

# **LABORATORY SAFETY MANUAL**

**Research Service Chemical Hygiene Plan**

**August 2016**

# LABORATORY SAFETY MANUAL

## Research Service Chemical Hygiene Plan

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## SECTION A. Emergency Response Information

|  | <b>Phone Extension</b> | <b>Pager or Alternate Number</b> |
|--|------------------------|----------------------------------|
| <b>Fire Emergency (Code Red)</b>                                   | *20 or pull box        |                                  |
| <b>Chemical Emergency</b>  | *20                    |                                  |
| Radiation Safety Officer   | 54483                  | *41-2745                         |
| Industrial Hygienist   | 54765 or 51722         | 503-202-1873                     |
| Safety Officer   | 56330                  |                                  |
| After Hours-Energy Center  | 56300                  |                                  |
| Emergency Preparedness Manager                                     | 56317                  | 503-209-6125                     |
| <b>Police</b> (for disruptive/dangerous behavior-Code 5/Code Grey) | *21                    |                                  |
| <b>Cardiac Arrest/Unconsciousness</b> (Code 99/ Code Blue)         | *22                    |                                  |

### To Report an Emergency:

1. Dial number
2. Give your name
3. Give your specific location
4. State the problem

## SECTION B. Safety Personnel Directory

| <b>Research &amp; Development Service</b>  | <b>Extension</b>  |
|--|---|
| Associate Chief of Staff, R&D<br>Michael P. Davey, Ph.D. M.D.  | 55125   |
| Deputy ACOS for R&D<br>Archie Bouwer, Ph.D.  | 55125   |
| Chair, Subcommittee on Research Safety<br>Sonemany Salinthone, Ph.D.   | 54394   |
| Chemical Hygiene Officer<br>Diony Ohakwe, MS   | 54765   |
| <b>Medical Center</b>  | <b>Extension</b>  |
| Safety Officer<br>Bill Stewart, CHSP   | 56330   |
| Emergency Preparedness Manager<br>Michael Patterson  | 56317   |
| Industrial Hygienists<br>Diony Ohakwe, MS  | 54765, 51722  |
| Radiation Safety Officer<br>Shannon P. Voss, PhD   | 54483   |
| <b>Subcommittee on Research Safety (current)</b>   |   |
| Sonemany Salinthone, Ph.D.<br>Charles Meshul, Ph.D.,<br>Archie Bouwer, Ph.D., ex officio<br>Shannon P. Voss, PhD<br>Isaac Forquer, Ph.D.<br>Diony Ohakwe, M.S.<br>Ky Dehlinger, D.V.M., ex officio<br>Jason Taylor, M.D., Ph.D.<br>Melanie Harriff, Ph.D.<br>Tamara Phillips, Ph.D.<br>Sherri Atherton, M.S., R.N.<br>AFGE member, TBD | Chair<br>Alternate Chair<br>Deputy ACOS/R&D<br>Radiation Safety Officer<br>Research Service<br>Chemical Hygiene Officer<br>Veterinary Medical Officer<br>Staff Physician/ Biological Safety Officer<br>Immunology/Infectious Disease Research<br>Research Scientist<br>Infectious Disease<br>AFGE Employee Union Safety Rep |

## SECTION C. Chemical Hygiene Plan

### 1. INTRODUCTION

#### 1.1. Purpose

To educate laboratory personnel at the VA Portland Health Care System (VAPORHCS) in the use of safe laboratory practices and procedures and of the hazards associated with chemicals and other hazardous materials; thereby reducing the risk of exposure and preventing unnecessary injury or illness.

#### 1.2. Policy

VAPORHCS maintains a program capable of educating employees on a continuous basis and protecting them from unsafe practices and health hazards associated with hazardous chemicals in the laboratory. The program is designed to keep employee exposures below permissible limits and to ensure compliance with pertinent Federal, State, and local regulations. The program is also designed to protect patients, personnel, visitors, property, and the environment.

#### 1.3. Scope

VAPORHCS continually strives to provide a learning, teaching, public service, and research environment that is reasonably free from recognized hazards. Pursuant to Occupational Safety and Health Administration (OSHA) Regulations 29 CFR 1910.1450, the medical center establishes this Chemical Hygiene Plan (CHP) to protect employees, patients, visitors, property, and the environment from potential health hazards associated with the handling, use, and storage of hazardous chemicals in laboratories.

This Chemical Hygiene Plan applies to all laboratory scale usage of chemical products at VAPORHCS.

“Laboratory scale” is defined by OSHA as “work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. Laboratory scale excludes those workplaces whose function is to produce commercial quantities of materials.”

The manual is not intended as an encyclopedia of chemicals and their hazards. It will not contain listings of the thousands of chemicals that employees may potentially encounter while working in research, teaching, and development. Although numerous chemicals and compounds may be referred to herein, for the most part, they will serve as illustrations for broad categories of hazards, except in the case of chemical incompatibility charts or listings.

The safe use of biological materials (e.g., potentially infectious medical waste such as human blood or other bodily fluids) requires control measures similar to those found in chemical safety. However, biological agents may have the added dimension of infectious hazards, and require different disposal methods. For specific information on these agents, please consult the research Biosafety Manual as well the VA Medical Center Infection Control Manual, Section I: Blood borne Pathogens Exposure Control Plan (BPP) for proper work practices involving biological materials or Biosafety in Microbiological and Biomedical Laboratories (BMBL) <http://www.cdc.gov/biosafety/publications/bmb15/>.

## 2. RESPONSIBILITIES

### 2.1. Chief Executive Officer (CEO)

- 2.1.1. Responsible for chemical hygiene within the institution.
- 2.1.2. Provides support for and ensures that the appropriate laboratory facility is provided.
- 2.1.3. Approves the selection of the Chemical Hygiene Officer (CHO) and VA Subcommittee of Research Safety (SRS) members

### 2.2. Associate Chief of Staff/Research & Development

- 2.2.1. Responsible for ensuring adherence with all phases of laboratory safety and elements covered in the chemical hygiene plan.
- 2.2.2. Recommends to the CEO for approval the selection of the Chemical Hygiene Officer (CHO) and VA Subcommittee of Research Safety (SRS) members.
- 2.2.3. Responsible to ensure compliance with regulatory requirements and safety laboratory work practices as outlined in the Chemical Hygiene Plan

### 2.3. Deputy ACOS/Research & Development

- 2.3.1. Develops and implements appropriate chemical hygiene policies and practices in conjunction with CHO and SRS.
- 2.3.2. Provides administrative assistance in support of the activities of the VA Subcommittee of Research Safety (SRS) and the Chemical Hygiene Officer.
- 2.3.3. Maintains a current and detailed inventory report for all hazardous chemical utilized by the Research Service.
- 2.3.4. Works with the CHO and/or the Radiation Safety Officer (RSO) to conduct investigations into incidents, in which employees have become seriously injured or ill, or where unsafe procedures and practices may have resulted in excessive employee exposures. This process may include official boards of inquiries and may involve lab closures.
- 2.3.5. Ensure that required training is updated and taken annually by all employees. Also ensure that established procedures and protocols are being followed with respect to the use, storage, spill control and disposal of hazardous chemical utilized in Research Service.

### 2.4. Chemical Hygiene Officer (CHO)

- 2.4.1. Monitor procurement, use, and disposal of chemicals used in the lab.
- 2.4.2. Know the current legal requirements concerning regulated substances and seek ways to improve the chemical hygiene program.
- 2.4.3. Work with Deputy ACOS to develop appropriate chemical hygiene policies and practices.
- 2.4.4. Works with the Deputy ACOS and/or the Radiation Safety Officer (RSO) to conduct investigations into incidents, in which employees have become seriously injured or ill, or where unsafe procedures and practices may have resulted in excessive employee exposures. This process may include official boards of inquiries and may involve lab closures.
- 2.4.5. Develop and update Safety Checklist as necessary to ensure the safe handling and disposal of hazardous chemicals.
- 2.4.6. Provides assistance in support of the activities of the VA Subcommittee of Research Safety (SRS) as a voting member.

### 2.5. VA Subcommittee on Research Safety (SRS)

- 2.5.1. Review protocols and grant proposals for research projects where biohazards, radioactive substances or hazardous chemical will be used. Reviews must be conducted and approved prior to initiation of protocols. The Subcommittee reserves the right to provide additional review of specific procedures (even if the overall protocol has previously been reviewed and approved) prior to their initiation if they feel the proposal warrants additional review.
- 2.5.2. Provide support to the Deputy ACOSACOSR&D and CHO as needed.
- 2.5.3. Coordinate semi-annual Laboratory Safety Audits and review responses to deficiencies using the Lab Audit Checklist in Appendix C as a guideline.
- 2.5.4. Investigate incidents of unsafe conditions or employee injuries or illnesses involving hazardous substances and assure that prompt corrective action is taken to prevent recurrence.

## 2.6. Principal Investigators

- 2.6.1. Ensure that employees comply with the Chemical Hygiene Plan and other safety related policies.
- 2.6.2. Train employees under your supervision with regard to chemical handling and disposal of hazardous chemicals. If needed, the Chemical Hygiene Officer, members of the VA Subcommittee of Research Safety, and resources of the Medical Center Safety and Risk Management Committee (SRMC) can be utilized.
- 2.6.3. Ensure that employees under your supervision complete all mandatory safety training required by the Medical Center and Research Service.
- 2.6.4. Ensure that proper personal protective equipment (PPE) is available, used, and stored properly in the laboratory.
- 2.6.5. Ensure that less hazardous chemicals are substituted, where possible. Ensure that only the minimal quantities necessary are ordered to minimize potential exposure and waste.
- 2.6.6. Ensure that a current and detailed inventory for all hazardous chemicals is maintained in each laboratory. A Safety Data Sheet (SDS) must be available and readily accessible for every hazardous chemical used in the laboratory.
- 2.6.7. Ensure that discrepancies found during laboratory inspections are corrected within 30 days of receiving the report and that a response is sent to the appropriate personnel.
- 2.6.8. Ensure that proper closeout procedures are followed according to the "R&D Service Policy and Procedures for Lab Closeout" in Appendix B. All chemicals no longer needed must be identified to assure proper disposition (waste disposal or reuse). All excess equipment must be decontaminated before it changes hands for resale or disposal.
- 2.6.9. Ensure that employees observe the "No eating or drinking" rule in all laboratories. They are only to eat in offices separated from the labs by a door or in the break-room.
- 2.6.10. Inform Deputy ACOS of changes in protocols and procedures that involve variations in the fire and associated hazards of materials used in individual spaces.
- 2.6.11. Ensure all employees are enrolled in VAPORHCS's Employee Health program.

## 2.7. Employees

- 2.7.1. Read and comply with this Chemical Hygiene Plan and other safety related policies.
- 2.7.2. Promptly report unsafe conditions or unsafe use of hazardous chemicals to the respective supervisor.
- 2.7.3. Remain aware of the hazards of materials used in the laboratory and use them in a safe manner.

- 2.7.4. Ensure that all primary and secondary containers of chemicals are properly labeled with the identity of the chemical, its hazards and manufacturer information. Under certain circumstances (i.e. chemical containers are too small to accommodate a legible label), alternate forms of labeling is acceptable.
- 2.7.5. Coordinate hazardous waste pick-ups by calling extension x56330 as needed.
- 2.7.6. Complete all required lab safety trainings.

### 3. GENERAL SAFETY REQUIREMENTS

- 3.1. Smoking, eating, drinking, mouth pipetting, and application of cosmetics or contact lenses are prohibited in the laboratory. These activities (excluding mouth pipetting) are only permitted in the designated areas, such as separate offices and break rooms.
- 3.2. Shorts, mini-skirts, and open-toe shoes shall not be worn while working in the laboratory. In addition, lab coats/gowns must be worn when working with corrosive or bio-hazardous substances.
- 3.3. Contact lenses should not be worn in the laboratory when working with corrosive chemicals unless splash resistant goggles are worn. Contact lenses, especially soft contact lenses, will absorb certain chemicals and, in addition, constitute a hazard in splashes and spills.
- 3.4. Appropriate disposable or re-usable utility gloves shall be used when working with hazardous chemicals or biohazardous material. Hands should be washed before leaving laboratory technical areas, before and after glove use, and after any process that involves hazardous chemicals and/or biohazards. Gloves should be changed before each process. If employees are unsure of what glove to use with a given chemical, they can consult the SDS for the product they are using, contact the IH, or look at the Ansell Chemical Resistance Guide found at this link:  
[http://www.ansellpro.com/download/Ansell\\_8thEditionChemicalResistanceGuide.pdf](http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf)
- 3.5. Use of a fume hood, splashguard, or wearing of face shields and eye protection is required when handling caustics, solvents, corrosives or any substance absorbed through the skin or that are irritating to the eyes.
- 3.6. Hair should be secured back and off the shoulders in such a manner to prevent contact with hazardous chemicals and contaminated materials.
- 3.7. Work areas should be kept clean and uncluttered, with chemicals and equipment properly labeled and stored; cleanup work area on completion of task or at the end of each day. Minimize storage of hazardous substances on countertops and inside fume hoods
- 3.8. Glassware, even if chipped or broken should be discarded into the glass recycling container, unless contaminated. Contaminated glass should go into the red sharps container.
- 3.9. Safety Data Sheets (SDS) should be consulted for chemicals used on a routine basis and when performing procedures involving new and unfamiliar chemicals. Appropriate protection measures shall be instituted according to the SDS. The website for SDS's is [www.vsn20.msds.com](http://www.vsn20.msds.com)
- 3.10. A chemical should not be handled without knowledge of its hazards, or if a SDS is not available.
- 3.11. In cases where the formulation of new chemical/molecular species occurs, the new species must be accompanied by a hazard determination. This information must be included on the label or posted in the lab as a reference to others who may enter the work area.
- 3.12. Work practices should attempt to minimize the transportation of hazardous material. If chemicals must be transported, it should be done safely, utilizing carrying containers where appropriate. Never carry a glass jug by its handle: this is the weakest part of the container. Grasp jugs using two hands one at the handle and the other supporting its weight at the base.

- 3.13. Visitors are not authorized entry into the laboratory unless they are accompanied by Research staff. Visitors and/or children must be kept under the strict supervision of the researcher AT ALL TIMES! They may not be left unattended. They may not handle radioactive or other hazardous substances unless the individual has been selected as part of an approved educational program, to work with a Principal Investigator on a project.
- 3.14. Emergency contact information must be posted in each lab in case of emergency.

#### 4. CHEMICAL PROCUREMENT AND STORAGE

##### 4.1. Procurement

- 4.1.1. If an SDS has not been obtained previously for a particular chemical, the individual who fills out the order form must request on the order that the manufacturer provide an SDS with the chemical when it is delivered. No hazardous chemical is to be employed in the laboratory without an SDS.
- 4.1.2. Any new chemicals not previously listed on the chemical inventory should be pre-approved by either the SRS committee or industrial hygiene.
- 4.1.3. Every effort should be made to find less hazardous substitutes for more hazardous chemicals, provided a suitable substitute is available.
- 4.1.4. Every effort should be made to only order the quantity of chemicals required for any given experiment. Avoid storing excess chemicals for long periods.

##### 4.2. Storage

###### 4.2.1. General Guidelines

- a. All corrosive chemicals must be stored at or below eye level, whether in the laboratory or in a storage room.
- b. Store chemicals in compatible containers that will not be degraded by its contents (i.e. corrosive chemicals may erode steel, so they should not be placed in metal cans).
- c. Always inspect chemical containers for leakage, corrosion, oozing, fuming, formation of crystals, and to ensure that caps are securely fastened. Report any problems to the Industrial Hygienist. Chemicals should always be stored with the labels facing outward.
- d. Store chemicals with respect to their compatibility (refer to Appendix A).
- e. Do not use chemical fume hoods as storage facilities. Avoid keeping bulky equipment and supplies in hoods as they can interfere with proper airflow and distribution, and compromise employee protection.
- f. Never store or use hazardous substances alongside food products, including refrigerators! Consume foods only in designated areas, such as separate offices and break rooms.
- g. Utilize secondary containment whenever possible to prevent spills and to ensure proper segregation.
- h. Do not store acids with bases. Do not store flammables with corrosives. Do not store inorganic acids with organic acids. Oxidizers must be stored separately from other chemicals.

###### 4.2.2. Flammables

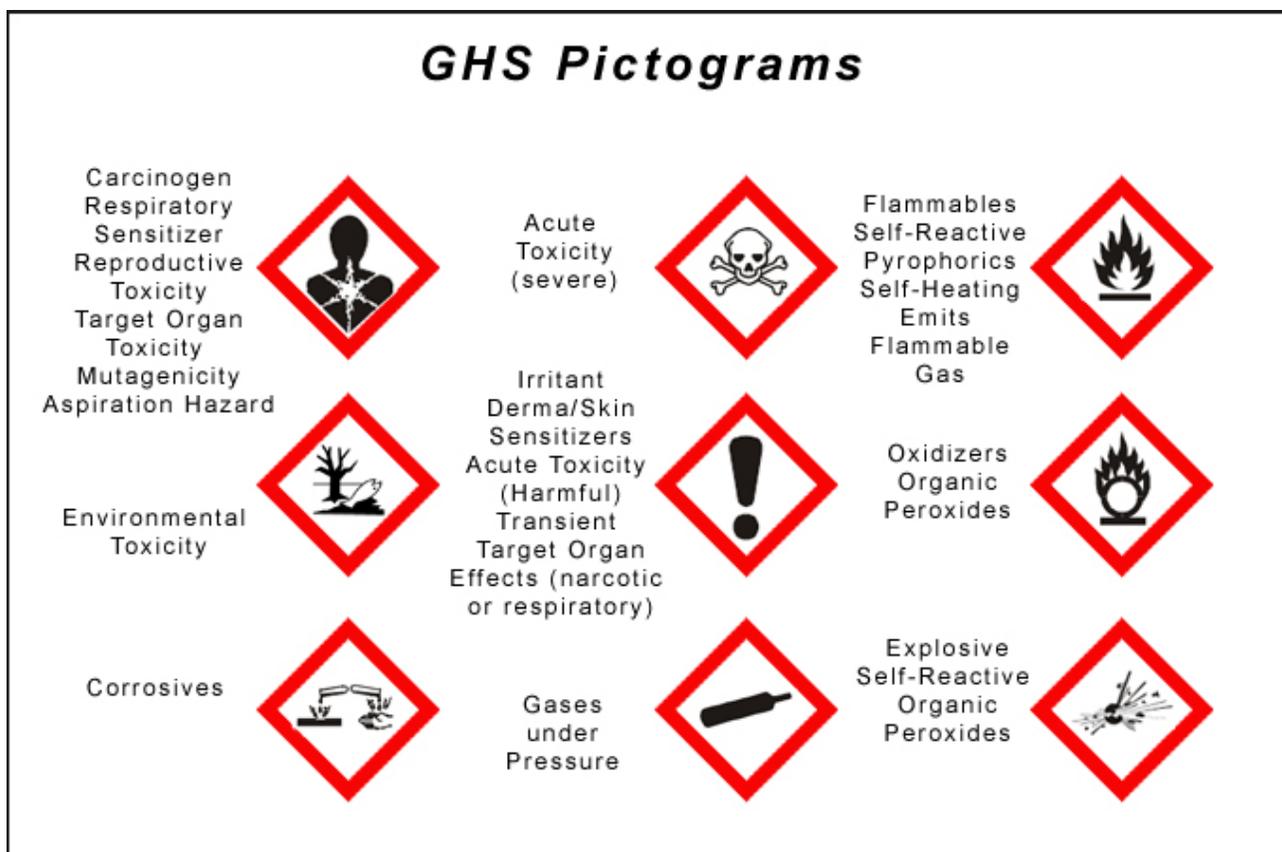
- a. It is recommended that reagents in 500ml or larger glass containers be placed in a bottle carrier or cart when they are being transported from one area to another to lessen the danger of accidental breakage.
  - b. Small quantities (working amounts, such as 1 bottle) may be stored in the laboratory. These quantities are to be kept to a minimum, and containers must be clearly labeled. Bulk storage must be stored in an approved flammable storage cabinet.
  - c. The floor and open counters are not storage areas for hazardous substances.
  - d. Where transferring flammables from one metal container to another, electrical bonding (connect a conductive cable or wire to each container) should be employed to avoid a static spark that may result from pouring the solvent.
- 4.2.3. Perchloric Acid – Perchloric Acid has been specifically banned from use in this facility. This decision was based on the fact that we do not have an appropriate wash down perchloric acid hood and without this equipment, explosive perchlorate salts may form within the duct system.
- 4.2.4. Picric Acid
- a. Picric Acid is classified as a flammable solid when wetted with more than 30% water and a class 1 high explosive with less than 30% water. Picric acid is explosive but also highly shock, heat, and friction sensitive. Picric acid is toxic, a skin irritant, and will produce toxic products on decomposition. If Picric Acid is allowed to dehydrate, it may form explosive picric salts.
  - b. Any principal investigator that desires to use Picric Acid should submit a memorandum to the SRS stating the purpose, the physical state, and the quantity to be procured. No picric acid is to be used in the laboratory without prior approval by the SRS.
- 4.2.5. Chloroform-Chloroform has the potential to form phosgene gas. Therefore the standard recommendation is to store in a cool, dark place not to exceed one year, unless a preservative such as; amylene has been added. If chloroform does not have a preservative, it must be dated upon opening, and storage should not exceed one year.
- 4.2.6. Incompatible Chemicals – Incompatible chemicals require separate storage areas. A table of chemicals that are incompatible can be found in Table A.
- 4.2.7. Peroxide-forming Compounds – are highly reactive materials and may be extremely shock sensitive explosives; simply moving a cap off a bottle contaminated with peroxides can lead to explosions, injuries, or death.
- a. All peroxide forming compounds must be double dated; that is dated upon receipt and dated upon opening.
  - b. Liquid peroxide forming compounds must be tested for peroxides or discarded within 6 months and gaseous peroxide forming compounds must be discarded within 1 year of opening.
  - c. Do not distill or evaporate without testing for peroxides. Testing can be completed using a 10% ethanol solution or ready to use peroxide strips.
  - d. The following list of materials is representative of those compounds which form peroxides at VAPORHCS:

|                   |                                       |
|-------------------|---------------------------------------|
| Tetrahydrofuran   | Ethyl ether                           |
| Cyclohexane       | Ethylene Glycol Dimethyl Ether (EGDE) |
| Dicyclopentadiene | Methyl Cyclopentane                   |
| Furan             | Butadiene                             |
| Styrene           |                                       |
| Vinyl chloride    | Vinyl pyridine                        |

- e. All peroxide forming compounds should be stored away from heat and light. Protection from physical damage and ignition sources during storage is also essential. Most common container materials, such as steel, stainless steel, copper, nickel, aluminum, baked phenolic linings and ceramics are suitable for containers; but must be clean and free from metal oxides. When possible, purchase only peroxide forming compounds that contain an inhibitor such as; Hydroquinone, alkyl phenols, Butylated hydroxytoluene (BHT), aromatic amines, or similar materials that are recommended by the manufacturers as being effective in preventing peroxide formation during storage. The selection of proper inhibitors should be made to avoid possible conflict with use or purity requirements of the compound.
- f. Compounds that are suspected of having very high peroxide levels, because of visual observation of unusual viscosity, crystal formation, or because of age, should be considered extremely dangerous. DO NOT TOUCH! Products that contain the above characteristics should be reported to the energy center immediately at \*20.

## 5. CHEMICAL LABELING

- 5.1. Each primary chemical container must be labeled with the following information:
- 5.2. Product name or identifier (Identify hazardous ingredients, where appropriate)
- 5.3. Signal word (Danger or Warning): used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label.
- 5.4. Hazard Statement: a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical including degree of hazard.
- 5.5. Precautionary Information: phrase that describes recommended measures to be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.
- 5.6. Pictogram: a symbol that is intended to convey specific information about the hazards of a chemical. A Table containing examples of pictograms used is below:



- 5.7. Manufacturer Identification: All hazardous chemical solutions of 1% (or acutely toxic and/or toxic by virtue of use > 0.1%) or greater must bear the same hazard warning label as the concentrated chemical(s).
- 5.8. All secondary containers can be labeled as above, or product name and words, pictures, symbols, or a combination thereof, which provides at least general information regarding the hazards of the chemicals, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.
- 5.8.1. Nation Fire Protection Agency (NFPA) fire diamond or Hazardous Material Information System (HMIS) information can still be used on workplace label however; it must be consistent with manufacturer label, e.g. no conflicting hazard warnings or pictograms.
- 5.8.2. While the hazard category number does not appear on the label, consider: GHS 1 – Highest hazard, 4 – Lowest hazard and NFPA/HMIS 1 – Slight hazard, 4 – Severe hazard.
- 5.9. Labeling of the chemicals and the work area where carcinogenic risk is significant is mandatory. The recommended precautionary label should include the following warning:

**CAUTION: CANCER SUSPECT AGENT**

**NOTE: If chemical containers are too small to accommodate labels, or if chemicals are in vessels, instruments, or pass through tubing, plumbing**

**or other enclosures, creative methods can be employed (color coded charts, batch labeling, numerical codes) to identify the contents. Training provided under this plan shall include recognition and understanding of any alternative labeling method.**

## 6. SIGNS AND LABELS

6.1. Sign Types - Prominent signs and labels of the following types should be posted:

- 6.1.1. Telephone numbers of emergency personnel, supervisors, and laboratory workers.
- 6.1.2. Location of Emergency exits and fire devices (pull boxes, fire extinguishers).
- 6.1.3. Warnings at areas where unusual hazards exist such as carcinogens, radioactive materials, x-ray equipment, hot surfaces, etc.

6.2. Flammable Refrigerators – If category 1 or 2 flammable liquids are stored under refrigeration (i.e. for analytical purposes), the refrigerators must be approved and labeled to store flammable materials.

## 7. HAZARDOUS CHEMICAL WASTE DISPOSAL

7.1. Sewer Disposal

- 7.1.1. It is the policy of VAPORHCS to not dispose of chemicals down the drain. However there are some exceptions, but they must be approved by the SRS, the CHO, the RSO, and/or the industrial hygienist.

**SPECIAL NOTE: A chemical solution should never be diluted to below acceptable limits for disposal. These actions constitute treatment and require a special permit. Evaporation must not be used to remove chemicals as this is not an accepted method of disposal.**

- 7.1.2. Disposal through the sewer system must comply with all Federal, State, and local regulations and ordinances and be acceptable to the privately operated treatment works (POTW).
- 7.1.3. For more information on whether a chemical is hazardous waste, please review the Hazardous Waste Disposal Chart found in Appendix D.

7.2. Contracted Disposal

- 7.2.1. A contractor or contractors with valid EPA licensees to transport, store and/or dispose of hazardous wastes will be hired, to process hazardous wastes generated by the medical center.
- 7.2.2. The GEMS Program Manager is responsible for maintaining a complete inventory of all hazardous wastes that are generated by the medical center, as well as all EPA manifests for materials processed by the contractors.

7.3. Waste Collection Procedures

- 7.3.1. Safety Office personnel collect chemical wastes for disposal every week. Chemical waste collection can be arranged for specific times and dates by contacting, x56330.

- 7.3.2. To determine if your waste is hazardous, use Appendix D Hazardous Waste Disposal Flow Chart as a guideline, or for further questions contact the CHO and/or Industrial Hygienist.
- Chemical wastes that are turned in for disposal must meet the following conditions:
  - Containers must be appropriate to the waste (i.e. non-porous for liquids or foil-wrapped or opaque for photo-reactive materials). The containers do not need to be entirely full, but large containers holding miniscule volumes of material will not be taken.
  - Chemicals may not be in centrifuge tubes, plastic bags, or in cracked or leaking containers.
  - Containers must be tightly sealed with a closure that is unlikely to break or become dislodged during collection. Containers sealed with paraffin paper, cork or rubber stoppers, etc. will not be taken.
  - Containers must be labeled as "hazardous waste" and must list all hazardous contents and percentages, stating the primary hazard (i.e. flammable, toxic, corrosive, or reactive). An accumulation start date is not needed, as the waste accumulation time begins when the waste is given to safety for disposal.
  - If chemical components or hazards are not clear, safety may ask for a SDS sheet for further clarification.
- 7.3.3. Staff shall try to avoid mixing biological, chemical, and radiological waste streams. If this is unavoidable, the waste shall be identified, as such, through appropriate labeling.
- 7.3.4. X-ray films must not be disposed of in the trash. A recycling receptacle has been provided in the dark rooms for all films.

#### 7.4. Toxic Use Reduction/Hazardous Waste Reduction

- 7.4.1. The VA is committed to reducing the volume of hazardous wastes through chemical sharing, source reduction (toxic use reduction), recycling and reclamation.
- 7.4.2. The VAPORHCS research service actively participates in this program to result in minimizing potentially harmful impacts to the environment, minimizing employee toxic exposures and saving money. Among other activities, research services;
- ✓ Substitutes toxic chemicals with those less toxic
  - ✓ Recycles paper, batteries, plastic, glass, cardboard, and metal.
  - ✓ Reduces generation of biohazardous waste
  - ✓ Only orders what the lab will use
  - ✓ Routinely conducts chemical clean outs Uses the SDS database to trade and share chemicals between labs

## 8. CLASSES OF HAZARDOUS LABORATORY CHEMICALS AND SUBSTANCES

### 8.1. Gases

- 8.1.1. Gasses Under Pressure – Gases contained in a receptacle at a pressure of 200 kilopascal (kPa) or more, or which are liquefied or refrigerated.
- 8.1.2. Compressed gas – packaged under pressure, entirely gaseous at -50C (-58F) with a critical temperature < or = -50C.

- 8.1.3. Liquefied gas – packaged under pressure and partially liquid > -50C. High pressure has critical temperature between -50C and 65C (149F) and low pressure has critical temperature above 65C.
- 8.1.4. Refrigerated Liquefied gas – made partially liquid due to low temperature.
- 8.1.5. Dissolved gas – under pressure and dissolved in a liquid solvent.
- 8.1.6. Oxidizing gases – any gas or gas mixture which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.
  - a. Each PI shall determine that compressed gas cylinders under their control are in a safe condition to the extent that this can be determined by visual inspection.
  - b. Cylinders must be secured in a rack in an upright position, at both the top and bottom.
  - c. Valve safety covers should be left on when not in use or until pressure regulators are attached.
  - d. Containers must be labeled clearly with name of contents and hazards.
  - e. Hand trucks or dollies with securing device installed must be used when moving cylinders.
  - f. The use of oil, grease, or lubricants on valves is prohibited due to the potential fire risk, especially on oxygen cylinders.
  - g. Repair of damaged cylinders and/or forcing of frozen cylinder valves should not be attempted. Valves and regulators for specific gases shall not be exchanged with those used on other gas cylinders.
  - h. Cylinders should be stored and used with consideration given to their compatibility with other substances.
  - i. The number of reserve cylinders within general laboratory work areas shall not exceed one week's working supply.
  - j. Transfer of all other gases from one cylinder to another within the laboratory shall be prohibited.
  - k. The aggregate accumulation of cylinders at any one working station shall not exceed one extra cylinder for each cylinder actually connected for use.
- 8.1.7. Flammable Gases
  - 8.1.7.1. Flammable gases/Chemically unstable gases – A gas having a flammable range with air at 20C (68F) and a standard pressure of 101.3 kPa. A flammable gas that is able to react explosively even in the absence of air or oxygen is a chemically unstable gas.
- 8.1.8. Flammable and non-flammable aerosols – Non-refillable receptacles made of metal, glass or plastic containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste, or powder and fitted with a self-closing release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder in a liquid or gaseous state.
  - a. Flammable gases/aerosols and chemically unstable gases must only be used under controlled circumstances and away from any potential sources of ignition (i.e. flammable, combustible or reactive chemicals).
  - b. Flammable gases and chemically unstable gases must be segregated from oxygen cylinders, unless connected via a manifold.

- c. No more than two cylinders should be manifold together; however, several instruments or outlets are permitted for a single cylinder.
- d. When more than one cylinder of a highly flammable gas is to be used in one room, specific approval by the CHO must be obtained.
- e. Valves on all flammable gas cylinders or gas utility feeds shall be shut off when the unit is unattended.

## 8.2. Flammable Liquids/Solids

8.2.1. Flammable Liquids – liquid with a flashpoint not more than 93C (199.4F).

8.2.2. Flammable Solids – Solid which is readily combustible, or may cause or contribute to fire through friction.

8.2.2.1. Flammable liquids and solids should be stored in an approved flammable cabinet when not in use.

## 8.3. Oxidizers

8.3.1. Oxidizing Liquids – Liquid substance or mixture which, while in itself not necessarily combustible, may, generally by yielding oxygen, contribute to the combustion of other material.

8.3.2. Oxidizing Solids – Solid substance or mixture which, while in itself not necessarily combustible, may, generally by yielding oxygen, contribute to the combustion of other material.

8.3.3. Oxidizing liquids and solids should be stored away from flammable materials.

## 8.4. Organic Peroxides

8.4.1. Liquid or solid organic substances which contain the bivalent –O-O- structure and maybe be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixture, which may undergo exothermic self-accelerating decomposition. In addition, they can have one or more of the following properties:

8.4.1.1. Be liable to explosive decomposition

8.4.1.2. Burn rapidly

8.4.1.3. Be sensitive to impact or friction

8.4.1.4. React dangerously with other substances

8.5. Corrosive to Metals – A substance or mixture which is corrosive to metals through chemical action.

8.6. Acute Toxicity – Adverse effects occurring following oral or dermal administration of a single dose of a substance or a mixture, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

## 8.7. Specific Target Organ Toxicity (STOT)

8.7.1. STOT Single Exposure – non lethal target organ toxicity arising from a single exposure to a substance or mixture.

8.7.2. STOT Repeated Exposure – target organ toxicity arising from a repeated exposure to a substance or mixture. All significant health effects that can impair function, reversible and irreversible, immediate and/or delayed are included.

- 8.8. Aspiration Toxicity – Includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration.
- 8.9. Laboratory Procedures Involving Radioactivity
- 8.9.1. Lab coats or other protective clothing are to be worn at all times in areas when radioactive materials are utilized. Thermo-Luminescent Dosimeters are to be worn when working with sources of radiation, as determined by the Radiation Safety Officer (RSO).
  - 8.9.2. Disposable gloves must be worn at all times when using radioactivity.
  - 8.9.3. In the event of a spill, hands, clothing, and shoes must be monitored for contamination before leaving the immediate vicinity. Clean up procedures established by the RSO must be followed.
  - 8.9.4. Non-porous absorbent lab mats or trays are to be used on all work benches, and other work surfaces where radioactive materials are handled. These mats will be replaced in those areas that are used regularly, or if they become contaminated.
  - 8.9.5. Solid and liquid radioactive waste must be disposed of as instructed by the RSO. This is to include a visible radioactive symbol with the isotope, and date of activity recorded to insure housekeeping does not take radioactive waste.
  - 8.9.6. Radioactive solutions must be confined in covered containers or shielded containers plainly identified and labeled with the name of the radionuclide, date and activity, and other information as needed.
  - 8.9.7. The amount of radioisotopes stored at any one time in any laboratory must not exceed the possession limit for the authorized user.
  - 8.9.8. The weekly or monthly wipe test, as determined by the RSO, will be done by laboratory personnel to monitor radioactive material in the area.
  - 8.9.9. A permanent record of the survey results will be kept by the laboratory and reviewed periodically by the RSO.
  - 8.9.10. Personnel are to monitor themselves and their work area with an appropriate meter after finishing an operation or when leaving the area.
- 8.10. Acids and Bases
- 8.10.1. Skin corrosion – production of irreversible damage to the skin; visible necrosis through the epidermis and into the dermis.
  - 8.10.2. Skin irritation – production of reversible damage to the skin
  - 8.10.3. Serious eye damage – production of tissue damage in the eye, or serious physical decay of vision, which is not fully reversible within 21 days of application.
  - 8.10.4. Eye irritation – production of changes in the eye following the application of test substances, which are fully reversible within 21 days of application.
    - a. The primary routes of entry for corrosive materials are the skin and the eyes.
    - b. Lab coats, gloves, and eye protection should be worn, as recommended on SDS, when handling highly corrosive materials. If not working under a fume hood, eye protection, including splash proof chemical goggles and/or face shield shall be worn.
    - c. Care should be taken so that vapor is not inhaled. Whenever the possibility of exposure to vapors or splashing exists, chemicals shall be handled in the fume hood. Ensure proper working and accessible eyewash is present before working with acids and bases.
    - d. Dilution: Always add acid to water. Allow acid to run down the side of the container and mix slowly by gentle rotation. Avoid overheating.

### 8.11. Solvents

- 8.11.1. The primary routes of entry for solvents are through inhalation and skin absorption.
- 8.11.2. Toxic effects of some solvents (plus flammable properties) must be considered. All solvents should be handled in a fume hood.
- 8.11.3. Appropriate eye protection (i.e. goggles, face shield) must be worn.
- 8.11.4. Special procedures may be required for certain extremely hazardous chemicals and wastes (i.e. phenol, osmium tetroxide, benzene, and formaldehyde).

### 8.12. Carcinogens

- 8.12.1. OSHA has several categories of carcinogens that all employees should be aware of, these include:
  - a. Germ Cell Mutagenicity: that may cause mutations in germ cells of humans that can be transmitted to the progeny.
  - b. Carcinogenicity: A substance or mixture of substances which induces cancer or increases its incidence.
- 8.12.2. Carcinogens are chemical substances that may cause malignant tumors in test animals under severe, prolonged, or combined conditions.
- 8.12.3. Use of protective apparel is required. On leaving a designated area, remove protective apparel and thoroughly wash hands and skin surfaces.
  - a. Appropriate clothing may include Tyvek suits, laboratory coats, aprons, dust masks or respirators, and gloves. Clothing and equipment should be laundered or discarded after each use or contact.
  - b. Appropriate eye protection devices should be available and used in the work area. Such devices may include close-fitting goggles.
- 8.12.4. Personnel should wash hands and forearms after the completion of any procedures in which a chemical carcinogen has been used. All work, including transfers, should be performed in controlled areas or restricted access, such as hoods, glove boxes, or portions of a laboratory specifically designated for the purpose.
- 8.12.5. Access to chemical carcinogens should be limited to knowledgeable individuals. The work area should be designed to preclude casual contact by others.
- 8.12.6. Work surfaces should be covered by dry absorbent plastic-backed paper that should be disposed of in the regular trash, unless soiled, after each procedure. If soiled, please contact safety for chemical pick up. Alternatively, the work surface should be constructed of impervious material and thoroughly decontaminated after each procedure.
- 8.12.7. Working quantities should be maintained at a minimum. In all cases where known carcinogens are in use, serious attempts should be made to change the procedures, substituting chemicals with less inherent hazard.

### 8.13. Reactive and Explosive Substances

- 8.13.1. Self-Reactive substances or mixtures are thermally unstable liquid or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen.
  - a. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.

- 8.13.2. Pyrophoric liquids/substances (e.g. phosphorous) are liable to ignite within five minutes of contacting air.
- 8.13.3. Substances or mixtures which, in contact with water, are liable to become spontaneously flammable or give off flammable gases in dangerous quantities (e.g. sodium and metal hydrides).
- 8.13.4. Self-heating substances and mixtures which, by reaction with air and without energy supply, is liable to self-heat; this substance or mixture differs from a pyrophoric substance in that it will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).
- 8.13.5. Explosive substances are capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.
  - a. Pyrotechnic substances are included even if they do not evolve gases. Pyrotechnic substances are designed to produce an effect by heat, light, sounds, gas or smoke or a combination of these as the result of non-detonative self-sustaining exothermic reactions.
  - b. Store and handle all reactive substances under the conditions that preclude such reactions (i.e., age, light, heat, sparks, moisture, air, incompatible substances). Refer and adhere to guidelines found on warning labels on the container, SDS sheets and to the compatibility charts (Appendix A).

#### 8.14. Reproductive Toxicity

- 8.14.1. Reproductive Toxicity includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring.
- 8.14.2. Many substances pose harm to the reproductive system. Lead for example is a reproductive hazard that in high concentrations may cause sterility to both men and women. Employees should consult SDS's for information regarding non-specific male and female reproductive health hazards.
- 8.14.3. All employees of child bearing age should pay particular attention to substances with specific reproductive effects, handling those using stringent precautions (PPE, fume hoods). Decontaminate all surfaces that have had contact with these substances. Follow scrupulous procedures for removal of contaminated PPE to avoid recontamination. Conduct frequent hand washing in between procedures and prior to leaving the lab.
- 8.14.4. Women should be aware of the risk posed by working around chemicals during pregnancy and should be extremely careful to minimize exposure to all harmful substances. While there is no reproductive policy regarding chemical exposure, nothing precludes pregnant employees from discussing, with their supervisors, work alternatives or additional protections that minimize excessive chemical exposure.

#### 8.15. Allergens or Sensitizers

- 8.15.1. A respiratory sensitizer is a substance that will induce hypersensitivity of the airways following inhalation of the substance.
- 8.15.2. A skin sensitizer is a substance that will induce an allergic response following skin contact.
- 8.15.3. There are many substances (nickel, toluene diisocyanate, fungi, and animal dander and latex) that may result in mildly or severely adverse allergic reactions including rash, blistering and bronchial constriction. Consult SDS sheets and/or labels to identify these chemicals and avoid contact and inhalation exposure. Employee Health can also provide more information on health effects information of these substances.

#### 8.16. Chemotherapy Agents

- 8.16.1. The use of these agents, also known by the terms “cytotoxic” and “antineoplastic” agents, shall follow the policies and procedures outlined in section The Medical Centers Hazardous Drug policy listed in the safety manual.

#### 8.17. Biological Agents

- 8.17.1. There are numerous procedures involving the use of substances, biological in nature, which do not fall under the scope of the chemical hygiene plan. There are separate policies and procedures which address some of these exposures. These include Mycobacterium tuberculosis, HIV, hepatitis, and other infectious agents.
- 8.17.2. Consult the Infection Control Manual or the Research Biosafety Manual. Additionally, the CDC has published an article entitled “Biosafety in Microbiological and Biomedical Laboratories” that further outlines necessary working procedures to follow when working in containment facilities.
- 8.17.3. HEPA filters, or overflow flasks must be attached on vacuum flasks to prevent lines from contamination.

### 9. SAFETY DATA SHEETS (SDS)

#### 9.1. SDS sheets will be standardized in the following format:

- a. Identification – product identifier used on label; recommended and restriction of use, manufacturer address, emergency phone number.
- b. Hazard(s) Identification – classification of chemical, signal word, hazard statement, pictogram and precautionary statement.
- c. Composition Information – chemical name, common name, synonyms, CAS number, impurities and stabilizing agents used. Mixtures: concentration in exact percentage.
- d. First-aid Measures – Necessary measures subdivided according to the different routes of exposure i.e. inhalation, skin and eye contact, ingestion.
- e. Fire-fighting Measures – Suitable extinguishing media, protective equipment.
- f. Accidental Release Measures – Personal precautions, protective equipment, and emergency procedures. Methods and materials for containment and clean-up.
- g. Handling and Storage – Safe handling, storage, and incompatibilities.
- h. Exposure Control and Personal Protection – OSHA-Permissible Exposure Limits (PEL), ACGIH-Threshold Limit Value (TLV), engineering controls, PPE.
- i. Physical and Chemical Properties – Appearance, odor, odor threshold, pH, melting/freezing point, flammability, vapor pressure.
- j. Stability and Reactivity – Possibility of hazardous reactions, conditions to avoid (static discharge, shock, vibration), incompatible materials.
- k. Toxicological Information – Health effects, routes of exposure, symptoms related to the physical, chemical, and toxicological characteristics. Delayed and immediate effects and chronic effects from long term exposure.
- l. Ecological Information – (Non-Mandatory) Eco Toxicity, bio accumulative potential, hazard to ozone.
- m. Disposal Considerations – (Non-Mandatory) Method of disposal, can include packing.
- n. Transportation Information – (Non-Mandatory) Special precautions user needs to be aware of or comply with in connection to transport or conveyance outside of premises.

- o. Regulatory Information – (Non-Mandatory) Safety, health, and environmental regulations specific for the product in question.
- p. Other Information – Date of preparation or last change to SDS.

## 10. SPILLS AND ACCIDENTS

- 10.1. Chemical Spills – Releases of hazardous chemicals are specifically addressed in both the Medical Center’s Emergency Preparedness Plan and Chemical Spill Contingency Plan. It is the policy of this Medical Center for the general staff to only respond to incidental spills. Spills of significant magnitude will require outside emergency responders. The following provisions apply to all spills regardless of magnitude:
- ◆ All spills must be reported to the Energy Center by dialing \*20.
  - ◆ Spill control kits are available in various locations in the hallway and designated rooms marked with signage in all research areas, as deemed appropriate by the CHO, Industrial Hygienist and/or RSO.
  - ◆ The CHO, Industrial Hygienist and/or RSO will train laboratory personnel in proper use of any spill kit provided. Only trained individuals may use spill kits.

### R. I. N. S. E.

**Rescue** – If applicable and safe to do so. DO NOT ATTEMPT TO RESCUE PERSONNEL IF DOING SO MAY ENDANGER YOUR LIFE OR HEALTH.

**Incident Command** – Provide first aid to spill victims; control access to the spill area

**Notify** – Dial \*20 and report the situation to the energy center; provide relevant information (who, what, when, where, quantity)

**Suppress** – Contain the spill as much as possible

**Evacuate** – When the HAZMAT team arrives or if fumes or vapors are overpowering.

NOTE: only personnel trained in spill cleanup procedures are authorized to use spill kit materials. DO NOT attempt to use these materials if you lack sufficient training or are unsure of how to proceed.

## 10.2. Biological Spills

- 10.2.1. Thoroughly wash any parts of the body exposed.
- 10.2.2. Lab Personnel in the area should clean up spill and dispose of spill contents in the biohazard container, as appropriate PPE should already be donned.
- 10.2.3. Call the work order desk at x56332 during business hours or the energy center at x56300 after hours to request a final clean up by the housekeeping staff after the hazard has been removed.
- 10.2.4. If exposure occurs from a biological spill, report to Employee Health immediately during regular business hours or to the VA Emergency Department after hours.

10.3. Radioactive Spills (or suspected spills) of radioactive material are to be reported to the RSO immediately. Emergency instructions are posted in all areas where radioactive materials are used, usually on hoods. The person(s) responsible for the spill are responsible for cleaning it up. The RSO will provide guidance, assistance (as necessary), and will insure that documentation and cleanup is complete.

## 10.4. Spill Evaluation

- 10.4.1. All significant spills will be carefully evaluated by the CHO. All spill assessments will be reported to the Medical Center Safety & Risk Management Committee (SRMC) and the SRS for follow-up action.
- 10.4.2. The results and conclusions of the assessment should be discussed with all affected personnel to prevent further incidents.

## 11. PROTECTIVE APPAREL AND EQUIPMENT

### 11.1. General Guidelines

11.1.1. Personal Protective Equipment (PPE) includes gloves, goggles, face shields, lab coat, fluid impervious gowns, masks and respirators. Although the use of such equipment is generally the least desirable way to control workplace hazards because it places the burden of protection on the worker, the equipment must be available for situations when an unexpected exposure to chemical substances, physical agents, or biological materials could have serious consequences.

11.1.2. Prior to the purchase or use of any personal protective equipment, the CHO, the Industrial Hygienist or the Safety Officer should be consulted to determine whether the equipment is acceptable. Supervisors, with assistance from the CHO, the Industrial Hygienist, and the Safety Officer, shall train staff on making sound decisions with respect to the use of appropriate PPE.

### 11.2. Types of Personal Protection Equipment

#### 11.2.1. Eye wear

- a. Chemical splash goggles should be used when pouring or aerosolizing any hazardous chemicals or hazardous waste, as they provide the best protection against splashes and sprays. Goggles are intended to shield the eyes against liquid or chemical splash, irritating mists, vapors and fumes.

- b. Face shields are secondary protectors intended to protect the entire face against exposure to chemical hazards. Face shields MUST be worn with chemical splash goggles; they are not intended as stand-alone protection for the eyes.
- c. Protective eyewear must be utilized while working with lasers. Determine the maximum power density, or intensity, lasers produce when workers are exposed to lasers beams. Based on this knowledge, select lenses that protect against the maximum intensity.
- d. Protective eyewear must be available in all areas where hazardous substances are utilized.
- e. Protective eyewear should be easy to clean and disinfect.
- f. For those employees who wear glasses, goggles must fit over the glasses. Straps must be adjusted to ensure that goggles fit securely on the face.

#### 11.2.2. Gloves

- a. Employees are required to wear protective gloves appropriate for the chemical substance or patient specimens that are being handled.
- b. Acid resistant gloves will be used in all areas utilizing acids.
- c. Latex gloves are not recommended for use with chemicals as they do not provide the best protection and can create allergy issues. Nitrile gloves are recommended for use with chemicals.
- d. Gloves should be chosen according to the Ansell guide and degradation chart at this 8th Edition:  
[http://www.ansellpro.com/download/Ansell\\_8thEditionChemicalResistanceGuide.pdf](http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf)

#### 11.2.3. Other Personal Protective Equipment:

- a. Lab Coats should be worn in the lab when working with chemical and biological to protect the skin and clothing from splatter and spills.
- b. Disposable jumpsuits (if there is a need to completely cover clothing) are available.

#### 11.2.4. Respirators

- a. Respirators are required under the following circumstances:
  - i. Whenever there is a documented exposure to personnel of a substance in excess of OSHA's Permissible Exposure Limit (PEL) and/or Short Term Exposure Limit (STEL), or ACGIH's Threshold Limit Value (TLV) and/or Ceiling (C) limit, and feasible engineering controls are not available.
  - ii. When mandated by other OSHA standards or guidelines (i.e., OSHA/CDC TB Guidelines, Asbestos, Lead, etc.) to protect the health of employees.
- b. Respirators that are required may be worn if:
  - i. Employee has completed a medical evaluation through Employee Health..
  - ii. Employee has been fit tested for the approved respirator. A fit test must occur annually.
  - iii. Employee has completed mandatory training on use, care and maintenance of a respirator, which is given at the time employee is fit tested.
- c. Respirators must bear a NIOSH TC approval number, and be selected based on the nature of the hazard, as per OSHA's Respiratory Protection Standard, 29 CFR 1910.134.
- d. Voluntary use of respirators is permitted under certain circumstances, but must be approved prior to use by the facility Safety Specialist, x55241. As well staff must be given a copy of OSHA Respiratory Protection Standard Appendix D prior to voluntary use.

## 12. ENVIRONMENTAL MONITORING

### 12.1. Monitoring Criteria

The Industrial Hygienist is responsible for coordinating air monitoring to minimize exposure to potentially hazardous materials regulated by the Occupational Safety & Health Administration (OSHA) or other consensus guidelines (i.e. American Conference of Governmental Hygienists - ACGIH). Whenever there is a conflict between various regulating limits, the most stringent limit will be used for compliance.

- a. All exposed sampling media will be sent to an AIHA accredited laboratory for analysis.
- b. The Industrial Hygienist will forward copies of the results of all monitoring for review to the Deputy ACOS/R&D, the CHO, and the appropriate PI.
- c. In the event of overexposure, the employee must be notified in writing within 15 days of results of sampling.
- d. All detectable results must be shared with the employee affected and Employee Health.
- e. Abatement plans shall be implemented for any results that exceed the permissible exposure limit, to reduce exposures to acceptable levels.
- f. Where the action level (or in the absence of an action level, the permissible exposure limit) is routinely exceeded for a regulated substance with exposure monitoring, the employee will be monitored on a semi-annual basis and, if positive, on a quarterly basis thereafter.

Potential hazards will be identified during semi-annual lab audits or other periodic assessments.

### 12.2. Employee Record Access

12.2.1. Personnel have a right to review their chemical exposure records and medical records under OSHA 29 CFR 1910.1020 Access to Records. In order to view medical records, which may include exposure records for certain employees, they should submit their request to Employee Health through the Release of Information Office. If an employee is found to be exposed in excess of acceptable limits, the location and/or process will be identified by notices and employees must wear respirators until such time that feasible engineering or administrative controls reduce the exposure to acceptable limits. Employees may be required to undergo medical surveillance, depending upon the nature of the exposure.

## 13. RECORDKEEPING

13.1. Accident Reporting – In the event of an accident, a copy of the appropriate accident reporting forms should be submitted in ASSISTS by the Principal Investigator or immediate supervisor of the injured employee.

13.2. Medical Recordkeeping – Medical records will be retained in accordance with the requirements of State and Federal regulations.

### 13.3. Chemical Inventory

13.3.1. The PI will maintain and post an inventory or index of all chemicals used in each laboratory section.

13.3.2. Chemical Inventories must be updated continuously, and each hazardous chemical listed must have a corresponding SDS that is readily accessible to affected employees.

- 13.4. Training Records – All safety and health training performed shall be tracked and documented. Training records will be kept in the AO's office or another designated location.

#### **14. EMPLOYEE INFORMATION AND TRAINING**

- 14.1. The Chemical Hygiene Plan shall be readily available to all employees and students. A copy of the plan shall be made available for each laboratory section. All staff shall receive annual training and orientation on the plan and shall make time to review the contents. This review shall be documented.
- 14.2. Personnel will receive documented annual training or information related to:
- a. Blood borne pathogen control guidelines.
  - b. Emergency preparedness plan and procedures.
  - c. General laboratory safety.
  - d. Chemical hazard awareness.
  - e. Fire safety.
- 14.3. More specific training may also be provided depending upon the needs and requirements. Examples include training in the use and care of respirators, chemical specific hazard awareness and process or equipment safety

#### **15. EMERGENCY SHOWER AND EYEWASH EQUIPMENT**

- 15.1. It is the responsibility of employees to perform weekly testing/inspection of all plumbed emergency eyewash equipment in their work areas. Inspection procedures include:
- 15.1.1. Actuation of mechanism; does the water flow with sufficient force to push the caps off the eyewash, but not so much that water sprays across the room? Is the flow from the showerhead of sufficient velocity to drench the user without causing injury or discomfort?
  - 15.1.2. Does the water flow evenly from both eyewash nozzles? Does the pattern from the showerhead have a minimum diameter sufficient to drench all parts of a user's eyes?
  - 15.1.3. Ensuring duration of the flush is adequate to flush the line back to the first active service connection.
  - 15.1.4. Supply line must be cleared of sediment and microbial contamination due to sitting water; and there must be adequate water supply at the head of the unit.
- 15.2. Documenting the performance of emergency equipment at or near the device. Records can be kept on a tag or label attached to the eyewash or shower, or on an inspection checklist maintained on file, or by an electronic method that provides a permanent record.
- 15.3. Notify the research office x55125 of the need to repair emergency eyewash and shower equipment in their work areas.
- 15.4. The location of emergency equipment must be identified with a highly visible sign.
- 15.5. Occasionally emergency eyewashes or showers may be located in supply rooms or other areas where daily tasks do not create a hazard. Units in these locations may be tagged "out of service" until needed and their testing requirements suspended.

15.6. Eyewashes shall not be blocked or made inaccessible.

15.7. Emergency drench-type showers – Emergency drench-type showers are on a periodic preventive maintenance schedule and shall be checked monthly by Engineering Service.

## **16. HOUSEKEEPING, MAINTENANCE AND INSPECTIONS**

### **16.1. Housekeeping**

16.1.1. Environmental Management Service is responsible for routinely cleaning all floors within the Research areas.

16.1.2. All laboratory personnel are responsible for daily cleaning of all bench tops and other work areas such as fume hoods and laminar flow hoods

16.1.3. All bench tops within the laboratories should be routinely disinfected with a germicide approved by the CHO.

### **16.2. Maintenance**

16.2.1. The Biomedical Engineering Section, Engineering Service, will provide routine maintenance of the laboratory equipment.

16.2.2. All laminar flow hoods (Biological Safety Cabinets) will be inspected, cleaned and certified by a certified contractor on a yearly basis. Staff shall not use hoods lacking certification or where certification has expired. Any deficient hoods should be reported to the research office x55125.

16.2.3. Chemical fume hoods will be inspected annually for adequate airflow across the face (80-120 fpm). Necessary maintenance will be performed by Engineering Service. If there are indications of hood failure, either by manometer readings or through other clues of inadequate airflow, immediately contact the research office at x 55125.

16.2.4. Chemical fume hoods should have hood indicators on them, such as Kim wipes or caution tape cut into strips to help determine if the hood is flowing adequately.

16.2.5. When working in the hood, keep the sash at 18" to prevent exposure and contamination. When the hood is not in use, please close the sash completely.

16.2.6. Fire extinguishers – The FMS Office shall inspect all fire extinguishers on a monthly basis.

### **16.3. Passageways**

16.3.1. Stairwells and hallways should not be used as storage areas.

16.3.2. Access to emergency exits, emergency equipment and utilities controls should never be blocked.

16.3.3. Emergency exit routes should be posted.

16.3.4. Corridors shall be maintained clear and unobstructed at all times.

## 17. ACCIDENTAL EXPOSURES/MEDICAL SURVEILLANCE PROGRAM

### 17.1. Routine Surveillance

NOTE: All employees must be registered with the VA Employee Health.

17.1.1. All employees that work with hazardous chemicals shall be provided an opportunity to receive medical attention, including any follow-up examinations when Employee Health determines to be necessary including:

- 1910.1450 (g)(1)(ii): Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level the permissible exposure limit (PEL) for and OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee as prescribed by the particular standard.
- 1910.1450 (g)(1)(iii): Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.
- 1910.1450 (g)(2): All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

17.1.2. The Employee Health Section administers the medical surveillance program, as outlined by OSHA regulations, for all VA employees who handle or are exposed to hazardous materials.

17.1.3. The following medical surveillance is provided on an as needed basis by Employee Health:

- a. Hazardous Drugs
- b. Formaldehyde
- c. Hazardous noise
- d. Ionizing Radiation
- e. Blood-borne Pathogens
- f. TB
- g. Other Hazardous Exposures as determined by the Industrial Hygienist.

17.1.4. Under the provisions of 29 CFR 1910.20 "Access to Records", employees have a right to review their medical records.

### 17.2. Emergency First Aid Procedures

#### 17.2.1. Eye:

- a. In the event of a chemical splash to the eyes, ask co-workers to help you wash the eyes thoroughly. Lift eyelids to avoid pooling of chemicals under eyelids. Flush with water for 15 minutes.
- b. Report to the Emergency Room immediately.

- c. Report accident to immediate supervisor and file the necessary accident reporting forms.

#### 17.2.2. Cuts, Punctures and Needlesticks:

- a. If the injuries are clean cuts, punctures, and needle sticks, clean the affected area immediately with soap and water, then flood or soak the affected area in antiseptic fluid. Bandage to prevent infection. Consult Employee Health or the VA emergency department after hours.
- b. If the injuries are dirty cuts, punctures, or needle sticks, (e.g. those contaminated with patient blood or body fluids or bacterial agents) proceed as above as long as no object which caused the wound is left in the wound. Consult Employee Health or the VA emergency department after hours.
- c. If the object causing the injury is not easily removed, do not attempt to cleanse area. Doing so may cause further damage. Consult Employee Health immediately or the VA emergency department after hours.
- d. If the object which causes the injury is contaminated with patient's specimens, identify the specimen with the patient's name for further evaluation and investigation. Consult Employee Health immediately or the VA emergency department after hours.
- e. Report all accidents of any degree to supervisor and consult Employee Health.
- f. Refer to the Medical Center's Bloodborne Pathogen "Exposure Control Plan" found in the Infection Control Manual regarding exposure to these agents.

#### 17.2.3. Chemical Burns:

NOTE: Always consult the chemical manufacturer's SDS for emergency first aid procedures before working with any chemical.

- a. Corrosives can cause second and third degree burns. These chemicals include alkalis such as potassium hydroxide, common acids such as hydrochloric, sulfuric, and nitric acids, or oxidizers such as bleach.
- b. Chemicals should be diluted and washed off with copious amounts of water. Minor splashes and spills can be flooded in a sink. Larger splashes and spills require the use of the emergency drench-type shower. Enlist the help of co-workers. Some chemical powders should be brushed off the skin before flooding with water to avoid further skin and tissue damage.
- c. Report to the Emergency Room immediately.

### 17.3. Injury Management Program

- 17.3.1. Report all work-related injuries and/or illnesses to the supervisor, and complete necessary forms as outlined in the Injury Management Program Guide.

## 18. SAFETY PROCEDURES

NOTE: The following practices are those which are directed primarily towards prevention of physical injury rather than towards the prevention of toxic exposure. However, failure to take precautions against injury will often have the secondary effect of causing toxic exposure. Therefore, the following have been added to this CHP.

18.1. Fire Safety – Fire safety is specifically addressed in MCM 138-10: Occupational Health, Safety and Fire Protection Program. Fires of significant magnitude will require outside emergency responders. The following provisions apply to all fires regardless of the magnitude:

### 18.1.1. General Fire Safety

- a. Be aware of ignition sources (i.e. open flames, heating elements, and spark gaps).
- b. Do not use flammable liquids or gases in the presence of ignition sources.
- c. Flammable liquids give off vapors which may also ignite or explode. Be sure flammable liquids (other than small, “working” quantities) are properly stored in an approved flammable cabinet.
- d. Fire blankets are not available; rather the person should follow “stop, drop and roll” procedures.
- e. Heat resistant gloves should be used to move or handle small burning objects, hot vessels, hot valves, or hot handles.
- f. Maintain an 18” ceiling clearance at all times to ensure that the sprinklers can operate properly.

18.1.2. If a significant fire hazard exists:

#### **R. A. C. E.**

- ✓ **Rescue** – If applicable and safe to do so. DO NOT ATTEMPT TO RESCUE PERSONNEL IF DOING SO MAY ENDANGER YOUR LIFE OR HEALTH.
- ✓ **Alarm** – Pull the fire alarm (pull box) and dial \*20 to report the fire. Alarms are located near exits and stairwells.
- ✓ **Contain/Confine** – Close all of the doors to prevent the spread of fire and smoke.
- ✓ **Extinguish** – If the fire is small enough to put it out.  
OR  
**Evacuate** – Move to safety within the building (horizontal, then vertical evacuation if necessary).

18.1.3. The red fire extinguishers located throughout the VAPORHCS are ABC and can be used on all types of fires. If a fire requires the use of a fire extinguisher, remember to:

#### **P. A. S. S.**

- ✓ **Pull the pin.**
- ✓ **Aim at the base of the fire.**
- ✓ **Squeeze the handle.**
- ✓ **Sweep from side to side.**

18.2. Electrical Safety

18.2.1. Grounding

- a. All instruments must be grounded and periodically checked by the Biomedical Engineers and/or facility electricians.

18.2.2. Shocks

- b. All shocks of any magnitude must be reported to the Research Office immediately so that the equipment can be checked. Do not attempt to use an instrument that is causing shock. Small shock often precedes major shocks.

18.2.3. Repairs

- a. Repairs on the electrical system by other than Engineering personnel are prohibited.
- b. Notify the Research Office of any malfunctioning equipment so assistance can be requested from appropriate Engineering personnel.

18.2.4. Extension cord usage

- a. Three-to-two wire adapters (cheater plugs, multiple outlet plugs) and extension cords are prohibited from use on all equipment. Modifications to electrical distribution systems shall be accomplished in areas where their use seems to be indicated.

18.3. Centrifuges – All centrifuges should have interlocks which shut off the motor when the cover is removed. On older models without this protection, signs/labels should be attached to the equipment to instruct the user to refrain from lifting the cover until the rotor has stopped rotation.

18.4. Cryogenic Liquids – All cryogenic liquids (i.e. liquid nitrogen) and dry ice shall be handled using thermal insulated gloves, lab coat, goggles, and face shield to prevent frostbite and splash injuries. Cryogenic liquids shall be kept away from incompatible substances and stored in well ventilated areas.

18.5. High Vacuum Apparatus – Equipment that is handled under pressure should be shielded to protect against the risk of glass breakage or substance splattering due to implosion. In addition backflow prevention devices must be placed on tubing.

18.6. Heated Appliances – All heated appliances (i.e. ovens, incubators, hot plates, Bunsen burners) shall be kept at a safe distance from flammable, combustible, or reactive materials. They should be monitored to ensure that the proper temperature is being maintained and that overheating is not occurring. Exposed hot surfaces shall be identified by a label or sign. **HOT PLATES MUST NOT BE USED IN THE FUME HOOD WITH SOLVENTS OR OTHER FLAMMABLES.**

18.7. Autoclaves – Autoclaves should only be operated by individuals trained in their safe use and operation.

18.8. Non-Ionizing Radiation (NIR) – Radiation in the form of ultraviolet light (UV), lasers, infrared radiation (IR), and others may be hazardous if safe practices and procedures are not followed.

- 18.8.1. All NIR equipment shall be handled using the appropriate eyewear (specific to the respective wavelength).
- 18.8.2. Never stare at UV lighting or flashes. Avoid contact with IR heating devices.
- 18.8.3. Contact the RSO for appropriate laser safety guidelines.

## REFERENCES

Occupational Safety and Health Administration (OSHA) 1910.1450

RESEARCH & DEVELOPMENT APPROVAL DATE:

NEXT REVIEW DATE: **August 2017**

## Appendix A: Incompatible Chemicals

| Chemical                                  | Incompatible Substances   |
|---|---|
| Alkali Metals(calcium, potassium, sodium) | Water, carbon dioxide, carbon tetrachloride, other chlorinated hydrocarbons.  |
| Acetic acid                               | Chromic acid, nitric acid, hydroxyl-containing compounds, ethylene glycol, perchloric acid, peroxides, and permanganates.               |
| Acetylene                                 | Copper (tubing), fluorine, bromine, chlorine, iodine silver, mercury and their compounds.   |
| Ammonia (anhydrous)                       | Mercury, halogens, calcium, hypochlorite, hydrogen, fluoride.   |
| Ammonium nitrate                          | Acids, metal powders, flammable liquids, chlorates, nitrates, sulphur, and finely divided organics or combustibles                      |
| Aniline                                   | Nitric acid, hydrogen peroxide  |
| Bromine                                   | Ammonia, acetylene, butadiene, butane, hydrogen, sodium carbide, turpentine, and finely divided metals.                                 |
| Chlorates                                 | Ammonium salts, acids, metal powders, sulphur, finely divided organics or combustibles, carbon  |
| Chlorine                                  | Ammonia, acetylene, butadiene, benzene, and other petroleum fractions, sodium carbides, turpentine, and finely divided powdered metals. |
| Chromic acid                              | Acetic acid, naphthalene, camphor, alcohol, glycerin, turpentine and other flammables.  |
| Cyanides                                  | Acids   |
| Flammable liquids                         | Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, the halogens   |
| Hydrogen peroxide                         | Copper, chromium, iron, most metals or their respective salts, flammables, aniline, and nitro-methane                                   |
| Iodine                                    | Acetylene, ammonia  |

| Chemical               | Incompatible Substances   |
|------------------------|---|
| Mercury                | Acetylene, fulminic acid, ammonia   |
| Nitric acid            | Acetic, chromic and hydrocyanic acids, aniline, carbon, hydrogen sulfide, flammables, readily nitrated substances                   |
| Oxygen                 | Oils, grease, hydrogen, flammables  |
| Oxalic acid            | Silver, mercury   |
| Perchloric acid        | Acetic anhydride, bismuth and its alloys, alcohol, paper, wood and other organic materials  |
| Phosphorous Pentoxide  | Water   |
| Potassium              | Carbon tetrachloride, carbon dioxide, water   |
| Potassium permanganate | Glycerin, ethylene glycol, benzaldehyde and sulfuric acid   |
| Sodium                 | Any oxidizing substances; e.g., methanol, glacial acetic acid, carbon disulfide, benzaldehyde, ethylene glycol, ethyl acetate, etc. |
| Sulfuric acid          | Chlorates, perchlorate, permanganates   |

## Appendix B: Lab Close-out Plan

### Laboratory Closeout Checklist

Portland VA Medical Center

Principal Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

Laboratory to be closed out: Building(s): \_\_\_\_\_ Room(s): \_\_\_\_\_

| Chemicals   | Y/N | N/A | Comments |
|---|-----|-----|----------|
| Check all storage areas; fume hoods, cabinets, common areas, refrigerator/freezers for chemicals. |     |     |          |
| Determine if any chemicals can be transferred to another PI for use.                              |     |     |          |
| Identify all chemicals for disposal, label with name of chemical and hazard.                      |     |     |          |

| Gas Cylinders  | Y/N | N/A | Comments |
|--|-----|-----|----------|
| Gas Cylinders – Close valve, remove connections, fasten cylinder caps, and return cylinder |     |     |          |

| Biological Hazards: Animal and Human   | Y/N | N/A | Comments |
|--|-----|-----|----------|
| If tissue is stored in preservative, separate tissue and liquid.               |     |     |          |
| Tissue should be disposed of in bio-hazardous waste (red bags).                |     |     |          |
| Liquid preservative (formalin, etc.) should be disposed of as hazardous waste. |     |     |          |

| Microorganisms and Cultures  | Y/N | N/A | Comments |
|--|-----|-----|----------|
| Autoclave liquid cultures for 20 minutes with wet heat, or treat w/ bleach overnight and pour down the drain, run water for 5 minutes. |     |     |          |
| Culture plates placed in bio-hazardous waste bags and deposited in collection room for incineration.                                   |     |     |          |
| Microorganisms to be used by another investigator are to be labeled and transferred to their space.                                    |     |     |          |

| Microorganisms and Cultures – Cont.   | Y/N | N/A | Comments |
|---|-----|-----|----------|
| Clean all laboratory areas that contained microorganisms and disinfect with 10% bleach. |     |     |          |

| Radioactive Materials   | Y/N | N/A | Comments |
|---|-----|-----|----------|
| Inventory – Contact the RSO (ext. 54483) to determine how to transfer/dispose of leftover Radioactive material inventory.   |     |     |          |
| Records – Give all radioactive related paperwork to RSO.  |     |     |          |
| Contamination Wipes – Conduct final contamination wipes of radioactive material work areas (may include floor, sink, drain, hood, counter, cabinet, refrigerator, freezer, lab equipment) |     |     |          |
| Radioactive Waste – Contact the RSO for waste pickup (ext. 54483)   |     |     |          |

## Appendix C: Policy and Procedures for Lab Closeout

### Research & Development Service Policy and Procedures for Lab Closeout

I. PURPOSE: The purpose of this plan is to outline proper closeout procedures for laboratories with hazardous materials.

#### II. POLICY AND PROCEDURES

The following hazards require completion of the outlined procedures when the Principal Investigator (PI) or other responsible individual leaves the VA Portland Health Care System (VAPORHCS) or transfers to a different laboratory:

##### A. Chemicals

- 1) Check all storage areas (i.e., fume hoods, store rooms, cabinets), common service areas, refrigerators, and freezers for chemicals.
- 2) Determine which chemicals are usable and transfer responsibility for these materials to another investigator who is willing to take charge of them, or contact safety at x56330. If a new user cannot be found, the materials should be disposed of. Hazardous chemicals must not be sewered or trashed; they must be collected for disposal.
- 3) To prepare chemicals for disposal:

- a. Label all containers with the name of the chemical (abbreviations are not acceptable!), manufacturer and hazard warning (i.e. flammable).
- b. Securely close all containers. Open containers (i.e. uncapped flasks or jars) are not acceptable.
- c. Remove the chemicals or residues from beakers, flasks, evaporating dishes, etc., rinse with appropriate solvent and clean.
- d. An updated inventory of the chemicals scheduled for re-use must be available.
- e. Current SDSs must be available.
- f. Chemical pickup must be completed before the laboratory is vacated. Waste collection will take at least a week after submitting chemical disposal list. Unlabeled chemicals will not be accepted without prior approval from the safety office.

#### B. Gas Cylinders

- 1) Close the gas valves.
- 2) Remove gas connections from the equipment.
- 3) Fasten the cylinder caps.
- 4) Return all gas cylinders.

#### C. Biological Hazards: Animal and Human Tissues

- 1) If tissue is stored in a liquid preservative, separate the tissue and liquid.
- 2) Bag and seal the tissue in a biohazard bag. Any tissue that is radioactive must be disposed of as radioactive waste. Tissues will be incinerated. Call the Radiation Safety Officer (RSO) at ext. 55853 with any questions.
- 3) Liquid preservatives such as formalin should be disposed of as hazardous waste. Do not assume that preservatives can be sewerred. Contact the safety office x56330 with any questions on disposing of liquid preservatives.
- 4) Defrost and clean refrigerators and freezers once they are empty. Disinfect with 10% bleach.
- 5) If any tissues are to be saved, identify an investigator who will take responsibility for them. Check all shared refrigerators, freezers, cold rooms and other storage areas to ensure all your experimental materials have been properly disposed of.

#### D. Microorganisms and Cultures

- 1) Locate all stored microorganisms or cultures in the freezers, incubators, refrigerators and cold rooms.
- 2) Autoclave liquid cultures for 20 minutes with wet heat or treat them with bleach overnight and then pour down the drain, running water for 5 minutes afterward.
- 3) Place culture plates into bio-hazardous waste bags and deposit in collection room for incineration.
- 4) Remove all unwanted microorganisms stored in the freezers and place the vials in biological waste bags and then deposit in collection room for incineration. Microorganisms stored in glass containers

should be placed into the plastic sharps containers before depositing in collection room for incineration.

- 5) Place microorganisms that are to be used by another investigator into containers labeled with the name of this investigator and transfer to his/her freezer storage space. The investigator receiving these microorganisms takes responsibility for them.
- 6) Clean all laboratory areas that contained microorganisms including freezers, refrigerators, cold rooms, and incubators, and disinfect with 10% bleach.

#### E. Controlled Substances

**The person having custody of the controlled substance must dispose of outdated, surplus, no longer intended for use, and waste controlled substances according to Federal regulations. All aspects of controlled substances use in research must comply with the VAPORHCS Pharmacy Service Policy and Procedure Manual.**

- 1) Decide whether the controlled substance(s) will be transferred or disposed of:
  - a. If transferring ownership, ensure that appropriate Drug Enforcement Agency (DEA) forms are completed.
- 2) If disposing of controlled substances, collect all necessary paperwork (record of the acquisition, use and disposal log). The use and disposal logs shall include:
  - a. Name of the substance.
  - b. Number of units or total volume of each commercial container.
  - c. Number of commercial containers of each substance.
  - d. Expiration date and lot numbers of the containers.
  - e. Name, address and registration number of the source from which the containers were received.
  - f. Amount of each substance transferred or used, including the name and address of the person(s) to whom it was given, the date of transfer, the name of the individual who used the substance and the reason it was used.
  - g. If controlled substances are compounded or aliquoted, each new container must be labeled and tracked as with the original container.
  - h. Number of units or volume of the finished forms and/or commercial containers disposed of in any other manner, as well as the date and manner of the disposal.
- 3) Notify Pharmacy Service at ext. 55566 of pending lab closeouts. Present the Pharmacy Service with a list of controlled substances that are intended to be disposed of or transferred. Arrange for pickup and disposal of controlled substances. Please allow ample time for this process.
- 4) Abandonment and improper management of a controlled substance is a violation of the DEA permit.

#### F. Radioactive Materials

- 1) If you are moving to another location in the Medical Center you must:

- a. Notify the RSO of the new location and get permission to use material at that location BEFORE moving.
  - b. Provide the RSO with all contamination surveys of all storage and use areas within the lab and with the sink log.
  - c. Perform a final contamination survey of all storage areas, use areas and equipment within the lab. Decontaminate any contaminated areas or equipment and perform a follow-up survey. Provide a copy of this to the RSO.
- 2) If you are not moving to another location in the Medical Center, you must:
- a. Reconcile your inventory with the RSO. This means you have to account for each vial of material delivered to your lab.
  - b. For each piece of equipment with a radiation sticker, inform the RSO the nature of potential contamination including isotope(s) used with that equipment.
  - c. Insure all survey meters and radiation counters that are Medical Center equipment are turned in.
- 3) If you are moving off station you may not take any radioactive material with you without consulting the RSO and obtaining permission. This includes counting equipment (liquid scintillation for example) that has embedded sources.
- 4) If you are moving off station, OR are no longer using radioactive materials, you must inform the RSO with the names of all personnel so he/she may delete dosimetry devices (film badges) as necessary.
- 5) All radioactive dry, solid waste must be "tagged & bagged". All radioactive waste (solid and liquid) must be labeled with the isotope, activity in microcuries, date and name of authorized user. Additionally, liquid waste must be labeled with the name of the compound(s).

#### G. Equipment and Shared Storage Areas

- 1) Clean and decontaminate all equipment before the lab is closed.
- 2) If the equipment has been used in a radioactive environment, clean and decontaminate all parts of the equipment. Notify the RSO at ext. 54483.
- 3) If the equipment has been used in a biohazardous environment, clean and decontaminate (with bleach) all parts of the equipment.
- 4) If the equipment is to be discarded, please note that capacitors, circuit boards, transformers, mercury switches, mercury thermometers, radioactive sources, and Freon refrigerants must be removed prior to disposal. Contact the Supply Technician at ext. 56280 for assistance. However, the equipment must be cleaned and decontaminated prior to contacting the Supply Technician.

- 5) All property of the VAPORHCS must be cleaned and decontaminated prior to disposal.
- 6) Special Note: Please check all the common service ultra-low freezers, refrigerators, etc., where you may have samples stored. Please discard all samples **prior to** lab closure, or transfer to an investigator who will assume responsibility.
- 7) Contact the safety office x56330 with any questions regarding disposing of hazardous materials from shared storage areas (e.g., cold rooms, stock rooms, flammable liquid cabinets and waste disposal areas).

### III. RESPONSIBILITIES:

- A. Any regulatory action or fines resulting from an inappropriate management or disposal of hazardous materials shall be the responsibility of the Principal Investigator and Research Service.
- B. Investigators who do not prepare chemicals for disposal according to the above procedures may be charged for costs incurred by the Research Service to remove these materials.
- C. If an Investigator is unsure of proper disposal procedures, it is his/her responsibility to contact the safety office at x56330.

### IV. REFERENCES:

- <http://www.dehs.umn.edu/policies/termination.html>
- [http://www.dehs.umn.edu/hwd/cls\\_chk.html](http://www.dehs.umn.edu/hwd/cls_chk.html)

V. RESCISSIONS: None

VI. ATTACHMENTS: Hazardous Materials Closeout Check-List Form

VII. FOLLOW-UP RESPONSIBILITY: Chair, Subcommittee on Research Safety (SRS).

MICHAEL P. DAVEY, MD, PhD  
ACOS/Research & Development Service

## Appendix D: SRS semi-annual inspections checklist

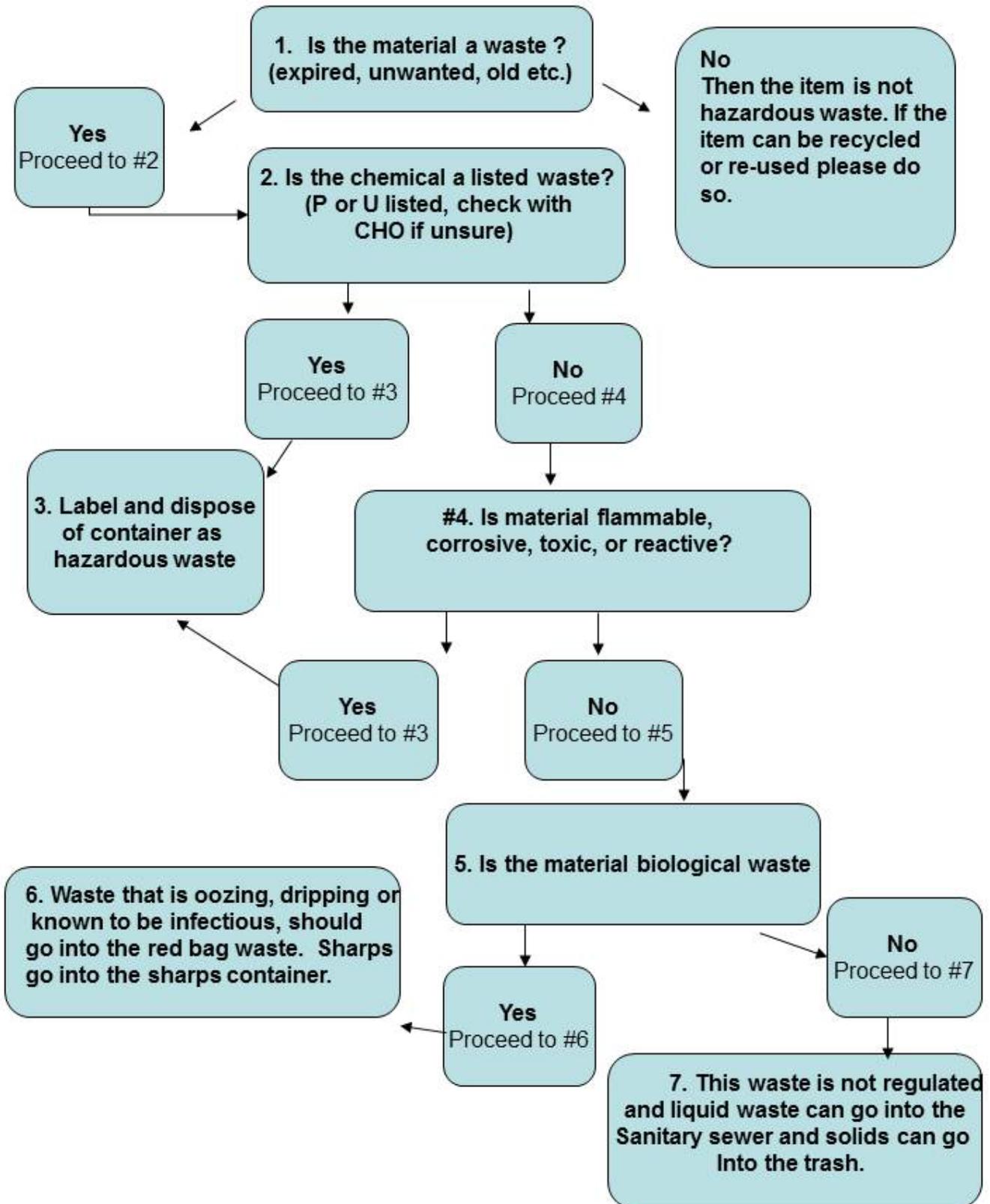
|   | Column1 | Specific concerns noted by committee | Corrective action taken by the P.I. |
|---|---------|--------------------------------------|-------------------------------------|
| Date: FY 2016-Fall  |         | Laboratory location /Room #          |                                     |
| P.I. Name and email:  |         |                                      |                                     |
| Lab manager Name and email:   |         |                                      |                                     |
| <b>General Lab Safety</b>   | No      |                                      |                                     |
| Lab practices good housekeeping (no clutter, clean floors, and work surfaces, etc.)             |         |                                      |                                     |
| Eye washes are unobstructed and tested weekly   |         |                                      |                                     |
| No evidence of eating, drinking, smoking or application of cosmetics in the lab                 |         |                                      |                                     |
| Staff know what to do in case of medical or fire emergency                                      |         |                                      |                                     |
| The chemical hygiene plan is readily available and employees are aware of the location          |         |                                      |                                     |
| <b>Biological</b>   |         |                                      |                                     |
| Biological Safety Cabinets are certified and functioning properly                               |         |                                      |                                     |
| Appropriate disinfectants are in place and proper disinfection procedures are being followed    |         |                                      |                                     |
| The lab has appropriate labels posted e.g.: BSL level, biohazard stickers, etc.                 |         |                                      |                                     |
| The biohazardous waste is emptied when bin is no more than 3/4 full or disposed at least weekly |         |                                      |                                     |
| Vacuum lines are protected with either a secondary disinfectant flask or a HEPA filter          |         |                                      |                                     |
| Appendix 3 from the safety protocol is posted on the biosafety cabinet                          |         |                                      |                                     |

|   | Column1 | Specific concerns noted by committee | Corrective action taken by the P.I. |
|---|---------|--------------------------------------|-------------------------------------|
| The current R&D Service Biosafety Manual is readily available and employees are aware of the location                               |         |                                      |                                     |
| <b>Chemical</b>   |         |                                      |                                     |
| A paper copy of the chemical inventory is posted, dated, and current (date on inventory is less than 6 months old)                  |         |                                      |                                     |
| Acids, bases, and flammables are stored separately  |         |                                      |                                     |
| Organic and inorganic compounds are stored separately   |         |                                      |                                     |
| Nitric acid is being stored separately  |         |                                      |                                     |
| Corrosive and liquid chemicals are stored on shelves below eye level  |         |                                      |                                     |
| Proper waste management procedures are being utilized (hazardous waste labels, secondary containment, nothing down the sink, etc.)? |         |                                      |                                     |
| Chemical Fume Hoods are certified and functioning properly  |         |                                      |                                     |
| Chemical fume hoods are not cluttered: items are stored safely and are not blocking airflow   |         |                                      |                                     |
| Fume hoods sash is stored at 18"  |         |                                      |                                     |
| Products are properly labeled, containers are closed, stored upright, and no chemicals are on the floor                             |         |                                      |                                     |
| Peroxide formers are double dated   |         |                                      |                                     |
| Spill control materials are easily accessible and staff are aware of their location   |         |                                      |                                     |
| Staff are familiar with online MSDS database  |         |                                      |                                     |
| Liquid nitrogen is being used safely (face shield, glasses and insulator gloves are easily accessible)                              |         |                                      |                                     |

|  | Column1 | Specific concerns noted by committee | Corrective action taken by the P.I. |
|--|---------|--------------------------------------|-------------------------------------|
| Chloroform is dated not to exceed one year or contains preservative  |         |                                      |                                     |
| Staff are familiar with RINSE procedures for a chemical spill  |         |                                      |                                     |
| <b>Radiation</b>   |         |                                      |                                     |
| All postings in labs are correct (entrance, all containers properly labeled, emergency numbers available)                      |         |                                      |                                     |
| Unattended source vials are secured  |         |                                      |                                     |
| Lab coat, gloves, and absorbent paper are being used   |         |                                      |                                     |
| Radioactive material is not stored in corridors(exception: autoradiography film cassettes in locked refrigerators or freezers) |         |                                      |                                     |
| <b>Physical</b>  |         |                                      |                                     |
| Gas cylinders are properly secured and capped when not in use  |         |                                      |                                     |
| Ceiling tiles are unstained  |         |                                      |                                     |
| Lab microwaves are labeled "No Food or Drink"  |         |                                      |                                     |
| <b>Work Practice Controls</b>  |         |                                      |                                     |
| Staff use correct personal protective equipment (gloves, lab coat, goggles, etc.)  |         |                                      |                                     |
| Staff are dressed for the lab (no open toe shoes, long hair tied back, etc.)   |         |                                      |                                     |
| Hands are washed after removing gloves and lab coats are not worn outside the lab  |         |                                      |                                     |
| <b>Electrical/Fire Safety</b>  |         |                                      |                                     |
| Electrical cords are managed correctly (no extension cords, daisy chains, and power strips only)                               |         |                                      |                                     |
| Electrical cords are intact and properly placed.   |         |                                      |                                     |

|   | Column1 | Specific concerns noted by committee | Corrective action taken by the P.I. |
|---|---------|--------------------------------------|-------------------------------------|
| Staff are aware of the nearest fire alarm pull station                        |         |                                      |                                     |
| Fire extinguishers are available, unobstructed, and staff know their location |         |                                      |                                     |
| Sprinklers clearance is at least 18 inches                                    |         |                                      |                                     |
| Exit signs are in place and easily visible                                    |         |                                      |                                     |
| Egress from room is unobstructed  |         |                                      |                                     |
| Hot plates being used near flammable chemicals are turned off                 |         |                                      |                                     |

## Hazardous Waste Disposal Flowchart



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