General 1 and 2 – Door signs

Laboratories are required to have personnel contact numbers on the outside of their laboratory door, in the event of after-hours emergencies. Two (or more) names should be listed, in case one person is not available.

In addition, if the lab contains physical or health hazards that emergency personnel should be aware of, these hazards should also be indicated on the external lab door.

To request a new or updated door sign, follow this link: Laboratory Door Sign

Specific citations:
1. Emergency contact numbers (two names, preferably the PI, head technician, or a graduate student) shall be posted on the external doorway to the lab. These names and numbers shall be updated when personnel change. (Chemical Hygiene Plan: 5.1.2.2)
2. If a laboratory has 10 gallons or more of a flammable or corrosive liquid or toxic gas(es), the main doorway to the lab shall have a hazard warning sticker visibly posted on it to indicate the potential hazard. (Chemical Hygiene Plan: 5.1.2.3)

General 3 and 4 – (M)SDS signs and access

The Michigan Occupational Health and Safety Administration requires every workplace to post information about the location of Material Safety Data Sheets or Safety Data Sheets for the chemicals used in the laboratory.

For an updated MIOSHA (M)SDS poster, follow this link: (M)SDS Poster

In addition, employees must understand how to access the (M)SDSs for their location. Laboratories have two options:
- Keep (M)SDSs for their location either in paper form or electronically in their laboratory. Employees must demonstrate they have been trained on where these (M)SDSs are kept in the laboratory
- MSU EHS has an online (M)SDS repository of thousands of (M)SDSs; the State of Michigan has indicated that this can serve as the (M)SDS location for all laboratories on campus. Employees must demonstrate they are aware of the online (M)SDS repository, and know how to access it when asked. The link to the MSU EHS online (M)SDS database is here: (M)SDS Database

Specific citations:
1. Every laboratory shall have the Michigan Right-to-Know Law poster visibly posted, listing the location of MSDSs for all hazardous chemicals used in the lab. (Chemical Hygiene Plan 5.1.2.1)
2. The system a unit uses to store MSDSs can vary from keeping them in a filing cabinet to using the EHS request system. Each unit must post a Michigan Right-To-Know Law poster, which indicates the location of all MSDSs for hazardous chemicals used in the lab. (Chemical Hygiene Plan 5.1.1)
3. Employers shall organize the safety data sheets for the hazardous chemicals in the workplace in a systematic and consistent manner and shall train employees in locating particular safety data sheets. (OSHA 1910.1200 (g))
General 5 and 6 – Safety Training

All laboratory employees are required to be trained on the hazards of their workplace. This training is to take place
- At the time of initial assignment, and
- If the scope of work changes sufficiently to warrant retraining, and/or
- Annually, if determined necessary by the employer

This safety training has two parts – general online training modules and site specific training modules

The online training modules can be found here: Online Training Modules
You and your employees will be notified via email if any of your online training modules are overdue

Site-specific training modules are to be performed regularly for each employee. Site-specific training needs to be documented, and specific for the laboratory operations. The goal of site-specific training is to give the PI an opportunity to discuss in detail safety procedures specific to their lab operation with every employee.

A sample site-specific training template is located here: Site Specific Training Template

Documentation of both online modules and site-specific training records should be available to inspectors. These can be paper or electronic copies of training records.

Specific citations:
5. Site-specific training must be documented and maintained by the unit/PI/supervisor and be available to representatives of the EHS, the CHO, members of the CHS or other regulatory officials upon request. (Chemical Hygiene Plan: 1.9)
6. All laboratory employees who handle hazardous chemicals shall attend the Chemical Hygiene & Laboratory Safety course offered online at http://www.ehs.msu.edu. This training shall be at the time of initial assignment and prior to handling any hazardous chemicals. Employees should receive periodic refresher information and training to ensure that they are aware of the risks of exposure to hazardous chemicals. (Chemical Hygiene Plan: 1.9)

General 7-9a. Personal Protective Equipment

Supervisors must evaluate the need for Personal Protective Equipment (PPE) for all potentially hazardous procedures performed in the lab. The employer also needs to provide PPE for all employees; the PPE must be maintained in good working order and fit the employee appropriately.

Employees are responsible for wearing the PPE provided.

Both employers and employees must inspect PPE on a regular basis, and discard or repair those items that are broken, damaged or no longer offer protection.

Examples of Personal Protective Equipment include:
- Chemical protective gloves appropriate for chemicals used, free of rips or cracks
- Reusable gloves without tears or holes
- Safety glasses or goggles with clear, clean lenses and tight-fitting straps
- Lab coats that are reasonably clean, free from holes, and offer appropriate protection for the chemicals being used
- Other lab-specific PPE such as face shields, aprons or UV glasses are worn and maintained in good condition.

The MSU PPE Manual can be found here: [PPE Manual](#)
A printable eye and face protection poster can be found here: [Eye and Face Protection](#)

**Specific citations:**
7. Employees working with hazardous chemicals in laboratories must wear closed-toe shoes, long pants or skirts which fully cover the legs, and a lab coat. (Chemical Hygiene Plan 5.3.2)

7a. Protect exposed skin surfaces when there is a reasonable anticipation of a splash. Even when there is minimal danger of skin contact with an extremely hazardous substance, lab coats, coveralls, aprons, or protective suits should be utilized. (Chemical Hygiene Plan 5.3.2)

8. Always inspect equipment for leaks, tears and other damage before handling a hazardous chemical (Chemical Hygiene Plan 2.1(G)).

8a. Inspect gloves before each use, wash them before removal and replace them periodically (MIOSHA R325.70101 - R 325.70114, Appendix A: E.1(k)).

9. Eye protection must be made available to all employees or visitors to laboratories where chemicals are used and stored. (Chemical Hygiene Plan: 5.3.1)

9. A face or eye protector shall be kept clean and in good repair. Slack, worn out, sweat-soaked, knotted, or twisted headband shall be replaced. (MIOSHA R 408.13313)

9a. Protective eye and face equipment must be used where there is a reasonable probability of injury from hazardous chemicals that can be prevented from such equipment. (Chemical Hygiene Plan 5.3.1)

**General 10-11 – Emergency Eyewash Stations and Showers**

Eyewash facilities are required in all laboratories where injurious or corrosive chemicals are used.

The eyewash station must:
- Be kept free of equipment and debris
- Be easily accessible (no closable doorways or turns)
- Be tested weekly to ensure they are working properly and the water flows freely from both nozzles.

Link to eyewash log here: [Eyewash test log template](#)

- Be installed and maintained according to MIOSHA standards

If a laboratory does not have the means to install an eyewash station where one is necessary, the employer can:
- Move the chemicals to a location with a working eyewash station and work with them there
- Dispose of the chemicals via MSU EHS and discontinue work with chemicals in the area

An emergency shower must be available to laboratories with corrosive or injurious chemicals. The location of the shower may be in the laboratory, in an adjacent laboratory, or in the hallway. Showers are tested by IPF on an annual basis.

**Specific Citations:**
10. Eyewash facilities are required in all laboratories where injurious or corrosive chemicals are used or stored. (Chemical Hygiene Plan 5.3.3) If chemicals are removed from the lab, it will not be necessary to have an eyewash installed.
10a. The location of the shower and/or eyewash facility shall be easily accessible (i.e., no obstacles, closeable doorways, or turns) (MIOSHA-STD-07-1R2, XI. F.4)
10a. Eye wash facilities must provide the minimum of a 15 minute water supply at no less than 0.4 gallons per minute. (Chemical Hygiene Plan 5.3.3)
10b. Plumbed eyewash units shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available. (ANSI/ISEA Z358.1-200a 7.5.2)
10c. Nozzles and flushing fluids shall be protected from airborne contaminants. Whatever means is used to afford such protection, its removal shall not require a separate motion by the operator when activating the unit. (ANSI/ISEA Z358.1-200a 5.1.3)
11. The proximity of the emergency shower shall be determined by the injurious or corrosive nature of the chemical(s). See MIOSHA-STD-07-1R2 for more information.

General 12 – Food and Drink in Laboratories

Eating and drinking is not permitted in MSU research laboratories. Employees should not store their consumables or personal items in research refrigerators, including water bottles. Other personal activities that can cause chemicals to be transferred from surfaces to persons, such as removing contact lenses, applying Chap Stick, etc. are discouraged within the laboratory.

Specific Citations:
12. There shall be no food, drink, smoking or applying cosmetics in laboratories which have radioactive materials, biohazardous materials or hazardous chemicals present. There shall be no storage, use or disposal of these 'consumable' items in laboratories (including refrigerators within laboratories). Rooms which are adjacent, but separated by floor to ceiling walls, and do not have any chemical, radioactive or biohazardous agents present may be used for food consumption, preparation, or applying cosmetics at the discretion of the project director responsible for the areas. (Chemical Hygiene Plan: 2.3)

General 13 – Aisles uncluttered, laboratory housekeeping

Regular housekeeping reduces injuries and accidents in the workplace. Good housekeeping includes appropriate storage of chemicals, safe and regular cleaning of the facility, and proper arrangement of laboratory equipment.

Access to fire exits, emergency equipment and hallways must be maintained at all times. Remove all unnecessary paper, boxes, fabrics or unnecessary materials to prevent spread of fire.

Specific citations:
13. Do not block exits, emergency equipment or controls or use hallways and stairways as storage areas (Chemical Hygiene Plan 2.4(E)).
13. The floor of a work area, passageway, or aisle shall be maintained free of hazardous accumulations of scrap, debris, water, oil, grease, and other slip and trip hazards. (MIOSHA part 1 R408.10015(3))
13. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises. (International Fire Code 2012, Part II, Section 304.1)
General 14 – Chemical Spill Kits

Labs are required to have ready access to chemical spill kits. These spill kits must be checked and maintained on a regular basis. Employees should be trained on the basics of minor chemical spill clean-up. Labs may share a spill kit, if the spill kit can be accessed by all employees whenever someone is working in the lab.

A chemical spill kit can be purchased for $10 from The Biochemistry Store: BMB Store Catalogue

Specific Citations:
14. Ready access to a chemical spill kit is required in laboratories that work with hazardous chemicals. Each laboratory’s spill kit should be kept in a readily accessible location and each employee should be trained on how to use the spill kit. (Chemical Hygiene Plan: 4.1.4)

General 15 – Broken Glass Bucket

Laboratories that use glassware need to have a broken glass bucket or box that is separate from regular trash or hazardous waste. Broken glass that is not contaminated with chemical or biological agents is placed in the broken glass bucket for disposal. Do not put glass or sharps of any kind in the common trash – injuries to lab members and custodial staff can occur.

Contaminated, solid hazardous waste disposal directions can be found here: MSU Waste Disposal Guide

Specific Citation:
15. No broken glass bucket observed. A separate waste receptacle must be designated for non-contaminated glass. Follow guidelines established in the MSU Hazardous Waste Disposal Guide for disposal of contaminated glass. (Chemical Hygiene Plan 2.4(c))

General 16 – Fume Hood Testing and Maintenance

Proper fume hood maintenance is essential to those labs working with hazardous chemicals. Use of an untested or condemned fume hood is strictly forbidden at MSU. Fume hoods must be kept clean, free of debris and unobstructed.

Fume hoods are tested annually by MSU EHS. If a fume hood does not pass inspection, the room users will be notified and work in the hood must cease until the fume hood is repaired.

Supervisors should schedule maintenance and repair of fume hoods via Infrastructure Planning and Facilities.

Specific Citation:
16. MSU EHS staff will conduct fume hood testing as soon as possible.
16. Never work with hazardous chemicals if the required ventilation system is not working. The PI must contact Physical Plant to have the system repaired before hazardous chemicals can be used in the hood. (Chemical Hygiene Plan 5.4)
16. Keep the slots in the hood baffle free of obstruction by apparatus or containers. Minimize storage of chemicals or apparatus in the hood. (Chemical Hygiene Plan 5.4 #2, 4)
General 17 – Exit Ways Free of Obstructions

All exit ways to and from the lab must remain clear of debris, scrap, slip and trip hazards, or obstructions that prevent the unimpeded exit of all lab members in case of emergency.

Specific Citations:
17. Do not block exits or use hallways and stairways as storage areas (Chemical Hygiene Plan 2.4(E)).
17. A means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in case of fire or other emergency (MIOSHA part 6 R408.10632(1)).

General 18 & 19 – Fire Extinguishers

The MSU Police Department provides and maintains fire extinguishers throughout campus. Fire extinguishers must be kept accessible at all times, and be appropriate for the hazards in the lab space. Fire extinguishers may be located in the lab, or in the hallway. Do not relocate fire extinguishers from their designated area. Contact MSUPD at 517-355-2222 to request new fire extinguishers.

Specific Citations:
18. An extinguisher shall be located where it will be readily seen and accessible along normal paths of travel. (MIOSHA part 8 R408.10831(1))
18. An extinguisher shall be installed securely on a hanger, in a bracket or mounted in a cabinet unless it is a wheeled type or cart mounted. A means shall be used to indicate the location of an extinguisher mounted in a cabinet or on a shelf. (MIOSHA part 8 R408.10833(1))
19. An extinguisher shall have a tag attached to it showing the maintenance or recharge date and the initials or signature of the person who performed the service. (MIOSHA part 8 R408.10835(2))

General 20 – Inventory of Chemicals

An up-to-date, accurate chemical inventory is an important tool in managing laboratory chemicals. Inspectors will ask to see a laboratory’s chemical inventory; this can be electronic or on paper. Occasionally, entities outside of MSU will ask if certain chemical compounds are present on campus; chemical inventories make this information readily accessible. Inventories also alert faculty and staff members if highly hazardous or toxic chemicals are misplaced in the laboratory.

Specific Citation:
20. It is recommended that each facility keep a detailed inventory of highly toxic chemicals and explosive/reactive materials. There should be a record of the date of receipt, amount, location and responsible individual for all acquisitions, syntheses and disposal of these chemicals. A physical inventory should be performed annually to verify active records. There should be a procedure in place to report security breaches, inventory discrepancies, losses, diversions or suspected thefts. (MIOSHA R325.70101 - R 325.70114, Appendix A: E.3).
General 21 – Chemical Hygiene Plan

All MSU employees working with hazardous chemicals must know how to access the MSU Chemical Hygiene Plan. The Chemical Hygiene Plan can be present in paper form, electronically, or as an active link on a computer. Inspectors will ask lab personnel if they know where their copy of the MSU Chemical Hygiene Plan is located, and ask them to demonstrate their knowledge at the time of inspection. The Chemical Hygiene Plan is updated on a regular basis; employers must ensure their employees have access to the latest version of the document.

The MSU Chemical Hygiene Plan can be found here: MSU Chemical Hygiene Plan

Specific Citations:
21. The MSU Chemical Hygiene Plan must be readily available to employees and employee representatives through their PI, supervisor, or departmental office. Additional copies of this document are available from the EHS office and the EHS website: http://www.ehs.msu.edu under “Manuals and Forms.” (Chemical Hygiene Plan: 1.7)

21. An employer shall provide employees with information and training to ensure that they are apprised of and understand the hazards of chemicals present in their work area. This includes the location and availability of the employer’s chemical hygiene plan. (MIOSHA R 325.70107(b))

General 22 – Laboratory Standard Operating Procedures

Employers and employees must work together to develop safe and effective work procedures, and document those procedures via a standard operating procedure (SOP). While recommended for all laboratory operations, it is particularly important for highly hazardous chemicals, operations or dangerous equipment. Inspectors will ask to see SOPs for items such as toxic gases, highly toxic compounds, potentially dangerous equipment, highly reactive chemicals, etc.

The use of perchloric acid is strictly controlled at MSU. Heated perchloric acid can create potentially explosive perchlorate salts that deposit on equipment and ventilation elements. All laboratories using or storing perchloric acid will be required to follow all of the requirements outlined in the following document: Safe Use of Perchloric Acid.

All users of hydrofluoric acid must also follow MSU guidelines when using and storing this compound. This includes having a readily accessible and well-stocked HF exposure kit on hand at all times.

Other examples of SOP templates can be found here: Toxic Gases, Osmium Tetroxide, Blank SOP
Guidelines for creating SOPs can be found here: Standard Operating Procedures

Specific Citations:
22. Where the scope of hazards is not adequately addressed by the Chemical Hygiene Plan, units and/or PIs must develop written standard operating procedures for work area specific operations. It is required that records of specific laboratory training for individual laboratories be retained by the PI in the laboratory or the department. (Chemical Hygiene Plan 1.10, 2.0)
**Chemical 1 – Compressed Gas Cylinders**

Compressed gas cylinders are to be secured at all times. Active cylinders with regulators attached must be individually secured. Laboratories are allowed one “stand-by” cylinder per “active” cylinder in use—excessive storage of cylinders in a laboratory is discouraged. Place valve caps on cylinders not in active use.

Toxic, pyrophoric or corrosive gases must be used and stored in a gas cabinet or a fume hood. An SOP is required for toxic, pyrophoric and corrosive gases. See a list of these gases here: [Gases Requiring Approval](#)

Contact Genevieve Cottrell at **432-8715** or cottre36@msu.edu for gases requiring approval.

Cylinders with obvious corrosion and/or cylinders greater than 10 years old should be returned to the gas supplier immediately. Return gas cylinders by using this guide: [Returning Compressed Gas Cylinders](#)

Flammable and oxidizing gases must be separated by at least 20 feet, per fire code.

*Specific Citations:*
1. Cylinders with regulators must be individually secured. Only cylinders with valve protection caps securely in place may be safely chained in groups. (Chemical Hygiene Plan 2.7 (A))
1. Use suitable racks, straps, chains, or stands to support cylinders against an immovable object such as a bench or a wall. (Chemical Hygiene Plan 2.7 (C))
1. Corrosive or reactive gases must be used and stored with local exhaust ventilation such as a lab hood or a gas cabinet. EHS should be contacted for information concerning specific handling requirements. (Chemical Hygiene Plan 2.7 (I))
1. Cylinders of gases that are greater than lecture size and have a NFPA health rating of 3 or 4 must be used and stored in approved continuously mechanically ventilated gas cabinets. (NFPA 45, 11.1.4.3)
1. Observed lecture size cylinders that were not properly stored. All compressed gas cylinders in service or in storage at user locations shall be secured to prevent falling or rolling. Additional consideration should be given to separate storage of full and empty containers (CGA P-1-2008, 5.8.2).
1. Gas cylinders in poor condition observed. Defective or damaged gas containers, cylinders and tanks shall be returned to the supplier, to be repaired or removed from service and disposed of in an approved manner. (NFPA 55, 7.1.5.2.1)
1. Flammable and oxidizing gases stored within 20 feet of each other. Compressed gas cylinders containing flammable gases must be separated from oxidizing gases by at least 20 feet, or by a barrier of noncombustible construction with a fire resistance rating of at least 0.5 hours and interrupts the line of sight between the containers. (NFPA 55, 7.1.10)
1. Gas cylinders not in active use have regulators attached. Valve protection caps for a cylinder designed to accept a cap always shall be in place and hand tight except when cylinders are secured, in use and connected for use. (CGA P-1 5.5)
Chemical 2 – Leaking, Damaged or Inherently Waste-Like Containers

Laboratory personnel are responsible for maintaining their chemical stock in good order. Containers with labels missing, broken caps, obvious contamination, leaking or otherwise inadequately containing their contents can be considered inherently waste-like and can be cited for poor waste management. In addition, containers in poor condition lead to preventable spills, unintended reactions and expensive remediation costs.

Specific Citations:
2. Stored chemicals should be examined periodically (at least annually) for replacement, deterioration, and container integrity. Call the MSU EHS at 355-0153 if assistance is required. (MIOSHA, Part 431, Appendix A: D.2.b)
2. All use areas and indoor storage areas shall be designed, constructed, maintained, and operated to prevent the release of polluting materials through sewers, drains, or otherwise directly or indirectly into any public sewer system or to the surface or groundwaters of this state. (Department of Environmental Quality: Part 5, R324.2005(3))
2. For containers labeled by the manufacturer, inspect the labeling on incoming containers. Replace damaged or semi-attached labels. (Chemical Hygiene Plan 3.4.1.1(A))

Chemical 3 – Proper Labeling of Chemicals

MIOSHA Hazard Communication Standard requires employers to ensure all secondary containers of hazardous chemicals are labeled with the full chemical name, and any hazards associated with the chemical. Groups of vials, small bottles or samples can be labeled as a group with a common ticket for all items. If the lab members wish to use abbreviations instead of full chemical name, provide an abbreviation chart in plain view in the lab.

Examples of labeling techniques can be found here: Proper Labeling of Hazardous Chemicals
Request hazard warning labels here: Request Hazard Warning Labels

Specific Citations:
3. For transferred products or prepared solutions labeled by the user, label each chemical container with the chemical name and hazard warning. Refer to the MSDS for hazard warning. Hazard labels are available from EHS. (Chemical Hygiene Plan 3.4.1.1(B))
3. No key observed in laboratory for abbreviations used on secondary containers. Provide a key in a visible location in the lab with complete chemical name. (Chemical Hygiene Plan 3.4.1.2(A))

Chemical 4 – Chemical Compatibility

To prevent unintended reactions between incompatible compounds, chemical containers need to be segregated into compatible groups when in storage. The use of secondary containment (such as bus tubs, buckets, etc.) under containers is encouraged.
For further information on chemical compatibility, follow this link: Chemical Compatibility Information

Specific Citation:
4. Classes of incompatible chemicals should be segregated from each other during storage, according to hazard class. Please refer to Appendix B of the MSU Chemical Hygiene Plan for further assistance. (Chemical Hygiene Plan: Appendix B)

Chemical 5 & 6 – Peroxide-Forming Reagent Management

Certain classes of compounds will form potentially explosive peroxide crystals upon extended storage. Common examples of peroxide-forming compounds include: isopropyl ether, diethyl ether, tetrahydrofuran, dioxane, potassium metal. These compounds must be used in a timely manner, or tested on a regular basis to ensure peroxide formation is not occurring. A label affixed to the outside of the container should indicate date of last test, and test results. Any compound testing positive for peroxide formation must be disposed of via MSU EHS.

Peroxide forming compounds that are very old, have obvious container problems, or show visible crystallization inside the bottle or cap require immediate, specialized management. Telephone MSU EHS directly at 517-355-0153 for immediate assistance. Leave the container in place until MSU EHS arrives.

Peroxide test strips can be found here: Peroxide test strips
Peroxide-forming labels to record testing date and results are available here: Chemical Label Request
A list of peroxide-forming compounds can be found here: Chemical Hygiene Plan, Appendix G

Specific Citations:
5. Date all peroxidizables upon receipt and upon opening. Please refer to Appendix G in the Chemical Hygiene Plan for a list of common peroxide forming chemicals. (Chemical Hygiene Plan 3.6.6(A))
5, 6. Containers of materials that might become hazardous during prolonged storage shall be dated when first opened, and properly managed. Time sensitive materials that pass inspection shall be permitted to be redated and retained for an additional defined inspection period. All other material shall be safely discarded. (NFPA 45 9.2.3.4)
Dispose of or check for peroxide formation after the recommended time; 3 months to one year, depending on the chemical. Please refer to Appendix G in the Chemical Hygiene Plan for recommended times and peroxide detection procedures. (Chemical Hygiene Plan 3.6.6)

Chemical 7 – Chemical Storage Areas Labeled

Chemical storage areas within the laboratory must be clearly marked. This includes cupboards, cabinets, drawers and other closed storage areas. Large stickers are available via MSU EHS here: Chemical Label Request

Specific Citation:
7. Assure that the areas listed in 5.1.4 of the Chemical Hygiene Plan are labeled and chemicals are stored appropriately. (Chemical Hygiene Plan 5.1.4)
Chemical 8 – Flammables Near Ignition Sources

A diligent effort must be made to keep flammable and combustible items away from ignition sources. This includes chemicals, equipment, furnishings, waste and other lab items that may ignite when in the presence of heat, sparks, open flame or static electricity. Flammable and oxidizing chemicals shall be separated during storage. Household refrigerators are not suitable to store flammable chemicals, and pose a serious explosion risk when used to store flammable chemicals. Large containers of flammable liquids must be grounded and bonded when used for dispensing. Use and storage of any single chemical container holding 5 gallons or more requires preapproval from MSU EHS. Electrical equipment with obvious damage to cords or safety features may be confiscated or locked out at time of inspection.

Specific Citations:
8. Eliminate ignition sources such as open flames, hot surfaces, sparks from welding or cutting, operation of electrical equipment, and static electricity. (Chemical Hygiene Plan 3.6.1(A))
8. Oxidizers shall be stored separately from flammable gas containers or combustible materials especially oil or grease. Either a distance of 20 ft or a noncombustible barrier at least 5 ft high having a fire resistance rating of at least 1/2 hour is a minimum separation requirement. (CGA P-1, 2008, 6.4.3)
8. Ensure there is proper bonding and grounding when it is required, such as when transferring or dispensing a flammable liquid from a large container or drum. Assure bonding and grounding is checked periodically. (Chemical Hygiene Plan 3.6.1(C))
8. Refrigerators, freezers and other cooling equipment used to store or cool flammable liquids shall be listed as special purpose units for use in laboratories or equipment listed for Class I, Division 1 locations. (NFPA 45 12.2.2.2)

Chemical 9 – Corrosives are Stored Low to the Ground

Containers and dispensing equipment that store corrosive or toxic chemicals must be positioned in such a way that a splash or leak from the vessel will not spill directly into the eyes or face of all persons in the lab.

Specific Citation:
9. Chemicals should not be stored on high shelves, and large bottles should be stored no more than two feet from floor level. (Chemical Hygiene Plan 2.5(E))

Chemical 10 – Carcinogen Storage Labeled

Areas that are used to store carcinogens should be clearly labeled with a “Cancer Hazard” sticker on the outer cabinet door or drawer. Consider segregated storage areas for carcinogenic and highly toxic chemicals. A list of carcinogenic chemicals can be found in Appendix I of the Chemical Hygiene Plan: Appendix I
Specific Citations:
10. Assure that carcinogen storage areas are labeled and chemicals are stored appropriately. Please refer to Appendix I in the Chemical Hygiene Plan for a list of “select carcinogens.” (Chemical Hygiene Plan 5.1.4)
10. For work with chemicals that are human carcinogens or substances with high carcinogenic potency in animals, assure that the controlled area is conspicuously marked with warning signs and that all containers of these substances are appropriately labeled. (MIOSHA R325.70101 – R325.70114, Appendix A: E.4 (H))

Chemical 11 – Minimal Chemicals in the Open

Benchtops or fume hoods with multiple containers of open, unneeded or unused chemicals can create dangerous conditions if a fire occurs in the laboratory. Spills and accidents are more likely when a benchtop is overloaded with equipment and chemicals.
MSU EHS can assist you in removing and disposing of old, unneeded or outdated chemicals in your laboratory. Contact MSU EHS Hazardous Waste Coordinator Brian Smith at 517-432-4454 for more information.

Specific Citations:
11. Storage of chemicals at the lab bench or other work areas shall be kept to a minimum. (Chemical Hygiene Plan 2.5(H))
11. Keep the work area clean and uncluttered, with chemicals and equipment being properly labeled and stored; clean up the work area on completion of an operation or at the end of each day. (MIOSHA R325.70101 – R325.70114, Appendix A: E.1 (J))

Chemical 12 – 15 – Please Hide from View of PI for Report

Hazardous Waste 1 - 3 – Waste Containers Labeled, Completed, Dated and Closed

Every hazardous waste container must be labeled with the words "Hazardous Waste,” have the unabbreviated chemical names of the chemical(s) being collected, be closed at all times when being stored, and dated with the first date of use.

MSU also requires that hazardous waste linger no longer than 90 days from time of first collection. Common errors seen on hazardous waste containers include:
- Undated waste tag
- Incomplete waste tag
- Abbreviations used on waste tag
- Constituents not listed, or do not add up to 100% of total contents
Sharps containers also must be dated at time of first use, not allowed to overfill, and sent for disposal after 90 days of use.

To request a hazardous waste pick-up or tags for hazardous waste or sharps containers, see: Hazardous Waste Pick-Up Request
For detailed information about Hazardous Waste regulations please see: MSU Waste Disposal Guide
For frequently asked questions about waste disposal, see: Hazardous Waste FAQs
Specific Citations:
1. Each container of hazardous waste must have a completed waste tag attached. Include Project Leader, Department, Building and Room Number, Phone Number, the date and who filled out the tag. (Waste Disposal Guide: pg. 6)
2. Each container of hazardous waste must be labeled with the words “Hazardous Waste,” and have a completed waste tag attached. (Waste Disposal Guide: pg 6)
2. When listing the contents of a waste container on the MSU Waste Materials Pick Up Tag, do not use abbreviated chemical names. (Waste Disposal Guide: Appendix A)
2. When a sharps container is first put into use it must be labeled with a completed sharps label. (Biological Safety Manual, pg. 63, “Sharps”)
2. Enter the volume and composition of all the waste as it is added to the container. For solutions, list the solute and solvent concentrations. Include the amount of water present. (MSU Hazardous Waste Guide, pg. 9)
3. Chemical wastes shall not be accumulated for longer than 90 days. Each container shall be labeled with a collection start date and chemical constituents when waste is first added to the container. (Waste Disposal Guide: pg. 6)
3. Permanently close and dispose of sharps containers when they are ¾ full or within 90 days of the date of first use, whichever comes first. (Biological Safety Manual, pg. 51, #8)
3. When a sharps container is first put into use it must be labeled with a completed sharps label, including the date of first use clearly marked on the sharps container. (MSU Biosafety Manual, pg. 63)