboratory, and allows manipulation of chemicals to be conducted in the enclosure by use of remote controls or gloves which are physically attached and sealed to the enclosure. If this not achievable, then the appropriate respirator must be employed. Contact Environmental Health and Safety regarding use of respirators.

A Hazardous Waste Management Program has been established to discard chemical products. Waste chemicals are to be poured off into properly labeled containers or bottles. The label must include the chemical identity of the material, and the words "hazardous waste". The waste generator completes the label. It is important that

incompatible chemicals not be mixed together at any time. Waste bottles and containers will be collected by the FAMU Department of Environmental Health and Safety for proper disposal. Contaminated objects must be disposed of in similarly labeled containers.

While working in **Designated Areas**, the appropriate gloves must be worn as well as an impervious garment to protect the employee's clothing. The appropriate protective face shield and/or goggles must also be worn in conjunction with a respirator if, in fact, it is deemed necessary to wear one.

Upon leaving a **Regulated Area**, employees must remove any contaminated articles of clothing and place them in properly labeled containers for disposal or laundering. Disposable items, such as gloves, must be discarded appropriately.

Hand washing should be performed as soon as all work has been finished. No personal hygiene practices, such as combing of hair and application of make-up, are to take place within **Designated or Regulated Areas**. Smoking, eating and drinking are also forbidden in these areas.

II. HAZARDOUS CHEMICAL WASTE MANAGEMENT

The EPA divides hazardous wastes into two broad categories: Listed Hazardous Wastes and Characteristic Hazardous Wastes. The listed wastes are presented in the Code of Federal Regulations (40 CFR 261.31-261.33). The hazardous characteristics include ignitability, corrosivitity, reactivity, and toxicity. In addition, you may generate wastes that are neither EPA Listed nor Characteristic but are known to pose a potential hazard such as carcinogenicity, mutagenicity, etc. These should be considered hazardous and disposed of through EH & S.

At FAMU, hazardous wastes are typically encountered in the following forms:

Laboratory Chemicals
Radioactive Materials
Gas Cylinders
Contaminated Labware
Sharps

CHARACTERISTIC WASTES

IGNITABILITY – a solid waste exhibits the characteristic of ignitability if the waste exists in any of the following forms:

1. Any liquid, other than an aqueous solution containing less than 24% alcohol by volume, with a flash point below 60 degrees C or 140 degrees F;

2. A non-liquid, which under standard conditions is capable of causing fire through friction, absorption of moisture and spontaneous chemical changes and, when ignited, burns in manner that creates a hazard;
3. An ignitable compressed gas which includes gases that form flammable mixtures at concentrations of 13% or less in air;
4. An oxidizer, such as permanganate, inorganic peroxide, or nitrate that readily stimulates combustion of organic materials.

REACTIVITY – solid waste exhibits the characteristics of reactivity if the waste:

1. Is normally unstable and readily undergoes violent charge without detonation;
2. Reacts violently with water;
3. Forms potentially explosive mixtures with water;
4. Generates, when mixed with water, toxic gases; vapors, or fumes in a quantity sufficient to present a danger;
5. Is a cyanide or sulfide-bearing waste that generates toxic gases, vapors, or fumes at pH between 2 and 12.5;
6. Is capable of detonation or explosive reaction when subject to a strong initiating source or if heated in confinement;
7. Is readily capable of detonation, explosive decomposition, or reaction at standard temperature and pressure; or
8. Is an explosive

CORROSIVITY – solid waste exhibits the characteristic of corrosivity if the waste:

1. –Is aqueous and has a pH less that or equal to 2, or greater than or equal to 12.5, or
2. Is a liquid and corrodes steel at a rate, which is greater than 6.35 millimeters per year at a test temperature of 55 degrees C or 130 degrees F.

TOXICITY – a solid waste exhibits the characteristic of toxicity when EPA defined test procedures indicate that the extract derived from the waste contains certain toxicants. EPA requires toxicity to be tested using the Toxicity Characteristic Leaching Procedure (TCLP), which stimulates the leaching of materials in a landfill in to the ground water. The following toxicants are tested for:

Arsenic
Barium
Benzene
Cadmium
Carbon tetrachloride
Chlordane
Chlorobenzene
Chloroform
Chromium
o-, m-, p-Cresol
hexachloro-butadiene
hexachoroethane
lead
Lindane
mercury
methoxychlor
methyl ethyl ketone
nitrobenzene
pentachlorophenol
pyridene

2,4-D	selenium
1,4-dichlorobenzene	silver
1,2-dichloroethane	tetrachloroethylene
1,1-dichloroethylene	toxaphene
2,4-dinitrotoluene	trichloroethylene
Endrin	2,4,5 and 2,4,6 trichlorophenol
Heptachlor (and its expoxide)	2,4,5-TP (silvex)
Vinyl choloride	hexachlorobenzene

HAZARDOUS WASTE MINIMIZATION – The dispensing of hazardous waste is time-consuming and expensive. Every effort should be made to limit the amount of hazardous wastes generated. If possible, you should:

1. Order only what you need.

The saving achieved by buying chemicals in larger sizes may be lost when disposing of leftovers. In many cases, disposing of excess chemicals can cost much more than the price of the chemicals. Be sure to check your current stock before ordering chemicals; you may already have what you need. Also, keep in mind that it may be possible to borrow chemicals from other laboratories. Take time to check.

2. Plan experiments carefully.

When planning experiments, consider the leftover materials, products, and by-products that will be generated.

Ask these questions:

a. –Can any of the material be recovered for reuse?
b. Will the experiment produce any chemical that should be destroyed by a laboratory procedure? If so, what procedure?
c. Are any usual disposal problems anticipated?
d. Will the chemicals be ordered only in needed quantities?
e. Can a hazardous chemical be replaced with one that is less hazardous and, therefore, easier to dispose of?

3. Micro scale the Experiment. Using micro technology in the experiments can lead to significant saving in chemicals, energy, and space. Also, the amount of waste products from Micro scale experiments is greatly reduced.

III. HANDLING CHEMICAL WASTES

Laboratory personnel should not attempt to determine which chemicals are hazardous. The list of hazardous chemicals is extensive and continuously changing. Therefore, **every chemical should be considered hazardous and be treated as hazardous waste**.

The exceptions to this rule are listed in the **Chemicals Authorized for Direct Disposal** chart below.

PACKAGING, TRANSPORTATION AND COLLECTING CHEMICAL WASTES

Hazardous chemicals must be properly packaged for disposal as follows:

1. **Containers must be suitable for the contents**.
   Example: Hydrofluoric acid in plastic bottles and solvents in glass bottles.

2. **Containers must be tightly closed.**
   Do not overfill containers; expanding vapors may cause containers to break**.**

3. **Containers must not be damaged.**
   Cracked or missing caps should be completely sealed with plastic tape or Parafilm M. Severely damaged containers should be placed in a second container that is properly labeled.

4. **Containers must be labeled as follows**:
   1. "Hazardous Waste' must be clearly written on the container
   2. Specific names of chemicals, compounds and mixtures
   3. Name and department or research project turning over the waste
   4. Name, campus address, and campus phone number of person turning over the waste.

5. **Chemicals will be picked up by EH & S personnel**. Call 599-3442 to have chemical waste picked up.

SPECIFIC LABELING AND PACKAGING PROCUDURES

Formalin and Formaldehyde Solutions

Dilute formaldehyde solutions should be stored by disposal EH&S. Formaldehyde is a suspected carcinogen with a low permissible exposure limit (PEL) and poor warning properties.

Ethidium Bromide Solutions

Collect ethidium bromide solutions for disposal. Ethidium bromide is mutagenic at higher concentrations. Very dilute solutions of ethidium bromide may be discarded by flushing down the sanitary sewer. The maximum concentration for doing so is a **working solution of 5ppm or less**. Do not intentionally dilute any solution to avoid proper disposal methods.

Ethidium Bromide Gels

Ethidium bromide gels should be collected in double wrapped plastic bags. Excess buffer should be removed before wrapping or absorbed into paper towel. The gels can then be given EH&S.

Ignitable Liquids and Organic Solvents
Keep halogenated wastes separate from non-halogenated solvent wastes if possible. Separate organic solvents from aqueous solutions whenever possible. Keep acidified solvents separate from other solvent and acid wastes.

Acids, Bases, and Aqueous Solutions
Do NOT mix strong inorganic acids or oxidizers with organic compounds. Keep acids, bases, or aqueous solutions containing heavy metals separate from other wastes. Avoid mixing concentrated acids and bases together in the same container.

Mercury Solutions – Keep wastes containing mercury salts separate from all other wastes.
Corrosive Materials – The following corrosive liquids shall **not** be mixed with any other hazardous waste under any circumstances:

Nitric acid exceeding 40% concentration
Perchloric Acid
Hydrogen peroxide exceeding 52% strength by weight
Nitrihydrocholoric or Nitrohydrochloric acid diluted

Perchloric Acid and Perchlorates- Keep perchloric acid and perchlorate wastes separate from other wastes and in exclusive use containers.

Toxic Wastes – Separate toxic wastes from other hazardous wastes whenever possible. For example, do not mix aqueous waste containing heavy metals with wastes that do not. **This is especially true for wastes containing mercury**.

Severely Toxicity Wastes – Keep severely toxic wastes separate from other wastes whenever possible.

Sharps (needles) – Collect all needles in al sharps container. Do **NOT** put needles in cardboard boxes with other solid debris. See sharps in the biohazardous waste section of this manual.

Paint and Paint Thinner – Separate solid paint sludge from paint thinners by pouring off thinners into a separate waste container**. Do NOT put brushes, rollers, paper or other debris in paint wastes**. Keep water and water-based paint wastes separate from oil-base wastes. Rinsate from water-based paint cleanup is non-hazardous and can be disposed of down the sanitary sewer. Label wastes as paint thinners, paint stripper waste of paint sludge.

Chromatographic Adsorbent (Silica Gel)- Collect spent silica gel in a plastic pail or a polyethylene container with a tight fitting lid. **Do NOT mix adsorbent with liquid wastes. Do NOT mix paper, plastic, gloves or glassware with silica**. If the adsorbent does not contain any of the constituents in concentrations greater than those listed as heavy metals, organics, and pesticides; or severely toxic compounds, dispose of it in the

dumpster. If it contains any of the aforementioned compounds, indicate the concentration of contaminants on the waste label and call for it to be collected for disposal by Environmental Health and Safety. If concentration is unknown treat the Silica Gel as hazardous waste.

Broken Mercury Thermometers – Collect elemental mercury and glass from broken thermometers in an impermeable, sealed container. A wide mouth polyethylene or glass-jar with a screw top cap works well. Label the container as "broken thermometer and elemental mercury".

Photo Developer and Photo Fixer – Photo developer is a hazardous waste if it contains constituents in concentrations greater than those listed, if it is corrosive or if it is ignitable. Most spent Photo developer is non-hazardous and can be poured into the sanitary sewer. Used photo fixer contains silver, a heavy metal and is therefore, hazardous. It may also be corrosive. Collect fixer and developer in separate 5-gallon polyethylene containers.

Oils, Lubricating Fluids and Cooling Fluids – This category of material is collected for recycling and includes: motor oil, transmission fluid, lubricating oil, cutting oil, hydraulic oil, and mineral oil. Collect waste oils in 1 gallon, 5 gallon or 55 gallon containers depending on the volume of material generated. This waste stream is non-hazardous if it is recycled and therefore exempt from the 90-day storage limit. **Do NOT mix flammable solvents, halogenated solvents (degreasers), water or antifreeze with waste oils**.

Polychlorinated Biphenyls (PCB) Waste – PCB wastes require special handling. **Do NOT mix PCB waste with other waste.** Collect PCB liquids in a metal or polyethylene container. Collect PCB contaminated debris, rags, etc. in a 4-6 mil plastic bag or in a box lined with a 4-6 mil plastic bag if sharp objects are present that may puncture the bag. Always indicate the level of PCB on the waste label.

Animal Waste Contaminated with Hazardous Chemicals – PCB, dioxin and aflatoxin contaminated animal carcasses and bedding require special handling and will be picked up by EH & S. See pathological waste disposal procedures.

Gas Cylinders – promptly discard gas cylinder s to the vendor to regain any deposit on the cylinder and minimize rental charges. Non-returnable lecture bottles of gases will be picked up if they are empty and have the valve stem removed.

Explosive Materials – Potentially explosive materials such as dry picric acid or peroxide contaminated solvents will be picked up separately from other wastes. Contact EH &S whenever you discover any potentially explosive materials. See the Explosive Materials List.

Bulk Chemicals – Containers should be in good condition, have workable bungs and be DOT approved. Original shipping containers are DOT approved for disposal of the used

or discarded original material. **DO NOT store metal barrels outside where they will rust. DO NOT pack smaller containers of chemicals into a large drum for disposal**.

Agricultural Chemicals – Return unused agricultural chemicals to the manufacturer for disposal. Most companies will accept them. Alternatively, retain the material and use it as it was intended. If the manufacturer will not accept the material or you cannot use it as intended, prepare a packing list of all agricultural chemicals designated for disposal. Include on the list the common name, the chemical name, the container size and the number of containers for each chemical. Experimental agricultural chemicals must be identified with a chemical name. Additionally, list he manufacturer's contact person and phone number or any paperwork verifying their non-acceptance of the material for return. Call EH&S who will contact you to arrange for a pickup.

Contaminated Debris From Laboratories – This includes gloves, paper, plastic, and other inert debris contaminated with hazardous chemicals. Whether this material is a hazardous waste depends on how it is generated, the contaminants and the concentration of contaminants. If the debris contains any of the constituents in Pesticides, or the Table of Severely Toxic Compounds, it is a hazardous waste. If it comes from the cleanup of a hazardous material spill it is a hazardous waste. If it is neither of these, it s a non-hazardous waste and may be disposed of in the dumpster. In some cases it is not prudent to dispose of non-hazardous waste in the dumpster. For example ethidium bromide (mutagen) or phenol (poison) contaminated solid debris is best disposed of by incineration. In general any waste contaminated with trace levels of a poison or carcinogen should be collected for incineration.

STORAGE AND WASTE DISPOSAL

Laws regulate the disposal of many kinds of waste, and there are new restrictions on what may be put in a public landfill or poured down the drain. Many laboratory chemicals which you may consider non hazardous are in fact regulated by the EPA. Therefore, unless you are absolutely sure that a chemical is not classified as hazardous, do not put it down the drain or into the building trash. Package all waste properly for pickup and hazard determination by EH&S, or consult EH&S before disposing of it. Call 599-3442 for more information on the following:

1. **MEDICAL WASTE**: Questions about medical waste should be directed to EH&S (599-3442). "**Medical waste**" is defined as any waste containing "**INFECTIOUS AGENTS**" with evidence of human pathogenicity (e.g. arthropods, bacteria, fungi, helminths, protozoa and viruses).

2. All **SHARP WASTE** (i.e. **ALL** scalpels, razor blades, syringes and syringe needles, AND any glass or sharp devices which are contaminated with infectious or biohazardous waste).

3. Any fluid **HUMAN BLOOD** and blood products; all human anatomical remains.

DRAIN DIPOSAL: CAMPUS POLICY PROHIBITS THE DRAIN DISPOSAL OF HAZARDOUS WASTES OR ANY MATERIAL CAUSING A VIOLATION OF WASTEWATER DISCHARGE PERMIT LIMITATIONS. All hazardous and chemical wastes must be packaged for pickup and disposal by EH&S. Absolutely no carcinogenic or hazardous chemical waste is to go down the drain. A waste is considered hazardous if it is flammable, corrosive, reactive, toxic, or contains heavy metals. Failure to comply with Campus Policy can lead to substantial fines or restrictions on laboratory use.

What CANNOT Go Down the Drain:

Solutions containing any heavy metals
Poisons
Organic solvents
Strong acids and bases
Photographic fixer
Chromic acid/sulfuric acid glass washing solutions
Waste paint and paint thinner
Motor oil
Methanol
Radioactive and biohazardous wastes

What CAN Go Down the Drain:

Sugar and non-hazardous protein solutions
Liquid detergents
SOME DILUTE ACIDS AND BASES (pH<10 or pH>5.5)
Liquid non-medical waste which has be neutralized/decontaminated with bleach to a final concentration of 1%
Photo developer (pH<10)

BUILDING TRASH: Only non-hazardous materials are allowed in the building trash containers. Disposal of hazardous chemicals or medical waste in the building trash is strictly prohibited.

What CAN go into Building Trash

Sugars and some salts
Powdered detergent
Non-hazardous proteins
Sand and clay

BROKEN OR WASTE GLASSWARE (put in cardboard box, tape box closed, label it "**Broken Glassware**", and leave for pickup by custodians)

What must be packaged for EH&S Pickup

All hazardous lab chemicals
Unused copy machine toner
Photographic chemicals
Pesticides
Paint and paint thinner

CHEMICAL AUTHORIZED FOR DIRECT DISPOSAL

These chemicals can be directly disposed of down the laboratory drain or by labeling them as non-hazardous before throwing in the trash:

Organic Chemicals
Acetates: Ca, Na, NH4, and K
Amino Acids and their salts
Citric Acid and Salts, of Na, K, Mg, Ca, and NH4
Sugars
Inorganic Chemicals
Biocarbonates: Na, K
Borates: Na, K, Mg, Ca
Bromides: Na, K
Carbonates: Na, K, Mg, Ca
Chlorides: Na, K, Mg, Ca
Fluorides: Ca
Iodides: Na, K
Oxides: B, Mg, Ca, Al, Si, Fe
Phosphates: Na, K, Mg, Ca, NH4
Silicates: Na, K, Mg, Ca
Sulfates: Na, K, Mg, Ca, NH4

SPECIAL PRECAUTIONS: HANDLING PEROXIDES, ORGANIC SOLVENTS, AND UNKNOWN CHEMCIALS

Peroxides – many laboratory chemicals can form peroxides (such as ethers) when exposed to air over a period of time. Most peroxide forming chemicals should be stored for a limited amount of time. See **Recommended Peroxide Compound Shelf-life** below for details on peroxide storage and shelf life. These peroxides can be violently explosive. **Always** mark the opening date on the original container of a chemical that can form hazardous peroxides.

In addition, never move a chemical if the liquid is discolored or if crystals have formed around the cap or in the bottle. Contact EH & S at 599-3442 for details.

Recommended Peroxide Compound Shelf Life

Severe Peroxide Hazard on Storage with Exposure to Air Discard within three (3) months

Ethyl ether
Diisopropyl ether (isopropyl ether)
Divinylacetylene (DVA)
Potassium metal
Posassium amide Sodium amide (sodamide)
Vinylidene chloride (1,1-dichloroethylene)

Peroxide Hazard on Concentration; Do Not Distill or Evaporate Without First Testing for the Presence of Peroxides
Discard or test for peroxides after six (6) months

Acetaldehyde diethyl acetal (acetal)
Cumene (isopropylbenzene)
Cyclohexene
Cyclopentene
Decalin (decahydronaphtalene)
Diacetylene (butadiene)
Dicyclopentadiene
Diethyl ether (ether)
Diethylene glycol dimethyl ether (diglyme)
Dioxane
Ethylene glycol ether acetates
Ethylene glycol monoethers (cello solves)
Furan
Methyl acetylene
Methylcyclopentane
Methyl isobutyl ketone
Tetrahydrofuran (THF)
Tetralin (tetra hydronaphthalene)
Vinyl ethers.

Organic Solvent – Waste organic solvents must be segregated into separate non-halogenated and halogenated containers. Segregated waste is easier and less expensive to dispose of. Since organic wastes with high halogen levels are heavily surcharged at certain disposal facilities, it is necessary to indicate approximate halogen level in all organic waste. These wastes should be segregated as follows:

Place in non-halogenated waste containers: Pure non-halogenated waste solvents and mixtures with less than 1,000 ppm halogen solute.

Place in halogenated containers: pure halogenated waste solvents and mixtures with greater than 1,000ppm halogen solute.

Substances NOT to be placed in Waste Organic Solvent containers:

Solutions of acids	Solutions of bases
Aqueous solutions of toxic organic chemicals	Unknowns
Strong oxidizers or reducer	Water reactive substances
Large amounts of water	Metals

UNKNOWN CHEMICALS

Because the EPQ requires that all hazardous waste be identified before disposal, all chemicals going to the FAMU environmental Health and Safety Hazardous Waste Storage Area must have an identification label.
If a lab is unable or unwilling to identify wastes to be turned in for disposal, then the department responsible for the lab will have to bear the cost of analysis.

HANDLING RADIOACTIVE CHEMICAL – Refer to the "Policy and Procedures manual for Use of Radioactive Materials for FAMU". Any questions should be directed to the Radiation Safety Officer, Department of Environmental Healthy and Safety, Campus Extension 3442.

COMPRESSED GAS CYLINDERS – Handling Precautions

When a cylinder is empty, remove the regulator, replace with cap, and mark the cylinder EMPTY or MT. Be sure to secure the cap when moving a cylinder and then secure the cylinder to a cart designed for moving cylinders.

<u>Disposing of Cylinders</u>

Returnable cylinders should be returned by the department to the appropriate vendor. These arrangements and costs are handled by each department.
Non-returnable cylinders or cylinders with unknown contents are to be picked up by EH&S for disposal. Follow the handling precautions as outlined above. Disposal costs for these cylinders will be borne by the department which used them.

<u>Handling Contaminated Labware</u>

When labware is contaminated with acutely hazardous chemicals, disposal becomes a concern. Because the list of these acutely hazardous chemicals is extensive, Environmental Health and Safety should be contacted to verify that the chemical contaminating the labware is not included in this list and that the labware can be disposed

of safely and legally in ordinary trash. Labware includes (but is not limited to) any of the following: gloves, beakers, test tubes, pipettes, and aprons.

Handling Sharps

Laboratory equipment such as syringe needles can result in puncture wounds if disposed of in ordinary trash. Used syringe needles should be collected in Biohazardous Waste labeled syringe disposal boxes designed specifically for their disposal. Broken or discarded (but not yet broken) glassware should be stored in heavy cardboard boxes labeled **CAUTION – SHARPS**. When full, the box should be securely closed and taped shut, and put out for common trash. If such sharps waste is contaminated with a potentially infectious substance (meets the definition of biohazardous waste), it must be put into rigid plastic biohazardous waste containers and held for proper disposal.

Biological/Infectious Waste Disposal

See "**FAMU Policy For Handling Biohazardous Waste**" in the Appendices

Working with Bloodborne Pathogens

See "**Bloodborne Pathogens Exposure Control Plan**" in the appendices.

Radiation Safety

Contact the Radiation Safety Officer at Campus Extension 3442. Also refer to "FAMU policy and Procedures Manual for Use of Radioactive Materials". This manual is not in the Appendices, but is available from the Environmental Health and Safety Office. It is mandatory that any use of radioactive materials receive prior approval from the Radiation Control Committee.

EMERGENCY PROCEDURES

All laboratories are equipped with emergency equipment. Fire extinguishers for chemical fires are available as are emergency showers and eyewash stations. Some areas have Acid and Caustic spill Kits to be used on those types of spills.

Although no one is required to use one, the proper way to use an extinguisher is to twist the pin, pull it out, then squeeze the trigger. For CO2 or Dry Chemical extinguishers, stand approximately 6 to 8 feet from the fire, for water extinguishers, stand approximately 15 feet from the fire. Aim and direct the extinguishing medial in a sweeping motion at an imaginary line just above the base of the burning item. Slowly move closer to the fire.

Emergency Showers are to be used when an employee catches on fire or experiences a chemical splash. Stand under the shower and pull the ring or chain down with considerable force, or depress the lever, whichever is appropriate. Remove any contaminated clothing.

Eyewashes are used for chemical splashes in the eye. Rinse the eye(s) for a minimum of 15 minutes and refrain from rubbing. Seek medical attention for all chemical splashers in the eye and report and document all accidents.

Spill kits contain absorptive deactivating or neutralizing agents. These are to be poured or sprinkled onto small chemical spills working from the outer edge in toward the center. For large spills, Environmental Health and Safety will respond to assess the situation and determine how cleanup will be conducted and by whom. Environmental Health and Safety's determination will depend on the toxicity of the chemical, the concentration of the chemical, and the amount spilled.

Small Spill Clean-Up

1. Put on the appropriate personal protective equipment.

2. Evacuate any unnecessary personnel.

3. Create an absorbent barrier and try to deactivate or neutralize the spill Consult the MSDS for this information.

4. Always work from the outer edge in towards the center.

5. Dispose of all clean-up material as chemical waste in properly labeled containers as previously stated.

6. Contact Environmental Health and Safety at 599-3442 for disposal or if additional assistance is required.

Large Spill Clean-Up

1. For large chemical or gas releases, evacuate the area. Use the fire alarm system if necessary. Close the doors as you leave.

2. Call Environmental Health and Safety at 59-3442 to report the spill or leak. Do not try to enter the area until emergency personnel arrive.

3. If the spill is not considered to be hazardous, try to contain the spill until emergency personnel arrive.

4. Post a sign on the door(s) stating **DO NOT ENTER** and the nature of the spill.

5. All chemical waste is to be disposed of properly as hazardous waste.

Mercury Thermometer Spills

1. Wear gloves to avoid skin absorption

2. Scoop up the mercury and any broken glass into a plastic bag using wet paper towels.

3. Place the bag into a small box labeled "**MERCURY**" and call Environmental Health and Safety for all mercury spills other than small thermometers.

IV. CONTROL MEASURES

In order to reduce the employee exposure to toxic substances, the use of appropriate control measures needs to be implemented. The determination of the exact type of form of control measure will be based upon the chemical manufacturer's recommendations found on the substance's **Material Safety Data Sheet (MSDS)**. After **Product Substitution**, which is substituting a non-hazardous material for a hazardous one, the implementation of **Engineering Controls**, such as the use of a fume hood, is the primary method of controlling hazards. If this is not appropriate or adequate, there should be an alteration in **Administrative Controls**, which involves changing the policies and procedures for performing a particular laboratory task. A simple change in procedure could reduce employee exposure. The last approach for reducing exposure is the issuance of **Personal Protective Equipment**, such as gloves, goggles, lab coats, or respirators. PPE should never be substituted for Engineering Controls.

The following guidelines should be followed when using fume hoods:

1. Hoods should be considered as safety devices that can contain and exhaust toxic, offensive, or flammable materials when the design of an experiment fails and vapors or dusts escape from the apparatus being used.
2. Hoods should not be regarded as a means of chemical disposal.
3. Hoods should be evaluated before use to ensure adequate face velocities (typically an average of 100 linear feet per minute), and the absence of excessive turbulence. Monitoring should be performed at regular intervals; contact Environmental Health and Safety at 599-3442.
4. Except when adjustments of apparatus within the hood are being made, the hood should be kept closed; i.e. vertical sashes down and horizontal sashes closed. Keeping the face opening small improves the overall performance of the hood.
5. The airflow patter, and thus the performance of a hood, depends on such factors as placement of equipment in the hood, room drafts from open windows or doors, people walking by, or even the presence of the user in the front of the hood.
6. Hoods are not intended for chemical storage. Materials in hoods should be kept to a minimum. Make sure that these materials are not blocking vents or disrupting airflow.

7. Solid objects and materials should be permitted to enter exhaust ducts as they can lodge in the ducts or fans and adversely affect their operation.
8. A contingency plan for emergencies should be prepared in the event of ventilation failure, power failure, fire or explosion.
9. If it is certain that adequate general laboratory ventilation will be maintained when the fume hoods are not running, hoods should be turned off. If any doubt exists, or if toxic substances are being stored in the hood, the hood should be left on.

The selection of control measure will be based upon the information presented on the chemical products MSDS. Fume hoods will be the primary method used to limit employee exposure. If this is not sufficient or appropriate, a change in procedure will follow. If necessary, after all other possibilities have been exhausted, a respirator may be issued to an employee after that employee has undergone specific respirator training, fit testing, and pulmonary function testing. The appropriate gloves will be worn when an employee handles corrosives, solvents, irritants, carcinogens, teratogens, or toxic substances. Goggles, or a combination of safety glasses with side shields plus a face shield, will be worn whenever there is the possibility of a chemical splash.

When using any form or PPE, it is important to make sure that is the proper type. For example, if the MSDS states that polypropylene gloves are required, then that is the only type to sue. Where the MSDS is not specific, contact Environmental Health and Safety for guidance as to proper glove selection. It is also important to remember that the goggles that are adequate eye protection for biological splashes may not be appropriate for chemical splashes.

Permissible Exposure Limits (PEL's) have been established for all **OSHA regulated substances**. This value, which is measured in parts per million (ppm) or milligrams per cubic meter (mg/m3), is the level of a substance to which an employee can be exposed for an 8-hour workday. For those substances where there is no applicable OSHA standard, the **American Conference of Governmental Industrial Hygienists** has established **Threshold Limit Values (TLV's)**. Either or both of these values will be found o n the **MSDS**, in the **Registry of Toxic Effects of Chemical Substances (RTECS)** issued by the **National Institute for Occupational Safety and Health (NIOSH)**, in publications of the **ACGIH**.

TRAINING AND INFORMATION

A written copy of this standard is to be available in each laboratory

The acute signs and symptoms associated with exposure to hazardous chemicals used in the laboratory may vary. Headaches, nausea and dizziness may occur from chemical inhalation. Further inhalation could lead to more serious respiratory distress. Skill allergies and contact dermatitis may occur from absorbing chemical products through the skin. Nausea and vomiting may result from accidental chemical ingestion. Finally, chemicals which enter the body via an injection or wound may also produce a variety of

adverse symptoms. Certain chemical exposures may lead to chronic conditions, such as lung disease, liver disease, kidney failure and cancer. **In order for employees to know these potential hazards, it is important for them to read product labels and MSDS's, in accordance with the Hazard Communication Standard**.

Information concerning the hazards and safe handling of toxic substances can be found on MSDS's (Materials Safety Data Sheets) by law provided with all shipments of hazardous substances. Additional reference material can be found with the Department of Environmental Health and Safety located in the Plant Operations Building.

EQUIPMENT MAINTENANCE

All laboratory fume hoods are inspected by the Department of Environmental Health and Safety quarterly, and posted on the side of each hood. Laminar Floor Hoods are to be inspected by an outside contractor on an annual basis; however, in special cases, hoods are to be checked semi-annually. All hoods are to be rechecked after being moved of having major repair work performed. Respirators are to be inspected before each use and inspected and cleaned after each use. Gloves are to be checked for tears and holes before use. All other forms of personal protective equipment must be inspected before sue to ensure user safety. The laboratory supervisor should be notified whenever there is a malfunction in any piece of safety equipment, or any laboratory equipment that may present safety hazards to laboratory personnel.

EXPOSURE MONITORING

Initial exposure monitoring can be performed if there is any reason to believe that exposure levels for a hazardous substance exceeded the action level, or PEL where there is no action level. Periodic monitoring will required if initial results demonstrate elevated exposure levels. Monitoring frequency is determined OSHA standards and guidelines for specific substances.

EXPOSURE EVALUATION

In the event that an employee feels that he or she has been overexposed to a particular toxic substance, or has had an accident during work, that employee should first contact their supervisor then contact their personnel office to complete a first report of injury.
Non-University employees who feel an over-exposure to a toxic substance has taken place, or has had an accident with toxic substances, must seek medical attention. For students, this could be from the student health clinic or for students and all others; they could go to a private physician, a walk-in-clinic or a hospital emergency room, at their own expense. A supervisory person at the facility where the incident occurred should be notified of the accident immediately.

Specific information must be provided to the examining physician by the exposed individual. This to include the identity of the hazardous chemicals to which the individual has been exposed in addition to the conditions under which the exposure

occurred. It is also to include the symptoms of the individual and any available monitoring results, where applicable.

A written opinion from the physician must be obtained by the employee and provided to the University. It must state any recommendations for further medical follow up. It should also include any medical conditions that were revealed during the course of the examination, which may result in increased occupational risk due to hazardous chemical exposure in the workplace.

A final statement should be made that the employee has been informed of the results of the examination/consultation and if there is a need for further examinations or treatments. This written opinion is not to reveal any finding or conditions unrelated to the occupational exposure in question.

RECORDKEEPING

Records of training, exposure monitoring, and medical consultation/examination results will be kept confidential in accordance with 29 CFR 1910, 1200 the Hazard Communication Standard, by the individual laboratory and the Department of Environmental Health and Safety.

RESPONSIBILITY

Individual laboratories will be responsible for following all applicable information, rules and regulations in this Standard. Each laboratory will also be responsible for any additional procedures specific to that laboratory, which have not been addressed.

QUESTIONS OR PROBLEMS

Questions or problems concerning this or any other safety program should be directed to the Department of Environmental Health and Safety at: 599-3442.

FLORIDA A&M UNIVERSITY

HAZARD COMMUNICATION

PROGRAM POLICY

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HAZARD COMMUNICATION
PROGRAM POLICY

GENERAL POLICY

Florida A&M University is responsible for ensuring the evaluation of the hazards of all chemicals present in the workplace, and for ensuring that all employees receive relevant information about those hazards.

The **Hazard Communication Standard (OSHA 29 CFR 1910.1200)** requires that Florida A&M University develop, implement, and maintain in the workplace, a **Hazard Communication Program** that provides information to employees about the hazardous chemical to which they may be exposed. The Hazard Communication Standard also requires manufactures and importers of hazardous chemicals to assess the hazards of the chemical that hey produce or import.

This evaluation and communication of chemical hazards includes the following:

- Preparation of Material Safety Data Sheets (MSDSs) by manufacturers
- Distribution of MSDSs to users of hazardous substances
- Availability of MSDSs to employees
- Labeling of chemical containers in the workplace
- Development and maintenance of written hazard communication program for the workplace
- Development and implementation of programs to train employees about hazardous chemicals

A. WRITTEN HAZARD COMMUNICATION PROGRAM

This written chemical hazard communication is an integral part of the Florida A&M University continuing employee safety awareness program. The hazard communication standard requires Florida A&M University to provide information to all employees concerning various hazardous chemicals used at Florida A&M University.

This hazard communication program includes container labeling, material safety data sheets (MSDSs), employee training, and other information on chemicals found in the workplace.

The goal of this program is to reduce the possibility of illness and injuries caused by exposure to chemicals. FAMU intends to do that by providing employees with as much information s needed concerning the hazards of chemicals they come into contact with, and to present that information as needed concerning the hazards of chemicals they come into contact with, and to present that information in a usable, readily accessible form.

B. POLICY

It is the purpose of this document to establish and maintain compliance with the OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200 in each college, school and department of Florida A&M University.

Each such college, school and department of FAMU shall:

- Compile a hazardous chemical list;
- Use MSDSs
- Ensure all containers are labeled;
- Provide all employees with required training

This hazard communication program applies to all work operation where employees may be exposed to hazardous substances under normal working conditions or during an emergency situation.

At FAMU, the academic dean of each college or school, and the director of each administrative department shall have overall responsibility for the program. The department of Environmental Health and Safety will review and update the program, as necessary. All employees will be given a copy at the time of their employment. Copies of the written program may be obtained from the department of Environmental Health and Safety.

The appointed designee will report to the dean director on the specific and general compliance with the program requirements. Under this program, employees will be informed of the contents of:

- The OSHA Hazard communication Standard title 29 CFR 1910.1200;
- The hazardous properties of chemical with which they work;
- Safe handling procedures and measures to take to protect themselves from these chemicals
- In addition, employees will also be informed of the hazards associated with non-routine tasks.

If and when a FAMU college, school or department is informed of new or significant hazards by the chemical supplier, labels for these portable containers will be changed accordingly.

C. MATERIAL SAFETY DATA SHEETS (MSDSs)

Chemical manufactures and importers are required by the standard to develop a material safety data sheet for each hazardous chemical the produce to import. The MSDSs contains information on the chemicals, such as physical properties, health and safety data, and first aid information, which is useful in meeting the goals of this program.

MSDSs provide specific information on the chemical s employee's use. At FAMU, the designee for the college, school, or department will maintain a binder in his/her office with an MSDS on every substance on the list of hazardous chemicals.

The MSDS will be a fully completed OSHA form 174 or equivalent. The designee will ensure that each research laboratory, teaching laboratory, maintenance shop or other individual work area where hazardous chemicals are used maintains an MSDS for hazardous materials in that area. MSDSs will be readily available at employee request.

The designee is responsible for acquiring and updating MSDSs. He/she will contact the chemical manufacturer or vendor if additional research is necessary or if an MSDS has not been supplied with an initial shipment. A master file of MSDSs is available from Department of Environmental Health and Safety.

- MSDSs for each chemical used by a FAMU college, school, or department will be kept on a current basis in two locations, in the office of the designee for that college, school or department, and at the office of the Department or Environmental Health and Safety.

- Employees have the right to review all MSDSs on file for hazardous chemicals used at FAMU.

It is FAMU policy not to accept any chemicals, even on a trial basis, without any accompanying MSDS. MSDSs will be expected to either accompany the original shipment of the chemical, or be mailed in a timely fashion to the individual responsible for ensuring the MSDSs are obtained for all potentially hazardous chemicals used in the workplace. IN the event that an MSDS is not received with the first shipment of a chemical, the responsible person (for the department/work area) will contact the supplier in writing to request the appropriate MSDS.

Revised or updated MSDS received from our suppliers will replace the existing MSDS covering that chemical in binder, and the revised MSDS will be brought to the attention of the employees.

D. INVENTORY/LIST OF HAZAROUD CHEMICALS

At FAMU, the designee of the college, school or department will make a list of all hazardous chemicals and related work practices used, and will update the list as necessary through continuous coordination with those who purchase the chemicals. This list of chemicals will identify all of the chemicals used. A master list of these chemicals will be maintained by and shall be available from the department, school or college.

A listing of all chemicals used by each college, school or department which have been found to present the possibility of either physical or health hazards to employees, will be maintained in the "**Material Safety Data Sheet" binder**. That listing will also show the particular work area in the facility where exposure to chemicals is most common.

COMPONENTS OF THE FAMU HAZARD COMMUNICATION PROGRAM

A. CONTAINER LABELING

The Hazard Communication Standard requires that all chemical manufacturers, importers and distributors properly label shipments of hazardous chemicals with the identity of the chemical, clearly noted hazard warnings and the name and address of the manufacturer or other responsible party.

FAMU will verify that chemical containers are properly labeled at the time they are received in our warehouse from the manufacturer or distributor. All container in our warehouse covered by the standard will be labeled, tagged or marked with the identity of the hazardous chemical contained therein, and will show hazard warning appropriate for employee protection. The hazard warning will be legible and prominently displayed. Should employees discover any unlabeled containers in their work area, they will be instructed to immediately notify their supervisor or designee of the college, school or department.

Portable containers holding a potentially hazardous chemical (i.e. bucket of solvent) drawn by an employee from a labeled container and intended for the use of that employee only during the course of his/her shift are not required to be labeled.

Containers into which chemicals will be transferred and which can be expected to be used by several employees over a period longer than one shift will be labeled to show contents and an appropriate hazard warning. Labels, which become torn, corroded or defaced in a manner such that content and hazard information cannot be determined, will be replaced. For replacement purposes, the use of pre-printed hazardous material labels will provide all required information.

B. EMPLOYEE INFORMATION AND TRAINING

Under the standard, FAMU, as an employer, is required to establish an employee information and training program for employees routinely exposed to hazardous chemicals. This training and information will be provided to cover employees at the time of initial assignment of a new category of hazardous chemical being introduced into our operations.

Under the standard, all employees exposed to hazardous chemicals will receive this information and training in a group "classroom" format provided on a yearly basis, known as "Right-to-Know" and conducted by personnel of FAMU Environmental Health and Safety. All new employees should receive the training as part of their new employee orientation. A representative of FAMU Environmental Health and Safety currently covers this material at all new employee orientation meetings. The requirements of, and an outline for Employee Information and Training is provided below.

1. Non-Routine Tasks

If an employee is required to perform hazardous non-routine tasks, a special training session will be conducted to inform him/her regarding the hazardous chemical to which they might be exposed if they are different from those normally used, and the proper precautions to take, reduce, or avoid exposures.

2. Training

The employee who is required to work with or is potentially exposed to hazardous chemicals will receive the initial training on the OSHA Hazard Communication Standard 29 CFR 1910.1200, and the safe use of those hazardous chemicals from their supervisor or the designee. Whenever a new hazard is introduced, additionally training will be provided. Regular safety meting should also be used to review the information presented in the initial training. Supervisors are responsible to be aware of the hazards and appropriate protective measures so that they will be available to answer questions from employees and provide daily monitoring of safe work practices.

Training shall emphasize the following topics:

1. Summary of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and the FAMU Written Hazard Communication Program and Policy.
2. Chemical and physical properties of hazardous materials (e.g. flash point, reactivity) and methods that can be used to detect the presence of release of chemicals. The area designee will direct the posting of chemical lists and related MSDS at each designated posting area, and will monitor the area.
3. Physical hazards of chemicals (e.g. potential for fire explosion, etc.)
4. Health hazards, including signs and symptoms of exposure, associated with exposure to chemicals and any medical condition known to be aggravated by exposure to the chemical.
5. Procedures to protect against hazards (e.g. personal protective equipment required, proper use and maintenance; work practices or methods to assure proper use and handling of chemicals; and procedures for emergency response).
6. Work procedures to follow to assure protection when cleaning hazardous chemical spills and leaks.
7. Where MSDSs are located, how to read and interpret the information on both labels and MSDSs and how employees may obtain additional hazard information.

Re-training shall be provided when the hazard changes or when a new hazard is introduced into the workplace. It shall be University policy to provide training regularly in work unit safety meetings to ensure the effectiveness of this program. As part of the assessment of the training program, the dean or director will obtain input from employees regarding the training they have received, and their suggestions for improving it. The designee will maintain an up-to- date file of all employees training.

References: OSHA 29 CFR 1910.1200
OSHA 29 CFR 1926.59
USDOT 29 CFR 171, 172
USEPA RCRA 40 CFR 261-262

3. Outside Contractors

Outside contractors, which will include temporary employment service employees, performing work at a jobsite on FAMU property shall have access to the FAMU Hazard Communication Program, and shall be advised of the presence of hazardous chemicals to which their employees may be exposed.

C. HAZARD EVALUATION PROCEDURES

FAMU is an end user of various chemicals which have been found to present possible hazards to our workers. As a user, rather than a manufacturer or importer of those chemicals, we are not required to evaluate those chemicals for their potential hazards. We will rely on the chemicals hazard evaluation conducted by the manufacturer and/or importer as contained in the manufacturer or importer's material safety data sheet (MSDS).

D. MATERIALS (must be composed by each college school or department)

The materials commonly used by _____ (do/do not) contain hazardous chemicals components (in/not in) sufficient quantity to produce hazardous releases under normal conditions of use.

This (college, school or department) will take precautions to protect its employees which include assuring that occupational exposure limits are determined and strictly followed and, in keeping with the overall operation of the department, will provide personal protective equipment and engineering controls as is indicated by the degree of hazard.

This (college, school or department) will rely on the hazard evaluation procedures, and the resulting material safety data sheets supplied to us by vendors, to identify materials, which require special handling procedures to protect the health and safety of our employees.

OVERVIEW OF FAMU HAZARD COMMUNICATION PROGRAM

1. A Master list will be kept of all hazardous chemicals. A copy of the list will be kept in the master file in each school, college, or department.
2. If a chemical not on the list is purchased, the individual will immediately request a copy of the MSDS from the supplier. A copy of the MSDS will be kept in the mast file and each office that administer the chemical. Employees will be informed of the new chemical and of the precautions to be observed.

3. A Master MSDS file will be kept in the office of Environmental Health and Safety for all chemicals that are used by the University.
4. New employees will receive, at the time of hire, detailed training by their supervisor on all chemicals which they will be required to use or which they may be exposed. The trainer will be familiar with MSDS for specific chemical and will explain this information to employees. Training will follow the format as outlined on the training checklist. All training shall be documented. Safety update information of a general nature will be received in the regular work unit safety meetings.
5. Employee issue chemicals will, at the time of receipt ensure that container have proper labels or warning signs.
6. New chemicals will not be used until MSDSs have been received, reviewed, and new employees trained in their use.
7. The supervisor in charge at each location from which chemicals are issued to employees will be assigned the responsibility for ensuring proper labeling or warning signs for containers that hold hazardous chemicals. No chemical will be used unless container is properly labeled.
8. All chemical spills will immediately be cleaned up and disposed of in accordance with the appropriate MSDS.
9. Failure to comply with all rules, instructions and procedures concerning hazardous chemicals may be cause for disciplinary action.

NOTICE TO ALL EMPLOYEES

Access to Material safety Data Sheets

IN COMPLIANCE WITH THE OSHA STANDARD, YOU, YOUR PHYSICIAN, AND YOU APPOINTED REPRESENTATIVE HAVE THE RIGHT TO SEE AND RECEIVE COPIES OF:

Material Safety Data Sheets for substances used in the workplace that are on your department's List of Hazardous Substances.

Attached is a list of substances present it this employment which are on your department's List of Hazardous Substances.

Material Safety Data Sheets are available at:

FROM:

A copy of the department's List of Hazardous Substances is available from:

FROM:

NOTE: No employee may be discharged or discriminated against in any way for exercising the rights afforded them under the standard.

WORKING WITH HAZARDOUS MATERIALS

What are hazardous materials what are the dangers they represent?

A. Hazardous liquids (caustic or acids) – danger of burns.
B. Hazardous gases – danger of explosion and/or toxic effect.
C. Inorganic dusts (mineral dusts) – danger of inhalation (asbestos, silica, etc)
D. Metals, and their compounds (lead, mercury, arsenic, etc.) – danger of toxic effect.
E. Organic dusts – (dusts produced by grains, wood, cotton, etc.) – danger of explosion.
F. Organic solvents – hazards dependent on toxicity, vapor pressure, and use (can be absorbed, ingested, or inhaled).

What can be done to eliminate and control this type of danger?

A. Proper labeling (signs, color coding, etc.)
B. Periodic air sampling
C. Safety posters in storage or handling areas

Safe storage and handling of hazardous materials.

A. Special containers (drums, cylinders, bins, etc.) and how they should be stacked, piled, or stored.
B. Ventilation of storage area.
C. Proper lighting of storage areas.

Safe handling of hazardous materials.

A. Wear the proper protective equipment.
B. Keep floors clean; never allow them to become slippery.
C. Know what steps to take in emergency; know where first aid equipment is located and how to use it.
D. Always read the label before handling a container.
E. Follow department rules for showering, changing clothes.
F. Be familiar with the symptoms of overexposure to a hazardous material (itching, burns, fever, etc.)

FLAMMABLE AND COMBUSTIBLE LIQUIDS

The following is presented in order to help employees understand the properties of flammable and combustible liquids, so that they may understand why they are so hazardous, and what steps they can take to prevent an unnecessary fire or explosion.

1. Definitions: The distinction between flammable and combustible.

A. The lowest temperature at which a liquid releases enough vapor to start burning is the FLASH POINT.

B. **Flammable liquids** have a flash point below 100 degrees Fahrenheit (i.e. they will release enough vapor to form burnable mixtures with air at temperatures below 100 degrees F.
Examples include: carbon disulfide, ether, acetone, benzene, gasoline, lacquer thinner, alcohol, toluene, turpentine, etc.

C. **Combustible liquids** have flash points above 100 degrees F.
(i.e. they must be heated to temperatures greater than 100 degrees F before they will release enough vapor to form burnable mixtures.)

2. Why are these liquids so hazardous?

A. **Flammable liquids** vaporize and form flammable gas mixtures when they are left in open containers, when leaks or spills occur, or when they are heated.

1. The degree of danger is determined buy a number of factors.

a. The flash point of the liquid

b. The concentration of the vapors in the air.

c. The possibility of a source of ignition nearby.

1. Hot surfaces – hot plates and electric coils, overheated bearings.
2. Open flames – pilot lights, smoking materials.
3. Hot particles and embers – grinding, welding.
4. Sparks – static electricity from rotation belts or transferring liquids, sparks from electrical tools, etc.

Note: If an ignition source comes into contact with vapor and air, in the right combination, fire or explosion can result, causing serious injury and/or loss of life.

WORKING WITH SOLVENTS

A. Some solvents can break down into acids, poisonous gases, or corrosive components if exposed to hot surfaces.
B. Some solvents can react chemically with other substances.
C. All solvents produce vapors that can cause problems if the concentration gets too high. Exposure to too much solvent vapor can cause irritation of the eyes, dizziness, nausea, rashes and other skin disorders.

NOTE: Smoking around solvents can increase danger due to inhalation. Some solvents and chemicals break down under high temperature so inhalation through cigarettes can be more dangerous than regular inhaling of cigarette smoke.

Avoid these hazards by reading the labels on solvents carefully.

A. The label should contain specific information.

1. Name of product
2. Signal word designating the degree of hazard (Danger Warning, or Caution)
3. Statement of hazards (extremely hazardous, flammable, etc)
4. Precautionary measure to be taken or action to be avoided (e.g.) avoid breathing vapor, keep away from heat or open flames.)
5. Instruction in case of contact or exposure (e.g., flush eyes or skin with plenty of water for at least 15 minutes.)
6. Poison sign (skull and crossbones), followed by first aid instruction or antidote.

Safe procedures for handling solvents

A. Always read label directions before using.
B. While using solvents, wear splash proof chemical goggles and know where the nearest eye wash station is.
C. To protect your skin, wear suitable gloves and protective garments when required.
D. If your clothes become soaked with solvent, remove them and take a shower; don't put clothes back on until they are thoroughly dry.
E. Smoke only in approved areas.
F. Take precautions in cold cleaning operations.

1. Keep your head back so you won't be in the direct line of escaping vapor.
2. Wear suitable gloves when using solvents for wiping, dipping, spraying or flushing.

G. Use soap or mild detergent and water rather than solvents to clean grease, oil, dirt, or anything else off your skin.
H. Place all rags, waste, paper towels, etc., soaked with solvent in airtight, all-metal safety containers.
I. Store and transport small quantities of solvent only in approved safety containers.
J. Ground and bond all metal containers when transferring a flammable solvent from one container or another.
K. Make sure you have adequate ventilation when you use cold-cleaning solvents in a small room.
L. Use respiratory equipment when you enter areas where solvent vapor levels are or might be high. Don't rely on your nose vapors to wan you of excessive concentrations; some dangerous vapors have no odor warning at all.
M. Don't use any welding (or let anyone else weld) close to areas where solvents are being used. The heat or welding can cause dangerous solvent breakdown conditions, as well as fire or explosion.

What to do in case of emergency

A. If someone is overcome by solvent vapors

1. Get medical help immediately
2. Remove the person to fresh air
3. Loosen clothing
4. Give artificial respiration if breathing has stopped
5. Keep victim quiet and warm
6. Don't give anything by mouth to an unconscious person.

B. When a spill occurs

1. Evacuate the area if it is a big spill
2. Clean up the spill as soon as possible, wearing the proper protective equipment.
3. If the solvent cannot be reclaimed for further use, put in the galvanized or stainless steel paid with a tight lid.
4. Later on, dispose of the solvent safely; **DO NOT POUR IT DOWN A SEWER.**

C. In case of fire

1. Evacuate the area
2. Trained personnel should extinguish the fire with carbon dioxide, dry chemical foam, or a water fog.
3. Handle the burned solvent as though it was acid.

MATERIALS STORAGE

A. Material storage can pose unexpected dangers that result in serious injury.

1. Toppling or heaving materials that have been improperly stacked.
2. Collisions between improperly stored materials, and forklifts or pedestrians.
3. Breakage of containers with hazardous or toxic substances.
4. Obstruction of fire fighting equipment, first aid equipment, fuse boxes, etc., that are needed in an emergency.
5. Fire hazards posed by improper storage of flammable and combustible materials.

B. General safety precautions.

1. Follow the storage plan for your area.
2. Planned storage minimizes the handling necessary to bring materials in to production and move them out to shipping or where needed.
3. A good storage plan avoids obscuring emergency equipment, sprinkler system, lights, etc.

C. Observe proper clearance.

1. At least 18 inches clearance below sprinkler heads should be allowed to reduce interference with water distribution (36 inches if material is flammable.)
2. Keep materials out of aisles, areas that are designated by yellow lines in from of the electrical panels, and out of loading and unloading area.

D. Use racks, pallets, or skids whenever possible. Materials stored in this way can be moved easily and quickly with less material damage and fewer injuries. Material piled on skids or pallets should be cross-tied.

E. Know the maximum height limits for piling and stacking and observe maximum height lines.

F. Know the maximum weight allowed when material is stored on top of shelves, cabinets or rooms with non-permanent walls and ceiling.

G. Consider the contents (special storage considerations for any of the following materials that apply to your area.)

1. Hazardous liquids (acids, etc.)
2. Gas cylinders.
3. Combustible solids.

FLORIDA A & M UNIVERSITY

POLICY FOR THE HANDLING OF BIOHAZARDOUS WASTE

Florida A & M University
Policy for the Handling of
Biohazardous Waste

Intent – The purpose of this policy is to outline procedures for onsite segregation, handling, labeling, storage, and disposal of biohazardous waste to insure the maintenance of a safe environment for work and study with regard to biohazardous waste; and to insure compliance with Chapter 10D-104, Florida Administrative Code, **Biohazardous Waste.**

Identifying Biohazardous Waste – Biohazardous waste is any solid waste or liquid waste, which may present a threat of infection to humans. The term includes, but is not limited to: nonliquid human tissue and body parts; any laboratory waste which contains human disease-causing agents; discarded glassware, pipettes, and other disposables that have made contact with a potential disease-causing agent or human blood; **all** discarded syringes and needles, regardless of type of use; sharps, such as glass or plastic pipettes, that have been in contact with a human disease-causing agent; **all** discarded human blood, human blood products and human body fluids; blood, body fluids, and non-liquid tissue from laboratory animals that have been exposed to human disease-causing agents.

Body fluids to be treated as biohazardous waste include those that potentially harbor pathogens, including: lymph, semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids.

Human and laboratory animal body excretions such as feces and secretions such as nasal discharge, saliva, sputum, sweat, tears, urine, and vomits should not be treated as biohazardous waste, unless visibly contaminated with blood.

Any biohazardous waste mixed with hazardous waste shall be managed as hazardous waste. Any biohazardous waste mixed with radioactive waste shall be managed as radioactive waste.

Procedures – The following procedures and guidelines shall be followed by anyone who generates biohazardous waste at Florida A & M University.

1. Biohazardous waste may be disposed directly into the sanitary sewer system if the following requirements are met:

    a. The waste is in a liquid or semi-solid form.
    b. Aerosol formation from the waste material is minimal.
    c. The waste is not a characteristic chemically hazardous waste or radioactive waste.
    d. Protective equipment and apparel is worn by the individual discharging materials to the sewer system.

FLORIDA A & M UNIVERSITY

BLOODBORNE PATHOGEN EXPOSURE CONTROL PLAN

FLORIDA A & M UNIVERSITY
BLOODBORNE PATHOGEN
EXPOSURE CONTROL PLAN

I. Responsibility

Deans, department chairpersons, and **directors** are responsible to insure that their individual colleges, schools and departments are in compliance with the blood borne pathogen standard.

Principal investigators and **department supervisors are** responsible to ensure that the requirements and procedures outlined in the Exposure Control Plan that are appropriate to the individual work areas carried out.

Employees are responsible for reporting exposures to their supervisors and complying with all components of the Exposures Control Plan.

The Student Health Center (SHC) is responsible for providing to students, when requested, at student cost: immunizations, post-exposures follow-up, and maintenance of medical records for same.

The Office of Personnel Relations is responsible for maintenance of application A & P, USPS, and OPS employee medical records.

The Environmental Health & Safety Department (EH&S) is responsible for: insuring that all applicable work units of the University are informed of the Exposure Control Plan and the requirements of the Bloodborne pathogen standard; assisting in arranging appropriate training and medical services fro employees; and monitoring campus-wide compliance with the Bloodborne pathogen standard.

II. Definition

Blood
Blood refers to human blood, human blood components and products made from human blood.

Bloodborne Pathogens
Bloodborne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C virus and human immunodeficiency virus (HIV).

Decontamination
Decontamination means the use of physical of chemical means to remove, inactivate or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles, and the surface or item is rendered safe for handling, use, or disposal.

Engineering Controls
Engineering controls are those controls (e.g. sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

Exposure Incident
An expose incident is a specific eye, mouth, other mucous membrane, non-intact skin or parental contact with blood or other potentially infectious material that results from the performance of an employee's duties.

Occupational Exposure
Occupational exposure means reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious material that results from the performance of an employee's duties.

Other Potentially Infectious material (OPIM)
Materials other than human blood are potentially infectious for bloodborne pathogens. These include 1) the following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; 2) any unfixed tissue or organ (other than intact skin) from a human (living or dead); 3) HIV-containing cell or tissue cultures; organ cultures, culture medium or other solutions; and 4) blood, organs or other tissues from experimental animals infected with HIV or HBV.

Record-keeping

1. The dates of the training sessions, content outline, attendees list and presenters list shall be maintained by the individual department for 5 years.
2. College, school, or department compliance with the training requirements will be monitored by EH&S. A list of persons trained shall be submitted to EH&S annually by each college, school, and department.

Content – training program shall contain the following elements:

1. An accessible copy of the bloodborne pathogen standard.
2. A general explanation of the epidemiology and symptoms of bloodborne diseases.
3. An explanation of modes of transmission of bloodborne pathogens.
4. A review of the exposure control plan
5. An explanation of the appropriate methods for recognizing procedures and other activities that may involve exposure to blood and OPIM.
6. An explanation of the use and limitations of practices that will prevent or reduce the likelihood of exposure. This includes the appropriate use of personal protective equipment.
7. Information on types, proper use, location, removal, handling, decontamination and/or disposal of personal protective equipment.
8. An explanation of the rational for selecting personal protective equipment.
9. Information on the hepatitis B vaccine, including information on its efficacy, safety, and the benefits of being protected against hepatitis B.

III. Exposure Prevention

Universal Precautions

Universal Precautions shall be practiced to prevent employee exposure to blood and other potentially infectious materials (See Attachment B).

Engineering and Work Practice Controls

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Personal protective equipment shall be used when occupational exposure may occur even though the engineering and work practice controls are in place. Engineering controls shall be evaluated and updated as needed.

1. Hand washing facilities shall be provided and maintained with adequate supplies.
2. Hand washing shall be performed after removal of gloves and after contact with blood or OPIM.
3. Employees who have exudative lesions or weeping dermatitis shall refrain from handling blood or OPIM until the condition resolves.
4. Contaminated sharps and needles shall not be bent, recapped or sheared.
5. Contaminated sharps and needles shall be disposed of in puncture resistant, color-coded or labeled, leak-proof containers.
6. Eating, drinking, smoking, handling contact lenses and applying cosmetics are prohibited in work areas where there is a potential for blood OPIM exposure.
7. Food and drink are prohibited in work areas where there is a potential for blood or OPIM exposure.
8. All procedures involving blood and OPIM shall be performed in such a manner as to minimize splashing, spraying, spattering, generation of droplets or aerosolizaton of these substances.

3. Gowns, gloves, aprons, and other protective coverings
   These shall be worn depending upon the task and the degree of exposure anticipated.
4. Surgical caps, hoods, or boots:
   These shall be worn when gross contamination is reasonably anticipated.

There shall be a designated area in each work setting for the dispensing, storage, cleaning and disposal of PPE. Contaminated PE that is not immediately decontaminated shall be clearly designated and treated as biohazardous material.

Housekeeping

1. Cleaning, Disinfection, and Sterilization Practices
   a. All environmental and work surfaces shall be properly cleaned and disinfected on a regular schedule and after contaminated with blood or OPIM (see attachment C).
   b. Appropriate personal protective equipment (e.g. gloves) shall be worn to clan and disinfect blood and OPIM spills.
   c. Cleaning, disinfection, and sterilization of equipment shall be performed, as appropriate, after contamination with blood and OPIM.

2. All infectious wastes shall be managed according to the FAMU Biohazardous Waste Disposal Policy (see attachment D.)
   a. Gloves shall be worn by individuals who have direct contact with contaminated waste.
   b. All biohazardous and/or biomedical waste designated for removal and incineration off-site shall be labeled according to Florida statute.

WORKING WITH HAZARDOUS MATERIALS

What are hazardous materials and what are the dangers they represent?

A. Hazardous liquids (caustics or acids)- danger of burns.

B. Hazardous gases – danger of explosion and/or toxic effect.

C. Inorganic dusts (mineral dusts) – danger of inhalation (asbestos, silica, etc)

D. Metals, and their compounds (lead, mercury, arsenic, etc.) – danger of toxic effect.

E. Organic dusts – (dusts produced by grains, wood, cotton, etc.) – danger of explosion.

F. Organic solvents – hazards dependent on toxicity, vapor pressure, and use (can be absorbed, ingested, or inhaled).

What can be done to eliminate and control this type of danger?

A. Proper labeling (signs, color coding, etc.)

B. Periodic air sampling

C. Safety posters in storage or handling areas.

Safe storage and handling of hazardous materials.

A. Special containers (drums, cylinders, bins, etc.)

B. Ventilation of storage area.

C. Proper lighting of storage areas.

Safe handling of hazardous materials.

A. Wear the proper protective equipment.

B. Keep floors clean; never allow them to become slippery.

C. Know what steps to take in an emergency; know where first aid equipment is located and how to use it.

D. Always read the labels before handling a container.

E. Follow department rules for showering, changing clothes.

F. Be familiar with the symptoms of overexposure to a hazardous material (itching, burns, fever, etc.)

Encouraged to obtain same, at their own expense. The follow-up shall include these components, provided by a qualified medical professional:

1. The route and circumstances of the exposure shall be documented.
2. The identification of the source individual shall be documented unless it is unfeasible or prohibited by state law.
3. The source individual shall be tested for HIV and HBV according to Florida Statues. Retesting (of the source individual) is not necessary when the source individual is known to be positive for HIV or HBV. Those results shall be disclosed to the employee according to Florida Statues.
4. Serologic testing of the exposed employee shall be offered within provisions of Florida Statutes for HIV. If the employee consents to baseline blood collection, but chooses not to be tested for HIV at that time, the sample shall be held for 90 days after the incident enabling the employee to have HIV testing within the 90 days.

The evaluation and follow-up protocols are based upon U.S. Public Health Service recommendations. A written follow-up letter shall be provided by medical personnel, to the exposed employee, within 15 days of the completion of the evaluation. The letter shall document the following:

1. That the employee has been informed of these results of the evaluation.
2. That the employee has been informed about any medical conditions resulting from exposure to blood or other potentially infectious materials which require any further evaluations or treatment.
3. The hepatitis B immunizations status and the need for immunization.
4. The letter shall not include any confidential information.

FLAMMABLE AND COMBUSTIBLE LIQUIDS

The following is presented in order to help employees understand the properties of flammable and combustible liquids, so that they may understand why they are so hazardous, and what steps they can take to prevent an unnecessary fire or explosion.

1. **Definitions:** The distinction between flammable and combustible.

A. The lowest temperature at which a liquid releases enough vapor to start burning is the **FLASH POINT.**

A. **Flammable liquids** have a flash point below 100 degrees Fahrenheit (i.e. they will release enough vapor to form burnable mixture with air at temperatures below 100 degrees F.)

B. **Combustible liquids** have flash pints above 100 degrees F. (i.e. they must be heated to temperatures greater than 100 degrees F before they will release enough vapor to form burnable mixtures.)

3. Why are these liquids so hazardous?

A. **Flammable liquids** vaporize and form flammable gas mixtures when they are left in open containers, when leaks or spills occur, or when they are heated.

1. The degree of danger is determined by a number of factors.
   a. The flash point of the liquid.
   b. The concentration of the vapors in the air.
   c. The possibility of a source of ignition nearby.
      1. Hot surfaces – hot plates and electric coils, overheated bearings.
      2. Open flames- pilot lights, smoking materials
      3. Hot particles and embers – grinding, welding
      4. Sparks – static electricity from rotation belts or transferring liquids, sparks from electrical tools, etc.

Note: If an ignition source comes into contact with vapor and air, in the right combination, fire or explosion can result, causing serious injury and/or loss of life.

WORKING WITH SOLVENTS

A. Some solvents can break down into acids, poisonous gases, or corrosive components if exposed to hot surfaces.
B. Some solvents can react chemically with other substances.
C. All solvents produce vapors that can cause problems if the concentration gets too high. Exposure to too much solvent vapor cause irritation of the eyes, dizziness, nausea, rashes and other skin disorders.

NOTE: Smoking around solvents can increase danger due to inhalation. Some solvents and chemical break down under high temperature so inhalation through cigarettes can be more dangerous than regular inhaling of cigarette smoke.

Avoid these hazards by reading the labels on solvents carefully.

A. The label should contain specific information.
    1. Name of product
    2. Signal word designating the degree of hazard (Danger, Warning, or Caution)
    3. Statement of hazards (extremely hazardous, flammable, etc)
    4. Precautionary measures to be taken or action to be avoided (e.g. avoid breathing vapor, keep away from heat or open flame.)
    5. Instruction in case of content or exposure (e.g., flush eyes or skin with plenty of water for at least 15 minutes.)
    6. Poison sign (skull and crossbones), followed by first aid instructions or antidote.

Safe procedures for handling solvents

A. Always read label directions before using.
B. While using solvents, wear splash proof chemical goggles and know where the nearest eye wash station is.
C. To protect your skin, wear suitable gloves and protective garments where required.
D. If your clothes become soaked with solvent, remove them and take a shower; don't put clothes back on until they are thoroughly dry.
E. Smoke only in approved areas.
F. Take precautions in cold cleaning operations.
    1. Keep your head back so you won't be in the direct line of escaping vapor.
    2. Wear suitable gloves when using solvents for wiping, dipping, spraying or flushing.

G. Use soap or mild detergent and water rather than solvents to clean grease, oil, dirt, or anything else off your skin.
H. Place all rags, waste, paper towels, etc., soaked with solvent in airtight, all-metal safety containers.

I. Store and transport small quantities of solvent only in approved safety containers.
J. Ground and bond all metal containers when transferring a flammable solvent from one container or another.
K. Make sure you have adequate ventilation when you use cold-cleaning solvents in a small room
L. Use respiratory equipment when you enter areas where solvent vapor levels are or might be high. Don't rely on your nose to warn you of excessive concentrations, some dangerous vapors have no odor warning at all.
M. Don't use any welding (or let anyone else weld) close to areas where solvents are being used. The heat of welding can cause dangerous solvent breakdown conditions, as well as fire or explosion.

What to do in case of emergency

A. If someone is overcome by solvent vapors
    1. Get medical help immediately.
    2. Remove the person to fresh air.
    3. Loosen clothing
    4. Give artificial respiration if breathing has stopped.
    5. Keep victim quiet and warm.
    6. Don't give anything by mouth to an unconscious person.

B. When a spill occurs
    1. Evacuate the area if it is a big spill
    2. Clean up the spill as soon as possible, wearing the proper protective equipment.
    3. If the solvent cannot be reclaimed for further use, put in a galvanized or stainless steel pail with a tight lid.
    4. Later on, dispose of the solvent safely, DO NOT POUR IT DOWN A SEWER.
C. In case of a fire
    1. Evacuate the area
    2. Trained personnel should extinguish the fire with carbon dioxide, dry chemical foam, or a water fog.
    3. Handle the burned solvent as though it was acid.

MATERIALS STORAGE

A. Materials storage can pose unexpected dangers that result in serious injury.
   1. Toppling or heavy materials that have been improperly stacked.
   2. Collisions between improperly stored materials and forklifts or pedestrians.
   3. Breakage of containers with hazardous or toxic substances.
   4. Obstruction of fire fighting equipment, first aid equipment, fuse boxes, etc., that are needed in an emergency.
   5. Fire hazards posed by improper storage of flammable and combustible materials.

B. General safety precautions.
   1. Follow the storage plan for your area.
      a. Planned storage minimizes the handling necessary to bring materials in to production and move them out to shipping or where needed.
      b. A good storage plan avoids obscuring emergency equipment, sprinkler system, lights, etc.

C. Observe proper clearances.
   1. At least 18 inches clearance below sprinkler heads should be allowed to reduce interference with water distribution (36 inches if material is flammable.)
   2. Keep materials out of aisles, areas that are designated by yellow lines in front of the electrical panels, and out of loading and unloading area.

D. Use racks, pallets, or skids whenever possible. Materials stored in this way can be moved easily and quickly with less material damage and fewer injuries. Material piled on skids or pallets should be cross-tied.

E. Know the maximum height limits for piling and stacking and observe maximum height lines.

F. Know the maximum weight allowed when material is stored on top of shelves, cabinets or rooms with non-permanent walls and ceiling.

G. Consider the contents (special storage considerations for any of the following materials that apply to your area.)
   1. Hazardous liquids (acids, etc.)
   2. Gas Cylinders.
   3. Combustible solids.

HAZARDOUS CHEMICAL COMMUNICATION PROGRAM

Hazardous Material Identification System
HMIS

The **HMIS codes**, quickly tell you the chemical identity, health, flammability, and reactivity hazards and what personal protective equipment you need to use.

A. HAZARD INDEX
4 Severe Hazard
3 Serious Hazard
2 Moderate Hazard
1 Slight Hazard
0 Minimal Hazard

B. PERSONAL PROTECTION INDEX
A Safety Glasses
B Safety Glasses, Gloves
C Safety Glasses, Gloves, Synthetic Apron
D Face Shield, Gloves, Synthetic Apron
E Safety Glasses, Gloves, Respirator for dusts
F Safety Glasses, Gloves, Synthetic Apron, Respirator for dusts
G Safety Glasses, Gloves, Respirator for Vapors
H Safety Goggles, Gloves, Synthetic Apron, Respirator for Vapors
I Safety Glasses, Gloves, Respirator for dust and vapors
J Safety Goggles, Gloves, Synthetic Apron, Respirator for dusts and vapors
K Airline hood or Mask, Gloves, Full Body Coveralls, Boots
X Ask your supervisor for guidance

HAZARDOUS CHEMICAL COMMUNICATION PROGRAM

National Fire Protection Agency (NFPA) Codes

The NFPA System is intended to inform you of the basic hazard information for fire fighting. A simple 0-4 rating is used to let you know the degree of danger involved with each material as it relates to fire fighting, exposure and spill control.

A. Health Codes (Blue Diamond)
- 4 Deadly
- 2 Extreme Danger
- 3 Hazardous
- 1 Slightly Hazardous
- 0 Normal Material

B. Fire Hazard Flash Points (Red Diamond)
- 4 Below 73 degrees F (Boiling point below 100 degrees F)
- 3 Below 73 degrees F. (Boiling point at/above 100 degrees F. and or at/above 73 Degrees F. not exceeding 100 degrees F.

C. Reactivity (Yellow Diamond)
- 4 May detonate
- 3 Shock and heat may detonate
- 2 Violent chemical change
- 1 Unstable if heated
- 0 Stable

D. Specific Hazard (White Diamond)

Oxidizer	OX	Acid	ACID
Alkali	ALK	Corrosive	COR
Use NO Water		~W~	
Radioactive		Radioactive sign	

HAZARDOUS CHEMICAL COMMUNICATION PROGRAM

MATERIAL SAFETY DATA SHEET (MSDS) BOOK

INSTRUCTIONS

Each area must have an MSDS binder available for review by employees. These MSDS provide information about any product that is being used specifically at their job location.

A copy of the Hazardous Communication Program should include as part of the MSDS binder. An employee signature sheet should also be included in the MSDS binder. (Sample of employee signature sheet is included below.)

Failure to have the MSDS binder present at the job location can result in the issuance of a citation/violation by OSHA.

EMPLOYEE SIGNATURE SHEET

In accordance with the employee training requirements of the Hazard Communication Standard, the undersigned read and understands the Material Safety Data Sheet for the following product:

NAME OF PRODUCT

NAME (PRINTED)	DATE	SIGNATURE

GLOSSARY OF COMMON MSDS TERMS

Absolute: A chemical substance that is not mixed; pure. A single does of exposure to a substance.

"C" or Ceiling: The maximum allowable human exposure limit for an airborne substance; not to be exceeded.

Carcinogen: A substance or agent capable of causing or producing cancer in animals.

Chemtrec: Chemical Transportation Emergency Center; a national center to relay pertinent emergency information concerning specific chemicals on request. Toll free 24-hour telephone number 800-424-9300.

Combustible: A term used to classify certain liquids that will burn on the basis of flash points.

Dermal Toxicity: Adverse effects resulting from skin exposure to a substance.

Evaporation Rate: The rate at which a particular material will vaporize (evaporate) when compared to the rate of vaporization of a known material. The evaporation rate can be useful in evaluation the health and fire hazards of a material.

Explosive Limits: The range of concentrations over which a flammable vapor mixed with proper portions of air will flash or explode if an ignition source is present.

Flammable: A "flammable liquid" is defined by the NFPA and the DOT as a liquid with a flash point below 100 degrees F or 37.9 degrees C.

Flash Point: The temperature at which a liquid will give off enough flammable vapor to ignite. There are several flash point test methods, and flash points may vary for the same material depending on the method used, so the test method is indicated when the flash point is given.

Incompatible: Materials which could cause dangerous reactions from direct contact with one another are described as incompatible.

Irritant: A substance which, by contact in sufficient concentration for a sufficient period of time, will cause an inflammatory response or reaction of the eye, skin, or respiratory system.

LEL OR LFL: Lower Explosive Limit or Lower Flammable Limit of a vapor or gas, the lowers concentration that will produce a fire or flash when an ignition source is present.

Melting point: The temperature at which a solid substance changes to a liquid state. For mixtures, the melting range may be given.

PEL: Permissible Exposure Limit; an exposure limit established by the Occupational Health and Safety Administration (OSHA). May be a time weighted average (TWA) limit or a maximum concentration exposure limit.

ppm: Parts per million; a unit for measuring the concentration of a gas or vapor in air. Also used to indicate the concentration of a particular substance in liquid or solid.

P.S.I: Pounds per square inch; for MSDS purposes, a unit for measuring the pressure of a material exerts on the wall of a confining vessel or enclosure.

Pyrophoric: A chemical that will ignite spontaneously in the air at a temperature of 130 degrees F (54.4 degrees C) or below.

Reactivity: A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects – such as pressure build up, temperature increase, formation of noxious, toxic or corrosive by-products may occur because of the reactivity of a substance to heating, burning, direct contact with other material or other condition in use or in storage.

Solubility in water: A term expressing the percentage of a material by weight that will dissolve in water at ambient temperature. Solubility information can be useful in determining spill cleanup methods and fire extinguishing agents and methods for a material.

Stability: An expression of the ability of material to remain unchanged. For MSDS purpose, a material is stable if it remains in the same form unexpected and reasonable conditions of storage or use.

TLV: Threshold Limit Value; a term used to express the air-borne concentration of a material to which nearly all persons can be exposed day after day, with at least 60 minute exposure periods, and provided that the daily TVL-TWA is not exceeded.

TLV-C: The ceiling exposure limit; the concentration that should not be exceeded even instantaneously.

UEL: Upper Explosive Limit; vapor in air concentration above which the concentration is to rich to burn.

Unstable: A chemical which in pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure or temperature.

Vapor Density: The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas.

Materials lighter than air have vapor densities less than 1.0 (examples: acetylene, methane, and hydrogen).

All vapor and gases will mix air, but the lighter materials will tend to rise and dissipate unless confined. Heavier vapors and gases are likely to concentrate in low places – along on under floors, in sumps, sewers and manholes, in trenches and ditches – where they may create fire or health hazards.

Vapor Pressure: The pressure exerted by a saturated vapor above it's own liquid in a closed container. When quality control tests are performed on products, the test temperature is usually. 100 degrees F and the vapor pressures reported on MSDSs are in square in inch, but vapor pressures reported on MSDSs are in millimeters of mercury (mmHg) at 68 degrees F (20 degrees C), unless stated otherwise. Three facts are important to remember:

1. Vapor pressure of a substance at 100 degrees F will always be higher than the vapor pressure of the substance at 68 degrees F.
2. Vapor pressures reported on MSDS in mmHg are usually very low pressure; 760 mmHg is equivalent to 14.7 lbs per square inch.
3. The lower the boiling point of a substance, the higher its vapor pressure.

Water-Reactive: A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.