C. Eugene Bennett Department of Chemistry

Eberly College of Arts and Sciences

Safety Rules and Regulations for Researchers in the Chemistry Research Laboratory Building

October 2012

I certify that I have read and I understand the *Safety Rules and Regulations for Researchers in the Chemistry Research Laboratory Building (CRL)*. I will abide by these rules and regulations.

_____
Printed Name

_____ _____
Signature **Date**

_____ _____
Email Address **Telephone Number**

_____ _____
Emergency Contact Name **Emergency Contact Telephone Number**

Return signed form to Barbara L. Foster, Safety Director

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Safety Rules and Regulations for Researchers in the Chemistry Research Laboratory Building (CRL)

Established July 1991, Revised May 1992, January 2000, and June 2011

The following guidelines and policies are designed to protect research personnel from exposure to hazardous chemicals in the research laboratories. According to the Occupational Safety and Health Administration definition, a hazardous chemical is a chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed persons. These safety rules must be followed by all employees at all times. Everyone is responsible for safe laboratory practices and is expected to exercise all due caution and prudence when working in the CRL.

I. Guidelines for Personal Apparel and Personal Protective Equipment

A. Laboratory workers should wear cotton clothing that provides protection from chemical spills. Clothing which completely covers the legs must be worn at all times in the laboratory. Shorts and skirts that do not completely cover the leg are inappropriate apparel in the laboratory and are not permitted. To avoid exposure to hazardous materials, open-backed shirts, bare midriff shirts, or shirts which expose areas of the torso are not permitted. You must wear the equivalent of a t-shirt when working in the laboratory.

B. All employees must wear appropriate eye protection (over regular eyeglasses) and approved laboratory aprons or cotton lab coats (not lab jackets) in the research laboratories.

C. The use of contact lenses while working in the research laboratory is strongly discouraged. In the event of a chemical splash or vapor release, contact lenses can increase the degree of injury to the eye and may prevent prompt first-aid and eye-flushing procedures.

D. Wear shoes which completely cover the feet. Sandals, perforated shoes, open-toed shoes, open-backed shoes, or high-heeled shoes should not be worn in the research laboratory.
E. For your safety, hair longer than shoulder length and loose sleeves must be confined when working in the laboratory.
F. Wear appropriate disposable gloves when working in the laboratory. Inspect the gloves for defects before wearing. Always remove gloves before exiting the laboratory.
G. You are advised to avoid wearing synthetic fingernails when working in the laboratory. Synthetic fingernails can be damaged by solvents and are made of extremely flammable polymers which can burn to completion and are not easily extinguished.
H. For your protection, jewelry should not be worn while working in the laboratory. Dangling jewelry can become entangled in equipment and can conduct electricity. Chemicals can seep under the jewelry and cause injuries to the skin.

II. Procedures to Avoid Exposure to Hazardous Materials

A. Thoroughly review all proposed laboratory procedures to determine the potential health and safety hazards before beginning work in the laboratory. Refer to the MSDS for guidance on chemical storage, handling, and disposal. Avoid underestimation of risk when handling hazardous materials.
B. Minimize all chemical exposure. Avoid ingestion, injection, inhalation, eye contact, and skin contact with hazardous materials.
C. Plan appropriate protective procedures and plan the positioning of all equipment before beginning any operation. Follow the appropriate Standard Operating Procedures (SOP) at all times in the laboratory.
D. Read the MSDS and the label before using a hazardous chemical in the laboratory. Observe the PEL (Permissible Exposure Limit) and TLV (Threshold Limit Value) of each hazardous material in the laboratory. These limits are listed in the MSDS.
E. Know the location and proper use of the safety equipment, (i.e., eyewash station, safety shower, fire extinguisher, first-aid kit, and fire blanket) emergency telephone, and fire alarm in the general vicinity of the laboratory in which you are working.
F. Avoid working alone in the laboratory.
G. Report all injuries, accidents, incidents, and near-misses to the Safety Director. Report any unsafe conditions to the Laboratory Supervisor or Safety Director.
H. The choice of chemicals to be used in the laboratory should be appropriate to the facilities and should not exceed the capacity of the exhaust system.
I. Do not taste chemicals. Do not pipet by mouth; use a pipet aid.
J. When you attempt to smell a chemical, you should gently waft the vapors toward your nose using your gloved hand or a folded sheet of paper. Do not place the container directly under your nose and inhale the vapors.
K. Experiments involving odorous, lachrymatory, vesicant, toxic, corrosive, or particulates must be carried out in a hood under draft and <u>not</u> on the bench top. When using a chemical fume hood, the sash opening should be kept at a minimum to protect the user

and to ensure the efficiency of the operation. Keep your head and body outside of the hood face. All chemicals and equipment should be placed at least six inches from the hood face to ensure proper airflow.

L. Vent apparatuses which may discharge chemicals (i.e., vacuum pumps and distillation columns) into local exhaust or hoods.

M. Inspect gloves and glove boxes before use.

N. Always remove your gloves and wash exposed areas of skin after chemical usage and before exiting the laboratory.

O. Never wear gloves or lab coats outside of the laboratory or into areas where food is stored and consumed. Laboratory workers should wash laboratory apparel separately from personal clothing.

P. Eating, drinking, smoking, chewing gum, applying cosmetics, and using smokeless tobacco products are prohibited in the laboratory. Beverage containers, cups, bottled water, and food containers are not permitted in the laboratory. Never use laboratory glassware for eating or drinking purposes. Q. Do not store food and beverages in chemical storage areas or laboratory refrigerators.

R. Keep chemical containers closed when not in use.

S. Clean up all liquid spills (including water) immediately. Do not leave spilled chemicals on the bench top or floor. If a chemical spills onto the skin, immediately flush the affected area with water and notify the laboratory staff in Room 304 Clark Hall. Complete an Accident Report Form (included in this document) and submit it to the Safety Director.

III. General Guidelines for Laboratory Procedures

A. Unauthorized experimentation and work in the laboratory is forbidden.

B. Any personal injury or accident that may occur must be reported to the Safety Director within 24 hours via an Accident Report Form, included in this document.

C. When the fire alarm sounds you must evacuate the building immediately. Extinguish all flames and turn off all equipment, as appropriate, before exiting.

D. Unauthorized personnel, children, and pets are not permitted in the laboratory.

E. Excessive noise and boisterous conduct are forbidden. Radios must not be audible from outside the immediate laboratory or office and use must be discontinued if potentially hazardous situations exist or if the sound level disturbs coworkers.

F. Vocal warning should be given to those working nearby in case of fire, explosion, spillage of dangerous chemicals, or the release of toxic fumes. The information should be reported immediately to the Safety Director. Written notification of the use of a fire extinguisher should be made to the Safety Director within 24 hours.

G. All water, gas, air, electrical, and other service connections must be made in a safe and secure manner. All worn, frayed, or damaged cords and plugs on all electrical equipment must be replaced by satisfactory cords and plugs. Electrical components and power cords should be kept off of the floor in case of flooding. All tubing for water must be securely fastened.

H. Solid materials (paper, matches, towels, broken glass, stoppers, and rubber tubing) must be kept out of the sinks at all times to minimize the danger of plugged drains.

I. Clear visibility from corridors into laboratories must be maintained. Only authorized warning signs and directories are permitted on the glass of the laboratory doors.

J. In the event of a mercury spill, contact the Safety Director.

K. As a reminder of University policy, smoking is prohibited in all Chemistry facilities.

L. All chemicals, solvents, and reagents must be transported within the buildings in suitable “safety carriers” (such as a rubber pail with a handle or a chemical cart).

M. When heating or carrying out a reaction in a test tube or flask, never point the apparatus toward your co-workers or yourself.

N. When diluting concentrated acids always pour the acid slowly into the water with

stirring; never add water to concentrated acids because of the danger of splattering.

IV. Laboratory Glassware

A. Maintain clean glassware in the laboratory. Do not pile up dirty glassware in the sinks. Wear appropriate gloves to clean glassware. Wash glassware carefully. Dirty water can mask glassware fragments. Handle and store laboratory glassware with care. Promptly discard cracked or chipped glassware. Wash your equipment with tap water and use distilled water only for rinsing. Do not use more distilled water than is necessary.

B. Tubing ends must be fire-polished or ground smooth. Towels or gloves must be used to protect the hands when inserting glass tubing into corks or stoppers. Lubricants such as soapy water, mineral oil, or glycerol may be useful.

C. Do not attempt to dry glassware by inserting a towel wrapped around a glass rod.

D. Glass tubes must extend well through rubber stoppers so that closure of the tubes does not occur if the rubber stoppers swell.

E. Heavy pieces of apparatus must be supported with clamps suitably protected with pads and also with bottom support such as tripods or rings.

F. Broken glass should be disposed of in containers that are specifically designed for that purpose, not in the facility trash containers.

V. Laboratory Housekeeping

A. Access to exits, emergency equipment, and utilities must never be blocked. Coats, bags, and other personal items must be stored in the proper area, not on the benchtops or in the aisle ways.

B. Properly label chemicals for use and storage. Repair or replace any damaged labels immediately. Secondary containers must be labeled with the chemical name, manufacturer's name, hazard class, and any other special warnings.

C. The floors should be cleaned on a regular basis. Promptly wipe up all liquid spills and ice on the floor.

D. Keep work areas clean and uncluttered. Benchtops and hoods should remain clear of broken glass, spilled chemicals, and paper.

E. Chemical hazards should be maintained at least two inches from the edge of the bench tops.

F. Hallways and stairways should not be used as storage areas.

G. Do not conduct unattended experiments without the authorization and prior approval of the Laboratory Supervisor.

H. Do not store materials or chemicals on the floor.

I. Do not block the sink drains. Place rubber matting in the bottom of the sinks to prevent breakage of glassware and avoid injuries.

J. Clean up work areas at the end of the operation or day.

K. Properly dispose of broken glass and sharps (i.e., needles and razor blades). If broken glassware is contaminated with a hazardous substance, the glassware must be treated as a hazardous substance.

L. To avoid accidents, drawers and cabinets must be kept closed.

VI. Waste Chemical Disposal

Do not dispose of waste chemicals in the sink drains or in the wastebasket. It is the policy of the Eberly College of Arts and Sciences that no chemicals or solutions are poured down the drains or placed in the general wastebaskets in the laboratory. Waste chemicals must be collected in appropriate containers and must be stored in the assigned location within the laboratory. Properly label all waste

containers. Each waste container must have a "Hazardous Waste" sticker and a label that includes the complete contents of the container. (Obtain the stickers from the laboratory staff in Room 304 Clark Hall.)

A. Chemical waste containers must be capped at all times except when adding material.

B. The West Virginia Department of Environmental Protection (WV DEP) considers chemical containers that are dusty to be waste-like in manner since it would appear that they are no longer being used. They have stated that dusty containers should be considered waste and should be disposed.

C. Included in the departmental Chemical Hygiene Plan (Appendix D) you will find a list of chemicals that the U.S. Environmental Protection Agency has designated as "Acutely Hazardous" and they have placed special restrictions on their accumulation and disposal. These "P-Listed" wastes *and their empty containers* must be disposed of as hazardous waste through the WVU EH&S Hazardous Waste Program. You must label even empty containers of P-Listed wastes as "Hazardous Waste" and submit an EH&S waste disposal form. Do not rinse these empty containers because the rinsate that is created is a "P-listed waste" and is then treated as a hazardous waste.

EHS Hazardous Waste Guide for Satellite Accumulation Areas (research labs)
1. EHS will pick up unwanted chemicals and chemical wastes.
2. Chemicals must be compatible with the container.
3. Containers must be labeled with the words "Waste <chemical name(s)>". Obtain a waste sticker (example, below) for each liquid or solid waste container in your lab from Albert Taylor, Room 302 Clark Hall. Use the common or IUPAC name of each chemical (no abbreviations or formulas).
4. Containers must always be kept closed unless **actively** adding waste.
5. Containers should be no more than 95% full to allow for expansion.
6. Containers must have a screw cap closure or equivalent.
7. Date container when it is **FULL**.
8. Submit the online Hazardous Waste Disposal Form to EHS - available at http://fisehs.wvu.edu/haswastdisp.cfm

HAZARDOUS WASTE
Contains:

Date when full: ___/___/___

For Disposal: ehs.wvu.edu

VII. Compressed Gas Safety

A. General

All laboratory workers must know and understand the properties, uses, and safety precautions of the gas before using the gas and/or associated equipment. Consult the supplier and the Material Safety Data Sheets for the particular gases being used. The Laboratory Supervisor should provide proper training and instruction for all personnel handling compressed gases. Chemical splash goggles and leather gloves are recommended for handling compressed gas cylinders. More detailed information about specific types of gas cylinders, including the hazards of working with cryogenics, is available in the departmental Chemical Hygiene Plan.

B. Gas Cylinder Handling

Never drag or slide a gas cylinder, even for short distances. Cylinders should be moved by using a suitable hand cart. Remove the regulator and securely fasten the cylinder cap prior to transporting a gas cylinder. Never drop cylinders or permit them to strike each other violently. The valve protection cap must be left in place until the cylinder has been secured against a wall or

bench, placed in a cylinder stand, or on a cylinder cart and is ready to be used. Cylinders must be secured at all times. Do not tamper with safety devices in valves or cylinders and never permit oil, grease, or other readily combustible substances to come in contact with cylinders, valves, or regulators for oxidizing gases. Do not remove or deface the product identification labels or decals, or change the cylinder color. Never lift a cylinder by the cap. Promptly return empty or unneeded cylinders to the gas cylinder room.

C. Storage of Gas Cylinders

Cylinders should be stored in an upright position. Separate cylinders of gases belonging to various categories, taking into account the nature of the gases. Segregate full and empty cylinders. The area should be dry, cool, and well-ventilated, and preferably fire-resistant. Keep cylinders protected from excessive temperatures by storing them away from radiators or other sources of heat. Cylinders must be secured while in storage. Open flames are prohibited in oxidant or flammable gas cylinder storage areas. Store cylinders containing flammable gases away from other combustible materials.

D. Use of Gas Cylinders

The cylinder decal or label is the only positive way to identify the gas contained in a cylinder. Color coding of cylinders is an identification method used for the convenience of the cylinder supplier only. Do not use cylinders as rollers for moving material or other equipment. Never attempt to mix gases in a cylinder. Never transfer gases from one cylinder to another. Never use oxygen as a substitute for compressed air. No part of a cylinder should be subjected to temperatures above 130°F (54°C). Prevent sparks or flames from welding or cutting torches or any other source from coming in contact with cylinders. Do not permit cylinders to come in contact with electrical apparatus or circuits. Use regulators and pressure relief devices when connecting cylinders to systems of lower pressure service ratings. Only regulators approved for the specific gas should be used. Open the cylinder valve before adjusting the pressure on the regulator. Always open the cylinder valve slowly. Valves should be closed on cylinders and all pressure released from equipment connected to the cylinder at the end of a task or any time an extended nonuse period is anticipated. If a cylinder protective cap is extremely difficult to remove, do not apply excessive force or pry the cap loose with a bar inserted into the ventilation openings. Attach a label or tag to the cylinder identifying the problem and return the cylinder to the supplier. Wrenches should not be used on valves equipped with a handwheel. If the valve is faulty, attach a label or tag to the cylinder identifying the problem and return the cylinder to the supplier. Use only oxygen-compatible threading compounds such as Teflon tape on valve threads for oxygen service.

VIII. Building Security

A. If you are working in a laboratory or office and leave for any reason or any length of time, you must close and lock the door to prevent the theft of equipment, chemicals, computers, or personal items.
B. Do not loan your building keys or WVU employee ID card to anyone else.
C. Immediately report the loss or theft of your keys to the Safety Director.
D. Do not permit unauthorized persons to enter laboratories or offices in the chemistry buildings.
E. Do not prop open doors or leave doors ajar to allow unauthorized access to the chemistry facilities.
F. If an employee should discover that criminal activity has occurred in either Clark Hall or the CRL during regular working hours (8:15a.m. until 4:45p.m., Monday through Friday, excluding holidays), he or she should immediately notify the Safety Director (293-2729) or Barbara.Foster@mail.wvu.edu. (To report criminal activity after regular working hours, you should contact the WVU Police Department (293-3136).