HAZARD WARNING SIGNAGE SYSTEM

For Educational, Research and Diagnostic Laboratories

Review and Approval Authority

Prepared and Edited by:	
Industrial Hygienist	Date
Reviewed and Approved by:	
Director - Department of Environmental Safety	Date
Chair of the BACH Committee	Date
Chair of the DES Policy Committee	Date
Approved as UM Policy:	
President	— Date

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Emergency and Assistance Telephone Numbers

FIRE - POLICE - RESCUE - EMERGENCY MEDICAL SERVICE - CHEMICAL SPILL - 24 hour

9-1-1

CALL IMMEDIATELY FOR <u>ANY</u> EMERGENCY, INCLUDING CHEMICAL SPILL, FIRE, INJURED OR SICK PERSON

Environmental Safety (Main Office)

(40)5-3960

(Industrial Hygiene, Occupational Safety, Biological Safety, Hazardous Waste Management, Fire Protection, Insurance Services, Hazard Communication, Accident Investigation, Air Monitoring and Safety Education)

Environmental Safety - Radiation Safety Office

(40)5-3984

University Health Center - Occupational Health (Medical Consultation and Evaluation)

(31)4-8172

Facilities Management Work Control Center

(40)5-2222

(Repair of facility equipment deficiencies, e.g., steam line leaks, electrical failures, ventilation problems, etc.)

DES Contact Information
Campus Mail Address
Street Address
Departmental Phone Number
24 Hour Emergency Access
Training Phone Number
E-mail Address safety@umd.edu
Internet http://www.essr.umd.edu
FAX

POLICY STATEMENT

Approved by the President June 1, 1998

I. Purpose

The University of Maryland (UM) is dedicated to providing safe and healthful facilities for all employees and students, and complying with federal and State occupational health and safety standards. Administrators, faculty, staff and students share the responsibility to reduce potential physical and health risks encountered in the performance of duties requiring entry into educational, research and diagnostic laboratories and laboratory support locations. The University believes that a Hazard Warning Signage System significantly advances this objective. This policy is designed to identify and designate responsibilities for the implementation and maintenance of such a system.

II. Policy

The University of Maryland shall establish a uniform process for warning individuals who enter University laboratories about the known potential hazards associated with specific laboratory spaces. A Hazard Warning Signage System (HWSS) is a laboratory signage system which sets the conditions under which the signage components are to be posted. It is important that all employees, visitors and emergency responders are aware of the hazards identified by applicable signs,

The HWSS shall be implemented for all laboratory and laboratory support facilities at UM. Employees and students who are authorized to enter a UM laboratory must be provided access to the HWSS definitions. The definitions will also be supplied to applicable emergency response and laboratory systems maintenance personnel. Contractors working in laboratory buildings may access HWSS definitions through the campus department administering their contract or the Department of Environmental Safety (DES). A complete copy of the HWSS may be requested from DES.

III. Duties and Responsibilities

A. Department of Environmental Safety shall:

- (1) Identify a standard system for laboratory hazard warning signage on UM campus laboratory doors;
- (2) Establish standardized symbols and definitions for recognized laboratory hazards for posting laboratory doors;

- (3) Assist Principle Investigators/Lab Managers in identifying laboratory hazards and the appropriate labels to complete laboratory signs;
- (4) Maintain a supply of the signage system components;
- (5) Establish the initial hazard warning elements and data collection instruments for laboratories; and
- (6) Provide copies of this document to emergency responders and authorized personnel.

B. University of Maryland Police Department (UMPD) shall:

- Assure confidential online access to the current database of emergency contact information for UM laboratories based upon information collected by DES through designated department representatives; and
- (2) Provide laboratory emergency contact numbers to ranking emergency responders upon request during emergency events involving laboratories.

C. Designated Department Representatives shall:

- (1) Assure that laboratory signs are completed for each laboratory and laboratory support space in their area;
- (2) Coordinate annual audits of laboratory signage to assure signs are current;
- (3) Contact DES to obtain additional warning signs or labels as necessary to maintain departmental signage;
- (4) Notify DES when individual signs are altered, damaged or missing;
- (5) Maintain current Emergency Contact Information and transmit changes to DES.

D. Laboratory Managers shall:

- (1) Assure that labels associated with laboratory signage reflect current use of the lab;
- (2) Assure that visitors are aware of the hazards indicated by the laboratory signage;
- (3) Assure that the laboratory sign is maintained in a complete and readable condition at all main access points to their laboratories; and
- (4) Supply current emergency contact information for the placard. Listed emergency contact personnel must be familiar with the hazards in the posted location. The Principle Investigator must be one of the emergency contacts. Contact information must be updated immediately upon a change in staffing through the Designated Department Representative and DES.

E. Laboratory Users shall:

- (1) Be aware of the meanings of the signage labels; and
- (2) Use appropriate safety precautions based upon the supplied information.

IV. Information:

Assistance will be provided by the Department of Environmental Safety to any Department or individual requesting guidance to satisfy implementation of this policy. The Department of Environmental Safety may be contacted at 301-405-3960.

Introduction

The signage system is designed to fulfill regulatory signage requirements as well as alert lab users and visitors to specific hazards located in individual laboratories. The lab signs do not list every hazard associated with a lab and do not replace basic laboratory safety training or practice. Additional information concerning laboratory safety is available in the UM Laboratory Safety Guide available from DES or the Internet at http://www.essr.umd.edu. Laboratory Chemical Hygiene Plans and related standard operating procedures will provide more in-depth laboratory-specific safety information. Teaching laboratories should provide laboratory safety training to each class of users in addition to written safety protocols due to high user volume and frequent turnover.

Description

The 10" x 10" hazard warning sign illustrated in this section (Figure 1) is intended to warn personnel that a hazard exists in the area. The specific hazards are indicated by symbols and/or hazard warnings affixed to the placard.

Pressure-sensitive labels identifying the type(s) of hazard will be affixed to the placard. The available hazard pictograms are shown next to the definitions of conditions warranting posting of these labels. If more than one hazard exists in an area, the appropriate labels (up to a total of ten) should all be displayed on one placard.

Hazard identification labels have been divided into three priority categories: signage required by (A) federal or State regulation; (B) federal, State or industry standard guidelines; and (C) prudent or good work practice. If more than ten labels are applicable to the lab, labels will be assigned first from category A; then B; then C. No more than ten labels will be applied to any hazard warning sign.

Signs will be posted at the entrance(s) to each functionally separate lab. All entrances to laboratories from hallways will be posted with a completed sign. Entrances to laboratory prep rooms that serve multiple labs or require different labels from the main lab will also be posted.

Figure 1 Hazard Warning Placard



Hazard Warning Labels

Standard Labels - Laboratory spaces will generally be posted with these labels as a minimum standard of care.



This **NO FOOD OR DRINK** label will be posted at access points to all laboratories where chemical or biohazardous substances are used or stored and all laboratories or rooms where radioactive materials are used or stored.

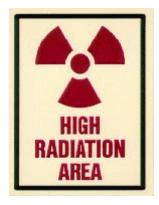


This **EYE PROTECTION REQUIRED** label will be posted at access points to all laboratories where there is a reasonable probability of exposure to hazardous chemicals, potentially-infectious agents or physical hazards which could result in injury if eye protection is not used.

Category A Labels - These labels fulfill a federal or State requirement for hazard warning signage. All applicable labels should be selected from this category before selecting labels from category B or C.

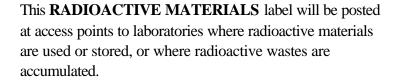


This **RADIATION AREA** label is posted at the entrance to any area accessible to individuals, in which radiation levels could result in an individual receiving a dose-equivalent in excess of 0.05 millisievert (5 millirem) in one hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.





This **HIGH RADIATION AREA** label is posted outside any area accessible to individuals, in which radiation levels could result in an individual receiving a dose-equivalent in excess of 1 millisievert (100 millirem) in one hour at 30 centimeters from any source of radiation or from any surface that the radiation penetrates.







This **BIOHAZARD** label will be posted at access points to BL2 and BL3 laboratories including laboratories working with human blood, unfixed tissue or other potentially-infectious material. The label itself may also be used to identify refrigerators, freezers, incubators and regulated waste containers where human blood or other potentially-infectious materials are stored.

This **HIGH VOLTAGE** label will be posted at access points to laboratories containing electrical equipment or cables operating at 600 volts or greater.





This **ELECTRICAL HAZARD** label will be posted at access points to laboratories containing accessible equipment with exposed and unguarded electrical components operating at less than 600 volts.

This **CANCER HAZARD** label will be posted at access points to laboratories or storage rooms containing chemicals that are specifically regulated by OSHA as carcinogens.



Category B Labels - These labels fulfill a federal, State or industry standard guideline for hazard warning signage. All applicable labels should be selected from this category before selecting labels from category C.

This **BIOSAFETY LEVEL 2** label will be posted at access points to research laboratories where BL2 containment is used; or where research is performed with human blood, unfixed tissue or other potentially-infectious material. BL2 agents used in the lab will be identified by name on a blank label immediately following the BL2 label.



This **BIOSAFETY LEVEL 3** label will be posted at access points to laboratories where research is conducted with microorganisms requiring BL3 containment. These agents have a potential for respiratory transmission, and may cause serious infection. BL3 agents used in the lab will be identified by name on a blank label immediately following the BL3 label.

This HAZARDOUS CHEMICAL/CANCER

SUSPECT AGENT label will be posted at access points to laboratories or storage rooms that use or store chemicals classified by IARC or NTP as known or suspected human or known animal carcinogens. (See the select carcinogen list posted on the DES home page on the Internet.)



This **LASER RADIATION** label will be posted at access points to laboratories where Class 2, 3 or 4 lasers are used or stored. The hazard warning placard must be supplemented by posting a DANGER or CAUTION warning placard (supplied through the Radiation Safety Office) when lasers are in operation. Protective eyewear capable of absorbing the exact wavelength of the produced laser light must be worn by all personnel with potential for beam exposure in these laboratories.



This **TOXIC CHEMICALS** label will be posted at access points to laboratories or storage rooms containing chemical substances defined by the Department of Transportation as poisonous, or by the Environmental Protection Agency as acutely toxic.

Poisonous Material (Department of Transportation - DOT, packing group I or II, 49 CFR 173.132, 1994) - Presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals:

Oral Toxicity: LD_{50} of ≤ 50 mg/kg. Dermal Toxicity: LD_{50} of ≤ 200 mg/kg.

Inhalation Toxicity: LC_{50} of

 $\leq 0.5 \, mg/l$

This **TOXIC GAS** label will be posted at access points to laboratories or storage rooms containing gases classified by the Department of Transportation as poisonous, or by the Environmental Protection Agency as acutely toxic.

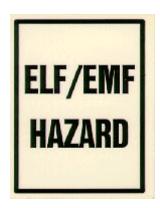
Poisonous Material (Department of Transportation - DOT, 49 CFR 173.115 (c), 1994) A material which is a gas at 20° C (68° F) or less with a pressure of ≥ 101.3 kPa (14.7 psi) and which:

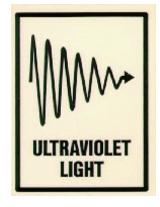
(1) Is known to be so toxic to humans as to pose a hazard to health during transportation, or (2) In the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an **LC50 value of not more than 5000 ml/m3**.

This **MICROWAVE RADIATION** label will be posted at access points to laboratories where there is potential for personal exposure to microwave radiation (frequency 300 MHZ to 30 GHz) in excess of 10 mW/cm².



This **ELF/EMF HAZARD** label will be posted at access points to laboratories containing equipment capable of generating an electrical field of 10 kV/m or more or a magnetic field of 0.5 mT or more.





This **ULTRAVIOLET LIGHT** label will be posted at access points to laboratories using non-laser equipment capable of producing UV wavelengths between 180 and 400 nm at or above the following intensities:

	-, ·
Wavelength (nm)	mJ/cm ²
180	250
200	100
250	7
300	10
350	1.5×10^4
400	1.5×10^5

The full curve is located in the annual "Threshold Limit Values" published by the American Conference of Governmental Industrial Hygienists, available for view at DES.

NOTE: 1. Biological Safety Cabinets with UV lamps will not be evaluated as a UV hazard unless work requires the lamp be activated when the cabinet is in use, 2. UV lasers will be posted with the laser radiation label.



This **PROTECTIVE CLOTHING REQUIRED** label will be posted at access points to all teaching laboratories where there is a reasonable probability of exposure to hazardous chemicals. This label will also be posted at access points to analytical and research laboratories where the laboratory manager has specified protective clothing beyond the standard lab coat.

Category C Labels - These labels represent prudent or good laboratory practice.



This **CORROSIVE MATERIALS** label will posted at access points to laboratories or storage rooms containing chemical substances capable of damaging human tissues.



This **FLAMMABLE MATERIALS** label will be posted at access points to laboratories or storage areas regularly storing any of the following:

- 1. 1 gallon or more of a class 1 or 2 flammable liquid outside of a flammables storage cabinet;
- 2. 5 gallons or more of a class 3A flammable liquid outside of a flammables storage cabinet;
- 3. Any quantity of a flammable gas;
- 4. Any quantity of a flammable solid;
- 5. Any quantity of a water or air-reactive solid

Class 1 = a liquid having a flashpoint below $100 \, {}^{\circ}F$

Class 2 = a liquid having a flashpoint between 100 °F and 140

Class 3A = a liquid having a flashpoint between $140 \, {}^{\circ}F$ and $200 \, {}^{\circ}F$

 ${}^{o}F$ ${}^{o}F$



This **CHEMICAL STORAGE AREA** label will be posted at access points to chemical stockrooms or storage rooms utilized by more than one researcher for chemical storage.



This **HEARING PROTECTION REQUIRED** label will be posted at access points to laboratories where there is a potential for noise exposures at or above 85 dBA.



This **RESTRICTED AREA** label signifies that access to the laboratory is restricted to only authorized laboratory and emergency response personnel unless the laboratory manager grants permission for entry and confirms the space safe for entry. Restricted areas are hereby defined as laboratories where:

- 1. ionizing radiation is generated;
- 2. radioactive materials are used or present; or
- 3. infectious human, plant or animal pathogens are used or present for research at Biosafety Level 3 (BL3);

Figure 2



Sample completed sign





Radio Frequency - This sign is required when the potential for personal exposure to electromagnetic radiation within the frequency range of 10 MHZ to 100 GHz exceeds a power density of 10 mW/cm² over a six minute period.

Confined Space - This sign is required to identify locations that:

- 1. are configured to allow someone to enter to perform work,
 - 2. have limited means for entry,
 - 3. are not designed for continuous occupancy, and
 - 4. have a potential to contain a hazardous atmosphere or other serious safety or health hazard.

No UM employee may enter a space marked with this sign without following the procedures indicated in the UM Confined Space Plan Contractors must utilize an appropriate confined space entry procedure.







Danger Laser Radiation signs must be displayed on the outside of the access points to each laboratory where class IIIB and IV lasers are in operation. The danger sign must be removed when the laser is not in operation. The Laser Safety Officer (LSO) will assist lab managers in obtaining appropriate signage. The LSO may be contacted at DES, Radiation Safety, x53985.





Caution Laser Radiation signs must be displayed on the outside of the access points to each laboratory where class IIIA and II lasers are in operation. The caution sign must be removed when the laser is not in operation. The Laser Safety Officer (LSO) will assist lab managers in obtaining appropriate signage. The LSO may be contacted at DES, Radiation Safety, x 53985.

Contact Information Each lab manager is required to provide a name, office location, office phone number or contact number for one or more individual(s) knowledgeable about all of the operations being conducted in the laboratory in order to provide assistance to visitors and support personnel who have a need to access the lab. Day and evening contact data must be provided for qualified individuals available to provide information about the laboratory operations and equipment to emergency responders. The Principle Investigator responsible for the lab must be listed as one of the emergency contact positions. The emergency contact phone number on the posted sign will be 405-3555. This is a recorded non-emergency phone line to the campus police emergency dispatcher. The dispatcher will match the contact name or lab location to the appropriate home contact information from the dispatch station. This system will provide access to emergency contacts while allowing for personal confidentiality.

The name and emergency contact information must be supplied to DES for use by emergency response personnel. Personal information will be maintained in a confidential manner but will be supplied to official emergency responders. (See Appendix A for an example contact information collection form.) Changes in emergency contact information must be forwarded to DES immediately.

Chemical Hygiene Plan

All laboratory facilities at the University of Maryland where hazardous chemicals are handled or used at laboratory scale must maintain a written functional Chemical Hygiene Plan including a complete inventory of chemicals used or stored in the lab, standard operating procedures for all work with hazardous chemicals in the lab and access to material safety data sheets for all inventoried chemicals. Chemical Hygiene training is mandatory for all UM lab users and managers. Contact DES for more information about implementing or maintaining a Chemical Hygiene Plan in your lab or to obtain training.

MSDS Access

The UM Hazard Communication and Chemical Hygiene Plans require access to Material Safety Data Sheets (MSDSs) for hazardous chemicals used or stored on UM property. Employees who are not familiar with MSDSs may be registered for Hazard Communication or Chemical Hygiene training through DES. (See the DES Contact Information block located on Page ii.)

Paper or electronic copies of MSDSs are maintained at UM in a central repository at DES. You may access MSDSs through DES, the DES home page on the Internet or the product's manufacturer. (See the DES Contact Information block located on Page ii.)

Appendix A - OSHA Substance Standards (29 CFR 1910.xxxx)

Use of any of the listed substances requires compliance with specific requirements of each of the individual standards. Full text of these standards may be found by on the OSHA Internet home page at www.osha.gov or by linkage through the DES home page.

Asbestos	.1001
4-Nitrobiphenyl	.1003
alpha-Naphthylamine	.1004
4,4'-Methylene bis(2-chloroaniline)	.1005
Methyl chloromethyl ether	.1006
3,3'-Dichlorobenzidine (and salts)	.1007
bis-Chloromethyl ether	.1008
beta-Naphthylamine	.1009
Benzidine	.1010
4-Aminodiphenyl	.1011
Ethyleneimine	.1012
beta-Propiolactone	.1013
2-Acetylaminofluorene	.1014
4-Dimethylaminoazobenzene	.1015
N-Nitrosodimethylamine	.1016
Vinyl Chloride	.1017
Arsenic (inorganic)	.1018
Lead	.1025
Cadmium	.1027
Benzene	.1028
Cotton dust	.1043
1,2-Dibromo-3-chloropropane	.1044
Acrylonitrile	.1045
Ethylene oxide	.1047
Formaldehyde	.1048
4,4'-Methylenedianiline	.1050

Appendix B - Signage Information Collection Form

(Use additional forms as necessary) Submission/Revision Date: _____ **Laboratory Location:** Building Name: ______ Building #: _____ Lab Name: Room Number: **Entry or Advice Contact:** Office Location: Building ______ Building #: _____ Room Number: _____ Office Telephone Number: _____ Pager Number: E-mail Address: **Emergency Contacts: Primary Contact** Office Location: Building ______ Building #: _____ Room Number: _____ Office Telephone Number: _____ Home Telephone Number: _____ Car Phone Number: _____ Pager Number: _____ E-mail Address: _____ Estimated Travel Time to Campus: _____ Secondary Contact Name:_____ Office Location: Building Building #: Room Number: _____ Office Telephone Number: _____ Home Telephone Number: _____ Car Phone Number: _____ Pager Number: _____ E-mail Address: _____ Estimated Travel Time to Campus: **SOP Location:** (e.g., shelf over bench to rt. of door.) Chemical Inventory Location:

Sign Elements Required: Circle Y (yes) or N (no) for each potential sign label. Insert the condition or reason for the posting in the box to the right of the label. Circle ? if you desire source assessment.

Restricted Area: Radiation Area: High Radiation Area: Radioactive Materials: No Food or Drink: Biohazard: High Voltage: Electrical Hazard: Eye Protection: Hearing Protection: BL2: BL3:	YN Condition YN ? Condition YN ? Condition YN Condition YN Condition
Hazardous Chemical/Cancer Suspect Agent: Laser Radiation:	YN Condition YN Condition
Toxic Chemicals:	Y N Condition
Toxic Gas:	Y N Condition
Microwave:	Y N ? Condition
ELF/EMF Hazard:	Y N ? Condition
UV Hazard	Y N ? Condition
Protective Clothing:	Y N Condition
Corrosive Materials:	Y N Condition
C1 C4 A	TT, Condition
Chem Storage Area:	YN Condition YN Condition