

WJB Dorn VA Medical Center Research Service

Safety Handbook and Chemical Hygiene Plan

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SAFETY INFORMATION FOR RESEARCH LABORATORIES

This manual is intended to provide you with general information about laboratory safety. It is by no means exhaustive. More information about specific issues or problems can be obtained by contacting the Safety Office or the Research & Development Administration Office at (803) 695-6825.

IMPORTANT TELEPHONE NUMBERS

Medical Center Safety/Health Manager

Vincent Perry _____ Ext. 6050

Medical Center Safety/Health Specialist

Jeffrey K. Brown (Safety Committee Chairperson) _____ Ext. 6047

Radiation Safety Officer

Nigel Burkhardt, M.P.H. (Safety Committee member) _____ Ext. 7492

Other Contacts for Safety

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Lawrence G. Peck, M.A. (Safety Officer) _____ Ext. 6632

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SUBCOMMITTEE on RESEARCH SAFETY (SRS)

1. **PURPOSE:** The Subcommittee on Research Safety functions as a subcommittee of the R&D Committee. The Safety Subcommittee advises the R&D committee on all matters relating to the safe use of biohazardous materials and organisms. It establishes, monitors and enforces policies and procedures that meet or exceed applicable norms or regulations for biohazardous materials. It reviews and approves any use of biohazardous materials. It appoints a Chemical Hygiene Safety Officer with responsibilities to coordinate with the investigator to ensure all safety measures are met.
2. **COMMITTEE MEMBERSHIP:** The Chairperson is elected when an appointed term has ended. Members will be appointed by the Medical Center Director based on nominations of the R&D Committee and in consultation with the R&D staff. Members usually serve a three-year term. Exceptions are only made when rotating a member off the committee would jeopardize the committee's composition.
3. **RESPONSIBILITIES:** The Subcommittee on Research Safety members will:
 - a. Serve as liaison medium in implementing the Research Service Safety Program.
 - b. Consider and make recommendations on matters presented to the Subcommittee for review to improve unsafe conditions or problems on safety in labs and animal facilities.
 - c. Carry out its mission by demonstrations, education, safety surveys and consultations.
4. **MEETINGS:**
 - a. The SRS Committee meets monthly as needed and at the call of the Chair.
 - b. Committee members are assigned specific reviews. Each member may be given between one to four proposals to review and present to the committee. Each member is provided with a complete reviewer's package prior to the meeting including **VHA Form 10-0398, Research Safety Survey**. If all answers on the form are "NO", a documented EXPEDITED review by the committee is still required.
 - c. All protocols involving the use of biological hazards, human or non-human cell or tissue samples, chemicals, controlled substances, ionizing radiation, and nonionizing radiation **must receive full committee review and approval prior to final approval** of the R&D Committee.
 - d. The SRS Committee meeting's minutes are written by the committee coordinator. Minutes are reviewed and approved by the Chairperson of the subcommittee.
 - e. All protocols that involving biological hazards including animal or human blood, body fluids, organs, tissues or cells, agents infectious to humans, animals or plants, CDC Select Agents and recombinant DNA must be approved by through the Institutional Biosafety Committee and acknowledged through SRS Committee. Refer to SOP 151-604.
5. **LABORATORY SAFETY INSPECTIONS:** Semi-annual safety inspections of the lab and animal facilities will be conducted. Necessary follow up inspections will be completed if warranted. The

LABORATORY SAFETY MANUAL AND CHEMICAL HYGIENE PLAN and OSHA CFR 29 Part 1910.1450 are supplied to each lab/area and used as a basis for semi-annual safety inspections. In addition, the *Safety Violation Checklist (Appendix 1 and 7)*, aids the subcommittee in making uniform rigorous safety inspections.

CHAPTER 1

REQUIREMENTS FOR PERSONAL & LABORATORY SAFETY

1. **Smoking** is prohibited in all areas of the hospital and VA Campus buildings which includes USC School of Medicine.
2. **Eating and drinking** are prohibited in the lab areas.
3. **Food and beverages** are not permitted in laboratory refrigerators/freezers.
4. **Application of cosmetics** in lab areas is prohibited.
5. **Contact lenses**, especially the soft lenses, will absorb certain solvents and also constitute a hazard in splashes or spills. Contact lenses offer no protection from a splash and may concentrate caustic material against the cornea or prevent tears from washing a caustic away. You are strongly advised not to wear contact lenses in the laboratory! If you choose to wear contact lenses...you must wear goggles to protect your eyes.
6. **Safety Goggles:**
 - a. Safety goggles are to be worn by personnel performing the following functions:
 - Heating liquid in a test tube
 - Pouring and handling caustic and corrosive materials
 - Toxic or hazardous reagent preparation
 - Handling or using volatile solvents
 - b. All personnel in each lab will be advised of the location of safety goggles and instructed to wear them when performing the functions described in paragraph a. above. All new employees will be instructed in the use of eyewashes by each supervisor.
7. **Clothing:** Hospital uniforms or laboratory coats should be worn when working. Do not wear uniforms or coats with a high percentage of acetate, or other highly flammable material. Uniforms or coats made of a non-porous material are required when using radioisotopes. Bare midriffs are prohibited in laboratory settings.
8. **Prohibited electronic devices** include Walkman radios, headphones, two-way pagers, and cell phones. Cell phones should be used only in designated areas.
9. **Footgear** should be securely fastened, comfortable, rubber soled and cover the entire foot (lace or loafer type). Shoes with open toes or heels are prohibited.

10. **Hair** must be secured back and off the shoulders in such a manner as to prevent it from coming into contact with contaminated materials or surfaces and to prevent shedding of organisms into the work area. This is especially true in bacteriology work. It is also important to keep hair out of moving machinery such as a centrifuge. Long beards are a danger in regard to moving equipment and a possible source of bacterial contamination ; therefore, they beard msut be covered by a mask.

11. **Hand washing:** Wash hands frequently during the day, during specimen processing, before leaving the laboratory, before and after contact with patients, and before eating, smoking or drinking.

12. **Personal hygiene:** Close attention should be paid to hazardous habits of hygiene such as nail biting, head scratching, putting pens/pencils in the mouth, etc. Avoid all hand to mouth motions.

13. **Gloves:** Wear gloves when using blood, body fluids, and radioactive materials. Gloves during the course of Laboratory work must be removed before leaving the laboratory.

14. **The VA Safety Manual prohibits mouth pipetting.** There are pipetting aids (i.e. bulb, syringe, or mechanical pipetting) available for every task. Mechanical pipetting systems will be used for all materials.

15. **Drinking fountains** are to be utilized only for that purpose and not for washing hands, rinsing items, or filling containers.

16. **Exits and aisles:** Do not obstruct exits and aisles in any way. No equipment, chairs, trash, or supplies are permitted in exit routes or areas. Empty boxes are to be placed in container(s) provided.

17. **Good Housekeeping:**

- a. Rags and/or flammable solvents will be disposed of in self-closing metal containers.
- b. Do not hang clothing on or near radiators, heating instruments, or open flames.
- c. Do not allow trash to accumulate in any area. Trash and boxes are to be disposed of daily.
- d. Reduce clutter and keep work area organized and neat.

18. **Glassware:**

- a. Do not use broken or chipped glassware. Discard it and order new.
- b. Do not leave pipettes sticking out of bottles, flasks, or beakers.
- c. Do not attempt to remove stoppers on glass tubing by forcing. Instead, cut them off.
- d. Decontaminate (by autoclave) glass exposed to possible hepatitis-containing samples.
- e. Heated glass containers should be handled with heat-resistant gloves (not asbestos). No asbestos containing material is permitted on the premisis at any time.

f. All glassware, broken or not, should be disposed of in special containers labeled for "broken glassware". Do not place in regular trash containers. Do not use these containers for disposable plastics e.g. pipette.

19. Centrifuges:

- a. Personnel should not operate any equipment without proper training.
- b. Do not operate any centrifuges (regardless of size) unless the covers are closed. Keep hair, beard, neckties, hair ribbons or other clothing OUT OF THE WAY.
- c. Do not centrifuge uncovered tubes of specimens (blood, urine, sputum) or flammable liquids. (Contaminated items become aerosols; flammable liquids become bombs, etc.). USE CAPS OR PARAFILM. Tubes must be counterbalanced.

20. Autoclaves:

- a. Personnel should not operate any equipment without proper training. This is especially true for autoclaves, centrifuges, power supplies and gas cylinders.
- b. Do not open the autoclave until both temperature and pressure is back to normal. Do not stand in front of door when opening.
- c. Use heat resistant gloves when putting items into or removing items from the autoclave. The sides and door may be hot in addition to the material being autoclaved. Note: Beware of steam, which will permeate heat-resistant gloves.
- d. Loosen caps of any containers to allow equalization of pressures inside containers. This prevents explosions, boil-over, and implosions. Do not move heated liquids until they have cooled down. Moving such liquids while hot can lead to "flash ups" of hot fluids and cause serious burns.

21. Needle and Syringe Handling Procedures:

- a. Do not destroy, bend or clip used needles. Do not replace the needle cap on a used needle (many needle sticks are caused in this manner.)
- b. Used needles should be placed in red, plastic, sharps containers, available from Facilities Management. Staff must contact Facility Management when the Sharp container reaches 2/3 full or above the line to have the sharp container replaced to prevent overfilling the container.
- c. Never leave needles, etc., lying on the workbench.
- d. If injured, report immediately to Employee Health Bldg. 22 (1st floor) or emergency room if off tour hours (1600 – 0800 and weekends and federal holidays) and then notify the Research Office on tour after injury is taken care of. If off tour contact the on call Research Office employee.

22. **Non-Infectious Sharps:** Non-infectious glass and sharps material that is not biohazardous waste must not be put in infectious waste sharps container. Unbroken glass can be disposed of in normal waste; broken glass must be sealed in containers to prevent punctures.

CHAPTER 2 GOOD LABORATORY PRACTICES

1. The following practices, precautions, and procedures apply to all laboratories working with hazardous chemicals.

a. Know the materials you are working with and their hazards. Read labels and MSDS carefully in order to have knowledge of the materials you are working with and their hazards **prior to** working with materials. Contact the Chemical Hygiene Officer if more information is needed.

b. Be prepared for emergencies: know what action to take. Make sure that spill kits and cleanup materials are available for small spills. The Research Office should be notified of any type of spills immediately. If off tour hours call Research Duty Personnel and Industrial Hygiene at pager 803-479-3370.

c. Know the location of safety showers, eyewash stations, fire blankets, fire extinguishers, and alarms.

d. Use the minimum amount of a hazardous chemical necessary.

e. Never deliberately smell or taste a chemical.

f. Inspect gloves and fume hoods before beginning procedures.

g. Do not allow the release of toxic substances into warm rooms or cold rooms.

h. Inspect equipment for damage before adding a hazardous chemical.

i. Avoid direct contact with any chemical. Keep chemicals off clothing, including shoes.

j. Do not engage in behavior that could distract and annoy others.

k. Band loose clothing with duct tape.

l. Keep the work area clean and uncluttered.

m. Label all secondary containers.

n. Keep hands and face clean. Wash with soap and water after handling any chemical.

o. Promptly clean up small spills using the SWIM process. (Appendix 3)

p. Contact the Safety Office for larger spills, ext. 6047 or 6824. (Appendix 3)

CHAPTER 3

WARNING SIGNS & LABELS

1. **Policies:**

a. **Area designations:** In most laboratories, there are no "high risk" areas. Chemical, bacteriologic and radioactive hoods and storage areas are considered "high risk" areas. The technical work areas are considered to be "moderate risk" and restricted to laboratory personnel. Administrative, clerical areas are considered to be "low risk", e.g. desks, non-technical work areas are not restricted.

b. **Posting:** In some laboratories, there may be high-risk periods that require posting while the hazard exists. In others, the designations are permanent and restrictions and signs should be permanent.

2. **Labels:** Chemical manufacturers are required to label their containers with identifying and hazard information. Whenever you put a chemical, whether purchased or produced yourself, into another container, that container must be adequately labeled. New chemicals should be labeled with the date received and the date opened. To insure uniformity among laboratories and reduce confusion, Research Service requires you to observe the following policy for labeling self-packaged items:

a. It is required that each laboratory maintains an electronic (computer based) inventory of chemical stocks and properly disposes of out-dated or unwanted items. This inventory must contain the following:

- 1) Reagent Name
- 2) Vendor purchased from (manufacturer)
- 3) Location of chemical (room & location within room)
- 4) Indication that MSDS is on file

b. The chemical inventory should be maintained on the research common drive and copies provided to the medical center safety office..

c. Inert items such as sodium chloride and other salts should be included on chemical inventories. Although antibodies can be excluded, reagents used as preservatives for antibodies must be included on chemical inventories.

d. The Medical Center Safety Program provides a disposal service for hazardous chemicals. This is an indirect charge and each laboratory should schedule pickup of chemical waste items as needed. Because disposal of hazardous wastes can be quite expensive, order only quantities needed for currently planned experiments and substitute non-hazardous items whenever possible. *Failure by investigators to properly manage their hazardous materials can result in the research service being required to provide funding for waste disposal.*

3. **Material Safety Data Sheets (MSDS):**

a. All laboratories must have a current listing of all chemicals in use and in storage. This list must be easily accessible to all laboratory personnel.

b. For all chemicals used or stored there must an MSDS on file and easily accessible to all laboratory personnel. If you cannot locate a MSDS in your files, check with the vendor, or contact the chemical

manufacturer. All purchase orders for chemical must include the wording "request Material Safety Data Sheet". You should read a MSDS on a substance before ordering it to determine if special handling is required. If it is hazardous, inquire about the possibility of substituting a less hazardous substance (several suppliers have 800-numbers that can be used for this purpose). If you are unaware of the nature of a substance, read the MSDS before opening the container. A tragedy can occur if you open a container and the substance turns out to be toxic!

4. **Chemical Inventory:** Each laboratory is required, when requested, to forward an updated version of their chemical inventory annually on the form provided by the Medical Center. Each laboratory must update their inventory whenever new materials are acquired and materials are no longer on hand or used.

CHAPTER 4

FIRE PREVENTION AND CONTROL

Procedures for emergency and disaster drills and exercises will follow those outlined in the medical center Safe Environment Management Plan and other directives referenced therein. As outlined in the *ANIMAL FACILITY DISASTER PLAN* (Research SOP 151-501), Primary Investigator's (PI's) are responsible for completing or suspending procedures in their laboratories, and returning animals to safe areas in the colony or laboratory, in cases of drills and exercises. When the Research Service is notified in advance of fire and other safety drills, PIs are notified and are responsible for avoiding scheduling procedures (e.g., surgery) that cannot be suspended during the drill, while also avoiding advance notice of the drill to research staff when appropriate. The small animal surgery operating room in Building 9, Room 202, should be treated analogously to hospital patient care areas in the event of a drill; that is, the surgeon and assistant may not leave animals undergoing aseptic surgery unattended. Unless an announcement is made to the contrary, all fire alarms are to be treated as a warning of an actual fire - not as tests of the system.

1. Prevention:

a. Be aware of ignition sources - open flame, heating elements and spark gaps (motors, light switches, friction and static sparks generated from static charges can ignite combustibles).

b. Do not use flammable liquids in the presence of ignition sources, and conversely, keep ignition sources away from areas where flammable liquids are used and/or stored.

c. Flammable liquids give off vapors that may also burn or explode. Be sure flammable liquids are properly stored. Quantities of more than one gallon must be in SAFETY CANS. BULK STORAGE should be in a safety cabinet. (Safety cabinet storage is limited to based on size of safety cabinet and manufactured capacity but a maximum of 60 gallons). Small quantities "in use" should be stored in well-ventilated areas, however not more than a 10-gallon aggregate may be available in any one lab at a time.

d. Do not store any flammable liquids in areas exposed to direct sunlight.

2. Priorities in Case of Fire:

a. Medical Center Policy Memoranda describe the basic policy, procedures, and responsibilities in the event a fire occurs.

b. The basic action is to Rescue, Alarm, Contain, Evacuate/Extinguish (remember the acronym R.A.C.E.).

3. **Procedures in Case of Fire:** When a fire is discovered, the Medical Center fire plan is to be followed. This plan consists of four steps forming the acronym RACE. These steps are:

RESCUE Remove people away from the fire/smoke source.

ALARM Alert the Medical Center by pulling the nearest alarm box and if time and conditions permit go to the nearest telephone and dial 6555, and report the fire verbally. Alert the nearest other employee – tell him/her the room number and instruct him/her to visit every room to alert other personnel.

CONTAIN Contain the fire. Close all doors and windows, including smoke doors.

EVACUATE Total evacuation of all building occupants to the minimum safe distance of 300 feet. Research staff in buildings 6 and 9 will meet at the SE corner of building 7. Research staff within the main hospital will evacuate in accordance with building 100 evacuation plans. Supervisors/PI's/administrators will take a head count of their staff and account for all staff members. Hallways must be kept unclogged. You should only extinguish small fires when you have an accessible escape route.

4. **Additional Responsibilities:** Immediately upon being alerted to a fire, personnel in all rooms will: Close windows and doors, especially those in corridors, (this will help contain fire and fumes). Turn off equipment, stop fans, but not ceiling lights. Evacuate the room, closing the doors. If fire emergency occurs in any corridor immediately adjacent to any research work area, secure work areas and leave the area until the all clear is sounded. Never place yourself in danger!

5. **Fight Fire:**

a. Evaluation

Evaluate the type and extent of the fire. If it is going to be a large fire, get out! Control measures should only be undertaken for small, isolated incipient fires. Never risk a life to extinguish or recover personal or Government property. Evaluate the type of material burning (wood, flammable, liquids, electrical or gases).

b. Solid Combustibles - wood-paper-cloth (Class A)

Small objects may be extinguished with CO₂, or ABC, dry chemical extinguishers.

c. Flammable Liquids - (Class B)

Dry chemical extinguishers are usually needed for safe and effective control of burning liquids. CO₂ will be effective only on a small fire. **DO NOT USE WATER** (it enhances spread). If flammable liquids have spilled but not ignited, sand (or other nonflammable absorbent) may be used to prevent spread and reduce the fire hazard. A dry chemical extinguisher should be available in case of fire.

6. **Fire Safety Equipment/Alarms:**

- a. Fire extinguishers are located in the corridors. Fire alarms are located adjacent to all exit doors.
- b. Fire and heat-resistant gloves may be used to move and handle hot vessels, turn off hot valves or handles. **CAUTION:** Some gloves may be permeable, and steam or hot liquids may soak through them and cause injury.

CHAPTER 5

ELECTRICAL SAFETY

1. **Grounding:** All instruments must be grounded. Facilities Management makes an annual inspection of instruments for proper grounding. The only exceptions to this rule are items entirely encased in plastic (such as microscopes).
2. **Report Shocks:** All shocks must be reported immediately, including small tingles. Small shocks often precede major shocks and a light tingle may indicate potential trouble.
3. **Corrective Actions:** Shut off the current and/or unplug the instrument. Do not attempt to use an instrument that is causing shocks. Not only is it potentially dangerous, but also any results from the instrument would be suspect. Report any defective equipment, inadequate electrical outlets, or shock hazards to the Facilities Management office for repairs.
4. **Repairs: DO NOT** work on or attempt to repair any instrument while it is plugged in. An exception is the calibration of instruments that require adjustment while plugged in. In this case, be sure hands are dry, remove all jewelry (watches and rings) and proceed with caution. Do not attempt to calibrate any instrument if you do not know the hazards involved. Only those persons designated (one from each lab) as authorized workers shall be allowed to work on any type of energized equipment.
5. **Repairs on the Electrical System of the Building are Prohibited.** Any work needed on switches, outlets, or circuit boxes (fuses, circuit breaker) must be referred to the Research Administration Office, whose staff will prepare a work order.
6. **Extension cords** shall not be used due to the dangers posed by overloading the circuits and by the possibility of tripping over loose cords. Use of power strips is acceptable. The practice of series connecting (daisy-chained) power strips/surge protectors is also prohibited.
7. **Miscellaneous:**
 - a. Employees should be on the lookout for frayed wires.
 - b. Small metal objects or large metal objects with protruding extensions will be kept away from outlets to prevent the possible contact with the receptacle.
 - c. All electrical outlets will remain accessible at all times.
 - d. Electrical equipment will not be operated near sinks. Personnel are cautioned about water standing on the floors and counters, and attempting to operate electrical equipment when this condition exists. Do

not stand in water. Additionally, be careful when using electrical cords near hot plates to insure that the insulation of the cord does not melt and expose hot wires or cause short-circuiting.

8. **Utility Failure:** If there is a utility outage call ext. 7558.

Turn off any equipment that might be affected by loss of that particular utility service and installing anti-restart devices. Protect any equipment that might be damaged by the loss of that utility service. Consider the effect of the loss of that utility on research samples and supplies stored or processed by that equipment. Consider the effects of what effect a “return to normal service” will have on equipment and laboratory operation. Of particular importance is the resultant power surge that might occur and damage computers or other sensitive electronic equipment. These should probably be turned off and unplugged until power is restored.

Utility systems whose outages would affect Research Service the most are: electrical, water, deionized water, climate control (heat and air conditioning), elevators, vacuum, compressed air, telephone, and computers.

All compressed air tanks should be treated as “full” at all times and should not be opened without a fitting attached.

CHAPTER 6 **COMPRESSED GASES**

1. **Introduction:** Compressed gases constitute several hazards. Any gas cylinder with a broken valve head becomes a missile capable of penetrating walls. Specific gases may be toxic or flammable. Finally, heating of cylinders may result in an explosion.

2. **General Standards:**

- a. Cylinders must be secured to prevent tip-over or damage at all times (limited to two per chain) .
- b. Valve safety covers should be left on until pressure regulators are attached.
- c. Containers must be marked clearly with the name of the contents. Tanks with wired on tags or color code only SHALL NOT be accepted.
- d. Hand trucks or dollies MUST be used in moving cylinders. Do not roll or drag cylinders. Transport with valve safety cover secured tightly and chained in place.
- e. The use of oil, grease, or lubricants on valves, regulators, or fittings is PROHIBITED.
- f. Do not attempt to repair damaged cylinders or to force frozen cylinder valves.
- g. Use only regulators or needle valves that conform to NCGA standards.
- h. When practical, cylinder valves must be closed before employees leave the lab at night.
- i. Maximum cylinder size in the laboratory will be limited to an H tank of 200 cu ft.

j. No more than one spare tank of each type kept in the lab with metal caps on spares.

3. **Flammable Gases:** Special care must be exercised when gases are used in confined spaces. Storage of flammable gases in the laboratory beyond what is being actively used is prohibited.

a. Do not manifold more than two cylinders together; however, several instruments or outlets are permitted for a single cylinder.

b. No more than one cylinder of highly flammable gas shall be in one room without specific review by the safety office.

c. Cylinder size is limited to 200 cubic feet.

d. Valves on all flammable gas cylinders shall be shut off when the laboratory is unattended.

4. **Pressure Regulators and Needle Valves:** Needle valves and regulators are designed specifically for different families of gases. Use only the properly designated fittings.

a. Threads and surfaces must be clean and tightly fitted. Do not lubricate.

b. Tighten regulators and valves firmly with proper sized wrench. Do not use adjustable wrenches or pliers, they damage the nuts. Do not force tight fits.

c. Open valves slowly. Do not stand directly in front of gauges (the gauge face may blow out). Do not force valves that "stick".

d. Check for leaks at connections. Leaks are usually due to damaged faces at connections or improper fittings. Do not attempt to force an improper fit. It may only damage a previously undamaged connection and compound the problem.

e. Valve handles must be left attached to the cylinders.

f. The high-pressure valve on the cylinder should set the maximum rate of flow. Fine-tuning of flow should be regulated by the needle valve.

g. Shut off cylinders when not in use.

5. **Leak Testing:** Facilities will check any suspected leak. (Call ext. 7558).

6. **Empty Cylinder:**

a. Must be marked "empty".

b. Empty or unused cylinders must be returned promptly.

c. Replace valve safety caps.

- d. Notify the Research Office of the empty tank.
- e. Research office will then contact warehouse personnel for the removal/replacement of spent tanks.

CHAPTER 7

CHEMICAL HAZARDS

1. **Introduction:** A number of routine procedures in a research laboratory involve the use of highly caustic, poisonous, or flammable reagents. These should be appropriately labeled to indicate the hazards. Read labels and observe precautions. Failure to follow safe practices is cause for disciplinary action.

2. Material Safety Data Sheets (MSDS):

a. Material Data Safety Sheets (MSDS) must be made available for all hazardous chemicals by the manufacturers. MSDS are important because they provide the most specific information about a product and its proper and safe use. A MSDS provides the identity of the chemical, the identity of the manufacturer and how to contact them, a list of hazardous ingredients, physical and chemical characteristics of the product; also fire and explosion data, reactivity data, health hazard data, precautions for safe handling and use, and control measures required.

b. Material Safety Data Sheets on all chemicals in use must be on file in each laboratory, and easily accessible to all laboratory personnel. If you cannot locate a MSDS in your files, check with the Vendor's Website. All purchase orders for hazardous chemicals must include the wording "request Material Data Safety Sheet". You should read a MSDS on a substance before ordering it to determine if special handling is required. If it is hazardous, inquire about the possibility of substituting a less hazardous substance (several suppliers have 800-numbers that can be used for this purpose). If you are unaware of the nature of a substance, read the MSDS before opening the container. A tragedy can occur if you open up a container and the substance turns out to be toxic! Principal investigators are responsible for insuring that instructions on MSDS's are followed.

3. **Carcinogenic and Hazardous Substances:** A carcinogen is defined as any substance that is reported to have produced a malignant tumor or one that metastasized to other parts of the body. Numerous carcinogenic and potential carcinogenic substances are used on the Research Service. Each is labeled by supplier and Material Safety Data Sheets (MSDS's) are supplied by them. Each lab should maintain a file of their dangerous substances (MSDS) and make all lab personnel aware of the list of carcinogenic and hazardous materials. Each employee should be trained in the proper procedures for the safe handling of these materials and that appropriate personal protective equipment is available and used when handling hazardous chemicals and carcinogens.

4. **Chemical Inventory:** An updated inventory of hazardous chemicals in your laboratory must be submitted to the Chemical Hygiene Officer for Research and the Subcommittee on Research Safety semi-annually.

5. Eye Hazard Areas:

Handling of corrosive or caustic materials.
Explosive materials used.
Hollow glassware under vacuum or pressure.

Cryogenic materials are handled.
Flying particles are generated.
Processes producing aerosols of infectious agents.
Power tools for drilling or cutting

6. Eye Splashes (Eye Wash Station): First aid begins with knowing what to do before an accident ever occurs. Practices finding the water hose at the lab sink and the eye-wash station with eyes closed. Also practice finding the phone to call for help after initial first aid. This simulation alone will help you realize the difficulty and time involved in treatment, especially if alone. **Remember, the first few moments after a contamination of the eyes by chemicals are the most crucial in terms of treatment.**

Move to nearest eye wash station and rinse immediately with copious temped tap water. Open eyes as much as possible to allow adequate rinsing. Forcibly hold eyes open to wash thoroughly behind eyelids, closing eyes defeats the purpose. Rinse for at least 10-15 minutes; with contact lenses, wash longer due to possibility of vapors concentrating under lenses. After sufficient flushing, keep eyes immobilized with clean wet soft cold pads while waiting for prompt medical attention. Seek medial attention as soon as possible (phone 6555). Inform supervisor. Eye wash stations in facility laboratory area should be checked every week.

7. Classification of dangerous chemicals:

a. **Caustic or Corrosive:** Acids and alkalis may cause burns of skin or mouth, or eyes and may cause damage to equipment and storage areas.

b. **Poisons/Toxins:** Almost any substance in quantity can be poisonous. For these purposes, a poison will be classified as a substance that may cause death or serious effects if relatively small amounts are inhaled, ingested or contact the skin (such as concentrated phenols). Poisons may be gas, liquid or solid.

c. **Carcinogens:** Substances designed by OSHA, ACGIH, IARC as carcinogenic require special handling.

d. **Flammables:** Such materials that easily ignite, burn, and serve as fuel for a fire.

e. **Explosives:** Materials that may explode under special circumstances.

f. **Radioactives:** Materials that spontaneously emit ionizing radiation.

8. Labeling: Refer to Chapter 2 of this manual for more information about labeling requirements.

9. General Practices for Chemical Storage are as follows:

a. All containers in storage must be in good condition and clearly labeled.

b. The Research Service Safety Committee inspects all stock at least semi-annually to ensure that containers are not deteriorating or leaking and that chemicals are all stored properly.

c. Chemicals should not be stored in alphabetical order.

d. Incompatible chemicals (such as acids and flammables in the same cabinet) should not be stored in proximity to each other. All laboratory personnel are responsible for reading and complying with the chemical storage system outlined in this document.

e. Chemical storage: All laboratories must implement the chemical storage system outlined below. The system is based on the National Fire Protection Association (NFPA) Manual of Hazardous Chemical Reactions. The NFPA codes are available on the internet located at http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp.

f. Separate all reagents into at least five categories for storage. When a chemical falls into more than one category, it should be stored according to its greatest hazard. The categories are:

Flammable: Store in Flammables cabinets.

Health hazards: Volatile substances require special storage.

Reactive or oxidizing: Store strong oxidizing agents and strong reducing agents separately.

Corrosives: Store strong acids and strong bases separately in Corrosives cabinets.

- g. Chemical storage refrigerators must be explosion proof.
- h. Hazardous chemicals must not be stored on refrigerator door shelves.
- i. Corrosion-resistant cabinets shall be used for storing corrosives.
- j. Spill trays or other containment devices shall be used under containers of strong reagents.
- k. Liquid chemicals shall not be stored above eye level.
- l. Larger containers shall be stored on lower shelves.
- m. Expired chemicals shall be disposed of through the Safety Office.
- n. Excess chemicals should be recycled or disposed of promptly.
- o. Storage of chemicals in laboratories should be minimized.
- p. In-laboratory storage should be in accordance with National Fire Protection Association (NFPA) limits.

10. Precautions and Procedures for Working with Hazardous Chemicals:

The following precautions, procedures, and requirements apply to chemicals according to the hazards they pose. Responsible parties subject to the approval of the Chemical Hygiene Officer and the Subcommittee on Research Safety may write specific procedures for any class of hazardous chemical.

11. Flammable/Combustible Chemicals: All chemicals that have vapor pressures high enough to generate sufficient, ignitable vapor at standard conditions:

- a. Flammable - can generate sufficient, ignitable vapors at temperatures below 140° F
- b. Combustible - can generate sufficient vapors at or above 100° F and below 104° F

12. When working with flammables and combustibles, employees must:

- a. Eliminate all ignition sources, including open flames, hot surfaces, electrical devices, static, and sparks from cutting equipment.
- b. Keep **only** the minimum quantity of any chemical reagent needed; typically in the work area this is the amount needed to perform one experiment. In general, the amount of a reagent stored in the laboratory should be the amount needed to complete experiments over the next 6-12 months.
- c. Put no more than one quart of flammable liquid in a glass container
- d. Store materials in cabinets approved for flammable substances
- e. Store these materials in explosion-proof refrigerators
- f. Store these materials away from oxidizers
- g. Ensure that there is proper grounding when transferring flammable chemicals from bulk containers.
- h. Make sure of the location of the nearest appropriate class of fire extinguisher.

13. **Special Precautions for Isopentane:** Isopentane is a highly flammable and explosive liquid with toxic properties. It must be handled with care. Avoid contact with any flame or potential ignition source. Because inhalation can cause respiratory distress, use in a fume hood is recommended, as are safety goggles and gloves.

14. **Corrosives, Acids and Bases:** These substances can cause chemical burns and degrade metals. For corrosives:

- a. Use corrosion-resistant containers and storage equipment.
- b. Always wear appropriate eye protection and gloves. Use face shields and rubber boots and aprons when procedures warrant. Refer to the MSDS for appropriate PPE requirements.
- c. When diluting concentrated acids with water, always add the acid to the water. Never add the water to the acid.
- d. Storage acids separately from bases and store acids and bases by themselves from other chemicals, reference attachment regarding appropriate chemical storage practices.
- e. Ensure that an eyewash station and a safety shower are readily accessible to areas where corrosive material is stored.

f. Flush skin or eyes that have come into contact with corrosive material continuously for at least 15 minutes and summon medical help.

g. Dedicated cabinets are recommended for acid storage.

h. Organic acids such as but not limited to acrylic acid, methacrylic acid, picric acid, peracetic acid require special handling procedure because of the potential explosive hazard. Therefore, pre-approval for any potential explosive organic acid must be obtained by the Subcommittee on Research Safety prior to purchase of such chemicals. Only limited quantities will be allowed for purchase with a short retention time, and handled by experienced investigators.

15. Special Precautions for Hydrofluoric Acid: Hydrofluoric acid (HF) is an extremely dangerous corrosive, eye hazard, and respiratory threat. HF attacks glass, concrete, many metals (especially cast iron), wood, leather, and rubber. HF can penetrate the skin, burning out subcutaneous layers, and ultimately can decalcify bone. When working with HF:

a. Cover work surfaces with wax.

b. Use containers coated with Teflon, polyethylene, or polypropylene.

c. Conduct all work in a fume hood.

d. In case of severe exposure, remove contaminated clothing at once and place employee under a safety shower.

e. In case of severe exposure, summon medical help at once. Continue medical surveillance for delayed systemic effects.

16. Oxidizers: By various definitions, oxidizers are materials that promote oxidation reactions in which a substance is combined with oxygen, loses hydrogen, or generally loses electrons. When working with oxidizers, employees should:

a. Know the reactivity of the materials. Make sure that there are no materials in the work area that could become involved in the reaction.

b. Isolate the work area behind a shield if there is a potential for violent or explosive reaction.

c. Use the minimum amount of substance required for the procedure. Do not store oxidizers in the work area.

d. Store oxidizers away from organic materials, flammables, and reducers, heat sources, direct sunlight, acids, bases (*reference Appendix 6 for details*).

17. Special Precautions for Perchloric Acid: Perchloric acid (HClO₄) is a particularly powerful oxidizer that has been the cause of many laboratory accidents. Perchloric acid is incompatible with:

Plastics

Nylon (polyamide)

Modacrylic ester, Dynet (35% to 85% acrylonitrile)

Polyester
Bakelite
Lucite
Micarta
Cellulose-based lacquers
Metals
Copper
Copper alloy (for shock-sensitive perchlorate salts)
Aluminum
High-nickel alloys
Other substances
Cotton
Wood
Wool
Glycerin-lead oxide

The major hazards of perchloric acid are dried salt in contact with organic material (wood) and/or heat.

18. The following special precautions should be exercised for perchloric acid:

- a. Notify the Chemical Hygiene Officer in advance when perchloric acid is to be used.
- b. Do not perform direct-flame heating.
- c. Do not mix with organics, as organic perchlorides are formed and are highly explosive.
- d. Perform all transfers over a sink.
- e. Only experienced/trained individuals will handle anhydrous perchloric acid.
- f. Two or more persons shall be in the room when anhydrous perchloric acid is used.
- g. Make only as much anhydrous perchloric acid as required for one day's work.
- i. Neutralize spilled perchloric acid before cleaning it up.
- j. Dilute acid to 5% and then neutralize with aqueous sodium hydroxide for disposal.

19. **Water-reactive Materials:**

- a. Materials that react with water to produce flammable or toxic gases. They include alkali metals (e.g., lithium, sodium, potassium, rubidium, and cesium) and metal hydroxides.
- b. The following are procedures for handling water-reactive materials:

Purchase and store only the minimum amount of water-reactive materials necessary.
Do not expose water-reactive materials to water or moisture.
Store sodium and lithium under mineral oil.
Store potassium under xylene.

Perform procedures under a fume hood.

Make sure that the laboratory contains a fire extinguisher.

20. Peroxidizables: Chemicals that can react with oxygen to form peroxides, which explode from impact, heat, and friction. Peroxides can form in containers even if they are unopened. For working with peroxidizables:

- a. Purchase the minimum amount necessary.
- b. Date all peroxidizables on receipt and on opening. Dispose of all materials after 18 months.
- c. Do not open any container that has crystal formation around the lid.
- d. Test containers for peroxides each month.
- e. Handle as flammables during procedures.
- f. Store in a cool dry place. Post storage areas with a warning sign: CAUTION POTENTIAL EXPLOSIVE HAZARD.

21. Light-sensitive Materials: Materials that degrade in the presence of light and that can create pressure in containers or form toxic by-products. For light-sensitive materials:

- a. Store in cool, dark area in amber-colored bottles or another form of container that blocks light.
- b. Date containers on receipt and on opening. Discard unopened containers after one year; discard opened containers after six months.

22. Shock-sensitive/Explosive Materials: Compounds that can spontaneously release energy under normal conditions or when subjected to agitation. For working with shock-sensitive or explosive materials:

- a. Inform the Chemical Hygiene Officer at least a day in advance of activities.
- b. Date all containers on receipt and on opening. Discard unopened containers one year from date of receipt. Discard opened containers six months from date of opening.
- c. Use the minimum amount necessary.
- d. Use shielding to isolate the materials during procedures.
- e. Post the work area with a warning sign: CAUTION EXPLOSIVE HAZARD

23. Compressed Gases: *See Chapter 5.*

24. Cryogenics: Liquified substances that are kept under pressure at low temperatures. They present a number of hazards:

- a. They can damage skin and eyes with brief contact.
- b. They condense oxygen out of the air and increase fire hazards.
- c. They can create an explosive hazard from the increase in pressure when they change from liquid to gas.
- d. They can embrittle other materials.

25. For working with cryogenics:

- a. Wear goggles or safety glasses with side shields.
- b. Do not wear watches, rings, and other jewelry.
- c. Wear gloves that are resistant to low temperatures and chemically resistant to the substance, if necessary.
- d. Keep equipment clean, especially when working with oxygen.
- e. Control mixtures to prevent formation of flammable or explosive mixtures.
- f. Follow the precautions for flammable materials for flammable cryogenics.
- g. Ensure that containers of cryogenics have pressure-relief valves.
- h. Ensure that containers and associated piping are able to withstand extreme cold without becoming brittle.

26. **Toxic Chemicals:** The primary reference for toxicity is the MSDS. The MSDS should contain OSHA and other exposure limits, if there are limits. Other sources for exposure limits are:

Note: The procedure for limiting exposure to a toxic chemical depends on the form of the chemical and the route of entry.

- a. OSHA. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances (http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10147)
- b. ACGIH TLV and BEI threshold limit values for chemical substances and physical agents and biological exposure indices.
- c. NIOSH. Pocket guide to chemical hazards (<http://www.cdc.gov/niosh/npg/>).

27. **Allergens or Sensitizers:** Substances that produce dermal and/or respiratory sensitivity (allergic rash or asthma-like symptoms). Once sensitization occurs, even minute exposure can trigger a full-blown response. For working with allergens:

- a. Wear suitable gloves.

- b. Conduct operations with volatile substances under fume hoods.

28. **Reproductive Toxins:** Substances that affect the reproductive capacity of male and female employees or the development of their progeny. When using reproductive toxins:

- a. Consult with the responsible party to review the procedure to be used. ? Chemical Hygeinst?
- b. Label containers with the warning: REPRODUCTIVE TOXIN: READ SPECIFIC PROCEDURES FOR USE.
- c. Store in unbreakable containers in well-ventilated areas.
- d. Guard against spills and splashes. Use appropriate safety apparel, fume hoods, or glove boxes.
- e. Notify the responsible party of all incidents of exposures or spills. (Appendix 3)
- f. During regular duty hours report to Employee Health Building 22 to seek treatment; after 1530 report to Emergency Room for treatment if exposed to toxin.

29. **Chemicals of Acute and Chronic Toxicity:** Materials that can be dangerous to those exposed to high doses or repeated small doses respectively. Use the following procedures:

- a. Review the toxic properties and the effects of the chemicals to be used.
- b. Use and store substances in designated restricted access areas that are posted with the appropriate warning.
- c. Use a hood with a filter or other containment device for working with volatile or aerosol substances.
- d. If local exhaust ventilation is not feasible, wear a respirator (see Chapter 7 of this Chemical Hygiene Plan).
- e. Avoid skin contact: wear appropriate gloves, long sleeves, and other appropriate protection.
- f. Maintain careful records of the amounts of materials purchased, amounts used, and the names of employees who used them.
- g. Be prepared for spills and accidents.
- h. Ensure that at least two people are present when working with highly toxic substances or substances of unknown toxicity.
- i. Store breakable containers in chemically resistant trays. Keep resistant trays under work and under apparatus.
- j. Cover work and storage surfaces with disposable, absorbent, plastic-backed paper.
- k. Call the Safety and Health Office if a major spill occurs.

l. Dispose of contaminated clothing as hazardous waste.

m. Store contaminated waste in closed, leak-proof containers that have been appropriately labeled.

30. Chemicals of High Chronic Toxicity: Materials that can cause cancer or other chronic conditions in humans or that have shown high carcinogenic potency in test animals. Substances currently regulated by OSHA as carcinogens are:

2-Acetylaminofluorene
Acrylonitrile
4-Aminodiphenyl
Asbestos, tremolite, anthrophyllite, actinolite
Benzene
Benzidine
Bis-chloromethyl ether
1,2-Dibromo-3-chloropropane
3,3'-Dichlorobenzidine (and salts)
4-Dimethylaminoazobenzene
Ethylene oxide
Ethyleneimine
Inorganic arsenic
Methyl chloromethyl ether
Naphthylamine
4-Nitrobiphenyl
N-Nitrosodimethylamine
Beta-Propiolactone
Vinyl chloride

31. Use the following procedures in addition to the procedures for chemicals of moderate chronic and high acute toxicity:

a. Perform all work, including transfers, in controlled areas of restricted access, such as hoods, glove boxes, or portions of a laboratory specially designated.

b. Train all persons with access to controlled areas in the hazards of the substances used.

c. Ensure that the controlled area is posted with signs such as: **CANCER-SUSPECT AGENT: AUTHORIZED PERSONNEL ONLY**

d. Label all containers: **WARNING HIGH CHRONIC TOXICITY** or **CANCER-SUSPECT AGENT**

e. Keep glove boxes at negative pressure (at least 0.5 inch of water lower than the surrounding environment) with a minimum of two air changes per hour.

f. If positive-pressure glove boxes are used, ensure that they are tightness tested before each use.

g. Vent glove boxes into a hood equipped with a HEPA filter and an appropriate scrubber for vapors.

h. Equip vacuum pumps with HEPA filters or scrubbers.

- i. Use absorbents for spilled volatile liquids. Use a wet mop or a vacuum equipped with a HEPA filter for other substances. Do not dry-sweep spilled solids.
- j. On leaving the controlled area, remove protective equipment and place it in an appropriate container that is labeled **WARNING HIGH CHRONIC TOXICITY**.
- k. Wash hands and arms thoroughly after contact with the agent before eating or smoking and at end of the workday.
- l. Keep accurate records of the amounts of substances stored and used and the names of persons using them and the dates used.
- m. Prepare contingency plans to ensure minimum exposure in case of accidents.
- n. Use chemical decontamination when possible.
- o. Ensure that contaminated wastes are removed under the supervision of authorized personnel.

32. Mercury: Medical Center Memorandum 544-833-1 explains the policy and procedures regarding mercury spillage, Medical Center policy regarding the use of mercury containing items (prohibited) and number of who to call in case of a spill. Call the Safety Office, ext. 6824. After hours, contact the telephone operator. Use of mercury is being phased out. Review potential applications with the Subcommittee on Research Safety. In addition, follow these general guidelines:

- a. Good personal hygiene practices will be observed when using these items. Consumption of food and beverages is prohibited where mercury is handled. Gloves, aprons, facemasks and fume hoods will be used when handling these items.
- b. Mercury will be stored in closed non-breakable containers. Surface of mercury may be covered with water or oil to slow vaporization.
- c. Do not place elemental mercury waste in drains.
- d. Mercury disposal procedures apply to instrument containing mercury as well, e.g. blood pressure monitors, thermometers.

33. Hazardous Unstable Chemicals:

- a. Such materials with limited shelf life (e.g. ether) should be purchased in the smallest containers and smallest quantity possible.
- b. A discard (expiration) date should be permanently applied to each container upon receipt. This will be determined based on the safe or useful shelf life or on the estimated duration of the process requiring its use, whichever is shorter.
- c. Periodic surveys of all chemical storage areas should be made. Containers, which are undated or

have passed their discard date will be disposed of immediately.

34. Use, Storage & Disposal of Ether or Containers (Center for Disease Control Recommendation):

Storage of solvents: Open vaporization inside the hospital must not be used for routine disposal of flammable and combustible liquids. Acceptable disposal procedures include the following:

a. Ether is highly flammable. It must be used in a fume hood and stored in the refrigerator. Whenever possible an alternative chemical should be used.

b. It should be replaced at least annually.

c. Disposal is by turn in only.

d. It should be heated with extreme caution.

e. Waste ether, even when treated to eliminate peroxides, should be handled as a flammable liquid. Unless stored below -50F, it will continue to vaporize. Storage in an approved flammable liquid storage cabinet, in a refrigerator listed as safe or explosion-proof, or in an approved hood is acceptable. Containers that show signs of crystals are extremely hazardous and are an uncontrolled explosion hazard that should not be handled by other than an explosion hazard specialist.

f. Safe practices for management of ethers include: maintaining the least inventory practicable; purchasing the smallest containers practicable; dating all containers on both receipt and opening; disposing of any residual amounts as soon as possible after initial opening and use; and disposing of unopened containers after expiration date.

35. Formaldehyde or Paraformaldehyde: All protocols that involve the use of formaldehyde must state that on the safety form. In addition, animal protocols that involve tissue fixation should state that this step will be performed within a fume hood. It is the responsibility of the investigator to notify the Medical Center Safety/Health Manager or Specialist of any person using formaldehyde and/or any other OSHA and ACGIH regulated chemical.

36. Breaks and Spills:

a. Skin/eye/mouth contact: wash area immediately. (Eye wash and showers should be utilized).

b. Chemical spills on clothing: remove items of clothing immediately, preferably while under shower, to avoid soaking through to skin. This includes belts and shoes (if affected).

c. Contain spills with appropriate neutralizer or absorbent materials, wash area thoroughly after clean up.

d. Disposal: Absorbent material should be placed in a sealed can and marked "HAZARDOUS WASTE – "Chemical Name" absorbent" for disposal by the safety office(see appendix 4).

37. Handling, Usage and Disposal of All Hazardous Chemicals:

Refer to Chapter 6.

38. Personal Protective Equipment/Apparel: Personal protective equipment (PPE) must be used in those circumstances when engineering controls are not feasible, when emergencies occur, and when routine protection of eyes, skin, and clothing is needed.

39. Respirators: When engineering controls are not feasible, the investigator must provide respirators. Persons required to wear respirators are subject to the regulations in 29 CFR 1910.134 and policy 544-812-25. Powered Air Purifying respirators (PAPR's) with loose fitting hood are the preferred respirator to be used in research. If PAPR's are not feasible then employees must be evaluated by a physician for their ability to wear respirators, fit tested, provided with fitted respirators, and trained in respirator use and maintenance. Contact the Safety Office, ext. 6824, to arrange this testing and training.

40. Eye Protection: The following rules must be followed at all times:

a. All employees within the laboratory must wear safety glasses with side shields when working with eye irritants.

b. Full-face shields with neck protection must be worn over safety glasses for all hazardous chemical operations that could result in splashing, spraying, or misting.

41. Skin Protection: The following rules apply:

a. All skin must be protected. Employees must wear lab coats and, when procedures warrant, coveralls or aprons. Employees may not wear open-toed shoes or sandals.

b. Employees working with extremely hazardous chemicals should tape all clothing openings and wear caps. If the responsible party or the CHO deems it necessary, or if indicated by the MSDS, impervious clothing must be provided.

c. Employees must wear appropriate gloves when working with hazardous chemicals.

d. Safety showers are located in the vicinity of every laboratory.

e. PPE should not leave the laboratory unless it is being discarded or taken to the laundry.

f. PPE contaminated with hazardous chemicals must be disposed of as hazardous waste.

42. General - Personal Protective Equipment: The MSDS for a substance should be consulted to determine what protective equipment is needed and whether or not monitoring is required. After consulting the MSDS, employees should notify their Principal Investigator of the need for protective equipment. It is the Principal Investigator's responsibility to provide these items for their laboratory.

Anyone whose work involves regular and frequent handling of toxicologically significant quantities of a chemical should consult the Chemical Hygiene Officer, Medical Center Safety Office, and Employee Health, on an individual basis, to determine whether a regular schedule of environmental monitoring or medical surveillance is desirable. Copies of the annual inventory of hazardous chemicals found in each lab must be made available to the Medical Center Safety/Health Manager or Specialist, who may also determine that monitoring is required for specific items. The hospital's Radiation Safety Officer (RSO),

will establish the necessary monitoring for uses of radioactive materials by all permit holders and their personnel. Questions should be directed to the RSO at ext. 7492.

43. Disposal of Chemical Wastes: All organic compounds, including ethanol and ethidium bromide, must be disposed of through the Safety Office. Note that disposal through the Safety Office should also be arranged for used gel electrophoresis material that contains ethidium. For other compounds, check the Material Safety Data Sheets or with the Safety Office. Evaporative release is not an acceptable method of disposal.

To dispose of chemicals through the Research Office, supply the following items:

- **HAZARDOUS WASTE TURN-IN FORM** (*Appendix 5*). This form can be obtained through the Research Office. The form should be filled out in its entirety by the investigator turning in the material. The hazardous waste cannot be disposed of unless all items on the form are filled out.
- **MSDS sheets**

Please have the above items available before contacting the Safety Office. The investigator will schedule a time with the Research Safety Coordinator to bring the completed Hazardous Waste Turn-In form, and MSDS sheets. The chemicals will remain in the possession of the investigator until a hazardous waste pick up is coordinated by the Safety Office.

44. Chemicals Developed in the Laboratory: The following requirements apply to chemical substances, including pharmaceuticals, developed in laboratories:

- a. If a chemical is produced exclusively for the laboratory's own use, the principal investigator must determine if it is hazardous and, if so, provide appropriate training to protect employees.
- b. If the composition of a chemical produced in the laboratory is not known, the chemical must be treated as hazardous.
- c. If a chemical is produced for use outside the laboratory, the responsible party must comply with the provisions of the OSHA hazard communication standard, including the issuance of an MSDS.

45. Use and Disposal of Picric Acid: Picric acid is a highly explosive chemical that poses a hazard to personnel. Dispose of with proper care. Investigators may be responsible for cost of disposal. All protocols using picric acid must be reviewed by the Subcommittee on Research Safety. No currently approved protocols utilize picric acid.

46. Satellite Accumulation Areas: To satisfy Environmental Protection Agency's Resource Conservation and Recovery Act (RCRA), each laboratory that is generating chemical waste must set up satellite accumulation areas for each type of waste being generated. Requirements for waste containers in these areas are as follows:

- 1) They must be clearly marked as 'Hazardous Waste';
- 2) The day on which the collection was initiated must be indicated on the label;
- 3) There must be appropriate secondary containment;

- 4) Each laboratory should not have more than one full collection container for a given type of waste.
- 5) An accumulation log documenting the date and quantity of waste added to a container must be maintained for each waste type.

CHAPTER 8 **CARCINOGENS**

1. **Introduction:** OSHA has established specific regulations regarding the handling of certain compounds designated as carcinogenic.

2. **Carcinogens:** The use of the substances listed below, considered by OSHA to be carcinogenic (i.e. containing .1 to 1% or more of such chemicals by weight), in the VA Medical Center is prohibited by VA Handbook 7700.1 July 8, 1998 (to revise Department of Veterans Affairs (VA) occupational safety and health (OSH) policy, formerly contained in VA Manual MP-3, VA Engineering, Part III, Safety, Occupational Health, and Fire Protection). Requirements for obtaining this exception are outlined in this publication.

Acrylamide
Benzene
Colchine
Ethidium Bromide
4 Nitrobiphenyl
Alpha-naphthalanine
4, 4'-Methylene bis 3, 3'-Dichlorobenzidine (and its salts)
2 chloroaniline)
Methyl chloromethyl ether
Bis-chloromethyl ether
Alpha-Naphthylamine
Benzidine and its salts
4 Aminodiphenyl
Ethylenimine
Beta-Propiolactone
2-Acetulaminofluorene
4-Dimethylaminoazobenzene
N-Nitrosodimethylamine
Beta-Naphtylamine

Compounds believed to be potential carcinogens should be segregated. A list of these chemicals should be posted in the cabinet where they are stored. Investigators should review compounds they are using for carcinogenetic properties and other hazards.

CHAPTER 9 **BIOLOGICAL HAZARDS** (e.g. recombinant DNA or infectious diseases)

1. **General Instructions:** Principal Investigators are responsible for establishing procedures for handling and disposing of specific biohazards used in their laboratories that are not covered by this manual.

Investigators must receive approval from the Subcommittee for Research Safety prior to working with biological hazards.

- a. Autoclave all items prior to cleaning or disposal.
- b. Follow approved biohazard statement.
- c. If using animals, animal carcasses and tissue samples should be disposed of by incineration.
- d. Plastic ware and waste material from cell culture experiments must be either bleached or incinerated.

2. Universal Precautions: Avoid contact with all visible blood, body fluids, mucous membranes and non-intact skin. Wear gloves, gowns and masks as necessary to avoid blood/body fluid contacts. Wear gloves for all invasive procedures, such as drawing blood, starting IVs dressing changes, track care, suctioning, opening specimen containers, working with specimens, and emptying urine bags. Wear gloves, gowns, and goggles when splash of body fluids is likely. Use ambu bags or seal-easy masks for providing CPR. Protect yourself at all times; don't assume anyone's blood or body fluids are safe. Wash hands (even if you wore gloves) after patient contact.

For high risk procedures, such as transferring a highly reactive or caustic chemical, it is recommended that more than one person be present.

NOTE: RED BIOHAZARD BAGS ARE NOT TO BE USED FOR GENERAL WASTE.

3. Route of infection: Several routes may spread infections. The actual occurrence of an infection depends on both the virulence of the infecting agent and the susceptibility of the host.

- a. Simply removing caps or cotton plugs or swabs from tubes may form droplets and aerosols. Heating liquids on needles too rapidly may also create an aerosol. Breakage in a centrifuge is a serious situation.
- b. Ingestion: May occur through mouth pipetting, and failure to wash hands after handling specimens or cultures.
- c. Direct inoculation: Scratches, needles, broken glass or animal bites may permit direct inoculation.
- d. Skin contact: Some very virulent organisms, and others not so virulent, can enter through small cuts or scratches, or through conjunctiva of the eye.
- e. Vectors: Mosquitoes, ticks, fleas, and other ectoparasites may be potential sources of infection in the laboratory, especially if animal work is performed.

4. Handling Specimens:

- a. WASH HANDS FREQUENTLY
- b. CENTRIFUGE: If specimens must be centrifuged, they MUST BE COVERED BY A SEALED

CAP TO PREVENT AEROSOL FORMATION.

5. Processing Specimens:

a. ALL SPECIMENS ARE POTENTIALLY CONTAMINATED – USE CAREFUL TECHNIQUES AT ALL TIMES.

b. ALL CULTURES ARE POTENTIAL PATHOGENS - USE CAREFUL TECHNIQUES AT ALL TIMES.

Large numbers of plates should be handled in baskets. Test tube racks or trays are required for tubed cultures. (DO NOT place tubes in glasses or paper cups). Tuberculosis, fungus specimens, and cultures will be handled and processed in the biologic safety cabinet. Needles and loops must be sterilized so as not to cause spattering of material on heating. Benches are to be disinfected with 5-10% bleach.

6. Disposal of Contaminated Materials:

Discard microbiology specimens and cultures into plastic autoclavable bags. Autoclave one cycle prior to placement in hazardous waste container for removal. Materials or containers that are to be reused should be autoclaved one cycle prior to cleaning. Place them in a sealed and clearly labeled container to minimize hazard to others prior to sterilization. Any breakage of bags or leakage of contaminated materials should be reported to the Research Safety Officer at once for instructions on procedures for safe clean up. All blood specimens are considered as biohazardous material and must be placed in the containers marked "biohazard" for disposal and subsequent incineration. Red triangle-shaped metal cans are to be used for unbroken, non-sharp, non-hazardous glass. This container does not require a bag. Red plastic sharps containers are to be used for all materials that would puncture a bag (i.e., broken glass, pipettes). This container may not be used for needles. This container does not require a bag. Sharps containers on the walls of the laboratory are for needles only. Waste containers with a red bag are for all hazardous materials that would not puncture a bag. Waste containers with a white bag are for use with all non-hazardous materials.

7. Accidents and Spills:

a. Specific plan to follow in the event of a spill is outlined in Appendix 3.

NOTE: LABORATORIES HANDLING HIGHLY VIRULENT INFECTIOUS AGENTS MUST HAVE SPECIFIC PLANS FOR HANDLING ACCIDENTS.

b. "Dry" spills (overturned or broken culture plate) with no significant aerosol formation: Evacuation of room probably not indicated. Soak up the disinfectant and contaminated material with an absorbent material (paper towels) and dispose of in a plastic bag or sealed container. Gloves should be worn for clean up. Clean flood area with disinfectant solution (i.e. phenol or bleach). Spill area should be thoroughly washed after clean up. Autoclave the contaminated material.

c. Liquid spills on bench or floor:
If significant aerosols were formed, the area should be evacuated and not re-entered for at least an hour. Do not re-enter for at least one hour until aerosols have settled. Persons entering the area to clean up

should wear protective clothing, gloves, and mask. If liquids are present, soak up in an absorbent material and handle as above. If not, clean the instrument and clean the room thoroughly before resuming work.

d. Spills in incubators, or other closed areas:

Soak up liquids with an absorbent and dispose of as outlined in paragraph 6b, if possible. If routine clean up is not possible, the unit may have to be decontaminated by means of a sterilizing gas such as formaldehyde or glutaraldehyde left overnight. See Safety Personnel before attempting to decontaminate in this manner. The unit should be thoroughly washed (if possible) after decontamination. Special spill control equipment is available in each section. This includes a powerful disinfectant in powder form.

e. Needle and syringe handling procedures:

Do not destroy, bend or clip used needles. The preferred practice is to not replace the needle cap on a used needle (many needle sticks are caused in this manner.) The "one handed scoop and tap" method for recapping can be used when that procedure proves safer than delaying disposal or transporting an uncapped needle. Used needles should be placed in sharps containers, available from Facilities Management. Never leave needles, lying at the patient's bedside or on bench tops. If injured, report immediately to Employee Health or the emergency room and then notify the Research Office.

f. Exposure to blood/body fluid continues to be a concern to us all. Report all needle sticks, cuts, bites, splashes of blood or body fluids to eyes, nose or mouth, or large volume or prolonged exposure to blood on chapped or abraded skin promptly to Employee Health or the emergency room and then notify the Research Office.

CHAPTER 10

REPORTS OF INCIDENTS & PREVENTION

1. **General information:** Medical Center Memoranda 544-812-6 contains information on reporting incidents, accidents, and the policy on injuries. All accident reports (VA Form 2162) must be filed in the Automated Safety Incident Tracking System (ASISTS) within three days of the occurrence.

2. **Needle and syringe handling procedures:**

a. Do not destroy, bend or clip used needles. The preferred practice is to not replace the needle cap on a used needle (many needle sticks are caused in this manner.) The "one handed scoop and tap" method for recapping can be used when that procedure proves safer than delaying disposal or transporting an uncapped needle.

b. Used needles will be placed in sharps containers, available from Facilities Management.

c. Never leave needles or other sharp objects lying unattended at the patient's bedside or on workbenches.

d. If injured, report immediately to Employee Health or the emergency room and then notify the Research Office.

CHAPTER 11 **GENERAL HEALTH MATTERS AND MEDICAL EXAMS**

Employee Health is located in Bldg. 22 on the main floor. Their extension is 7204

1. **TB Skin Test:** For your health, all employees are expected to receive a skin test for tuberculosis (TB) yearly. Employee Health administers tests.
2. **Immunizations for Hepatitis B**, and rabies are available through Employee Health. All personnel who work with dogs are required to receive the vaccine against rabies.
3. **Female employees** should be mindful of the use of hazardous substances, especially radioactive materials if pregnancy is suspected or real. Suspected or actual pregnancy should be reported immediately to the Radiation Safety Officer. Consult the MSDS for information on the substance with which you work. The Safety Office also has some materials on precautions to take during pregnancy.
4. **Employee Health:** Employees should consult with Employee Health about questions related to work-related illness, symptoms, or the need for medical surveillance.
5. **Medical Management:** Medical consultations and any medical follow-up deemed necessary by the examining physician must be made available under any of the following circumstances:
 - a. When an employee develops signs or symptoms associated with a chemical in the laboratory
 - b. In the event of a spill, a leak, or an explosion, resulting in a hazardous exposure
 - c. When monitoring reveals an exposure level routinely above the action level or the permissible exposure limit.
6. **If you are involved in an accident or contract a work-related illness**, report to Employee Health, who will direct you to the emergency room for treatment if needed. Life threatening emergencies should report directly to the emergency room or dial 6555. Notify the Research Office of accidents, work-related illnesses or suspected health hazards.

CHAPTER 12 **SAFETY INSPECTIONS**

1. **Monthly Inspections:** Each laboratory will be conduct and document its own monthly safety inspections. At a minimum, the following items will be checked: eye wash safety shower, fire extinguishers, electrical equipment, flammable solvents, unmarked bottles, hazardous chemicals, aisles and passageways. Eyewashes will be tested weekly by laboratory personnel to ensure proper operation. SAFETY VIOLATION CHECKLIST (Appendix 1) must be completed monthly. This form must be maintained in the Regulator Binder for the protocol and submitted during annual review.
2. **Subcommittee on Research Safety:** The Subcommittee on Research Safety shall make safety inspections of laboratories on a semi-annual schedule. Completion of the HAZARD SURVEILLANCE SURVEY (Appendix 1 and 7) will be completed during the semi-annual safety inspection of the

laboratory area inspection. A copy will be provided to the Principle Investigator for any corrective action plan.

CHAPTER 13 **FUME & BIOLOGICAL HOOD MAINTENANCE PLAN**

1. General Information:

a. Employees at the beginning of each shift should conduct daily inspections. They should visually inspect the hood area for blockages, and ensure adequate airflow.

b. The hood should never be operated with the sash fully open.

c. Chemicals stored in hoods should not block airflow.

d. No procedures should be performed in hoods designated strictly for storage.

e. All fume hoods are numbered to facilitate record keeping.

2. **Independent Contractor Inspections:** Fume and biological hoods are inspected and rated semi-annually by an independent contractor. Inspection dates and ratings are listed on stickers affixed to each hood. The Research Office assures the repair of hoods with insufficient ratings.

3. **Fume hood failure and monitoring:** If fume hoods or BSC shuts down either for planned maintenance or mechanical failure, users must terminate all activities that involve volatile hazardous agents, close all sources of volatile agents, close the hood sash, and notify the Research Office.

CHAPTER 14 **TRAINING**

1. **Purpose:** The goal of training is to inform employees of the risks of hazardous chemicals in the workplace, the controls available for their protection, how to use them, and the contents of the CHP. Training must be conducted initially when an employee is hired or when the potential hazards of the job change. Refresher training must be obtained annually.. Training for new employees should include:

a. The contents of the OSHA laboratory standard, 29 CFR 1910.1450 (<http://www.jmu.edu/safetyplan/lab/chemistry/osha.PDF>).

b. The contents of this manual

c. Material Data Safety Sheets

Investigators should instruct each lab member in the following:

1) The chemical and physical hazards of compounds specific to the laboratory they are working in

- 2) Routes of entry and how exposures can occur
- 3) Signs and symptoms associated with exposures
- 4) Methods of detecting chemicals (monitoring, visual appearance, smell, etc)
- 5) Good laboratory practice
- 6) Locations, proper use, and limitations of all available personal protective equipment within their laboratory
- 7) Spill control policy and location of cleanup equipment and materials within their laboratory.
- 8) Availability and location of information sources, such as books and Material Safety Data Sheets
- 9) Instruction on how to read a Material Data Safety Sheet
- 10) Emergency plans

2. Personnel will be instructed on the **personal protective equipment (PPE)** assessments relevant to their area of employment upon assignment, and anytime changes are made prior to being exposed to hazards in the workplace. Instruction on how to utilize PPE, how to maintain it and what its limitations are shall also be provided at these times.

3. **New Research Employee Orientation:** Principal Investigators and/or scientific and technical consultants are responsible for reviewing the Research Laboratory Safety Manual & Chemical Hygiene Plan with new employees. They are also required to train employees on special procedures to be followed in their laboratory. The employee must be shown the location of chemical inventories and Material Safety Data Sheets for all hazardous chemicals.

4. **New Procedures:** Investigators must also train employees on safety concerns whenever a new hazardous chemical or procedure is introduced, on a new item of equipment will be used.

5. **[VA Privacy and Information Security Awareness and Rules of Behavior \(VA 10176\) and 2\) VHA Privacy and HIPAA Training \(VA 10203\)](#)**. VA employees and Non-VA employee (WOC) may access said training via the VA TMS by visiting <https://www.tms.va.gov/plateau/user/login.jsp> There are two modules of training in CITI that are required, **Human Research Curriculum for VA Human Subjects & GCP or Working with VA IACUC and Animal specific and Biosecurity.**

6. **Documentation:** All individual personnel certificates will be submitted to the research office to be filed in file in the personnel folder and it is the Principle investigators responsibility to keep a copy of all training required in the Protocol's Regulatory Binder.

CHAPTER 15 **DISASTER PLAN**

General Information: Personnel in building 9 will follow the "Animal Facility Disaster Plan" Standard Operating Procedure 151-501 and "Research Service Line Safety Policy" Standard Operating Procedure

151-601. Instructions will also be given over the public address system or by Safety or Security Personnel.

“Research & Development Emergency Plan” will be implanted in case of an emergency situation.

CHAPTER 16

REQS FOR BIOHAZARD, ANIMAL & HUMAN STUDIES USE

Committee Approvals: Investigators will submit VHA Form 10-0398 Research Safety Survey upon submission of a new proposal (Research Review Subcommittee R&D SOP 544-401). VHA Form 10-0398 may be located within the Research site of the VA intranet (“Quick Navigate” drop-down box) and may also be provided by the Research Administration Office. Final approval from the WJB Dorn VA Subcommittee on Research Safety as well as the Research & Development Committee must be received prior to initiation of all studies, both clinical and basic (Research & Development Committee R&D SOP 544-201).

CHAPTER 17

PERMISSIBLE EXPOSURE LIMITS

OSHA Guidelines: Permissible Exposure Limits (PEL’s) define levels of exposure that are acceptable for different chemicals. These are based on exposure during a 40-hour workweek. Research personnel who are working with chemicals where there is a significant potential for exposure should be aware of PEL’s. Examples include Formaldehyde, Paraformaldehyde and Methacrylate. This is especially true if those compounds are used outside of a fume hood. PEL’s are listed in 29 CFR 1910.1000, and also in Material Data Safety Sheets and REO for NIOSH. All personnel should review compounds that they are using that may be appropriate for PEL monitoring. PI’s as part of the hazard assessment process must determine if there is a potential for employees to be exposed at or above the PEL. PI’s must perform and document a negative exposure assessment or coordinate with the facility safety office to have exposure monitoring performed.

CHAPTER 18

Animal Resource Facility (ARF) INFECTION CONTROL PROTECTION

Animal procurement, animal health monitoring, biohazards and employee protective procedures are the responsibility of the Veterinary Medical Officer (VMO). The VMO reports to the Animal Studies Subcommittee, which has jurisdiction on the overall animal, care and use program. The “Occupational Health and Safety for Research Personnel with Animal Contact” Research & Development Standard Operating Procedure 151-502 may be referenced.

1. Animal Procurement:

a. **Sources:** All animals brought in to the Animal Research Facility (ARF) must be ordered from commercial sources approved by the Institutional Animal Care and Use Committee (IACUC) and/or the VMO. This affords an opportunity to check the health status of animals from that source. Breeder reared animals will be quarantined in the ARF for at least one week.

b. **Receipt:** Upon receipt, animals and shipping crates are checked by the ARF staff (Biological Laboratory technicians) for any evidence that animal are unhealthy or that they have been unduly stressed in transit.

c. **Housing:** Animals that are observed to be free of illness, following at least 7 days of quarantine are taken into animal housing rooms. Ideally, each shipment of animals of a particular species is housed in a separate room. On occasion, it is necessary to put more than one shipment of the same species from the supplier in the same room. Mixing animals of the same species from different suppliers will be done only with the express approval of the VMO.

2. **Animal Health Monitoring:**

Every attempt is made to diagnose spontaneous (not experimentally induced) disease of laboratory animals. Diagnostic necropsies are done on site or at a commercial rodent diagnostic laboratory.

3. **Biohazards:**

Various biohazardous agents are used in ARF. These can include chemical reagents and radioisotopes. Areas and animals used in such experiments should be properly labeled. Proper procedures for safe handling, use and monitoring of biohazardous materials must be followed. Currently, radioisotopes are not used in any approved protocols.

ARF is physically isolated from the remainder of the VA facility, connected only by a tunnel to building 4, the USC School of Medicine ARF building. It is accessible only through a key-locked elevator. Signs are posted on the connecting doors to Building 4 to discourage entry by unauthorized personnel.

APPENDIX 1
SAFETY VIOLATION CHECKLIST

PI NAME _____ **ROOM #** _____ **DATE** _____

A checkmark indicates an acceptable assessment. Each unchecked box will be accompanied by comments to the right of the text.

1. SAFETY COMPLIANCE

Chemical Inventory, Material Safety Data Sheets (MSDS), and a copy of the Chemical Hygiene Plan is present and complete.

Are all organic compounds being disposed of by the research office?

Are any compounds being put down the drain?

2. RESEARCH SERVICE LABORATORY SAFETY MANUAL (RSLSM)

Signature sheet up to date; location known to workers.

3. FIRE

Storage closer than 18" minimum beneath sprinkler heads.

Storage of materials in doorway, hall or lab aisles.

Smoking

Fire extinguishers readily accessible

Aisle space maintained and free and clear of debris, unimpeded means of egress

4. FOOD

Food and/or drink in lab.

5. CHEMICALS

Chemicals stored accordingly to compatibility classification reference attachment

Hazardous chemicals stored on rolling shelves.

Chemicals in glass containers stored on floor.

Chemical stored above eye level.

Flammables, volatiles especially, not stored in either hood, flammable cabinet or spark proof refrigerator.

Excessive amounts of flammable chemicals stored in lab.

Chemicals lacking proper labels.

Unidentified containers/beakers present.

If ethidium bromide is being used, is it disposed of through the Research Office along with all contaminated gel electrophoresis waste materials?

Are there excessive amounts of chemicals, pollution prevention measures being implemented?

Emergency eye wash stations are functional, accessible, and have been tested.

6. ELECTRICAL

- Worn, frayed or cracked electrical cords.
- Access to breaker box blocked.
- Extension cords or power strips ganged together.
- Electrical cords draped on floor across walkways.
- Anti-restart device installed on equipment

7. GAS TANKS

- Unsecured or improperly secured gas tanks.
- Excessive number of extra tanks (>1 per gas) stored in lab.
- Gas tank caps lacking on unused tanks.

8. STORAGE

- Unstable storage shelves.
- Heavy or dangerous objects stored on high shelves.
- Unstable storage of objects.
- Unable to close storage doors freely.
- Stored items projecting beyond shelf on rolling shelves.
- Work area and lab cluttered.
- Combustibles (paper, boxes, etc.) stored on floor.

9. FUME HOODS

- Insufficient airflow.
- Crowded and obstructed storage in hood.
- Chemicals being stored in the fume hood

10. SAFETY

- Safety devices not present – gloves, safety glasses, and masks.
- A chemical spill kit not evident and/or location unknown.
- First aid kit not available.
- Lab coats used only in lab.
- Location of and proper knowledge of their use known for fire extinguishers, eye wash stations and safety shower.
- Doors closed except those needed for security or research purposes.
- Presence and proper use of sharp/broken glass containers.
- Is the work area maintained in a neat and organized fashion
- Adequate hand washing facilities
- Evidence of food and/or beverages in the lab area
- Hand to mouth motions observed
- Dirty or damaged PPE

11. RADIOACTIVE STORAGE AND WORK STATIONS

- Stored in one place, properly labeled, in original containers.
- Proper storage of wastes for disposal.
- Work usually done under hood, over trays with absorbent pads.
- Gloves always worn.
- Radioactive work areas/rooms properly identified, labeled and locked when not attended.

12. OTHER

*** This checklist is not intended to encompass all potential hazards but as a general guide line for inspections.**

APPENDIX 2
RESEARCH SAFETY COMMITTEE MEMBERS

Chairman:

Jeffrey K. Brown , DVAMC Safety Specialist, Non-Scientist; Industrial Hygienist/
GEMS

Voting Members:

Nigel D. Burkhardt, MPH, DVAMC Radiation Safety Officer
Xiaoming Yang , Ph.D., USC-SOM, Scientist, Chemical Hygiene Officer
Priscilla Ann Swartz, DVAMC, AFGE, Non-Scientist
Joshua Riente, PharmD, DVAMC, Oncology Pharmacist
Wayne Carver Ph.D., R&D Representative, Scientist, SOM IBC
Ashok Chauhan, Ph.D, Scientist, SOM IBC
Shawn Youngstedt, PhD, Psychology, Exercise Science

Non-Voting Ex-Officio Members:

K. Sue Haddock, Ph.D., DVAMC, ACOS/R&D
Lawrence G. Peck, MA, DVAMC, AO/R&D, Safety Officer

APPENDIX 3

CHEMICAL SPILL POLICY

Guidelines for Emergencies Involving a Minor or Major Hazardous Material Spill

Notes and Precautions: The range and quantity of hazardous substances used in a hospital setting requires that adequate preplanning be completed to respond safely to chemical spills. **Only attempt to clean-up incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release in the immediate release area.** Knowledgeable and experienced personnel only should do the cleanup of a large hazardous material spill. Spill kits with instructions, absorbents, reactants, and protective equipment should be available to clean up incidental spills of hazardous substances. **DO NOT attempt to clean up an emergency spill.** A general approach to an incidental spill is related in the following acronym. **All employees are required to receive specific training on the hazards associated with any hazardous materials that are used on the job to include spill procedures.**

GENERAL EMERGENCY PROCEDURES (for **INCIDENTAL** spills only)

S = Stop the spill if you can without endangering yourself

W = Warn Others

I = Isolate the area

M = Minimize your exposure

An *incidental* chemical spill is one that does not exceed the knowledge, skills, and/or abilities of the medical center staff involved and they are capable of handling it safely without the assistance of safety and emergency personnel.

An *incidental* spill:

- (1) Does not involve injury;
- (2) Does not represent a fire or life hazard;
- (3) Involves less than one gallon of a substance which is not highly toxic or volatile (the quantity varies for highly toxic or volatile substances, contact the Safety Office for quantity limits);
- (4) Involves a substance which is known by the individual (exact substance, known hazards, etc.) (this means you have reliable information regarding the material involved in the spill and can read the label on the chemical container);
- (5) Occurs within a contained area and has not contacted soil or surface water;
- (6) Occurs within an area where the individual in charge has proper training and appropriate protective equipment specific to the chemical(s) involved.
- (7) Does not involve a laboratory or research culture or stock microorganism.

An *emergency* spill:

- (1) Involves an immediate danger to life or health.
- (2) Involves a combustible or explosive hazard.
- (3) Involves a threat to the environment.
- (4) Volume exceeds the specified spill quantity limit (contact the Safety Office for limits) or staff has no knowledge of the material or cleaning process.
- (5) Does involve a laboratory or research culture or stock microorganism.

Incidental Chemical Spill:

- (1) Alert people in immediate area of spill. Isolate area, if necessary to prevent spread of material.
- (2) Obtain Material Safety Data Sheet and read all appropriate precautions and instructions.
- (3) Wear protective equipment, including safety goggles, gloves, and long-sleeve lab coat or apron.
- (4) Avoid breathing vapors from spill.
- (5) Confine spill to small area. Keep spilled material from reaching sanitary or storm sewer access points by using absorbent materials such as towels, granular absorbent, etc.

- (6) Use appropriate kit to neutralize and absorb inorganic acids and bases to pH of six to seven. Collect residue; place in container and dispose as regular waste.
- (7) For other chemicals, use appropriate kit or absorb spill with vermiculite, dry sand, or diatomaceous earth. Collect residue and place in proper spill container. Complete disposal request form and dispose as chemical waste through Safety Office.
- (8) Clean spill area with water.

Emergency Chemical Spill:

- (1) Notify the Safety Office, extension 6824 during duty hours, pager 241-1916 after hours.
- (2) **Evacuate the area** and alert other people in the area and isolate (**do not enter**) the spill area. Remove all personnel to area of safety.
- (3) Provide the following information to Safety personnel:
 - Location of the spill
 - Chemical(s) and quantities involved
 - Your name
 - Your telephone number
 - Advise whether or not you have an MSDS
 - In the event of a fire, call #6555 immediately.
- (4) Have person knowledgeable of incident stand by to assist responding emergency personnel.
- (5) Obtain Material Safety Data Sheet if not already completed.

APPENDIX 4

HAZARDOUS WASTE

Hazardous waste Procedures

Hazardous waste may only be disposed of through or with the approval of the Safety Manager or designee .

1. All personnel will request EPA-listed hazardous waste disposal by submitting the Hazardous Waste Disposal Request form to the Safety Manager or designee (137S). Incomplete or incorrect requests will not be processed and pickup will not proceed until all the required information is provided.
2. Once approved for pickup by the Safety Manager or designee (137S.) The safety office will complete waste pickup within 72 hours and transport the waste to the hazardous waste storage area located in Building 107. Managers of waste generating processes are reminded to allow sufficient time for pickup to occur before the container becomes completely full to avoid potentially unsanitary or unhealthful conditions.
3. All waste containers will be kept closed at all times, except during periods when wastes are added to or removed from the container. Only screw-type caps or snap on lids are allowed. Paraffin seals, tinfoil, or similar materials may not be used to close a container. Secondary containment will be provided for all hazardous waste containers, except for immobile solids such as gloves, material solids ("chunks"), and gas cylinders. Resealable plastic bags are acceptable for solids. Secondary containers must be capable of holding at least 110% of the primary waste container(s) placed into them. Secondary containers may hold multiple primary hazardous waste containers, but the hazardous wastes must be compatible.
4. All waste materials will be promptly removed from generation areas, except for those locations that have been approved as satellite storage locations. Satellite storage locations must be approved by the Safety Manager or designee prior to use and may not accumulate more than 1 quart of acutely hazardous waste or more than 55 gallons of hazardous waste. Each container of hazardous waste at an approved satellite storage location will be clearly marked with the Hazardous Waste label and also the Hazardous Materials Identification System (HMIS) label specified in Medical Center Memorandum 544-831, "Hazard Communication Program." The using service staff/supervisor must inspect satellite-storage container locations weekly using the form and the completed form returned to the Safety Manager or designee. Any identified discrepancies will be corrected promptly.
5. The central hazardous waste storage location located in Building 107 will be inspected weekly by the Safety Manager or designee, and a waste inventory will be taken using the form to annotate findings. Identified discrepancies will be corrected promptly. The inspection will also entail an assessment of available storage space and equipment. Any changes in space and equipment requirements will be brought before the Environment of Care sub-Council.
6. Containers of hazardous chemicals will be considered to have the same characteristics of the chemical substance they contained and must be managed properly to avoid becoming a hazardous waste. Each container must be completely and thoroughly emptied using normal means of removal so that the least possible amount of residue remains. The container will be triple-rinsed with a quantity of water equal to at least ten times the volume of the container (i.e., a one-gallon container would be rinsed out three times with ten gallons of water each time).

Generally, rinse waters from these processes will not be considered a hazardous waste; however, the Safety Manager or designee will be consulted to verify that disposal via the sanitary sewer is appropriate. The container will be marked with the word "Empty" and placed into the general waste after being rendered unusable (i.e., a hole punched in a metal container, the lids removed from glass and plastic and fiber containers). Containers intended for re-use must be cleaned as above and marked with the responsible person's name and the words "Hold for Re-use, Last Contained (identity of chemical)," unless the container will be re-used for the same chemical, in which case no rinsing or additional identification is needed. These containers must be managed as if full, however, and are subject to the provisions of the Hazard Communication Program. The Safety Manager or designee must approve containers intended for re-use.

7. All hazardous material spills will be handled in accordance with Appendix 3.

(a) The Safety Manager or designee is responsible for managing the incident-reporting process. External notification is given to government agencies for incidents that are required to be reported to them by the Safety Manager or designee. Internal reports of hazardous materials or chemicals and waste incidents are documented and directed to the Safety Manager or designee. One of the goals of the incident reporting system is for the Safety Manager or designee to be able to receive incident reports within eight hours of the occurrence. This goal is intended to set the stage for a timely investigation and to perform appropriate follow-up activities.

(b) The Safety Manager or designee will normally be assigned to investigate a hazardous material or chemical or waste incident. In all cases where a spill is involved, the responsible official for the service line/service where the spill occurred will receive a copy of the findings from the investigation. The Safety Manager or designee maintains documentation of incidents that are investigated or otherwise require follow-up activities. The Safety Manager or designee is responsible for developing recommendations that are indicated based upon the findings and is responsible for taking appropriate action to implement any recommendations developed.

(c) The Safety Manager or designee is responsible for performing an analysis on those incidents where they are required to be reported and for reporting the findings of such analysis to the ECC each quarter. The incident analysis is intended to provide an opportunity to identify trends or patterns that can be used to determine if changes to the Comprehensive Hazardous Waste Management Program could control or prevent future occurrence. Summary information related to incident and the ECC reports and analysis of such incidents are forwarded to the Medical Center Director.

APPENDIX 5

Department of Veterans Affairs Memorandum

Date:

From:

Subj: Hazardous Waste / Used / Recycling Disposal Request

To: Safety Manager (137S)

All recycling containers must be properly identified and stored so as to not present a health or safety hazard. Incomplete requests will be returned to the service line director/service chief of the responsible service line/ service, which will delay approval. Contact the Safety Office at extension #6824 or pager #241-1916 with any questions. All containers of hazardous waste submitted for disposal must be properly labeled and identified. The appropriate Material Safety Data Sheet (MSDS) must be included with each request. Waste materials will be collected within three days of submission of a completed request.

❖Hazardous Waste / Used / Recycling Disposal Request Form❖			
Service line/Service/Section:		Bldg. & Room No.:	
Person Requesting Container (Print):		Extension:	
❖Material Identification			
Material Identity (Trade name on MSDS or major constituent of mixture):			
Material is a (Circle One):	Solid	Liquid	Gas
Special handling considerations or other information:			
Size of Container:	Container Type :		
Storage Location for Container (Containers cannot be placed in corridors or present a safety hazard):			
<input type="checkbox"/> Acid pH____	<input type="checkbox"/> Base pH____	<input type="checkbox"/> Reactive	<input type="checkbox"/> Flammable/Combustible
<input type="checkbox"/> Toxic	<input type="checkbox"/> Carcinogen	<input type="checkbox"/> Spill Residue	<input type="checkbox"/> Listed Process Waste
❖Waste Classification-Check here if waste is considered hazardous if not recycled []			
<input type="checkbox"/> Office Paper <input type="checkbox"/> Confidential Office Paper <input type="checkbox"/> Cardboard <input type="checkbox"/> Wood			
<input type="checkbox"/> Metal (Circle One) Aluminum Steel Copper Lead Other Metal(specify)			
<input type="checkbox"/> Batteries (Circle One) Lead acid Lithium Nickel Mercury Other (Specify)			

❖For Safety Office Use Only❖
Date Request Received:
Notes:
Safety Office Review: [] Authorized [] NOT Authorized Reason:

APPENDIX 6

RULES FOR STORING CHEMICALS SAFELY

- 1) Segregate all incompatible chemicals for proper storage of chemicals for hazard class codes. In other words, store like chemicals together and away from other groups of chemicals that might cause reactions if mixed. Do not simply store chemicals in alphabetical order (see #3 below).
- 2) Flammable materials should be stored in an approved, dedicated, flammable materials storage cabinet or room if the volume exceeds ten (10) gallons.
- 3) Chemicals shall be stored separately from non-compatible hazard classes.
- 4) Liquids should be stored in unbreakable or double-contained packaging, or the storage cabinet should have the capacity to hold the contents if the container breaks.
- 5) Avoid floor chemical storage (even temporary).
- 6) Chemicals should be stored no higher than eye level and never on the top shelf of a storage unit.
- 7) Shelf assemblies should be firmly secured to the walls. Avoid island shelves.
- 8) Each shelf should have an anti-roll lip.
- 9) Store acids in a dedicated acid cabinet. Nitric acid may be stored there also, if it is kept isolated from the others.
- 10) Store severe poisons in a dedicated poison cabinet.
- 11) All chemicals should be labeled and dated.
- 12) Look for unusual conditions in chemical storage areas, such as:
 - * improper storage of chemicals
 - * leaking or deteriorating containers
 - * spilled chemicals
 - * temperature extremes (too hot or cold in storage area)
 - * lack of or low lighting levels
 - * blocked exits or aisles
 - * doors blocked open, lack of security
 - * trash accumulation
 - * smoking or open lights or matches
 - * fire equipment blocked, broken or missing
 - * lack of information or warning signs ("No Smoking", "Flammable Liquids", "Acids", "Corrosives", "Poisons", "Chemical Storage")Any of these conditions should be corrected immediately. Inspections of chemical storage areas on a routine basis will help to correct deficiencies and prevent accidents.

Suggested chemical storage pattern

INORGANIC	ORGANIC
Sulfur, Phosphorus, Arsenic, Phosphorus Pentoxide	Alcohols, Glycols, etc. (store flammables in dedicated cabinets)
Halides, Sulfates, Sulfites, Thiosulfates Phosphates, etc.	Hydrocarbons, Esters, etc. (store flammables in dedicated cabinet)
Amides, Nitrates (not ammonium nitrate), Nitrites, etc.	Ethers, Ketones, etc. (store flammables in dedicated cabinet)
Metals, Hydrides (store away from water)	Epoxy compounds, Isocyanates
Hydroxides, Oxides, Silicates, etc.	Sulfides, Polysulfides, etc.
Arsenates, Cyanides (store above acids)	Phenol, Cresols
Sulfides, Selenides, Phosphides, Carbides, Nitrides	Peroxides, Azides, etc.
Manganates, Chromates, Permanganates, Borates	Acids, Anhydrides, Peracids, etc.
Chlorates, Chlorites, Perchlorates, Peroxides, Perchloric acid	Miscellaneous
Acids. except nitric. (store acids in dedicated cabinets)	Miscellaneous (Nitric Acid)

Suggested storage time limits

For common peroxidizable compounds

MOST DANGEROUS: Discard after **3 months**.

Peroxide formation hazard during storage.

isopropyl ether
 divinyl acetylene
 vinylidene chloride
 potassium metal

sodium amide

DANGEROUS: Discard after **one year**.

Peroxide formation hazard during storage and on concentration (i.e. distillation) of compound.

Diethyl ether	Dicyclopentadiene
Tetrahydrofuran	Diacetylene
Dioxane	Methyl acetylene
Acetal	Cumene
Methyl isobutyl ketone	Tetrahydronaphthalene
Ethylene glycol dimethyl ether	Cyclohexene
Vinyl ethers	Methylcyclopentane

DANGEROUS: Discard after **one year**.

Peroxide formation causes initiation of hazardous polymerization.

Methyl methacrylate	Chlorotrifluoroethylene
Styrene	Vinyl acetylene
Acrylic acid	Vinyl acetate
Acrylonitrile	Vinyl chloride
Butadiene	Vinyl pyridine
Tetrafluoroethylene	Chloroprene

Safety Hints:

1. Do not purchase these compounds in quantities greater than can be used in the specified storage time period.
2. Ethers should be stored in the dark and under nitrogen if possible.
3. Always check for the presence of peroxides before distilling any peroxide former.
4. Consult safety references before working with peroxidizable compounds.

Short list of incompatible materials

ALKALI METALS	ACETIC ACID
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<p>such as calcium, potassium, and sodium with: water, carbon dioxide, carbon tetrachloride, and other chlorinated hydrocarbons.</p>	<p>with: chromic acid, nitric acid, hydroxyl containing compounds, ethylene glycol, perchloric acid, peroxides, and permanganates.</p>
<p>ACETONE with: concentrated sulfuric acid and nitric acid mixtures.</p>	<p>ACETYLENE with: copper (tubing), fluorine, bromine, chlorine, iodine, silver, mercury, or their compounds.</p>
<p>AMMONIA, ANHYDROUS with: mercury, halogens, calcium hypochlorite, or hydrogen fluoride.</p>	<p>AMMONIUM NITRATE with: acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, and finely divided organics or other combustibles.</p>
<p>ANILINE with: nitric acid, hydrogen peroxide, or other strong oxidizing substances.</p>	<p>BROMINE with: ammonia, acetylene, butadiene, butane, hydrogen, sodium carbide, turpentine, or finely divided metals.</p>
<p>CHLORATES with: ammonium salts, acids, metal powders, sulfur, carbon, finely divided organics or other combustibles.</p>	<p>CHROMIC ACID with: acetic acid, naphthalene, camphor, alcohol, glycerine, turpentine, and other flammable liquids.</p>
<p>CHLORINE with: ammonia, acetylene, butadiene, benzene and other petroleum fractions, hydrogen, sodium carbides, turpentine, and finely divided metals.</p>	<p>CYANIDES with: acids.</p>
<p>HYDROGEN PEROXIDE with: copper, chromium, iron, most metals or their respective salts, flammable liquids and other combustible materials, aniline, and nitromethane.</p>	<p>HYDROGEN SULFIDE with: nitric acid, oxidizing gases.</p>
<p>HYDROCARBONS generally, with: fluorine, chlorine, bromine, chromic acid, or sodium peroxide.</p>	<p>IODINE with: acetylene or ammonia.</p>
<p>MERCURY with: acetylene, fluminic acid, or hydrogen.</p>	<p>NITRIC ACID with: acetic, chromic, or hydrocyanic acids, aniline, carbon, hydrogen sulfide, flammable liquids or gases, or other substances which are readily nitrated.</p>
<p>OXYGEN with: oils greases, hydrogen, flammable liquids, solids, or gases.</p>	<p>OXALIC ACID with: silver or mercury</p>
<p>PERCHLORIC ACID with: acetic anhydride, bismuth and its alloys, alcohol, paper, wood, and other organic materials.</p>	<p>PHOSPHOROUS PENTOXIDE with: water.</p>
<p>POTASSIUM PERMANGANATE with: glycerine, ethylene glycol, benzaldehyde, or sulfuric acid.</p>	<p>SODIUM PEROXIDE with: any oxidizable substances, for instance: methanol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerine, ethylene glycol, ethyl acetate, furfural, etc.</p>
<p>SULFURIC ACID with: chlorates, perchlorates, permanganates, and water</p>	

The following list is a quick reference of incompatibilities of many chemicals commonly encountered in the laboratory. It is not a comprehensive list of all possible combinations and chemicals. For details on any chemical, check the MSDS.

Chemical	Incompatibilities for Chemical Storage
Acetic Acid	Aldehydes, bases, carbonates, chromic acid, ethylene glycol, hydroxides, metals, oxidizers, perchloric acid, peroxides, permanganates, phosphates, xylene
Acetic Anhydride	Acids, alcohols, bases, finely divided metals, oxidizers, reducing agents
Acetone	Inorganic acids, amines, hydrogen peroxide, oxidizers, plastics
Acetylene	Copper metal, halogens, mercury, potassium, silver, oxidizers
Alkalis	Acids, carbon dioxide, chlorinated hydrocarbons, chromium, flammable liquids, mercury, oxidizers, salt, sulphur, water
Ammonium Nitrate	Acids, alkalis, chlorates, fine organic powders, metals, nitrates, oxidizers, sulfur
Aniline	Inorganic acids, dibenzoyl peroxide, hydrogen peroxide, oxidizers
Azides	Acids, heavy metals, oxidizers
Bromine	Acetaldehyde, acetylene, alcohols, alkalis, amines, benzene, butadiene, butane and other petroleum gases, ethylene, fluorine, hydrogen, ketones, finely divided metals, sodium carbide, sulfur, turpentine
Calcium Oxide	Acids, ethanol, fluorine
Carbon (activated)	Alkalis, oxidizers, calcium hypochlorite, halogens
Carbon Tetrachloride	Benzoyl peroxides, ethylene, fluorine, oxygen, silanes
Chlorates	Acids, ammonium salts, carbon, metal powders, sulfur, finely divided combustibles and organics
Chromic Acid	Acetic acid, acetone, alcohols, alkalis, ammonia, bases, camphor, flammable liquids, glycerine, turpentine
Chlorine	Acetylene, ammonia, benzene, butadiene, ethylene and other petroleum gases, hydrazine, hydrogen, hydrogen peroxide, iodine, sodium hydroxide, turpentine, other petroleum components, finely divided metals
Chlorine Dioxide	Ammonia, hydrogen, hydrogen sulfide, mercury, methane, phosphine, phosphorous, potassium hydroxide
Copper	Acetylene, calcium, hydrogen peroxide, oxidizers
Cyanides	Acids, alkalis, strong bases
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Ammonia, halocarbons, halogens, ketones, metals, organic acids, hydrocarbons, other combustible material
Hydrazine	Inorganic acids, hydrogen peroxides, oxidizers
Hydrocarbons	Acids, bases, oxidizers
Hydrochloric Acid	Alkali metals, amines, bases, copper, copper alloys, aluminium, moisture
Hydrofluoric Acid	Ammonia, glass, organics, sodium
Hydrogen Peroxide	Acetylaldehyde, acetic acid, acetone, alcohols, aniline, carboxylic acids, flammable liquids and combustible material, metals and their salts, nitric acid, nitromethane, organics, phosphorous, sodium, sulfuric acid
Hydrogen Sulfide	Acetylaldehyde, oxidizers, sodium
Hypochlorites	Acids, activated carbon
Iodine	Acetylaldehyde, acetylene, ammonia, hydrogen, sodium
Mercury	Acetylene, aluminium, amines, ammonia, calcium, fulminic acid, lithium, oxidizers
Nitrates	Sulfuric acid, other acids, nitrites
Nitric Acid (Conc.)	Acetic acid, acetonitrile, amines, ammonia, aniline, bases, benzene, brass, chromic acid, copper, cumene, flammable liquids and gases, formic acid, heavy metals, hydrogen sulfide, ketones, organic substances, sodium, toluene
Nitrites	Acids, nitrates

Nitroparaffins	Amines, inorganic bases
Oxalic Acid	Mercury, oxidizers, silver, sodium chlorite
Oxygen	Acetylaldehyde, alkalis, ammonia, carbon monoxide, ethers, flammable gases, liquids & solids, hydrocarbons, phosphorous
Perchloric Acid	Acetic acid, acetic anhydride, alcohols, aniline, bismuth and bismuth alloys, combustible materials, dehydrating agents, ethyl benzene, hydroiodic acid, hydrochloric acid, grease, iodides, ketones, other organic materials, oxidizers, pyridine
Peroxides, Organic	Acids (inorganic, organic)
Phosphorous	Air, alkalis, oxygen, reducing agents
Potassium	Acetylene, acids, alcohols, carbon dioxide, carbon tetrachloride, halogens, hydrazine, mercury, oxidizers, selenium, sulfur
Potassium Chlorate	Acids, ammonia, combustible materials, fluorine, hydrocarbons, metals, organic substances, sugars
Potassium Perchlorate	Acids, alcohols, combustible material, fluorine, hydrazine, metals, organic materials, reducing agents
Potassium Permanganate	Benzaldehyde, ethylene glycol, glycerol, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, ammonia, ammonium compounds, fulminic acid, oxalic acid, oxidizers, ozonides, peroxyformic acid
Sodium	Acids, carbon tetrachloride, carbon monoxide, hydrazines, metals, oxidizers, water
Sodium Nitrate	Acetic anhydride, acids, metals, organic matter, peroxyformic acid, reducing agents
Sodium Nitrite	Ammonium nitrate and ammonium salts
Sodium peroxide	Acetic acid, acetic anhydride, benzene, benzaldehyde, carbon disulfide, ethyl acetate, furfural, glycerin, hydrogen sulfide, metals, methyl acetate, peroxyformic acid, phosphorous
Sulfides	Acids
Sulfuric Acid	Flammable and combustible liquids, potassium chlorate, potassium perchlorate, potassium permanganate, like compounds of sodium and lithium
Tellurides	Reducing agents

NOTE: These lists are not complete lists of incompatible materials. It contains some of the more common incompatible materials. Always research the materials you work with in order to be safe.

APPENDIX 7 HAZARD SURVEILLANCE SURVEY

PI: _____

LAB NUMBER: _____ DATE: _____

SURVEYEEY BY: _____

	SAFETY INSPECTION ITEM	YES	NO	COMMENTS/ DESCRIPTION
	All Areas:			
O1	Are furniture and fixtures free of splinters and sharp edges?			
O2	Are aisles sufficiently wide to permit movement?			
O3	Do desk and file drawers operate easily?			
O4	Are stacked file cabinets anchored to prevent tipping?			
O5	Is use of extension cords restricted?			
O6	Are scissors, knives, pins, razor blades and other sharp items safely stored and used?			
	EMERGENCY EQUIPMENT & PLANS			
	Fire:			
F1	Have fire extinguishers been inspected and signed off (monthly)?			
F2	Are the extinguishers ready for use, charged, pin intact?			
F3	Are all exits marked and exit lights functioning?			
F4	Do personnel questioned know what to do in event of a fire?			
F5	Are fire doors closed?			
F6	Can department personnel tell you where the nearest fire			

	alarm and extinguishers are located?			
F7	Can employees in area hear codes called?			
F8	Are area specific evacuation plans updated and communicated to all employees?			
	MATERIALS HANDLING, TRANSPORTATION AND STORAGE			
M1	Have all employees been instructed on how to lift or carry?			
M2	Are employees using proper body mechanics?			

	SAFETY INSPECTION ITEM	YES	NO	COMMENTS/ DESCRIPTION
	MATERIALS HANDLING, TRANSPORTATION AND STORAGE (cont.)			
M3	Is there adequate storage space and everything in its proper place?			
M4	In areas where sprinklers are installed at least 18" below sprinkler head?			
M5	Are supplies kept in appropriate containers?			
H1	Are there hazardous materials (i.e. infectious materials, chemicals, etc.) in the area? If yes, complete items H2-H10. If no, skip to next section.			
H2	Are Material Safety Data Sheets maintained and available?			
H3	Is there proper labeling of Hazardous Materials and Waste?			
H4	Are employees who may be exposed to hazardous materials provided information and training documented when they are newly assigned, hired or when new hazards are found or introduced and annually?			
H5	Are Standard Precautions used and policies followed?			
H6	Are Hazardous Materials/Wastes disposed of properly?			
H7	Has the Safety Office been notified of all waste going down the sanitary sewer?			
H8	Are goggles, masks, CPR airways, etc. available and patient caregivers know the locations of these items?			
H9	Is there proper storage of Hazardous Materials/Waste?			
H10	Are tanks or cylinders in racks properly secured and properly capped?			
	EQUIPMENT/UTILITIES			
Q1	Are personnel properly trained in inspection of equipment before use and prompt removal of defective equipment from service and referral to Infrastructure for repair?			
Q2	Is equipment safely arranged?			

	SAFETY INSPECTION ITEM	YES	NO	COMMENTS/
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				DESCRIPTION
	MATERIALS HANDLING, TRANSPORTATION AND STORAGE (cont.)			
Q3	Have all equipment users been trained on equipment failure contingency plans?			
Q4	Are all employees trained on utility failure contingency plans?			
Q5	Are unauthorized personnel prohibited from using equipment?			
	ELECTRICAL SAFETY			
E1	Are electric cords functioning properly, not worn or frayed?			
E2	Has all personally owned electrical equipment received an initial safety inspection prior to use?			
	PHYSICAL CONDITIONS			
P1	Are aisles, elevators, stairways and work areas in safe condition, free of cracks, holes, wires, cords, pipes, unauthorized storage of equipment wet, or slippery?			
P2	Is the area generally orderly and cleaned (swept, mopped, sealed, and free of excessive trash accumulation)?			
P3	Is there adequate lighting and ventilation?			
P4	Do all drains and plumbing fixtures work?			
P5	Are doorways, stairways, or aisles free of obstruction?			
P6	Are aisles adequate for movement of personnel and materials?			
P7	Are wet-mopped areas identified and barricaded?			
P8	(1) Is there any construction taking place?			
	(2) If so, are any Interim Life Safety Measures implemented?			
	(3) Has training been implemented?			

HAZARD SURVEILLANCE SURVEY - CORRECTIVE ACTION SHEET

PI: _____

LAB NUMBER: _____ DATE: _____

SURVEYEEY BY: _____

ITEM NO.	PROBLEM IDENTIFIED	CORRECTIVE ACTION	DATE INITIATED	COMPLETION DATE

Copy To: Safety Manager _____

Copy To: Department Manager _____

Safety Handbook and Chemical Hygiene Plan

Principal Investigator _____ Date _____
Department _____ Building/Floor/Room _____
E-mail address _____ Phone _____
Fax number _____
Laboratory Manager _____ Phone _____
Fax number: _____

Please complete and forward a copy to the Research Office

Keep a copy in the laboratory.

The **Principal Investigator** and/or the **Laboratory Manager** have personally discussed the hazards and the proper procedures for using and storing hazardous substances with all personnel who are or will potentially be exposed to such hazards.

The Principle Investigator has reviewed this plan and certifies that it reflects the current condition of his/her laboratory.

Principal Investigator's Signature: _____ Date: _____

Principal Investigator's Signature: _____ Date: _____