DEPARTMENT OF KINESIOLOGY

CHEMICAL HYGIENE PLAN

Approved by (Include date)

James Madison University
Department of Kinesiology
Godwin Hall
Harrisonburg, VA 22807
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PURPOSE AND SCOPE

This Chemical Hygiene Plan (CHP) complies with OSHA regulations 29 CFR 1950.1450. This plan applies to the Human Performance Laboratories of James Madison University supported by the Department of Kinesiology. A list of terms and definitions is included in Appendix A. Procedures regarding fire safety and evacuation are included in this CHP.

RESPONSIBILITIES AND CONTACTS

This CHP is administered by the Department of Kinesiology, the Chemical Hygiene Officer, and the Department of Kinesiology Safety Committee.

Department Head
Dr. Janet Wigglesworth
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Chemical Hygiene Officer (CHO)

The Chemical Hygiene Officer reports to the Kinesiology Department Head and is responsible for the day to day activities described in this plan. The current Chemical Hygiene Officer is Dr. Mike Saunders (saundemj@jmu.edu, 540-568-8121).

Kinesiology Safety Committee

The Safety Committee is appointed by the Kinesiology Department Head, and meets to set policy regarding issues of chemical safety and laboratory safety within the Human Performance Laboratories in the Department of Kinesiology. The members of the 2018-2019 Kinesiology Safety Committee are: Dr. Mike Saunders (CHO), Dr. Stephanie Kurti, Dr. Nick Luden, and Dr. Chris Womack. The committee will meet annually to review and update laboratory safety procedures. In addition, the group may meet on an as-needed basis to address more immediate safety issues/concerns.

PRUDENT LABORATORY PRACTICES AND STANDARD OPERATING PROCEDURES

General Laboratory Guidelines

- All laboratory work must be performed to provide minimal chemical exposure.
- Use only chemicals for which the laboratory in which you are working is adequately equipped to handle, i.e. adequate hood ventilation system.
- Never directly heat flammable chemicals with an open flame or hot plate. Instead, use a heating mantle, steam, or hot water bath.
- Never store flammables near an ignition source, such as Bunsen burners.
- All flammable solvents should be used in a chemical fume hood or well-ventilated area.
- When transferring flammables from one container to another, ground both containers if the potential for sparking exists.
- All flammable liquids should be stored in appropriately designed safety cabinets or safety cans.
- Avoid distracting or startling other laboratory workers. Never run or engage in horseplay in the laboratory.
- Laboratory workers are not allowed to work in the lab alone with chemicals. (Cleaning agents at working strength concentration are considered exempt from the chemical related requirements of this plan.)

- In conjunction with the PI, students will develop a communication plan for when individuals may be working in the facility alone (i.e. without chemicals).
- Always be alert to conditions that are unsafe in the laboratory. Correct such conditions immediately, if possible, or report them to the responsible faculty member, the Chemical Hygiene Officer, or Department Head.
- Familiarize yourself with the locations and content of Safety Data Sheets (SDSs, formerly MSDS) as well as other safety resources, and use them.

Personal Hygiene, Housekeeping, and Personal Protective Equipment (PPE)

- Do not eat, drink, smoke, chew gum, or apply cosmetics in the laboratory. The only exception to this rule is individuals consuming fluids/beverages as part of a research study, laboratory, or exercise testing. In these instances, food/beverages must be consumed in designated (non-chemical) areas.
- Never put your nose directly over an open chemical container.
- Avoid skin contact with chemicals. Immediately flush any exposed area with water.
- Do not pipette by mouth.
- Never store food or drinks in laboratory refrigerators with chemicals. Chemical refrigerators must be labeled "No food storage".
- All food/beverages for nutrition studies/labs must be stored in refrigerators marked "Nutritional Supplies Only – No Chemical Storage". Chemicals are not permitted in these refrigerators.
- Confine long hair and avoid loose clothing in the laboratory.
- Always wear closed shoes in the laboratory. Shoes with open toes or heels are not permitted. Sneakers with porous uppers are not recommended.
- ANSI Z-87-approved safety glasses, goggles, or other approved eyewear are to be worn when eye hazards are present (use of chemicals, pouring concentrated chemical cleaning agents, etc.).
- Lab coat or apron are strongly recommended when working in laboratories.
- Always wear gloves that are appropriate for the chemical and task. Wash reusable gloves before removing them. Gloves are not to be worn out of the laboratory.
- Maintain a clean and clutter-free work area; clean up each day prior to leaving the laboratory.
- All chemicals (including synthesized chemicals and chemicals that have been transferred from their original container) must be properly labeled with the following information: chemical name and concentration; responsible party's name, expiration date and the date it was created or transferred.
- Place all chemical waste into an appropriate container and attach a completed waste disposal label (Appendix B). All waste should be placed in the cabinet under the fume hood in Godwin 209 for disposal (and the CHO should be notified). Additional waste labels may be obtained from the CHO.
- Promptly clean up all spills; properly dispose of the spilled chemical and clean-up materials.
- Report all accidents or injuries to the research advisor or laboratory instructor, and the CHO.

Emergency Procedures

Accidents:

- Eye Contact: Promptly flush eyes with large amounts of water for 15 minutes and seek medical attention. Know the location of the nearest eye-wash station at all times.
- Skin Contact: Promptly remove any contaminated clothing and flush affected area with water for 15 minutes. Seek medical attention as needed.
- Ingestion: Do not allow the victim to eat or drink anything. Do not induce vomiting. Seek medical attention promptly.

Accidents occurring in teaching and research laboratories of the Department of Kinesiology laboratories must be reported to the research advisor or laboratory instructor, and the CHO. A laboratory incident report must be filled out and a copy maintained by the CHO in the Departmental safety records (Appendix C). The laboratory incident report is also available on the

Risk Management website:
https://www.jmu.edu/riskmgmt/wm_library/Lab%20Incident%20Report%20051315.doc

Spills:

- Promptly clean up all chemical spills while wearing proper PPE and properly dispose of clean-up materials.
  (Consult Hazards in the Chemical Laboratory or Prudent Practices in the Laboratory: Handling and Disposal of Chemicals for more specific clean-up procedures in advance of using a chemical).
- For large chemical spills (especially those of highly toxic material or volatile compounds), immediately evacuate the area and call campus police at 540-568-6911.

Fires:

- Small fires may be extinguished with a fire extinguisher, but only if the individual has been properly trained, has a clear means of egress, and feels comfortable doing so. Otherwise, manually pull the fire alarm and evacuate the area. Exit the building and call campus police at 540-568-6911.
- If your clothing catches on fire, move away from the ignition source and extinguish the flame with a safety shower/eyewash station.

Evacuation:

- When the building fire alarm sounds, turn off all sources of heat, electricity, and gas, and stabilize any reaction in process. Evacuate the building immediately. Please consult this plan for additional information.

Control Measures and Equipment

Experiments involving chemicals should be conducted in a chemical fume hood. This is especially important for reactions employing volatile, flammable, or halogenated solvents and any aqueous solution containing toxic substances. The fume hood sash can be in the raised position to set up the experiment, but should be lowered to operating position once the process has started, and only be raised to check on progress. You should always wear protective eyewear and gloves when working in a fume hood. Chemical storage in the fume hood should be kept to a minimum. Exhaust hood performance specifications and testing schedule are given in Appendix D.

Departmental Safety Inspections

The JMU Office of Risk Management conducts periodic inspections of all relevant Kinesiology laboratories.

Chemical Procurement, Receipt, Transport, Storage, and Disposal

Procurement and Receipt:

- All chemicals used within the Kinesiology Laboratories will be ordered by the Instructional Center Technician (Kent Wise) or other specified individuals in the department. Upon arrival, the container will be visually inspected for damage or leakage. he individual requesting the chemical will be notified that it has arrived from the vendor after it has been logged.
- Assess surplus chemicals prior to ordering new chemicals, to determine if additional supplies are needed.
- Order the minimum amount of chemicals necessary, and substitute less hazardous chemicals when feasible.
- Assess whether adequate storage space exists for chemicals and any waste that will be produced prior to purchasing chemicals.

Transport:

- Laboratory carts should be used to transport chemicals between rooms when moving more

than a kilogram of material and secondary containers should be used when transporting strong mineral acids, bases, and solvents. The elevator is to be used when transporting chemicals between floors. Stairs are not allowed to transport chemicals between floors.

Storage:

- All chemicals should be stored according to their hazards and associated storage requirements. Ultra-cold freezers and refrigerators are located in Godwin 209 and 217. Chemicals should be stored based on compatibility. Acids, bases, and organics must be segregated from one another. The quantities of chemicals stored in laboratories should be kept to a minimum. Bench top and hood storage of chemicals should be avoided. Take care to ensure that chemicals are not exposed to direct heat or sunlight.

Disposal:

- As a general rule, never purchase larger quantities of a chemical than you plan to use within a six-month period. Do not stockpile chemicals, and dispose of chemicals for which you have no planned use. Ethers, and substances that form explosive peroxides when open to the air, should be disposed of one year after receipt or prior to their stamped expiry if they have been compromised.
- Chemical waste generated within the Kinesiology Laboratories is collected for disposal by off-site contractor.
- Solid waste should be stored in glass containers that can be sealed with caps or lids. Aqueous solutions should be stored in glass or polyethylene containers. There should be separate containers for acidic and basic solutions, and for aqueous solutions of metals and organic substances. Prior to being moved to the collection area, a waste label (see appendix B) must be completed and attached to the container. The label must include the following information: faculty name, detailed container contents (do not use chemical formulas or abbreviations). The CHO and/or designee will inspect the container and add a label designating the container as "Hazardous Waste". This label will also include the date and a container # (see appendix B).

Donation of chemicals or acceptance of donated chemicals:

- Employees and students are prohibited from donating JMU chemicals. University policy 1506 Property Use (University) expressly "prohibits using, borrowing, or removing university property for personal or private purposes" which applies to chemicals purchased with university funds. In addition, employees and students are prohibited from accepting donated chemicals. Doing so is an inherently risky practice that creates safety and compliance issues (i.e. labeling, storage, availability of SDS) and exposes the university to significant liability and disposal costs.

Hazard Identification

- SDS sheets should be consulted for detailed, chemical-specific handling instructions before using any chemical. All chemicals should remain in their original container with the original label attached unless transferred to an appropriately labeled container. Online access to SDS sheets can be obtained at: jmu.kha.com, or by downloading the app 'SDS mobile', and login (Username: jmu@sdsmobile.app, Password: jmusds2019).

Chemical Specific Safety Procedures

Should a researcher deem it necessary to use highly toxic or pyrophoric chemicals such as Hydrofluoric Acid or an Organic Lithium, safety procedures will need to be developed and approved prior to ordering these chemicals.

EMPLOYEE INFORMATION

General Information

James Madison University Department of Kinesiology provides safety training for all Departmental employees to ensure safe handling of, and minimum exposure to, hazardous chemicals. The training methods employed by faculty and staff of the Kinesiology Department include, but are not limited to online training modules and appropriate safety books (see references). Additional aspects of Chemical Safety Training are detailed in Appendix E.

Training Requirements

Student researchers will receive safety training from their respective faculty advisor. Information and training will be provided at the time of an employee's assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. All students who work for more than one academic year will be required to participate in refresher training annually. Training should be documented on the Kinesiology Safety Training Database (http://www.cisat.jmu.edu/KIN/SafetyTraining/index.aspx).

Exposure Limits/Exposure Assessment

This chemical hygiene plan has been prepared to ensure that the exposure to hazardous chemicals in the workplace is minimal and does not exceed permissible exposure limits (PELs), specified in 29 CFR part 1910, Z tables (Appendix F). All employees have the right to medical consultations and/or examinations if there is reasonable suspicion that an overexposure occurred. All exposures potentially exceeding the PEL should be reported to the CHO and the University Environmental Health Coordinator.

Exposure Assessment

The purpose of the exposure assessment is to determine the facts surrounding a potential over exposure, including the names of the employees and hazardous chemicals involved.

An exposure assessment includes: (1) Interview of the complainant and victim (if not the same person), (2) determining whether the victim's symptoms match those described in the SDS, and (3) evaluation of current control measures and safety procedures.

The employee will be notified of the results of any monitoring within 15 days. All records of exposure monitoring results will be retained by the employer and will be accessible to the employee. Following an exposure assessment, if no further action is deemed necessary by both the CHO and the complainant, the reason for this decision will be included in the documentation.

Medical Consultations/Examinations

Laboratory employees and students who work with hazardous chemicals will be given an opportunity to receive medical attention, including any follow-up examinations that examining physician determines to be necessary, based upon the following:

- Whenever an employee or student develops signs or symptoms associated with a hazardous chemical to which he/she may have been exposed in the laboratory, or
- 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.

Terminating Employment with the University

When a faculty member terminates employment with the university they have a responsibility to ensure that all chemical hazards have been eliminated from their laboratory.

REFERENCES

The resources listed below contain in-depth information concerning laboratory safety and chemical hygiene practices. These resources were used in the development of and are meant to supplement the CHP. All of the resources contained on this list may be viewed by contacting the CHO or are available through the JMU library.

Alaimo, Robert J., ed. *Handbook of Chemical Health and Safety*. New York: Oxford University Press, 2001.

American Chemical Society. *Less is Better: Laboratory Chemical Management for Waste Reduction*. Washington, D.C.: ACS, 1993.

American Chemical Society. *Safety in Academic Chemistry Laboratories: Accident Prevention For College and University Students*. 7 Ed. Vol 1. Washington, D.C.: ACS, 2003.

American Chemical Society. *Safety in Academic Chemistry Laboratories: Accident Prevention For Faculty and Administrators*. 7 Ed. Vol 2. Washington, D.C.: ACS, 2003

American Chemical Society Task Force on Lab Waste Management. *Laboratory Waste Management, A Guidebook*. Washington, D.C.: ACS, 1994.

Bretherick, L. *Hazards in the Chemical Laboratory*. 4 Ed. London: Royal Society of Chemistry, 1986.

Furr, A. Keith. *CRC Handbook of Laboratory Safety*. 5 Ed. New York: CRC Press, 2000.

Gorman, Christine E., ed. *Working Safely with Chemicals in the Laboratory*. Schenectady: Genium Publishing Corporation, 1993.

Kingsley, Warren. *Living with the Laboratory Standard: A Guide for Chemical Hygiene Officers*. Washington, D.C.: ACS, 1998.

Laboratory Exhaust hood Safety. Dir. Wynn O. Jones. 1992.

Lefèvre, Marc J. *First Aid Manual for Chemical Accident*. Stroudsburg: Dowden, Hutchinson, and Ross, Inc., 1980.

Lunn, George and Eric B. Sansone. *Destruction of Hazardous Chemicals in the Laboratory*. 2 Ed. New York: John Wiley and Sons, Inc., 1994.

National Research Council. *Prudent Practices in the Laboratory: Handling and Disposal of Chemicals*. Washington, D.C.: National Academy Press, 1995.

U.S. Department of Labor. *Respiratory Protection*. OSHA, 1993.

Young, Jay A., et.al. *Developing a Chemical Hygiene Plan*. Washington, D.C.: ACS, 1990.

Young, Jay A. *Improving Safety in the Chemical Laboratory: A Practical Guide*. New York: Oxford University Press, 1991.

APPENDIX A - DEFINITIONS

Chemical Hygiene Officer - an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan.

Chemical Hygiene Plan - a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace.

Contact Hazard - (Allergens and Sensitizers) - A contact hazard chemical is an allergen or sensitizer that is so identified or described in the SDS or on the label, is so identified or described in medical or industrial hygiene literature, or is known or found to be an allergen or sensitizer.

Corrosive - A corrosive chemical is one that fits the OSHA definition of corrosive in Appendix A of 29 CFR 1910.1200, fits the EPA definition of corrosive in 40 CFR 261.22 (meaning the chemical has a pH greater than 12 or less than 2.5), or is known or found to be corrosive to living tissue.

Designated Area - an area which may be used for work with "select carcinogens", reproductive toxins, or substances which have a high degree of acute toxicity. A designated area may be the entire laboratory, an area of a laboratory or a device such as a laboratory hood.

Emergency - an occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace and/or personal injury or illness.

Explosive - a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Flammable - any liquid having a flashpoint below 100 °F (37.8 °C). Aerosols and certain solids can also be classified as flammable.

Flashpoint - the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite.

Hazardous Chemical - 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 employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucous membranes.

Laboratory - a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory Scale - 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.

Laboratory Chemical Exhaust hood - a device located in a laboratory, enclosed on five sides with a

moveable sash or fixed partial enclosure on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Medical Consultation - a consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examination or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Organic Peroxides - an organic compound that contains the bivalent –O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic substituent.

Oxidizer - a chemical other than a blasting agent or explosive as defined in 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either or itself or through the release of oxygen or other gases.

Physical Hazard - a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.

Reactives - A reactive chemical is one that is described as such in the applicable SDS or in the "Handbook of Reactive Chemical Hazards, is ranked by NFPA as 3 or 4, is identified by DOT as an oxidizer, organic peroxide, or class A, B, or C explosive, fits the EPA definition of reactive in 40 CFR 261.23, fits the OSHA definition of unstable in 29 CFR 1910.1450, or is known or found out to be reactive with other substances.

Reproductive Toxins - chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects of fetuses (teratogenesis).

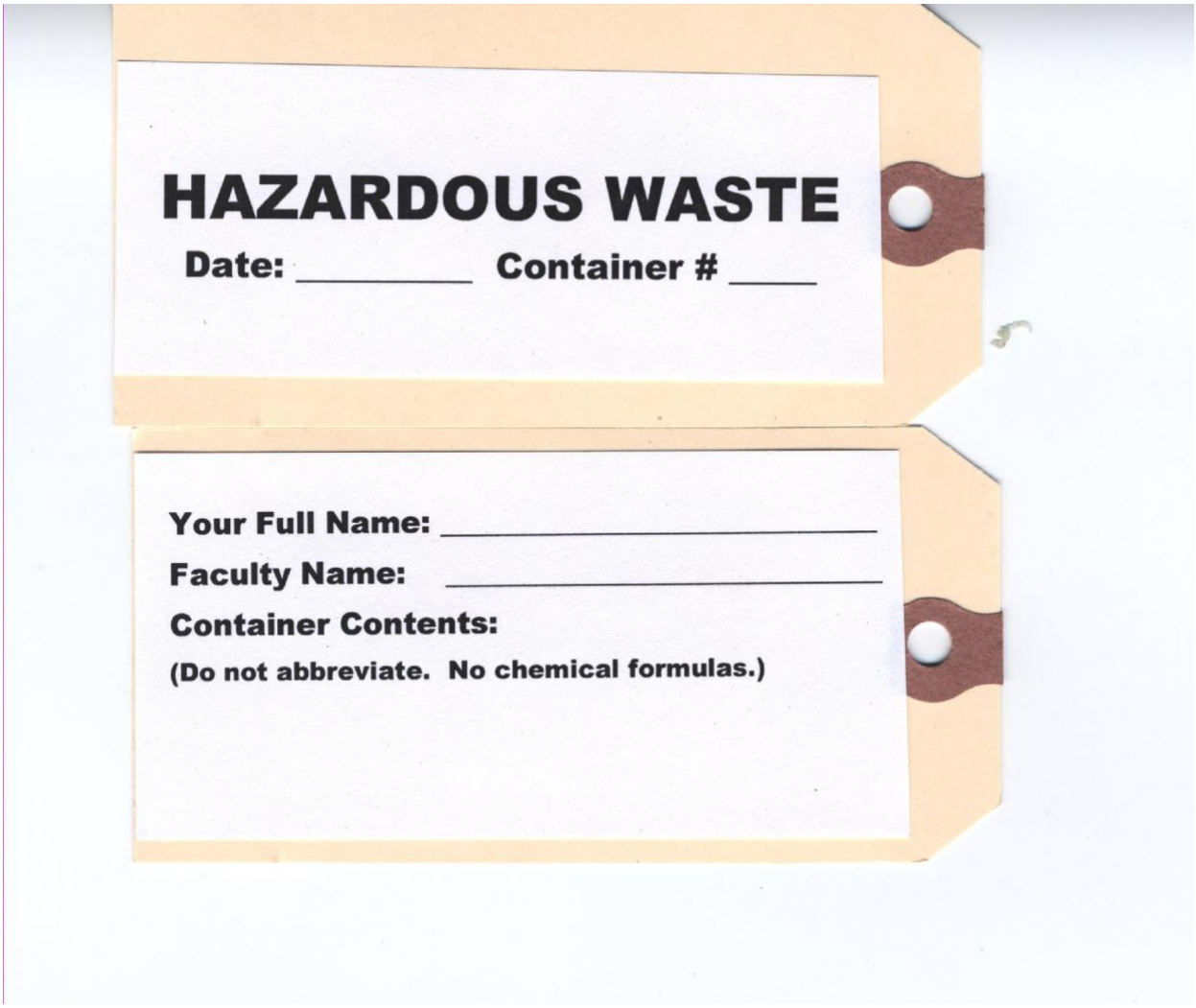
Select Carcinogen - any substance which meets one of the following criteria:

(a) is regulated by OSHA as a carcinogen; or
(b) it listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or
(c) is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest editions); or
(d) it listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with established criteria.

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

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

APPENDIX B – HAZARDOUS WASTE LABELS



James Madison University
Incident Report

Date and time of incident: Click or tap here to enter text. Location: Click or tap here to enter text.

Person involved: Click or tap here to enter text. Contact info (Phone/email): Click or tap here to enter text.
Please select: Employee ☐ Student ☐ Visitor ☐ Non-employee ☐

Person reporting: Click or tap here to enter text. Contact info (Phone/email): Click or tap here to enter text.

Witnesses: Click or tap here to enter text.

Incident Type: Choose an item.

Describe the incident and corrective actions below (use additional pages if necessary)

Detailed incident description:

Click or tap here to enter text.

Immediate corrective actions:

Click or tap here to enter text.

Long-term corrective actions:

Click or tap here to enter text.

Academic Unit Head signature (if applicable):

_____

Forward copies to: office of Risk Management

131 West Grace Street, MSC 6703, Harrisonburg, Virginia, 22807
(540) 568-4959, FAX: (540) 568-2878, mullenmr@jmu.edu,
www.jmu.edu/riskmgmt

Revised 2.9.21

APPENDIX D – MAINTENANCE OF SAFETY EQUIPMENT

FUME HOOD SPECIFICATIONS

- Hoods should be used when there is open handling of hazardous chemicals.
- Hoods will provide 2.5 linear feet of space per person for every two workers working in the hood.
- Hoods will provide a standard face velocity of 80-120 fpm.
- Storage of chemicals and equipment will be kept to a minimum in the laboratory hoods.
- Hoods will not be used to evaporate solvents (except for small quantities of volatile compounds).
- All Departmental laboratory fume hoods will be maintained in good working order at all times. The performance levels of all hoods will be monitored annually by the Office of Risk Management or designee.

SAFETY SHOWER/EYEWASH STATIONS AND DRENCH HOSES

- We will follow ANZI Z358.1-2009 for any safety issues not specifically covered in this CHP.
- Safety showers/eyewash stations and drench hoses are inspected on a monthly basis by the CHO, or designee.
- The safety shower/eyewash stations and drench hoses must be clear and unobstructed. An area of 30" wide by 48" deep must be free of obstructions around the safety shower/eyewash stations.
- The safety shower is actuated to verify that there is sufficient flow. The eyewashes are inspected for tepid water temperatures and symmetry of flow.
- If all criteria is met, the laminated tag is initialed and dated by the CHO, or designee.

FIRE EXTINGUISHERS

All fire extinguishers in the Kinesiology building are inspected on a monthly basis by JMU's Facilities Management staff.

VOLUNTARY USE OF DISPOSABLE DUST MASKS

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. Pollen masks and dust masks are considered "respirators" by OSHA.

You should do the following if you use disposable pollen or dust masks (respirators):

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

- Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[29 CFR, Sec. 1910.134 Appendix D]

APPENDIX E – ASPECTS OF CHEMICAL SAFETY TRAINING

Employee training shall include:

- Familiarization with the contents of the OSHA Laboratory Standard (29 CFR 1910-1450) by faculty member or designee that the students are working with.
- Location, availability, and content of the CHP.
- Signs and symptoms associated with exposures to hazardous chemicals.
- Location and availability of known reference materials on the hazards, safe handling, storage, and disposal of hazardous chemicals. Reference materials may include, but are not limited to, material safety data sheets received from chemical suppliers.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as employee exposure monitoring, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.)
- Physical and health hazards of chemicals in their work area.
- Measures employees can take to protect themselves from such hazards, including specific procedures that have been implemented to protect laboratory employees from exposure to hazardous chemicals. These include utilizing engineering controls such as chemical exhaust hoods, appropriate work practices, and personal protective equipment to be used.
- Standard operating procedures specific to individual labs.

APPENDIX F – LINKS TO OSHA Z TABLES

Links to **29 CFR 1910.1000 Z Tables**

Table Z-1: Limits for Air Contaminants
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992

Table Z-2
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9993

Table Z-3: Mineral Dusts
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9994