Ferris State University

BUSINESS POLICY LETTER

TO: All Members of the University Community 1997:40
DATE: September 1997

CHEMICAL SAFETY POLICY

(Supersedes 91:4)

I. POLICY

It is the policy of Ferris State University to protect the health and safety of students and faculty while engaged in the educational activities of the University. To this end it is the intent of the University to maintain laboratory exposures to hazardous chemicals as low as reasonably achievable. All faculty, students, and staff who enter any laboratory utilizing hazardous chemicals, as defined in this policy, shall comply with the rules and procedures of this policy and make every effort to minimize exposure to laboratory chemicals and other potential health and safety hazards in the laboratory. This policy is intended to provide basic guidelines for safe practices; therefore, it cannot be assumed that all necessary warnings and precautionary measures are contained in this document or that other additional information or measures may not be required.

II. SCOPE OF CHEMICAL SAFETY POLICY

The rules and procedures contained in this policy shall apply to all campus facilities in which there is laboratory use of hazardous chemicals.

III. DEFINITIONS

A. "Hazardous chemical" means 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 or a chemical which is considered a health hazard.
B. Chemicals which are considered a "health hazard" include chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizes, hepatoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes or mucous membranes.
C. "Laboratory use of hazardous chemicals" means handling or use of such chemicals in which all of the following conditions are met:
    1. Chemical manipulations are carried out on a laboratory scale;
    2. Multiple chemical procedures and/or chemicals are used;
    3. The procedures involved are not part of a production process, nor in any way simulate a production process;
    4. Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals.
D. For the purpose of this policy, all laboratories which are within the scope of the rules and regulations of this policy shall be referred to as "chemical laboratories."
E. "Select carcinogen" means any substance which meets one of the following criteria:
    1. It is regulated by OSHA as a carcinogen;
    2. It is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition);
    3. It is listed under Group I ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest edition);

4. It is 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.

IV. CHEMICAL SAFETY RESPONSIBILITIES

A. The Environmental Health and Safety Office is charged with the overall responsibility for chemical safety on the Ferris State University campus. This includes specific responsibility to perform quarterly inspections of all chemical laboratories and provide consultation and advice regarding chemical safety rules and procedures.
B. The head of the department which utilizes chemical laboratories shall be responsible for providing the necessary chemical safety equipment and supplies and ensuring department employees and students comply with the rules and procedures contained in this policy.
C. Faculty and students utilizing chemical laboratories shall comply with the rules and procedures contained in this policy.

V. CHEMICAL SAFETY COMMITTEE

A. The Vice President for Academic Affairs shall appoint a Chemical Safety Committee consisting of no more than five (5) faculty members and one representative of the Administration. The members shall be representatives of the departments coming within the scope of this policy. Each member shall serve three (3) years with terms alternating so that no more than three (3) members are appointed the same year.
B. A representative of the Environmental Health and Safety Office shall serve as an ex-officio member of the committee.
C. The committee shall meet at least quarterly.
D. The committee shall review and evaluate the effectiveness of this policy at least annually and update it as necessary.
E. The committee shall review and grant approval and disapproval on the basis of chemical safety requests for the use of particularly hazardous substances within the institution prior to being brought on campus.

VI. REQUIRED APPROVAL FOR USE OF PARTICULARLY HAZARDOUS SUBSTANCES (CHEMICAL, BIOLOGICAL, RADIOACTIVE, OR A COMBINATION THEREOF)

A. Any person wishing to work with particularly hazardous substances which include "select carcinogens" (as defined in this policy), reproductive toxins and substances which have a high degree of acute toxicity, shall first obtain permission from the Chemical Safety Committee. The application submitted to the Committee shall contain the following information:
    1. Names of the faculty who will be responsible for the safe use of the particularly hazardous substances;
    2. Location of use, including building and room number;
    3. List of particularly hazardous substances to be used, including physical form and maximum amount in possession at any one time;
    4. A description of how the particularly hazardous substances are to be used;
    5. A description of the equipment and facilities including a floor sketch;
    6. A description of containment devices, such as fume hoods or glove boxes;
    7. Procedures for safe removal of contaminated wastes;
    8. Decontamination procedures;
    9. A complete hygiene plan.

VII. CHEMICAL SAFETY RULES AND PROCEDURES

A. General - The facilities needed for chemical laboratories depend upon the type and quantity of hazardous chemicals used and the complexity of the laboratory operations. The work conducted and its scale must be appropriate to the physical facilities available and especially to the quality of ventilation.
B. Ventilation - The general ventilation system should provide a source of air for breathing and for input to local ventilation devices. It should not be relied on for protection from hazardous substances released into

the laboratory. It should direct airflow into the laboratory from non-laboratory areas and out to the exterior of the building.

C. Laboratory hoods - Laboratory hoods shall be provided in chemical laboratories where it is necessary to exhaust air contaminants and prevent exposure to hazardous chemicals above permissible exposure levels. Airflow into and within laboratory hoods should not be excessively turbulent. The hood face velocity shall be at least 100 fpm while the hood is being used. The front sash shall be marked to indicate the proper operating position.

D. Emergency eye and body wash - Each chemical laboratory shall be provided with an eyewash fountain and drench shower or a combination eye/body spray wash.

E. Fire extinguishers - Each laboratory shall be equipped with a carbon dioxide or dry chemical fire extinguisher.

F. Storage - Each chemical laboratory should have adequate, well-ventilated storage space for chemicals with sufficient sturdy shelving to properly segregate chemicals. Approved metal cabinets shall be provided for the storage of flammable liquids unless there is a separate approved flammable liquid storage facility.

G. Exits - Two exits should be provided for each chemical laboratory.

H. First aid - A first aid kit for treating simple cuts and burns shall be provided in each chemical laboratory.

I. Waste disposal - Facilities shall be provided for the proper disposal of waste chemicals, broken glass and other sharp objects.

J. Electrical facilities - All electrical outlets in a chemical laboratory shall carry a grounding connection requiring a 3-prong plug. All electrical equipment except glass cloth heaters and certain model oscillographs requiring a floating ground shall be wired with a grounding plug. Double-insulated equipment may be acceptable.

Receptacles that provide power for operations in laboratory hoods should be located outside of the hood. All electrical equipment should be fitted with a fuse or other overload-protection device that will disconnect the electrical circuit in the event the apparatus fails or is overloaded.

K. Housekeeping - The overall facility shall be maintained in an orderly and safe manner as determined by the Environmental Health and Safety Office.

L. Chemical/Biological/Radioactive Inventory - A complete inventory of all materials present in the facility shall be maintained in a remote location designated by a representative of the Chemical Safety Committee (Bar-coding will be used for inventory control).

VIII. ADMINISTRATIVE REQUIREMENTS

A. Procurement, Distribution and Storage

1. All toxic substances should be procured through the University Science Stores. No container shall be accepted without an adequate identifying label and having a Material Safety Data Sheet (MSDS) supplied with the container.
2. Hazardous chemicals should be segregated in a well-identified area with local exhaust ventilation. Chemicals, which are highly toxic, should be in unbreakable secondary containers. Stored chemicals should be examined periodically for replacement, deterioration, and container integrity.
3. When chemicals are hand-carried in corridors or other public areas, the container should be placed in an outside container or bucket.
4. The amount of toxic, flammable, unstable or highly reactive materials permitted to be stored in the chemical laboratory should be as small as possible. Storage of hazardous chemicals on laboratory benches and in hoods should be minimized. Exposure to heat or direct sunlight should be avoided. Periodic inventories shall be conducted, with unneeded items being discarded or returned to storage.
5. The maximum quantity of flammable liquid that may be stored in a laboratory, outside of approved storage cabinets, is one gallon per 100 square feet of laboratory space.

B. Environmental Monitoring Regular instrumental monitoring of airborne concentrations is not usually justified. However, whenever a highly toxic substance is stored or used in the laboratory, the Environmental Health and Safety Office should be contacted for possible environmental monitoring.

C. Housekeeping and Maintenance

1. Work areas shall be kept clean and free from obstructions. Cleanup should follow the completion of any operation or should be performed at the end of each day. Floors should be cleaned regularly.

2. Wastes shall be deposited in appropriate receptacles. Spilled chemicals shall be cleaned up immediately and disposed of properly. Chemical wastes shall be disposed of promptly by using the appropriate procedures. (See Section VIII-1.) Chemicals that are no longer needed should not accumulate in the laboratory.

D. Medical Program and First Aid

1. The University shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examination which the examining physicians determine to be necessary, under the following circumstances:
   i. Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee shall be provided an opportunity to receive any appropriate medical examination.
   ii. Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA-regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employees as prescribed by the particular standard.
   iii. Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provide an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.
2. All medical examination and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.
3. Information provided to the physician - The University shall provide the following information to the physicians:
   i. The identity of the hazardous chemical(s) to which the employee may have been exposed.
   ii. A description of the conditions under which the exposure occurred, including quantitative exposure data, if available.
   iii. A description of the signs and symptoms of exposure that the employee is experiencing, if any.
4. Physician’s written opinion
   For examination or consultation required under this standard, the University shall obtain a written opinion from the examining physician, which shall include the following:
   i. Any recommendation for further medical follow-up;
   ii. The results of the medical examination and any associated tests;
   iii. Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace;
   iv. A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

   The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.
5. First-aid treatment for simple cuts and burns may be administered in the laboratory utilizing the furnished first aid kit. All other injuries must be referred to the University Health Center or the hospital emergency services, depending on the nature of the injury.

E. Protective Equipment and Apparel

All persons working in a chemical laboratory shall use protective equipment and apparel appropriate for the required level of protection from the substances being handled.

F. Signs and Labels

Prominent signs and labels shall be used to:

1. Indicate emergency telephone numbers and emergency procedures, i.e., accidents and spills;
2. Identify contents of containers, including waste receptacles and associated hazards;
3. Indicate location of fire extinguishers, exits, safety showers and eye washes;
4. Prohibit smoking, eating and drinking in the laboratory;
5. Provide warnings at areas or equipment where special or unusual hazards exist.

G. Spills and Accidents.
   1. Written emergency procedure shall be posted in the laboratory and communicated to all persons working in the laboratory.
   2. All significant spills and accidents shall be reported to the Environmental Health and Safety Office immediately after taking the necessary action to secure the safety of all personnel and/or provide first aid.

H. Training and Information
   1. All faculty and staff working in chemical laboratories shall attend a Right-To-Know chemical safety training program presented by the Environmental Health and Safety office.
   2. A material safety data sheet for each hazardous chemical used in the laboratory shall be available to the faculty and staff using the chemicals.
   3. Safety training and education in a chemical laboratory should be a regular, continuing activity and not simply a one-time event.

I. Waste disposal
   1. The disposal of all toxic substances shall be in accordance with the Environmental Health and Safety Office's "Hazardous Waste Management Guide."
   2. Obsolete, outdated and potentially hazardous materials shall be disposed of by the Environmental Health and Safety Office at the discretion of the environmental engineer.
   3. Disposal of laboratory chemicals via the building sanitary sewer system (laboratory sinks) is highly restricted by the City of Big Rapids and the Michigan Department of Environmental Quality. Contact the University environmental engineer for the discharge limits to which the University must comply.
   4. On termination or transfer of any laboratory personnel, chemicals for which that person was responsible must be properly discarded or returned to storage by the personnel who are responsible for the area.

IX. GENERAL SAFETY RULES

A. Accidents and spills - In case chemicals are splashed in eyes, promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention. If a chemical is ingested, encourage victim to drink large quantities of water while en route to medical assistance. Be sure to inform the medical staff and poison control center exactly what substances have been ingested. If chemicals come in contact with the skin, promptly flush the affected areas with water and remove any contaminated clothing. If symptoms persist after washing, seek medical attention. All employee incidents will be reported per the treatment of occupational injury and illness policy.

B. Avoidance of Routine Exposure - Develop and encourage safe habits and avoid unnecessary exposure to chemicals by any route. Do not smell or taste chemicals. Vent apparatus, which may discharge toxic chemicals (vacuum pumps, distillation columns, etc.), into local exhaust devices. Inspect gloves and test glove boxes before use.

C. Choice of Chemical - Use only those chemicals for which the quality of the available ventilation system is appropriate.

D. Eating, Smoking, etc. - Do not eat, drink, smoke, or apply cosmetics in areas where laboratory chemicals are present. Do not store food or beverages in chemistry storage areas or refrigerators. Do not consume food or beverages with glassware and utensils which are also used for laboratory operations.

E. Equipment and Glassware - Handle and store laboratory glassware with care to avoid damage. Do not use damaged glassware. Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur. Use equipment only for its designed purpose.

F. Exiting - Wash areas of exposed skin thoroughly before leaving the laboratory.

G. Horseplay - Practical jokes or other behavior which might confuse, startle, or distract another laboratory worker is prohibited.

H. Mouth suction - Do not use mouth suction for pipeting or starting a siphon.

I. Personal Apparel - Confine long hair and loose clothing. Wear shoes at all times in the laboratory but do not wear sandals, perforated shoes, or sneakers.

J. Personal Housekeeping - Keep the work area clean and uncluttered, with chemicals and equipment being properly labeled and stored. Clean up work area on completion of an operation or at the end of each day.

K. Personal Protection - Appropriate eye protection shall be worn by all persons, including visitors, where chemicals are stored or handled. Avoid use of contact lenses in the laboratory unless necessary. If they are used, inform the instructor/supervisor so special precautions can be taken. Appropriate gloves shall be worn when the potential for contact with toxic materials exists. Inspect gloves before each use, wash them before removal and replace them periodically. When air contaminate concentrations are not sufficiently restricted by engineering controls, respirators may need to be used. Respirators may be used only by employees who have received training and medical examinations, as specified by the University's Respiratory Protection Rules and Procedures. Remove laboratory coats immediately upon significant contamination.

L. Planning - Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning any new operation.

M. Unattended Operations - Leave lights on, place an appropriate sign on the door, and provide for containment of toxic substances in the event of failure of a utility service to an unattended operation.

N. Use of Hood - Use a fume-hood for operations which might result in release of toxic chemical vapors or dust. As a rule of thumb, use a hood or other local ventilation device when working with any appreciable volatile substances with a TLV of less than 50 ppm.
Confirm adequate hood performance before use. Keep materials stored in hoods to a minimum and do not allow them to block vents or airflow. Leave the hood fan operating when it is not in active use, if toxic substances are stored in it, or if it is uncertain whether adequate general laboratory ventilation will be maintained when it is not operating.

O. Vigilance - Be alert to unsafe conditions and see that they are corrected when detected.

P. Waste Disposal - Deposit chemical waste in appropriately labeled receptacles and follow all other waste disposal procedures established by the laboratory instructor/director in accordance with the University's Hazardous Waste Management Guide.

Q. Working Alone - Avoid working alone in a building. Do not work alone in a laboratory if the procedures being conducted are hazardous.

R. Electrical Safety - All electrical connections should be grounded. Electrical equipment service cords should be in good condition. Frayed cords or exposed wires should be repaired by qualified personnel.
Avoid overloading circuits. Do not use multiple outlet plugs for additional connections. Do not handle any electrical connections with wet hands or when standing in or near water. Do not use electrical equipment, such as mixers or hotplates, around flammable solvents unless the equipment is spark-free. Do not try to repair equipment yourself. All repairs should be done by qualified personnel (Instrument Repair or electrician). Never try to bypass any safety device on a piece of electrical equipment.

S. Compressed Gases - Compressed gas cylinders should be handled as high-energy sources or potential explosives. Avoid dropping cylinders or allowing them to bump each other. Large cylinders must be moved only with an approved cylinder cart. Cylinders must be secured with straps or chains to a wall or lab bench, both while in storage and while in use. Cylinders must not be stored near sources of heat. Oxidizing gases and reducing gases should be stored separately from each other. Empty and full cylinders should not be stored together. An empty cylinder should be marked as such with the code "MT" and the date; the regulator should be removed, the valve cap replaced, and arrangements should be made to have it removed from the lab. Keep valve-protection cap on the cylinder at all times when the pressure regulator is not attached. Use an open-end wrench on cylinder valves. All cylinders should be marked on the body as to content. Valves on cylinders of flammable gases should be grounded. Leave a slight pressure of gas in the cylinder to prevent contamination from being sucked into the cylinder, which might form an explosive mixture. NEVER EMPTY A CYLINDER COMPLETELY. Never interchange regulator valves and tubing between cylinders containing different gases. Oxygen cylinders need special oil and grease-free valves, regulators and tubing. It is important that only these types of fittings be used with oxygen to avoid explosions.

T. Fire and Explosions - Fire is one of the major hazards in the chemistry laboratory. The vapor of nearly all organic solvents is flammable. To avoid igniting flammable vapors, keep all organic solvent covered and away from open flames, heating elements and electrical sparks.
For your own protection, avoid loose clothing, jewelry and unrestrained long hair. Cotton clothes rather

then synthetics are recommended, since synthetics burn so rapidly and stick to the skin. Always make a point of locating the fire extinguishers in a lab and be sure you know how to use them.

U. Custodians, trade workers, and public safety officers shall not enter a posted restricted entry laboratory without full knowledge of the hazards and wearing appropriate Personal Protection Equipment (PPE).

V. Purchase and store chemicals in minimum quantities for the intended purpose.

W. The department head or faculty responsible for laboratory operations will determine who will be responsible for monitoring the facility during periods of absence (semester breaks, vacations, etc.).

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Contact: Physical Plant